

***1985
ANNUAL TROPICAL
CYCLONE REPORT***

***JOINT TYPHOON
WARNING CENTER
GUAM, MARIANA ISLANDS***

FRONT COVER: Typhoon Odessa (above right) as viewed through the cargo bay of the NASA Space Shuttle. The cloudiness at the lower right is associated with Typhoon Pat. Odessa and Pat, along with Skip, Ruby and Tess, became part of the single most active tropical cyclone day during the the 1985 northwestern Pacific season, when all five systems existed at the same time. At picture time, 282220Z August 1985, the Shuttle was passing eastward across the position 24.1N latitude 143.4E longitude (NASA slide #35-078 provided by CDR D.A. Mautner, OIC NAVPOLAROCEANCEN Detachment, Johnson Space Center, Texas).

U.S. NAVAL OCEANOGRAPHY COMMAND CENTER
JOINT TYPHOON WARNING CENTER
COMNAVMARIANAS BOX 17
FPO SAN FRANCISCO 96630

CHARLES G. STEINBRUCK

Captain, United States Navy

COMMANDING

*** DAVID W. MCLAWHORN**

Lieutenant Colonel, United States Air Force

VERNON G. PATTERSON

Lieutenant Colonel, United States Air Force
DIRECTOR, JOINT TYPHOON WARNING CENTER
COMMANDER, DETACHMENT 1, 1ST WEATHER WING



*** TRANSFERRED DURING 1985**

STAFF

*LCDR Scott A. Sandgathe, USN
*MAJ Mark E. Older III, USAF
LCDR George M. Dunnavan, USN
*LCDR Brett T. Sherman, USN
CAPT Boyce R. Columbus, USAF
CAPT Anita F. Dye, USAF
LT John L. Shoemake, USN
CAPT Michael T. Gilford, USAF
LT Brian J. Williams, USN
LT Mark J. Gunzelman, USN
LT Harry S. Gatanis, USN
TSGT Marguritta H. Smith, USAF
AG2 Kevin L. Cobb, USN
*AG2 Teddy R. George, USN
AG2 Kristopher W. Buttermore, USN
SGT Donna M. Curtis, USAF
*SGT Margaret E. Gray, USAF
AG3 Shirley A. Murdock, USN
*SGT Thomas L. Parra, USAF
*AG3 Randall J. McKillip, USN
AG3 Erika L. Sauer, USN
*SRA James Kelly III, USAF
SRA Ronald W. Jones, USAF
SRA Donald L. Novak, Jr, USAF
SRA Angelia Gavin, USAF
AGAN James P. Gallagher, Jr, USN
AGAN Steven M. Deola, USN

EDITORS: LT William P. Wirfel, USN
MR Frank H. Wells, CIV

CONTRIBUTER: Detachment 1,1WW - USAF
(Satellite Operations)
CAPT Frederick J. Svetz, USAF
CAPT Donna P. McNamara, USAF
TSGT William H. Taylor, USAF
SSGT Fabrice F. Clark, USAF
*SSGT Charles B. Siniff, Jr, USAF
*SSGT Patti A. Ashby, USAF
SSGT Paul F. Schirle, USAF
SSGT Jerome P. Koch, Jr, USAF

*Transferred during 1985

FOREWORD

The Annual Tropical Cyclone Report is prepared by the staff of the Joint Typhoon Warning Center (JTWC), a combined USAF/USN organization operating under the command of the Commanding Officer, U.S. Naval Oceanography Command Center/Joint Typhoon Warning Center, Guam. JTWC was established in April 1959 when USCINCPAC directed USCINCPACFLT to provide a single tropical cyclone warning center for the western North Pacific region. The operations of JTWC are guided by CINCPACINST 3140.1 (series).

The mission of the Joint Typhoon Warning Center is multi-faceted and includes:

1. Continuous monitoring of all tropical weather activity in the Northern and Southern Hemispheres, from 180 degrees longitude westward to the east coast of Africa, and the prompt issuance of appropriate advisories and alerts when tropical cyclone development is anticipated.
2. Issuing warnings on all significant tropical cyclones in the above area of responsibility.
3. Determination of reconnaissance requirements for tropical cyclone surveillance and assignment of appropriate priorities.
4. Post-storm analysis of all significant tropical cyclones occurring within the western North Pacific and North Indian Oceans, which includes an in-depth analysis of tropical cyclones of note and all typhoons. Also for the first time a summary of the South Pacific and South Indian Ocean significant tropical cyclones for the period 1 July 1984 through 30 June 1985 are included.
5. Cooperation with the Naval Environmental Prediction Research Facility, Monterey, California, on the operational evaluation of tropical cyclone models and forecast aids, and the development of new techniques to support operational forecast scenarios.

Satellite imagery used throughout this report represents data obtained by the tropical cyclone satellite surveillance network. The personnel of Detachment 1, 1WW, collocated with JTWC at Nimitz

Hill, Guam, coordinate the satellite acquisitions and tropical cyclone surveillance with the following units:

Det 4, 20WS, Hickam AFB, Hawaii

Det 5, 20WS, Clark AB, RP

Det 8, 20WS, Kadena AB, Japan

Det 15, 30WS, Osan AB, Korea

Air Force Global Weather Central,
Offutt AFB, Nebraska

In addition, the Naval Oceanography Command Detachment, Diego Garcia, and DMSP equipped U.S. Navy aircraft carriers have been instrumental in providing vital satellite position fixes of tropical cyclones in the Indian Ocean.

Should JTWC become incapacitated, the Alternate Joint Typhoon Warning Center (AJTWC) located at the U.S. Naval Western Oceanography Center, Pearl Harbor, Hawaii, assumes warning responsibilities. Assistance in determining satellite reconnaissance requirements, and in obtaining the resultant data, is provided by Det 4, 20WS Hickam AFB, Hawaii.

A special thanks is extended to the men and women of: 27th Information Systems Squadron, Operating Location C, for their continuing support by providing high quality real-time satellite imagery; the Pacific Fleet Audio-Visual Center, Guam, for their assistance in the reproduction of satellite and graphics data for this report; to the Navy Publications and Printing Service Branch Office, Guam, for their efforts to meet deadlines; and to AG3 S. A. Murdock for typing the many drafts and assistance with the final manuscript of this report. Thanks is also extended to Lt. G. H. Carpenter and Lt. R. A. Wimmer for submitting Tropical Cyclone write-ups on Typhoon Tess and Typhoon Kit respectively. A special thanks to TSGT W. H. Taylor for gridding the numerous satellite images for this report and to Mrs. Leah M. Foster of the Xerox Corporation, Guam for her assistance with the preparation of the script font portions of this document.

Note: Appendix IV contains information on how to obtain past issues of the Annual Tropical Cyclone Report (titled Annual Typhoon Report prior to 1980).

TABLE OF CONTENTS

CHAPTER I	OPERATIONAL PROCEDURES	PAGE
1.	General - - - - -	1
2.	Data Sources - - - - -	1
3.	Communications - - - - -	1
4.	Analyses - - - - -	2
5.	Forecast Aids - - - - -	2
6.	Forecasting Procedures - - - - -	2
7.	Warnings - - - - -	3
8.	Prognostic Reasoning Messages - - - - -	3
9.	Tropical Cyclone Formation Alert - - - - -	3
10.	Significant Tropical Weather Advisory - - - - -	3
CHAPTER II	RECONNAISSANCE AND FIXES	
1.	General - - - - -	5
2.	Reconnaissance Availability - - - - -	5
3.	Aircraft Reconnaissance Summary - - - - -	5
4.	Satellite Reconnaissance Summary - - - - -	5
5.	Radar Reconnaissance Summary - - - - -	7
6.	Tropical Cyclone Fix Data - - - - -	7
CHAPTER III	SUMMARY OF WESTERN NORTH PACIFIC AND NORTH INDIAN OCEAN TROPICAL CYCLONES	
1.	General - - - - -	11
2.	Western North Pacific Tropical Cyclones - - - - -	11

INDIVIDUAL TROPICAL CYCLONES

<u>TROPICAL CYCLONE</u>	<u>AUTHOR</u>	<u>PAGE</u>	<u>TROPICAL CYCLONE</u>	<u>AUTHOR</u>	<u>PAGE</u>
(01W) TS ELSIE	WIRFEL - - -	18	(02C) TY SKIP	GUNZELMAN -	74
(02W) TS FABIAN	GILFORD - -	20	(15W) TY TESS	CARPENTER -	76
(03W) TY GAY	GUNZELMAN -	22	(16W) TS VAL	SHOEMAKE -	80
(04W) TD 04	COLUMBUS - -	26	(17W) TS WINONA	DYE - - -	82
(05W) TY HAL	COLUMBUS - -	28	(18W) TY ANDY	GATANIS - -	84
(06W) TY IRMA	SHOEMAKE - -	34	(19W) TY BRENDA	MCNAMARA -	86
(07W) TY JEFF	WELLS - - -	38	(20W) TY CECIL	DYE - - -	90
(08W) TY KIT	WIMMER - - -	42	(21W) STY DOT	COLUMBUS -	92
(09W) TS LEE	GUNZELMAN -	46	(22W) TS ELLIS	WILLIAMS -	100
(10W) TY MAMIE	WILLIAMS - -	52	(23W) TY FAYE	GATANIS - -	106
(11W) TY NELSON	SHOEMAKE - -	54	(24W) TS GORDON	SHOEMAKE -	108
(12W) TY ODESSA	WELLS - - -	58	(25W) TY HOPE	COLUMBUS -	110
(13W) TY PAT	GILFORD - -	64	(26W) TS IRVING	WILLIAMS -	116
(14W) TS RUBY	GUNZELMAN -	70			

3.	North Indian Ocean Tropical Cyclones - - - - -	118
----	--	-----

INDIVIDUAL TROPICAL CYCLONES

<u>TROPICAL CYCLONE</u>	<u>AUTHOR</u>	<u>PAGE</u>	<u>TROPICAL CYCLONE</u>	<u>AUTHOR</u>	<u>PAGE</u>
TC 01B	GILFORD - - -	122	TC 04B	DYE - - -	130
TC 02A	GILFORD - - -	126	TC 05B	WILLIAMS -	134
TC 03B	SHOEMAKE - -	128	TC 06B	GATANIS - -	136

CHAPTER IV	SUMMARY OF SOUTH PACIFIC AND SOUTH INDIAN OCEAN TROPICAL CYCLONES	
	1. General - - - - -	138
	2. South Pacific and South Indian Ocean Tropical Cyclones	-139
CHAPTER V	SUMMARY OF FORECAST VERIFICATION	
	1. Annual Forecast Verification - - - - -	-148
	2. Comparison of Objective Techniques - - - - -	-155
CHAPTER VI	APPLIED TROPICAL CYCLONE RESEARCH SUMMARY FROM NAVENTVPREDRSCHFAC	-161
ANNEX A	TROPICAL CYCLONE TRACK AND FIX DATA	
	1. Western North Pacific Data - - - - -	-163
	2. North Indian Ocean Data - - - - -	-230
	3. South Pacific and South Indian Ocean Data - - - - -	-235
APPENDICES	I. Definitions - - - - -	-270
	II. Names of Tropical Cyclones - - - - -	-271
	III. References - - - - -	-272
	IV. Past Annual Tropical Cyclone Reports - - - - -	-273
DISTRIBUTION	- - - - -	-274

CONTRACTIONS

ACCRY	Accuracy	EL	Elongated
ACFT	Aircraft	ELEV	Elevation
ADP	Automated Data Processing	EXP	Exposed
AFGWC	Air Force Global Weather Central	FI	Forecast Intensity (Dvorak)
AIREP	Aircraft Weather Report(s) (Commercial and Military)	FLT	Flight
ANT	Antenna	FNOC	Fleet Numerical Oceanography Center
AOR	Area of Responsibility	FT	Feet
APRNT	Apparent	GMT	Greenwich Mean Time
APT	Automatic Picture Transmission	GOES	Geostationary Operational Environmental Satellite
ARWO	Aircraft Reconnaissance Weather Officer	HATRACK	Hurricane and Typhoon Tracking (Steering) Program
ATT	Attenuated	HGT	Height
AVG	Average	HPAC	Mean of XTRP and CLIM Techniques (Half Persistence and Climatology)
AWN	Automated Weather Network	HR(s)	Hour(s)
BPAC	Blended Persistence and Climatology	HVY	Heavy
BRG	Bearing	ICAO	International Civil Aviation Organization
CDO	Central Dense Overcast	INIT	Initial
CI	Cirriiform Cloud or Cirrus also Current Intensity (Dvorak)	INJAH	North Indian Ocean Component of TYAN
CINCPAC	Commander-in-Chief Pacific AF - Air Force, FLT - Fleet (Navy)	INST	Instruction
CLD	Cloud	IR	Infrared
CLIM	Climatology	KM	Kilometer(s)
CLSD	Closed	KT	Knot(s)
CM	Centimeter	LLCC	Low-Level Circulation Center
CNTR	Center	LVL	Level
CPA	Closest Point to Approach	M	Meter(s)
CSC	Cloud System Center	M/S	Meter(s) per Second
CYCLOPS	Tropical Cyclone Steering Program (HATRACK and MOHATT)	MAX	Maximum
DEG	Degree	MB	Millibar(s)
DIAM	Diameter	MET	Meteorological
DIR	Direction	MIN	Minimum
DMSP	Defense Meterological Satellite Program	MOHATT	Modified HATRACK
DST	Distance	MOVG	Moving

MSLP	Minimum Sea-Level Pressure	STNRY	Stationary
MSN	Mission	SST	Sea Surface Temperature
NAV	Navigational	ST	Subtropical
NEDN	Naval Environmental Data Network	STR	Subtropical Ridge
NEDS	Naval Environmental Display Station	STY	Super Typhoon
NEPRF	Naval Environmental Prediction Research Facility	TAPT	Typhoon Acceleration Prediction Technique
NESDIS	National Environmental Satellite, Data, and Information Service	TC	Tropical Cyclone
NET	Near Equatorial Trough	TCARC	Tropical Cyclone Aircraft Reconnaissance Coordinator
NM	Nautical Mile(s)	TCFA	Tropical Cyclone Formation Alert
N/O	Not Observed	TCM	Tropical Cyclone Model
NOAA	National Oceanic and Atmospheric Administration	TD	Tropical Depression
NOCC	Naval Oceanography Command Center	TDO	Typhoon Duty Officer
NOGAPS	Navy Operational Global Atmospheric Prediction System	TIROS	Television Infrared Observational Satellite
NTCM	Nested Tropical Cyclone Model	TPAC	Extrapolation and Climatology Blend
NWOC	Naval Western Oceanography Center	TS	Tropical Storm
NR	Number	TY	Typhoon
NRL	Naval Research Laboratory	TYAN	Typhoon Analog Program
OBS	Observations	TYFN	Western North Pacific Component (Revised) of TYAN
OTCM	One Way (Interactive) Tropical Cyclone Model	TUTT	Tropical Upper-Tropospheric Trough
PACOM	Pacific Command	ULAC	Upper-Level Anticyclone
PCN	Position Code Number	ULCC	Upper-Level Circulation Center
PSBL	Possible	VEL	Velocity
PTLY	Partly	VIS	Visual
QUAD	Quadrant	VMNT	Vector Movement (ddff)
RADOB	Radar Observations	WESTPAC	Western (North) Pacific
RECON	Reconnaissance	WMO	World Meteorology Organization
RNG	Range	WND	Wind
RT	Right	WRNG(s)	Warning(s)
SAT	Satellite	WRS	Weather Reconnaissance Squadron
SFC	Surface	XTRP	Extrapolation
SLP	Sea-Level Pressure	Z	Zulu Time (Greenwich Mean Time)
SRP	Selective Reconnaissance Program		

CHAPTER I - OPERATIONAL PROCEDURES

1. GENERAL

The Joint Typhoon Warning Center (JTWC) provides a variety of routine services to the organizations within its area of responsibility, including:

- a. Significant Tropical Weather Advisories: issued daily, these products describe all tropical disturbances and assess their potential for further development during the advisory period;
- b. Tropical Cyclone Formation Alerts: issued when synoptic, satellite and/or aircraft reconnaissance data indicate development of a significant tropical cyclone in a specified area is likely;
- c. Tropical Cyclone Warnings: issued periodically throughout each day for significant tropical cyclones, giving forecasts of position and intensity of the system; and
- d. Prognostic Reasoning Messages: issued twice daily for tropical storms and typhoons in the western North Pacific; these messages discuss the rationale behind the most recent JTWC warnings.

The recipients of the services of JTWC essentially determine the content of JTWC's products according to their ever changing requirements. Therefore, the spectrum of routine services is subject to change from year to year. Such changes are usually the result of deliberations held at the Annual Tropical Cyclone Conference.

2. DATA SOURCES

a. COMPUTER PRODUCTS:

A standard array of synoptic-scale computer analyses and prognostic charts are available from the Fleet Numerical Oceanography Center (FLENUMOCEANCEN) at Monterey, California. These products are provided to JTWC via the Naval Environmental Data Network (NEDN).

b. CONVENTIONAL DATA:

This data set is comprised of land-based and shipboard surface and upper-air observations taken at, or near, synoptic times, cloud-motion winds derived twice daily from satellite data, and enroute meteorological observations from commercial and military aircraft (AIREPS) within six hours of synoptic times. Conventional data charts are prepared daily at 0000Z and 1200Z using hand- and computer-plotted data for the surface/gradient and 200mb (upper-tropospheric) levels. In addition to these analyses, charts at the 850, 700, and 500 mb levels are computer-plotted from rawinsonde/pibal observations at the 12-hour synoptic times.

c. AIRCRAFT RECONNAISSANCE:

Aircraft weather reconnaissance data are invaluable for locating the position of the center of developing systems and essential for the accurate determination of:

- maximum surface and flight level wind
- minimum sea-level pressure
- horizontal surface and flight level wind dis-

tribution

- eye/center temperature and dewpoint

In addition, wind and pressure-height data at the 500 and/or 400 mb levels, provided by the aircraft while enroute to, or from fix missions, or during dedicated synoptic-scale flights, provide a valuable supplement to the all too sparse data fields of JTWC's area of responsibility. A more detailed discussion of aircraft weather reconnaissance is presented in Chapter II.

d. SATELLITE RECONNAISSANCE:

Meteorological satellite data obtained from the Defense Meteorological Satellite Program (DMSP) and National Oceanic and Atmospheric Administration (NOAA) spacecraft played a major role in the early detection and tracking of tropical cyclones in 1985. A discussion of the role of these programs is presented in Chapter II.

e. RADAR RECONNAISSANCE:

During 1985, as in previous years, land based radar coverage was utilized extensively when available. Once a tropical cyclone moved within the range of land based radar sites, their reports were essential for determination of small scale movement. Use of radar reports during 1985 is discussed in Chapter II.

3. COMMUNICATIONS

a. JTWC currently has access to three primary communications circuits.

(1) The Automated Digital Network (AUTODIN) is used for dissemination of warnings, alerts and other related bulletins to Department of Defense installations. These messages are relayed for further transmission over U.S. Navy Fleet Broadcasts, and U.S. Coast Guard CW (continuous wave Morse Code) and voice broadcasts. Inbound message traffic for JTWC is received via AUTODIN addressed to NAVOCEANCOMCEN GQ, JTWC GQ, or DET 1 LWW NIMITZ HILL GQ.

(2) The Air Force Automated Weather Network (AWN) provides weather data to JTWC through a dedicated circuit from the Automated Digital Weather Switch (ADWS) at Hickam AFB, Hawaii. The ADWS selects and routes the large volume meteorological reports necessary to satisfy JTWC requirements for the right data at the right time. Weather bulletins prepared by JTWC are inserted into the AWN circuit via the Naval Environmental Display Station (NEDS) through the Nimitz Hill Naval Telecommunications Center (NTCC) of the Naval Communications Area Master Station Western Pacific.

(3) The Naval Environmental Data Network (NEDN) is the communications link with the computers at FLENUMOCEANCEN. JTWC is able to receive environmental data from FLENUMOCEANCEN and provide data directly to the computers to execute numerical techniques.

b. NEDS is the backbone of the JTWC communications system. It is the terminal that provides a direct interface with the NEDN and AWN circuits, and is capable of preparing messages for indirect AUTODIN transmission.

4. ANALYSES

A composite surface/gradient level (3000 ft (915 m)) manual analysis of the JTWC area of responsibility is accomplished on the 0000Z and 1200Z conventional data. Analysis of the wind field using streamlines is stressed for tropical and subtropical regions. Analysis of the pressure field outside the tropics is accomplished routinely by the Naval Oceanography Command Center (NOCC) Operations watch team and is used by JTWC in conjunction with their analysis of the tropical wind fields.

A composite upper-tropospheric manual streamline analysis is accomplished daily utilizing rawinsonde data from 300 mb through 100 mb, winds obtained from satellite-derived cloud motion analysis, and AIREPS (taken plus or minus six hours of chart valid time) at or above 29,000 feet (8,839m). Wind and height data are used to generate a representative analysis of tropical cyclone outflow patterns, mid-latitude steering currents, and features that may influence tropical cyclone intensity. All charts are hand-plotted in the tropics to provide all available data as soon as possible to the TDO. These charts are augmented by computer-plotted charts for the final analysis.

Computer-plotted charts for the 850, 700, and 500 mb levels are available for streamline and/or height-change analysis from the 0000Z and 1200Z data base. Additional sectional charts at intermediate synoptic times and auxiliary charts such as station-time plot diagrams and pressure-change charts are also analyzed during periods of significant tropical cyclone activity.

5. FORECAST AIDS

The following objective techniques were employed in tropical cyclone forecasting during 1985 (a description of these techniques is presented in Chapter V):

a. MOVEMENT

- (1) 12-HOUR EXTRAPOLATION
- (2) CLIMATOLOGY
- (3) TPAC (Extrapolation and Climatology Blend)
- (4) TYAN78 (Analog)
- (5) COSMOS (Model Output Statistics)
- (6) OTCM (Dynamic Model)
- (7) NTCM (Nested Grid Dynamic Model)
- (8) TAPT (Empirical)

b. INTENSITY

- (1) THETA E (Empirical)
- (2) DVORAK (Empirical)

(3) CLIMATOLOGY

(4) WIND RADIUS (Analytical)

6. FORECAST PROCEDURES

a. INITIAL POSITIONING

The warning position is the best estimate of the center of the surface circulation at synoptic time. It is estimated from an analysis of all fix information received up to one and one-half hours after synoptic time. This analysis is based on a semi-objective weighting of fix information based on the historical accuracy of the fix platform and the meteorology features used for the fix. The interpolated warning position reduces the weighting of any single fix and results in a more consistent movement and a warning position that is more representative of the larger-scale circulation. If the fix data are not available due to reconnaissance platform malfunction or communication problems, synoptic data or extra-polation from previous fixes are used.

b. TRACK FORECASTING

A preliminary forecast track is developed based on an evaluation of the rationale behind the previous warning and the guidance given by the most recent set of objective techniques and numerical prognoses. This preliminary track is then subjectively modified based on the following considerations:

(1) The prospects for recurvature or erratic movement are evaluated. This evaluation is based primarily on the present and forecast positions and amplitudes of the middle-tropospheric, mid-latitude troughs and ridges as depicted on the latest upper-air analysis and numerical forecasts.

(2) Determination of the best steering level is partly influenced by the maturity and vertical extent of the tropical cyclone. For mature tropical cyclones located south of the subtropical ridge, forecast changes in speed of movement are closely correlated with anticipated changes in the intensity or relative position of the ridge. When steering currents are relatively weak, the tendency for tropical cyclones to move northward due to internal forces is an important consideration.

(3) Over the 12- to 72-hour (12- to 48-hour in the Southern Hemisphere) forecast period, speed of movement during the early forecast period is usually biased towards persistence, while the subsequent forecast periods are biased towards objective techniques. When a tropical cyclone moves poleward, and toward the mid-latitude steering currents, speed of movement becomes increasingly more biased toward a selective group of objective techniques capable of estimating significant increases in speed of movement.

(4) The proximity of the tropical cyclone to other tropical cyclones is closely evaluated to determine if there is a possibility of interaction.

A final check is made against climatology to

determine whether the forecast track is reasonable. If the forecast deviates greatly from one of the climatological tracks, the forecast rationale may be reappraised.

c. INTENSITY FORECASTING

For this parameter, heavy reliance is placed on intensity trends from aircraft reconnaissance reports, wind and pressure data from ships and land stations in the vicinity of the tropical cyclone, the Dvorak satellite empirical model and climatology. An evaluation of the entire synoptic situation is made, including the location of major troughs and ridges, the position and intensity of any nearby tropical upper-tropospheric troughs (TUTTs), the vertical and horizontal extent of the tropical cyclone's circulation and the extent of the associated upper-level outflow pattern. An essential element affecting each intensity forecast is the accompanying forecast track and the environmental influences along that track, such as terrain, vertical wind shear, and the existence of an extra-tropical environment.

Once the forecast intensities have been derived, the horizontal distribution of surface winds (winds greater than 30-, 50-, and 100-knots) is determined. The most recent wind radii and associated asymmetries are deduced from all available surface wind observations and reconnaissance aircraft reports. Based on the current surface wind distribution, preliminary estimates of future wind radii are provided by an empirically derived objective technique. These estimates may be subjectively modified based upon the anticipated interaction of the tropical cyclone's circulation with forecast locations of large-scale wind regimes and significant land masses. Other factors including the tropical cyclone's speed of movement and possible extratropical transition are also considered.

7. WARNINGS

Tropical cyclone warnings are issued when a closed circulation is evident and maximum sustained winds are forecast to increase to 34 knots (18 meters per second) within 48 hours, or if the tropical cyclone is in such a position that life or property may be endangered within 72 hours. Warnings may also be issued in other situations if it is determined that there is a need to alert military or civil interests to conditions which may become hazardous in short period of time.

Each tropical cyclone warning is numbered sequentially and includes the following information: the position of the surface center; estimate of the position accuracy and the supporting reconnaissance (fix) platforms; the direction and speed of movement during the past six hours (past 12 hours in the southern hemisphere); and the intensity and radial extent of surface winds over 30-, 50-, and 100-knots, when applicable. At forecast intervals of 12-, 24-, 48-, and 72-hours (12-, 24-, and 48-hours in the southern hemisphere), information on the tropical cyclone's anticipated position, intensity and wind radii are also provided. Vectors indicating the mean direction and mean speed between forecast positions were also included in all warnings.

Warnings in the western North Pacific and North Indian Oceans are issued every six hours valid at standard times; 0000Z, 0600Z, 1200Z and 1800Z (every twelve hours; 0000Z, 1200Z or 0600Z, 1800Z in the Southern Hemisphere). All warnings are released to the communications network no earlier than synoptic time and no later than synoptic time plus two and

one-half hours so that recipients will have a reasonable expectation of having all warnings "in hand" by synoptic time plus three hours (0300Z, 0900Z, 1500Z and 2100Z).

Warning forecast positions are later verified against the corresponding "best track" positions (obtained during detailed post-storm analysis to determine the actual path and intensity of the cyclone). A summary of the verification results for 1985 is present in Chapter V.

8. PROGNOSTIC REASONING MESSAGES

For tropical storms and typhoons in the western North Pacific Ocean, prognostic reasoning messages are transmitted following the 0000Z and 1200Z warnings, or whenever the forecast reasoning is no longer valid. This plain language message is intended to provide meteorologists with the reasoning behind the latest forecast.

In addition to this message, prognostic reasoning information applicable to all customers is provided in the remarks section of warnings when significant forecast changes are made or when deemed appropriate by the TDO.

9. TROPICAL CYCLONE FORMATION ALERT

Tropical Cyclone Formation Alerts (TCFAs) are issued whenever interpretation of satellite imagery and other meteorological data indicates that the formation of a significant tropical cyclone is likely. These formation alerts will specify a valid period not to exceed twenty-four hours and must either be cancelled, reissued, or superseded by a tropical cyclone warning prior to the expiration of the valid time.

10. SIGNIFICANT TROPICAL WEATHER ADVISORY

This product contains a general, non-technical description of all tropical disturbances in the JTWC area of responsibility (AOR) and an assessment of their potential for further (tropical cyclone) development. In addition, all tropical cyclones in warning status are briefly discussed. This message is issued once daily at 0600Z and is valid for a 24-hour period. (As of 1 August 1985 this single message was divided into two separate messages to better handle the meteorological watch of the AOR. The AOR east of 100 degrees East longitude is covered by message at 0600Z daily and the AOR west of 100 degrees East longitude at 1800Z daily. Both remain valid for a twenty-four hour period.) It is reissued whenever the situation warrants. For each suspect area, the words "poor", "fair", and "good" are used to describe the potential for further development. "Poor" is used to describe a tropical disturbance that is not expected to require a TCFA during the advisory period; "fair" is used to describe a tropical disturbance that is currently not covered by a TCFA, but for which it is likely that a TCFA will be issued during the advisory period; and "good" is used when the tropical disturbance is covered by a TCFA.

CHAPTER II - RECONNAISSANCE AND FIXES

1. GENERAL

The Joint Typhoon Warning Center depends on reconnaissance to provide necessary, accurate, and timely meteorological information in support of each warning. JTWC relies primarily on three reconnaissance platforms: aircraft, satellite, and radar. In data rich areas synoptic data are also used to supplement the above. Optimum utilization of all available reconnaissance resources is obtained through the Selective Reconnaissance Program (SRP); various factors are considered in selecting a specific reconnaissance platform including capabilities and limitations, and the tropical cyclone's threat to life and property both afloat and ashore. A summary of reconnaissance fixes received during 1985 is included in Section 6 of this chapter.

2. RECONNAISSANCE AVAILABILITY

a. Aircraft

Aircraft weather reconnaissance for the JTWC is performed by the 54th Weather Reconnaissance Squadron (54th WRS) located at Andersen Air Force Base, Guam. The 54th WRS is presently equipped with six WC-130 aircraft and, from July through October, is normally augmented by two additional aircraft from the 53rd WRS, Keesler Air Force Base, Mississippi, bringing the total number of available aircraft to eight. The JTWC reconnaissance requirements are provided daily to the Tropical Cyclone Aircraft Reconnaissance Coordinator (TCARC), who marries the tasking from the JTWC with the available airframes from the 54th WRS.

As in previous years, aircraft reconnaissance provides direct measurements of standard pressure-level height, temperature, flight-level winds, sea-level pressure, estimated surface winds (when observable), and numerous additional parameters. The meteorological data are gathered by the Aerial Reconnaissance Weather Officer (ARWO) and dropsonde operators of Detachment 3, 1st Weather Wing who fly with the 54th WRS. These data provide the Typhoon Duty Officer (TDO) with indications of tropical cyclone position and intensity. Another important aspect is the availability of the data for technique development and tropical cyclone research.

b. Satellite

Satellite fixes from USAF/USN ground sites and USN ships provide day and night coverage in the JTWC area of responsibility. Interpretation of this satellite imagery provides tropical cyclone positions and estimates of current and forecast intensities through the Dvorak technique.

c. Radar

Land radar provides positioning data on well developed tropical cyclones when in the proximity (usually within 175 nm (324 km)) of the radar sites in the Philippines, Taiwan, Hong Kong, Japan, South Korea, Kwajalein, and Guam.

d. Synoptic

JTWC also determined tropical cyclone positions based on the analysis of the surface/gradient level synoptic data. These positions were helpful in sit-

uations where the vertical structure of the tropical cyclone was weak or accurate surface positions from aircraft or satellite were not available.

3. AIRCRAFT RECONNAISSANCE SUMMARY

During 1985, JTWC levied requirements for 192 vortex fixes and 59 investigative missions of which 12 were flown into disturbances that did not develop. In addition to the levied fixes, 167 intermediate fixes were also obtained. Eighteen synoptic missions were requested and flown to provide mid-level steering information. The average vector error for all aircraft fixes received at the JTWC during 1985 was 11 nm (20 km).

Aircraft reconnaissance effectiveness is summarized in Table 2-1 using the criteria set forth in CINCPACINST 3140.1 (series).

4. SATELLITE RECONNAISSANCE SUMMARY

The Air Force provides satellite reconnaissance support to JTWC using imagery from a variety of spacecraft. The tropical cyclone satellite surveillance network consists of both tactical and centralized facilities. Tactical DMSP sites are located at Nimitz Hill, Guam; Clark AB, Republic of the Philippines; Kadena AB, Japan; Osan AB, Korea; and Hickam AFB, Hawaii. These sites provide a combined coverage that includes most of the JTWC area of responsibility in the western North Pacific from near

TABLE 2-1. AIRCRAFT RECONNAISSANCE EFFECTIVENESS

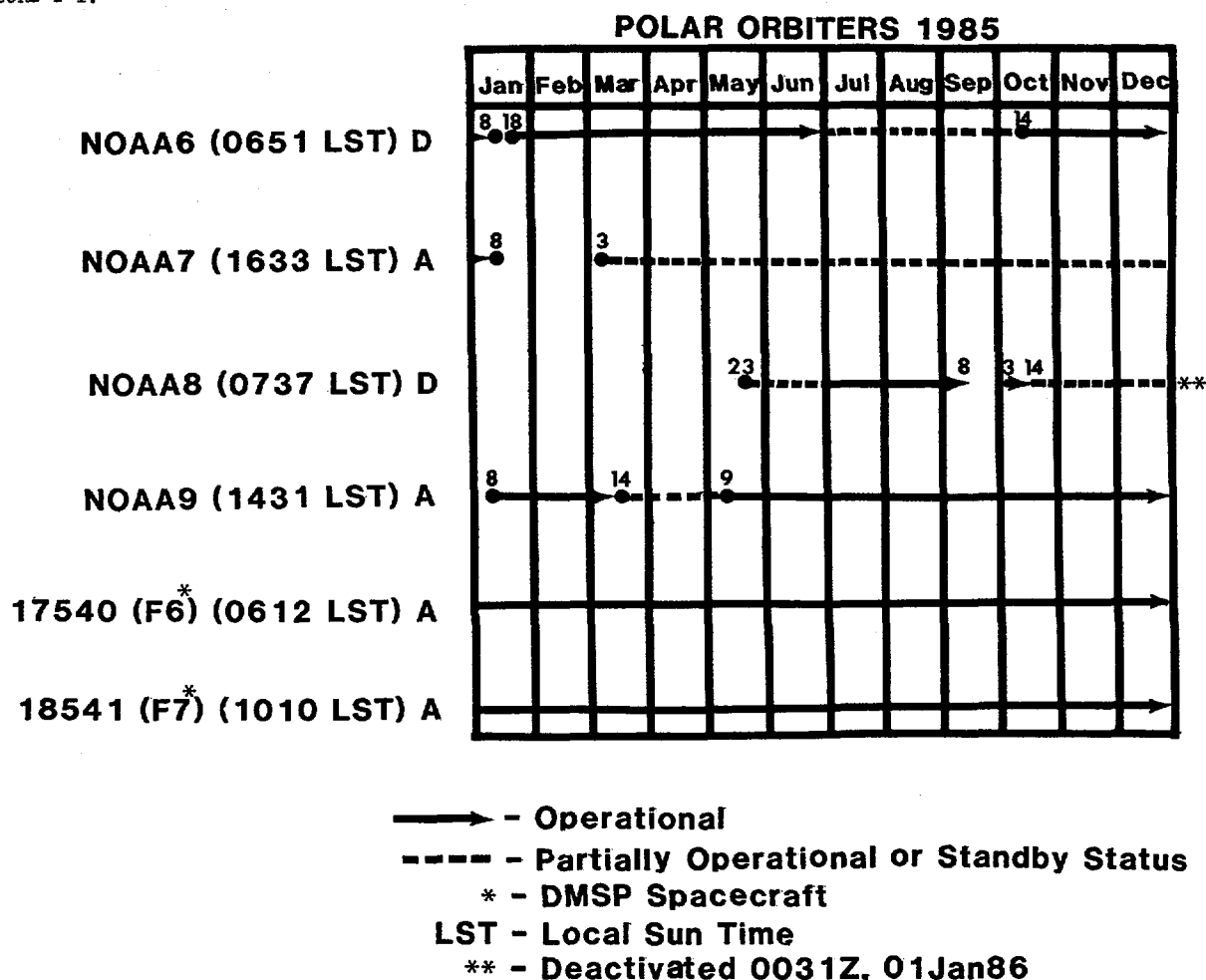
EFFECTIVENESS	NUMBER OF LEVIED FIXES	PERCENT
COMPLETED ON TIME	174	90.6
EARLY	4	2.1
LATE	4	2.1
MISSED	10	5.2
TOTAL	192	100.0

LEVIED VS. MISSED FIXES

	LEVIED	MISSED	PERCENT
AVERAGE 1965-1970	507	10	2.0
1971	802	61	2.0
1972	624	126	20.2
1973	227	13	5.7
1974	358	30	8.4
1975	217	7	3.2
1976	317	11	3.5
1977	203	3	1.5
1978	290	2	0.7
1979	289	14	4.8
1980	213	4	1.9
1981	201	3	1.5
1982	276	17	6.2
1983	157	3	1.9
1984	210	2	1.0
1985	192	10	5.2

The hub of the network is Det 1, 1WW, collocated with JWC on Nimitz Hill, Guam. Based on available satellite coverage, Det 1 coordinates satellite reconnaissance requirements with JWC and tasks the

The network provides JTWC with several products and services. The main service is one of surveillance. Each site reviews its daily satellite coverage for indications of tropical cyclone development. If an area exhibits the potential for development, JTWC is notified. Once JTWC issues either a formation alert or warning, the network is tasked to provide three products: tropical cyclone positions, intensity estimates, and 24-hour intensity forecasts. Satellite tropical cyclone positions are assigned Position Code Numbers (PCN) to indicate the accuracy of the fix position. This is dependent upon the availability of visible landmarks in the image for precise gridding, and the degree of organization of the tropical cyclone's cloud system (Table 2-2). During 1985, the network provided JTWC with a total of 2505 satellite fixes on tropical systems in the western North Pacific. This is a record number of fixes for the year. Another 195 fixes were made for tropical systems in the North Indian Ocean. A



comparison of those fixes of numbered tropical cyclones in the western North Pacific with their corresponding JTWC best track positions is shown in Table 2-3a (Comparison of fixes with the corresponding best track for the South Pacific and Indian Oceans is presented in Table 2-3b). Estimates of the tropical cyclone's current intensity and 24-hour intensity forecast are made every 12 hours by applying the Dvorak technique (NOAA Technical Report NESDIS 11) to visual and enhanced infrared imagery.

Figure 2-1 shows the status of operational polar orbiting spacecraft. Six were available at various times in 1985. NOAA 6 suffered low power problems from the 8th of January to the 18th. It continued to operate with degraded imagery until July, when it was placed on standby and replaced by the repaired NOAA 8. NOAA 8 suffered from continuing oscillator problems until finally deactivated on 1 January 1986,

TABLE 2-2. POSITION CODE NUMBERS

PCN	METHOD OF CENTER DETERMINATION/GRIDDING
1	EYE/GEOGRAPHY
2	EYE/EPHEMERIS
3	WELL DEFINED CC/GEOGRAPHY
4	WELL DEFINED CC/EPHEMERIS
5	POORLY DEFINED CC/GEOGRAPHY
6	POORLY DEFINED CC/EPHEMERIS

leaving NOAA 6, once again, as the primary morning spacecraft. NOAA 7 was placed on standby March 3rd after operating with impaired high resolution picture transmissions (HRPT) since 8 January. It was replaced by NOAA 9, (launched 12 December 1984) which became fully operational 9 May. At the end of the year, NOAA 9 was the only fully operational NOAA satellite.

5. RADAR RECONNAISSANCE SUMMARY

Seventeen of the 27 significant tropical cyclones in the western North Pacific during 1985

passed within range of land-based radar with sufficient cloud pattern organization to be fixed. The land radar fixes that were obtained and transmitted to JTWC totaled 1360. Three radar fixes were obtained by reconnaissance aircraft.

The WMO radar code defines three categories of accuracy: good (within 10 km (5nm)), fair (within 10-30 km (5-16 nm)), and poor (within 30-50 km (16-27nm)). Of the 1091 radar fixes coded in this manner; 299 were good, 413 were fair, and 379 were poor. Compared to the JTWC best track, the mean vector deviation for land radar sites was 13 nm (24 km). Excellent support through timely and accurate radar fix positioning allowed JTWC to track and forecast tropical cyclone movement through even the most difficult erratic tracks.

As in previous years, no radar reports were received on North Indian Ocean tropical cyclones.

TABLE 2-3b. MEAN DEVIATION (NM) OF ALL SATELLITE DERIVED TROPICAL CYCLONE POSITIONS IN THE SOUTH PACIFIC AND SOUTH INDIAN OCEANS. NUMBER OF CASES IN (PARENTHESES).

1985		
PCN	(ALL SITES)	
1	15.8	(20)
2	15.5	(168)
3	26.1	(42)
4	29.2	(190)
5	46.9	(241)
6	39.8	(1140)
1&2	15.5	(188)
3&4	28.7	(232)
5&6	41.1	(1381)
TOTAL NUMBER OF CASES	(1801)	

6. TROPICAL CYCLONE FIX DATA

A total of 4268 fixes on 27 western North Pacific tropical cyclones and 195 fixes on 6 North Indian Ocean tropical cyclones were received at JTWC. Table 2-4a, Fix Platform Summary, delineates the number of fixes per platform for each individual tropical cyclone. Season totals and percentages are

TABLE 2-3a.

MEAN DEVIATION (NM) OF ALL SATELLITE DERIVED TROPICAL CYCLONE POSITIONS FROM THE JTWC BEST TRACK POSITIONS IN THE WESTERN NORTH PACIFIC AND NORTH INDIAN OCEANS. NUMBER OF CASES (IN PARENTHESES).

PCN	WESTERN NORTH PACIFIC OCEAN		NORTH INDIAN OCEAN	
	1975-1984 AVERAGE	1985	1980-1984 AVERAGE	1985
	(ALL SITES)	(ALL SITES)	(ALL SITES)	(ALL SITES)
1	13.3 (1505)	17.7 (127)	16.7 (40)	---- (0)
2	17.0 (1617)	13.2 (175)	18.9 (7)	---- (0)
3	20.6 (2176)	24.8 (191)	21.4 (13)	11.5 (8)
4	23.9 (1000)	19.5 (300)	64.6 (8)	33.1 (2)
5	37.4 (4070)	37.0 (311)	34.8 (171)	28.9 (49)
6	42.4 (2278)	32.8 (972)	41.1 (106)	33.6 (97)
1&2	15.2 (3122)	15.1 (302)	17.2 (47)	---- (0)
3&4	21.6 (3176)	21.6 (491)	41.3 (21)	15.8 (10)
5&6	39.2 (6348)	33.8 (1283)	36.1 (277)	32.1 (146)
TOTAL NUMBER OF CASES	(12646)	(2076)	(345)	(156)

TABLE 2-4a. FIX PLATFORM SUMMARY FOR 1985.

FIX PLATFORM SUMMARY					
WESTERN NORTH PACIFIC	AIRCRAFT	SATELLITE	RADAR	SYNOPTIC	TOTAL
TS ELSTIE (01N)	3	23	-	1	27
TS FABIAN (02W)	7	82	-	8	97
TY GAY (03W)	10	127	-	-	137
TD (04W)	-	40	-	4	44
TY HAL (05W)	12	119	79	4	214
TY IRMA (06W)	22	110	83	-	215
TY JEFF (07W)	23	180	99	12	314
TY KIT (08W)	29	165	289	4	487
TS LEE (09W)	10	61	28	-	99
TY MAMIE (10W)	2	70	9	7	88
TY NELSON (11W)	20	113	141	1	275
TY ODESSA (12W)	31	135	144	-	310
TY PAT (13W)	16	101	88	1	206
TS PURY (14W)	8	52	52	-	112
TY SKIP (02C)	20	118	-	-	138
TY TESS (15W)	12	86	54	-	152
TS VAL (16W)	3	64	-	-	67
TS WINONA (17W)	-	47	19	3	69
TY ANDY (18W)	-	60	14	2	76
TY BRENDA (19W)	21	95	57	4	177
TY CECIL (20W)	8	70	8	-	86
SVY DOT (21W)	24	144	57	-	225
TS ELLIS (22W)	14	64	-	3	81
TY PAY (23W)	31	144	139	-	314
TS GORDON (24W)	3	86	-	-	89
TY HOPE (25W)	17	90	-	-	107
TS IRVING (26W)	3	59	-	-	62
TOTAL					
	349	2505	1360	54	4268
% OF TOTAL					
NR OF FIXES	8.2	58.7	31.9	1.2	100.0
NORTH INDIAN OCEAN					
		SATELLITE			TOTAL
TC 01B		36			36
TC 02A		25			25
TC 03B		26			26
TC 04B		20			20
TC 05B		30			30
TC 06B		58			58
TOTAL					
		195			195
% OF TOTAL					
NR OF FIXES		100.0			100.0

TABLE 2-4b. FIX PLATFORM SUMMARY FOR 1985

FIX PLATFORM SUMMARY				
THE SOUTH PACIFIC AND SOUTH INDIAN OCEANS.	SATELLITE	RADAR	SYNOPTIC	TOTAL
TC 01S ----	41	-	-	41
TC 02S BOBALAHY	63	-	-	63
TC 03S EMMA	48	-	1	49
TC 04P ----	51	-	-	51
TC 05S FRANK	64	8	1	73
TC 06P ----	25	-	2	27
TC 07P MONICA	43	-	-	43
TC 08P ----	47	-	-	47
TC 09P DRENA	20	-	-	20
TC 10S CELESTINA	56	-	1	57
TC 11P ERIC	61	-	-	61
TC 12S ----	29	-	-	29
TC 13P NIGEL	75	-	-	75
TC 14P ODETTE	65	-	-	65
TC 15S DITRA	36	-	-	36
TC 16P FREDIA	26	-	-	26
TC 17S GERTIE	17	-	-	17
TC 18P ----	66	-	-	66
TC 19S ESITERA	36	-	3	39
TC 20S HUBERT	87	-	-	87
TC 21S FELIXSA	32	-	1	33
TC 22S ISOBEL	92	-	-	92
TC 23S GERIMENA	86	-	-	86
TC 24S ----	21	-	-	21
TC 25S JACOB	121	-	-	121
TC 26P PIERRE	46	-	-	46
TC 27P GAVIN	58	-	-	58
TC 28S KIRSTY	98	-	-	98
TC 29S LINDSAY	30	-	-	30
TC 30P HINA	90	-	-	90
TC 31P SANDY	116	-	-	116
TC 32P TANYA	86	-	1	87
TC 33S HELISAONINA	51	-	-	51
TC 34S GRIETEL	53	8	1	62
TC 35S MARGOT	87	-	-	87
TOTAL				
	2023	16	11	2050
% OF TOTAL				
NR OF FIXES	98.7	0.8	0.5	100.0

also indicated. (Table 2-4b provides the same information for the South Pacific and South Indian Oceans.)

Annex A includes individual fix data for each tropical cyclone in the western North Pacific and North Indian Oceans. (Additionally, it includes individual fix data for each tropical cyclone in the South Pacific and South Indian Oceans.) Fix data are divided into four categories: satellite, aircraft, radar, and synoptic. Those fixes labeled with an asterisk (*) were determined to be unrepresentative of the surface center and were not used in determining the best tracks. Within each category, the first three columns are as follows:

FIX NO. - Sequential fix number

TIME (Z) - GMT time in day, hours, and minutes

FIX POSITION - Latitude and longitude to the nearest tenth of a degree

Depending on the category, the remainder of the format varies as follows:

a. Satellite

(1) ACCRY - Position Code Number is used to indicate the accuracy of the fix position. A "1" or "2" indicates relatively high accuracy and a "5" or "6" relatively low accuracy (reference Table 2-2, Position Code Numbers).

(2) DVORAK CODE - Intensity evaluation and trend (Figure 2-2, Table 2-5). (For specifics, refer to NOAA Technical Report NESDIS 11.)

(3) COMMENTS - For an explanation of the contractions, see pages vi and vii.

(4) SITE - ICAO call sign of the specific satellite tracking station.

b. Aircraft

(1) FLT LVL - The constant pressure surface level, in millibars, or altitude, in feet, maintained during the penetration. The usual flight level flown in developing tropical cyclones is 700 mb, due to turbulence considerations. Low-level missions are normally flown at 1500 ft (457 m).

(2) 700 MB HGT - Minimum height of the 700 mb pressure surface within the vortex recorded in meters.

(3) OBS MSLP - If the surface center can be visually detected (e.g., in the eye), the minimum sea-level pressure is obtained by a dropsonde release above the surface vortex center. If the fix is made at the 1500-foot level, the sea-level pressure is extrapolated from that level.

(4) MAX-SFC-WND - The maximum surface wind (knots) is an estimate made by the ARWO based on sea state. This observation is limited to the region of the flight path and may not be representative of the entire tropical cyclone. Availability of data is also dependent upon the absence of undercast conditions and the presence of adequate illumination. The positions of the maximum flight level wind and the maximum observed surface wind do not necessarily coincide.

(5) MAX-FLT-LVL-WND - Wind speed (knots) at flight level is measured by the AN/APN 147 doppler radar system aboard the WC-130 aircraft. This measurement may not represent the maximum flight level wind associated with the tropical cyclone

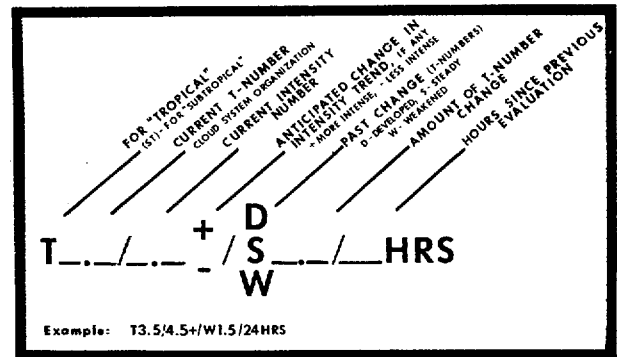


Figure 2-2. Dvorak code for communicating estimates of current and forecast intensity derived from satellite data. In the example the current T-number is 3.5 but the current intensity estimate is 4.5 (equivalent to 77 kt). The cloud system has weakened by 1.5 T-numbers since the previous evaluation conducted 24 hours earlier. The plus (+) symbol indicates an expected reversal of the weakening trend or very little further weakening of the tropical cyclone during the next 24-hour period.

TABLE 2-5. MAXIMUM SUSTAINED WIND SPEED (KT) AS A FUNCTION OF DVORAK CI & FI (CURRENT & FORECAST INTENSITY) NUMBER AND MINIMUM SEA-LEVEL PRESSURE (MSLP)

TROPICAL CYCLONE INTENSITY NUMBER	WIND SPEED	MSLP (NW PACIFIC)
0.0	<25	---
0.5	25	---
1.0	25	---
1.5	25	---
2.0	30	1000
2.5	35	997
3.0	45	991
3.5	55	984
4.0	65	976
4.5	77	966
5.0	90	953
5.5	102	941
6.0	115	927
6.5	127	914
7.0	140	898
7.5	155	879
8.0	170	858

because the aircraft only samples those portions of the tropical cyclone along the flight path. In many instances, the flight path is through the weakest sector of the tropical cyclone. In areas of heavy rainfall, the doppler radar may track energy reflected from precipitation rather than from the sea surface, thus, preventing accurate wind speed measurement. In obvious cases, such erroneous wind data will not be reported. In addition, the doppler radar system on the WC-130 restricts wind measurements to drift angles less than or equal to 27 degrees if the wind is normal (perpendicular) to the aircraft heading.

(6) ACCY - Fix position accuracy. Both navigational (OMEGA and LORAN) and meteorological (by the ARWO) estimates are given in nautical miles.

(7) EYE SHAPE - Geometrical representation of the eye based on the aircraft radar presentation. The eye shape is reported only if the center is 50 percent or more surrounded by wall cloud.

(8) EYE DIA/ORIENTATION - Diameter of the eye in nautical miles. When an elliptical eye is present, the lengths of the major and minor axes and the orientation of the major axis are respectively listed. When concentric eye walls are present, each diameter is listed.

c. Radar

(1) RADAR - Specific type of platform (land, aircraft, or ship) utilized for fix.

(2) ACCY - Accuracy of fix position (good, fair, or poor) as given in the WMO ground radar weather observation code (FM20-V).

(3) EYE SHAPE - Geometrical representation of the eye given in plain language (circular, elliptical, etc.).

(4) EYE DIA - Diameter of eye given in kilometers.

(5) RAOB CODE - Taken directly from WMO ground weather radar observation code FM20-V. The first group specifies the vortex parameters, while the second group describes the movement of the vortex center.

(6) RADAR POSITION - Latitude and longitude of tracking station given in tenths of a degree.

(7) SITE - WMO station number of the specific tracking station.

d. Synoptic

(1) INTENSITY ESTIMATE - An estimate of the tropical cyclone's maximum sustained surface wind in knots is based on the tropical cyclone forecaster's analysis of low-level synoptic data.

(2) NEAREST DATA - The accuracy of a synoptic fix is based on the distance in nautical miles from the estimated fix position to the nearest synoptic report or to the average distance of reports in data sparse areas.

(3) COMMENTS - For an explanation of the contractions see pages vi and vii.

CHAPTER III - SUMMARY OF WESTERN NORTH PACIFIC AND NORTH INDIAN OCEAN TROPICAL CYCLONES

1. GENERAL

During 1985, JTWC issued warnings on 27 western North Pacific tropical cyclones (1 tropical depression, 9 tropical storms, 16 typhoons and one super-typhoon). This was almost an average year when compared to the climatological mean of 27 for the frequency of tropical storms and typhoons. Six north Indian Ocean tropical cyclones, all of tropical storm intensity, developed as compared to the climatological average of four. In summary, JTWC issued warnings on 33 northern hemisphere tropical cyclones.

In 1985 for the western North Pacific there were 127 warning days - a warning day is defined as a day during which JTWC issues warnings on at least one tropical cyclone. For 38 of these 127 days, warnings were being issued on two tropical cyclones. There were also 2 three-cyclone days, 2 four-cyclone days, and one day in which JTWC issued warnings on five different WESTPAC tropical cyclones at the same time. When the north Indian Ocean tropical cyclones are included, there were 141 warning days, 41 two-cyclone days, 3 three-cyclone days, 3 four-cyclone days and 1 five-cyclone day.

Six hundred and fifteen warnings were issued on the 27 western North Pacific tropical cyclones and 54 were issued on the six north Indian Ocean tropical cyclones. There were 39 initial Tropical Cyclone Formation Alerts (TCFA) for WESTPAC and 8 for the north Indian Ocean. In WESTPAC, TCFAs were issued for all except one of the significant tropical cyclones that developed during 1985. The false alarm rate of 33% for WESTPAC seems fairly high, however, it did enable JTWC to provide the customer with an mean lead time of 27.5 hours on significant tropical cyclone development. For the North Indian Ocean TCFAs were issued for all but one of the significant tropical cyclones. The false alarm rate for TCFAs was 38% with a mean lead time of 20.2 hours.

2. WESTERN NORTH PACIFIC TROPICAL CYCLONES

There are several interesting aspects of the 1985 tropical cyclone activity. In general, it can be neatly divided into two periods: the early part, January to August and the late, September to December (see composite tropical cyclone best tracks on pages 15 and 16). The early 1985 composite best tracks show that the overwhelming majority of the tropical

cyclones during that period recurved, that is: 11 recurvers versus 3 west-northwest straight runners and one low-latitude tropical storm (Fabian) which behaved erratically. This is somewhat atypical since, normally, the majority of the recurvers occur during the later part of the year when breaks in the subtropical high pressure ridge develop as the influence of the mid-latitude troughs extends further south with the approach of fall. The Philippine Islands were spared during the first part of the year, except for a glancing blow from Typhoon Hal in June. However, during that period, no less than 8 tropical cyclones affected, or posed a direct threat to, Okinawa, Korea and Japan. In some cases the same tropical cyclone affected all three. Notice the point 200 nm (370km) south-southeast of Okinawa - four, and nearly five, different tropical cyclone tracks intersected at that location. The major generation areas during the first part of the year were: a two-to-three degree swath centered on six degrees north latitude, from the southeastern coast of the Philippine Islands to near Ponape; another area north of Guam; and a third area south of Okinawa.

A major shift in tropical cyclone activity occurred during the second part of the year (see composite best tracks on page 16). Notice that only 2 tropical cyclones recurved. Whereas, Japan and Korea received the brunt of the tropical cyclone activity the first half of the year, it was the Philippines and Vietnam which suffered most during the second. Three typhoons and one supertyphoon transited Luzon. In addition, one typhoon crossed the southern Philippine Islands. Three typhoons affected northern Vietnam and a total of 4 typhoons and 4 tropical storms struck the Asian mainland from southern Vietnam to the vicinity of Hong Kong. The major generation areas were: one west of Palawan Island in the South China Sea, and the other south and southeast of Guam. This contrasts with the first part of the year, when generation locations were more evenly distributed over WESTPAC.

In the western North Pacific, tropical cyclones reaching tropical storm intensity, or greater, are assigned names in alphabetical order from a list of alternating male/female names (refer to Appendix II). Table 3-1 provides a summary of key statistics for all western North Pacific tropical cyclones. Each tropical cyclone's maximum surface wind and minimum sea-level pressure (in millibars) were obtained from best estimates based on all available data. The distance traveled was calculated from the JTWC official best tracks (see Annex A).

Tables 3-2 through 3-5 provide further information on the monthly and yearly distribution of tropical cyclones, warnings and Tropical Cyclone Formation Alerts.

TABLE 3-1.

WESTERN NORTH PACIFIC
1985 SIGNIFICANT TROPICAL CYCLONES

TROPICAL CYCLONE	PERIOD OF WARNING	CALENDAR DAYS OF WARNING	NUMBER OF WARNINGS ISSUED	MAXIMUM SURFACE WINDS-KT (M/S)	ESTIMATED MSLP- MB	BEST TRACK DISTANCE TRAVELED-NM (KM)
01W TS ELSIE	07 JAN - 09 JAN	3	9	40 (21)	995	976 (1808)
02W TS FABIAN	09 JAN - 13 JAN	5	16	55 (28)	989	507 (939)
03W TY GAY	21 MAY - 26 MAY	6	22	100 (51)	951	1464 (2711)
04W TD 04W	18 JUN - 20 JUN	3	10	30 (15)	992	441 (817)
05W TY HAL	19 JUN - 25 JUN	6	22	100 (51)	942	1305 (2417)
06W TY IRMA	25 JUN - 01 JUL	7	27	90 (46)	957	2413 (4469)
07W TY JEFF	22 JUL - 02 AUG	12	43	75 (39)	967	2668 (4941)
08W TY KIT	03 AUG - 11 AUG	9	33	85 (44)	959	1953 (3617)
09W TS LEE	11 AUG - 14 AUG	4	15	60 (31)	985	1326 (2456)
10W TY MAMIE	16 AUG - 20 AUG	5	17	70 (36)	975	1335 (2472)
11W TY NELSON	17 AUG - 24 AUG	8	27	95 (49)	961	1651 (3058)
12W TY ODESSA	23 AUG - 01 SEP	10	39	90 (46)	957	2328 (4311)
13W TY PAT	27 AUG - 01 SEP	6	23	95 (49)	961	1337 (2476)
14W TS RUBY	28 AUG - 01 SEP	5	19	55 (28)	982	1310 (2426)
02C TY SKIP	30 AUG - 08 SEP	10	34	80 (41)	974	1822 (3374)
15W TY TESS	01 SEP - 06 SEP	7	22	75 (39)	967	1470 (2722)
16W TS VAL	15 SEP - 18 SEP	4	14	50 (26)	992	1630 (3019)
17W TS WINONA	19 SEP - 22 SEP	4	11	50 (26)	990	518 (959)
18W TY ANDY	28 SEP - 02 OCT	5	16	70 (36)	970	705 (1306)
19W TY BRENDA	29 SEP - 05 OCT	7	25	90 (46)	964	1551 (2872)
20W TY CECIL	12 OCT - 16 OCT	5	16	100 (51)	944	1034 (1915)
21W STY DOT	13 OCT - 22 OCT	10	34	150 (77)	897	3074 (5693)
22W TS ELLIS	16 OCT - 20 OCT	5	19	50 (26)	995	1046 (1937)
23W TY FAYE	23 OCT - 01 NOV	10	39	100 (51)	960	1849 (3424)
24W TS GORDON	20 NOV - 26 NOV	7	23	45 (23)	997	797 (1476)
25W TY HOPE	17 DEC - 24 DEC	8	26	100 (51)	948	1444 (2674)
26W TS IRVING	18 DEC - 21 DEC	4	14	60 (31)	994	806 (1493)

1985 TOTALS: 127* 715

* OVERLAPPING DAYS INCLUDED ONLY ONCE IN SUM.

TABLE 3-2.

1985 SIGNIFICANT TROPICAL CYCLONES

WESTERN NORTH PACIFIC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	(1959-1985) AVERAGE	CASES
TROPICAL DEPRESSIONS	0	0	0	0	0	1	0	0	0	0	0	0	1	3.7	99
TROPICAL STORMS	2	0	0	0	0	0	0	2	2	1	1	1	9	9.9	268
TYPHOONS	0	0	0	0	1	2	1	5	3	4	0	1	17	17.3	468
ALL TROPICAL CYCLONES	2	0	0	0	1	3	1	7	5	5	1	2	27	30.9	835
1959 - 1985 AVERAGE	.6	.3	.7	.8	1.3	2.0	4.7	6.3	5.7	4.6	2.6	1.4	30.9		
CASES	15	8	18	22	34	54	128	170	153	124	71	38	835		

FORMATION ALERTS: 26 of 39 Formation Alerts developed into significant tropical cyclones. Tropical Cyclone Formation Alerts were issued for all except one of the significant tropical cyclones that developed in 1985.

WARNINGS: Number of calendar warning days: 127
Number of calendar warning days with two tropical cyclones in region: 32
Number of calendar warning days with three or more tropical cyclones in region: 6

TABLE 3-3.

FREQUENCY OF TYPHOONS BY MONTH AND YEAR

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
(1945-1958) AVERAGE	.4	.1	.3	.4	.7	1.1	2.0	2.9	3.2	2.4	2.0	.9	16.3
1959	0	0	0	1	0	0	1	5	3	3	2	2	17
1960	0	0	0	1	0	2	2	8	0	4	1	1	19
1961	0	0	1	0	2	1	3	3	5	3	1	1	20
1962	0	0	0	1	2	0	5	7	2	4	3	0	24
1963	0	0	0	1	1	2	3	3	3	4	0	2	19
1964	0	0	0	0	2	2	6	3	5	3	4	1	26
1965	1	0	0	1	2	2	4	3	5	2	1	0	21
1966	0	0	0	1	2	1	3	6	4	2	0	1	20
1967	0	0	1	1	0	1	3	4	4	3	3	0	20
1968	0	0	0	1	1	1	1	4	3	5	4	0	20
1969	1	0	0	1	0	0	2	3	2	3	1	0	13
1970	0	1	0	0	0	1	0	4	2	3	1	0	12
1971	0	0	0	3	1	2	6	3	5	3	1	0	24
1972	1	0	0	0	1	1	4	4	3	4	2	2	22
1973	0	0	0	0	0	0	4	2	2	4	0	0	12
1974	0	0	0	0	1	2	1	2	3	4	2	0	15
1975	1	0	0	0	0	0	1	3	4	3	2	0	14
1976	1	0	0	1	2	2	2	1	4	1	1	0	15
1977	0	0	0	0	0	0	3	0	2	3	2	1	11
1978	0	0	0	1	0	0	3	2	4	3	2	0	15
1979	1	0	1	1	0	0	2	2	3	2	1	1	14
1980	0	0	0	0	2	0	3	2	5	2	1	0	15
1981	0	0	1	0	0	2	2	2	4	1	2	2	16
1982	0	0	2	0	1	1	2	5	3	3	1	1	19
1983	0	0	0	0	0	0	3	2	1	4	2	0	12
1984	0	0	0	0	0	0	4	2	1	5	3	1	16
1985	0	0	0	0	1	2	1	5	3	4	0	1	17
(1959 - 1985) AVERAGE	.2	.04	.2	.6	.8	.9	2.7	3.3	3.1	3.1	1.6	.6	17.3
CASES	6	1	6	15	21	25	74	90	85	85	43	17	468

TABLE 3-4.

FREQUENCY OF TROPICAL STORMS AND TYPHOONS BY MONTH AND YEAR

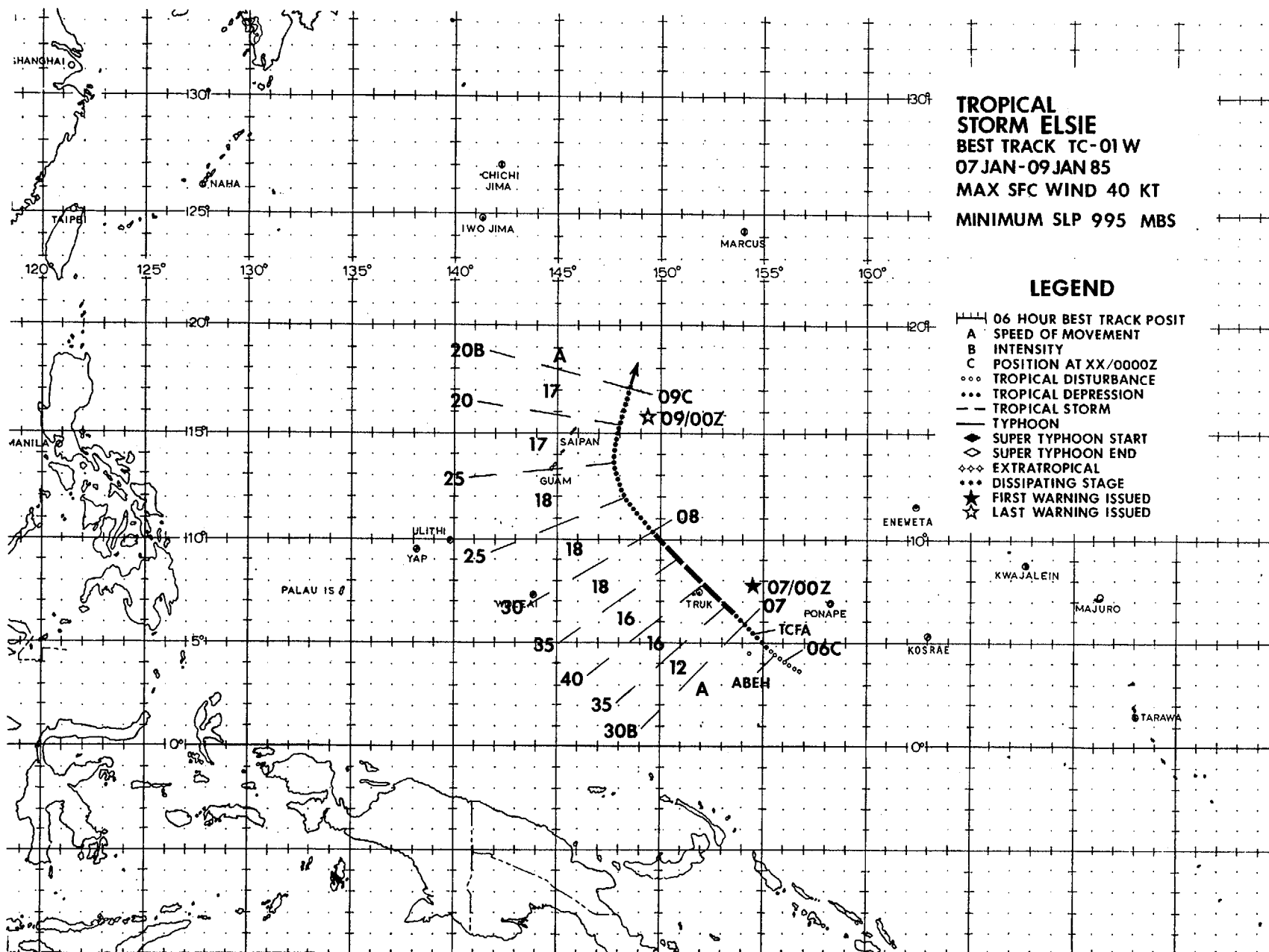
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
(1945-1958) AVERAGE	.4	.1	.4	.5	.8	1.3	3.0	3.9	4.1	3.3	2.7	1.1	21.6
1959	0	1	1	1	0	0	3	6	6	4	2	2	26
1960	0	0	0	1	1	3	3	10	3	4	1	1	27
1961	1	1	1	1	3	2	5	4	6	5	1	1	31
1962	0	1	0	1	2	0	6	7	3	5	3	2	30
1963	0	0	0	1	1	3	4	3	5	5	0	3	25
1964	0	0	0	0	2	2	7	9	7	6	6	1	40
1965	2	2	1	1	2	3	5	6	7	2	2	1	34
1966	0	0	0	1	2	1	5	8	7	3	2	1	30
1967	1	0	2	1	1	1	6	8	7	4	3	1	35
1968	0	0	0	1	1	1	3	8	3	6	4	0	27
1969	1	0	1	1	0	0	3	4	3	3	2	1	19
1970	0	1	0	0	0	2	2	6	4	5	4	0	24
1971	1	0	1	3	4	2	8	4	6	4	2	0	35
1972	1	0	0	0	1	3	6	5	4	5	2	3	30
1973	0	0	0	0	0	0	7	5	2	4	3	0	21
1974	1	0	1	1	1	4	4	5	5	4	4	2	32
1975	1	0	0	0	0	0	2	4	5	5	3	0	20
1976	1	1	0	2	2	2	4	4	5	1	1	2	25
1977	0	0	1	0	0	1	4	1	5	4	2	1	19
1978	1	0	0	1	0	3	4	7	5	4	3	0	28
1979	1	0	1	1	1	0	4	2	7	3	2	2	24
1980	0	0	0	1	4	1	4	2	6	4	1	1	24
1981	0	0	1	2	0	2	5	7	4	2	3	2	28
1982	0	0	3	0	1	3	4	5	5	3	1	1	26
1983	0	0	0	0	0	1	3	5	2	5	5	2	23
1984	0	0	0	0	0	2	5	5	4	7	3	1	27
1985	2	0	0	0	1	2	1	7	5	5	1	2	26
(1959-1985) AVERAGE	.5	.3	.5	.8	1.1	1.6	4.3	5.4	4.9	4.1	2.4	1.2	27.3
CASES	14	7	14	21	30	44	117	147	131	112	66	33	736

TABLE 3-5.

FORMATION ALERT SUMMARY

WESTERN NORTH PACIFIC

<u>YEAR</u>	<u>NUMBER OF ALERT SYSTEMS</u>	<u>ALERT SYSTEMS WHICH BECAME NUMBERED TROPICAL CYCLONES</u>	<u>TOTAL NUMBERED TROPICAL CYCLONES</u>	<u>DEVELOPMENT RATE</u>
1975	34	25	25	74%
1976	34	25	25	74%
1977	26	20	21	77%
1978	32	27	32	84%
1979	27	23	28	85%
1980	37	28	28	76%
1981	29	28	29	97%
1982	36	26	28	72%
1983	31	25	25	81%
1984	37	30	30	81%
1985	39	26	27	67%
(1975-1985) AVERAGE	32.9	25.7	27.1	78%
CASES	362	283	298	



Tropical Storm Elsie, the first tropical cyclone of the 1985 season, was also the first tropical storm to develop during January in six years. Warnings were issued for only two days and it never intensified beyond 40 kt (21 m/s).

During the first week of January the near-equatorial trough was quite active, and extended from the southern Philippines southeast to the vicinity of the Equator and 160E. Embedded in this trough were two weak circulations, one southwest of Guam which would later develop into Tropical Storm Fabian and another southeast of Guam which would eventually develop into Elsie. Enhanced convective activity persisted throughout the region.

The cloud system that was to become Elsie first appeared on 4 January as an area of weak convection southwest of Pohnpei (Ponape WMO 91348). The convection persisted through the 4th, and on the 5th began to increase in strength and organization. At 0000Z on the 6th, analysis of satellite imagery gave the first indications that a low-level circulation center was developing. Sparse synoptic data up to this time had only indicated that a very broad 10 to 15 kt (5 to 8 m/s) cyclonic circulation was present. The persistence and improved organization of the convection resulted in the disturbance being mentioned in the 060600Z Significant Tropical Weather Advisory (ABEH PGIW). The disturbance was assessed as having a "fair" potential for further development (meaning that it was considered likely that a TCFA would be issued during the next 24 hours). Indeed, this was the case.

Analysis of satellite imagery during the next ten hours showed continued development, with Dvorak intensity analysis of the 061600Z imagery estimating surface winds of 25 kt (13 m/s). This was confirmed by a late 061200Z ship report near the Mortlock Islands (Satawan Atoll WMO 91338) which observed northwest winds of 30 kt (15 m/s). As a

result, a TCFA was issued at 061700Z.

Just prior to 070000Z, the first aircraft reconnaissance mission was conducted into the disturbance. It located a 25 kt (13 m/s) circulation center at 062238Z approximately 60 nm (111 km) northeast of the Mortlock Islands near 5.8N 154.4E. As the WC-130 exited to the southwest a short time later, a small area of 30 kt (15 m/s) surface winds was observed. This prompted the first warning on Elsie, as a 30 kt (15 m/s) tropical depression, valid at 070000Z.

Elsie was upgraded to a 35 kt (18 m/s) tropical storm at 070600Z based on synoptic data received from the Mortlock Islands. The tropical cyclone briefly attained an intensity of 40 kt at 071200Z.

From the time Elsie was detected until the time JTWC went to warning status, the disturbance had moved to the northwest at about 7 kts (13 km/hr). After 070000Z, however, Elsie accelerated to the northwest as it moved around the western periphery of the subtropical ridge, passing east of Truk (WMO 91334) at about 071000Z. As Elsie moved further north (Figure 3-01-1) it encountered strong southerly winds aloft from an upper-level anticyclone south of Wake Island (WMO 91245). These winds sheared off the central convection. As a result, Elsie quickly lost all organization and rapidly weakened. Its low-level circulation could not be located on satellite imagery or by aircraft reconnaissance after 082100Z. The final warning was issued at 090000Z.

As Elsie passed east of Guam it did enhance the tradewinds, with gusts to 31 kt (16 m/s) observed at the U. S. Naval Oceanography Command Center/Joint Typhoon Warning Center building on Nimitz Hill. After Elsie dissipated, a secondary circulation formed in its wake near Guam and persisted for two days until it also moved to the northeast and dissipated.

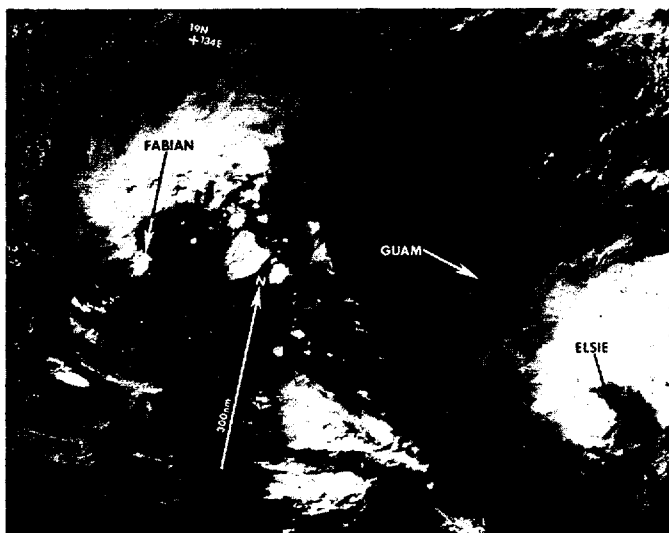
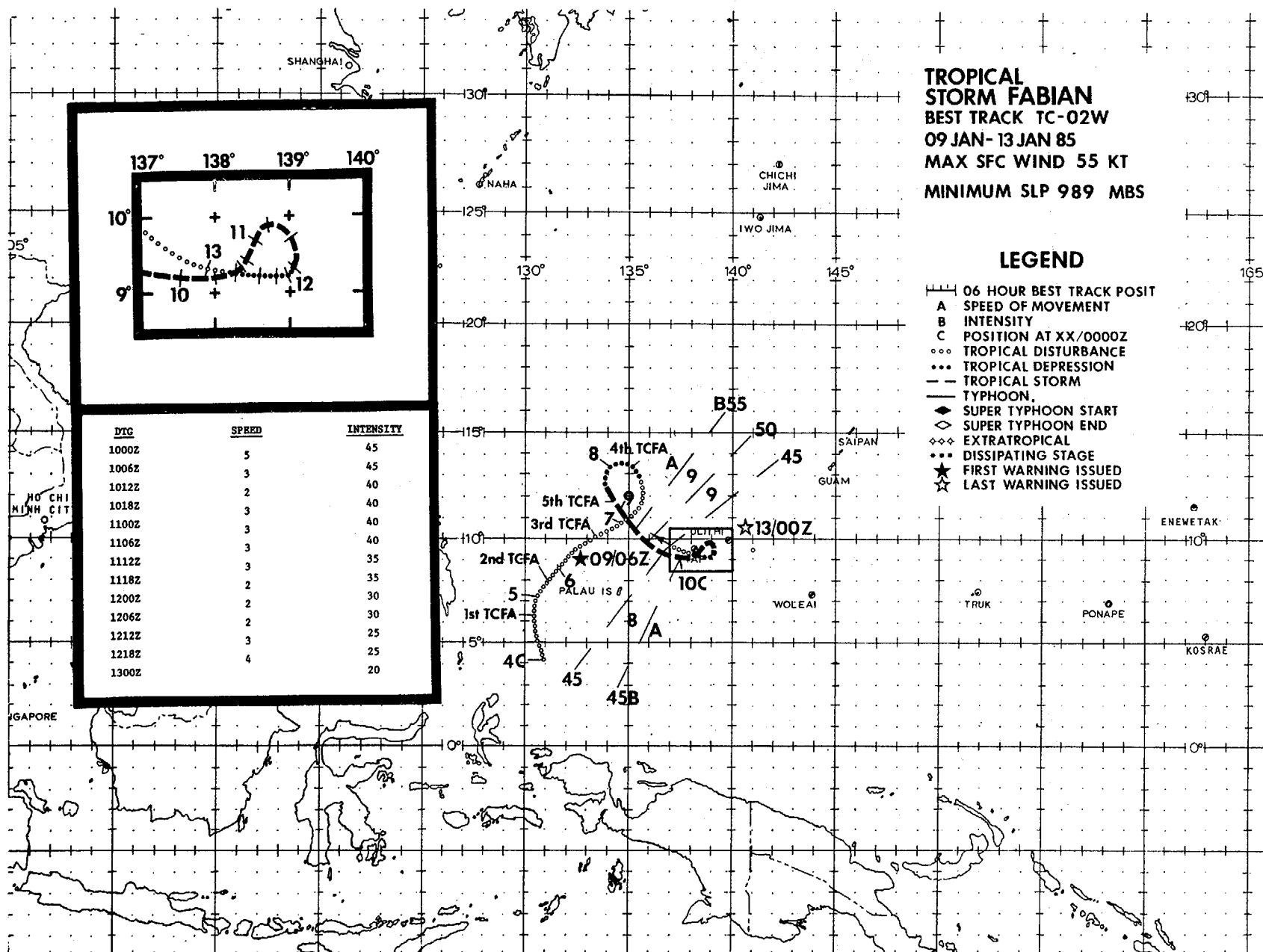


Figure 3-01-1. Tropical Storm Elsie weakening southeast of Guam. Later, strong upper-level winds north of Elsie sheared away the central convection. Rapid weakening and dissipation quickly followed. (The disturbance that would soon develop into Tropical Storm Fabian is located to the northwest of Elsie) (080047Z January DMSP visual imagery).



TROPICAL STORM FABIAN (02W)

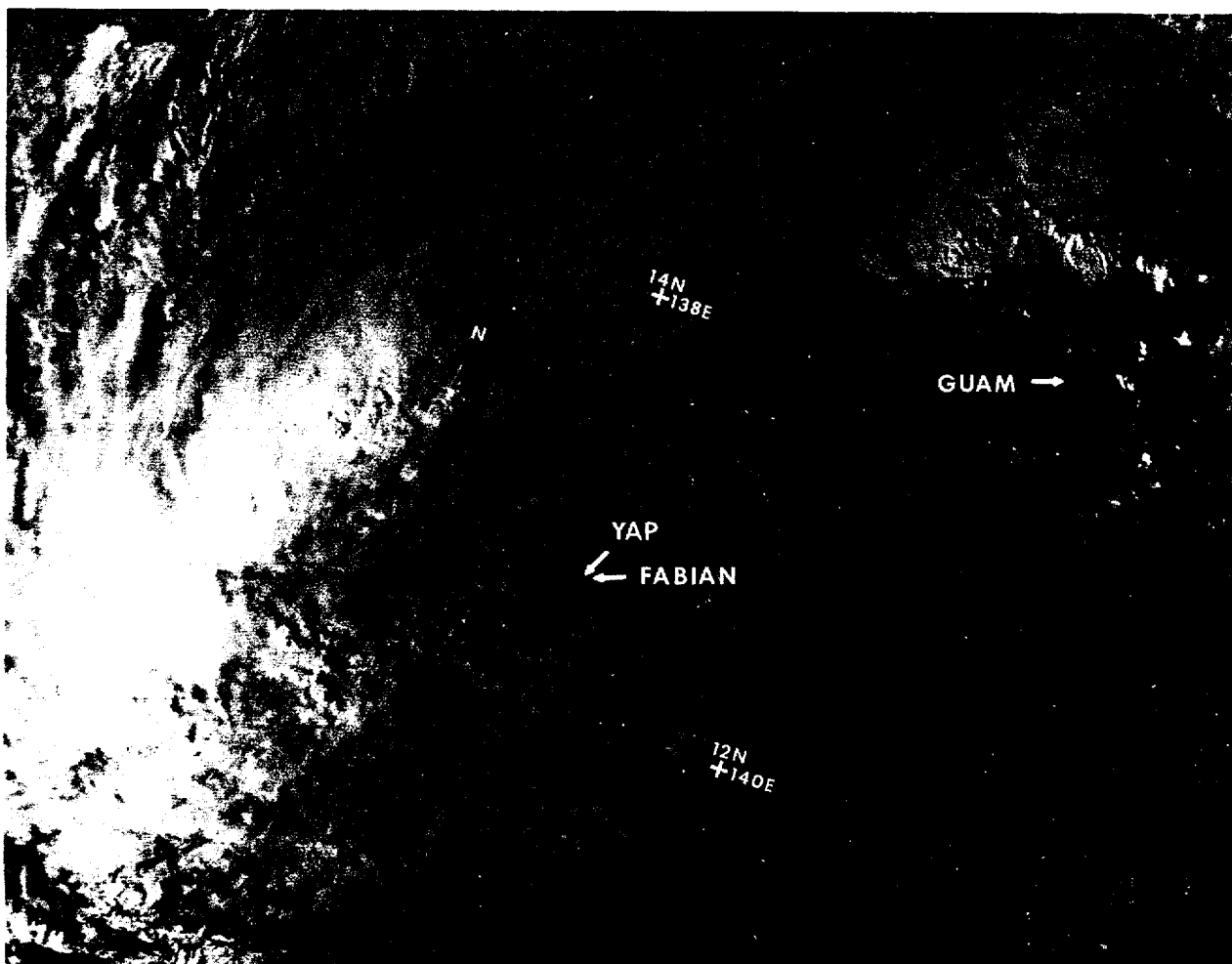


Figure 3-02-1. The development of Tropical Storm Fabian marked the first time in twenty years that two tropical storms formed in WESTPAC during January. Fabian developed at the western end of the near-equatorial trough, and as a result had major interactions with the northeast monsoon. Not surprisingly, the strongest winds were consistently observed in the tropical cyclone's western semi-circle, where the gradient between the low central pressure of Fabian and the higher pressures of the Siberian anticyclone was the greatest. The [above] satellite imagery shows Fabian, as a weakening Tropical Storm, with a well-defined low-level circulation. Fabian's low-level circulation was exposed for much of its lifetime due to strong upper-level winds from the south which sheared the convection to the north. The Tropical Storm passed very close to Yap (WMO 91413) and caused considerable crop damage on some of the outer islands (100630Z January NOAA visual imagery).

TYPHOON GAY
BEST TRACK TC-03W
21 MAY-26 MAY 85
MAX SFC WIND 100 KT
MINIMUM SLP 951 MBS

LEGEND

- 06 HOUR BEST TRACK POSIT
- A SPEED OF MOVEMENT
- B INTENSITY
- C POSITION AT XX/0000Z
- ... TROPICAL DISTURBANCE
- ... TROPICAL DEPRESSION
- TROPICAL STORM
- TYPHOON
- ◆ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- EXTRATROPICAL
- ... DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ☆ LAST WARNING ISSUED

 06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
 ... TROPICAL DISTURBANCE
 ... TROPICAL DEPRESSION
 --- TROPICAL STORM
 --- TYPHOON
 SUPER TYPHOON START
 SUPER TYPHOON END
 EXTRATROPICAL
 ... DISSIPATING STAGE
 ★★ FIRST WARNING ISSUED
 ★ LAST WARNING ISSUED

 06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
 ... TROPICAL DISTURBANCE
 ... TROPICAL DEPRESSION
 --- TROPICAL STORM
 --- TYPHOON
 SUPER TYPHOON START
 SUPER TYPHOON END
 EXTRATROPICAL
 ... DISSIPATING STAGE
 ★★ FIRST WARNING ISSUED
 ★ LAST WARNING ISSUED

Typhoon Gay was the first tropical cyclone to reach typhoon intensity in 1985. It was also the season's first to enter the mid-latitude westerlies and recurve. The formation of Gay followed more than four months of inactivity in WESTPAC and marked the start of the 1985 summer tropical cyclone season.

The tropical disturbance that eventually intensified into Typhoon Gay was first detected by synoptic data on 16 May as a weak surface circulation 380 nm (704 km) west-southwest of Koror (WMO 91408). The convection in this area appeared to be random. Another area of disorganized convection was developing further east along 139E under an area of upper-level diffluence associated with a westward moving upper-level anticyclone. To the north, a tropical upper-tropospheric trough (TUTT) extended from the Volcano Islands southwest to just east of the Philippines. Figure 3-03-1 shows the movements and locations of the upper-level anticyclonic and low-level cyclonic circulations over a five day period as Gay went through its formative stages. Although the upper-level and low-level circulations became nearly vertically aligned on 19 May, the disturbance still struggled for two more days before reaching tropical storm intensity. The most probable cause for this slow intensification was the close proximity of the TUTT to the north, which restricted the upper-level outflow to the northwest (Figure 3-03-2).

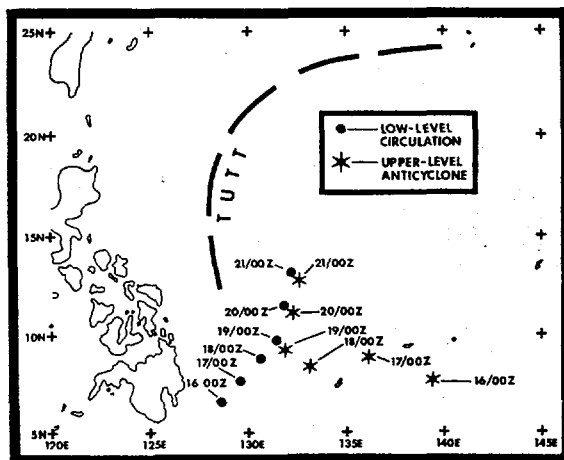


Figure 3-03-1. These plots show the positions and movements of the upper-level anticyclonic and low-level cyclonic circulations during Gay's formative period. The juxtaposition of these upper- and low-level circulations on 19 May usually indicates the tropical cyclone is reaching maturity. However, the presence of the TUTT to the north and northwest is thought to have impeded development through the 21st.

Between 0000Z and 0600Z on the 19th two different tactical DMSP sites, based upon Dvorak intensity analyses of satellite imagery, estimated that the disturbance had 30 kt (15 m/s) surface winds. These increased intensity estimates were founded on the more organized intense convection associated with the upper-level circulation center, which was then displaced approximately 50 nm (93 km) southeast of the surface center. These satellite reconnaissance inputs prompted a TCFA to be issued at 190800Z. At the time of the TCFA, sparse synoptic data near the disturbance center could not confirm the satellite derived intensities. However, synoptic data on the periphery of the disturbance implied that at least a 15 kt (8 m/s) circulation was present. Until this time, the only reported stronger wind was the gradient-level wind at Koror (WMO 91408) which increased from 9 kt (5 m/s) at 171200Z to 27 kt (14 m/s) at 180000Z as the disturbance passed west of the island late on the 17th. For the remainder of the 19th and into the 20th, with the TUTT continuing to exert influence on the disturbance, there was no significant improvement in the tropical cyclone's organization. As a result, the TCFA was reissued at 200700Z.

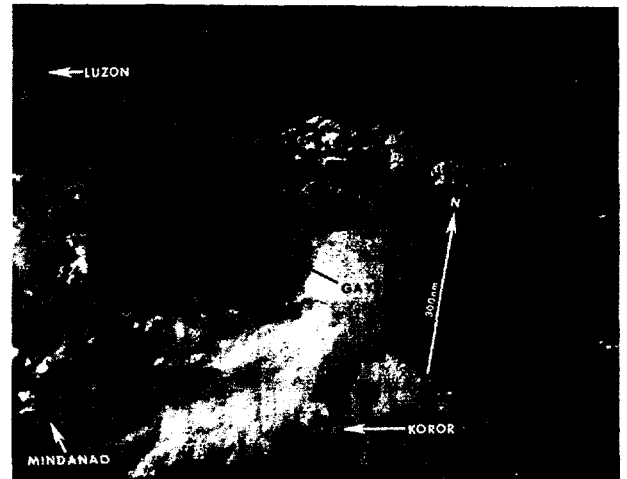


Figure 3-03-2. The tropical disturbance, which would later develop into Typhoon Gay, is interacting with the upper-level trough to the northwest. The outflow is restricted on the northwest side of the tropical cyclone (200518Z May NOAA visual imagery).

The first warning on Gay was issued at 210000Z after visual satellite imagery showed the convection was developing over the low-level circulation and Dvorak intensity analysis estimated that 35 kt (18 m/s) surface winds were present. The presence of the upper-level trough and its restrictive influence on outflow aloft strongly influenced the intensity forecasts on the first nine JTWC warnings. Gay was expected to strengthen only slowly, then maintain

intensity or weaken slightly in the extended outlook periods. These scenarios appeared valid based on satellite derived intensity analyses and forecasts, and on expectations that the upper-level trough would persist. Post-analysis revealed these intensities were consistently low. This was primarily due to the lack of any aircraft reconnaissance or synoptic data confirming the intensity, and partially due to the TUTT weakening faster than expected.

Gay attained typhoon intensity at about 230000Z just prior to the first aircraft reconnaissance penetration at 230830Z. The Aerial Reconnaissance Weather Officer (ARWO) reported Gay as very compact, with 65 kt (33 m/s) surface winds surrounding a 15 nm (28 km) diameter eye, and a 971 mb minimum sea-level pressure (MSLP). Gay's intensification to typhoon strength can be attributed to the significant weakening of the TUTT on the 22nd and to its tight circulation. In this case, the Typhoon's small size allowed it to mature in an area where a larger circulation would have interacted unfavorably with the surrounding atmosphere. Consequently, Gay became vertically stacked and developed a ragged eye while moving northwest with the mid-level steering flow around the western periphery of the subtropical ridge. This set the stage for Typhoon Gay's final phase.

By 230000Z, with a frontal boundary and associated mid-latitude trough quasi-stationary across the Ryukyu Islands, a recurvature scenario seemed most probable. JTWC incorporated this into the warnings and called for recurvature along the subtropical ridge axis near 22N in 48 hours. This scenario was ahead of all forecast aids (Figure 3-03-3), especially the OTCM (One-way Interactive Tropical Cyclone Model), JTWC's best forecast aid. With Gay continuing to intensify and move northwest, Kadena AB (WMO 47931) set Condition of Readiness III at 232230Z. Fortunately, Gay came under the influence of the mid-latitude westerlies and recurved earlier than forecast passing well south of Okinawa. Just prior to Gay's recurvature, another mid-lati-

tude mid-level trough began to dig unseasonably southward across eastern China northwest of Gay. This apparently increased the upper-level outflow ahead of the trough and may be the reason why Gay continued to intensify for 6 to 12 hours after recurvature. Gay reached a peak intensity of 100 kt (51 m/s) between 240600Z and 241200Z (Figure 3-03-4). This intensification correlates well with the studies by Riehl (1972) and Guard (1983) on the intensification of recurving tropical cyclones in WESTPAC.

After recurvature, Gay started a gradual acceleration to the northeast with satellite imagery indicating interaction with the frontal boundary beginning at 241200Z. By 0600Z on the 25th, Gay was entraining modified polar air into the low-level circulation and the eyewall was disintegrating. Extratropical transition had begun and the intense central convection started displacing outward. A steady decrease in convective organization and intensity continued as the mid-latitude trough moved rapidly eastward from the Yellow Sea over Japan. Gay was downgraded to a Tropical Storm at 260000Z.

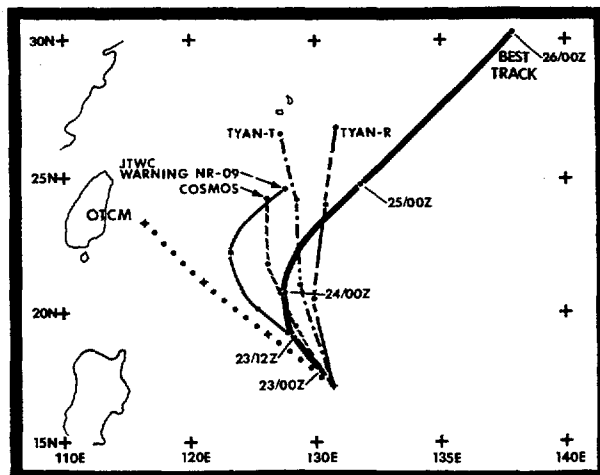


Figure 3-03-3. These plotted forecast aids were available to the Typhoon Duty Officer (TDO) at the time the first recurvature forecast was issued. OTCM, JTWC's best aid, failed to predict the recurvature. OTCM guidance repeatedly failed to forecast recurvature, in this case, until after it had actually occurred!

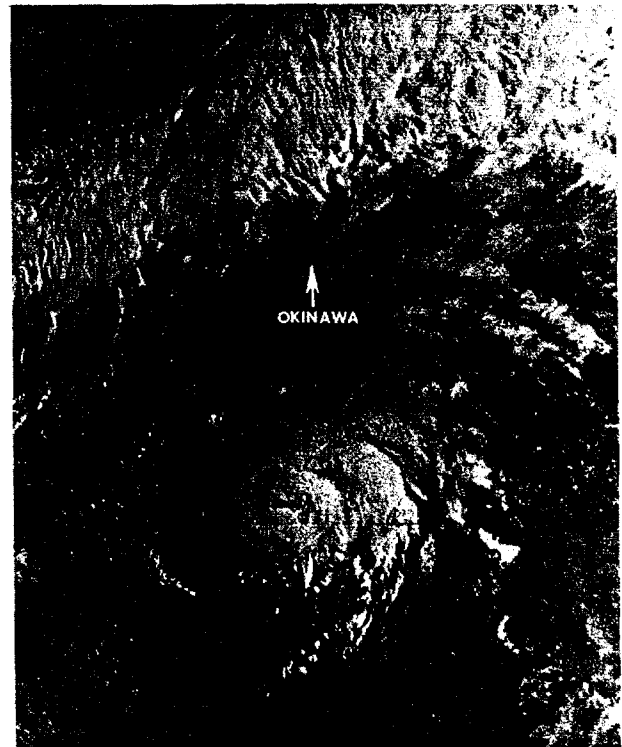


Figure 3-03-4. This early morning picture reveals Typhoon Gay near maximum intensity. (Note Gay's developing eye). The proximity of the frontal boundary to the north led to a recurvature forecast, overruling the the incorrect guidance from the forecast aids (232127Z May DMSP visual imagery).

Figure 3-03-5 shows the effect of the strong vertical wind shear on the remaining convection from the storm's circulation. Gay completed extratropical transition at 260600Z when the final warning was issued.

After completing extratropical transition, the nearly convection free low-level circulation drifted eastward and eventually dissipated. There were no reports of lives lost or damage to shipping from Typhoon Gay.

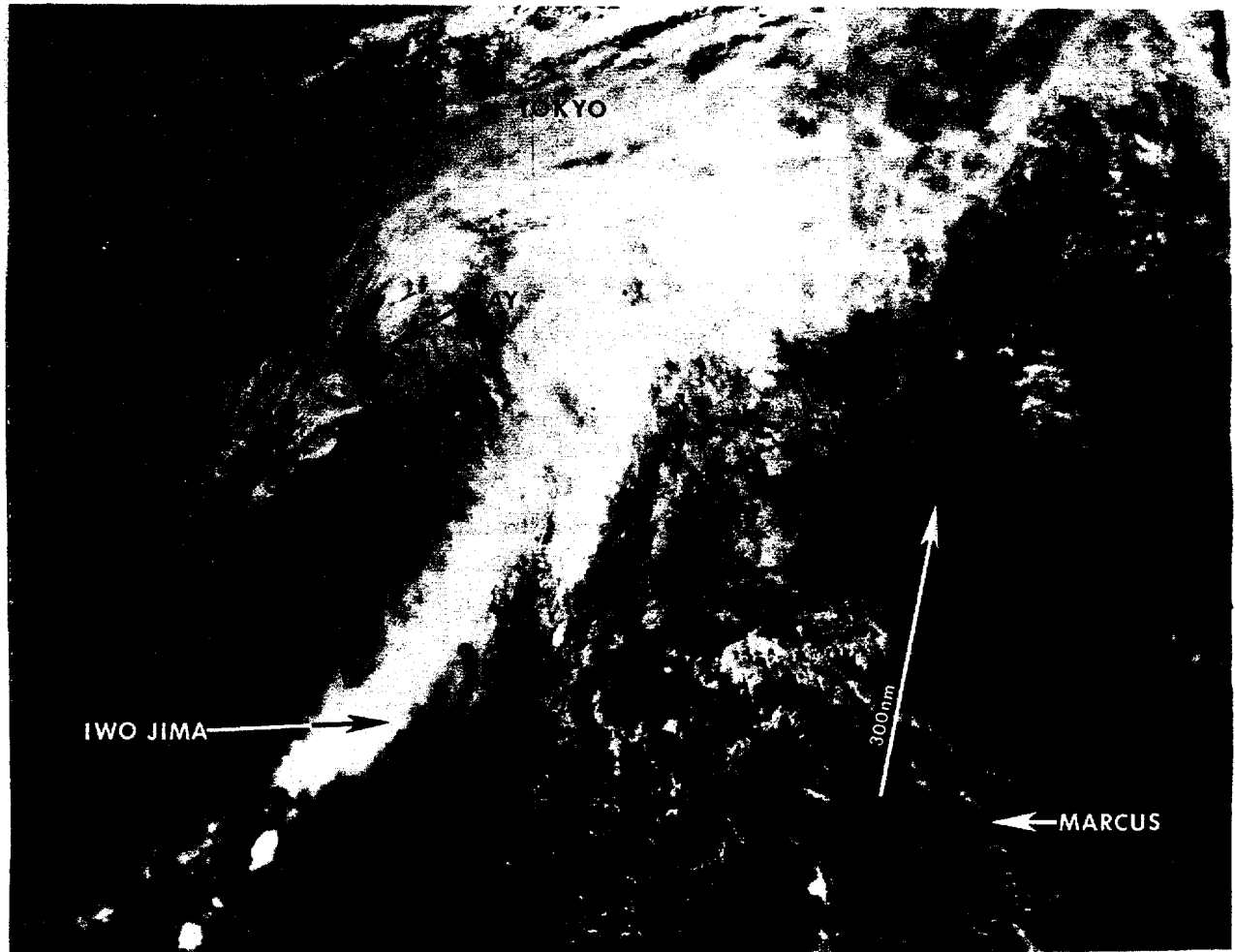
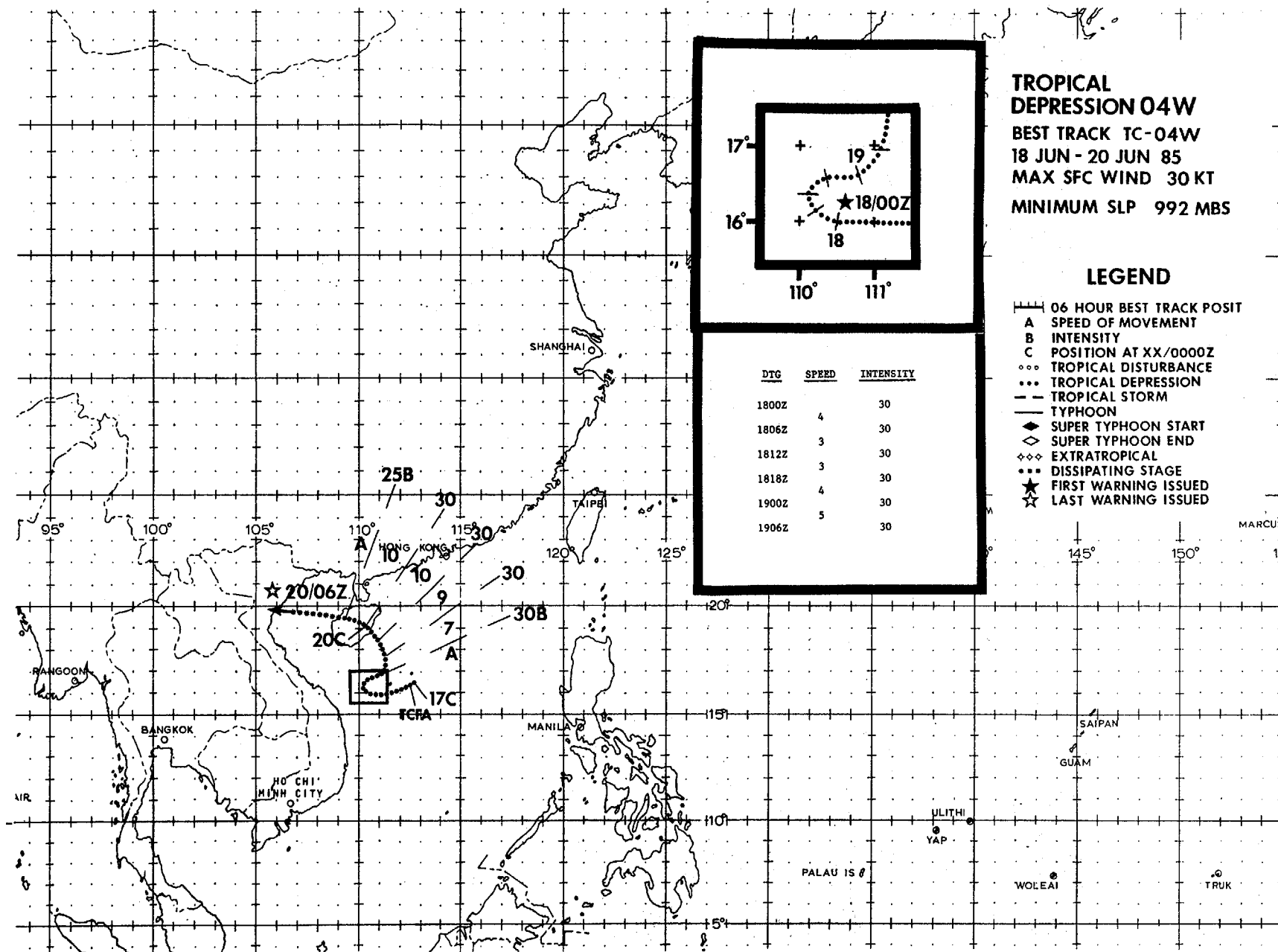


Figure 3-03-5. As Gay completes extratropical transition, the upper-level westerlies are shearing the convection away to the northeast of the low-level circulation center (260413Z May NOAA visual imagery).



TROPICAL DEPRESSION 04W

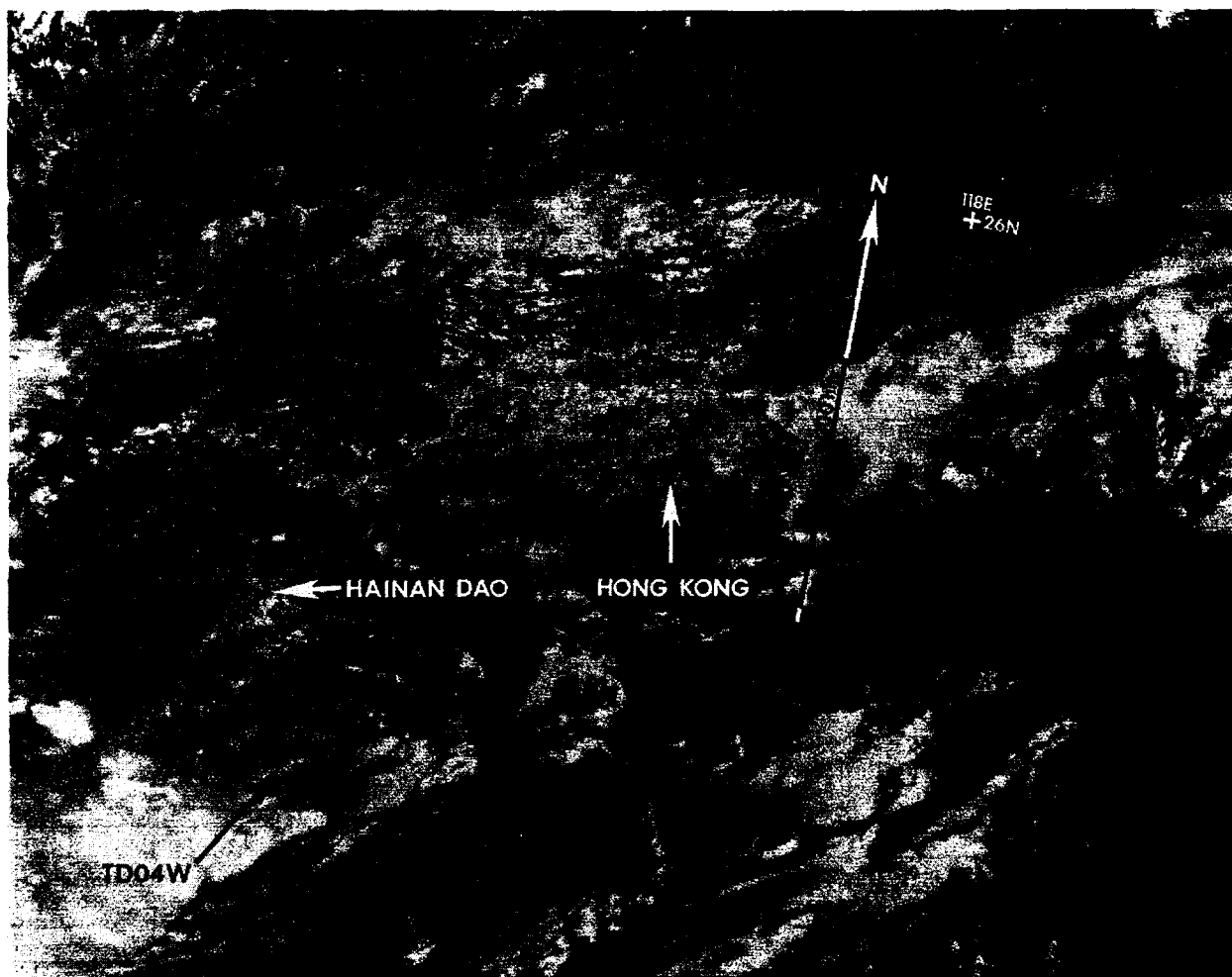
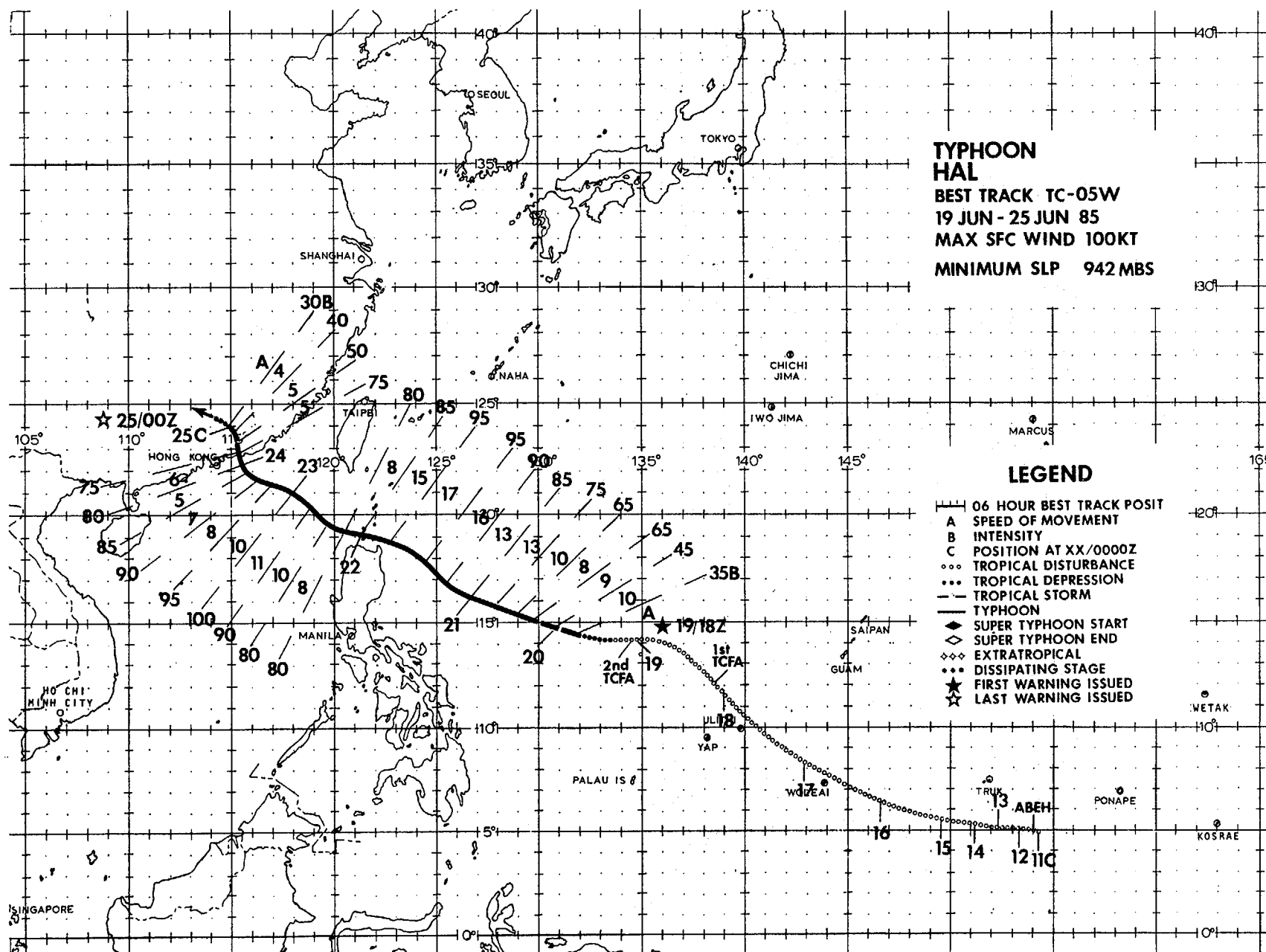


Figure 3-04-1. Tropical Depression 04W developed in the northern end of the monsoon trough in late June and remained embedded in the trough throughout its lifetime. Due to strong vertical wind shear aloft from the northeast, the low-level circulation center was often observed near the northeast edge of the convection (see the above imagery). This strong shearing environment prevented Tropical Depression 04W from intensifying above 30 kt (15 m/s) (190153Z June DMSP visual imagery).



TYPHOON HAL (05W)

Typhoon Hal, the fifth tropical cyclone of the 1985 WESTPAC season, developed from a southwest monsoon trough disturbance. Hal caused considerable forecast difficulties because JTWC's primary forecast aid, OTCM, was unable to resolve a narrow mid-level subtropical ridge due to its relatively coarse grid spacing.

After Typhoon Gay completed extratropical transition on 26 May, a springtime weather pattern returned to the tropical western North Pacific. A strong tropical upper-tropospheric trough (TUTT) became established over most of the area, resulting in strong surface ridging from the Dateline westward to the Malay Peninsula and a large-scale suppression of convective activity. Transient mid-latitude short wave troughs passed north of a quasi-stationary Polar front that extended from near Hainan Island to about 300 nm (556 km) north of Minami-Torishima (WMO 47991). By 1 June, a weak low-level southwest monsoon flow had returned to the South China Sea.

There was a significant surge in the southwest monsoon commencing on 8 June, and by 12 June the low-level southwest monsoon flow extended as far eastward as Guam (WMO 91212).

Typhoon Hal was first detected as a weak tropical disturbance in the near-equatorial trough at 05N 154E on 11 June. The disturbance showed poor organization as it moved slowly westward during the next three days. Most of the intense convection was located west of the low-level circulation center and showed signs of cross-equatorial outflow after 14 June. On the 15th, the disturbance began moving west-northwest and showed signs of increasing organization. By 18 June, the disturbance had merged with the strong low-level southwest monsoon flow and had taken on the characteristics of a monsoon trough disturbance. As shown in Figure 3-05-1, the disturbance was sheared from the north by upper-level flow which left a broad, weak low-level circulation in

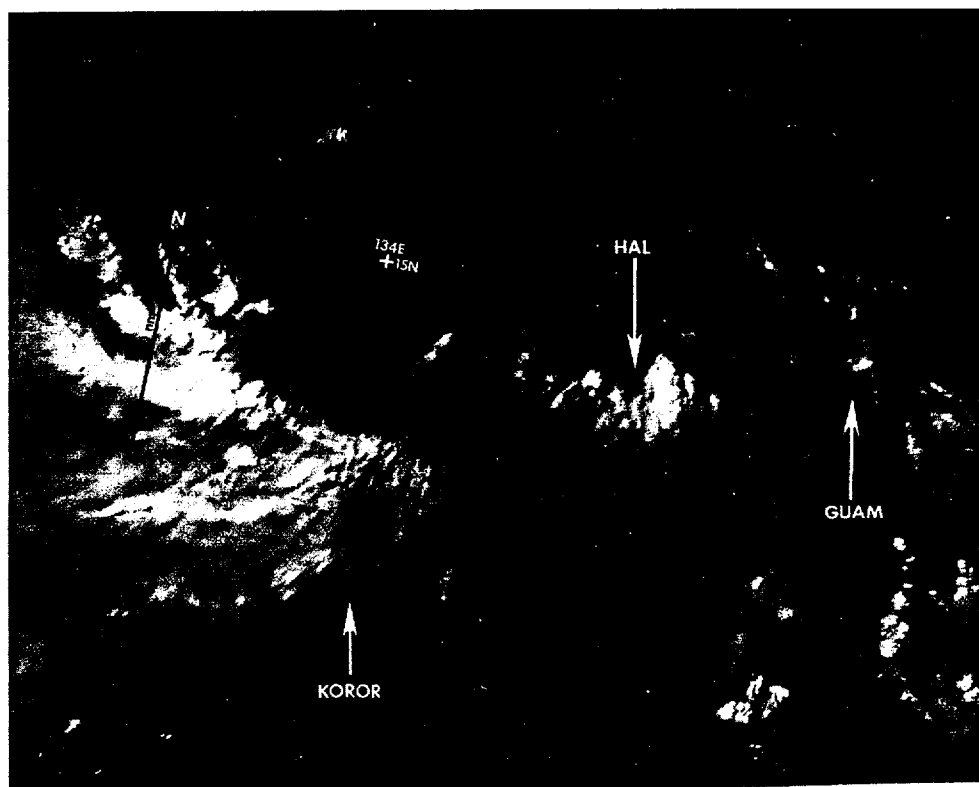


Figure 3-05-1. The tropical disturbance that developed into Typhoon Hal with strong upper-level shear from the north confining the intense convection to the south semicircle. Only scattered cumulus are evident in the north semicircle. The low-level circulation is in the form of a broad trough at this time (180511Z June NOAA visual imagery).

the first warning, the cyclone had reached typhoon intensity. Figure 3-05-2 shows a plot of the aircraft reconnaissance mission flown at that time. Notice the location of the maximum surface winds. In this case, the maximum surface winds are located approximately 90 nm (167 km) from the center of the cyclone. This large separation is a characteristic of many cyclones that evolve from strong monsoon troughs. Typhoon Hal continued intensifying during the next 24-hours and developed a large, ragged eye as shown in Figure 3-05-3. This feature is also a characteristic of this type of cyclone. The satellite picture also shows a TUTT cell located east of

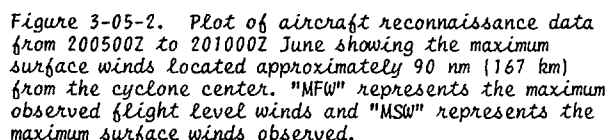




Figure 3-05-3. Typhoon Hal with a large, ragged eye. Most of the intense convection is in the south semicircle. (210109Z June DMSP visual imagery).

Hal that enhanced the upper-level outflow pattern in that direction. Figure 3-05-4 shows Typhoon Hal near the time of its maximum intensity.

Except for a few short-term variations, Hal moved in a west-northwestward direction during its five-day lifetime as a tropical storm and typhoon. This is interpreted in post-analysis as a normal south-of-the-subtropical ridge track movement. Figure 3-05-5 shows the 500 mb wind pattern at

201200Z, 18-hours after the first warning was issued, but still representative of the environment present throughout Hal's lifetime. Note the narrow subtropical ridge north of Hal that extends westward towards China. Based on just this pattern and assuming that it would persist, a forecast track of west-northwest would have been a good choice. However, JTWC's primary forecast guidance, the OTCM (One-way Interactive Tropical Cyclone Model)

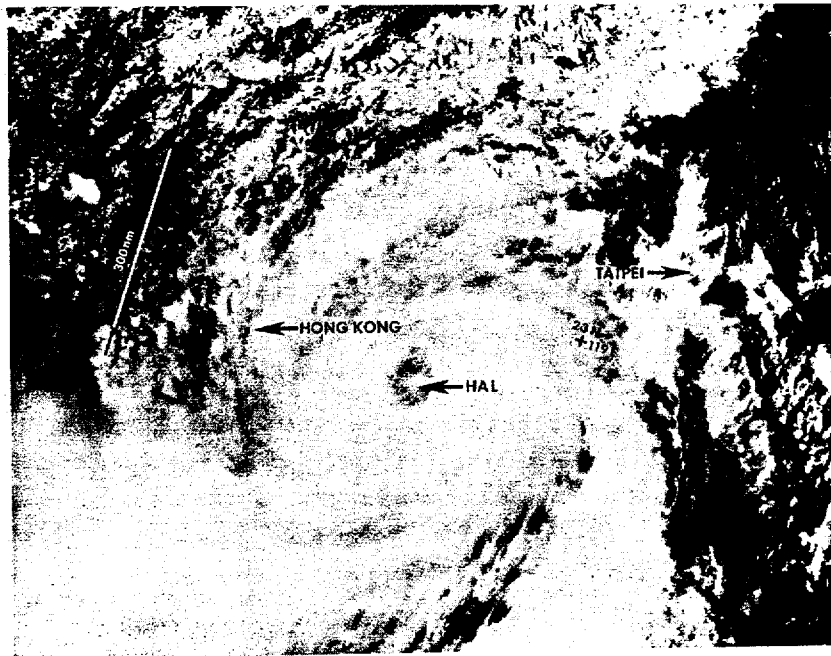


Figure 3-05-4. Typhoon Hal near the time of maximum intensity (230559Z June NOAA visual imagery).

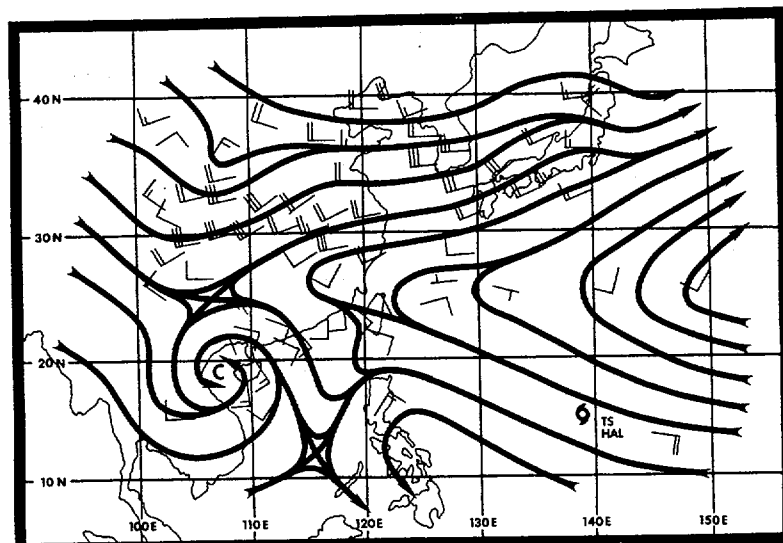


Figure 3-05-5. The 201200Z June 500 mb analysis showing the narrow mid-level subtropical ridge north of Hal. This ridge kept Hal from taking a more northerly course and entering the westerlies, contrary to the guidance provided by OTCM.

consistently indicated a more northward, and even a recurving northeastward, track. Figure 3-05-6 is a plot of the OTCM forecast tracks starting with the one on which the first warning was based. JTWC followed the guidance offered by the OTCM, and as a result, the forecast tracks were consistently north of Hal's actual track. In post-analysis it is apparent that OTCM was unable to resolve the narrow mid-level ridge because of the relatively coarse grid size (205 km) that the model uses. The flow that OTCM "saw" influencing the movement of Hal was the westerlies on the north side of the ridge. This resulted in the northward and recurving component in the OTCM forecasts. This situation will likely arise again in the future years, and will be closely watched for by the forecasters at JTWC as a result of this experience.

The Philippine island of Luzon experienced the strongest effects as the center of Typhoon Hal passed just 30 nm (56 km) off the north coast and westward through the Luzon Straits. The death toll was 23 persons with nine others reported as missing. There was widespread flooding and crop damage. Total damage was estimated at more than \$10 million. Eight crewmen of the US Navy frigate Kirk (FF-1087) were injured when a large wave crashed over the bow. The ship was operating in the South China Sea about 5 nm (9 km) southwest of Subic Bay. High winds caused superficial damage to the hull of the destroyer USS Oldendorf (DD-972) when a drifting, unmanned barge struck the ship while it was moored at Subic Bay. Strong winds tore the barge from its mooring in mid-harbor shortly before the incident occurred. As

Typhoon Irma approached from the east, Subic Bay received 30 in (762 mm) of rainfall during the period 26-28 June as a result of the strong low-level southwest monsoon flow that continued over the area after Hal had moved into China and dissipated as a significant tropical cyclone.

Taiwan was also affected by Typhoon Hal as it caused strong winds and heavy rains. Two people died, 18 injured, and five people listed as missing as a result of the typhoon. Eastern Taiwan experienced the heaviest rainfall, with almost 9 inches (229 mm) being reported. The heavy rainfall caused flooding that was responsible for most of the death, injury, and damage.

Typhoon Hal made landfall approximately 75 nm (139 km) east-northeast of Hong Kong (WMO 45005) at 240500Z. Maximum mean hourly wind speed reported at the Royal Observatory was 22 kt (11 m/s) from the west-northwest, with a peak gust to 49 kt (25 m/s). A gust to 50 kt (26 m/s) was recorded at the Hong Kong International Airport (WMO 45007). Some minor injuries were reported and the property damage was slight. All modes of transportation were disrupted on 23 and 24 June. Heavy rain on 25 and 26 June, after Hal had moved inland, caused numerous landslides in the Hong Kong area with only a few minor injuries.

Over mainland China, 13 more people died with some 40,000 homes and 321,000 acres (130,000 hectares) of crops damaged.

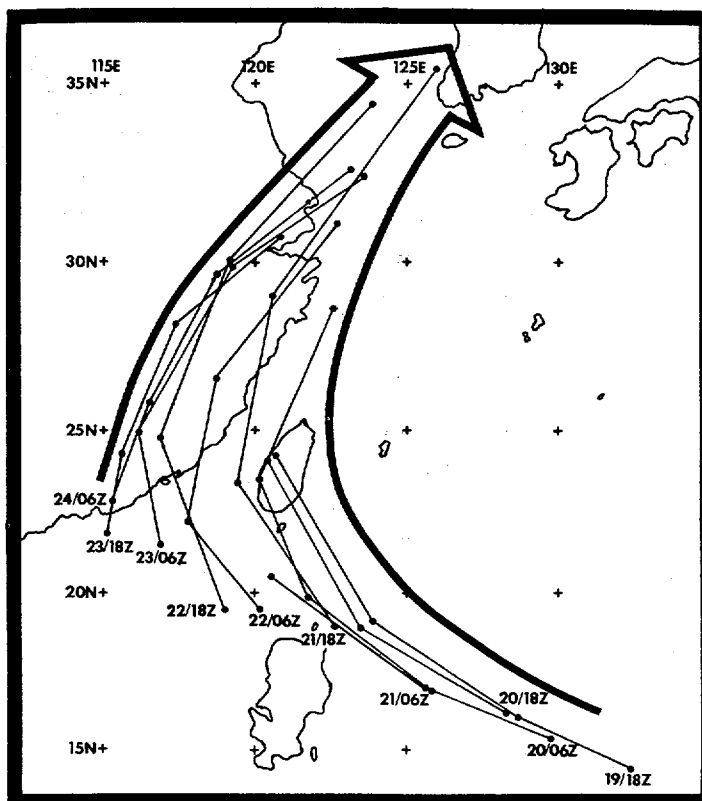
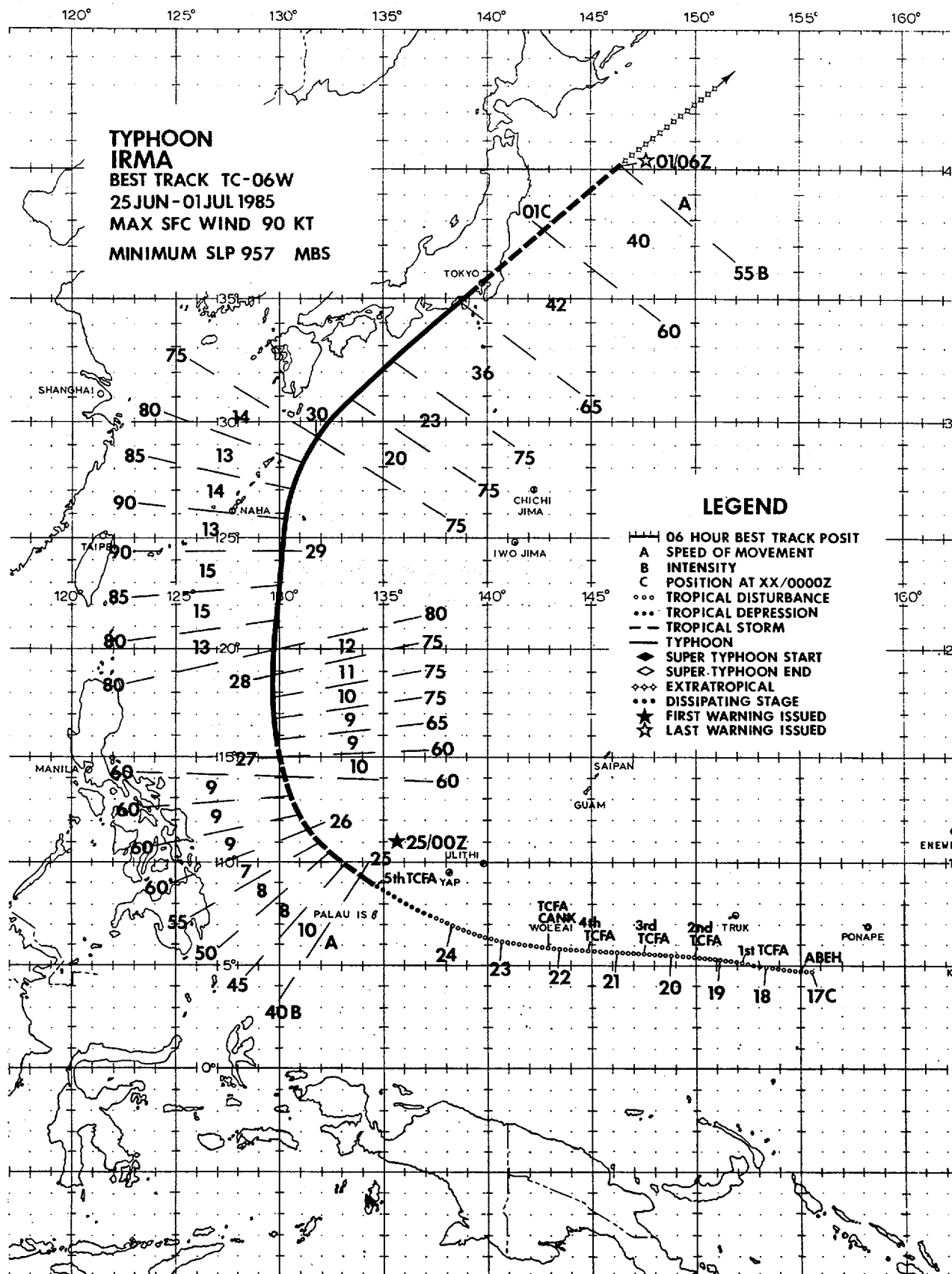


Figure 3-05-6. Plot of the OTCM (One-Way Interactive Tropical Cyclone Model) forecast guidance at 12-hourly intervals starting when the first warning was issued.



Although Typhoon Irma was not one of the more intense systems of the year, it became noteworthy due to the magnitude of property damage and loss of life it caused in the Philippines; and later, by passing directly over the Tokyo metropolitan area. It was the third significant tropical cyclone to develop in June within the monsoon trough and the first (in June) to recurve into the mid-latitude westerlies.

Typhoon Irma originated in the eastern extension of the monsoon trough in mid-June. It was slow to develop, taking eight days to become a tropical storm. At 0000Z on the 17th, the disturbance which later developed into Irma was located approximately 220 nm (407 km) southwest of Ponape (WMO 91348). Synoptic data showed a broad weak surface circulation with winds of 5 to 10 kt (3 to 5 m/s). Another disturbance, which would shortly develop into Typhoon Hal, was located to the northwest in the same trough 270 nm (500 km) east-southeast of Yap (WMO 91413). A broad surface ridge north of both disturbances dominated the northwest Pacific.

When the disturbance was initially mentioned on the 170600Z Significant Tropical Cyclone Advisory (ABEH PGIW), satellite imagery indicated that an upper-level cold low in the tropical upper-tropospheric trough (TUTT) was present northeast of Guam. This upper-level low, which was positioned 7 to 10 degrees of latitude north-northwest of Irma, was contributing to the upper-level diffluence and enhancing the convective activity in the vicinity of the disturbance. The potential for significant tropical cyclone development was evaluated as "fair" (meaning that issuing a TCFA during the advisory period was likely). By 0900Z on the 18th, the disturbance had moved west-northwest and was 150 nm (278 km) south-southeast of Truk (WMO 91334). Satellite imagery indicated the amount of convection was increasing and had more organization. Consequently, a TCFA on the system was issued at 181200Z and aircraft reconnaissance requested for the following day.

Over the next three days satellite imagery showed vigorous, but poorly organized, convection. The aircraft reconnaissance flight on the 19th of June at the 1500 ft (457 m) level was unable to locate a circulation center and reported a MSLP of 1006 mb. On the following day, aircraft reconnaissance found a surface circulation with a 5 nm (9 km) diameter area of light and variable surface winds, a drop in the MSLP of 4 millibars from the previous day and surface winds of 10 to 20 kt (5 to 10 m/s). The flow aloft over the disturbance was hampered by in-

creased outflow from Hal to the west. During this period TCFAs were re-issued at 1200Z on the 19th through the 21st of June. Early on the 22nd, the convection within the disturbance became so suppressed that the TCFA was cancelled at 220500Z.

Unfavorable vertical shear from Hal hindered development of the disturbance until the 24th. The 241200Z synoptic data showed increasing southwesterly low-level flow entering the disturbance. This coincided with Typhoon Hal making landfall over southern China. Subsequent satellite imagery at 241600Z revealed a significant increase in the size of the central cloud mass. The fifth, and final, TCFA on this system followed at 241730Z.

With Hal weakening overland in mainland China, Irma now began to intensify in earnest. The first warning on the system was issued at 250143Z, after the Dvorak intensity analysis of the 250000Z satellite imagery showed the disturbance had increased to tropical storm intensity. Aircraft reconnaissance later in the day (250516Z) located a 994 mb circulation center with 45 kt (23 m/s) maximum surface winds 90 nm (167 km) east-northeast of the center.

The initial forecasts called for Irma to follow in Hal's footsteps up the monsoon trough into the South China Sea and around the subtropical ridge. Due to the uncertainty about the analysis over the data sparse Philippine Sea, 400 mb synoptic track aircraft missions were flown on 25 and 26 June to help define the mid-level flow to the north of Irma. These flights confirmed the presence of lower 400 mb heights in the ridge along 130E, which indicated the ridge would not steer Irma into the South China Seas as it had done with Hal. JTWC now forecast a more northward movement with eventual recurvature to the northeast. This forecast scenario proved correct.

Irma slowed slightly as it approached the end of the ridge at 130E longitude and continued to intensify. Early on the 27th, Irma attained typhoon intensity as verified by synoptic ship observations of 65 kt (33 m/s) north-northeast of the center and the Dvorak intensity analysis. For the next two days (Figure 3-06-1) Irma moved northward and reached a maximum intensity of 90 kt (46 m/s) with a MSLP of 957 mb at 290000Z.

Along with reaching maximum intensity, Irma also came under the influence of the mid-latitude westerlies. Within 24-hours, Irma was accelerating rapidly to the northeast headed for Tokyo and the

Kanto Plain area of Japan's Honshu Island. Simultaneously, the system began weakening and undergoing extratropical transition. Aircraft reconnaissance on the 30th indicated entrainment of the cooler, drier air into the system. The Aerial Reconnaissance Weather Officer (ARWO), at 300817Z, reported a 30 nm (56 km) elliptical eye with a slight tilt to the north-northeast.

By 010600Z, Irma had completed extratropical transition and the last warning was issued. The remains of Irma continued to move northeast toward the Kuril Islands where it merged with a complex low pressure area just south of the Kamchatka Peninsula.

In summary, as the Typhoon passed east of the Philippines on 28 and 29 June, heavy rains associated

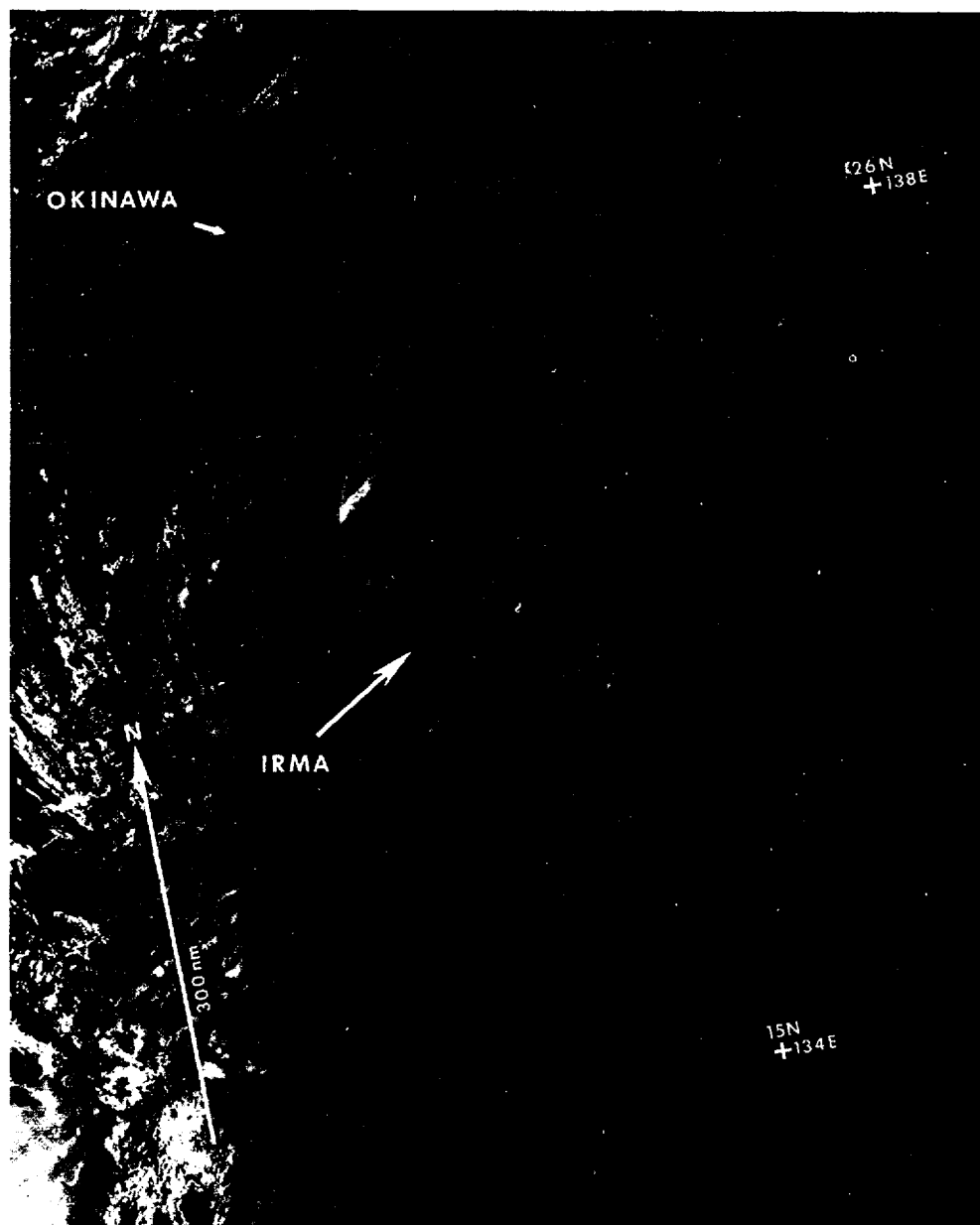


Figure 3-06-1. Irma, with maximum winds of 80 kt (41 m/s), nearing peak intensity south of Okinawa, Japan. (With the sun low in the west the cloud top topography is striking) (280931Z June DMSP visual imagery).

with the strong south westerly monsoon flow from the South China Sea across the island of Luzon produced more than 28 inches (711 mm) of rain. Flooding was widespread across areas of Manila and other sections of Luzon. At least 46 people perished in these floods; additionally, over 1,500 lost their homes. Later, when Irma made landfall on the southeastern tip of Honshu at 301800Z, maximum winds were estimated at 65 kt (33 m/s). The Naval Oceanography Command Facility at Yokosuka reported maximum winds

of 51 kt (26 m/s) with a peak gust to 83 kt (43 m/s). The associated barograph trace is shown in Figure 3-06-2. Various military activities at Yokosuka reported minor damage and flooding, but no significant personal injuries. However, Japan police reported three deaths and five people were missing as a result of Irma. Twelve bridges were reported out, flood damage occurred to over 20,000 homes and power outages affected about 440,000 households.

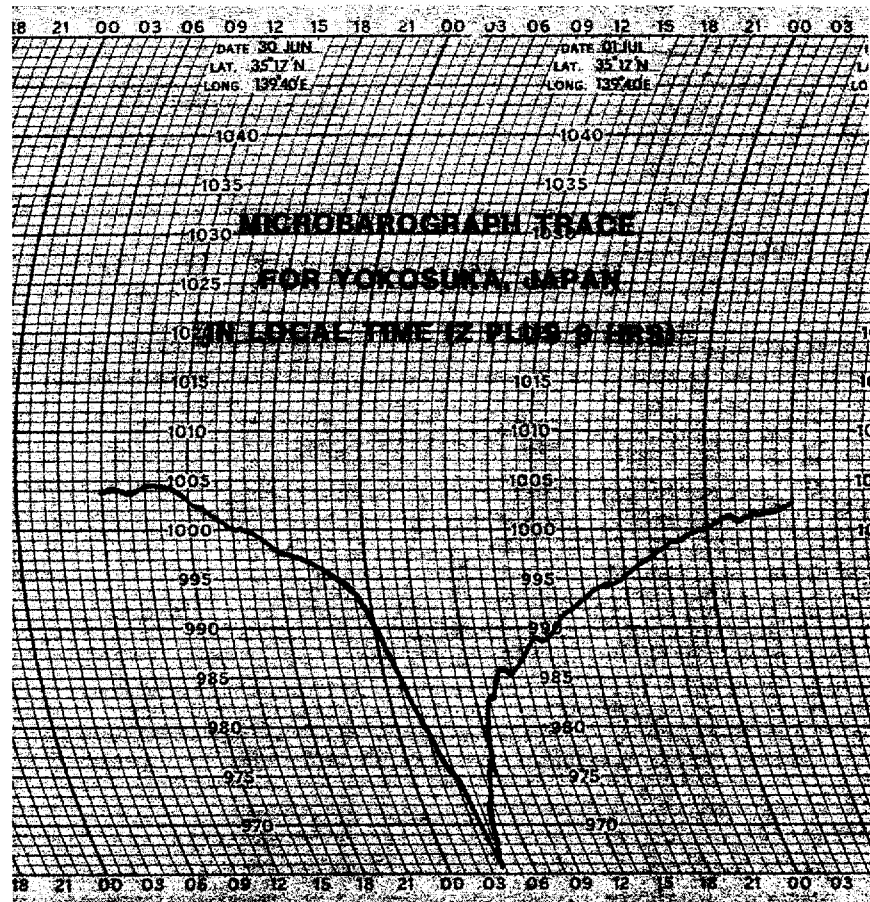
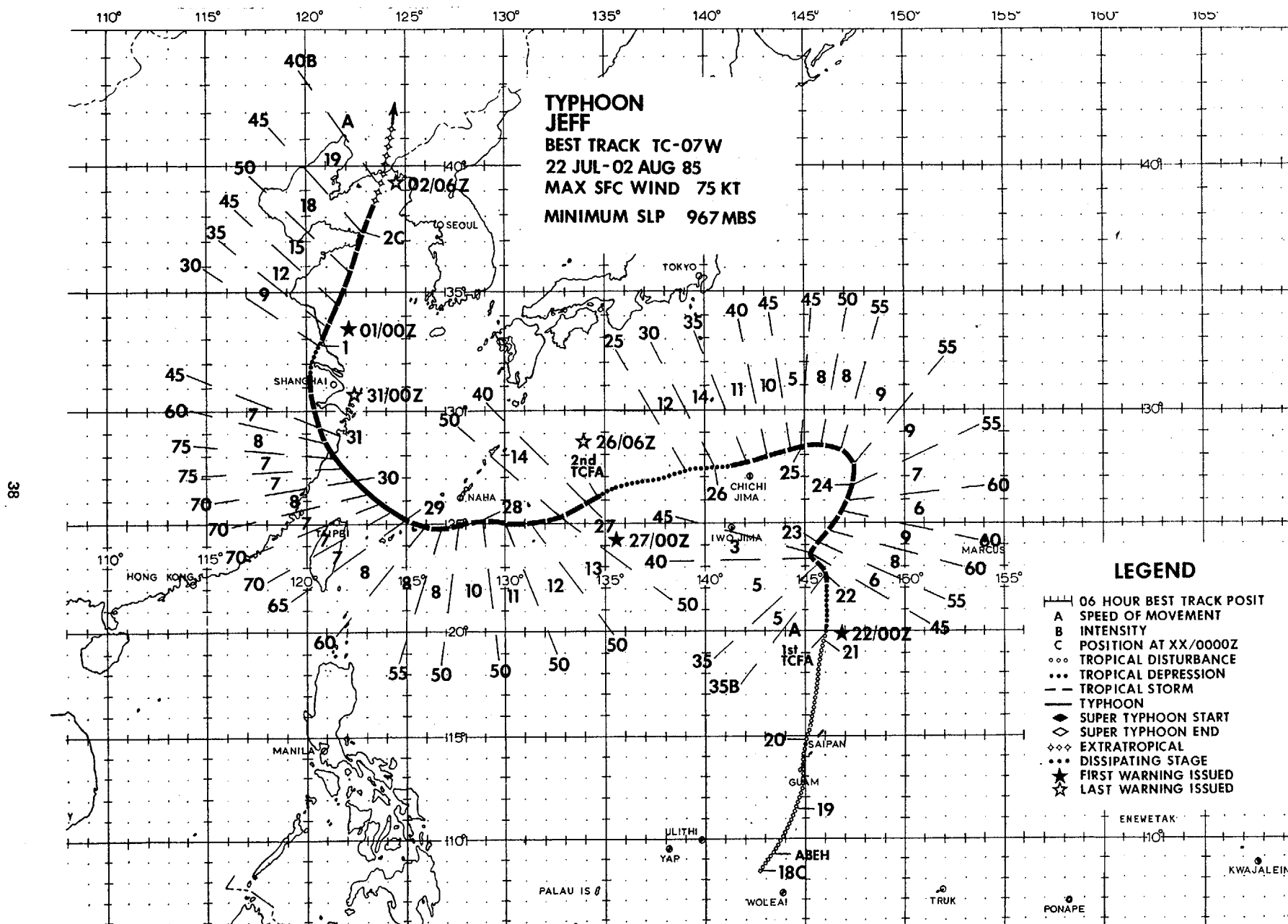


Figure 3-06-2. Barograph trace from the Naval Oceanography Command Facility in Yokosuka documenting Irma's passage over the Kanto Plain. The minimum sea-level pressure recorded was 963.3 mb at 301930Z.



TYPHOON JEFF (07W)

Typhoon Jeff was the longest-lived tropical cyclone of the 1985 season. It required a total of forty-one warnings and was finalled by JTWC on three separate occasions. During its twelve day life span, Jeff peaked in intensity three times: once east of the island of Iwo Jima; once west of Okinawa, Japan; and the third time over the Yellow Sea. Jeff, as it turned out, would be the only tropical cyclone to develop during July, a month that normally produces five cyclones.

After Typhoon Irma became extratropical on 1 July, tropical activity in the western North Pacific decreased. One significant tropical disturbance developed east of the Philippines on 4 July and moved into the South China Sea on the 6th before dissipating east of Hong Kong (WMO 45005) on 8 July. This disturbance was the subject of a TCFA from the 4th through the 7th. After this disturbance dissipated, the tropics stayed inactive until Typhoon Jeff developed a week later.

The low-level circulation which was to mature into Typhoon Jeff, was spawned in the monsoon trough south of Guam on 18 July in a broad area of disorganized cloudiness that stretched along ten degrees north latitude. Consolidating slowly, the system drifted northward across the island of Guam and through the northern Marianas, bringing little more than increased rainshower activity. Three days after genesis, the development of persistent central convection and better cloud organization prompted a TCFA, valid at 210200Z. Aircraft reconnaissance into the disturbance a few hours later was unable to locate a surface circulation, but instead found a broad trough with 10 to 15 kt (5 to 8 m/s) surface winds and a MSLP of 1006 mb. Early the next morning, a second aircraft reconnaissance mission found a tropical depression with a 1002 mb central pressure. As a result, the first warning was issued at 220000Z. For the next two days Jeff continued to intensify, reaching a peak of 60 kt (31 m/s) on the 23rd.

Up to this point, the steering flow had remained weak. Initially, Jeff's movement had been to the northwest, but then changed to the northeast in response to the approach of a mid-latitude trough from the northwest. Forecasting recurvature into the mid-latitude westerlies ahead of the trough was the most attractive possibility, especially since the tropical cyclone was already at 25N latitude and had been steadily tracking northeastward for nearly 24-hours. In contrast to the persistent northeasterly movement, both numerical forecast aids (NTCM and OTCM) consistently indicated a northwesterly track. Because of the major difference between what was actually happening and the guidance provided by the aids, the possibility of a return to a westerly or northwesterly track was still considered. The "less" likely alternative forecast scenario, i.e. northwestward movement, was repeatedly

mentioned in the Prognostic Reasoning Messages (WDPAL PGTW), but the official forecast was for recurvature. Unfortunately, the "more" likely recurvature scenario to the northeast did not last long.

Late on the 23rd as the trough approached, vertical wind shear from the west increased over the system. It soon became apparent that Jeff was weakening and the persistent central convection was shearing away to the east (Figure 3-07-1). The mid-latitude trough passed to the east on the 24th, leaving behind Jeff's exposed low-level circulation.

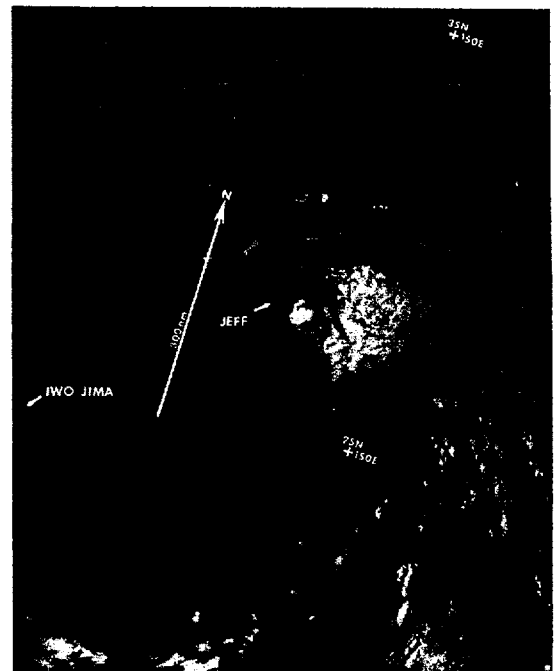


Figure 3-07-1. The low-level center of Tropical Storm Jeff located near the western edge of the central dense overcast. Strong upper-level westerly winds are shearing away the central convection to the east and will soon expose the low-level circulation center (240318Z July NOAA visual imagery).

The residual low-level vortex then began to move westward, embedded in the southeastern portion of the low- to mid-level anticyclone which was centered over northern Honshu. Without any regeneration of the central convection on the 25th or the 26th, Jeff

continued to weaken. By 260600Z the maximum surface winds had dropped below 30 kt (15 m/s). Despite the fact that a well-defined low-level circulation was still present, the lack of persistent central convection and the systems rapid movement to the west-southwest made further development seem unlikely (Figure 3-07-2). As a consequence, the final warning was issued at 260600Z, with the caveat that "the system will be closely monitored for indications of possible regeneration." That was precisely what happened! Almost immediately after Jeff was finalled, convection began to redevelop about the low-level center since the shearing influence of the trough was absent.

Throughout the night of the 26th Jeff regenerated, and JWC immediately alerted Kadena AB (WMO 47931) and other customers on Okinawa of the change. Weather satellite reconnaissance revealed a dramatic increase in central convection when warnings were again issued on Jeff, as a 35 kt (18 m/s) Tropical Storm, at 270000Z (Figure 3-07-3). Because Jeff was less than 24-hours from affecting Okinawa, Kadena AB went to Condition of Readiness III as a precaution. As Jeff neared Okinawa it slowed, passing about 75 nm south of Okinawa at 280530Z. The warnings verified well. Maximum sustained winds at Kadena AB were 25 kt (13 m/s), with a peak gust to

39 kt (20 m/s) at 280208Z. Naha (WMO 47930) had a peak gust of 47 kt (24 m/s) at 280355Z. Eighteen hours after passing south of Okinawa, Jeff attained typhoon intensity. By that time, the Typhoon had turned to the west-northwest as it started to move around the western side of the subtropical ridge. Further intensification to a peak of 75 kt (39 m/s) occurred as Typhoon Jeff approached, and made land-fall on, the coast of mainland China approximately 180 nm (333 km) south of Shanghai (WMO 58367) (Figure 3-07-4). Once onshore, surface frictional effects caused a rapid decrease in maximum winds. The persistent central convection began to fall apart and, once again, the system was finalled, although "movement back off the coast and regeneration in the Yellow Sea" remained a distinct possibility (Figure 3-07-5).

Indeed, Jeff was not finished yet. Warning number 36 was issued at 0000Z on 1 August as meteorological satellite reconnaissance reported significantly increased convection over water. The track was now to the north-northeast around the western edge of the subtropical ridge. Acceleration was gradual as Jeff redeveloped maximum surface winds of 50 kt (26 m/s) by 1800Z on 1 August. Strong south-westerly winds aloft hindered the system's attempt to further intensify and achieve vertical alignment

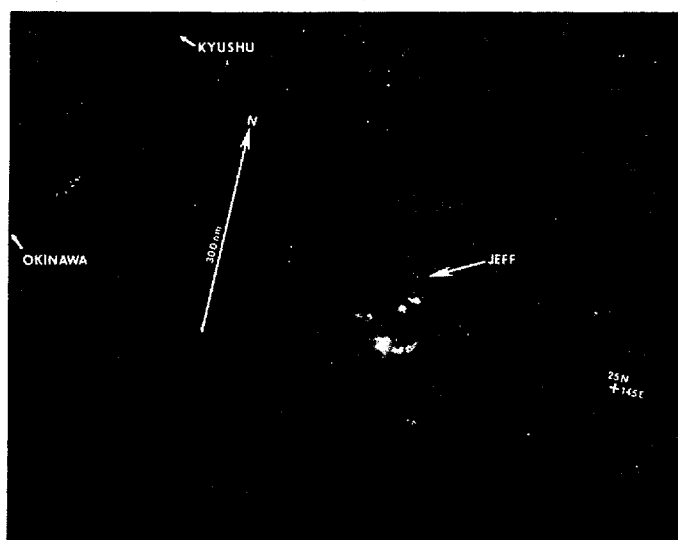


Figure 3-07-2. The nearly convection free low-level circulation of Jeff as it was finalled for the first time (260508Z July NOAA visual imagery).

Figure 3-07-3. Typhoon Jeff just after its dramatic regeneration during the night (270048Z July DMSP visual imagery).



between the low-level cyclone and anticyclone aloft. Then, at 0600Z on 2 August Jeff was finalled for the third and last time after completing extratropical transition in the northern Yellow Sea.

In retrospect, eastern China bore the brunt of Typhoon Jeff. The provinces of Shanghai and coastal Zhejiang were battered. News reports indi-

cated at least 180 people were killed, 1400 injured and tens of thousands left homeless. In addition, 1400 watercraft, mostly fishing boats, were lost or badly damaged. Some 75,000 acres (30,352 hectares) of crops were destroyed and another 400,000 acres (161,878 hectares) badly damaged, by the typhoon. China's irrigation network was severely disrupted by flooding.

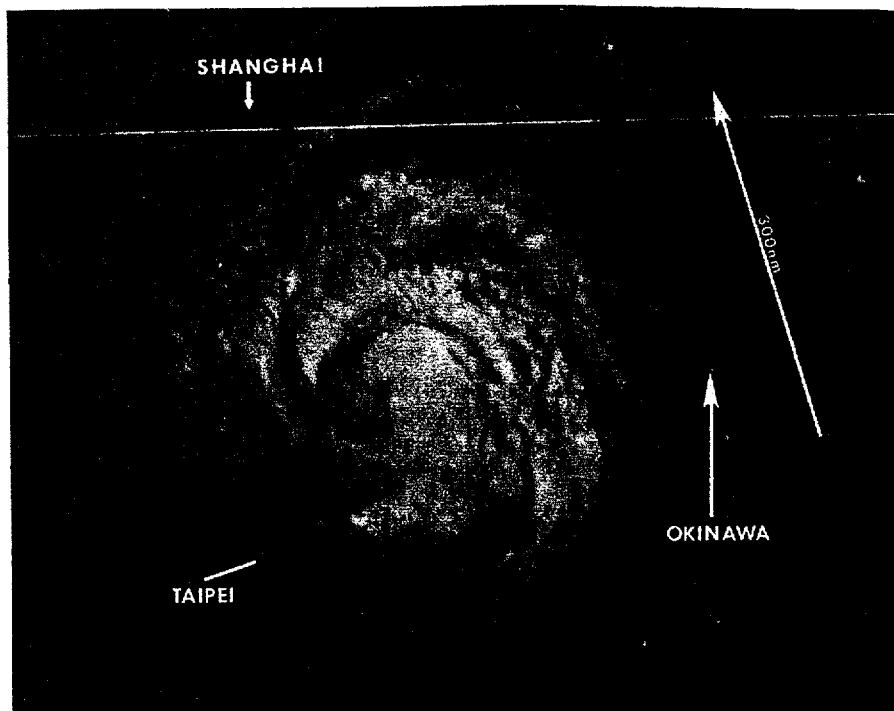


Figure 3-07-4. Typhoon Jeff near maximum intensity less than 18-hours from making landfall over eastern mainland China. During the hours immediately preceding landfall, a small banding eye formed (292303Z July NOAA visual imagery).

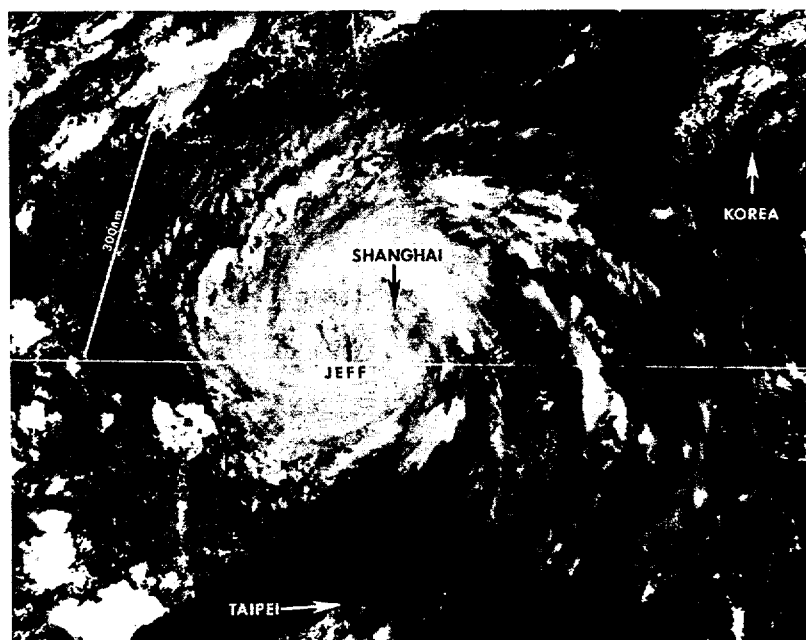
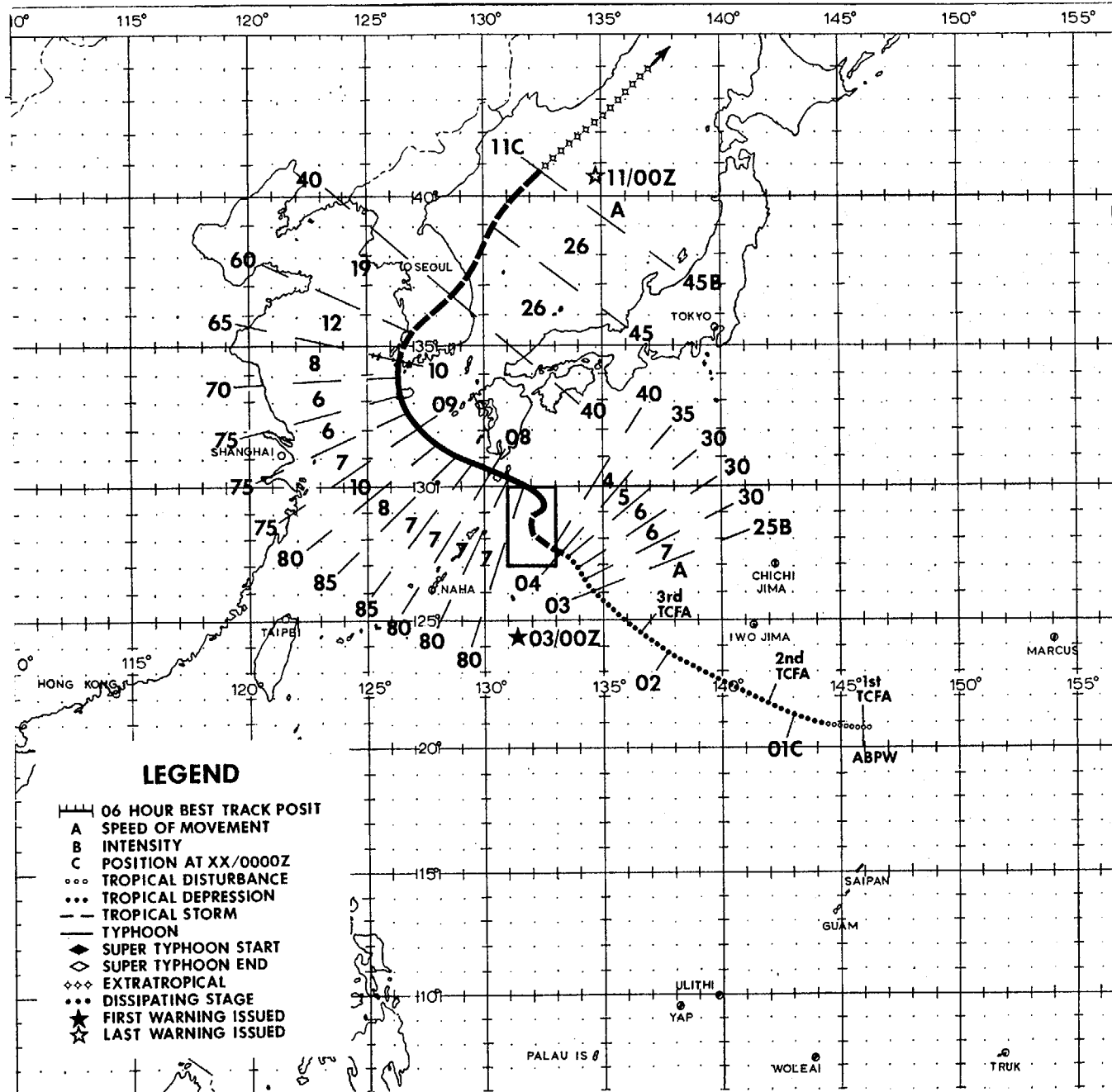
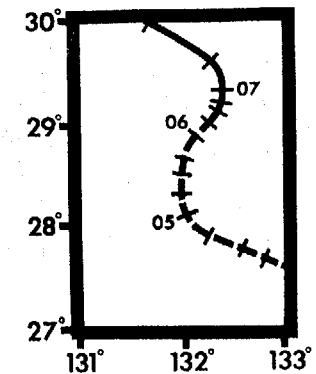


Figure 3-07-5. Jeff over mainland China after being finalled for the second time. Jeff spent nearly 36 hours over mainland China before moving back over open water and reintensifying (310556Z July NOAA visual imagery).



TYPHOON KIT

BEST TRACK TC-08W
03 AUG-11 AUG 1985
MAX SFC WIND 85 KT
MINIMUM SLP 959 MBS



DTG	SPEED	INTENSITY
0406Z	4	40
0412Z	3	45
0418Z	3	45
0500Z	2	50
0506Z	2	55
0512Z	2	55
0518Z	2	55
0600Z	2	60
0606Z	2	65
0612Z	2	70
0618Z	1	75
0700Z	1	80
0706Z	3	80
0712Z	7	80

Typhoon Kit was the first of seven tropical cyclones to reach warning status during August 1985. As was the case with its predecessor, Typhoon Jeff, Kit's recurvature posed considerable forecast problems. Like many WESTPAC tropical cyclones, Kit developed from an area of increased convection in the eastern portion of the monsoon trough.

As the remnants of Typhoon Jeff transited eastern China, satellite imagery early on 31 July showed that a possible circulation with good convective organization was rapidly forming north of Guam. This area of disturbed weather was developing at the northeast end of the monsoon trough, which at the time was linked to the trailing end of an old frontal boundary. The presence of this frontal boundary may have provided some initial low-level cyclonic shear to account for the system's rapid formation. Synoptic data indicated that a low-level circulation was present in the disturbed area with winds of 10 to 20 kt (5 to 10 m/s) and a MSLP of 1004 mb. The disturbance was mentioned on the Significant Tropical Advisory (ABEH PGTW) at 310451Z, but development was so rapid and the satellite signature so impressive, that a TCFA was issued by 310600Z. No significant additional development occurred overnight, however, as the system moved to the west-northwest. The first aircraft reconnaissance mission into the disturbance the following day found winds of only 20 kt (10 m/s) on the west side of a 1004 mb surface trough. The TCFA was reissued on the 1st as development still appeared likely. Follow-on aircraft reconnaissance was requested for the 2nd. This time the investigative mission located a 30 nm (56 km) wide surface circulation center with better organized winds of 10 to 20 kt (5 to 10 m/s) and a MSLP of 1005 mb, one millibar higher than on the previous day. A third TCFA followed at 020600Z as the disturbance tracked to the northwest. Aircraft reconnaissance was again requested.

The next aircraft reconnaissance mission flew into the system late on the 2nd, closed a circulation at 022204Z and reported that the MSLP had decreased to 1000 mb. Both aircraft and synoptic data now indicated 25 kt (13 m/s) surface winds near the center. JTWC responded by issuing the first warning on Tropical Depression 08W valid at 030000Z. During the next 24-hours the tropical depression slowly intensified while moving to the northwest along the southern periphery of a high pressure ridge located over Japan.

Tropical Depression 08W was upgraded to Tropical Storm Kit at 040000Z after aircraft reconnaissance

reported 35 kt (18 m/s) winds in all quadrants. Once upgraded, Kit continued to intensify and move slowly west-northwestward for the next 24 hours. Extended forecasts, based on FNOC's NOGAPS prognoses, indicated that Kit would move northwestward around the ridge which was expected to be displaced southeastward in advance of an approaching trough. This would result in Kit recurving to the northeast after 36 hours and eventually make landfall on Japan (Figure 3-08-1). However, the trough was weaker than forecast so instead of eroding the ridge and allowing Kit to recurve into the westerlies, the trough only temporarily weakened the ridge as it passed to the north. Kit responded to the trough passage by slowing and turning to the north on the 5th. Typhoon Kit then moved slowly northward through the 6th and into the 7th while continuing to intensify. By the 7th the trough had passed to the east and the tropical cyclone was left in the weakness between the subtropical ridge to the east and a weaker anti-cyclone over mainland China. With the passage of the mid-latitude trough over the subtropical ridge, the ridge began to build westward on the 7th. Kit responded by resuming a course to the west-northwest and intensifying (Figure 3-08-2). Kit attained its maximum intensity of 85 kt (44 m/s) at 080600Z southwest of Kyushu as it moved into the East China Sea. With FNOC's NOGAPS progs indicating another mid-latitude trough approaching from the west, and Kit definitely nearing the western end of the subtropical ridge axis, recurvature over South Korea, with extratropical transition in the Sea of Japan, appeared likely. After 081200Z, Kit began to weaken as relatively cooler and drier low-level air was entrained into the vortex's southwest quadrant.

Kit recurved south of the Korean peninsula and was barely at typhoon strength when landfall occurred on the southwest tip of South Korea early on the 10th. Kit still packed quite a punch, however. Torrential rains on the island of Cheju and southern coastal Korea caused extensive property and crop damage. At least ten people were reported missing or killed. Additionally a Department of Defense communications site in the area received an estimated 1.5 million dollars damage. With extratropical transition in progress, Kit rapidly lost strength while accelerating northeastward into the Sea of Japan. Extratropical transition was completed and JTWC issued the final warning on Kit at 110000Z. Subsequent warnings on the extratropical remnants of Kit were contained in the NAVOCEANCOMCEN GUAM Northwest Pacific Extratropical Wind Warning bulletins.

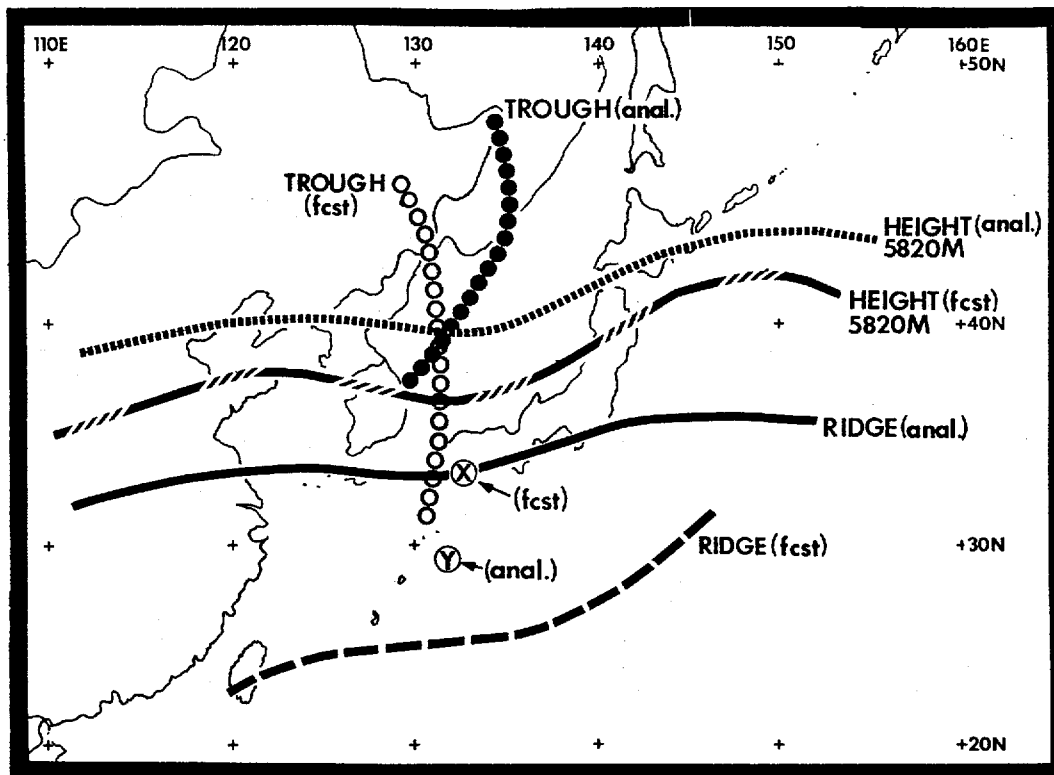


Figure 3-08-1. Comparison of 500mb 48-hour prognosis with verifying 500mb analysis. This chart depicts the major 500mb features available from the 48-hour prognosis valid 060000Z August: ridge axis (dashed line), trough line (open dots), 5280 meter height isopleth (———), and forecast warning point (X). The verifying 500mb analysis is shown for 060000Z August: ridge axis (solid line), trough line (solid dots), 5280 meter height isopleth (.....), and Best Track position (Y) for Kit. In retrospect, with the 48-hour prognosis and the location of the forecast warning position (X) - north of the ridge (forecast) and east of the trough (forecast) - a recurvature scenario looks valid. The tropical cyclone is an immediate threat to Japan. However, with the verifying analysis, Kit's position (Y) remains south of the ridge (analysis) and the trough (analysis). This is not favorable for recurvature. This pattern suggests weakened steering flow, with slow and erratic tropical cyclone movement - which is what occurred on the 6th.

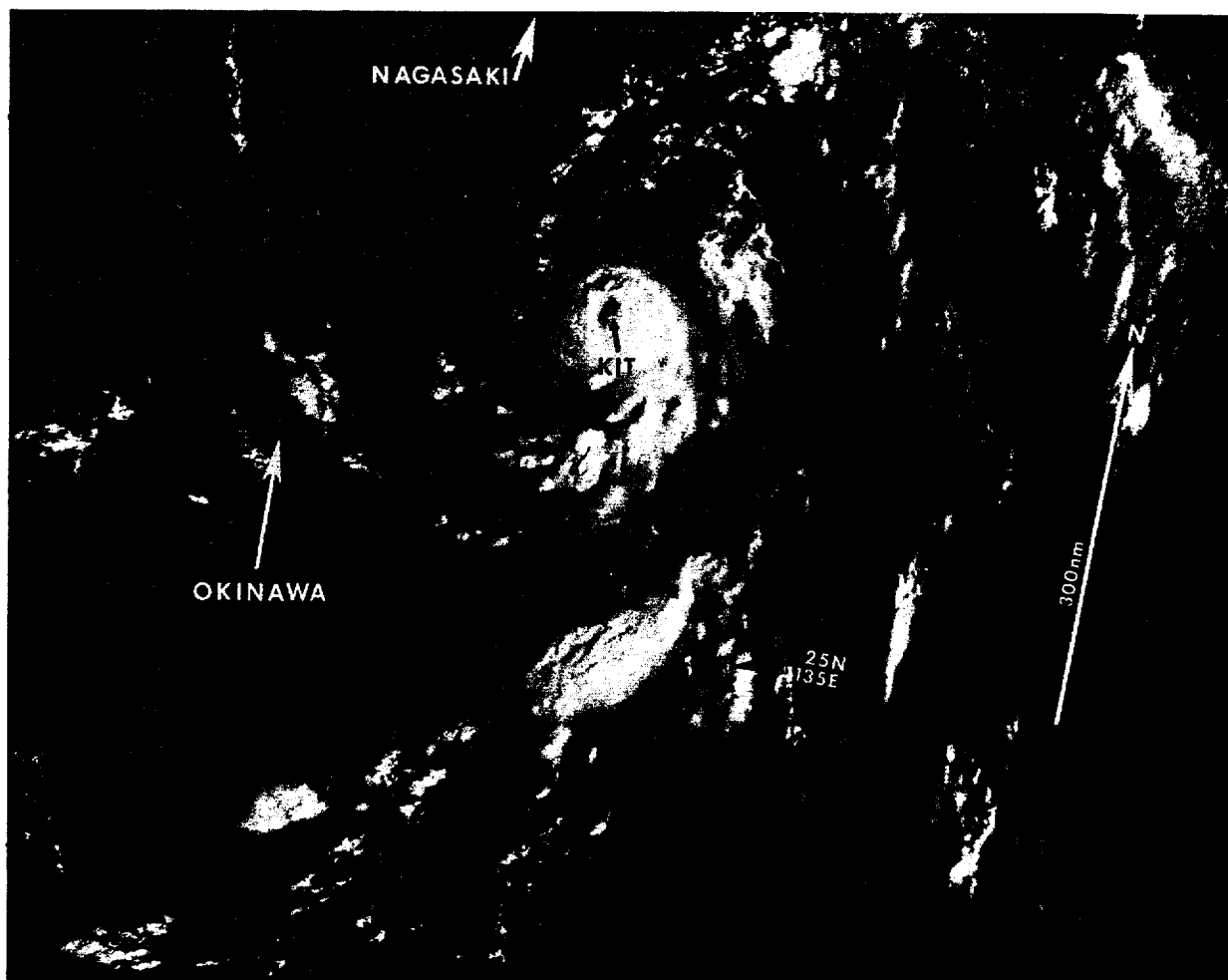
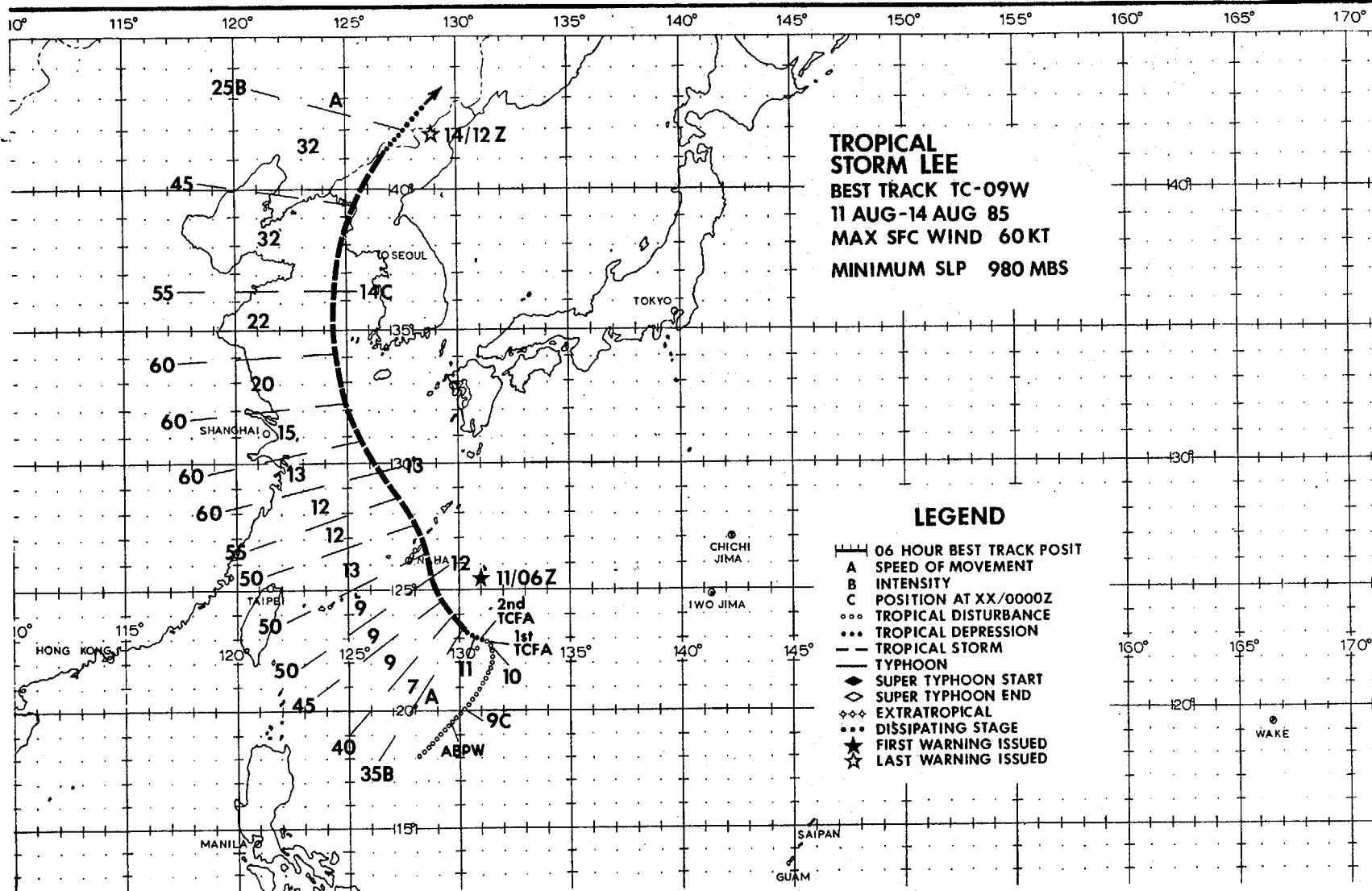


Figure 3-08-2. Typhoon Kit near maximum intensity south of the island of Kyushu, Japan. Kit remained a very compact storm for much of its lifetime, with the over-30 kt (15 m/s) and over-50 kt (26 m/s) wind radii remaining smaller than normal (070028Z August DMSP visual imagery).



Unlike its predecessors, Typhoons Irma, Jeff, and Kit, that developed on the northeast periphery of the southwest monsoon trough, Lee formed in the trough in the central Philippine Sea. Lee's initial development and movement within the monsoon trough was influenced by Typhoon Kit, which was located further to the north.

On the 31st of July, the monsoon trough was oriented southwest to northeast, extending from the central Philippine Sea eastward across the northern Mariana Islands. To set the stage, Typhoon Kit, which developed on the northeastern end of the trough, moved northwestward and intensified. As Kit's low pressure area migrated northwestward, the axis of the monsoon trough repositioned along with it until finally, on the 8th of August the monsoon trough was oriented almost north to south.

Ship reports at 081200Z indicated a broad circulation in the trough 480 nm (889 km) south of the island of Okinawa with a minimum sea-level pressure (MSLP) of 1002 mb. Satellite imagery also showed that the convection associated with this

disturbance had some curvature. Since good outflow channels were present aloft to the south and southwest, the Significant Tropical Weather Advisory (ABPW PGTW) was reissued at 082000Z to include this system.

During the following 24-hours, as the disturbance moved to the north-northeast, the convection remained on the equatorward side of the circulation center, associated with the 15-25 kt (8-13 m/s) convergent low-level wind flow. Synoptic data showed only 5 kt (3 m/s) winds on the northwest side of the circulation. This area of lighter winds underwent a change on the 10th of August. The low-level subtropical ridge built back to the north of the disturbance and across the Ryukyu Islands in the wake of Kit and the pressure gradient increased over the north side of the disturbance. In response, the broad low-level circulation consolidated with increased winds of 10-15 kt (5-8 m/s) over the northwest quadrant (Figure 3-09-1). Simultaneously, the upper-level wind reports showed an anticyclonic circulation was developing over an area of comma-shaped convection. The cloudiness increased in

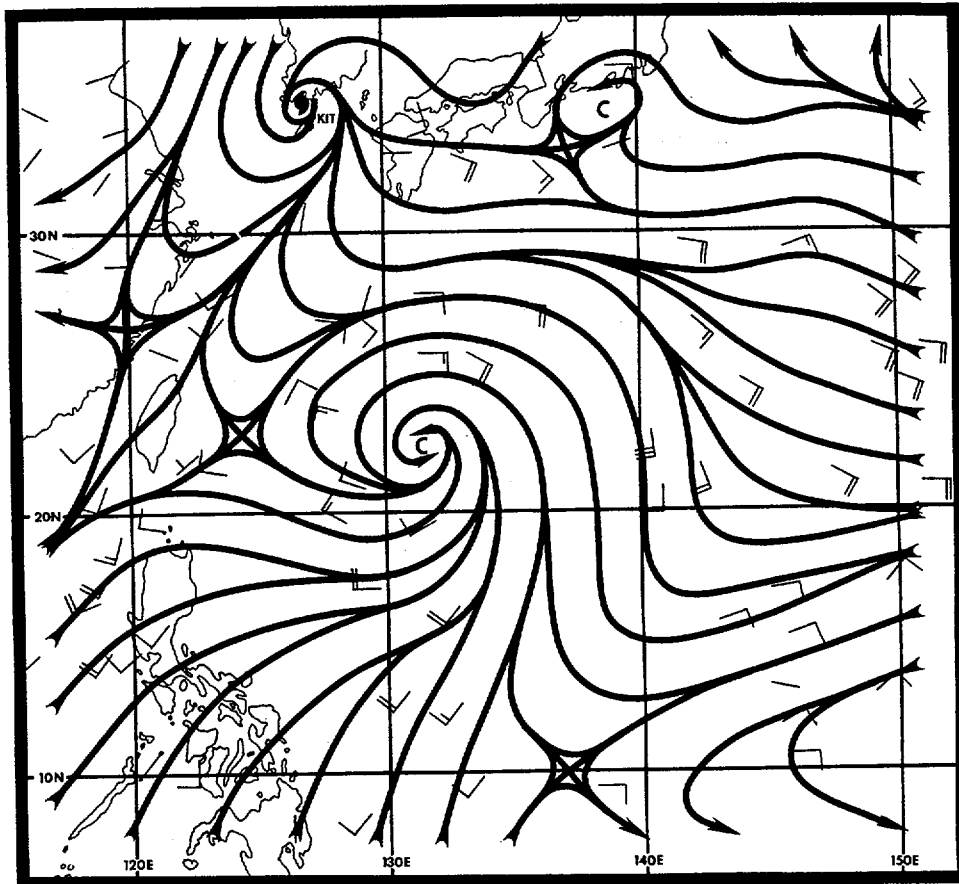


Figure 3-09-1. Surface analysis at 100000Z August showing the subtropical ridge which built across to the north of the disturbance in the wake of typhoon Kit. The monsoon depression is beginning to consolidate. The convergent flow is only on the south and east sides of the broad circulation center.

amount and was near the surface center. These events prompted the issuance of the first TCFA at 100230Z.

The initial aircraft reconnaissance mission, at 100650Z, into the disturbance reported a broad surface circulation with dimensions of 60 nm (111 km) north to south by 90 nm (167 km) east to west and a 997 mb MSLP. The new location of the circulation center, as determined by the aircraft, required the issuance of a second TCFA at 100800Z. The circulation center was relocated 115 nm (213 km) further to

the east-southeast and outside of the original TCFA area which was based on an earlier position derived from visual satellite data.

During the following twenty-four hours, Lee turned towards the northwest, moved very slowly, and showed little intensification. This slow intensification could be related to the persistent strong flow aloft from the north over the disturbance (Figure 3-09-2). Satellite imagery for the same period is shown in Figure 3-09-3).

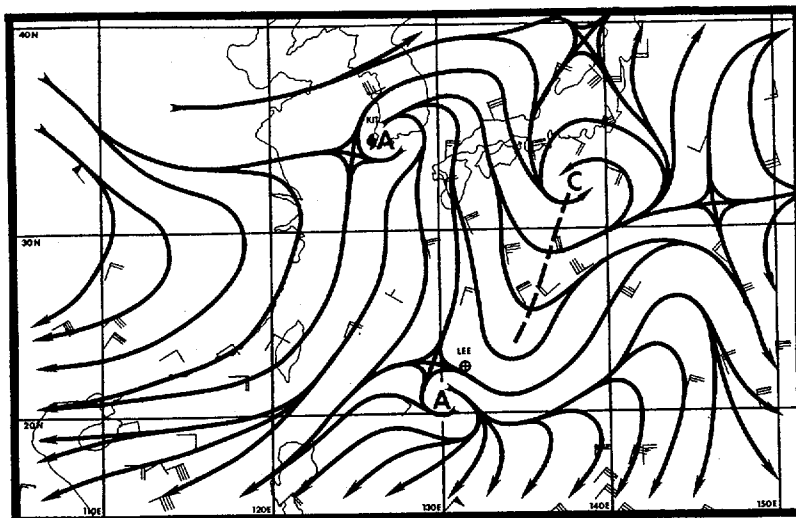
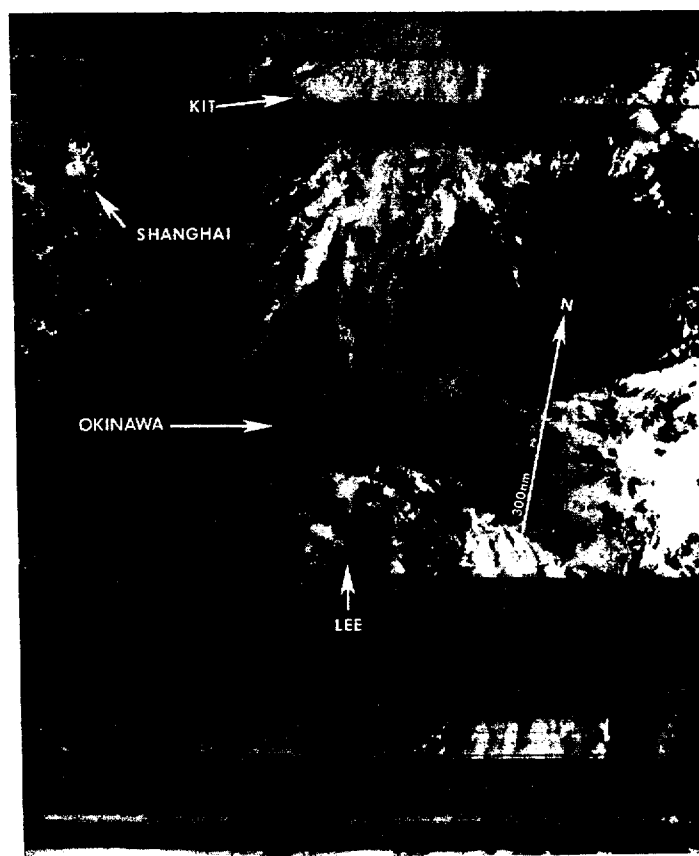


Figure 3-09-2. The 100000Z August 200 mb analysis showing the northerly flow aloft across the disturbance.

Figure 3-09-3. With the northerly flow aloft there is little convection on the poleward side of the disturbance's circulation center. The cloudiness persists over the low-level southwesterly flow (100108Z August DMSP visual imagery).



An aircraft reconnaissance flight into the disturbance at 110656Z found a 25 nm (46 km) diameter light and variable wind center with only 15 kt (8 m/s) maximum surface winds around it. However, the MSLP had dropped another 5 mb during the previous twenty-four hours to 992 mb. This supported maximum winds of 40-45 kt (21-23 m/s) based on the Atkinson/Holliday wind/pressure relationship. Aircraft, synoptic and satellite data indicated that stronger winds of 25-35 kt (15-18 m/s) were located in a band displaced 60-180 nm (111-333 km) to the east of the center. These data led to the issuance of the first warning at 110600Z. As a result, Kadena AB, Japan (WMO 47931) immediately set a Condition of Readiness III.

Fortunately, Lee continued to exhibit typical characteristics of a monsoon depression where the maximum surface winds and intense convection never consolidate at the surface center. Instead, the maximum surface winds remained in the eastern semi-circle. As a consequence, when Lee passed within 15 nm (28 km) northeast of Okinawa at 120430Z, the maximum sustained winds stayed well to the east of the island. In fact, the strongest winds experienced at Kadena AB were from the west-southwest at 22 kt (11 m/s) with 32 kt (16 m/s) approximately twelve hours later. Naha (WMO 47936) located on an elevated and exposed part of the island of Okinawa reported highest winds (in association with the southwest

monsoon flow) of 27 kt (14 m/s) with gusts to 40 kt (21 m/s) at 121948Z. At that time Lee was 170 nm (315 km) to the north-northwest of the station. Overall, Lee's track and asymmetrical wind distribution spared Okinawa, but the western coast of South Korea appeared to be the next target and preparations had begun for the tropical cyclone's approach.

On the synoptic scale, lower standard pressure-level heights prevailed over the East China Sea between the two ridges. As the mid-latitude trough (Figure 3-09-4) approached the Yellow Sea on the 13th of August, it came into phase with the short wave trough extending south-southwestward from a deepening Siberian low near 52N 116E. By 131200Z the trough was oriented along 118E longitude and the ridge over Japan continued to build northward across the Seas of Japan and Okhotsk. This caused the mid-level steering flow from the south to increase over Lee. In response, Lee steadily accelerated across the East China Sea and passed 240 nm (444 km) west of the island of Kyushu, Japan. Coastal stations on Kyushu reported 10-25 kt (5-13 m/s) sustained winds. Aircraft reconnaissance reported the band of 40-60 kt (21-31 m/s) maximum winds remained about 120 nm (222 km) west of the coast.

As Lee began to break free of the monsoon trough, it reached its peak intensity of 60 kt

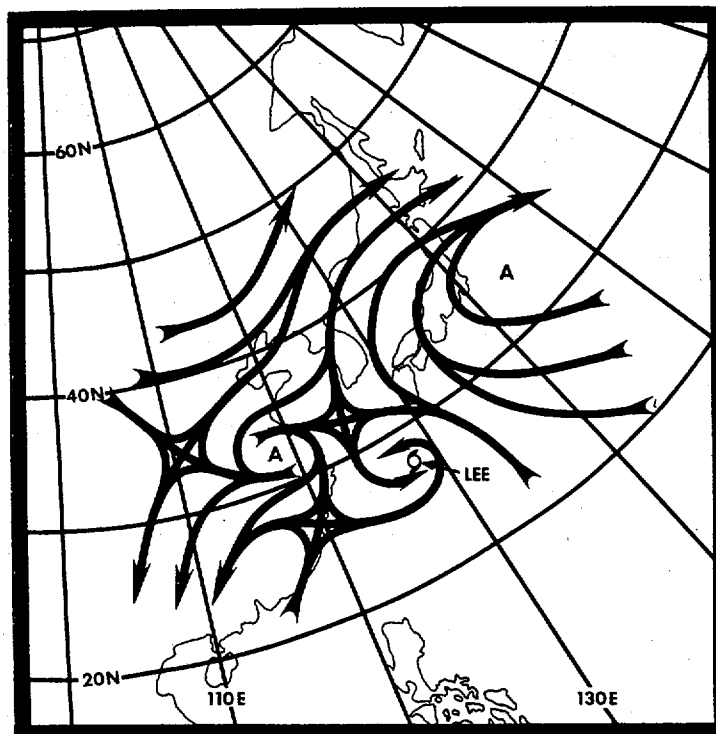


Figure 3-09-4. The 121200Z August 500 mb analysis with troughing in the subtropical ridge over the East China Sea.

(31 m/s) (Figure 3-09-5). Satellite imagery showed orientation of the supporting convection was changing, too. The strong upper-level westerlies were already pushing Lee's outflow to the northeast towards the southwest coast of South Korea.

Lee continued to accelerate and followed a northerly track across the Yellow Sea on 14 August, staying approximately 120 nm (222 km) offshore. This spared the coastline from any significant damage. A few reports of 35 kt (18 m/s) sustained winds were recorded at the southwest portion of the Korean peninsula. Later, Lee transited the North Korean coastline 60 nm (111 km) southeast of Sinuiju (WMO 54498) at 140600Z, and dissipated rapidly inland over the mountainous terrain. No reports of damage were available.

Of note, the tracks of Jeff, Kit, Lee, and later, Mamie in the Yellow Sea came under the

influence of the same synoptic scale pattern during the first three weeks of August with ridging over Japan and troughing over northeast mainland China. This pattern maintained semi-persistent south-to-north mid-level steering flow over the Yellow Sea. Each tropical system in its own time recurved around the western periphery of the subtropical ridge and accelerated. Figures 3-09-6 and 3-09-7 show the approximate location and orientation of the synoptic scale trough with respect to the point of recurvature of each tropical system. The pattern shifted eastward from Jeff to Kit, then retrograded westward with Lee, and later, Mamie's track. The points of recurvature also indicate the western extent of the subtropical ridge in each case plus the northward displacement of the ridge axis which was well north of its climatological position.

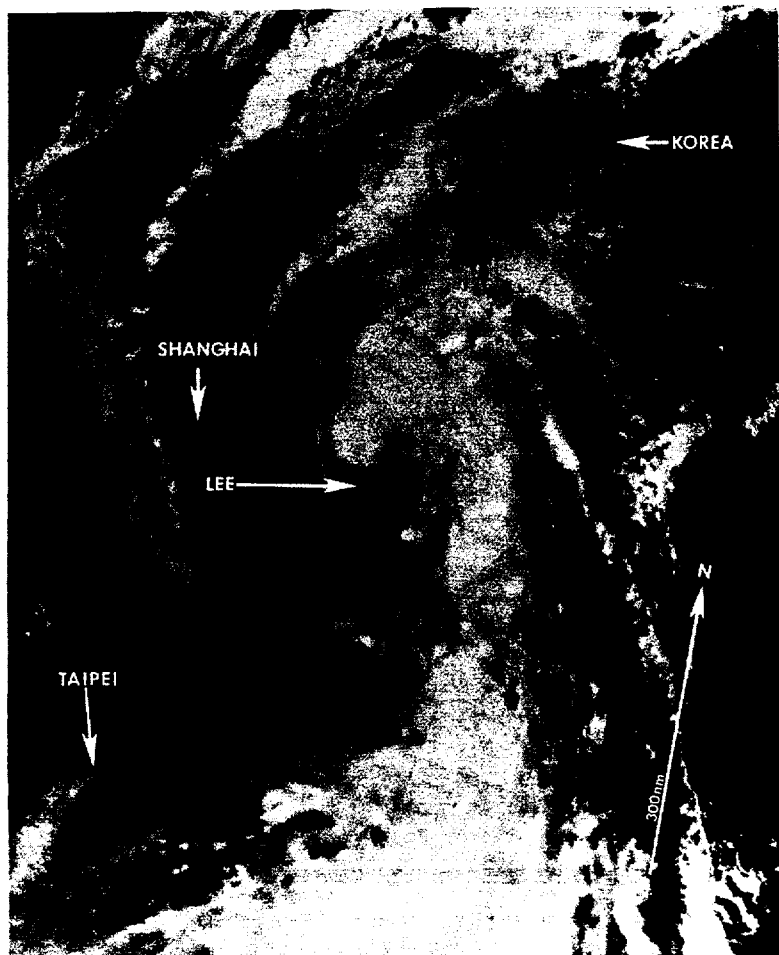


Figure 3-09-5. Tropical Storm Lee at its maximum intensity of 60 kt (31 m/s). The upper-level anticyclonic circulation displaced slightly to the northeast of the exposed low-level circulation center (130518Z August NOAA visual imagery).

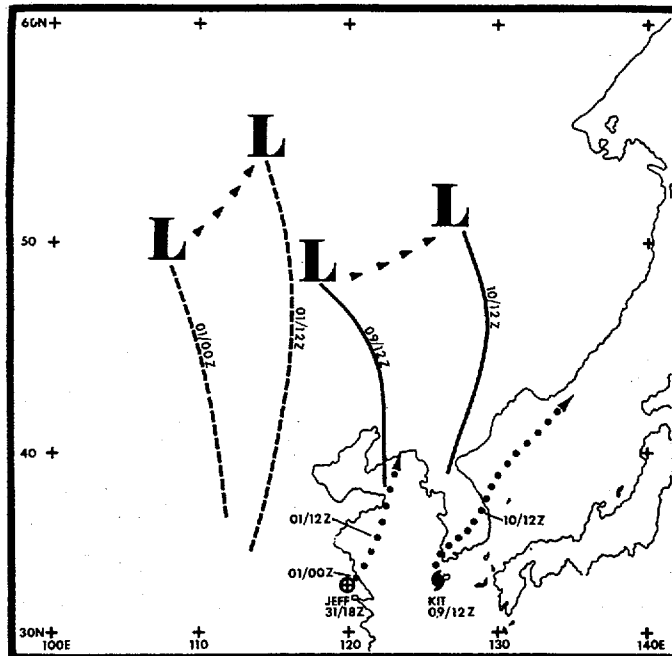


Figure 3-09-6. The best tracks (dotted line) of Jeff and Kit from the point of recurvature through the final warning are depicted. The times along the dotted lines at, or after, the recurvature point correspond with the respective positions of the mid-latitude troughs (dashed and solid lines). The arrows show the movement of the Siberian mid-level lows. Notice the Siberian low track is displaced further southeast during Kit.

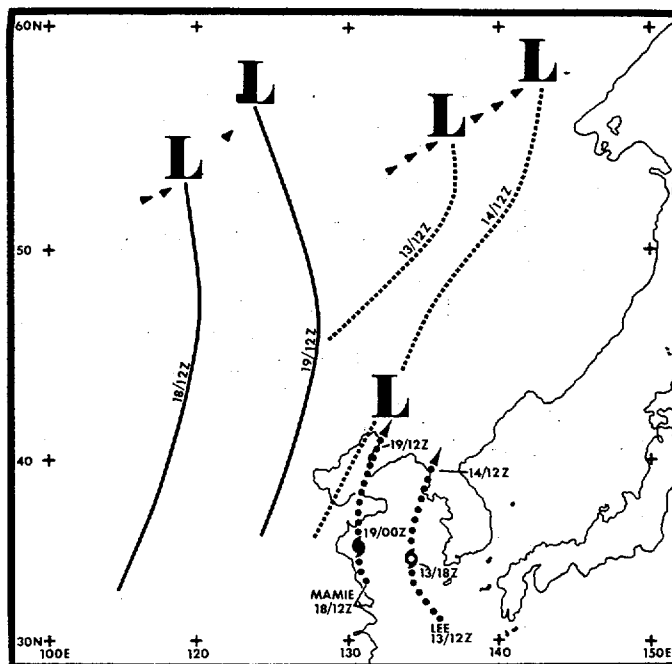
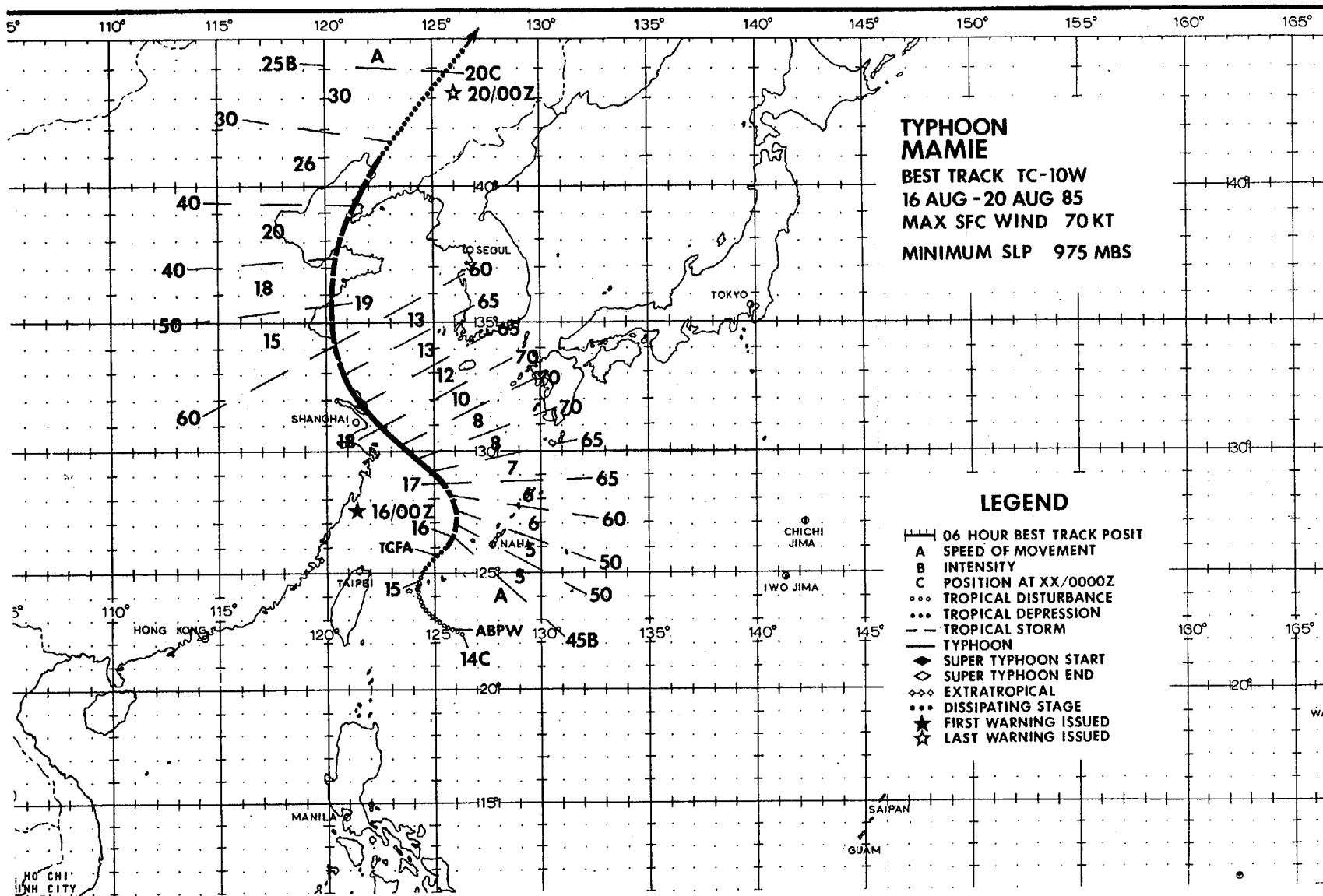


Figure 3-09-7. The best tracks (dotted line) of Lee and Mamie from the point of recurvature through the final warning are shown. The times along the dotted lines at, or after, the recurvature point correspond with the respective positions of the mid-latitude troughs (dashed and solid lines). Notice that the track of the Siberian lows retrogrades between the second and third week of August.



Despite reaching a maximum intensity of only 70 kt (36 m/s), Typhoon Mamie was one of the more destructive tropical cyclones of the 1985 western North Pacific season. Following a path similar to its predecessor, Tropical Storm Lee, Mamie was responsible for at least 35 deaths and caused heavy damage to crops, homes, and shipping. For two days, Mamie skirted a 400 nm (740 km) stretch of the eastern Chinese coast from Shanghai (WMO 58367) to the Shantung Peninsula, inundating farmland and washing away many dikes and dams with its torrential rains. More than 800,000 civilians and soldiers were mobilized to combat the flooding and repair damage. Estimates of the destruction caused by Mamie were staggering: over 6.5 million trees uprooted, 2.9 million metric tons of high stalk farm crops ruined, more than 120,000 houses destroyed or damaged, over 200 watercraft of various types sunk or driven aground, and over 122,000 domestic livestock drowned.

Mamie formed from an area of convection that was originally part of the southwest monsoon flow into Tropical Storm Lee. At 0129Z on 14 August, visual satellite imagery indicated slight curvature in an area of convection due east of Taiwan that had separated from Lee's inflow. Figure 3-10-1 shows this area and its relationship to Lee. Subsequently, the area was included as a "poor" on the 140600Z Significant Tropical Weather Advisory (ABPW PGIW). Satellite imagery through the remainder of the 14th showed the disturbance was turning to the north and becoming more organized as the separation from Lee's wind field increased. The 150600Z ABPW PGIW bulletin reflected this development by upgrading the potential for development to "fair" and aircraft reconnaissance of the disturbance was requested for the following morning.

At 151200Z, a TCFA was issued, based on increased curvature of the convective bands and anticyclonic cirrus outflow indicated by satellite imagery. At this point, the area was beginning to intensify more rapidly than before, due partly to Lee's waning influence on the new circulation. At 152340Z, aircraft reconnaissance closed-off a circulation of tropical storm intensity 90 nm (167 km) due west of Okinawa, prompting the issuance of the first warning on Mamie at 160000Z. Less than three hours later Kadena AB on Okinawa reported its strongest winds from Mamie - south at 20 kt (10 m/s) with a peak gust to 35 kt (18 m/s).

On 16 August Mamie began to turn to the northwest. This turn was due to the low-level ridge north of Mamie strengthening slightly as the mid-latitude trough that had interacted with the remnants of Tropical Storm Lee began to move rapidly to the east in the mid-latitude westerlies. However, the ridge never became strong enough to stop Mamie from heading north-northwest, then north through a weak area in the ridge that persisted throughout Mamie's lifetime. Mamie continued to intensify, reaching typhoon intensity at about 170000Z as it moved northwest at 7 kt (13 km/hr) toward Shanghai (WMO 58367).

The Typhoon reached a peak intensity of 70 kt (36 m/s) 12-hours later at 171200Z, just prior to affecting the Chinese coast near Shanghai (Figure 3-10-2). Mamie traversed the Chinese coastline, hitting Tsingtao, with decreased winds of 50 kt (26 m/s) at about 190200Z. Mamie then turned north around the western periphery of the subtropical ridge and crossed the Shantung Peninsula, striking Yantai, China (near Fushan WMO 54764) at about 190600Z.

Mamie accelerated to 20 kt (37 km/hr) and weakened to a 40 kt (21 m/s) tropical storm just prior to crossing the Yellow Sea and moving toward Dairen, China (WMO 54662). After making landfall just west of Dairen at 191200Z, Mamie began to dissipate over land. Because Mamie's intensity decreased to an estimated 25 kt (13 m/s) and due to its location over the mountains of northeast China, the last warning was issued at 200000Z.

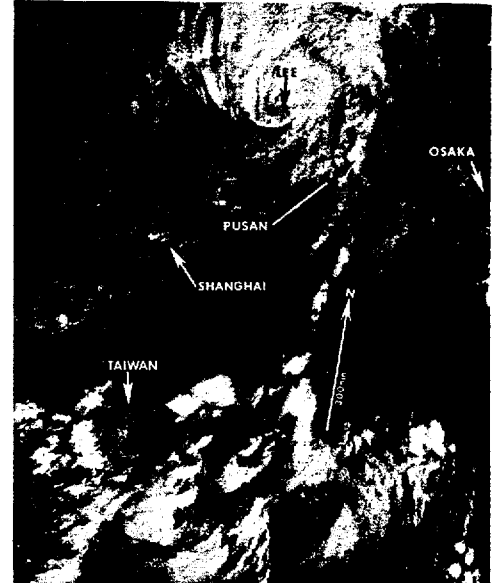


Figure 3-10-1. The tropical disturbance that became Typhoon Mamie is located east of the island of Taiwan. The slightly curved convective band and separation from the cloudiness associated with Tropical Storm Lee to the north were the first signs of organization (140129Z August DMSP visual imagery).

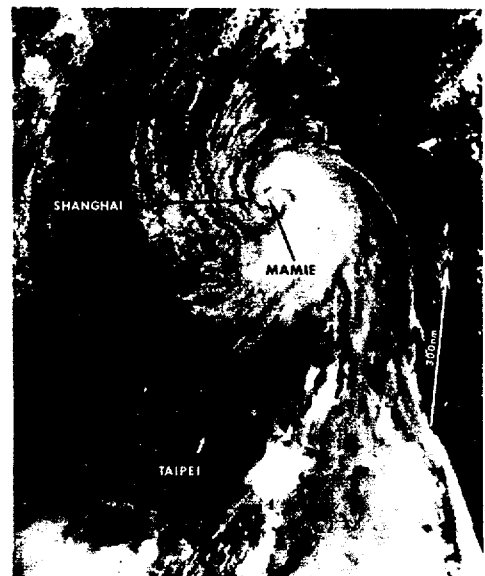
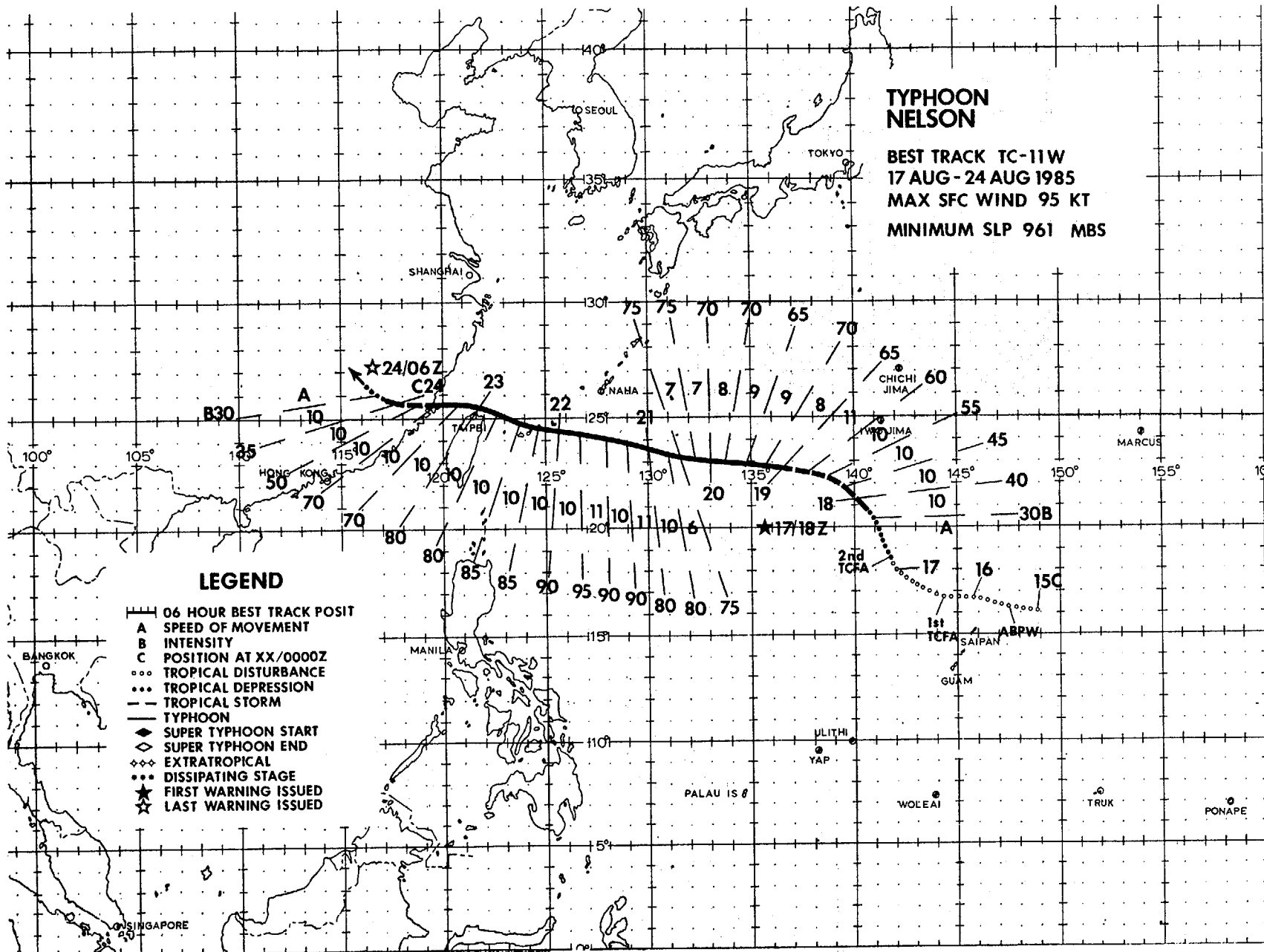


Figure 3-10-2. Mamie with typhoon force winds passing just east of Shanghai, China (180149Z August DMSP visual imagery).

TYPHOON NELSON

BEST TRACK TC-11W
17 AUG - 24 AUG 1985
MAX SFC WIND 95 KT
MINIMUM SLP 961 MBS



TYPHOON NELSON (11W)

Typhoon Nelson was the fourth of seven tropical cyclones that developed over the Northwest Pacific in August. It caused substantial damage and loss of life as it passed through the southern Ryukyu Islands, brushed by northern Taiwan and crossed into mainland China.

On 14 August Tropical Storm Lee was dissipating as it moved across North Korea and Typhoon Mamie was building near the southern Ryukyu Islands just east of Taiwan. The following day the disturbance that developed into Typhoon Nelson was first noticed as a small, but persistent, area of poorly organized convection 150 nm (278 km) east-northeast of the island of Saipan in the Marianas. The area was located in the near-equatorial trough where the convective cloudiness was enhanced by the divergent upper-level flow associated with an upper cold low in the tropical upper-tropospheric trough (TUTT). Synoptic data at 150000Z indicated that southwesterly gradient-level flow from the Philippine Sea was near the disturbance. These factors, plus the satellite imagery at 150300Z which showed a slight cyclonic curvature in the convection, prompted mention of the area on the 150600Z Significant Tropical Weather Advisory (ABPW PGIW).

During the next 24-four hours, satellite imagery revealed a marked increase in the amount of convection over the northeastern portion of the disturbance with another larger area of unorganized convection moving toward the disturbance from the west-southwest. By 160000Z, synoptic data indicated that the southwesterly gradient flow had propagated eastward to the disturbance and an associated upper-level anticyclone had formed over the disturbance. A Tropical Cyclone Formation Alert (TCFA) followed at 160625Z.

Aircraft reconnaissance late on the sixteenth was unable to locate a surface circulation. However, the aircraft reconnaissance weather officer

(ARWO) did report: a narrow low-level trough that was 200 nm (370 km) in extent and elongated northeast-southwest; three possible 1002 mb pressure centers; and maximum winds of 10-20 kt (5-10 m/s) to the north of the trough. The TCFA was reissued at 170555Z.

A dramatic increase in both the cyclonic curvature and amount of central convection occurred at 171600Z. The Dvorak intensity estimate of the system was 35 kt (18 m/s). This intensity estimate together with the continuing development of the system led to the first warning on Nelson at 171800Z. Aircraft reconnaissance at 172131Z confirmed this development, and more, when gale force surface winds were located north of a 989 mb low pressure center. Specifically, the flight revealed the 700 mb center was displaced 31 nm (57 km) to the northwest of the surface center and a band of 45 kt (23 m/s) low-level winds was located 90 nm (167 km) to the north-northwest.

Due to the uncertainty in the Fleet Numerical Oceanography Center (FNOC) mid-level wind fields in the data sparse region south of Japan, a 400 mb synoptic track mission was flown early on the 18th to better define the mid-level steering flow north of Nelson. Data from this flight confirmed that the ridge extended westward over Nelson and indicated forecasts for an "under the ridge" scenario were appropriate. This forecast scenario proved to be correct.

Further intensification occurred as Nelson assumed a more west-northwesterly track. At 190000Z, Nelson was upgraded to a typhoon after aircraft reconnaissance indicated the system had a 5 nm (9 km) diameter light/variable wind center with a 979 mb MSLP and 65 kt (33 m/s) maximum surface winds displaced 40-120 nm (74-220 km) northwest of the center. Almost three days later, at 211800Z, Nelson reached a peak intensity of 95 kt (49 m/s) with a MSLP of 961 mb (see Figure 3-11-1).

Nelson passed between the Ryukyu Islands of Yaeyama and Miyako early on 22 August and continued moving west-northwestward under the ridge. Early on 23 August (Figure 3-11-2), the typhoon skirted northern Taiwan passing within 25 nm (46 km) of Taipei (WMO 58968). The tropical cyclone quickly transited the Formosa Straits and made landfall 40 nm (74 km) southwest of Fuchou (WMO 58847) in China's Fuchien province at 241400Z.

In retrospect Nelson's passage between Yaeyama and Miyako Islands resulted in more than 1.5 million dollars in damage to banana and sugar cane crops. As Nelson skirted northern Taiwan, four people were reported killed from the associated winds and tor-

rential rains. At landfall in China's Fuchien province, another forty-eight people perished, with an additional 329 reported injured, more than 5,000 homes destroyed, 969 fishing boats sunk and about 178,500 acres of crops lost.

After Nelson dissipated, an additional three days of heavy rains associated with the remains of the system affected many areas of eastern China. At least 147 people were killed and more than 30,000 persons were driven from their homes by flooding in Hunan province further inland. Later, Shanghai reported 50,000 homes with flood damage resulting from these heavy rains inland.

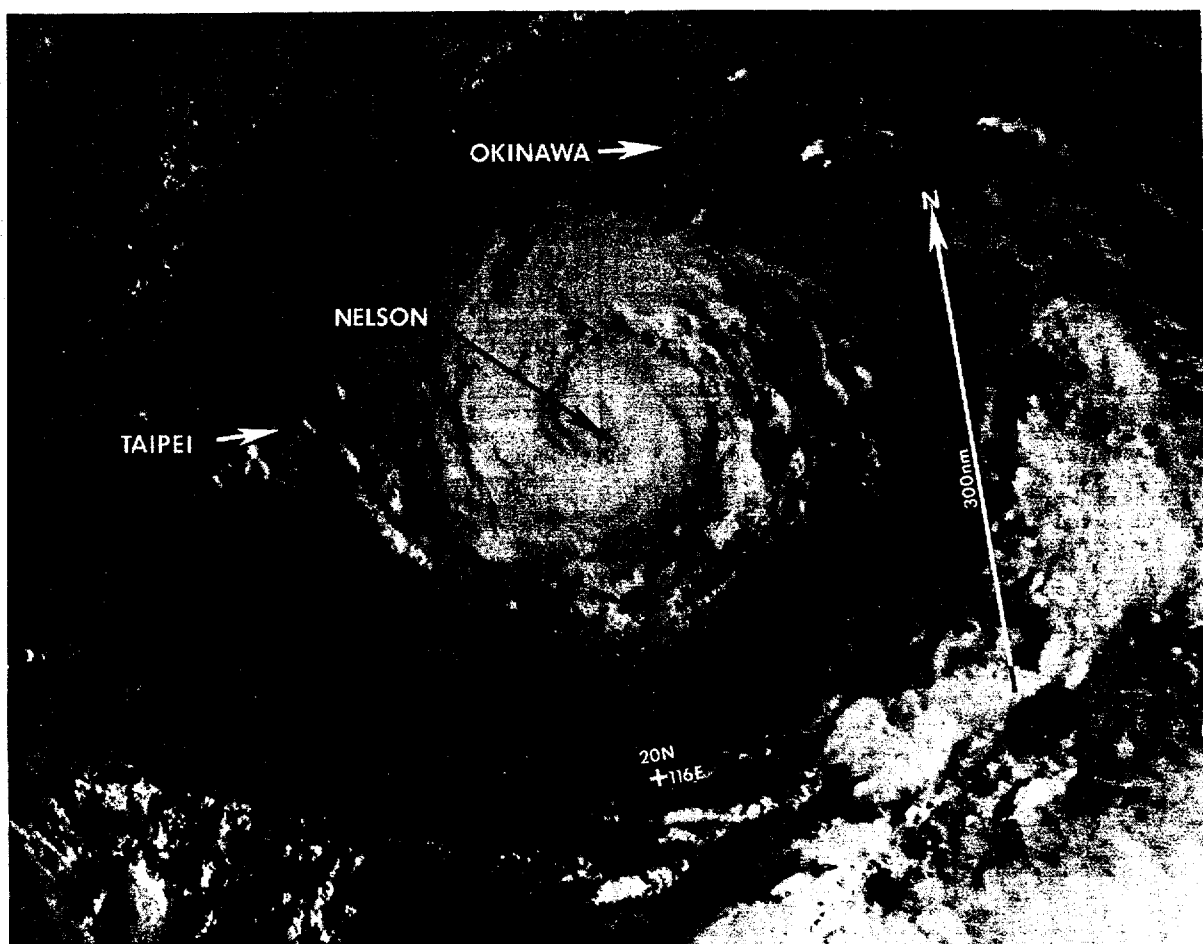


Figure 3-11-1. Typhoon Nelson near maximum intensity (212352Z August NOAA visual imagery).

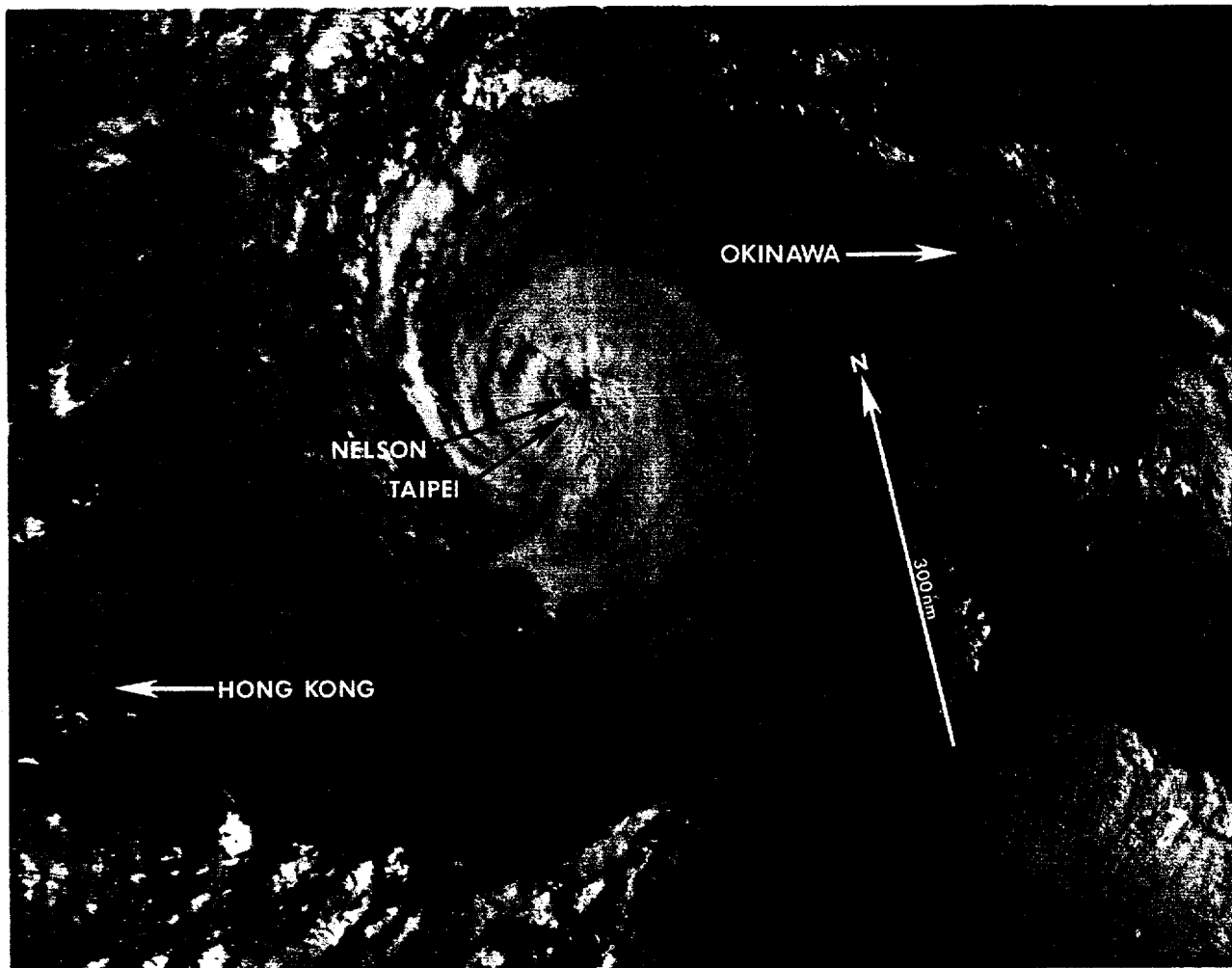


Figure 3-11-2. Nelson skirting the island of Taiwan (222334Z August NOAA visual imagery).

Odessa persisted for almost two weeks and required a total of thirty-eight warnings - in this regard, only Typhoon Jeff with forty-one exceeded Odessa's total during 1985 season. The system became part of a multiple tropical cyclone outbreak along with Typhoon Pat and Tropical Storm Ruby. At one time five tropical cyclones were in warning status. Ultimately, Odessa underwent a complex binary interaction with Typhoon Pat south of Japan before completing extratropical transition over the Sea of Japan.

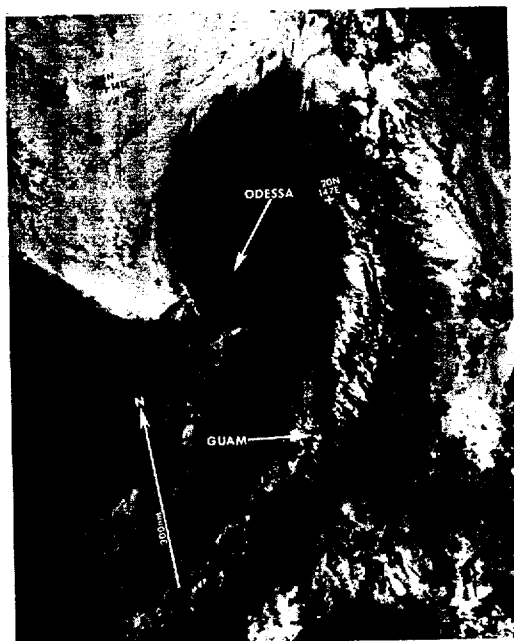


Figure 3-12-1. Nighttime imagery of Odessa with a single outflow channel that is directed equatorward (241227Z August DMSP infrared imagery).

By the third week of August, Typhoon Nelson had moved westward across the northern Philippine Sea. At that time, the eastern end of the monsoon trough extended across the Philippine Sea to the vicinity of Guam. The eastern end of the low latitude westerly monsoonal flow, where it interacted with the easterly tradewinds, became the preferred location for maximum cloudiness. Initially, on 19 August, the deep convection in this area appeared random with little, or no, curvature, but its persistence was sufficient reason for its inclusion on the Significant Tropical Weather Advisory (ABPW PGTW). With maximum surface winds in the monsoonal flow of 15 to 20 kt (8 to 10 m/s) and a minimum surface pressure of 1006 mb, the potential for development was rated as poor.

This potential for intensification changed to fair at 220600Z as the convective mass began to increase in size over a low-level circulation which began to separate from the surrounding cloudiness. A TCFA followed at 230230Z based on meteorological satellite imagery which showed a Central Dense Overcast (CDO). Aircraft reconnaissance was scheduled for the next day. The persistent CDO, a favorable outflow channel aloft to the south, and a pre-existing low-level circulation center, prompted the first warning for Tropical Depression 12W a short time later at 230600Z. The Depression was upgraded at 240000Z when aircraft reconnaissance observed sustained surface winds of 30 kt (15 m/s) that were gusting to 55 kt (28 m/s) southeast of the center - the MSLP was estimated to be 1000 mb (Post analyses revealed that Odessa reached tropical storm intensity shortly before 231800Z). The aircraft also discovered that the low-level center had drifted south-eastward during the night, when interpretation of infrared satellite imagery was restricted to positioning the poorly defined upper-level circulation center.

Erratic movement became less of a concern as Odessa matured and assumed a north-northwestly track. Aircraft reconnaissance at 242340Z reported typhoon

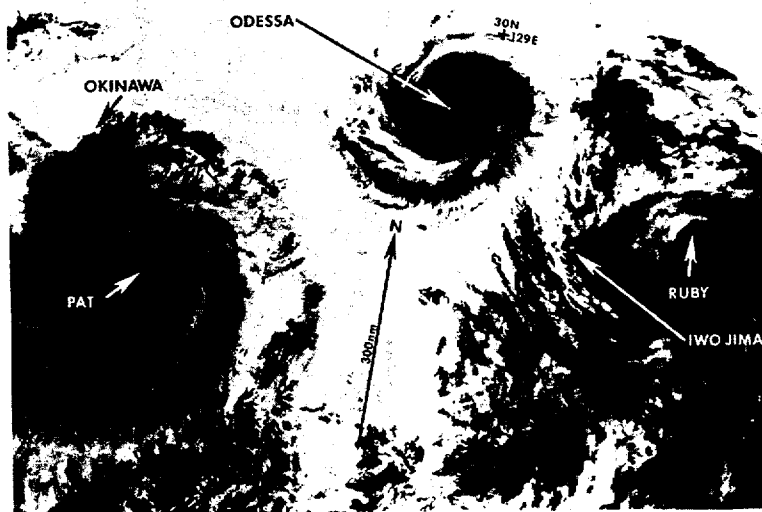


Figure 3-12-2. Odessa with channel-less or no-channel outflow (281024Z August NOAA infrared imagery).

intensity winds and a circular eye 15 nm (28 km) in diameter. The warning valid at 250000Z, upgraded Odessa to a Typhoon. Odessa remained a compact typhoon for the following six days. Of interest in this regard was the change in the outflow channel from equatorward, during the maturation process, to the absence of the channel, during the small, but intense, typhoon stage. Compare Figures 3-12-1 and 3-12-2 to appreciate the shift of outflow.

Odessa's north-northwesterly movement slowed

as it approached the subtropical ridge axis. The critical forecast - whether to go through the ridge or westward under the ridge - was handled well. The primary aids, the One-way Interactive Tropical Cyclone Model (OTCM) and Nested Tropical Cyclone Model (NTCM), (Figure 3-12-3) were at odds apparently due to their respective sensitivities to the narrow ridge to the north. NTCM provided the better guidance in this case. Odessa tracked, as forecast, and turned westward under the influence of the narrow subtropical ridge over Japan.

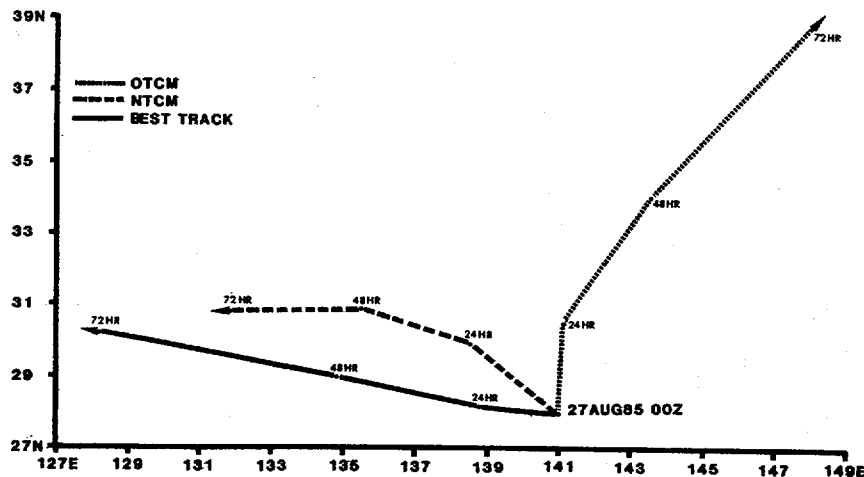
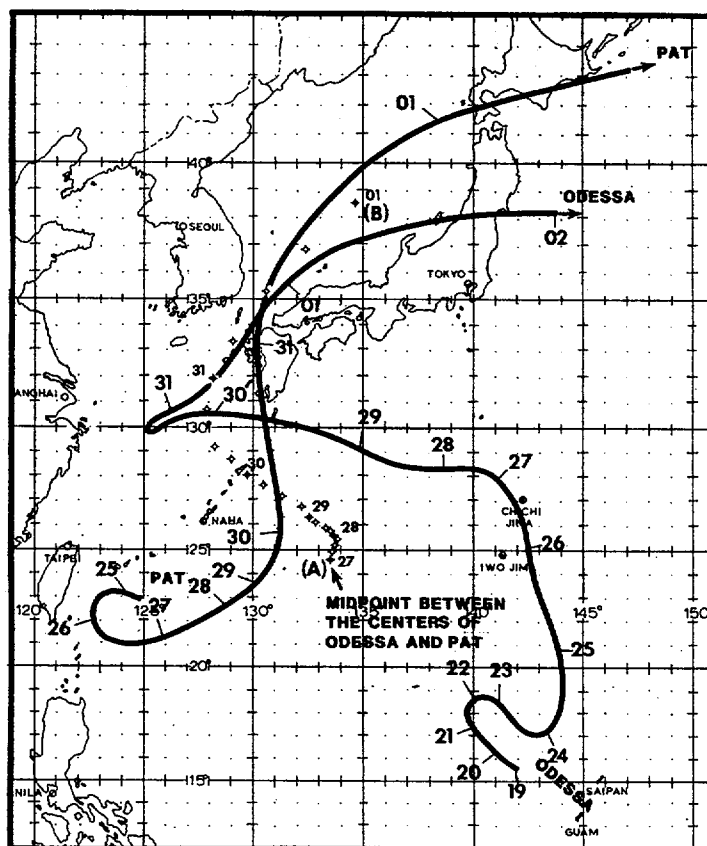


Figure 3-12-3. Primary aids, NTCM and OTCM, provide conflicting guidance. NTCM correctly senses the track to the West. The best track position is a solid line.

Figure 3-12-4. Best track positions for Pat and Odessa. The small symbols from (A) to (B) are the midpoints between the respective centers of Pat and Odessa at each six hourly interval.



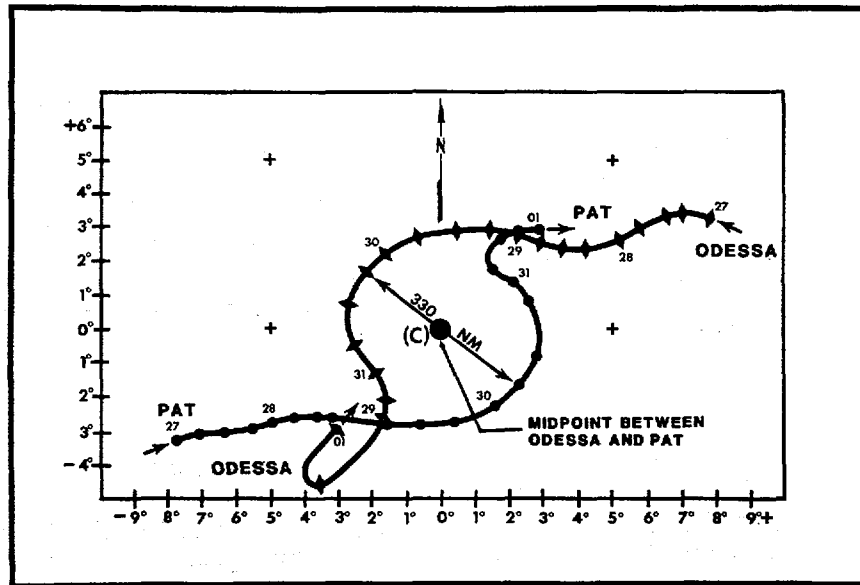
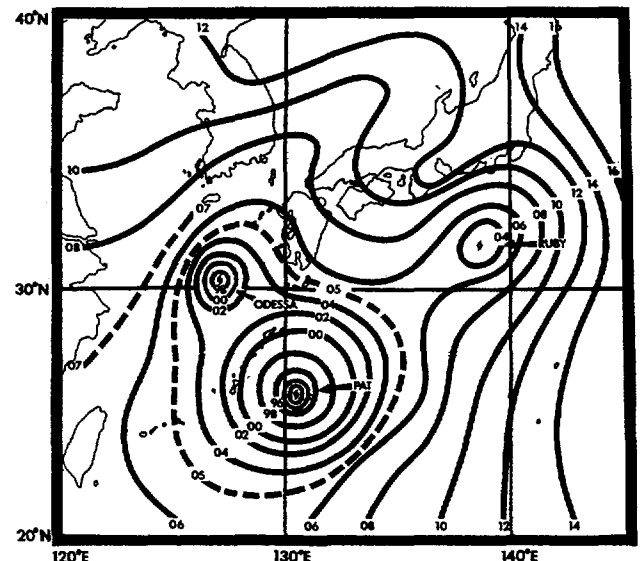


Figure 3-12-5. The singular point at (C) contains all the midpoints taken from the (A) to (B) in the previous Figure 3-12-4. The positions of both Pat and Odessa relative to the midpoint reflect the inward, spiralling interaction between the two systems with time.

As the tropical cyclone pressed ahead on its new track, it began to accelerate in response to the approach of Typhoon Pat from the south. The complex interaction between the spatially proximate cyclones, or binarys, is not readily apparent from Figure 3-12-4, which depicts the superimposed tracks. If the midpoint is determined for each six hourly time period, the locus of midpoints from A to B results (see Figure 3-12-4). When this locus becomes a singular point (C) in Figure 3-12-5 and the respective positions of the two typhoons are replotted

relative to (C), the subtle attraction and cyclonic rotation into a circle of 330 nm (611 km) becomes apparent. It is interesting to compare the relative sizes of Pat, which is average, and Odessa, which is small and compact (reference the surface isobaric analysis in Figure 3-12-6). Returning to Figure 3-12-5, it is important (next) to note the departure of both typhoons from the 330 nm (611 km) circle at 310000Z. This was the beginning of extratropical transition and separation. Satellite imagery is provided in Figure 3-12-7.

Figure 3-12-6. Isobaric analysis for 300000Z August indicates the size difference between Pat and the small compact Odessa. The weaker system to the northeast is Tropical Storm Ruby, which remained solitary and apparently didn't enter into the interaction.



The movement of Odessa under the ridge had served the prognostic reasoning well since the 27th. The forecast remained conservative and held to persistence as Odessa began to display erratic behavior, but the ridge to the north had changed. Both aids, OTCM and NTCM, indicated north to north-easterly movement (see Figure 3-12-8). When Pat started accelerating northeastward across Japan, Odessa executed an abrupt turn to the northeast and followed on its heels. Forecasts for Odessa's forward motion proved too slow as it accelerated into

the Sea of Japan and began extratropical transition. Fortunately the system was compact and weakening or damage might have been more widespread. In Kyushu and other southern islands of Japan strong rains and winds from Odessa knocked out power and caused fishing vessels to capsize. Ships remained in port at Sasebo, Japan (WMO 47812) as Odessa passed sixty miles to the north. The final warning was issued at 011200Z September as the extratropical remains of Odessa approached northern Honshu.

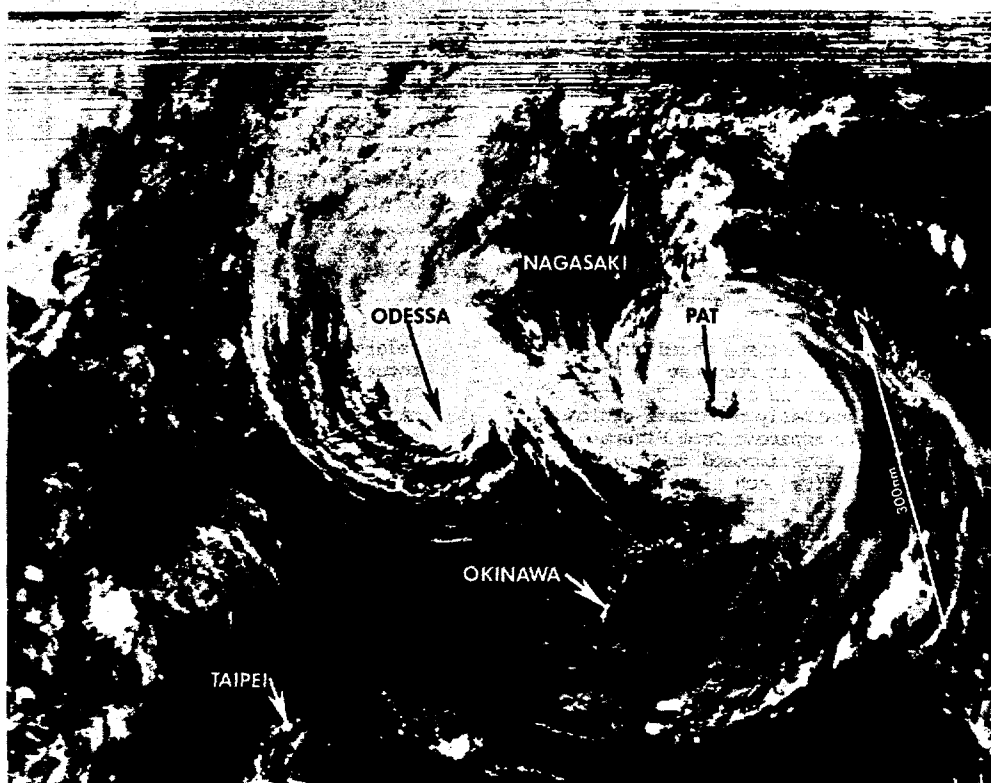


Figure 3-12-7. In this moonlight photo Pat's ragged eye and large surrounding cloud mass dwarf Odessa, which is also at typhoon intensity (301348Z August DMSP visual imagery).

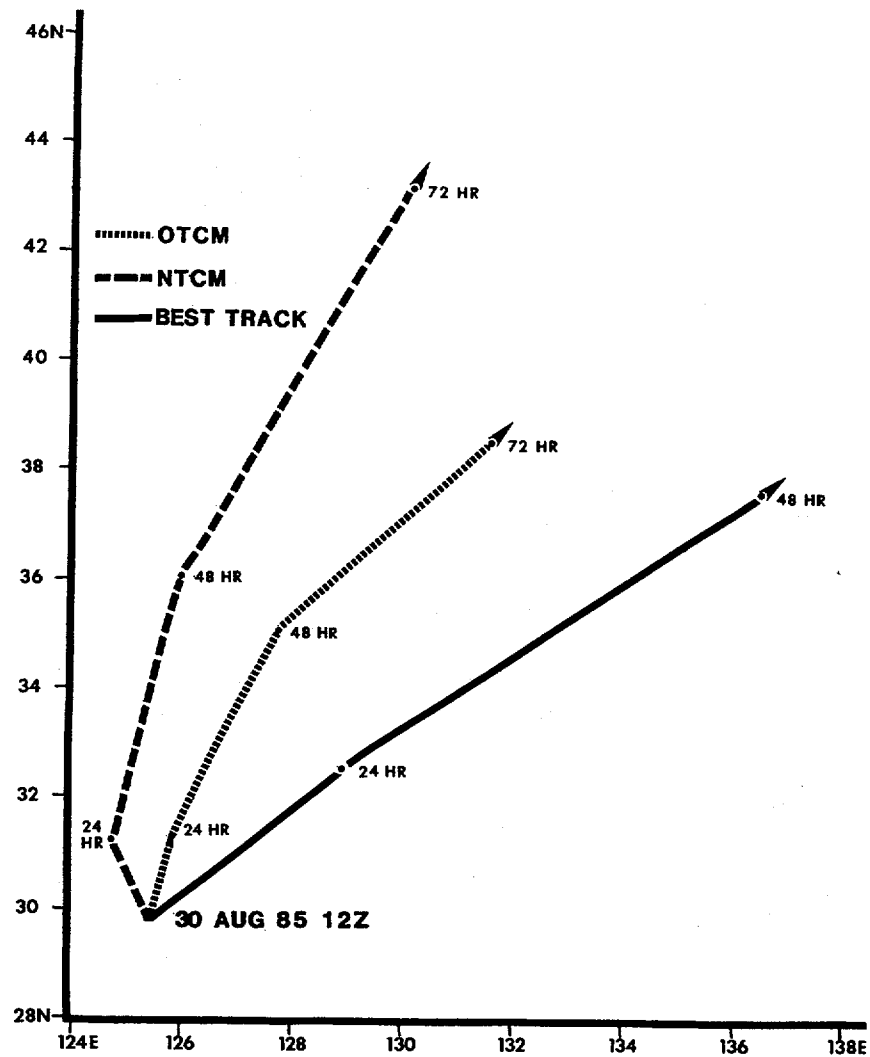
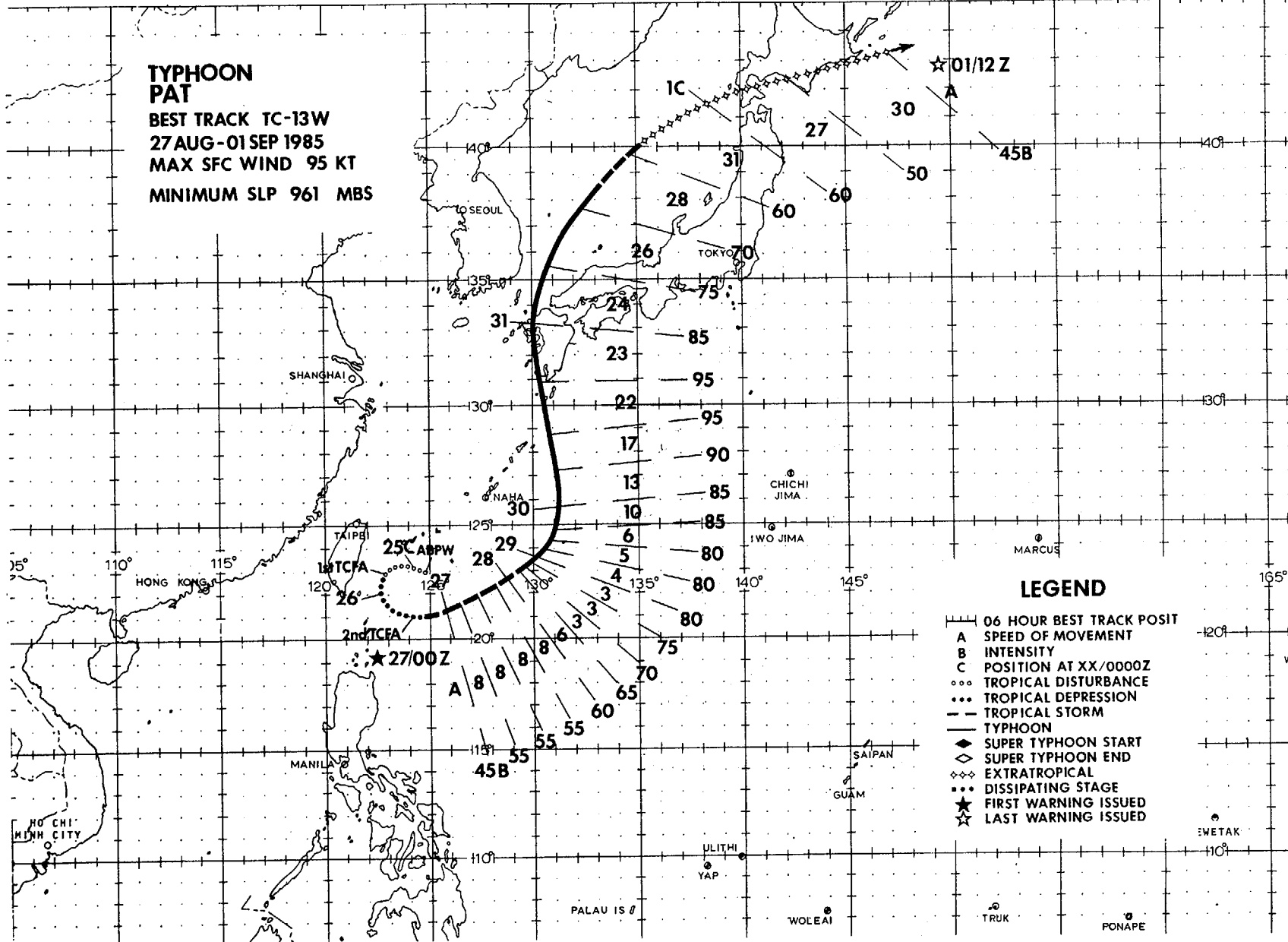


Figure 3-12-8. Primary aids, NTCM and OTCM, at 301200Z August reflect a north to northeasterly track. The best track positions (solid line) indicate the guidance was basically correct.

**BEST TRACK TC-13W
27 AUG-01 SEP 1985
MAX SFC WIND 95 KT
MINIMUM SLP 961 MBS**



LEGEND

-  06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
 ... TROPICAL DISTURBANCE
 ... TROPICAL DEPRESSION
 --- TROPICAL STORM
 --- TYPHOON
 ◆ SUPER TYPHOON START
 ◇◇◇ SUPER TYPHOON END
 ◇◇◇ EXTRATROPICAL
 ... DISSIPATING STAGE
 ★ FIRST WARNING ISSUED
 ★ LAST WARNING ISSUED

TYPHOON PAT (13W)

Typhoon Pat developed east of Taiwan in the monsoon trough a few days after Typhoon Odessa and one day before Tropical Storm Ruby. Pat was significant due to the complex forecasting problems it caused and the damage it inflicted in Japan. The presence of two other storms (Odessa and Ruby) presented a variety of possible forecast interactions. The movement of each cyclone had to be considered in combination with the changing synoptic pattern.

The monsoon trough remained quite active the last two weeks of August. The disturbance which eventually evolved into Pat, originated in the wake of Typhoon Nelson as it moved into eastern China. The 241900Z Significant Tropical Weather Advisory (ABPW PGTW) first identified this disturbance as an area of enhanced convection in the monsoon trough. The convergence in the southwest monsoon flow combined with upper-level divergence provided an environment favorable for continued development.

The first Tropical Cyclone Formation Alert (TCFA) was issued at 251530Z when synoptic data indicated the minimum sea-level pressure (MSLP) had dropped to 1002 mb and winds of 25 kt (13 m/s) were present. An aircraft reconnaissance mission flew to investigate the region on the 26th. Although it was unable to locate a circulation, the data collected indicated the disturbance was developing - the MSLP had fallen to 999 mb and 40 kt (21 m/s) winds were observed on the south side of the monsoon trough. As a result, the TCFA was renewed at 261530Z. Figure 3-13-1 shows the active monsoon trough at this time. The disturbance is visible on the western side of the imagery with Typhoon Odessa further to the east.

Aircraft reconnaissance early on the 27th located the circulation center, prompting issuance of the first warning, valid at 270000Z. By this time

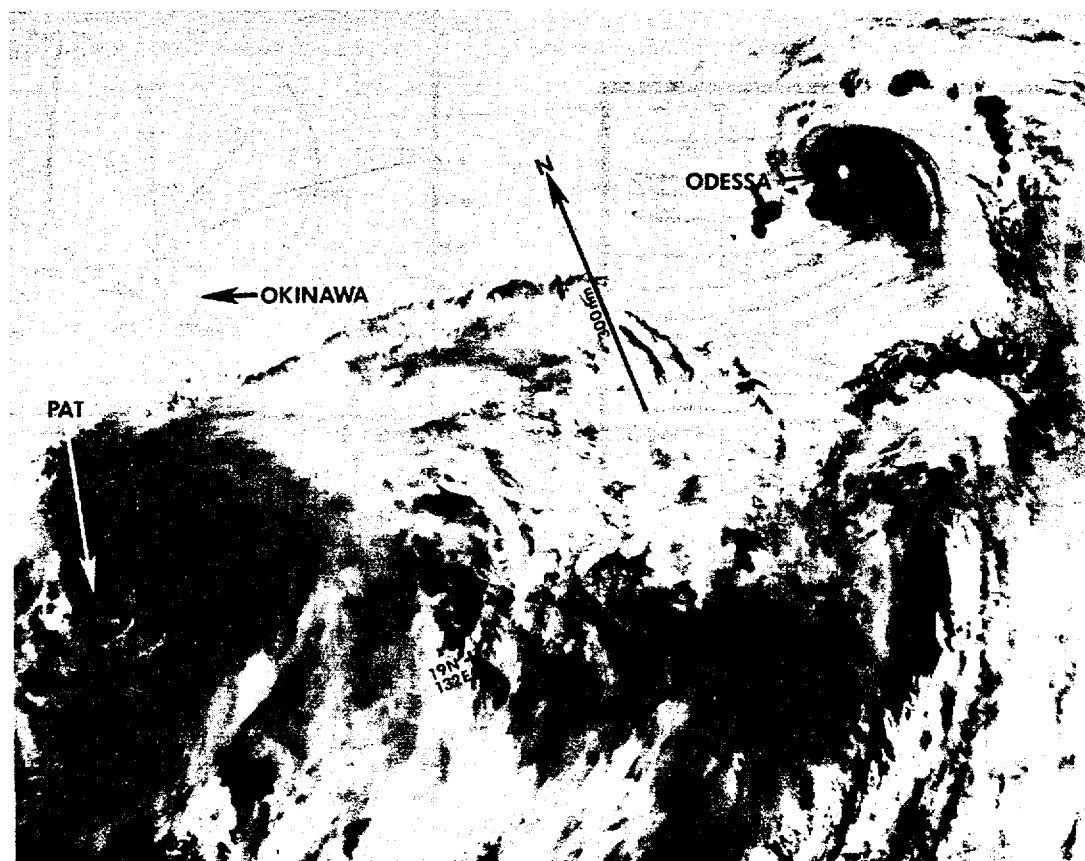
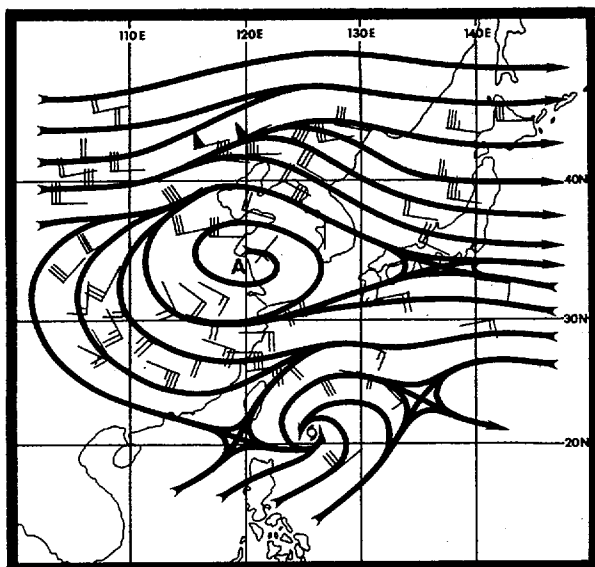


Figure 3-13-1. The tropical disturbance which became Typhoon Pat is visible as an organized area of convection in the monsoon trough. (Typhoon Odessa can also be seen) (261328Z August DMSP infrared imagery).

Pat, due to the enhanced southwesterly monsoon flow, already was at tropical storm intensity. As mentioned earlier, a large number of different factors needed to be taken into account in Pat's forecast.

Determining the direction of the track was the first problem. Because the cyclone was poorly defined on satellite imagery and as a consequence difficult to position, Pat was believed to be moving west-northwest for the first two warnings, when it was actually moving east-northeast. This was critical since persistence from past movement is often a major forecast consideration, especially in the short term forecasts. Figures 3-13-2 and 3-13-3 show some of the data available to the forecasters. A streamline analysis of the 270000Z August 500 mb data has been completed in Figure 3-13-2 to show the location of the subtropical ridge north of Pat. Figure 3-13-3 depicts the first set of forecast aids, using the east-northeast persistence track as a basis, along with the forecast and best track. The most striking feature is, that despite a lot of different options provided by the aids, none really hit the mark at seventy-two hours.

Figure 3-13-2. Mid-tropospheric (500 mb) wind flow at 270000Z August. The dominant synoptic feature is the subtropical ridge extending across China and Japan to the north of Pat.



hit the mark at seventy-two hours.

The forecast called for Pat to move along the monsoon trough to the east-northeast; separate from the trough, and turn back to the west-northwest under the subtropical ridge. This was in reasonable agreement with the One-way Interactive Tropical Cyclone Model (OTCM) model which is usually the best performing forecast aid. The Fleet Numerical Oceanography Center (FNOC) 72-hour 500 mb Navy Operational Global Atmospheric Prediction System (NOGAPS) prognosis called for the ridge to weaken as a trough moved eastward across Mongolia. It appeared, however, that the ridge would remain strong enough to keep Pat south and west of Japan. As it turned out, the prognosis was slow on the movement of the trough, which resulted in the ridge weakening over western Japan.

For the rest of the 27th and all of the 28th, Pat remained in the monsoon trough and continued drifting to the northeast. The forecast situation was further complicated by the presence of Typhoon

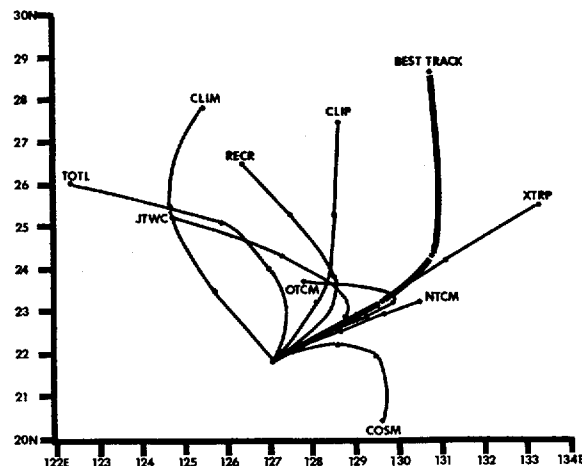


Figure 3-13-3. The primary forecast aids at 271200Z, along with the forecast and post analysis best track; all valid for 72-hours. None of the aids are able to provide correct guidance at seventy-two hours.

Odessa and Tropical Storm Ruby. Figure 3-13-4 shows Pat on the 28th - Odessa and Ruby are also visible. Despite the three cyclones being so close, each was moving a different direction. Pat was moving north-eastward, Odessa west, and Ruby north-northwest. According to the OTCM, Pat should stay under the ridge. The forecast reflected this guidance and continued to show a turn to the northwest.

The 290600Z OTCM was the first to suggest a track change for Pat, taking it around the ridge and into the Sea of Japan. In analyzing this change, the presence of Odessa was closely examined. Odessa

was moving west and located only 380 nm (704 km) north-northeast of Pat. The OTCM, however, had Odessa moving north into the Sea of Japan, despite the fact Odessa was continuing to move westward under the ridge.

On the 29th, the OTCM guidance was rejected and Pat was forecast to turn to the northwest. It was believed that the ridge over Japan was too narrow for the OTCM to pick up with its relatively large grid spacing. The fact that the OTCM was consistently wrong with Odessa reinforced this belief. In post analysis, however, it is believed Odessa kept moving

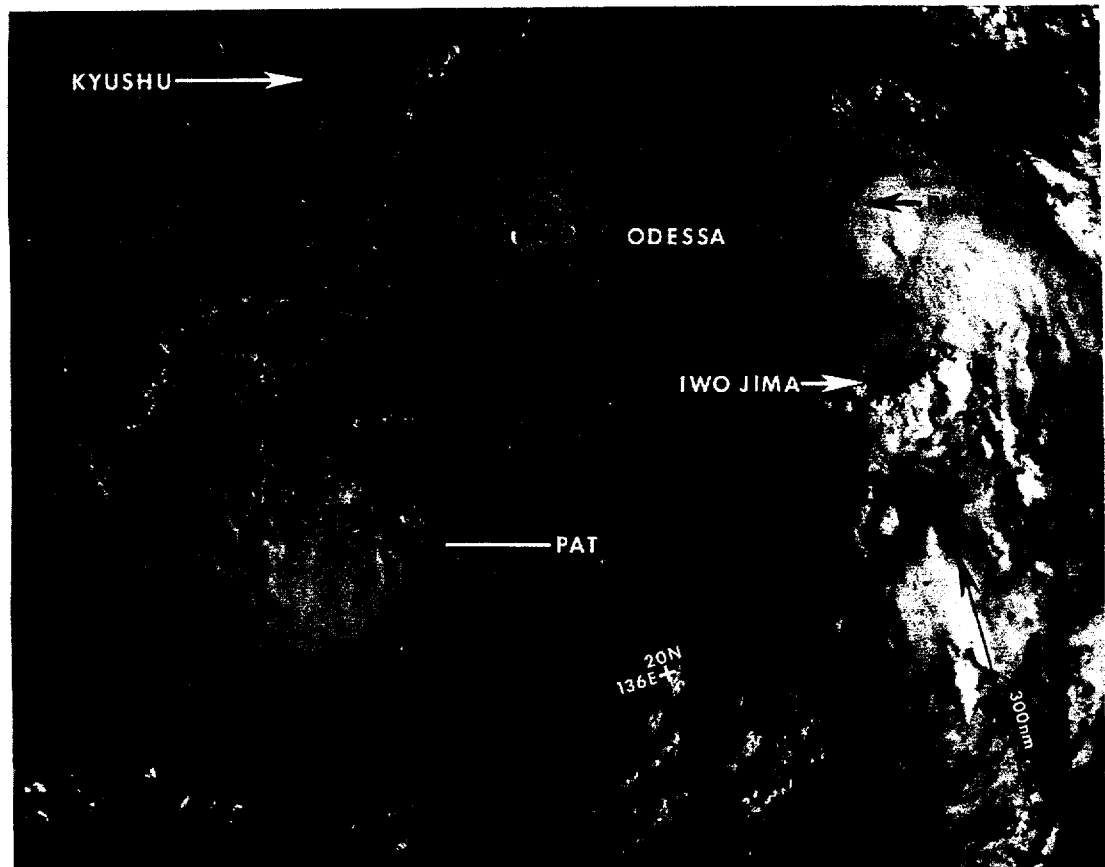


Figure 3-13-4. Three active tropical cyclones south of Japan and all moving different directions. Typhoon Pat is heading northeast, Typhoon Odessa is heading west, and Tropical Storm Ruby is heading north-northwest (282303Z August NOAA visual imagery).

westward at this stage due to binary interaction with Pat rather than from a response to the ridge. Visual satellite imagery early on the 30th (Figure 3-13-5) shows the two were spatially proximate. It is reasonable to believe that if Pat had been the only tropical cyclone in the region at this time, the forecast probably would have been changed on the 29th rather than on the 30th; providing Japan an additional 24 hours of warning time.

With the additional data received on the 30th, it became evident that Pat was not responding to the steering flow of the ridge and was going to hit the Japanese island of Kyushu. The 301200Z forecast was the first to reflect this change. Figure 3-13-6 shows the 500 mb data available at that time. When comparing it with Figure 3-13-2, it is evident that major synoptic changes took place in seventy-two hours. The anticyclone over the China coast was gone and a trough was located just northwest of the Korean Peninsula.

An in-depth look at the interaction between Pat and Odessa, revealed the two typhoons rotated cyclonically around each other. The affect on Odessa's track was greater, however, since Pat was the larger system. Odessa kept moving westward, aided by interaction with Pat. It was interesting to note that Pat did not turn to the north and accelerate until Odessa rotated across to the north-northwest. Then, as soon

as Pat was east-northeast of Odessa, Odessa turned to the northeast and both cyclones accelerated into the Sea of Japan. The closest point of approach between the two was 270 nm (500 km).

At that point, the forecast was straightforward with extratropical transition taking place in the Sea of Japan. Figure 3-13-7 shows Pat during its transition with stable stratocumulus clouds present around a large open center and convection limited to the northeast quadrant. Pat completed extratropical transition at approximately 312100Z. The warnings continued warning on the system until it moved across the island of Hokkaido in northeastern Japan. The final warning was issued at 011200Z.

Typhoon Pat caused significant damage in southwestern and northeastern Japan; primarily on the islands of Kyushu and Hokkaido. Kyushu was hit the hardest with wind gusts of 107 kt (55 m/s) reported at 301940Z in Kagoshima (WMO 47851). Misawa AB (WMO 47580) recorded sustained winds of 33 kt (17 m/s) with a peak gust to 52 kt (27 m/s) at 010710Z when extratropical remnants of Pat crossed the northern Japanese islands. A total of 23 people were reported killed with over 180 people injured. An estimated 3,000 homes were damaged and 148 watercraft of varying sizes lost. Pat also severely disrupted transportation by land, sea and air.

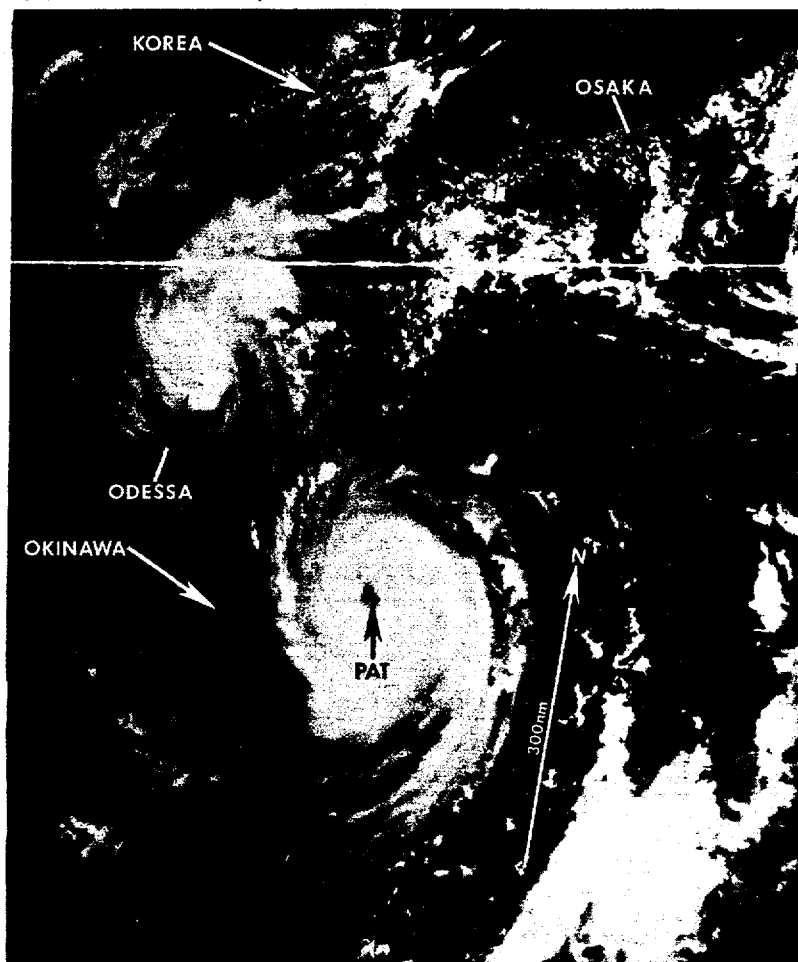


Figure 3-13-5. Typhoon Pat moving northward towards Kyushu and interacting with Typhoon Odessa. Pat is the larger of the two typhoons (300538Z August NOAA visual imagery).

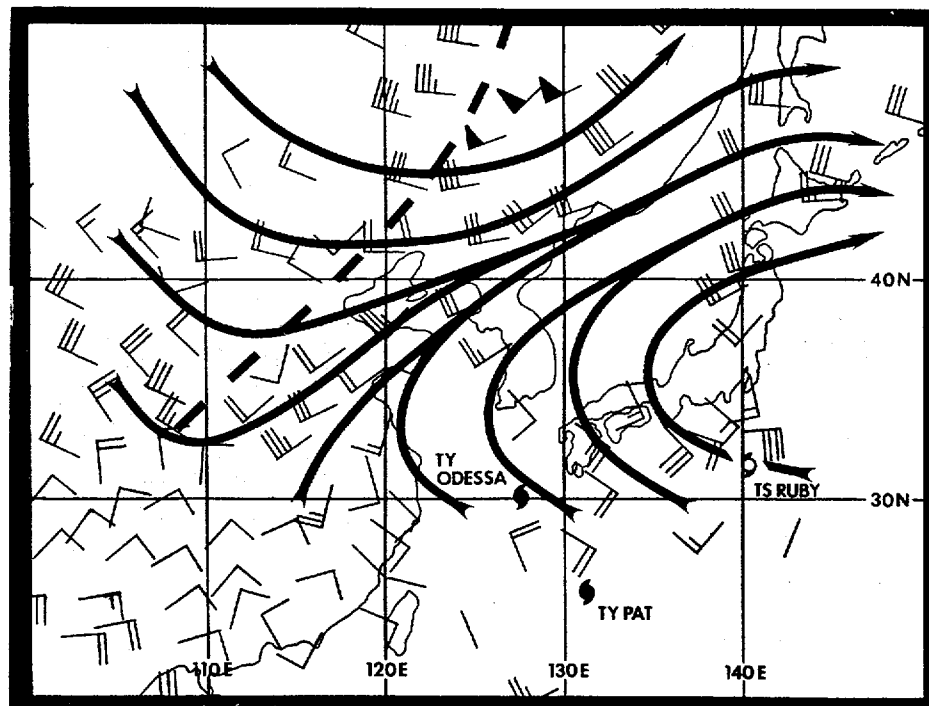


Figure 3-13-6. Mid-tropospheric (500 mb) wind flow at 300000Z August seventy-two hours after Figure 3-13-2. The anticyclone over the coast of China is gone and a trough is moving into the region from the northwest.

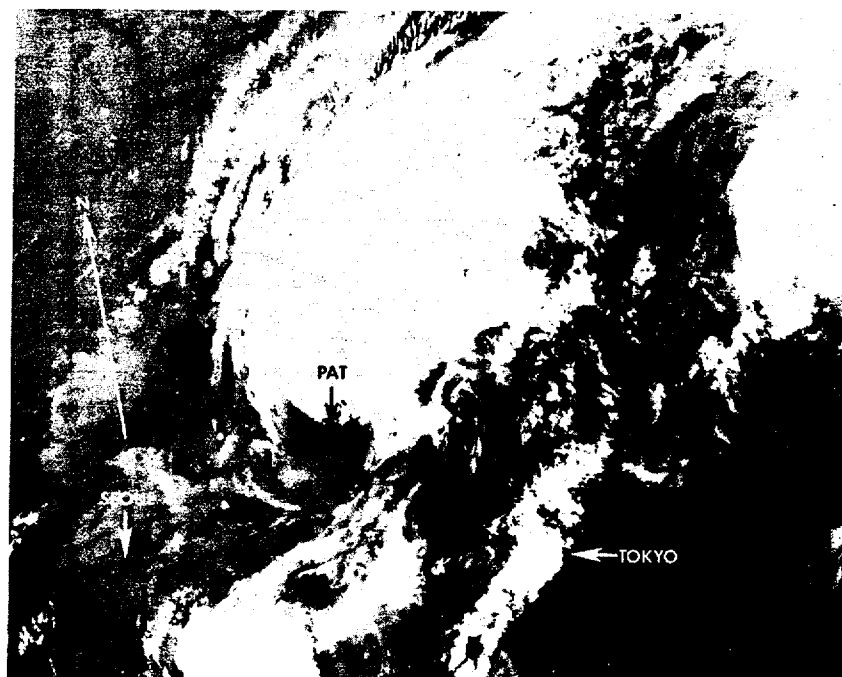
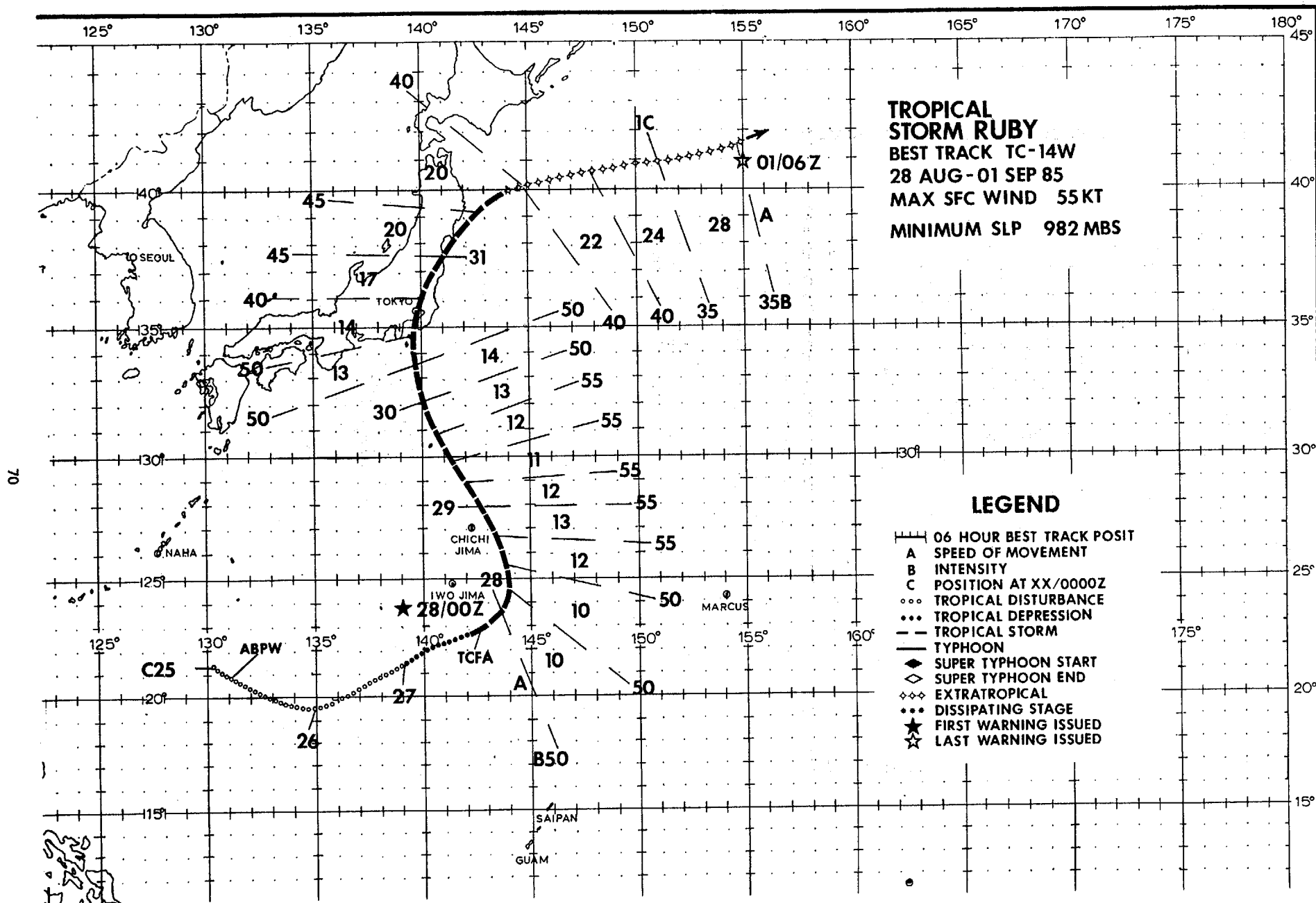


Figure 3-13-7. Pat has nearly completed its transition to an extratropical low in the Sea of Japan. The convection is moving to the northeast leaving behind a broad, exposed low-level circulation center (311813Z August NOAA infrared imagery).



TROPICAL STORM RUBY (14W)

Ruby was the last of three disturbances to develop in the active southwest monsoon trough near 20N latitude during late August. Unlike its predecessors, Typhoons Odessa and Pat, Ruby did not engage in any complex binary interaction, but appeared to remain a solitary system. Ruby was noteworthy in that it tracked directly over the Tokyo metropolitan area.

On 24 August the well-developed monsoon trough was displaced north of its climatological position and provided large scale low-level converging flow. This flow was the combination of the southwest monsoon and the southeast trades around the southwest periphery of the strong subtropical ridge located east of Japan. The low-level monsoon trough had a narrow, but active, tropical upper-tropospheric trough (TUTT) located aloft and to the north, and the upper-level near-equatorial ridge to the south.

Synoptic data on the 25th of August revealed a small (60 nm (111 km) diameter) circulation with a minimum sea level pressure (MSLP) of 1006 mb 330 nm (611 km) south-southeast of the island of Okinawa. Initial mention of this area appeared on the 250600Z Significant Tropical Weather Advisory (ABPW PGTW). The disturbance weakened a day later. Post-analysis showed the circulation tracked eastward and the convection associated with the disturbance exhibited typical monsoon depression characteristics - some curvature, but the enhanced convection only on the equatorward side of the trough. Increased surface winds of 25 kt (13 m/s) on the eastern side of the

circulation and a steady drop of sea-level pressure to 1002 mb, prompted new mention of the disturbance on the Significant Tropical Weather Advisory (ABPW PGTW) at 270600Z. A Tropical Cyclone Formation Alert (TCFA) followed at 271800Z based on a 25 kt (13 m/s) satellite intensity estimate based on convection that had consolidated into a ragged central dense overcast (CDO) feature. Aircraft reconnaissance was subsequently scheduled for the daylight hours of the 28th of August. At that time the typhoon forecaster was faced with a dilemma: was the flare-up of convection at the end of the monsoon trough just another clash of the low-level southeasterlies, or was the signature that of a maturing tropical cyclone? Ruby's relatively close proximity to Typhoon Odessa (to the northwest) and the apparent weak surface inflow in the northwest quadrant, as depicted by the sparse synoptic data, deepened the uncertainty concerning the intensity of the system.

The question was answered when the initial aircraft reconnaissance mission at 280020Z reported an elliptical eye forming and a minimum sea-level pressure of 982 mb. Based on this information, the first warning on Tropical Storm Ruby was issued immediately. Satellite imagery showed the cloudiness was comma shaped with a large band of convection coming into the center from the southeast. This convective band was positioned over the strong zone of convergence between the monsoon and the southeast trades. The data sparse analysis at 280000Z, shown in Figure 3-14-1, depicts this convergent area. Additionally, aircraft reconnaissance reported that

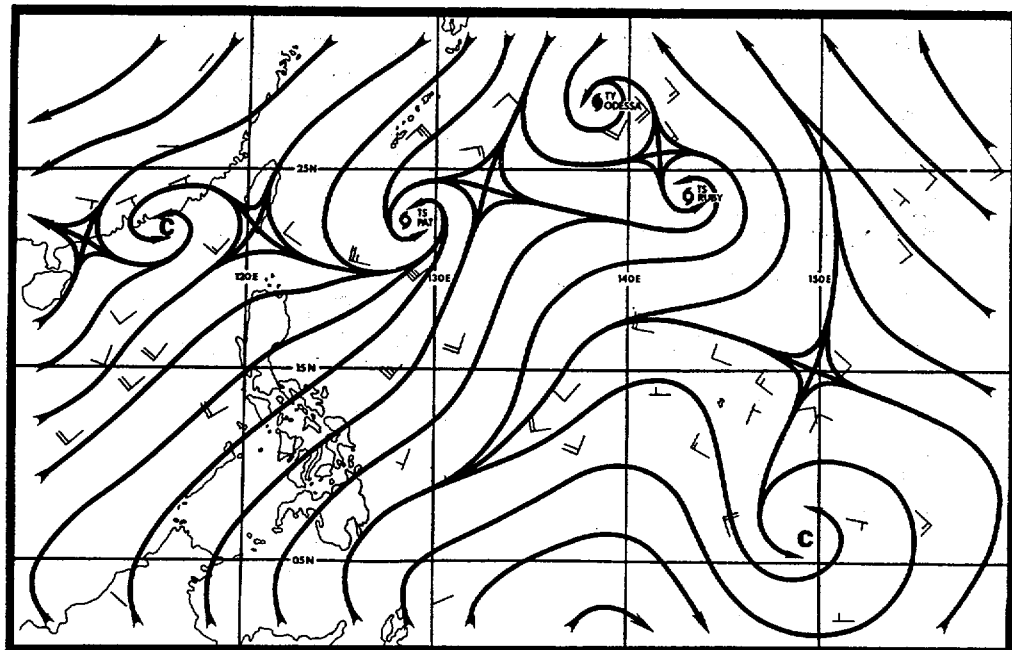


Figure 3-14-1. Surface/gradient analysis at 280000Z showing Tropical Storm Ruby located at the eastern end of the southwest monsoon flow where it converges with the southeast trades.

maximum sustained winds of 50 kt (26 m/s) with gusts to 65 kt (33 m/s) were restricted to the area of the low-level convergence and cloud band. Elsewhere, to the west and southwest, the aircraft found only 15-30 kt (8-15 m/s) surface winds. Figure 3-14-2 shows the proximity of Odessa to Ruby. The continuous vertical shear from the outflow of Odessa to the northwest appears to have hampered Ruby's further development.

During the following twenty-four hours, Ruby turned northwestward and gradually increased speed. Finally, late on the 29th, Ruby appeared to be breaking free of the monsoon trough. The forecast philosophy throughout the 28th and 29th of August was for Ruby, like Odessa, to turn more westward, stay equa-

torward of the narrow subtropical ridge and pass south of Honshu, Japan. This forecast scenario was based on Ruby's interaction with Typhoon Pat. Ruby was forecast to be pulled around the northern periphery of Pat's much larger circulation, which was centered southeast of Okinawa, Japan. Initially, the synoptic situation and, as a result, the meteorological reasoning appeared to be similar to that for Odessa and contrary to guidance provided by the best forecast aid, the One-way Tropical Cyclone Model (OTCM). OTCM moved Ruby northward into the subtropical ridge and towards Honshu, Japan, but at a slower speed than it had previously with Odessa. OTCM apparently was responding to the approach of a mid-latitude short wave trough. Figure 3-14-3 compares



Figure 3-14-2. Nighttime moonlight satellite imagery of Ruby. The close proximity of Odessa to Ruby appears to have hampered Ruby's further development. Ruby is near maximum intensity of 55 kt (28 m/s) (281248Z August DMSP visual imagery).

OTCM guidance with the forecasts for warnings 04 through 08. By following the forecast philosophy that OTCM still could not resolve the narrow subtropical ridge (due to its larger internal grid spacing), the warnings failed to reflect Ruby's gradual recurvature and subsequent landfall until approximately six hours before the event.

Over a thirty-six hour period, between 281200Z and 300000Z, the Tropical Storm maintained a maximum intensity of 55 kt (28 m/s). Ruby packed 55 kt (28 m/s) winds as it moved south of Tokyo, Japan, but began to weaken just prior to moving into Tokyo Bay

and the Kanto Plain. Satellite imagery showed Ruby lost most of its central convection before making landfall due to interaction with the mid-latitude westerlies. Yokosuka received maximum sustained winds of 33 kt (17 m/s) with gusts to 47 kt (24 m/s) at 301420Z, as Ruby passed 5-10 nm (9-19 km) to the east. During this period Tokyo received three inches (76 mm) of rain and minor damage - trees down, windows broken and power outages for thousands of homes. After twelve hours over land, Ruby moved back into the Pacific and completed extratropical transition at 311000Z.

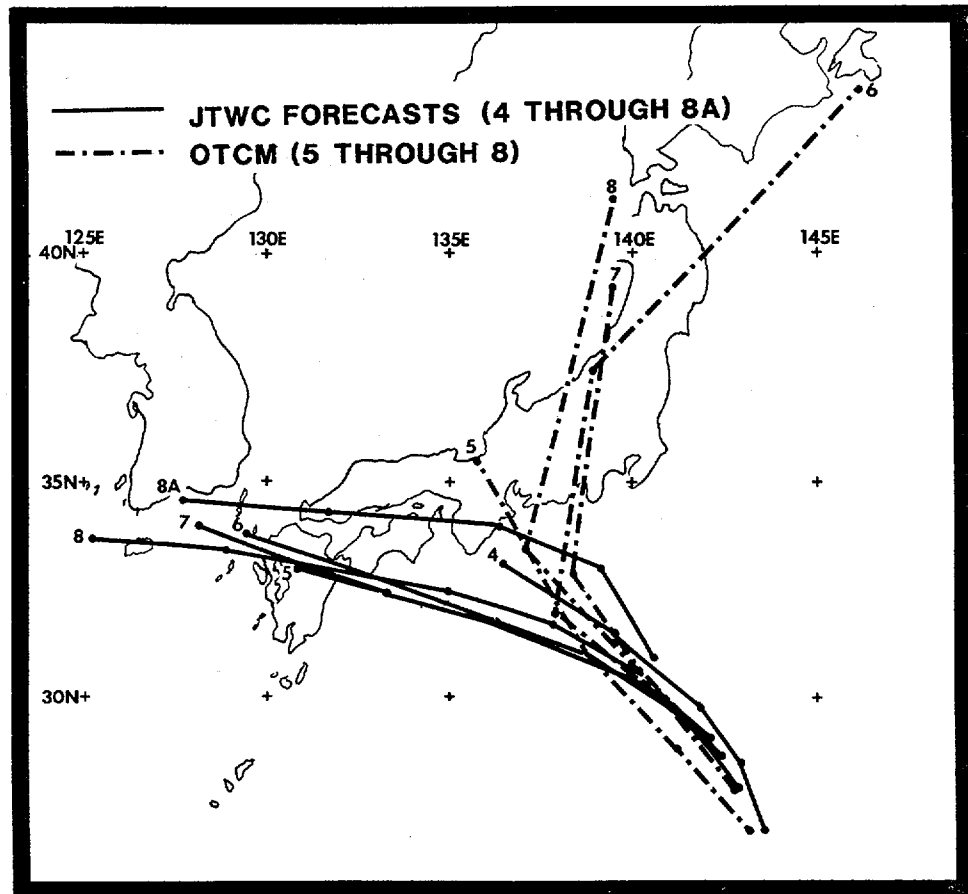
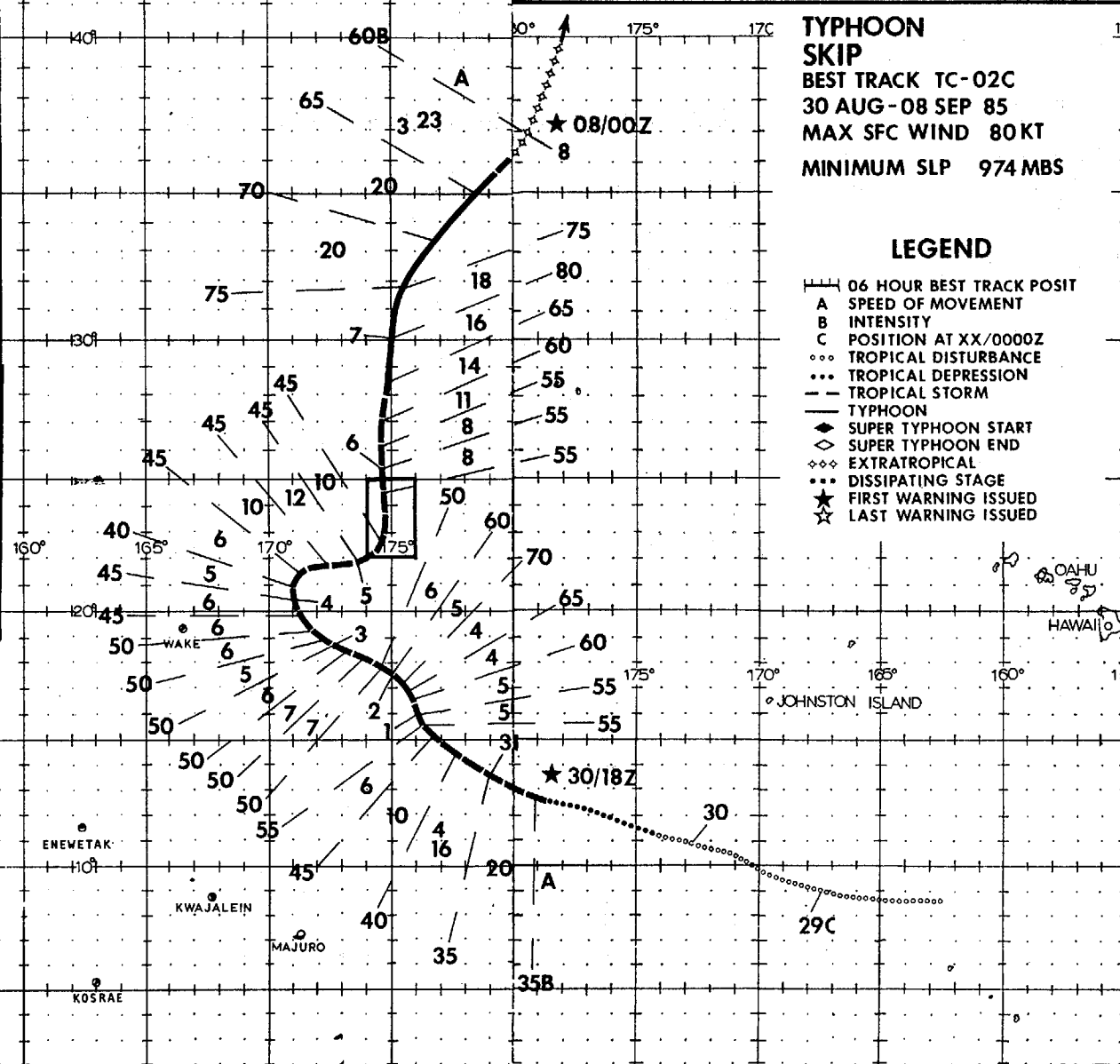
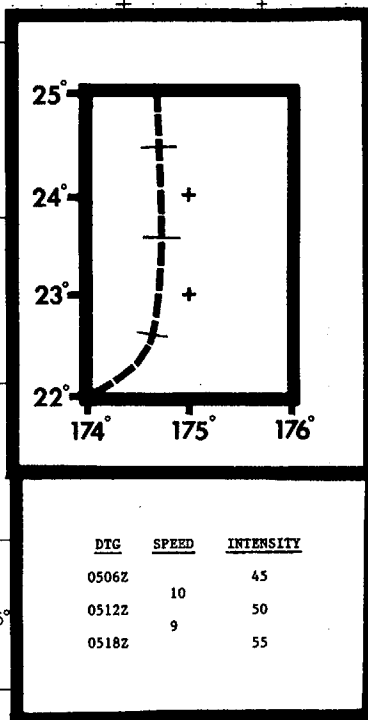


Figure 3-14-3. A comparison of OTCM guidance and the forecasts for five warnings (04 through 08).



Typhoon Skip was the first system in the North Pacific to be warned on by both the Naval Western Oceanography Center (NWOC), Pearl Harbor, Hawaii and the Joint Typhoon Warning Center (JTWC), since Tropical Storm Carmen (02) in early April, 1980. (Note: Tropical cyclones east of the dateline are the responsibility of the Central Pacific Hurricane Center (CPHC), Honolulu, Hawaii, but all warnings and alerts are issued in coordination with NWOC.) Skip developed in the central North Pacific and transited the dateline twice. Additionally, the system achieved typhoon intensity twice: once east-southeast, and then later northeast, of Wake Island.

Satellite imagery detected an area of organized convection along the near-equatorial trough on the 28th of August. This disturbance raced west-northwestward for the next forty-eight hours under pressure from the strong mid-Pacific subtropical ridge. On 30 August, despite the 20 kt (10 m/s) plus movement, satellite images showed the cloud system's organization had increased significantly. This prompted the issuance of a Tropical Cyclone Formation Alert (TCFA) at 301730Z by NWOC. Almost immediately the TCFA was followed by the first warning at 301800Z on Tropical Depression 02C. As Skip transited the dateline from east to west, it became the fourth of what would be a five tropical cyclone scenario in the same ocean basin. The other systems that were part of this unusual event were Odessa, Pat, Ruby near Japan and Tess southwest of Guam.

Responsibility was transferred at the dateline from NWOC to JTWC for the second warning. The following warning upgraded Skip to a tropical storm at 310600Z based on satellite intensity estimates (post analysis later showed that Skip had reached tropical storm intensity six hours earlier, at 310000Z). Coincident with intensification Skip also began to slow its forward motion. The system obtained typhoon intensity at 011200Z. A weakening trend set in on 02 September as a mid-level trough approached from the northwest, but Wake Island was still threatened by Skip's approach. Finally, late on the 3rd, Skip turned away from Wake Island and moved towards the north. The Tropical Cyclone then executed an abrupt turn to the east and moved eastward for eighteen hours. During this period the central convection was displaced, by stronger winds aloft, to the east and northeast of the low-level circulation center.

On 05 September, after the passage of a mid-level trough, Skip resumed a northward track through the subtropical ridge and began to intensify and accelerate. A distinct eye developed (see Figure 3-02C-1) as the peak intensity of 80 kt (41 m/s) was reached on 07 September. But this peak was short lived, as increased wind shear aloft from mid-latitude westerlies and interaction with a trailing cold front came into play. Extratropical transition was rapidly completed near the dateline at 072100Z. The warning responsibility was transferred from JTWC to NWOC once again as Skip transited the dateline, this time from west to east, and the last warning followed at 080000Z.

In retrospect, Skip provided its share of forecasting difficulties due to its location in the data sparse central North Pacific and the complex interaction between mid-latitude troughing and the subtropical ridge. Skip also proved to be a challenge for the 54th Weather Reconnaissance Squadron to fly primarily for two reasons: its remote location, which required staging at the islands of Kwajalein and Wake; and the simultaneous occurrence of the multiple tropical cyclone outbreak in the western North Pacific, that stretched aircraft reconnaissance assets to their limit. Once it became apparent that Wake Island was no longer threatened by Skip, aircraft reconnaissance tasking was cancelled.

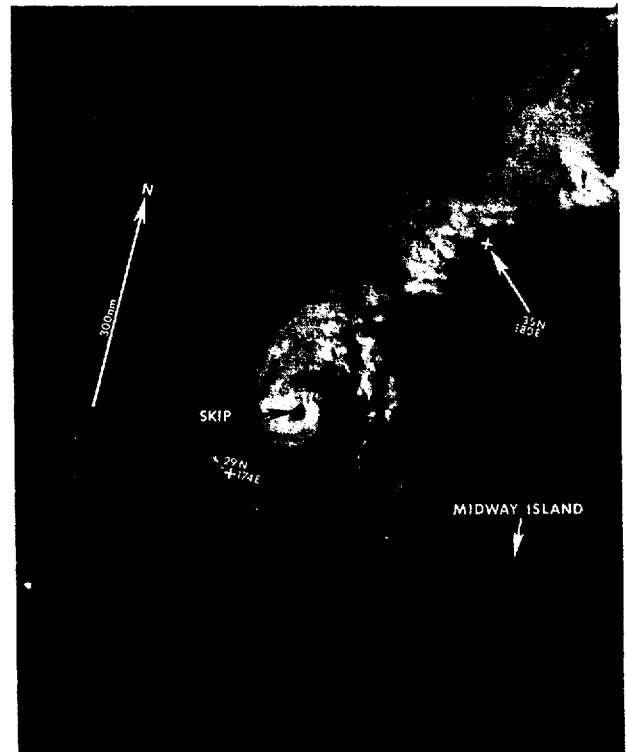


Figure 3-02C-1. Typhoon Skip at maximum intensity with a well defined eye. Skip trails at the end of a cold frontal cloud band that extends to the northeast (070229Z September NOAA imagery).

TYPHOON TESS

BEST TRACK TC-15W

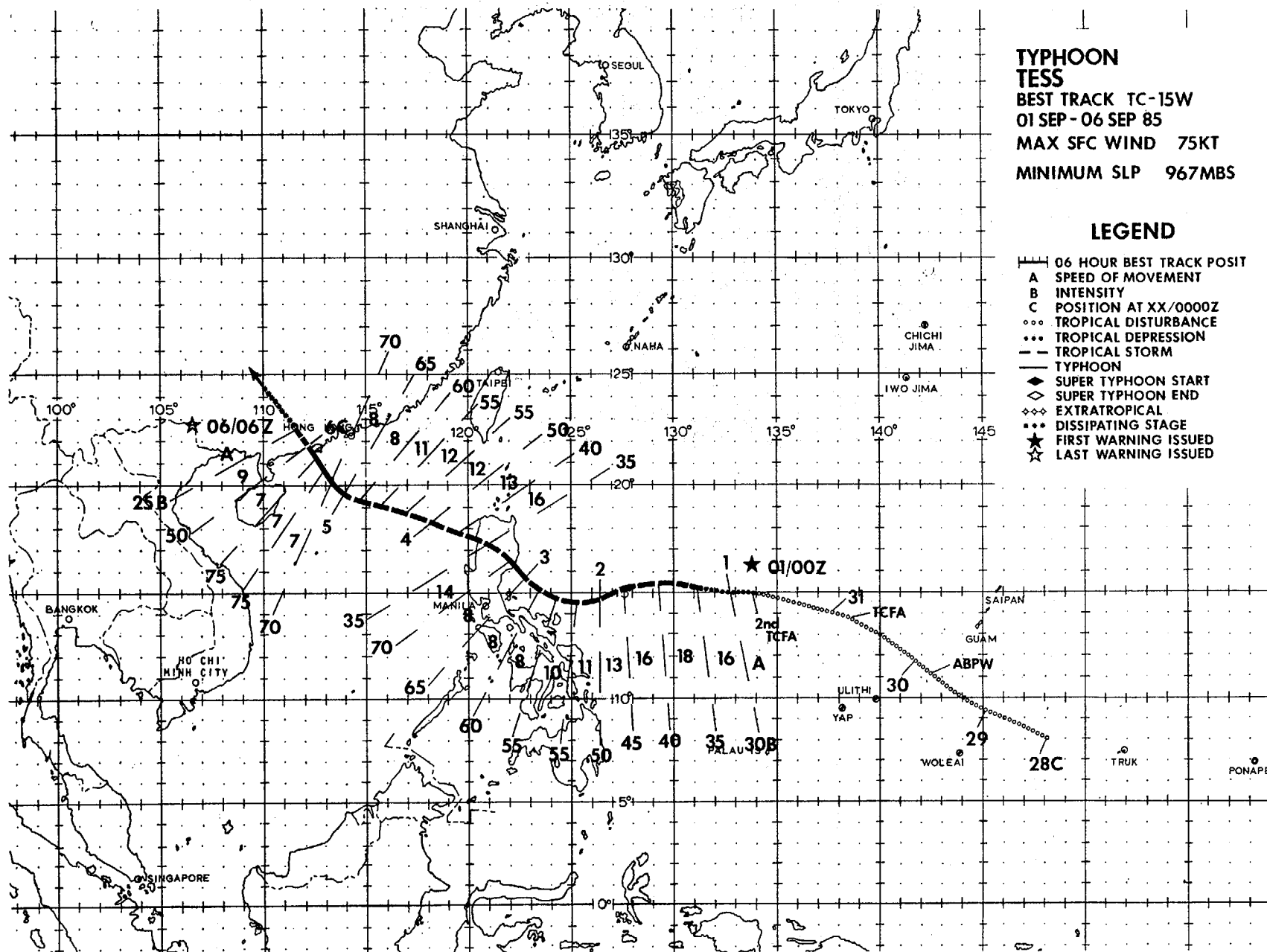
01 SEP-06 SEP 85

MAX SFC WIND 75KT

MINIMUM SLP 967MBS

LEGEND

- 06 HOUR BEST TRACK POSIT
- A SPEED OF MOVEMENT
- B INTENSITY
- C POSITION AT XX/0000Z
- ... TROPICAL DISTURBANCE
- ... TROPICAL DEPRESSION
- TROPICAL STORM
- TYPHOON
- ◆ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- ◆◆ EXTRATROPICAL
- ... DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ☆ LAST WARNING ISSUED



TYPHOON TESS (15W)

Typhoon Tess, the first of five significant tropical cyclones to develop in September, originated as a low latitude disturbance southeast of Guam (WMO 91217). Although bringing needed rain to the Philippines during a spell of drier than normal weather, Tess also brought unwanted death and destruction. Four people perished, several were missing and at least 300 were left homeless as this tropical cyclone crossed northern Luzon and disrupted air, ground and sea transportation. In addition, a tornado spawned by Tess, ravaged the coastal town of Lemery, 50 nm (93 km) south of Manila (WMO 98425).

During the last days of August, the monsoon trough was displaced poleward and extended from the northern South China Sea eastward encompassing Typhoons Pat and Odessa, and Tropical Storm Ruby. This left a broad zone of low-level southwesterly flow across the Philippine Sea. The surface/gradient level streamline analysis for 280000Z (Figure 3-15-1) indicated anticyclonic flow over Guam and a cyclonic circulation to the southeast. This cyclonic circulation center, which was moving northwestward, remained at the western end of a band of maximum cloudiness that showed no organization. Initial conditions for development of this low latitude disturbance were unfavorable because of the strong vertical shear from the equatorward outflow channel of the multiple tropical cyclones to the north.

At 1200Z on 30 August satellite data indicated that the area of cloudiness, then located 300 nm (556 km) west of Guam, had shown a marked increase in organization and amount of convection over the previous 12-hours. Synoptic data at that time confirmed the existence of a low-level circulation, a gradual decrease in sea-level pressure and winds estimated at 10 to 20 kt (5 to 10 m/s). These data prompted issuance of the first of two TCFA's at 301930Z. Aircraft reconnaissance was requested for the next day.

On 010126Z September, the first aircraft reconnaissance flight into the system verified the location of the surface circulation, and found

surface winds of 30 to 35 kt (15 to 18 m/s) and a MSLP of 1003 mb. The first warning on Tropical Depression 15W followed at 010400Z. The center of the depression was located 600 nm (1111 km) east of Manila. The tropical cyclone was moving rapidly westward under the steering influence of the subtropical ridge which lay to the north. As the system matured, satellite imagery detected the formation of a ragged Central Dense Overcast (CDO). Based on the persistent CDO and associated intensification trend, Tropical Depression 15W was upgraded to Tropical Storm Tess at 011200Z (Post analyses showed that Tess actually had reached tropical storm intensity six hours earlier). Aircraft reconnaissance 36 hours later at 022351Z found 65 kt (33 m/s) maximum surface winds and a MSLP of 983 mb. As a result, Tess was further upgraded to typhoon status. At that time, Typhoon Tess was located by a combination of aircraft, satellite and radar information approximately 130 nm (241 km) east-northeast of Manila. Tess was destined to make landfall over Luzon within six hours. As Tess neared Luzon, it took a jog to the northwest sparing the Manila area from the strongest effects of the typhoon.

Landfall over northern Luzon resulted in the temporary downgrading of Tess to a tropical storm at 031200Z. However, within eleven hours Tess had cleared Luzon and was again over water in the South China Sea. Redevelopment to typhoon intensity was forecast and did occur at 050000Z when the Typhoon was located 170 nm (315 km) south of Hong Kong (WMO 45005) (Figure 3-15-2). Tess continued northwestward under the influence of the subtropical ridge and within 24 hours moved inland over the southern coast of mainland China near Yangjiang (WMO 59663), 120 nm (222 km) west-southwest of Hong Kong. The final warning was issued at 060600Z.

Despite passing well south of Hong Kong, Tess generated a peak gust to 60 kt (31 m/s) at the Royal Observatory, and 65 kt (33 m/s) at the Hong Kong International Airport (WMO 45007). Although considerable flooding and crop damage occurred over southern China as Tess moved inland, there were no reports of death or injuries.

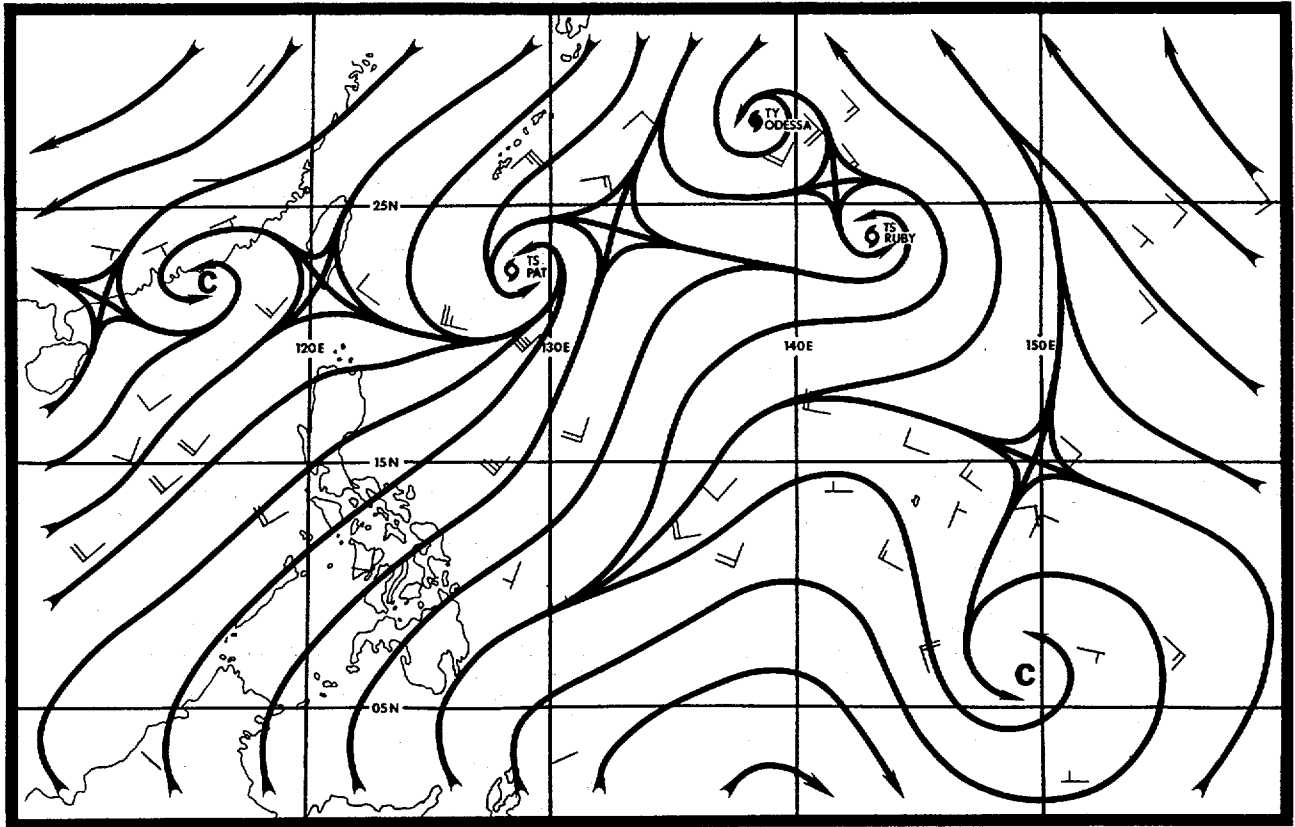


Figure 3-15-1. The 280000Z August surface/gradient level streamline analysis of the southwest monsoonal flow across the Philippine Sea. The low-latitude disturbance southeast of Guam was the precursor of Tess.

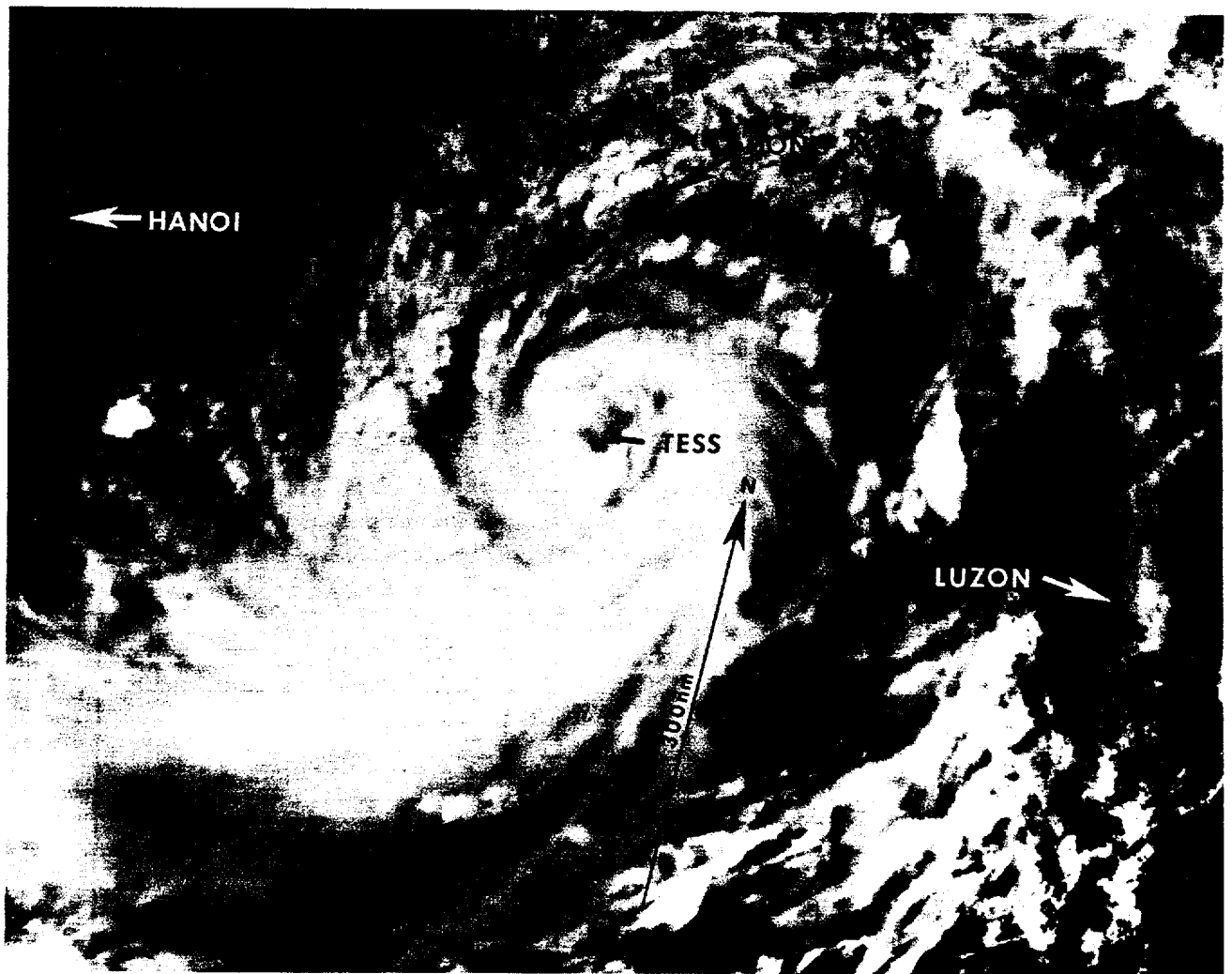
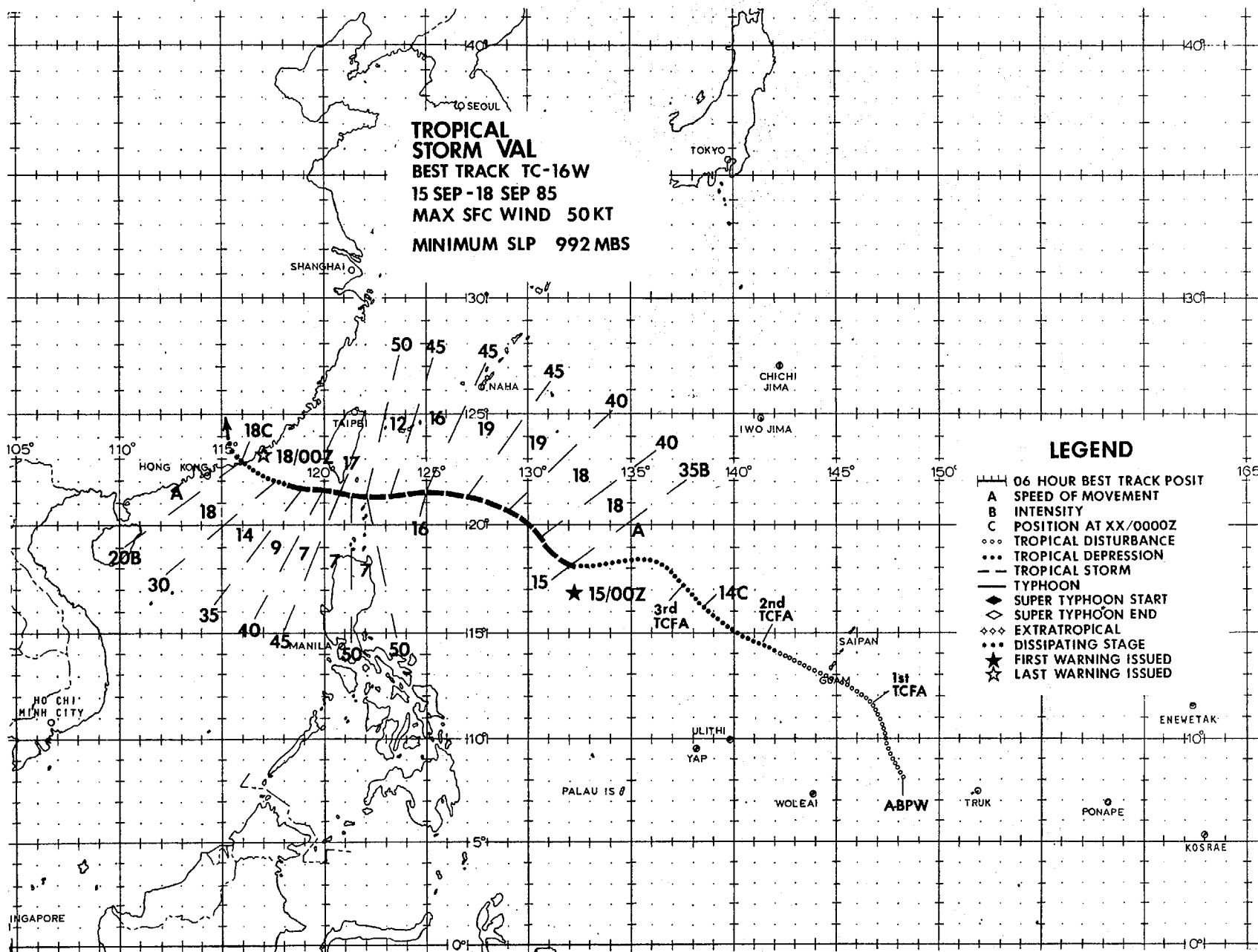


Figure 3-15-2. Typhoon Tess, with a ragged eye, near peak intensity. The coastline along the northern Gulf of Tonkin is to the west of Tess' cirrus outflow (050229Z September DMSP visual imagery).



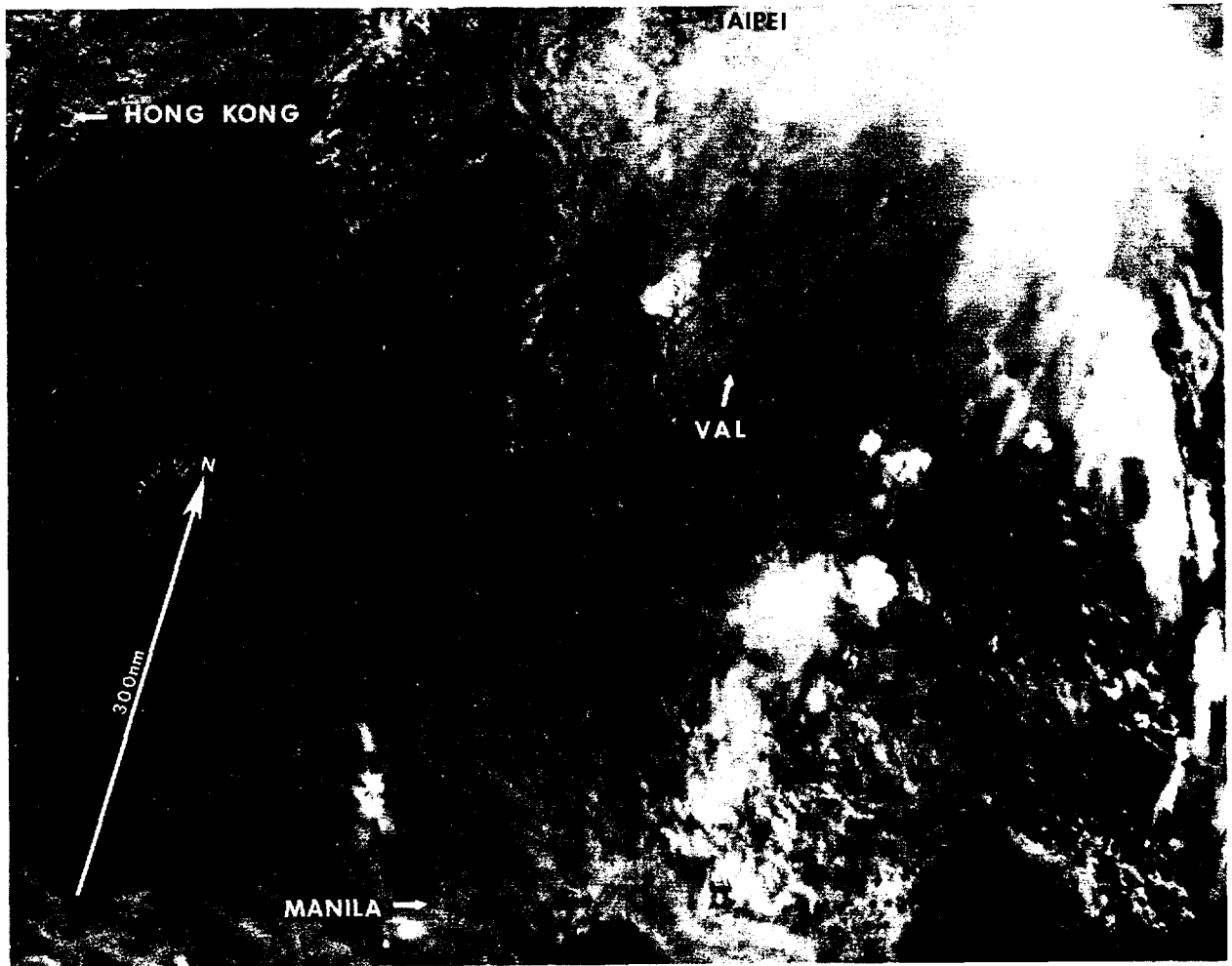
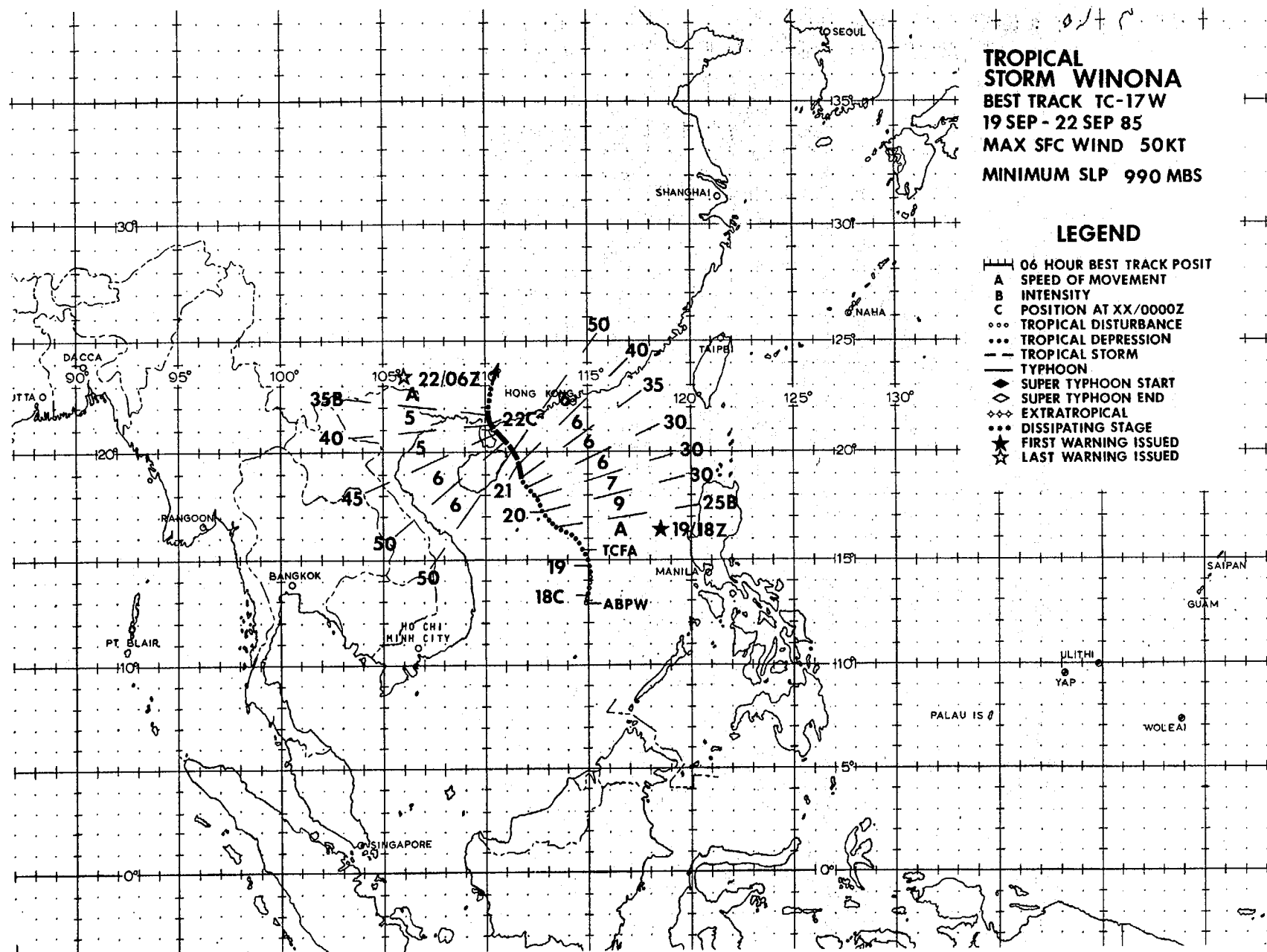


Figure 3-16-1. Tropical Storm Val was the first of two successive storms to reach a peak intensity of 50 kt (26 m/s). Originating in the monsoon trough southeast of Guam, it slowly developed as it moved northwest out of the trough. After moving into the central Philippine Sea, Val took a more westerly heading, paralleling the subtropical ridge axis to the north. Val remained poorly organized much of its lifetime, with the low-level center often difficult to locate from both satellite imagery and aircraft reconnaissance data. The above imagery shows one of the few times the low-level center could be identified. As Val approached Taiwan, its circulation became further disrupted. The low-level circulation center tracked west while most of the convection became displaced to the northwest and enhanced by Taiwan's mountainous terrain. The convection attempted to redevelop over the low-level wind center as Val transited the Luzon Straits, but without success. As a result, Val weakened prior to making landfall on mainland China and was not identifiable as a tropical cyclone after 180000Z. Due to the threat posed by Val, Hong Kong (WMO 45005) did go to Condition of Readiness II at 161500Z. However, Val dissipated earlier than anticipated and no significant weather was reported (160558Z September NOAA visual imagery).

**TROPICAL
STORM WINONA**
BEST TRACK TC-17W
19 SEP - 22 SEP 85
MAX SFC WIND 50KT
MINIMUM SLP 990 MBS

LEGEND

- 06 HOUR BEST TRACK POSIT
- A SPEED OF MOVEMENT
- B INTENSITY
- C POSITION AT XX/0000Z
- ... TROPICAL DISTURBANCE
- ... TROPICAL DEPRESSION
- TROPICAL STORM
- TYPHOON
- ◆ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- ◇◇◇ EXTRATROPICAL
- ... DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ★ LAST WARNING ISSUED



TROPICAL STORM WINONA (17W)

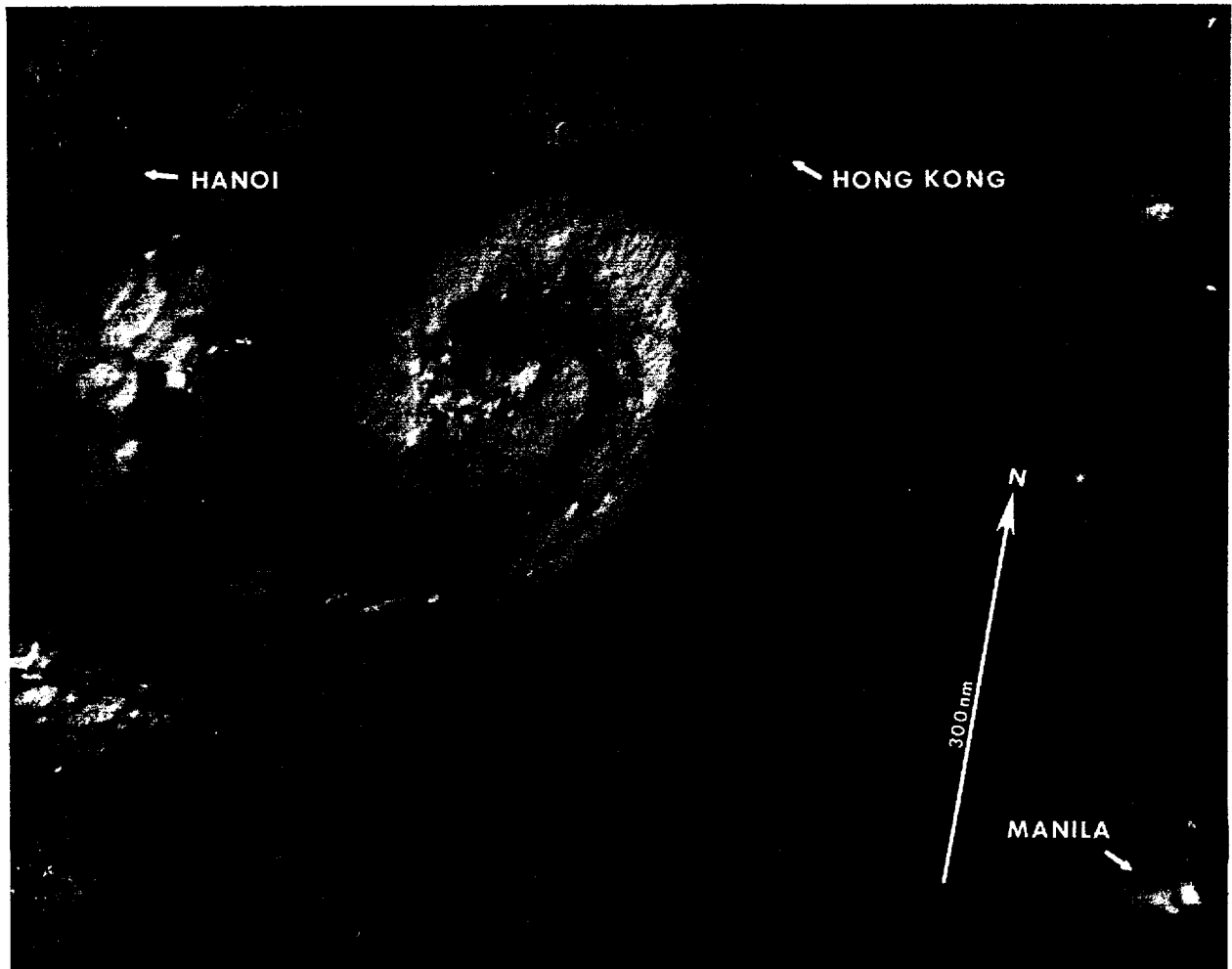


Figure 3-17-1. After the remnants of Tropical Storm Val dissipated over eastern China, excess vorticity at the base of the monsoon trough formed a surface circulation in the central South China Sea. Two days later this circulation intensified into Tropical Storm Winona. Winona tracked to the north-northwest as it intensified, moving around the western periphery of the subtropical ridge which was extending westward across the Philippine Sea. Winona made landfall as a 50 kt (26 m/s) tropical storm just west of Zhanjiang, China (WMO 59658) at about 212000Z. There were no reports of damage as it moved inland and dissipated. The satellite imagery above shows Winona just prior to reaching maximum intensity. Note the well-defined convective banding surrounding the center of the storm (210208Z September DMSF visual imagery).

TYPHOON ANDY

BEST TRACK TC-18W

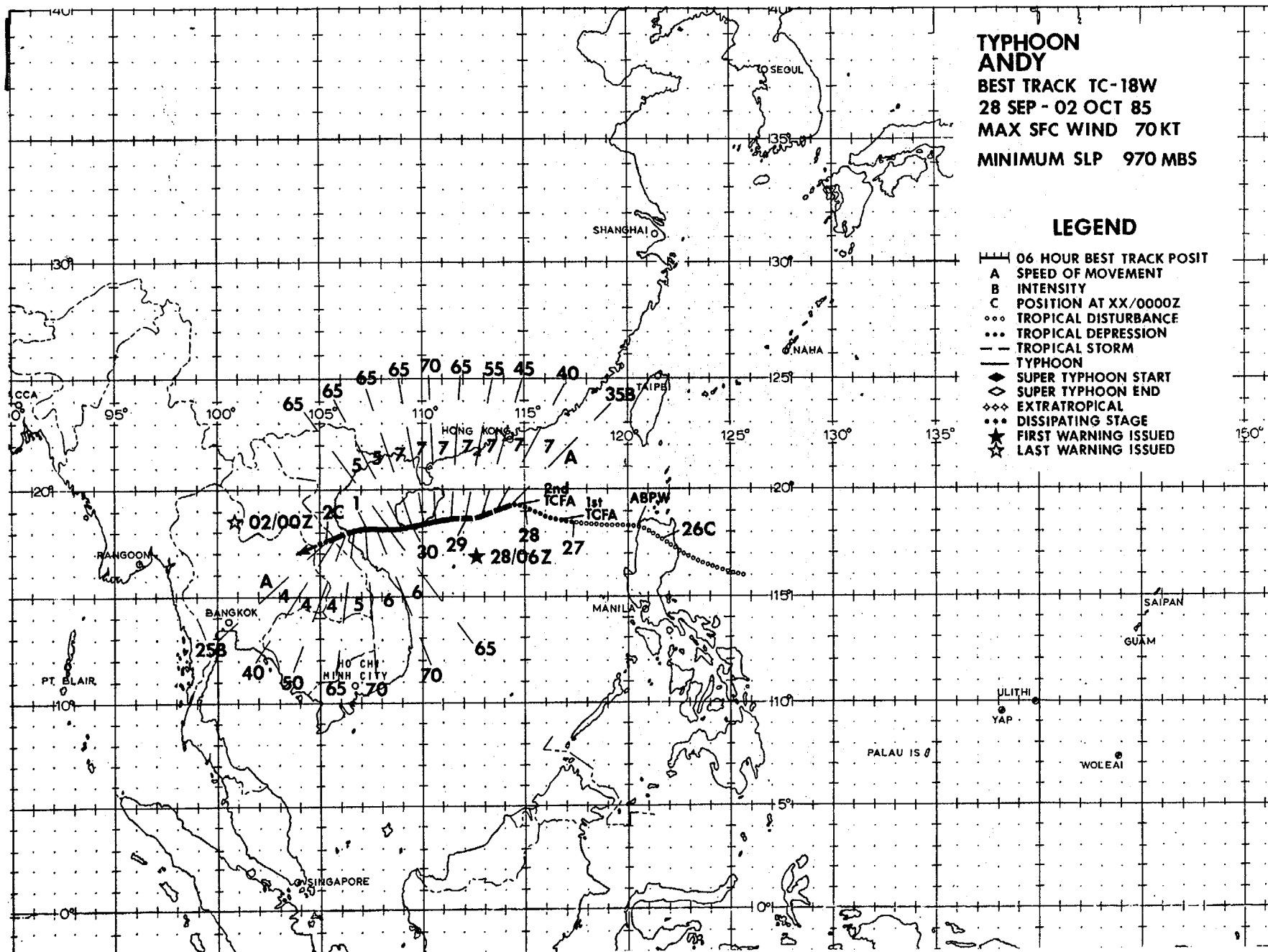
28 SEP - 02 OCT 85

MAX SFC WIND 70 KT

MINIMUM SLP 970 MBS

LEGEND

- 06 HOUR BEST TRACK POSIT
- A SPEED OF MOVEMENT
- B INTENSITY
- C POSITION AT XX/0000Z
- ... TROPICAL DISTURBANCE
- ... TROPICAL DEPRESSION
- TROPICAL STORM
- TYPHOON
- ◆ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- ◆◆ EXTRATROPICAL
- ... DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ★ LAST WARNING ISSUED



TYPHOON ANDY (18W)

Typhoon Andy was a relatively short-lived tropical cyclone. Developing in the South China Sea, Andy transited uneventfully to the west-south-west. Although the cyclone made landfall twice at or near typhoon strength, there were no reports of serious damage or injuries.

The disturbance that eventually developed into Typhoon Andy was first detected late on 25 September as a small area of intense convection in the monsoon trough east of the Philippines. This compact CDO feature was part of a larger area of disturbed weather which had persisted east of Mindanao for several days. The southern portion of this large area had been the subject of a TCFA on the 24th and 25th. When the area of convection moved northwest across northern Luzon early on the 26th and entered the South China Sea, development of Andy began in earnest.

Between 260000Z and 270000Z the tropical disturbance moved to the west-northwest and slowly consolidated. Coincidentally, an early season surge in the northeast monsoon was underway generating 25 to 40 kt (13 to 21 m/s) winds across the Taiwan Straits and the northern South China Sea. This surge most probably contributed to the excess low-level cyclonic vorticity needed to produce a lee-side circulation off the northwest coast of Luzon. The development of this low-level vortex is thought to have aided the development of Andy. At 270000Z, Dvorak intensity analysis of the cloud system estimated 30 kt (15 m/s) surface winds were present. Sparse supporting synoptic data at that time showed only 20 to 25 kt (10 to 13 m/s) surface winds near the disturbance's center. However, due to the improved organization and the expectation for further development, a TCFA was issued at 270300Z. Less than three hours later, satellite imagery revealed the presence of a partially exposed low-level circulation center.

Over the next 24 hours, the system continued to move to the west-northwest in the monsoon trough. Despite the presence of the low-level circulation center on satellite imagery on the 27th, aircraft reconnaissance early on the 28th was unable to find a surface circulation. But, because winds of 25 to 30 kt (13 to 15 m/s) and a 1001 mb MSLP were observed, the TCFA was reissued at 280300Z.

The first warning on Andy, as Tropical Depression 18W, followed several hours later at 280600Z. By that time it had become apparent the system was more than just a benign circulation in the monsoon trough. Dvorak intensity analyses by two different tactical DMSP sites estimated the intensity at 30 and 45 kt (15 m/s and 23 m/s). As Tropical Depression 18W matured, it came under the influence of low- to mid-level ridging to the north. The Tropical Cyclone responded by turning to the west-southwest. It moved in this direction for the remainder of its lifetime.

Continuing to intensify, Andy attained typhoon strength about 24 hours after the first warning, at 290600Z. At that time, the Dvorak intensity analysis was a T4.0, supporting 65 kt (33 m/s) surface winds. Andy's intensification to a typhoon coincided with the formation of a small ragged eye. Typhoon Andy first made landfall on the southern tip of Hainan Island just east of Yai-Xian (WMO 59948) at 291800Z with maximum sustained winds of 65 kt (33 m/s), gusts to 80 kt (41 m/s). After a glancing blow to Hainan (Figure 3-18-1), Andy continued west-southwestward across the southern Gulf of Tonkin and reached its maximum intensity of 70 kt (36 m/s) at 301800Z. Typhoon Andy made landfall as a minimal strength typhoon approximately 30 nm (56 km) north of Dong Hoi, Vietnam (WMO 48848) at 011000Z. The tropical cyclone rapidly weakened as it moved inland. The last warning, issued at 020000Z, downgraded Andy to a 25 kt (13 m/s) tropical depression as it dissipated over central Laos.

Although a tropical cyclone of this magnitude would normally be expected to cause widespread damage, none was reported. Extensive preparations made prior to the cyclone's arrival probably lessened the impact of Andy's passage.

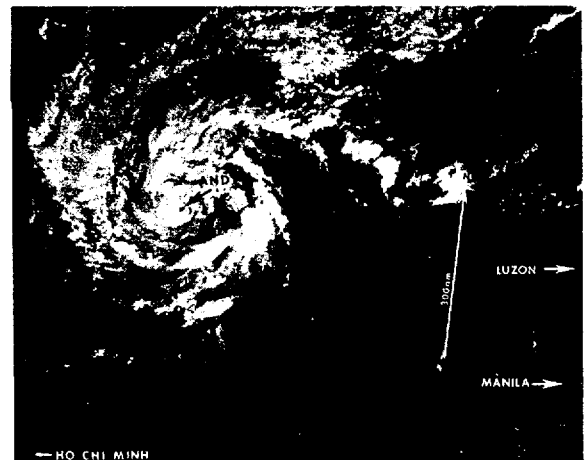
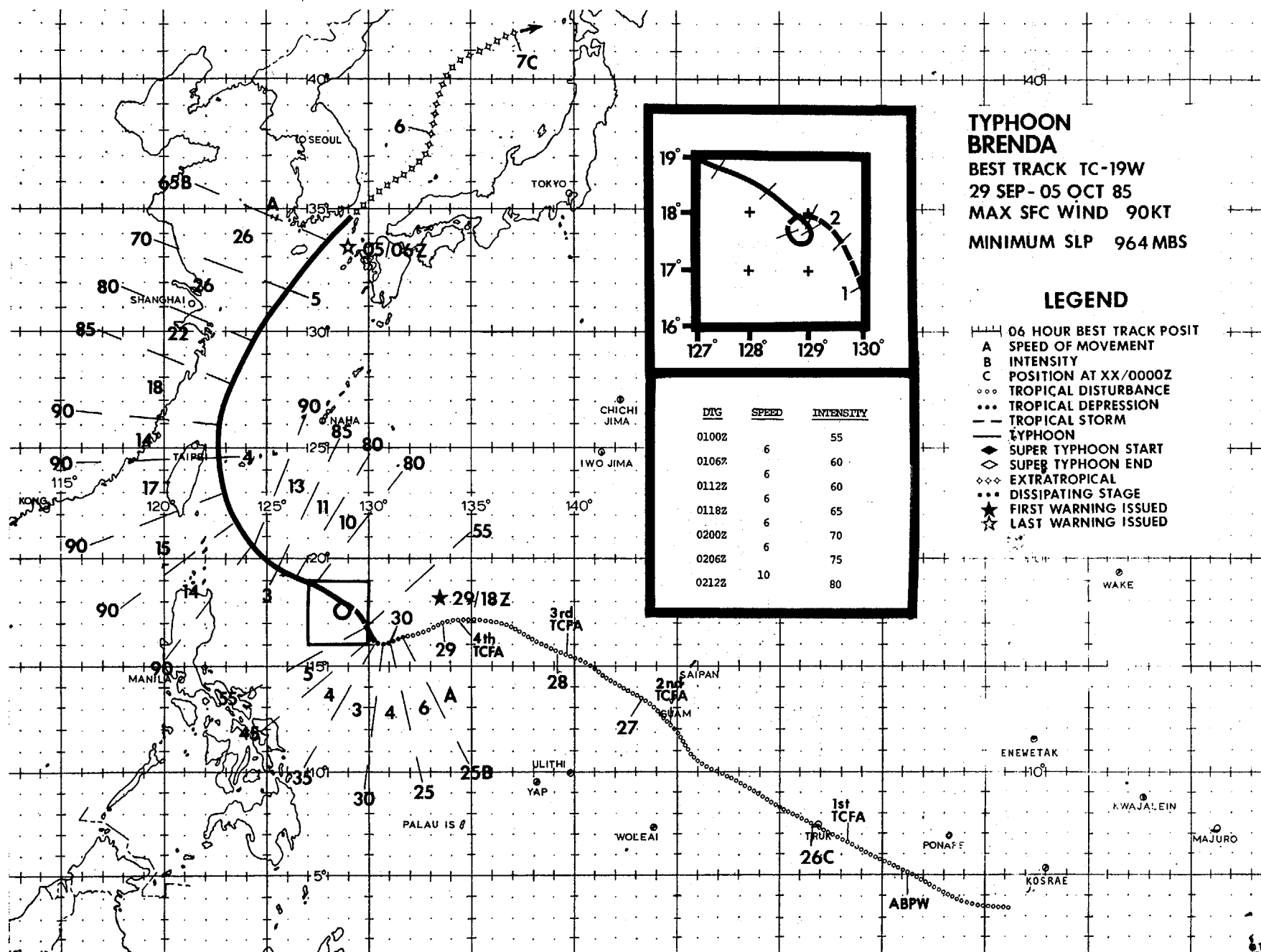


Figure 3-18-1. Typhoon Andy, with a small eye, as it entered the Gulf of Tonkin (300228Z September DMSP visual imagery).



Typhoon Brenda developed from a broad, persistent area of convection in the monsoon trough. Its life was influenced by two mid-latitude troughs. The first caused erratic early movement. The second caused Brenda to recurve into the mid-latitude westerlies, a track which was well-forecast by the Joint Typhoon Warning Center.

The disturbance that would become Brenda was first noticed on 25 September as a large area of persistent convection southeast of Truk (WMO 91334). (Further west, the early signs of Typhoon Andy were evident in the western Philippine Sea). Although the system was disorganized, good upper-level outflow was evident. The proximity of the tropical disturbance to Guam and its impressive satellite signature resulted in the issuance of the first of four TCFA's at 252230Z. Aircraft reconnaissance early on the 26th was unable to locate a surface circulation, but did find a broad area of troughing. The area tracked northwest through the 26th, with the convec-

tion covering a broad area and upper-level outflow remaining favorable. This prompted the reissuance of the TCFA, at 262230Z, but once again aircraft reconnaissance early on the 27th was unable to locate a circulation. This scenario repeated itself the next day. Finally, late on 28 September, the deep convection began to show an increase in amount and organization. A few hours later, after the fourth TCFA was issued, aircraft reconnaissance found a closed 15 kt (8 m/s) circulation at 290329Z. The slow development of the disturbance was surprising, since it appeared that all the necessary ingredients for development were present. It is thought that the extremely broad size of the disturbance may have prevented a faster development, which is more typical of WESTPAC tropical cyclones (Figure 3-19-1).

The first warning on Brenda was issued at 292347Z, valid at 291800Z, based upon aircraft reconnaissance which located a 20 kt (10 m/s) circulation and a MSLP of 1000 mb - a drop of three

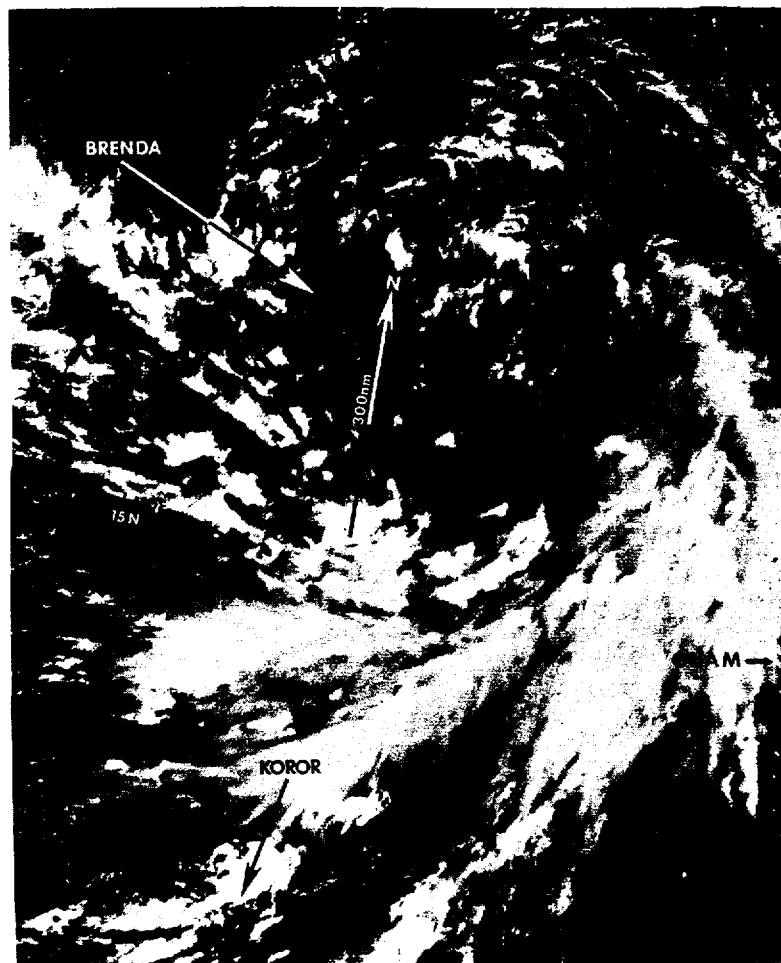


Figure 3-19-1. Visual imagery of the Tropical Disturbance at the time aircraft reconnaissance first located a surface circulation center. This extremely broad area of convection showed little change from the 25th through the 28th. Most of the curvature due to an upper-level anticyclone. The abnormally large size of the disturbance may have slowed development (290107Z September DMSP visual imagery).

millibars in less than 24-hours. Initial forecasts called for the system to gradually increase in intensity, move west-northwest and cross northern Luzon. This was based on the expectation that the subtropical ridge would maintain itself north of Brenda. But, Brenda moved west-southwest followed by a brief turn to the northwest before apparently completing a small cyclonic loop on 1 October. These movements were related to the passage of a mid-latitude trough to the north. Although the trough did not completely weaken the ridge, it eroded the ridge enough to affect the steering flow. As a result, Brenda moved slowly and erratically. By the 2nd, the trough had passed to the northeast and the subtropical ridge began to rebuild. Brenda responded by turning back to the west-northwest while continuing to intensify,

eventually reaching typhoon force at 011800Z. At that point it appeared that Brenda would miss northern Luzon and track just south of the island of Taiwan.

On 2 October, aircraft reconnaissance determined that the Typhoon had increased in strength and was more circular. With another mid-latitude trough approaching from mainland China, it appeared that Brenda's track would again be affected in 24- to 36-hours. Using this information and the belief that the subtropical ridge was not going to build far enough west to drive Brenda through the Luzon Straits, the forecast track was revised to recurve Brenda around the end of the ridge just east of Taiwan. Figure 3-19-2 shows the forecast aids

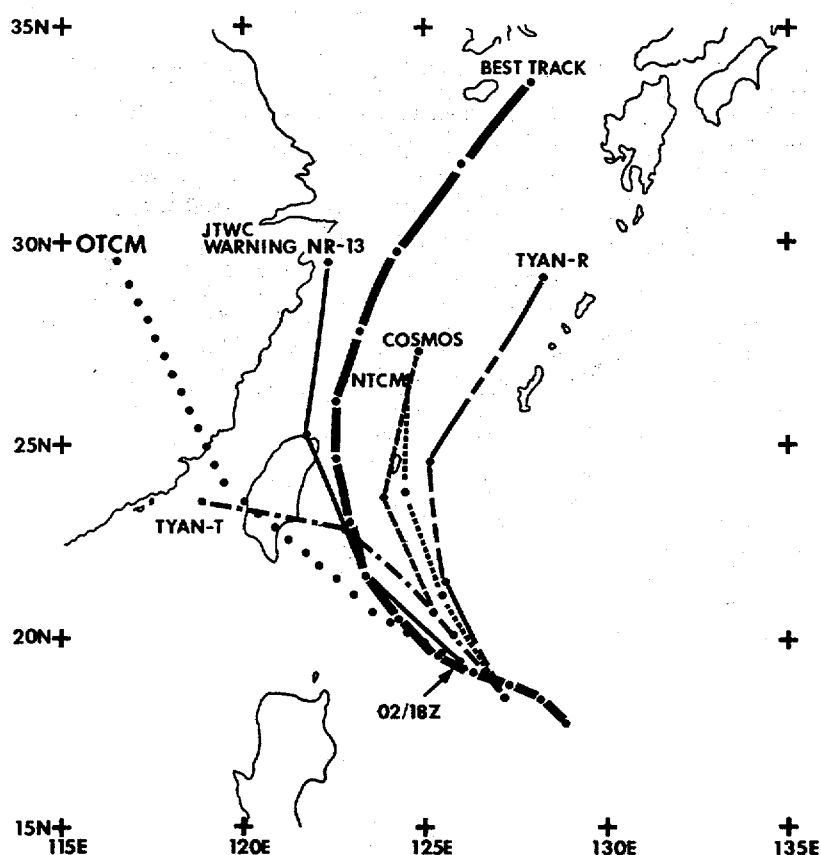


Figure 3-19-2. Forecast aids at 24-hour intervals, when the first recurvature forecast was issued, are compared to the warning and Brenda's best track. While some aids (NTCM, COSMOS and TYAN RECURVER) forecast recurvature; OTCM, JTCW's best aid during the past few years fails to indicate recurvature. All aids are slow in forecasting the speeds of movement during recurvature.

available to the TDO when the first recurvature forecast was issued. This forecast differed considerably from those of other warning agencies, but proved to be quite accurate, although the speed of movement was slow.

Brenda had a unique signature on satellite imagery because of its extremely large eye. Aircraft reconnaissance confirmed the existence of a large banding eye on 3 October. Satellite imagery showed a ragged eye, often larger than 60 nm (111 km) in diameter (Figure 3-19-3). The large eye lasted from 030000Z until Brenda moved around the ridge and began to accelerate into the westerlies on 4 October.

During recurvature, Brenda performed as forecast. It reached a maximum intensity of 90 kt (46 m/s) at 030600Z, and maintained that intensity for 24-hours, as it turned to the north and passed east of Taiwan. Under the influence of the mid-

latitude westerlies north of the ridge axis, Brenda turned to the northeast and accelerated, passing just south of Korea on the 5th. Extratropical transition was underway by 050000Z and the final warning was issued at 050600Z. The extratropical remains of Brenda passed through the Korea (Tsushima) Strait and entered the Sea of Japan at 051200Z before slowing down and weakening.

Known damage from Brenda was limited to the southern Korean Peninsula and adjacent islands. Nearly 12 inches (30 cm) of rain was reported over a large area. The Korean National Disaster Relief Center reported 14 dead, 43 missing, and damage to 167 houses, 630 watercraft, and 34,600 acres (14,000 hectares) of rice paddies as a result of the storm's passage. Damage was greatest on the island province of Cheju and the two provinces near the coastal city of Pusan (WMO 47153) in the southeast corner of the peninsula.

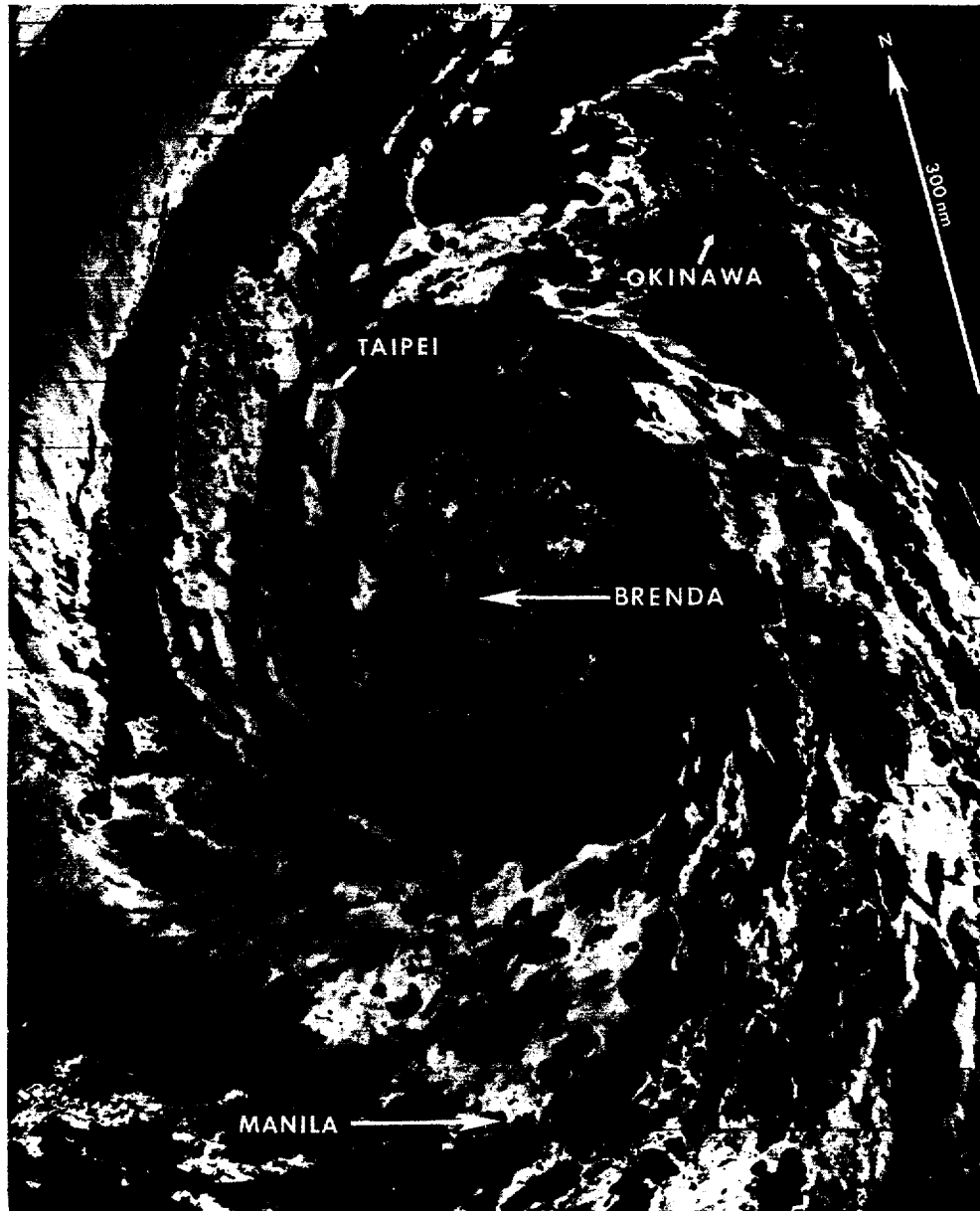


Figure 3-19-3. Nighttime enhanced infrared imagery of Brenda's large eye. The eye is 75 nm (139 km) in diameter (031407Z October DMSP enhanced infrared imagery).

TYPHOON CECIL

BEST TRACK TC-20W
12-16 OCT 1985

MAX SFC WIND 100 KT

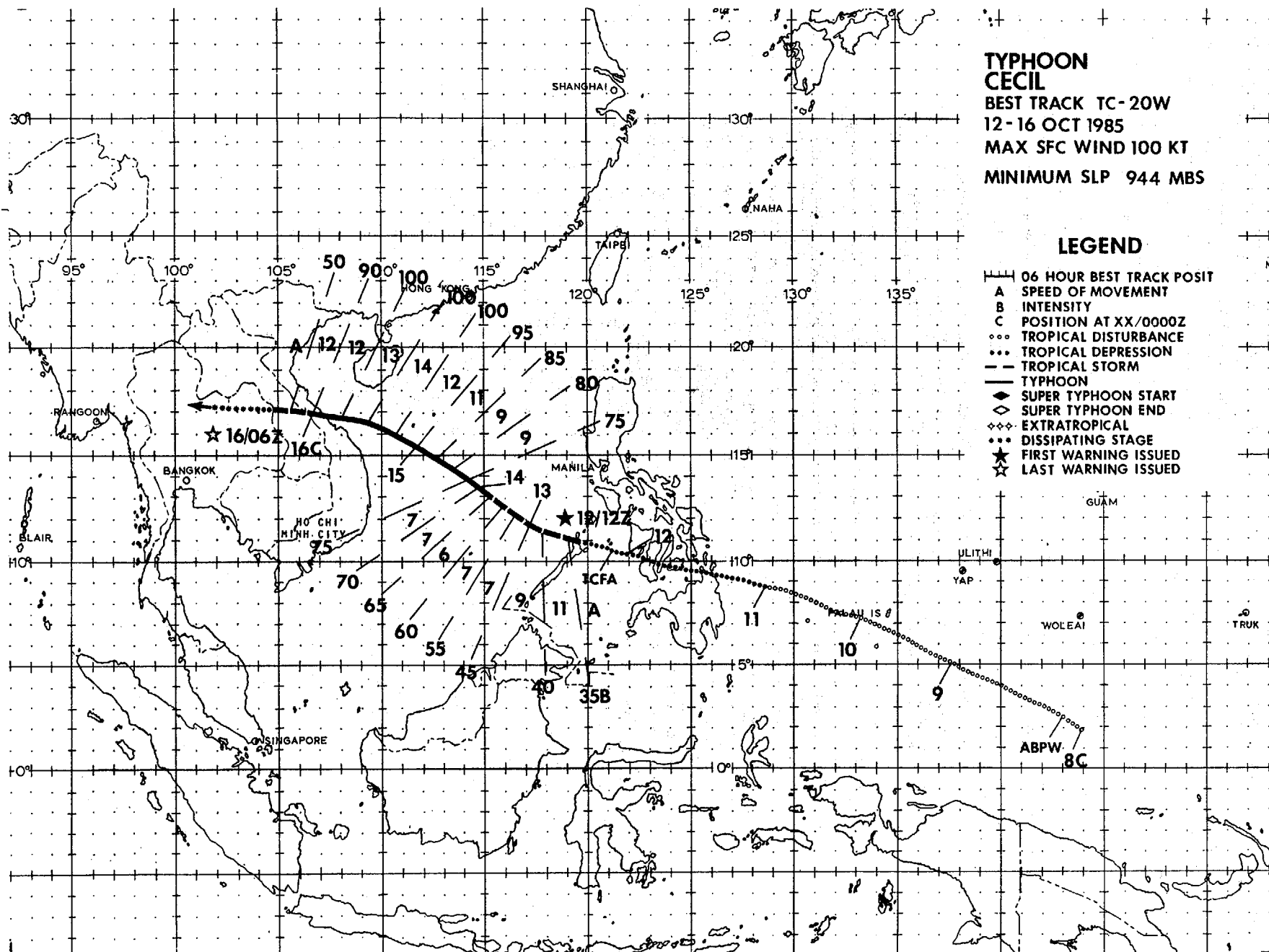
MINIMUM SLP 944 MBS

LEGEND

- 06 HOUR BEST TRACK POSIT
- A SPEED OF MOVEMENT
- B INTENSITY
- C POSITION AT XX/0000Z
- ... TROPICAL DISTURBANCE
- ... TROPICAL DEPRESSION
- TROPICAL STORM
- TYPHOON
- ◆ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- ◇◇◇ EXTRATROPICAL
- ... DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ☆ LAST WARNING ISSUED

MA

06



Typhoon Cecil was one of several tropical cyclones to hit Vietnam during the autumn of 1985. In its wake, more than 700 were left dead and half-a-million homeless. The dollar value of the damage caused by Cecil has been estimated to be in excess of 65 million dollars.

Typhoon Cecil began innocently enough as an area of increased convective activity south of the Caroline Islands on the 8th of October. Satellite imagery at 080600Z showed a large area of strong, slightly curved convection extending along 04N from 136E to 145E. Supporting synoptic data showed convergent cross-equatorial flow. Over the next 72-hours, the tropical disturbance tracked to the west-northwest towards northern Mindanao, passing just south of the Belau (Palau) Islands late on the 9th. It maintained good upper-level outflow, enhanced by upper-level troughing to the north, and became more organized at the lower levels. Aircraft reconnaissance first located a surface circulation east of Mindanao at 110222Z. Maximum sustained winds at that time were 15 to 20 kt (8 to 10 m/s) and the MSLP was estimated to be 1006 mb.

Further organization of the low-level center was slowed as the disturbance passed through the islands of the southern Philippines. With continued development considered likely once the disturbance crossed the Philippines, a TCFA was issued at 120330Z for the northern Sulu Sea westward into the South China Sea. By 121200Z the disturbance had moved west of Palawan Island into the South China Sea. Little damage was sustained in the southern Philippines due to its passage. By then, satellite imagery indicated that the system had begun to consolidate over water, prompting JTWC to issue the first warning on Tropical Depression 20W at 121200Z. Initially, Cecil was expected to consolidate rapidly and traverse the South China Sea making landfall within 72-hours of the first warning over southern Vietnam.

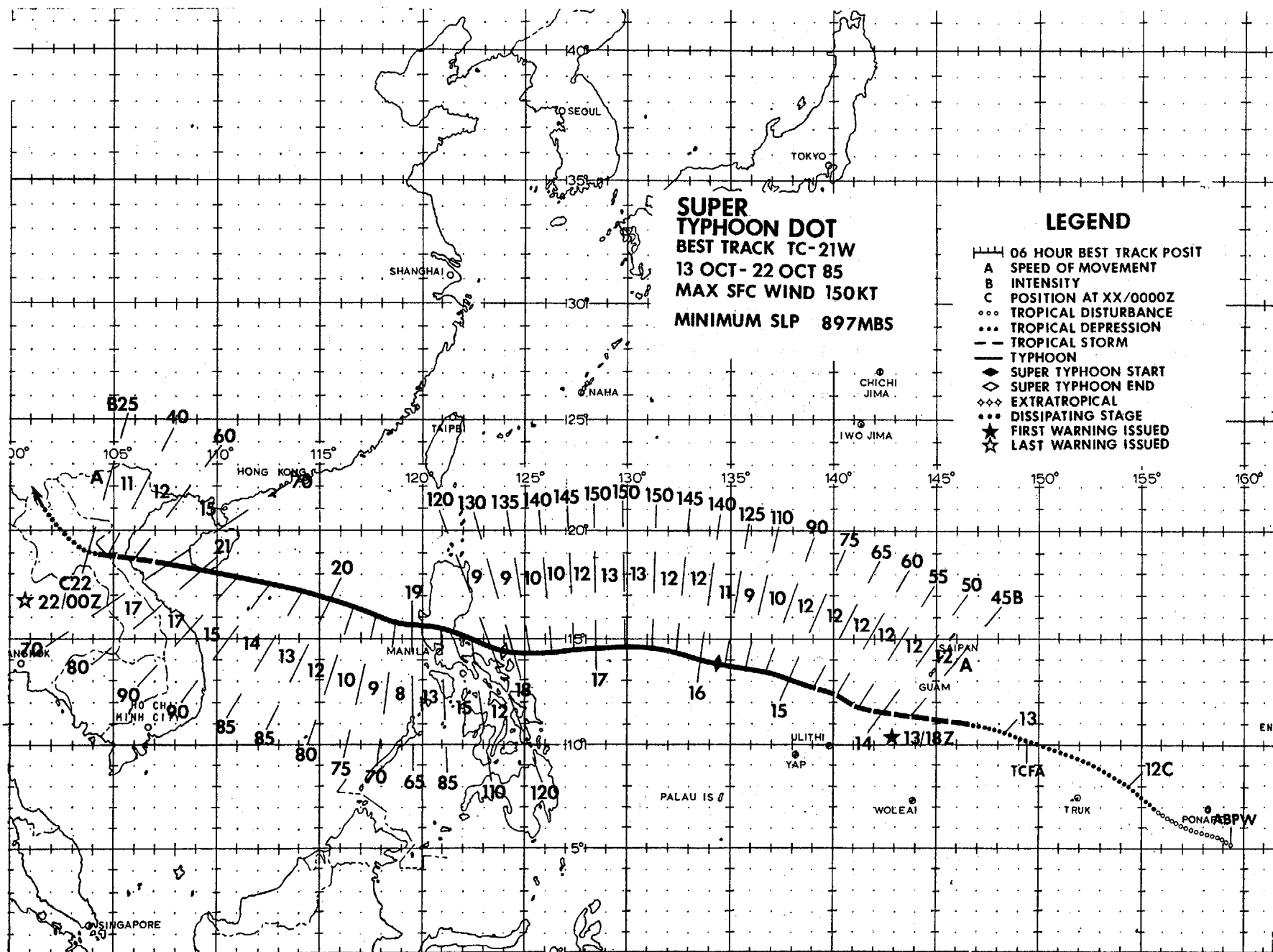
Post-analysis indicated that Cecil was already at tropical storm intensity upon emerging into the South China Sea. It then turned to a more north-westerly heading and tracked along the southern edge of a ridge over eastern China and the East China Sea. Cecil steadily intensified as it moved northwest, reaching typhoon intensity by 131800Z. By that time satellite imagery showed that Cecil was slowing to 7 kt (13 km/hr) and developing an eye. The slower movement and a slightly more northward track meant that Cecil would not make landfall as early as previously expected. Aircraft reconnaissance at 130824Z confirmed the presence of a 20 nm (37 km) diameter eye and a minimum sea-level pressure of 984 mb.

Cecil took three days to cross the South China Sea. During the latter half of this transit, Cecil maintained an eye and continued to intensify at a steady rate. The low- to mid-level ridge was not as strong as forecast, so Cecil maintained a track to the northwest. As Cecil passed south of Hainan Island on the 15th (Figure 3-20-1), it was at its maximum intensity of 100 kt (51 m/s). By 151200Z, interaction with the topography of Vietnam and Hainan was preventing further intensification by hampering low-level inflow. The mid-level subtropical ridge remained across the island of Taiwan and mainland China. This turned Cecil on a more westerly track, resulting in landfall about 40 nm (74 km) north of Hue (WMO 48852) at 152200Z. Cecil continued to move west and weaken, dissipating over the Laos/Thailand border on the 16th. The final warning was issued at 160600Z.

Officials in Binh Tri Thien Province in central Vietnam described Typhoon Cecil as "the worst natural disaster yet in central Vietnam ...causing... damage worth more than 65 million dollars". At least 702 people were confirmed dead with 128 still missing and 560,000 left homeless. In addition to destroying or damaging 200,000 or more homes, Cecil also destroyed about 850 fishing boats and other small vessels. Winds of up to 90 kt (46 m/s) combined with flooding to ruin 70,000 hectares (172,900 acres) of rice and other crops. A 200 bed hospital was destroyed, five other hospitals damaged, and 250 dispensaries swept away, along with almost 9,000 classrooms with accompanying school equipment and textbooks. Dikes, canals, and pumping stations sustained almost one million dollars in damage. Telephone lines, electricity service, and roadways were cut, bringing business to a halt and hampering relief efforts. It will be many years before this province, one of Vietnam's poorest, recovers from the accumulated affects of this and the other tropical cyclones which affected Vietnam in 1985.



Figure 3-20-1. Typhoon Cecil at maximum intensity passing south of Hainan Island (150733Z October NOAA visual imagery).



After Typhoon Brenda, which had developed in the low-level southwest monsoon trough, completed extra-tropical transition on the 5th of October, the mid-level subtropical ridge became well-established over the Northwest Pacific. This synoptic feature would confine the development of tropical cyclones to low latitudes near 10N in the near-equatorial trough. Also coincident with Brenda's movement to the north was the replacement of the low-level southwest monsoon flow over the South China Sea with north-to-northeasterly flow off of the Asian continent.

Typhoon Dot was the only super typhoon (intensity equal to or greater than 130 kt (67 m/s)) of the 1985 WESTPAC season. It intensified (deepened) explosively causing intensity forecast difficulties. Other distinguishing characteristics were the small

size of the area of intense convection, the small radius of maximum wind, and the absence of low-level southwest monsoon inflow. Also of interest was the large wind radius in the northwest semicircle (when it was located southeast of Luzon) where surface winds were enhanced by a strong pressure gradient between the tropical cyclone and a polar high pressure cell located near 40N 110E.

Dot was first detected as a tropical disturbance in the near-equatorial trough, 150 nm (278 km) south-east of Ponape (WMO 91348) on the 11th of October. Figure 3-21-1 shows the disturbance on the 12th of October exhibiting signs of organization in its upper-level outflow. The system moved west-northwest and reached tropical storm intensity on the 13th south of Guam.

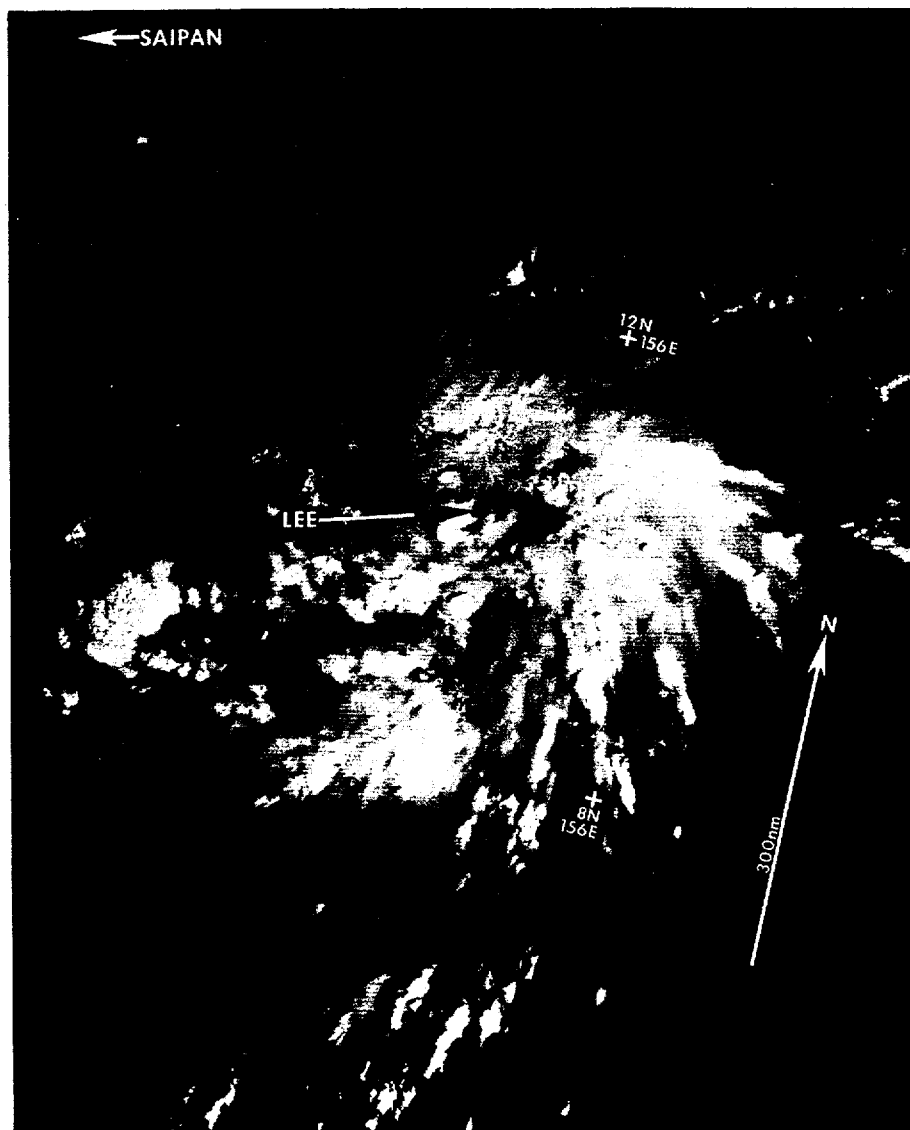


Figure 3-21-1. Super Typhoon Dot as a disturbance in the near-equatorial trough with signs of organized upper-level outflow (120006Z October DMSP visual imagery).

The track forecasts for Typhoon Dot did not present any significant difficulty for the forecasters at JTWC. Figure 3-21-2 shows that the mid-level easterlies dominate the Trust Territories westward through the Philippine Islands and into Southeast Asia at 120000Z. With no change expected in the orientation or strength of the ridge, a west-northwest track at 10 to 20 kt (19 to 37 km/hr) under this ridge was considered to be the best forecast. This was in agreement with climatological and analog forecast guidance. The two numerical models, OTCM (One-way interactive Tropical Cyclone

Model) and NTCM (Nested Tropical Cyclone Model), were of little help during the crucial first four days of forecasts (when Dot was approaching the Philippines). Due to computer problems at Fleet Numerical Oceanography Center (FNOCC) the older Primitive Equation (PE) model was run in place of the Navy Operational Global Atmospheric Prediction System (NOGAPS). Later, it was determined that OTCM, when running with data from the PE model, didn't have access to the necessary data fields. Subsequently, OTCM was modified to accept the needed data.

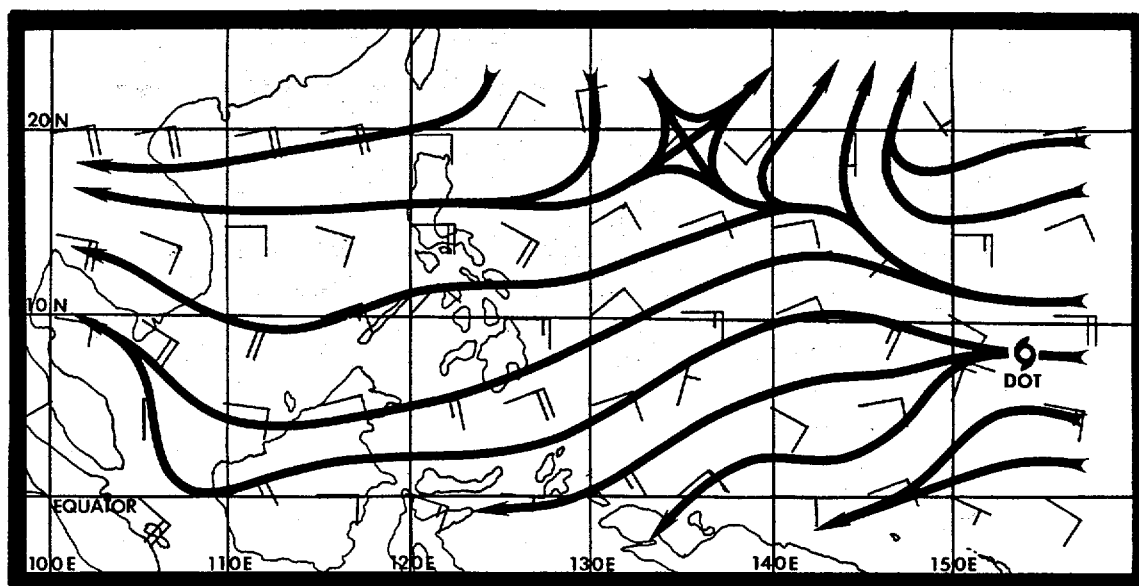
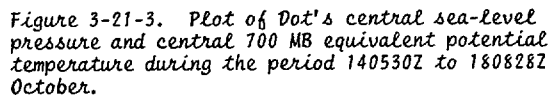


Figure 3-21-2. 400 mb Numerical Variational Analysis (NVA) at 120000Z October showing easterlies over Dot's future track to the west-northwest.

tion. The technique calls for intensification to below 925 mb (how far below can be estimated from the technique also) whenever the plots of central sea-level pressure and Theta-E intersect near the critical values of 950 mb and 360 degrees Kelvin (both values being statistical means derived from past intense storms). Figure 3-21-3 is a plot of Dot's central sea-level pressure and Theta-E during the period 140530Z to 180828Z. At Point A (142130Z), the two lines show a tendency to intersect (notice extrapolation to Point A'). However, Point B (150022Z) reflects a decrease in Theta-E. Then, at Point C (150615Z), this trend reverses and again extrapolation to Point C' would indicate intersection. Point D (150853Z) shows a slight



decrease in Theta-E and no intersection. The next available aircraft reconnaissance data was not received until 152102Z, and by that time Dot's central sea-level pressure had plummeted to 906 mb and the central 700 mb temperature had soared from 20 Celsius to 30 Celsius (yielding a Theta-E of 372 K when paired with the dewpoint temperature of 11 Celsius). This forecast method is a reliable one in most instances. However, Typhoon Dot demonstrates a situation when the lack of timely aircraft data prevented the effective use of the technique. In post-analysis, if pressure, temperature, and dewpoint data had been available around 151200Z it is a distinct possibility that the intersection of the central sea-level pressure line and the Theta-E line would have been observed.

The reliability of this forecast technique was mentioned earlier. However, in addition to the timing problem already mentioned, a couple of factors

should be pointed out. First, the computation of Theta-E is very sensitive to dewpoint temperature (and to a lesser degree ambient temperature). The dewpoint measurement is also sensitive to a sometimes non-homogeneous distribution of moisture in the storm's center. Second, a rarer but sometimes complicating factor is the complexity and delicacy of the dewpoint hygrometer which is an alternately cooled/heated mirror coupled with a thermistor. The dewpoint temperature is recorded when a thin film of dew forms on the mirror. Malfunctions of the instrument occasionally occur.

To give the reader an indication of what impact not knowing that Dot was going to explosively deepen had on the intensity forecasts can be seen in Figure 3-21-4. The graph depicts the best track intensities (at six hour intervals) for the period 131800Z to 181200Z compared to the corresponding 12-, 24-, 48-, and 72-hour intensity forecasts. Twelve-hour fore-

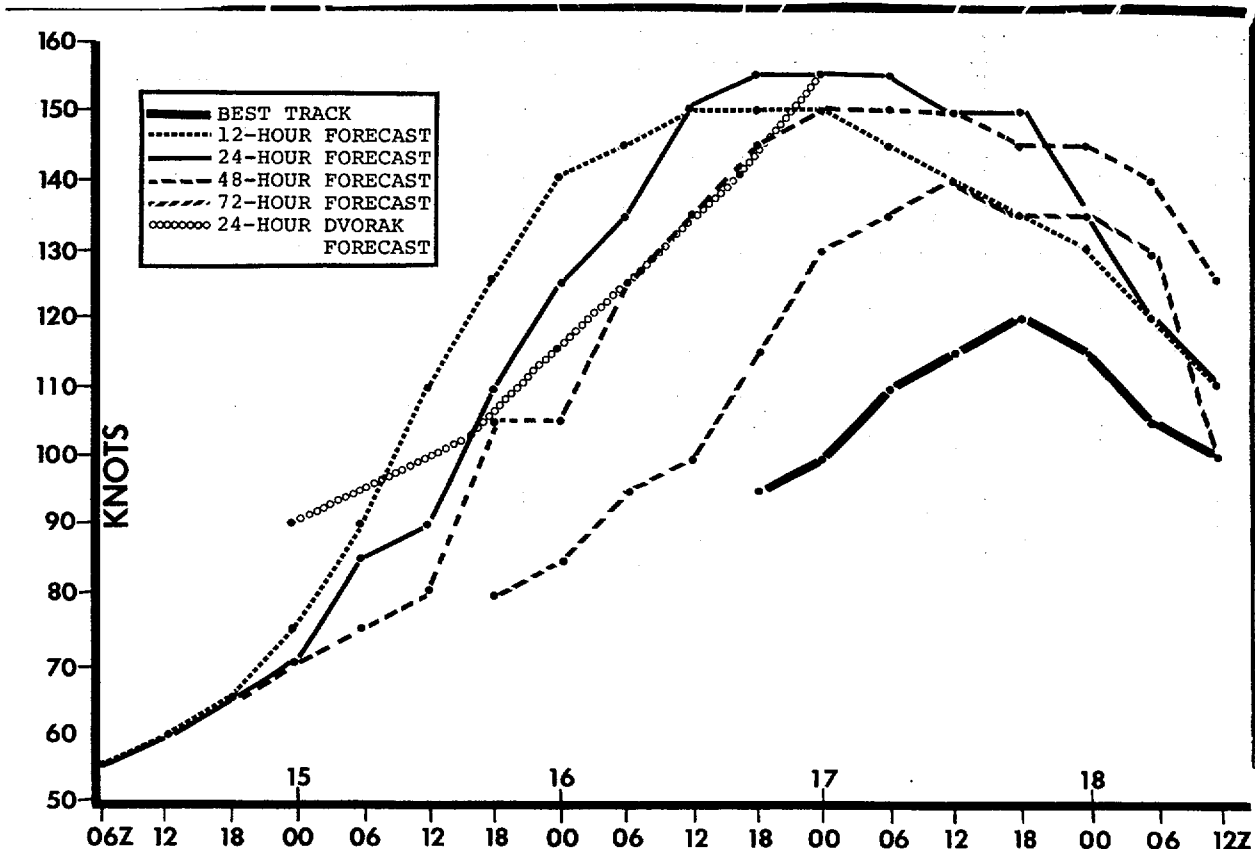


Figure 3-21-4. Plot of Dot's best track intensities at six-hour intervals and corresponding 12-, 24-, 48-, and 72-hour forecast intensities for the period 131800Z to 181200Z October 85.

casts for the period 151200Z through 160600Z were 20, 15, 15, and 10 kt (10, 8, 8, and 5 m/s) low. For the same period twenty-four hour forecasts were 30, 20, 35, and 20 kt (15, 10, 18, and 10 m/s) below the best track intensities. From the graph one can see that the 24-hour forecast intensity curve is very close to the Dvorak forecast intensity curve. This is usually the case since the Dvorak model is the main JTWC 24-hour intensity forecast tool. The problem with explosive intensification really starts showing up at the 48-hour forecast period. The 48-hour intensity forecasts during the period 151800Z through 161800Z October were 45, 55, 50, 50, and 35 kt (23, 28, 26, 26, and 18 m/s) too low. The three 72-hour forecasts that were effected by the explosive deepening were for the period 161800Z through 170600Z Oct and were 55, 50, and 35 kt (28, 26, and 18 m/s) too low. After Dot had explosively deepened, the intensity forecasts reflected the storm's high initial intensity and the forecast errors decreased signi-

ficantly with the average 12-hour intensity forecast error for the period 140600Z through 181200Z (18 cases) being 5 kt (3 m/s), the average 24-hour error for the period 141800Z through 181200Z (16 cases) being 14 kt (7 m/s), the average 48-hour error for the period 151800Z through 181200Z (12 cases) being 24 kt (12 m/s), and the average 72-hour error for the period 161800Z through 181200Z (8 cases) being 28 kt (14 m/s). The point being made is that a forecaster doesn't necessarily have to know 72 hours ahead of time that a system is going to explosively deepen, but if he knows 12 or 24 hours ahead of time then the longer range forecasts made during that period will reflect the higher storm intensity and be more accurate.

Figure 3-21-5 shows Super Typhoon Dot at maximum intensity with a well-defined eye and intense convection confined to a small area around the system. Aircraft reconnaissance on the 16th and 17th of



Figure 3-21-5. Super Typhoon Dot at maximum intensity with a well-defined eye and small surrounding ring of intense convection (170147Z October DMSP visual imagery).

October consistently located the maximum surface winds 5 to 10 nm (3 to 5 km) from the center and radar eye diameters of 10 to 15 nm (5 to 8 km).

Figure 3-21-6 shows the surface wind circulation pattern around Dot (while it was southeast of Luzon) at 181200Z October. Strong winds extended out much further in the northwest semicircle where the surface winds were from the north to northeast. This increased flow resulted from a strong pressure gradient that existed between Dot and a polar high-pressure cell located near 40N 110E. The figure also shows the absence of any enhanced low-level southwest monsoon flow over the South China Sea.

The threat posed by Super Typhoon Dot caused all U.S. military installations in the Philippines to be placed in Tropical Cyclone Condition of Readiness I and resulted in the evacuation of aircraft from Cubi Point NAS and Clark AB, and the movement of several ships from Subic Bay. Seventy-four peoples were reported killed, more than 50,000 left homeless, and damage to buildings and crops estimated at 1.3 million dollars. NAVOCEANCOMFAC Cubi Point reported a peak gust of 19 kt (10 m/s) and Det 5, 20WS at

Clark AB reported maximum sustained winds of 27 kt (14 m/s) with a peak gust of 44 knots (23 m/s). Dot was a very intense typhoon but the damage done in the Philippines was certainly limited by the storm's small diameter of maximum wind, its small area of intense convection, its path of approach to Luzon (this kept most of the low-level flow parallel to the mountainous terrain, reducing orographically-enhanced rainfall), and the absence of enhanced low-level southwest monsoon flow.

After entering the South China Sea late on the 18th of October with minimal typhoon intensity, Dot began regaining organization overwater and continued on a west-northwesterly track. By 201200Z, the Typhoon's intensity peaked at 90 kt (46 m/s) 300 nm (556 km) south-southwest of Hong Kong (WMO 45007). Dot weakened as it churned across the southern tip of Hainan Island, leaving at least two dead, 2300 houses collapsed, and flooding in its wake. Crossing the Gulf of Tonkin in less than a day, it slammed into the coast of North Vietnam 130 nm (241 km) south of Hanoi (WMO 48819). The final warning on Dot was issued at 220000Z as the system dissipated over the rugged mountains inland.

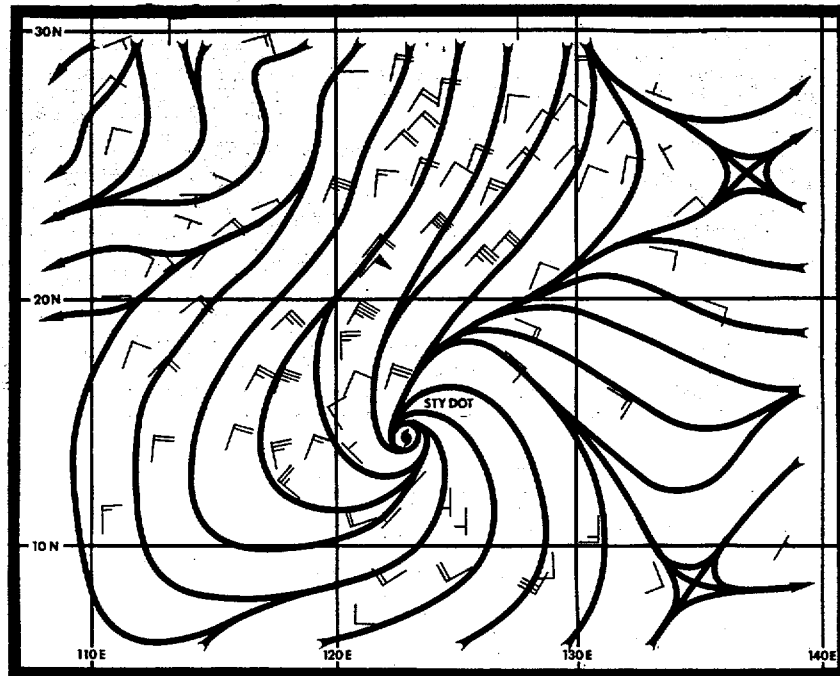


Figure 3-21-6. Surface analysis at 181200Z October showing strong winds extending out a great distance in the northwest semicircle and the absence of (convection-enhanced) low-level southwest monsoon flow.

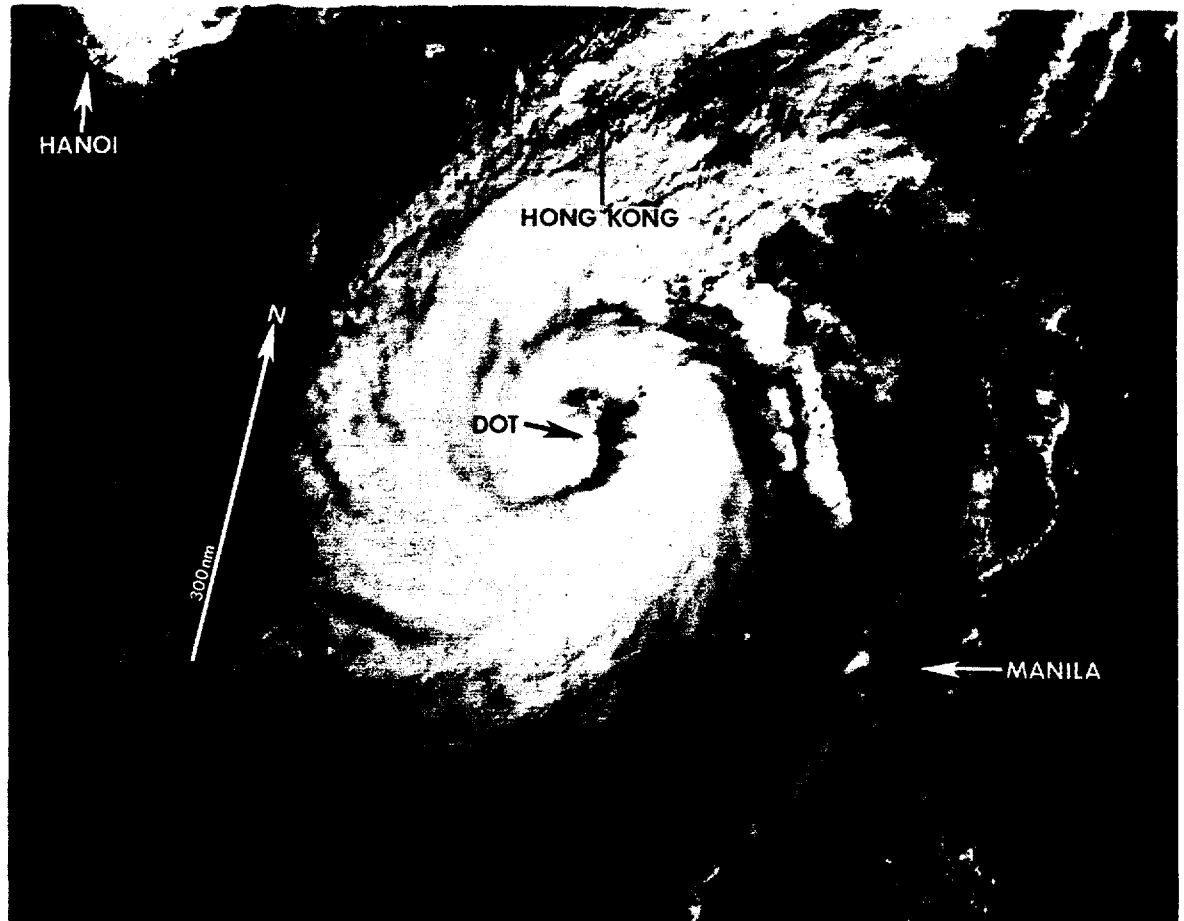
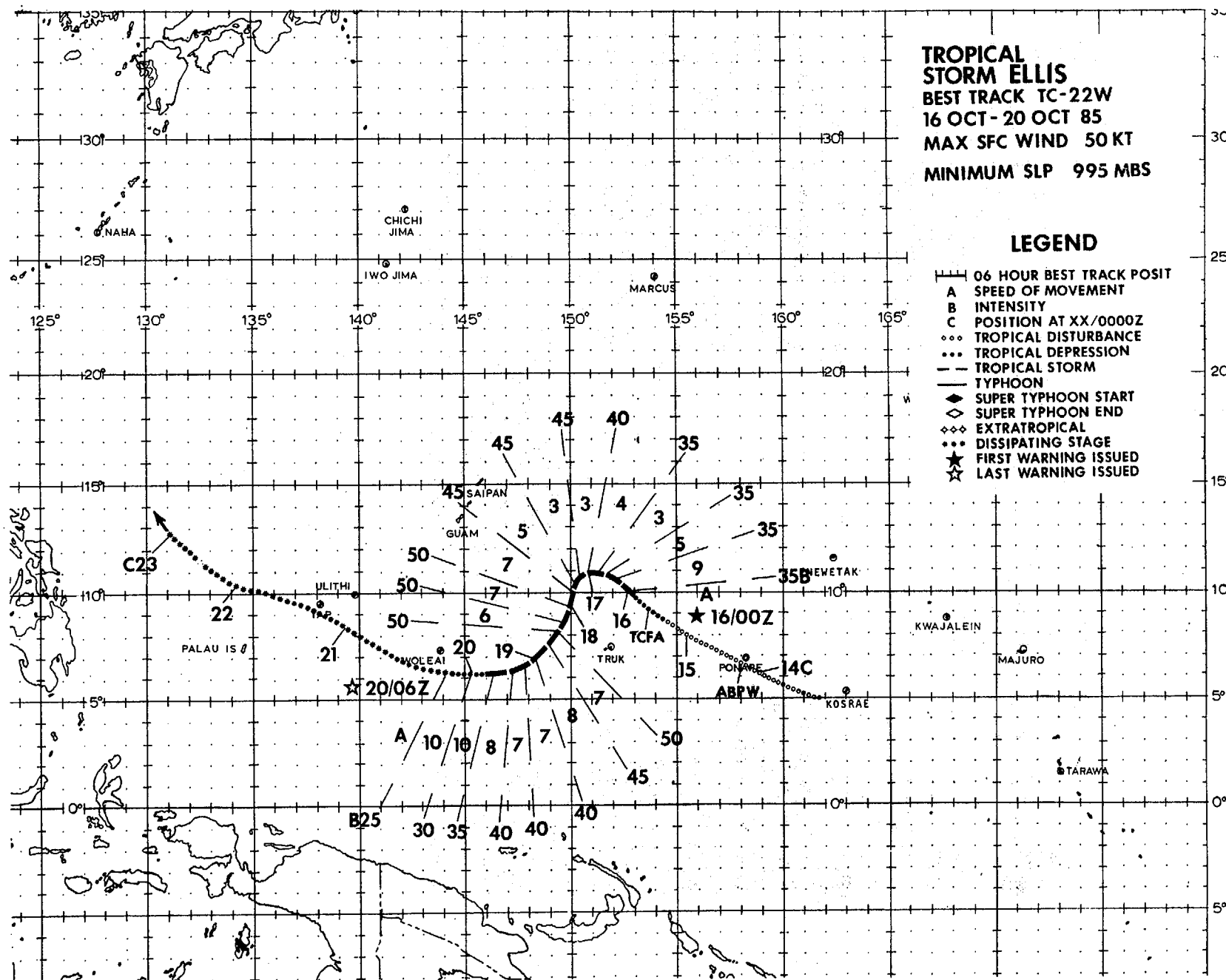


Figure 3-21-7. Super Typhoon Dot with 85 knots (44 m/s) after crossing Luzon and re-intensifying in the South China Sea (200227Z October DMSP visual imagery).

**TROPICAL
STORM ELLIS**
BEST TRACK TC-22W
16 OCT - 20 OCT 85
MAX SFC WIND 50 KT
MINIMUM SLP 995 MBS

LEGEND

- 06 HOUR BEST TRACK POSIT
- A SPEED OF MOVEMENT
- B INTENSITY
- C POSITION AT XX/0000Z
- ... TROPICAL DISTURBANCE
- ... TROPICAL DEPRESSION
- TROPICAL STORM
- TYPHOON
- ◇ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- ◇◇◇ EXTRATROPICAL
- ... DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ☆ LAST WARNING ISSUED



TROPICAL STORM ELLIS (22W)

Tropical Storm Ellis, which formed in the wake of Super Typhoon Dot, proved to be a relatively short-lived system. Although it did not pass close enough to any populated areas to cause significant damage, Ellis was noteworthy since it presented a unique forecasting problem. Originally forecast to move west-northwest under the subtropical ridge and pass relatively close to Guam, it actually slowed just after reaching tropical storm intensity and proceeded to move southwest for almost three days before dissipating over water.

The disturbance which eventually developed into Tropical Storm Ellis was first observed as a curved band of convection near the island of Ponape (WMO 91348) on 14 October. The area was subsequently included on the Significant Tropical Weather Advisory (ABPW PGTW) at 140600Z. The system moved west-northwest and increased in organization during the next 36-hours. At 151730Z, a Tropical Cyclone Formation Alert (TCFA) was issued and aircraft reconnaissance requested for the following day.

Interpretation of the 160000Z visual satellite imagery, using the Dvorak intensity technique, yielded a surface wind estimate of 35 kt (18 m/s).

This, in combination with aircraft reconnaissance which located a surface circulation with 35 kt (18 m/s) at the 1500 ft (457 m) level at 160458Z, prompted the first warning on Tropical Storm Ellis at 160500Z. Ellis was forecast to move west-northwest under the subtropical ridge which was apparently well established to the north of the system. At 170000Z Ellis slowed to 3 kt (6 km/hr) as the steering flow south of the subtropical ridge axis weakened in response to the passage of a mid-latitude trough to the north. The forecast philosophy of continuing the west-northwest track was not changed at this point, as a resumption of that movement was expected when the mid-latitude trough moved northeastward. In addition, the synoptic guidance appeared to be in agreement with this reasoning. Figure 3-22-1 is Fleet Numerical Oceanography Center's (FNOC) 700 mb Numerical Variational Analysis (NVA) field for 170000Z, which indicates the weak easterly flow around the subtropical ridge and the mid-latitude trough north of Ellis. The 400 mb analysis for the same time (Figure 3-22-2) indicates similar features, except the north-south extent of the subtropical ridge is much smaller. Note that the flow near Ellis is generally weak and southerly, with weak easterlies to the north.

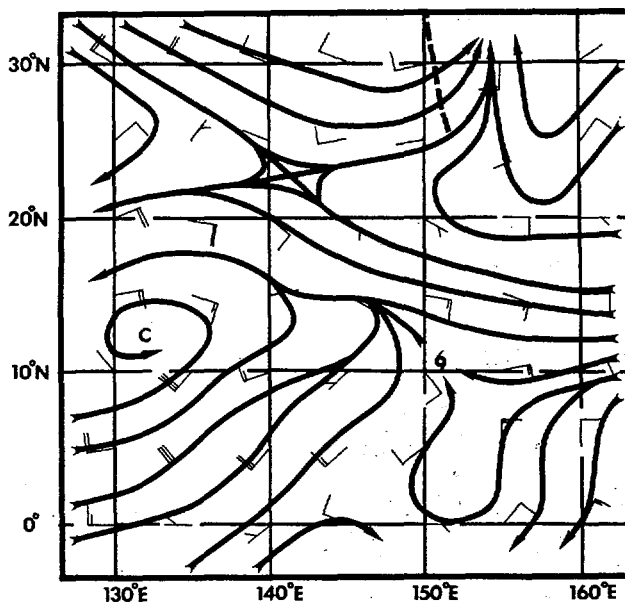


Figure 3-22-1. 170000Z 700 mb Numerical Variational Analyses (NVA) showing weak troughing and 15 kt (8 m/s) easterlies to the north of Ellis.

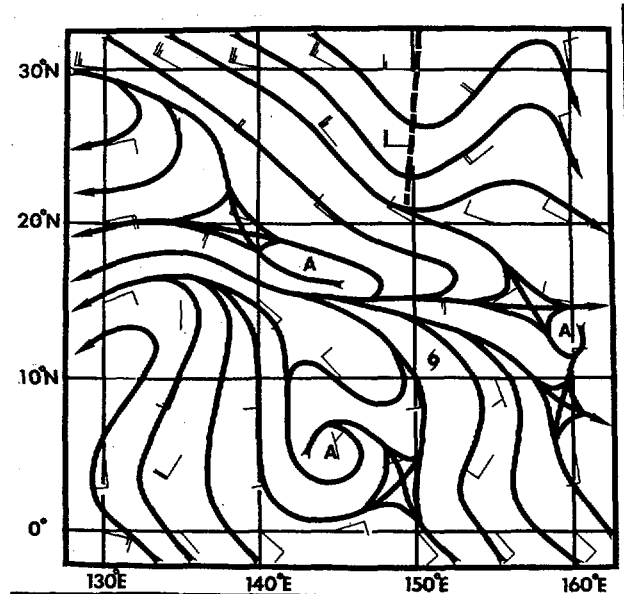


Figure 3-22-2. 170000Z 400 mb NVA depicting weak ridging north of Ellis.

Due to the uncertainty of these mid-tropospheric analyses, synoptic track aircraft missions were requested. The one flown between 0300Z and 0700Z on 17 October provided 400 mb winds in the vicinity of Ellis' forecast track. Figure 3-22-3 shows these observations. In contrast to the NVA analysis (Figure 3-22-2) for that time, the flow is generally northerly to the north and west of Ellis. The lack of data over water in the western North

Pacific was probably responsible for the disagreement between the aircraft observations and the NVA analysis at 400 mb. However, the NVA from the following day (180000Z) represented a significant change; the observations from the synoptic track were in good agreement with the new analysis at 400 mb (see Figure 3-22-4).

In the meantime aircraft reconnaissance at

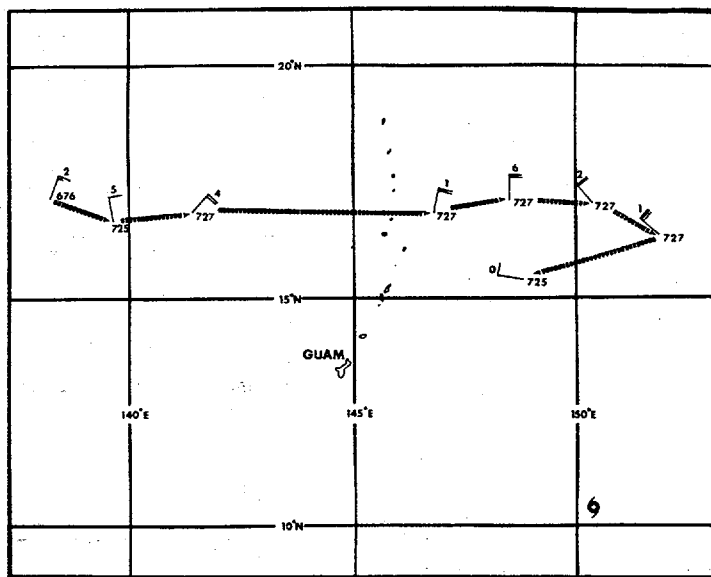


Figure 3-22-3. Observations from the aircraft reconnaissance mission synoptic track at 400 mb, indicating northerly flow vice easterly flow ahead of Ellis.

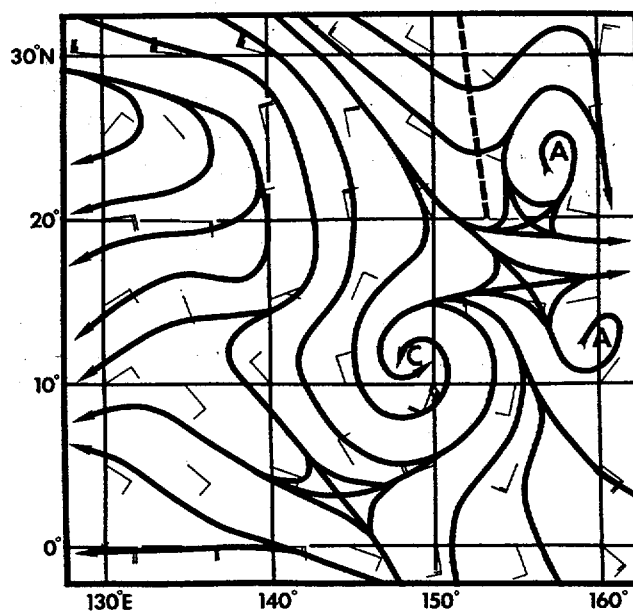


Figure 3-22-4. 180000Z October 400 mb analysis, showing northerly flow ahead of Ellis, which agrees with earlier observations from the synoptic track.

172200Z and 172345Z found the low-level circulation center well south of the forecast track, indicating Ellis had moved south-southwest during the period. At that time Ellis also reached its maximum intensity of 50 kt (26 m/s). The feature that helped to drive the low- to mid-level ridging to the west and moved Ellis to the south-southwest, was most probably an upper cold low, or cell, in the tropical upper-tropospheric trough (TUTT). The 200 mb analysis for 190000Z (see Figure 5-22-5) indicated that the TUTT cell was in close proximity to Ellis. Satellite imagery at that time indicated that upper-level outflow was suppressed in the west semicircle (see Figure 3-22-7). The low- to mid-level flow remained northerly, and Ellis continued its southwestward

track.

At 191200Z, Ellis began to weaken as it attempted to move under the TUTT cell and experienced increased vertical shear. By 200000Z the intensity had decreased to 30 kt (15 m/s) and the low-level cloud lines had lost most of their curvature. The last warning was issued at 200600Z.

In retrospect the One-way Tropical Cyclone Model (OTCM) presented a puzzle during the initial forecasts on Ellis, because of its previous performance on Super Typhoon Dot several days before. With Dot, which also formed in low latitudes, OTCM guidance repeatedly, and erroneously, drove the system equa-

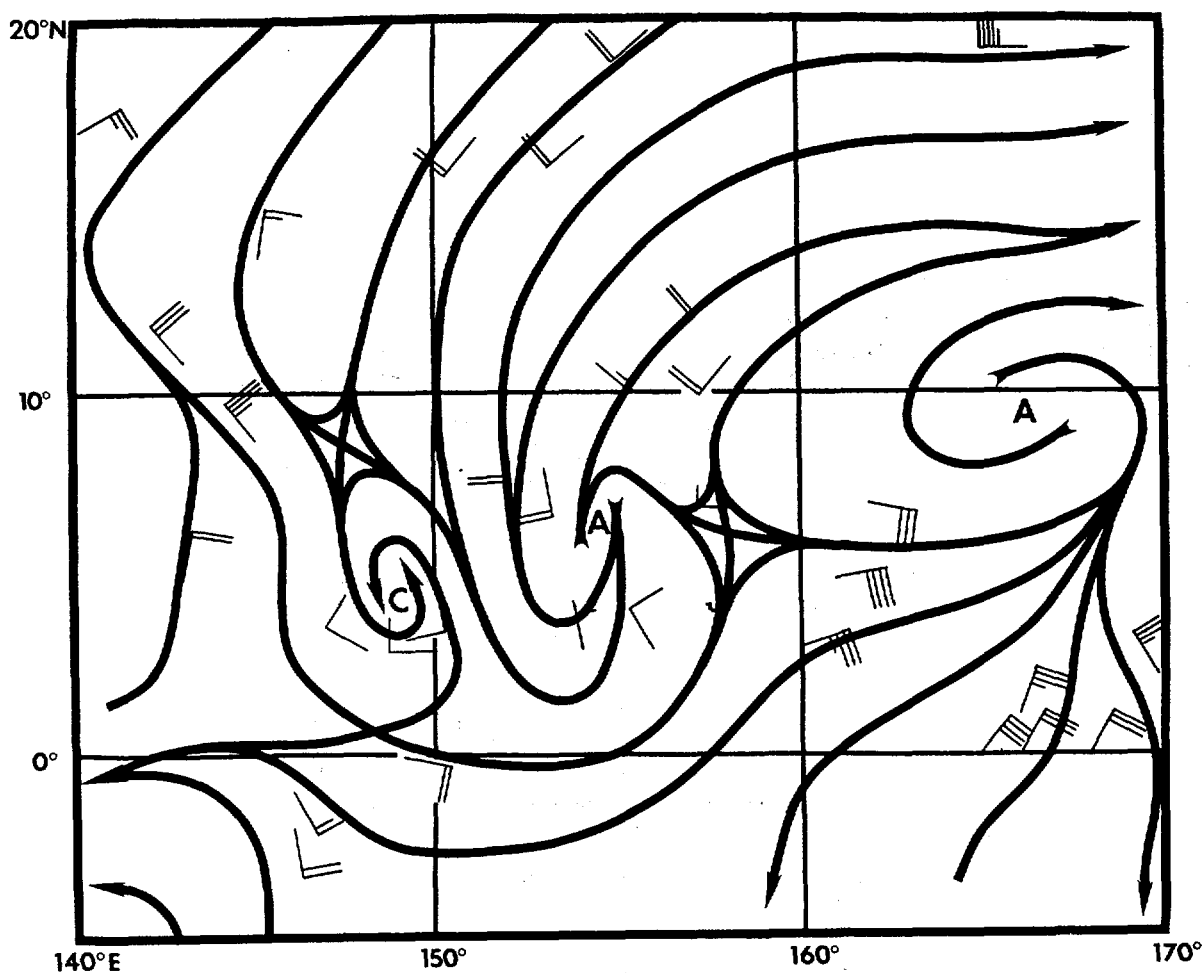


Figure 3-22-5. 190000Z October 200 mb analysis depicting the location of the TUTT and the upper-level cold low.

torward. As a consequence, the OTCM (Figure 3-22-6), which indicated southwest movement for Ellis, was highly suspect. Persistence and climatology favored a west to northwest track through the southern Mariana Islands. As it turned out, Ellis moved southwest, passing well south of the island of Guam. In this case the OTCM guidance was "right" for the "wrong" reasons. After-the-fact it was determined by the software managers at Fleet Numerical Oceanography Center that during this time the Primitive Equation (PE) model was run instead of the Navy Operational

Global Atmospheric Prediction System (NOGAPS). Since the PE model was hemispheric - not global - OTCM, when it received the data fields, only found the northern hemisphere with a boundary at the equator. Thus, for a low latitude systems like Ellis and Dot, OTCM generated a spurious vortex due to the lack of southern hemisphere fields. This caused the forecast guidance to fluctuate wildly and drive the system towards the equator. OTCM, subsequently, was modified to incorporate the latest southern hemisphere fields before running.

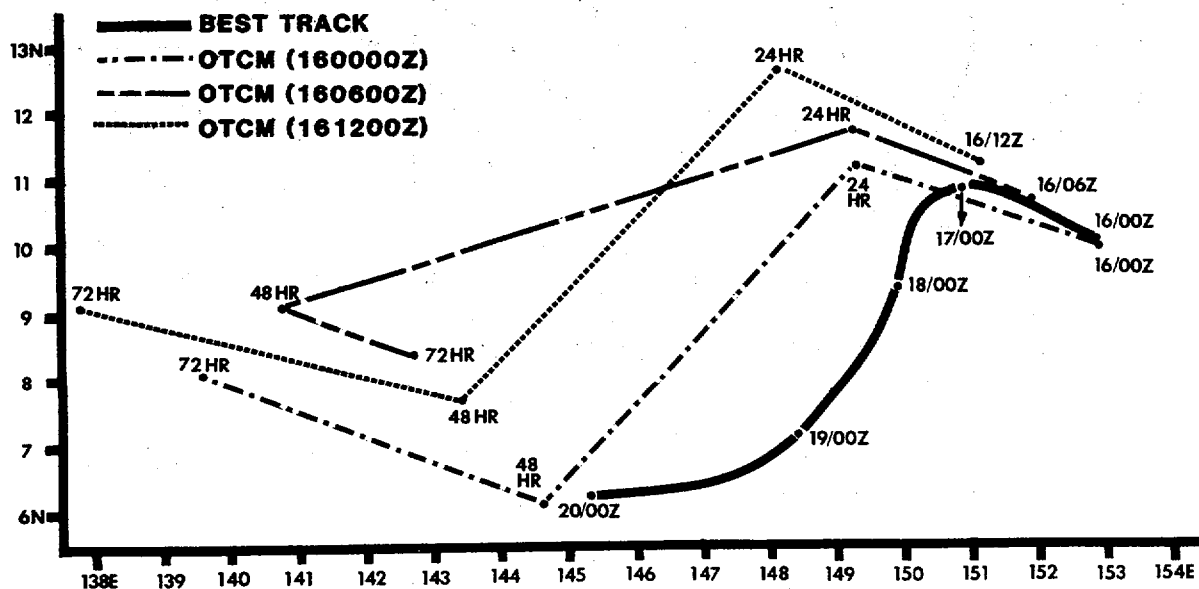


Figure 3-22-6. Comparison of the best track for Ellis with OTCM guidance for the period 160000Z through 161200Z October.

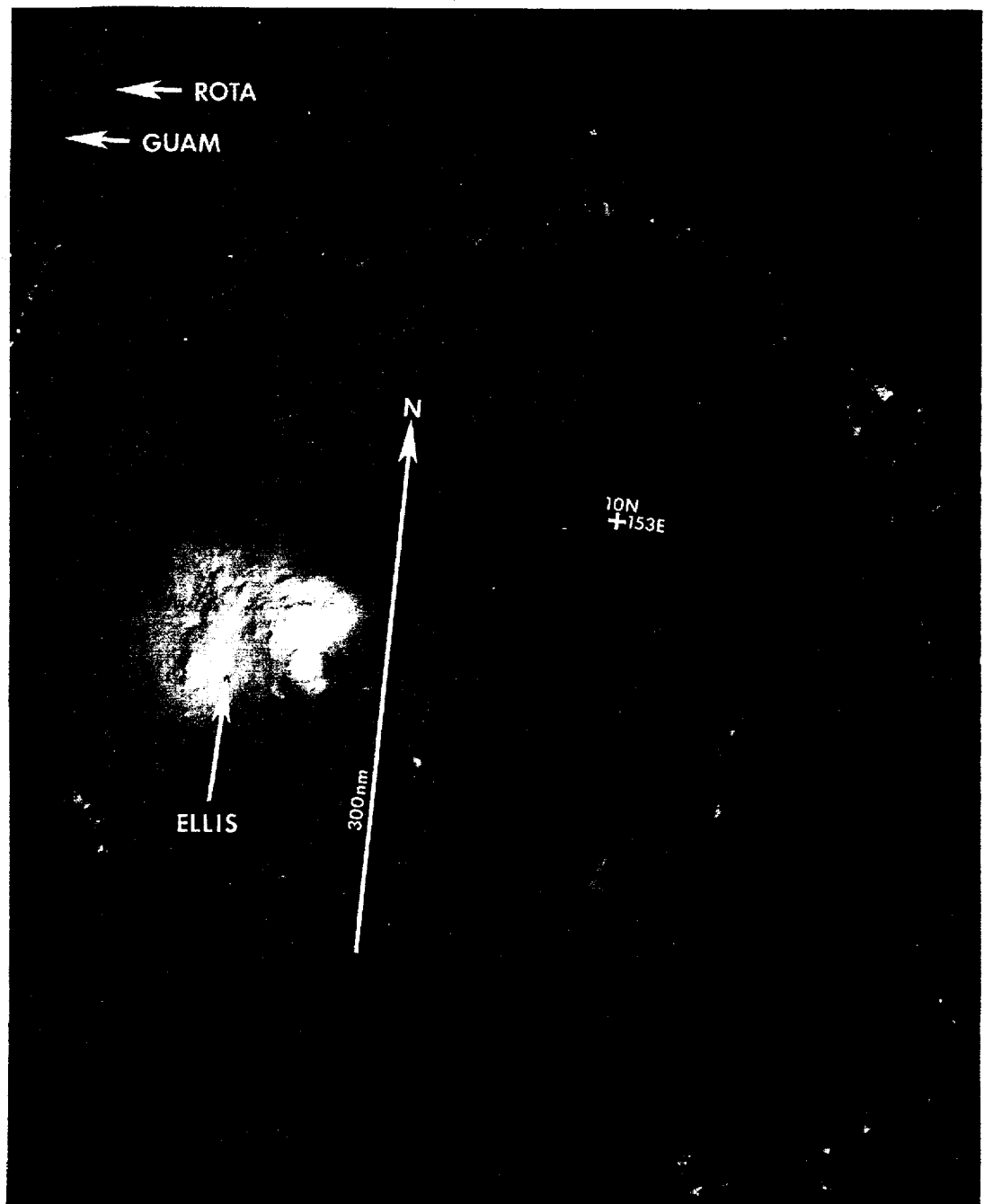


Figure 3-22-7. Tropical Storm Ellis 440 nm (815 km) south-southeast of Guam. Cirrus clouds define the outflow boundary in the eastern semicircle. Although Ellis is near the edge of the satellite imagery, the absence of cirrus in the western semicircle hints at the restricted outflow aloft due to the close proximity of the upper cold low further to the west (182325Z October DMSP visual imagery).

TYPHOON FAYE

BEST TRACK TC-23W

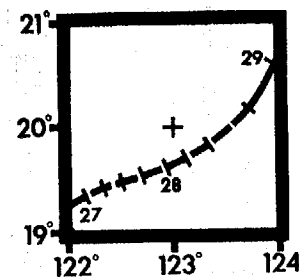
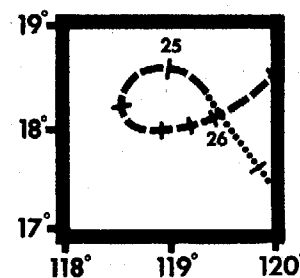
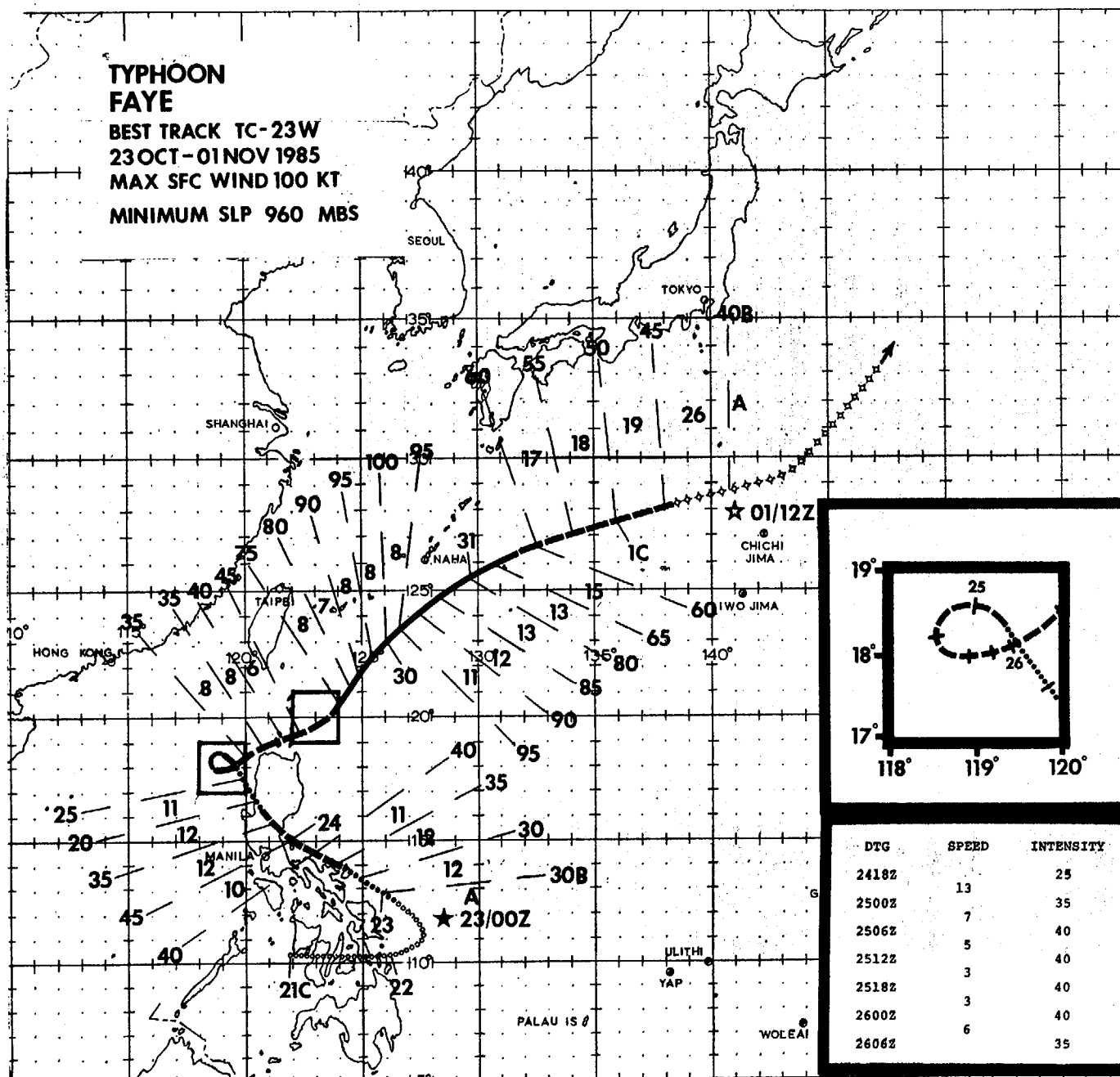
23 OCT - 01 NOV 1985

MAX SFC WIND 100 KT

MINIMUM SLP 960 MBS

LEGEND

- 06 HOUR BEST TRACK POSIT
- A SPEED OF MOVEMENT
- B INTENSITY
- C POSITION AT XX/0000Z
- ... TROPICAL DISTURBANCE
- ... TROPICAL DEPRESSION
- TROPICAL STORM
- TYPHOON
- ◆ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- ◇◇ EXTRATROPICAL
- ... DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ☆ LAST WARNING ISSUED



DTG	SPEED	INTENSITY
2418Z		25
2500Z	13	35
2506Z	7	40
2512Z	5	40
2518Z	3	40
2600Z	3	40
2606Z	6	35

DTG	SPEED	INTENSITY
2700Z		45
2706Z	2	50
2712Z	2	50
2718Z	2	50
2800Z	3	50
2806Z	4	55
2812Z	5	60
2818Z	5	65
2900Z		75

Faye was the last of four tropical cyclones to form in October, a month that normally accounts for five. Its formation was unusual because it was masked by two other tropical cyclones already in progress.

To set the stage, on 21 October Super Typhoon Dot was moving from the South China Sea into North Vietnam. The low-level southwesterly flow, that had been feeding into Dot, extended across the South China Sea into the Philippine Islands. A day later - with Dot over land and dissipating - a fresh outbreak of polar air from the northeast moved across the northern South China Sea and Philippines. The low-level convergence and cloudiness associated with the southwesterly monsoon flow persisted in the southern Philippine Islands - (this was the start of Faye). To the east in the Philippine Sea the remnants of Ellis were embedded in the western end of the near-equatorial trough. Ellis had been finalled at (200600Z). Although devoid of central cloudiness, it still retained some cyclonic vorticity. As the remnants of Ellis drifted west-northwestward, satellite imagery at 221200Z revealed a resurgence of its central convection. This renewed activity resulted in the issuance of two Tropical Cyclone Formation Alerts (TCFA) at 211200Z and 220300Z. The remains of Ellis, however, did not regenerate.

In conjunction with the continued interest in Ellis, an aircraft reconnaissance investigation mission was scheduled for the daylight hours on the 23rd of October. It located east-southeasterly winds at 10 kt (5 m/s) and a MSLP of 1009 mb associated with the TCFA area; however, as the flight continued to the west, it discovered 35 kt (18 m/s) winds and a MSLP of 1004 mb associated with another circulation. This prompted the first warning on Tropical Depression 23W at 230000Z. Up to this time there had been no mention of this new system in either the Significant Tropical Weather Advisory (ABPW PGTW) or the TCFA associated with Ellis. The tropical depression, once identified, moved northwestward under the subtropical ridge and slowly intensified. It reached tropical storm intensity at 231200Z. Later (240300Z), Tropical Storm Faye made landfall over central Luzon 60 nm (111 km) northeast of Manila (WMO 98429) with an intensity of 40 kt (21 m/s). Faye tracked to the northwest across Luzon in 9 hours and entered the South China Sea as a 20 kt (10 m/s) tropical depression some 130 nm (241 km) north-northwest of Manila. During the next 12-hours, Faye re-intensified over open water and moved on to the northwest. As a consequence of this northwesterly movement, Hong Kong (WMO 45005) went to Tropical Cyclone Condition of Readiness III at 250303Z.

Although, the system was forecast to move slowly to the northwest and intensify, the presence of a mid-latitude trough over mainland China changed that scenario. Faye was upgraded to tropical storm intensity late on the 24th and slowed further. Actually, satellite, radar and two aircraft reconnaissance fixes confirmed that the system completed a small cyclonic loop between 241800Z and 251800Z. Then Faye turned northeastward and accelerated through the Luzon Straits. Aircraft reconnaissance peripheral data between 262100Z and 270000Z showed the maximum surface winds to be in the northeastern semicircle. This was due to the increased pressure gradient between the low central pressure of Faye and the ridge to the northeast over Japan. For the next two days, after moving from the Straits, Faye slowed again, covering only 140 nm (259 km). The slowing trend was accompanied by intensification. Faye became a typhoon at 281800Z.

With Typhoon Faye approaching, Kadena AB on the island of Okinawa set Tropical Cyclone Condition of Readiness III (at 290900Z), and Condition II at 300310Z. During this period Typhoon Faye was at its maximum intensity of 100 kt (51 m/s) and beginning to accelerate to the northeast (see Figure 3-23-1). The closest point of approach to Kadena AB was 90 nm (167 km) to the southeast at 301900Z. Even though Faye's intensity at this time was 85 kt (44 m/s), the maximum observed winds at Kadena AB were only 18 kt (9 m/s).

After passing south of the island of Okinawa, Typhoon Faye continued to decrease in intensity due to the increased strength of the upper-level westerlies and the associated vertical wind shear. At 311200Z, 17 hours after its closest point of approach to Okinawa, Typhoon Faye was downgraded to a tropical storm. Faye continued accelerating to the east-northeast and transitioned to an extratropical low with an intensity of 45 kt (23 m/s) six hours before the final warning at 011200Z.

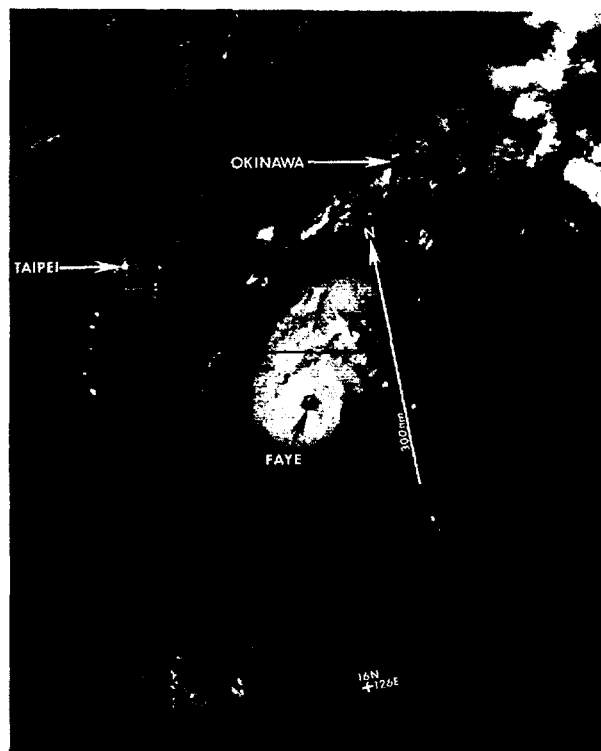


Figure 3-23-1. Nighttime moonlight imagery of Typhoon Faye one day after reaching typhoon intensity. Because this is a low-light-level image, the bright city lights along the west coast of the island of Taiwan can be seen to the west of the Tropical Cyclone [291346Z October DMSP visual imagery].

BEST TRACK TC-24W
20 NOV-26 NOV 1985
MAX SFC WIND 45 KT
MINIMUM SLP 997 MBS

LEGEND

- 06 HOUR BEST TRACK POSIT**
- A SPEED OF MOVEMENT**
 - B INTENSITY**
 - C POSITION AT XX/0000Z**
 - ... TROPICAL DISTURBANCE**
 - ... TROPICAL DEPRESSION**
 - TROPICAL STORM**
 - TYPHOON**
 - ◇ SUPER TYPHOON START**
 - ◇ SUPER TYPHOON END**
 - ◇◇ EXTRATROPICAL**
 - ... DISSIPATING STAGE**
 - ★ FIRST WARNING ISSUED**
 - ★ LAST WARNING ISSUED**

<u>DTG</u>	<u>SPEED</u>	<u>INTENSITY</u>
2018Z		35
	5	
2100Z		35
	3	
2106Z		35
	3	
2112Z		35
	3	
2118Z		30
	3	
2200Z		30
	3	
2206Z		30
	2	
2212Z		30
	2	
2218Z		30
	2	
2300Z		30
	2	
2306Z		30
	3	
2312Z		30

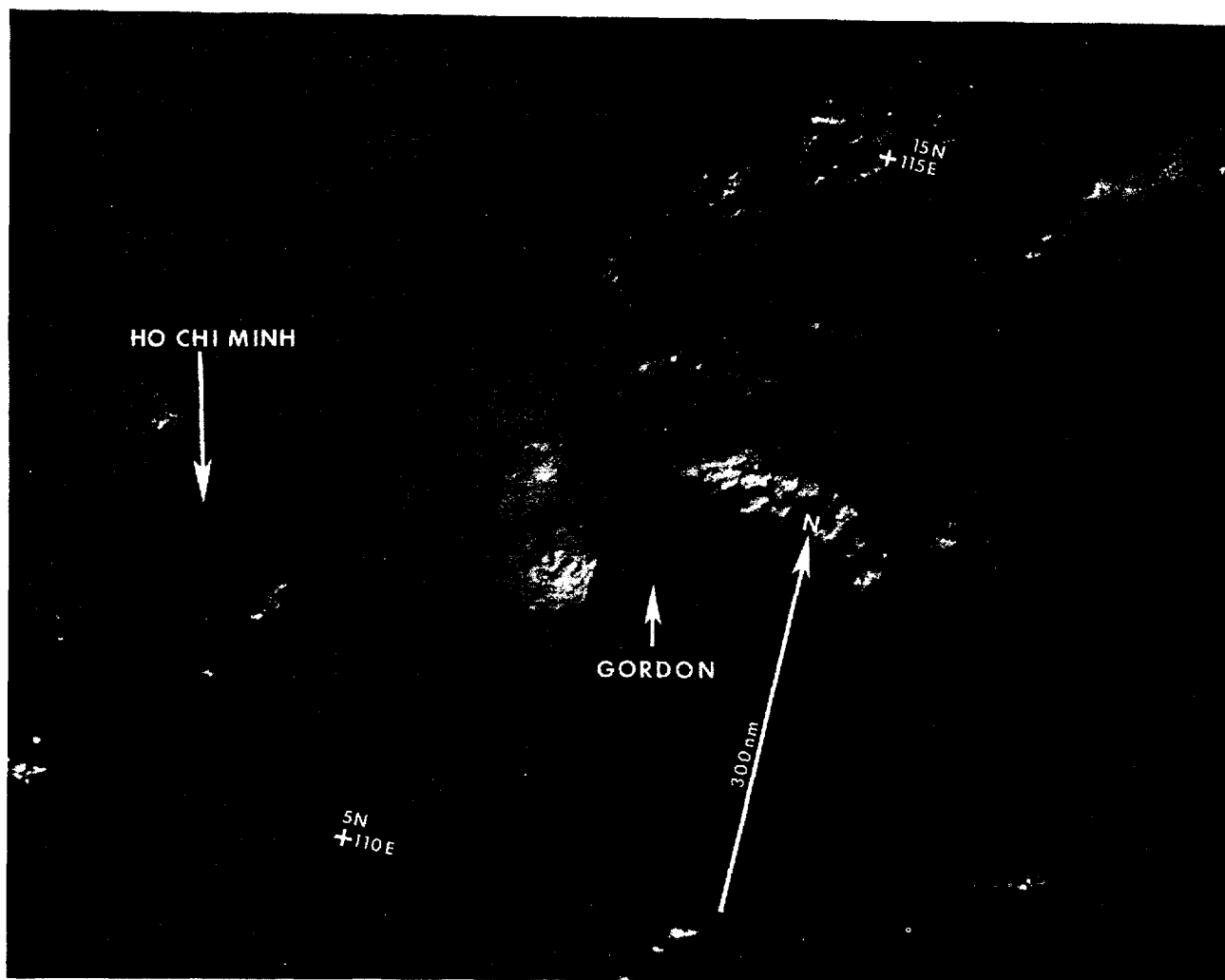


Figure 3-24-1. Tropical Storm Gordon, the only significant tropical cyclone to develop in WESTPAC during November, originated in the monsoon trough in the South China Sea. Gordon's initial intensification to a tropical storm on the 20th was coincident with a surge in the northeast monsoon which was present from late on the 19th until early on the 21st. However, by 220000Z the surge had weakened and so did Gordon. Subsequent redevelopment to tropical storm intensity on the 23rd and 24th appeared to be due to the system's development as a warm-core tropical cyclone. The USS Kitty Hawk (CV-63) Battle Group passed close to Gordon's center on the 23rd without sustaining any damage, and reported winds of 35-45 kt (18-23 m/s). Positioning the center of Tropical Storm Gordon was often difficult, particularly at night. The low-level circulation center was often several degrees away from the strongest convection, and although frequently exposed, consisted of only low-level cloudiness, which was difficult to resolve on infrared satellite imagery. The most intense convection was usually observed northwest of the low-level circulation center, as shown in the (above) imagery (230228Z November DMSP visual imagery).

TYPHOON HOPE

BEST TRACK TC-25W

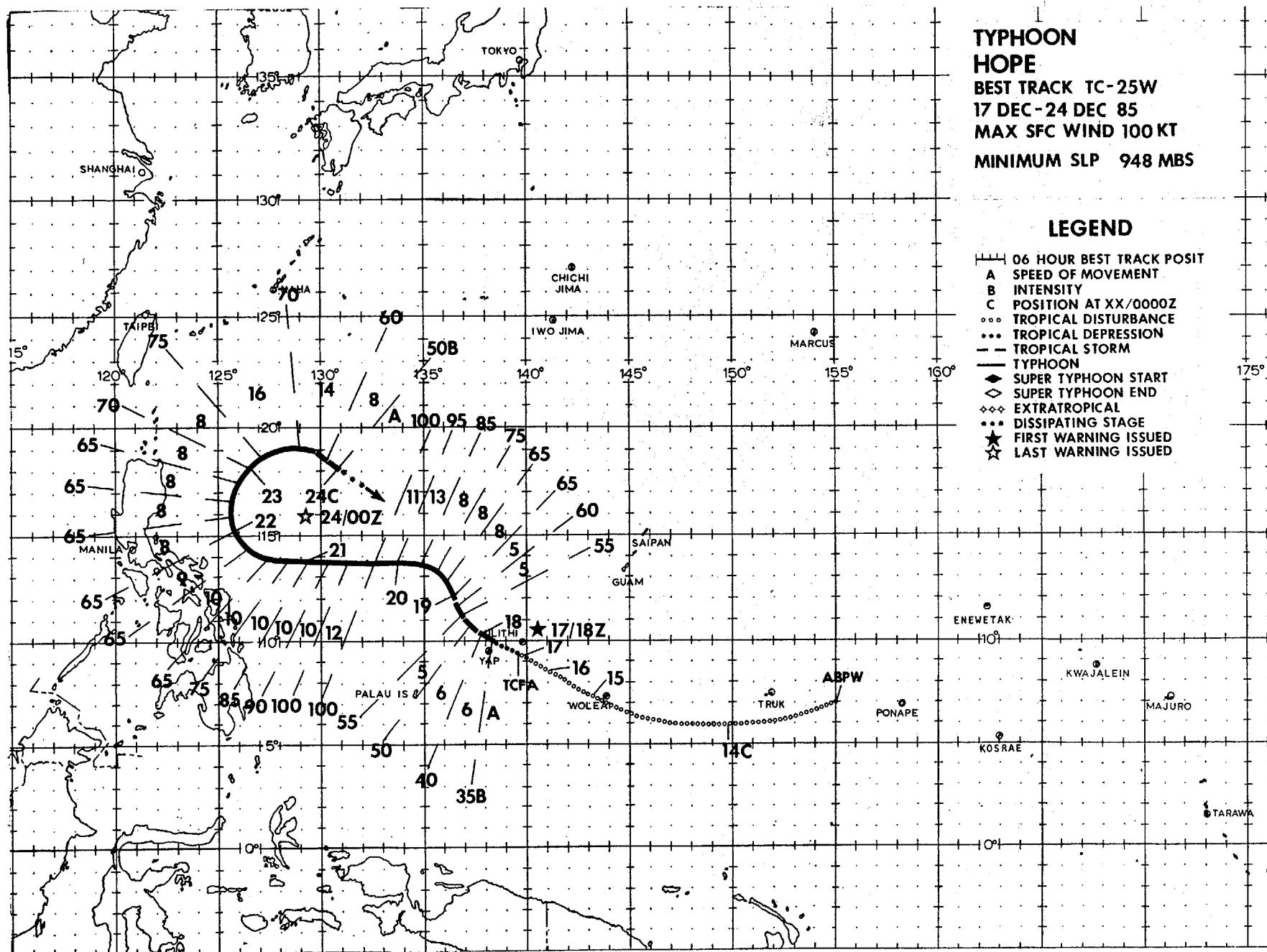
17 DEC-24 DEC 85

MAX SFC WIND 100 KT

MINIMUM SLP 948 MBS

LEGEND

- 06 HOUR BEST TRACK POSIT
- A SPEED OF MOVEMENT
- B INTENSITY
- C POSITION AT XX/0000Z
- ... TROPICAL DISTURBANCE
- ... TROPICAL DEPRESSION
- TROPICAL STORM
- TYPHOON
- ◆ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- ◆◆ EXTRATROPICAL
- ◆◆ DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ☆ LAST WARNING ISSUED



TYPHOON HOPE (25W)

Hope was a late-season typhoon that originated at low-latitude in the near-equatorial trough. It was aided in its initial development by the presence of enhanced low-level northeast monsoon flow and an associated shear zone. Typhoon Hope presented forecast problems at two different times: first at the crucial turning point from a westward to a northward track; and after recurvature when extratropical transition was imminent.

After Tropical Storm Gordon dissipated over Vietnam on the 25th of November, a winter weather pattern dominated the northwest Pacific area. Convective activity was confined to low latitudes in the near-equatorial trough. The disturbance, that was to become Typhoon Hope, was detected on the 13th of December between Truk and Pohnpei. The disturbance moved in a general westerly direction for the next three days and showed signs of slow intensification. Figure 3-25-1 shows Hope as a tropical depression located approximately 90 nm (167 km) east of Yap. By 171800Z, satellite data indicated the disturbance had further intensified while moving west-northwestward

aided by the effect of the shear zone to the north. As a result, the initial warning was issued. Between 171800Z and 191200Z December, Hope moved northwest before coming under the full steering influence of the mid-level subtropical ridge that caused the system to assume a westward track.

Tracking Hope during the period 191200Z-201200Z was facilitated by the availability of four aircraft fixes and several satellite eye fixes. Typhoon Hope reached its maximum intensity of 100 kt (52 m/s) at 200600Z (see Figure 3-25-2) just thirty hours after the initial warning. After that, Hope decreased slightly in intensity and maintained 65-75 kt (34-39 m/s) during the period 210600Z-231200Z.

After the 200300Z warning, the One-way Interactive Tropical Cyclone Model (OTCM) showed definite indications of a recurvature type track, whereas before it had indicated a generally north-westward track. The OTCM is the primary forecasting aid. The Nested Tropical Cyclone Model (NTCM) did not show signs of recurvature, but did indicate a

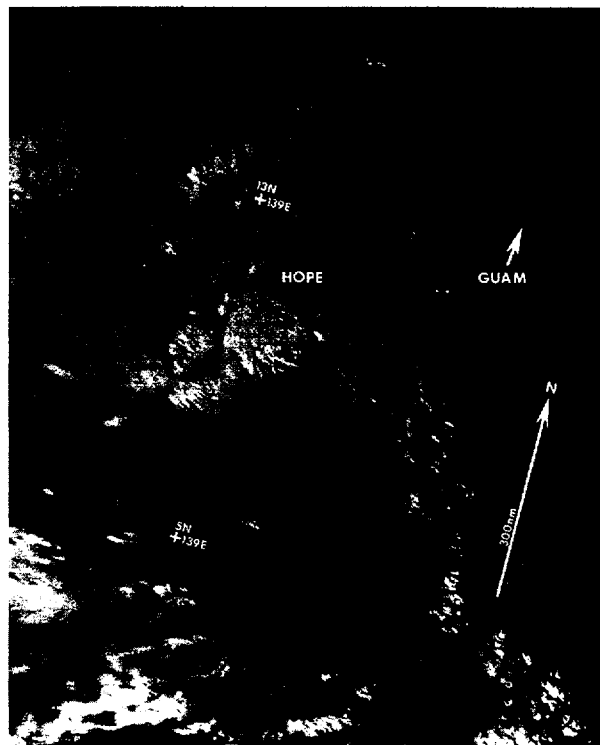


Figure 3-25-1. Hope as a tropical depression approximately 90 nm (167 km) east of Yap (WMO 91413). The shear zone to the north apparently aided Hope's development by enhancing the low-level northeast flow (170441Z December NOAA visual imagery).

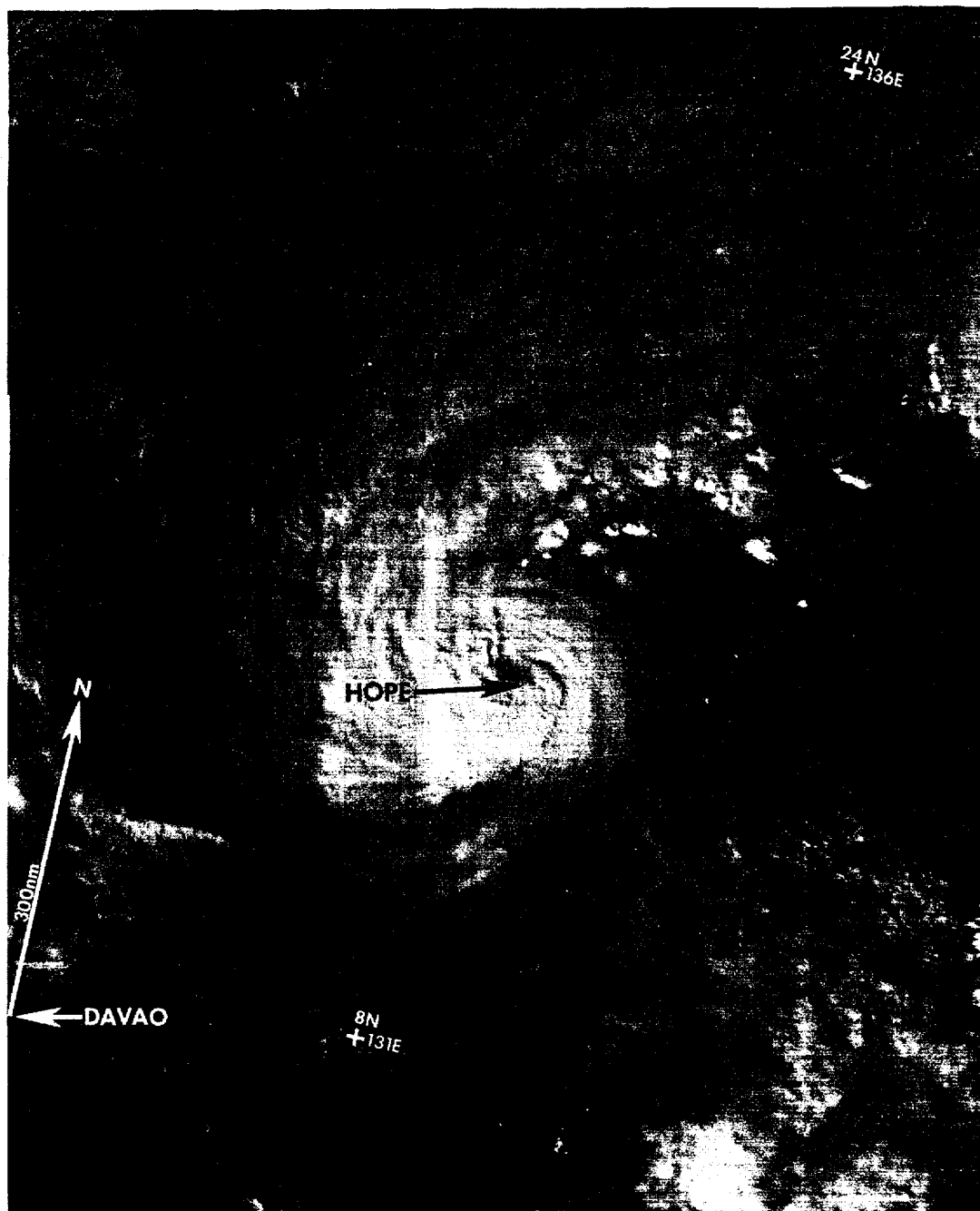


Figure 3-25-2. Typhoon Hope with a large ragged eye near time of maximum intensity (200551Z December NOAA visual imagery).

northerly track. As indicated in Figure 3-25-3, the OTCM yielded good forecast guidance during the period 191800Z-201200Z and the NTCM (Figure 3-25-4) gave fairly good guidance during the period 191800Z-210000Z. OTCM indicated a northwestward track and recurvature to the north-northeast (Figure 3-25-3) after about 48 hours. NTCM indicated a track change from northwest to northward (Figure 3-25-4). This guidance was integrated into the 201500Z warning. The track made good synoptic sense since it could be interpreted as Typhoon Hope moving around the western periphery of the mid-level subtropical ridge. The forecasts held with a curving track that started toward the west-northwest, turned north, and became northeast at about the 48 hour point.

After 201200Z December, a sequence of events started that caused major track forecast problems. As has been pointed out earlier, after 201200Z Typhoon Hope began to weaken slightly and the eye structure disappeared from satellite imagery. This resulted in doubts about the exact location of the

surface center of the typhoon. At 210842Z, a 31 hour period began during which no aircraft fixes were made on Typhoon Hope due to aircraft non-availability and maintenance problems. Under normal conditions, four aircraft fixes would have been made during that time period. Aircraft positioning of typhoons is the most accurate method available and is especially important at major track changes.

After 210000Z, the OTCM guidance stopped the recurvature scenario and started showing just a general northwest movement (Figure 3-25-5). It indicated a more westward direction with each run of the model. NTCM also indicated a northward track until 210000Z. After that time, it went to a straight westward track (Figure 3-25-6). This erroneous guidance (ie. the westward track) reflected OTCM and NTCM's inability to forecast in a winter synoptic situation. With specific reference to the model, strong middle-to-upper level westerlies apparently caused an early termination of the model run, or (as in this case) misleading guidance.

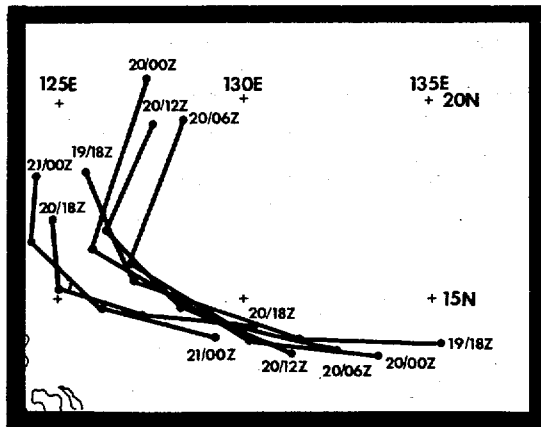


Figure 3-25-3. One-way interactive Tropical Cyclone Model (OTCM) forecast tracks for the period 191800Z-210000Z December showing a recurvature track.

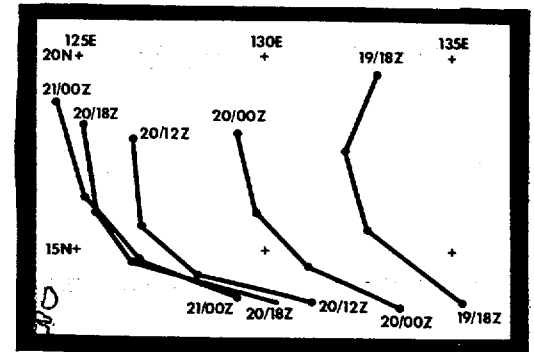


Figure 3-25-4. Nested Tropical Cyclone Model (NTCM) forecast tracks for the period 191800Z-210000Z December showing fairly good forecast track guidance in the form of tracks with northward movement.

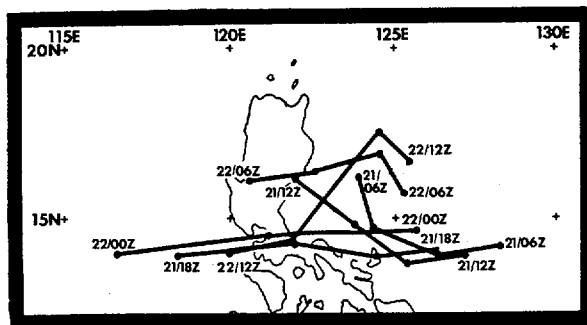
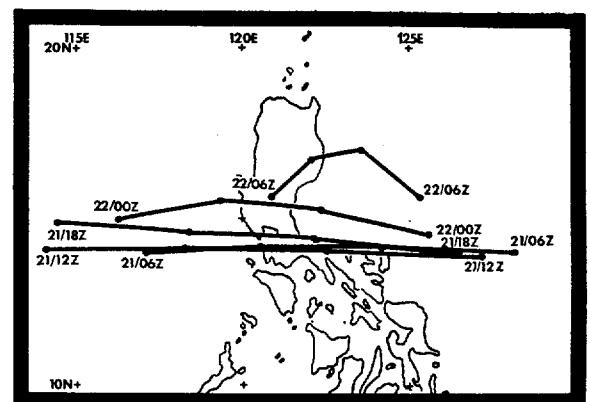


Figure 3-25-5. One-way interactive Tropical Cyclone Model (OTCM) forecast tracks for the period 210600Z-221200Z December. The forecast guidance indicates that the recurvature track is changed to westerly with time.

Figure 3-25-6. Nested Tropical Cyclone Model (NTCM) forecast guidance for the period 210600Z-220600Z December showing the swing to an almost straight westward track.



The final factor leading up to the forecast problem was Hope's continued west-northwestward movement and decreasing distance from Luzon. There was a definite need to warn of Hope's approach if there was a possibility that it was going to continue moving west-northwest and not recurve.

The combination of these events presented a dilemma for the typhoon forecaster, who had to issue the 220300Z warning. Hope was close to the critical track turning point. It was either going to continue moving west-northwest and make landfall on the east coast of Luzon, or start moving northward and recurve as had been forecast for the past 36 hours. The forecaster was presented with the following facts: (1) Hope's position was known within an estimated accuracy of 60 nm (111 km) based on poorly defined infrared satellite fixes (no satellite eye fixes or aircraft fixes being available); (2) Hope appeared to be continuing on a west-northwest track; (3) the numerical forecast models were indicating a straight westward track and had not indicated recurvature for about 24 hours; and (4) there was a definite need to warn Department of Defense interests on Luzon of Hope's approach. After carefully considering the combined effect of these factors, the forecaster decided to significantly change the forecast philosophy and forecast Typhoon Hope to track west-northwest across Luzon into the South China Sea.

During the next six hours; however, satellite fixes indicated that Typhoon Hope was moving toward

the north. A quick recovery was made on the 220900Z warning when the forecast track was switched back to one reflecting northward movement, followed by recurvature to the northeast, and decreasing intensity as extratropical transition occurred. The warnings over the next two days were accurate with a general concept of eastward movement with extratropical transition. The forecast tracks had Hope accelerating in speed and moving as far east-northeast as 27N 149E before completing extratropical transition.

In retrospect, an extratropical transition where the tropical cyclone is sheared away by upper-level westerlies and then dissipates below 20N would have been a more representative forecast for the final two days. Climatologically, this is what one would expect to happen in late December. In the case of Typhoon Hope, the 400mb trough with moderate westerlies over southern China was super-imposed over moderate-to-strong anticyclonic flow and cold air advection at the 925 mb level. These features are depicted in Figures 3-25-7 and 3-25-8. Based on these patterns, a shearing type of extratropical transition (followed by a dramatic decrease in the system's associated wind speeds) with no significant eastward acceleration is to be expected. Shearing, decreased wind speeds, and no significant eastward acceleration is exactly what happened after 240000Z. Figure 3-25-9 shows the remnants of Hope. There were no reported deaths, injuries, or property damage attributed to this late-season typhoon.

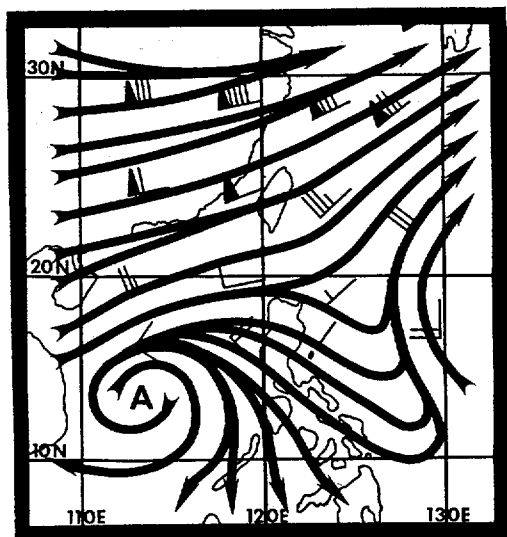


Figure 3-25-7. 400 mb Numerical Variational Analysis (NVA) at 220000Z December indicates a trough extends from near 60N 130E to 22N 107E with moderate westerlies north of Hope.

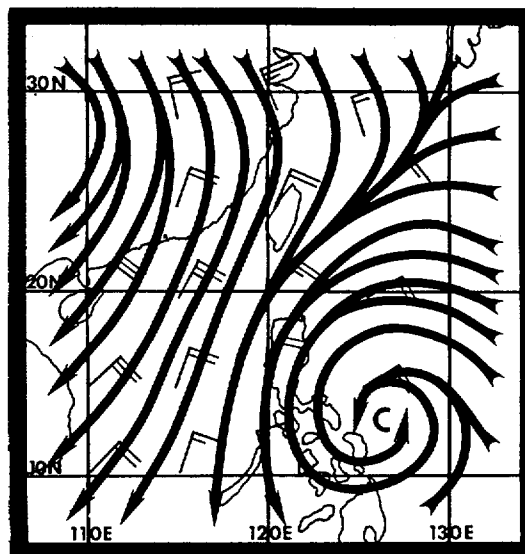


Figure 3-25-8. 925 mb NVA analysis at 220000Z showing moderate-to-strong anticyclonic flow and cold air advection over southern China.

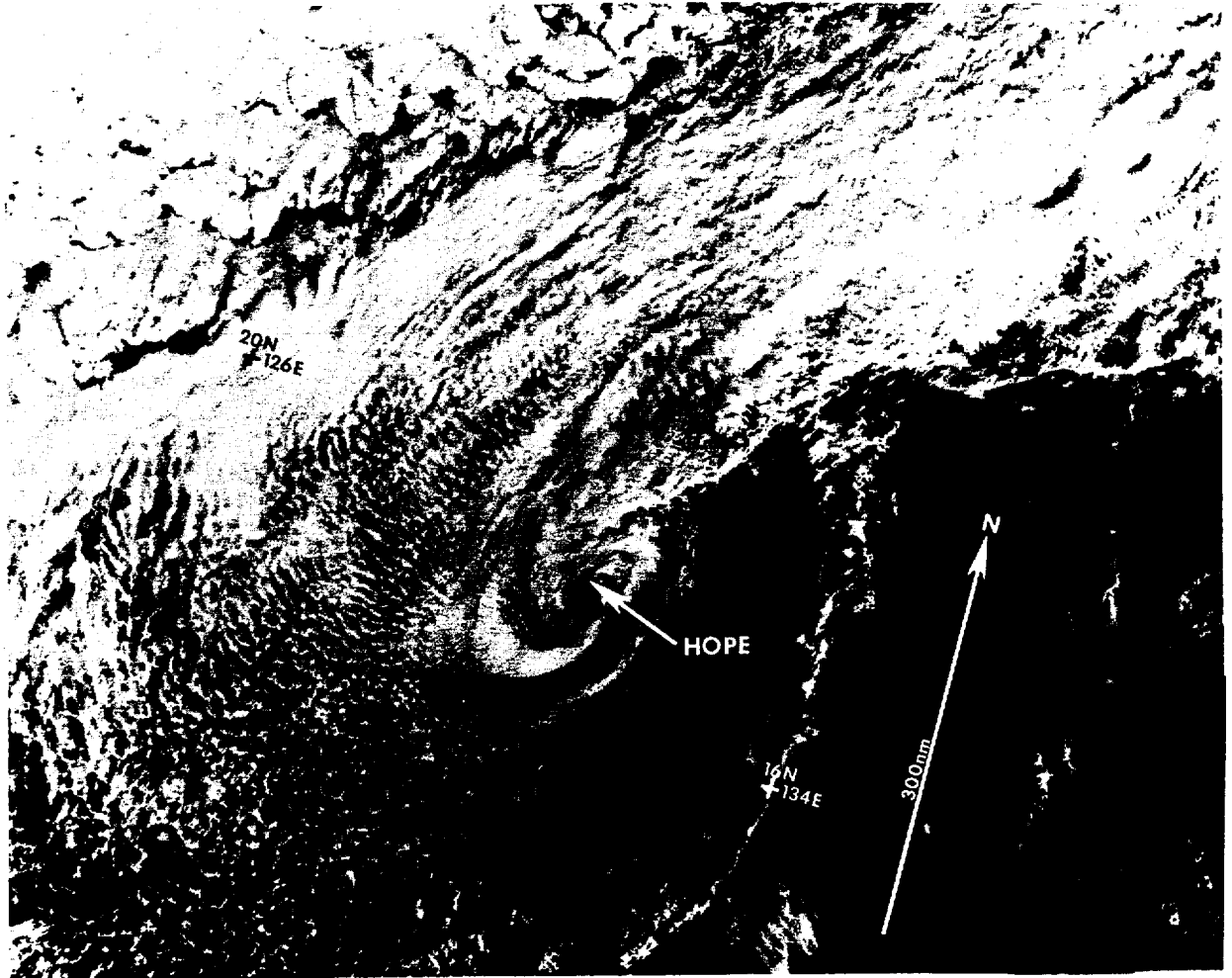


Figure 3-25-9. Typhoon Hope dissipating after having the central convection sheared away by mid- to upper level westerlies (240042Z December DMSP visual imagery).

TROPICAL STORM IRVING

BEST TRACK TC-26W

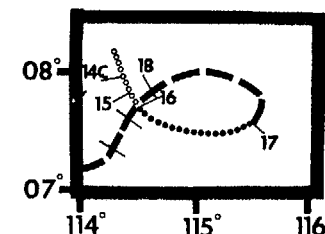
18 DEC-21 DEC 1985

MAX SFC WIND 60KT

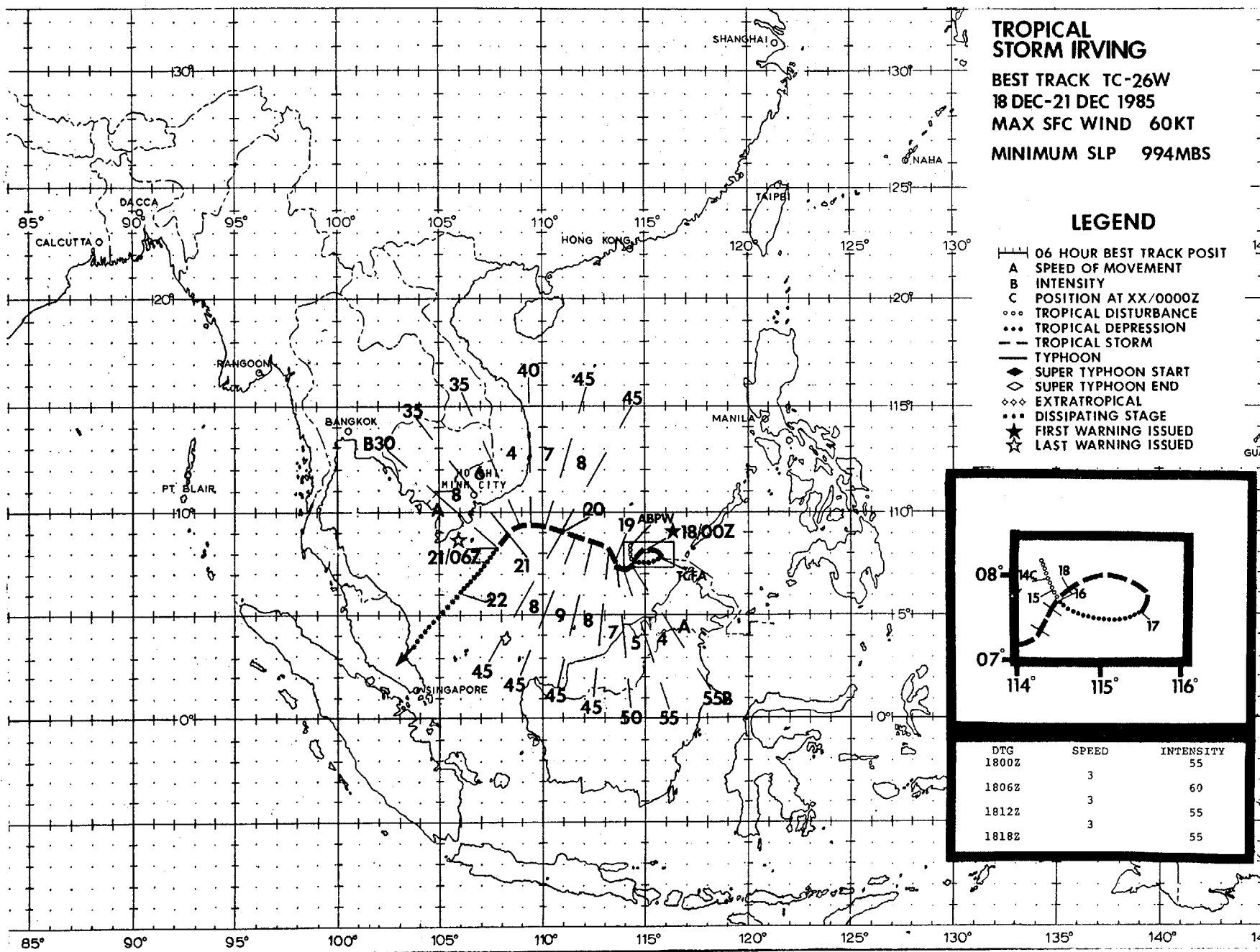
MINIMUM SLP 994MBS

LEGEND

- 06 HOUR BEST TRACK POSIT
- A SPEED OF MOVEMENT
- B INTENSITY
- C POSITION AT XX/0000Z
- ... TROPICAL DISTURBANCE
- ... TROPICAL DEPRESSION
- TROPICAL STORM
- TYPHOON
- ◆ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- ◇◇ EXTRATROPICAL
- ... DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ☆ LAST WARNING ISSUED



DTG	SPEED	INTENSITY
1800Z	3	55
1806Z	3	60
1812Z	3	55
1818Z	3	55



TROPICAL STORM IRVING (26W)

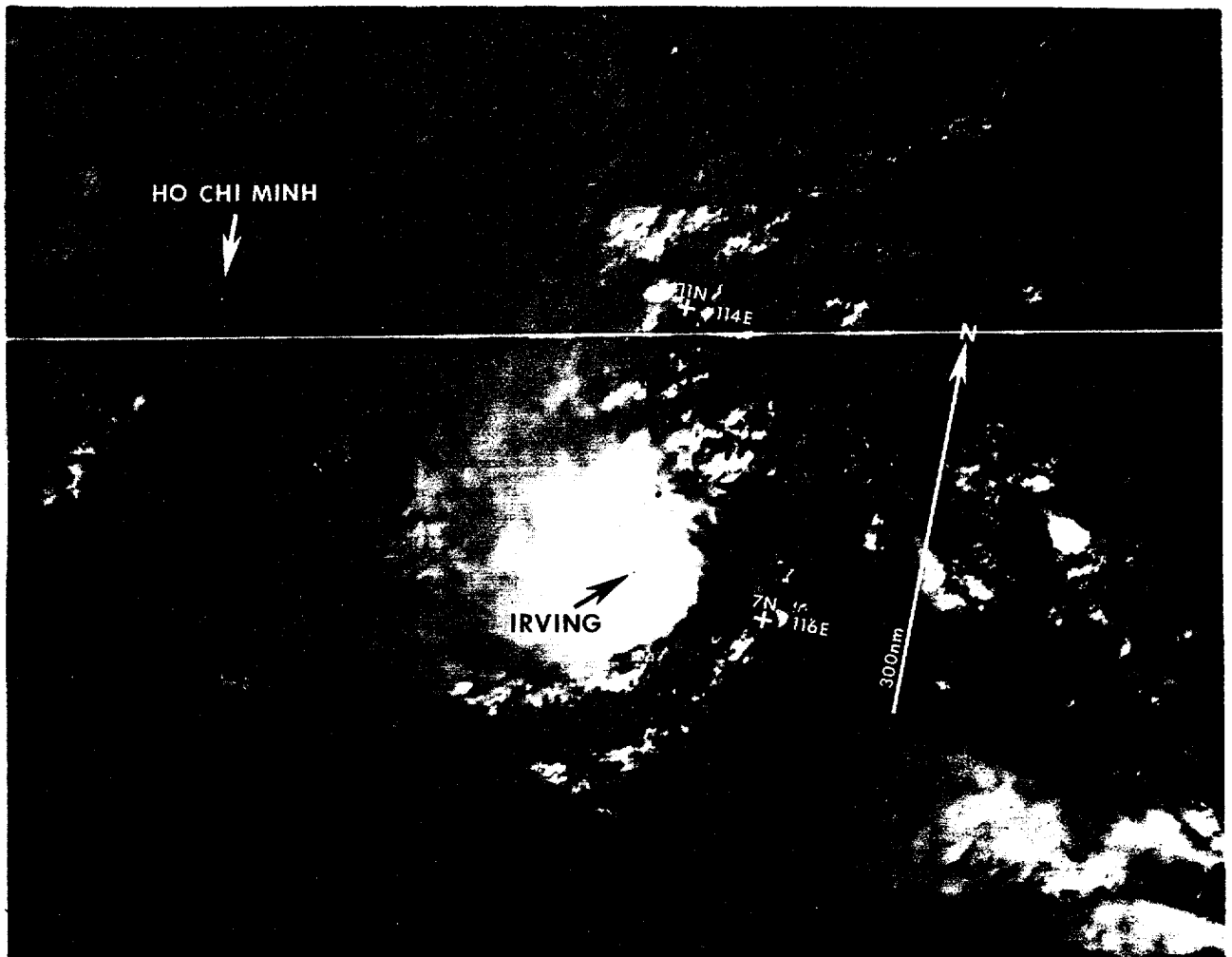


Figure 3-26-1. Tropical Storm Irving was one of two significant tropical cyclones to occur in the month of December. It formed at the western end of the low-latitude near-equatorial trough. The proximity of the low-level northeast monsoon and associated winter gales in the South China Sea masked Irving's initial development. Aircraft reconnaissance proved instrumental in locating the low-level circulation center and describing the wind field of this off-season tropical cyclone. Irving's central dense overcast and low-level cumulus spirals are visible in the (above) satellite imagery (190224Z December DMSP visual imagery).

3. NORTH INDIAN OCEAN TROPICAL CYCLONES

Tropical cyclone activity in the North Indian Ocean was above normal. Six significant tropical cyclones, all of tropical storm intensity, developed as compared to the climatological mean of four. These systems occurred in the spring and fall trans-

ition season, which normally encompasses the peak of the activity. Tables 3-6 through 3-8 provide a summary of information for 1985 and comparison with earlier years.

TABLE 3-6.

1985 SIGNIFICANT TROPICAL CYCLONES

TROPICAL CYCLONE	PERIOD OF WARNING	CALENDAR DAYS OF WARNING	NUMBER OF WARNINGS ISSUED	MAXIMUM SURFACE WIND KT - (M/S)	ESTIMATED MSLP MB	BEST TRACK DISTANCE TRAVELED NM - (KM)
TC 01B	23MAY - 25MAY	3	8	60 (31)	979	515 (954)
TC 02A	29MAY - 31MAY	3	12	50 (26)	987	609 (1128)
TC 03B	9OCT - 11OCT	3	7	50 (26)	988	667 (1235)
TC 04B	15OCT - 16OCT	2	4	50 (26)	987	296 (548)
TC 05B	15NOV - 18NOV	4	12	55 (28)	983	843 (1561)
TC 06B	11DEC - 14DEC	4	11	50 (26)	987	1025 (1898)
1985 TOTALS:		19	54			

TABLE 3-7.

1985 SIGNIFICANT TROPICAL CYCLONES

NORTH
INDIAN OCEAN

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1985 TROPICAL CYCLONES	0	0	0	0	2	0	0	0	0	2	1	1	6
1975 - 1985 AVERAGE	.1	-	-	.1	.8	.4	-	.1	.3	1.1	1.4	.4	4.5
CASES	1	-	-	1	9	4	-	1	3	12	15	4	50

FORMATION ALERTS: 5 out of 8 Formation Alerts developed into significant tropical cyclones. Tropical Cyclone Formation Alerts were issued for all significant tropical cyclones, except one, that developed during 1985.

WARNINGS

Number of warning days: 19

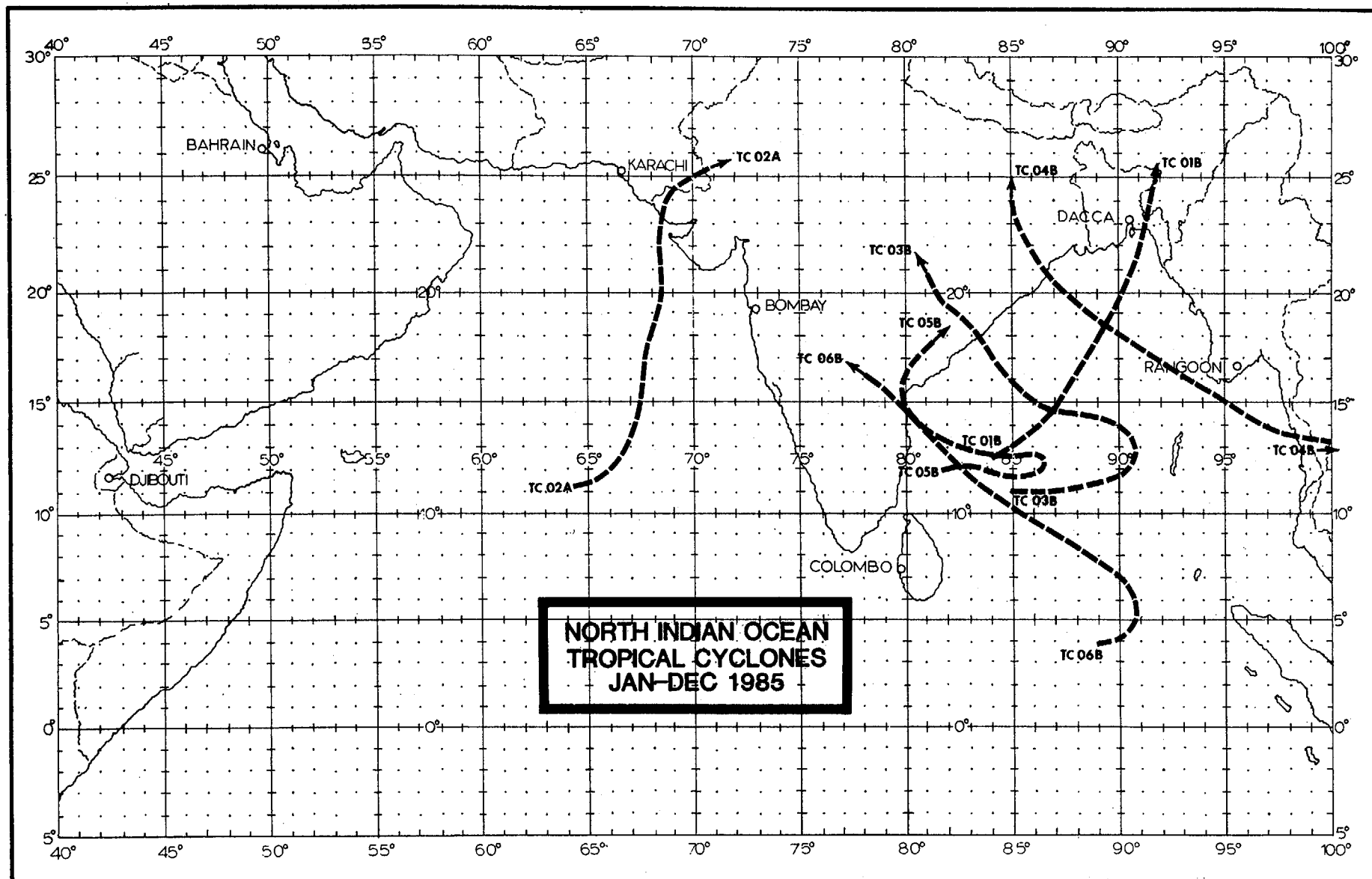
Number of warning days with two tropical cyclones in region: 0

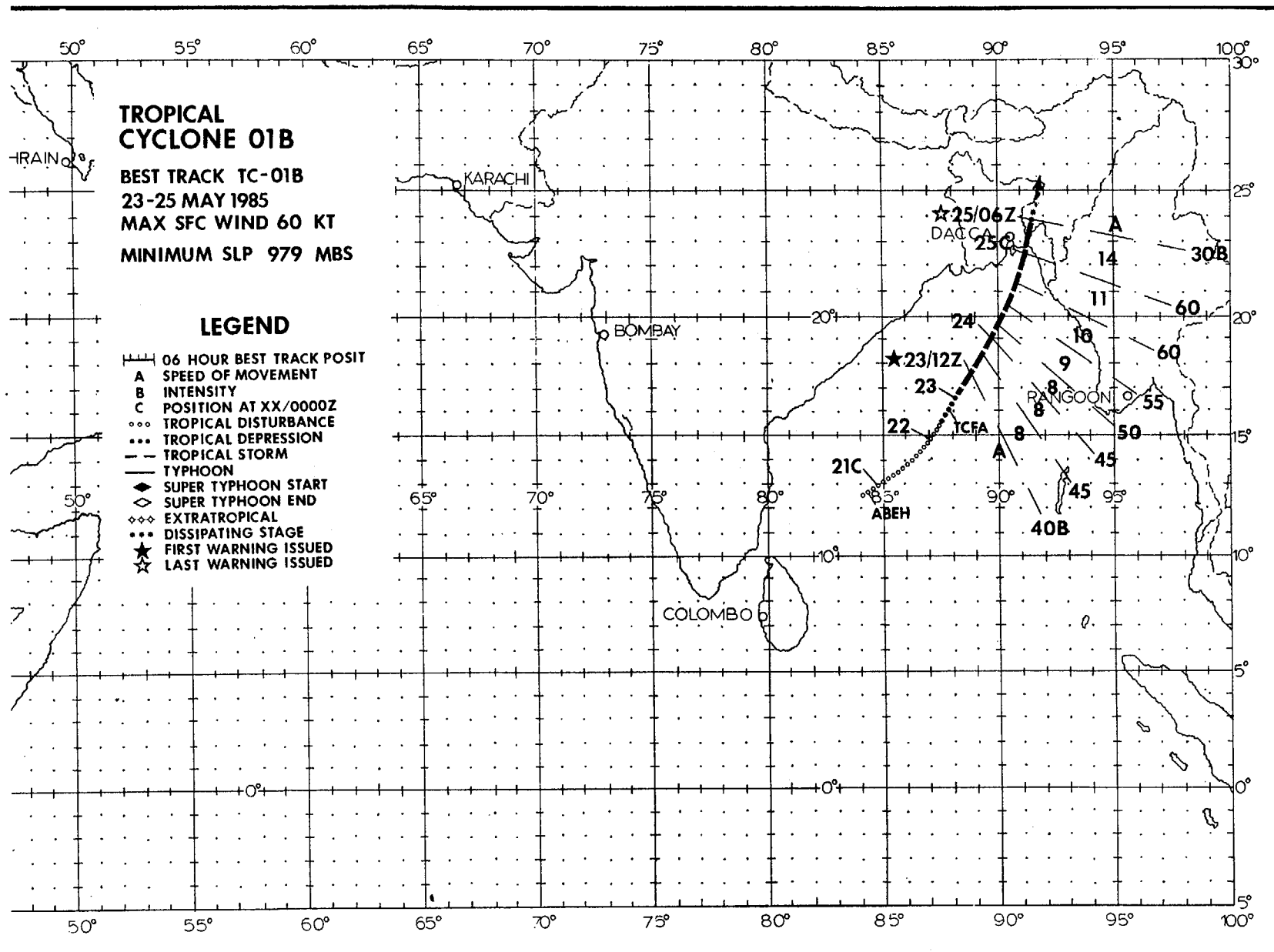
Number of warning days with three or more tropical cyclones in region: 0

TABLE 3-8.

<u>YEAR</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>TOTAL</u>
1971*	-	-	-	-	-	0	0	0	0	1	1	0	2
1972*	0	0	0	1	0	0	0	0	2	0	1	0	4
1973*	0	0	0	0	0	0	0	0	0	1	2	1	4
1974*	0	0	0	0	0	0	0	0	0	0	1	0	1
1975	1	0	0	0	2	0	0	0	0	1	2	0	6
1976	0	0	0	1	0	1	0	0	1	1	0	1	5
1977	0	0	0	0	1	1	0	0	0	1	2	0	5
1978	0	0	0	0	1	0	0	0	0	1	2	0	4
1979	0	0	0	0	1	1	0	0	2	1	2	0	7
1980	0	0	0	0	0	0	0	0	0	0	1	1	2
1981	0	0	0	0	0	0	0	0	0	1	1	1	3
1982	0	0	0	0	1	1	0	0	0	2	1	0	5
1983	0	0	0	0	0	0	0	1	0	1	1	0	3
1984	0	0	0	0	1	0	0	0	0	1	2	0	4
1985	0	0	0	0	2	0	0	0	0	2	1	1	6
<u>1975-1985</u>	<u>.1</u>	<u>-</u>	<u>-</u>	<u>.1</u>	<u>.8</u>	<u>.4</u>	<u>-</u>	<u>.1</u>	<u>.3</u>	<u>1.1</u>	<u>1.4</u>	<u>.4</u>	<u>4.5</u>
<u>AVERAGE</u>													
CASES	1	0	0	1	9	4	0	1	3	12	15	4	50

* JTWC warning responsibility began on 4 June 1971 for the Bay of Bengal, east of 90E. As directed by USCINCPAC, JTWC issued warnings only for those tropical cyclones that developed or tracked through that portion of the Bay of Bengal. Commencing with the 1975 tropical cyclone season JTWC's area of responsibility was extended westward to include the western portion of the Bay of Bengal and the entire Arabian Sea.





TROPICAL CYCLONE 01B

Tropical Cyclone 01B was the first of two cyclones to form in the North Indian Ocean during the Spring transition season. Although only reaching an intensity of 60 kt (31 m/s), it was one of the most noteworthy storms of 1985 due to the tremendous loss of life the cyclone caused in Bangladesh. An estimated 6,000 people died from the storm, with an additional 300,000 people left homeless. Most of the deaths were due to the storm surge, estimated at 15 ft (5 m), which completely inundated many of the low-lying islands (DeAngelis, 1985).

By late May, the Spring transition season was well underway in the North Indian Ocean. The southwest monsoon had moved into the southern Bay of Bengal and was creating a large amount of convection across the region. Late on the 20th of May, an area of convection began to show some organization in the southwest Bay of Bengal. This prompted the Signifi-

cant Tropical Weather Advisory (ABEH PGTW) to be reissued at 202030Z to include mention of this disturbance. During the following nine hours satellite imagery showed the disturbance continuing to improve in organization. As a result, the potential for significant tropical cyclone development was upgraded to "fair" on the 210600Z Significant Tropical Weather Advisory. Subsequent data continued to show slow development. An upper-level anticyclone was forming over the disturbance and a Dvorak analysis of satellite imagery estimated surface winds of 25 to 35 kt (13 to 18 m/s). This resulted in the issuance of a TCFA at 222100Z as the disturbance moved into the central Bay of Bengal.

Since the disturbance was developing in the monsoon trough (Figure 3-01B-1), there was some uncertainty as to whether a closed surface circ-

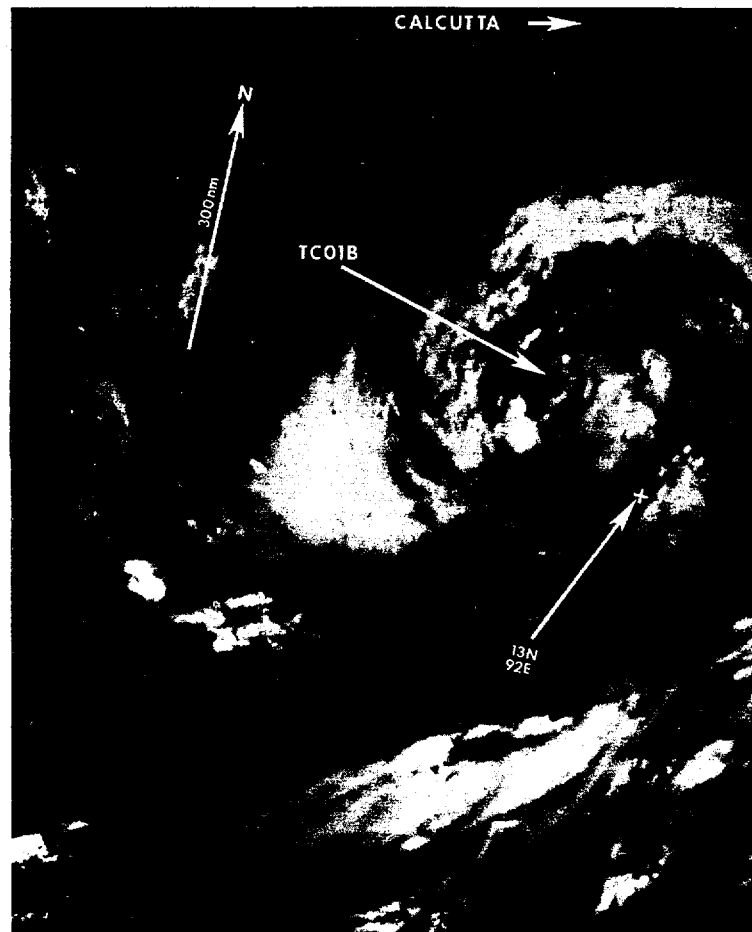


Figure 3-01B-1. The tropical disturbance, which became Tropical Cyclone 01B is consolidating in the Bay of Bengal. Estimated surface winds at this time are 25 kt (13 m/s) (220432Z May DMSP visual imagery).

lation existed or the disturbance was still a broad trough. Analysis performed by the Air Force Global Weather Center (AFGWC) on satellite imagery at 230442Z quickly settled the question by estimating surface winds of 45 kt (23 m/s), which supported a closed surface circulation. Based on this information, the first warning on Tropical Cyclone 01B was issued at 231200Z.

The forecast reasoning for Tropical Cyclone 01B centered on the presence of the monsoon trough. The initial forecast called for the storm to remain in the trough and move to the north-northeast. This forecast philosophy proved to be correct, and remained unchanged throughout the lifetime of Tropical Cyclone 01B. As a result, Bangladesh received nearly a 36 hour warning of the cyclones arrival. The only forecasting difficulty with Tropical Cyclone 01B was predicting its speed. Based on satellite fixes of the poorly defined circulation center from nighttime infrared imagery, the first three warnings indicated a slower forward speed than was actually taking place. This was corrected early on the 24th, when visual satellite imagery revealed the location of the low-level circulation center (Figure 3-01B-2).

Tropical Cyclone 01B continued to intensify, reaching a peak intensity of 60 kt (31 m/s) at 241800Z. This intensity was maintained until land-

fall at 250200Z just west of Chittagong, Bangladesh (WMO 41977). The cyclone lost organization fairly rapidly as it moved inland, but still brought torrential rains and extensive flooding to the higher elevations of Bangladesh and eastern India. The final warning was issued at 250600Z.

The fact that Bangladesh was given advance warning of the cyclones approach was responsible for the saving of thousands of lives. Tropical Cyclone 01B inflicted the greatest damage and death in the delta region of the Ganges. Several low-lying islands were completely submerged due to the 15 ft (5 m) storm surge which accompanied the storm at landfall. In several cases the only structures left standing were concrete multi-story shelters built after the 1970 cyclone (In November 1970, a tropical cyclone hit Bangladesh and killed an estimated 300,000 people). The islands of Sandwip, Urir Char and Bhola were among the most heavily damaged. Further inland, heavy rains caused severe flooding along Bangladesh's northeastern border with India. Overflowing rivers affected tens of thousands of people, with the Tripura and Manipur States of India being among the hardest hit regions.

Reference: DeAngelis, Dick, 1985: Under the Bangladesh Cyclone. Mariners Weather Log, Vol 29, No. 3, pp. 141-143.

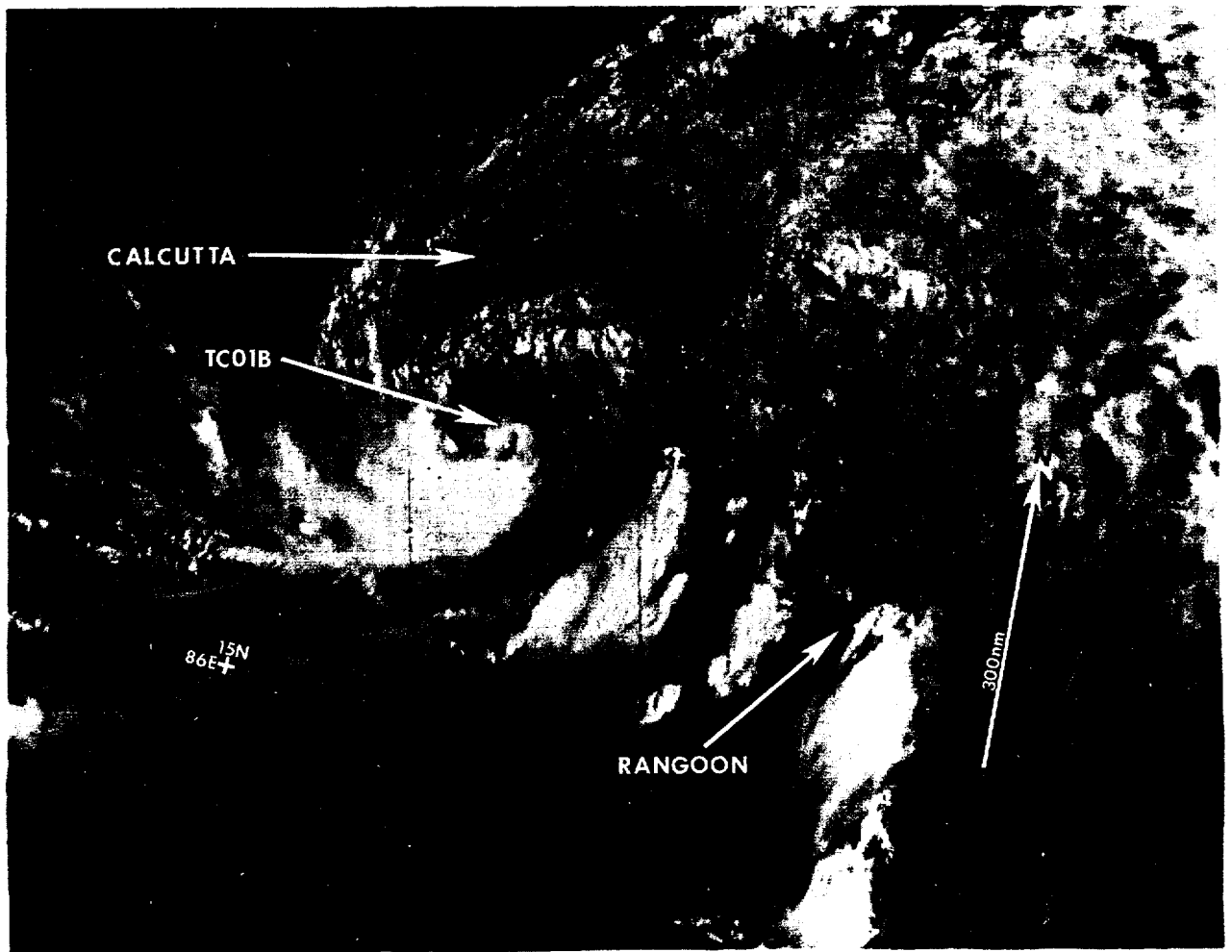
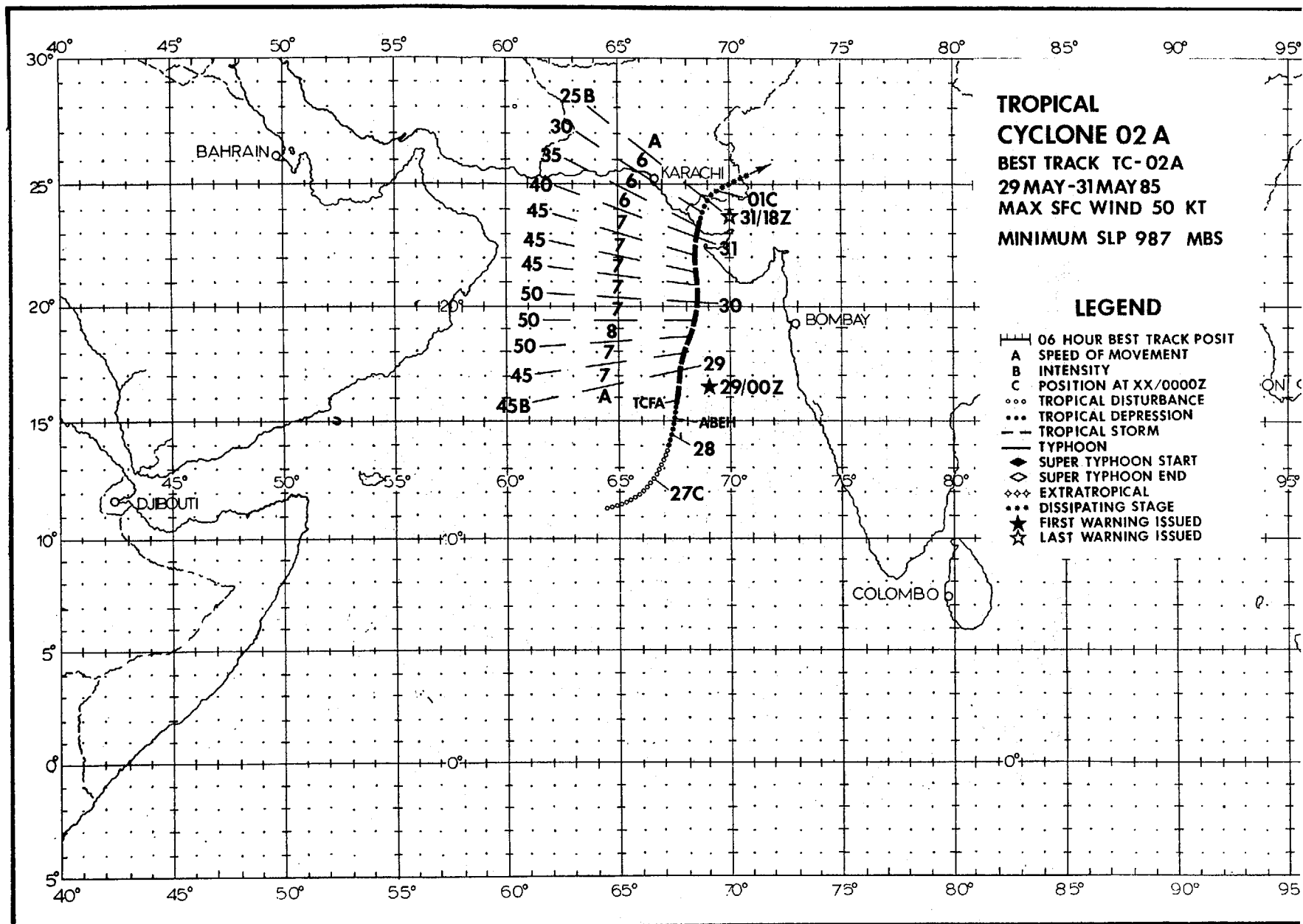


Figure 3-01B-2. Tropical Cyclone 01B less than one day prior to making landfall over Bangladesh (240351Z May DMSP Visual Imagery).



TROPICAL CYCLONE 02A

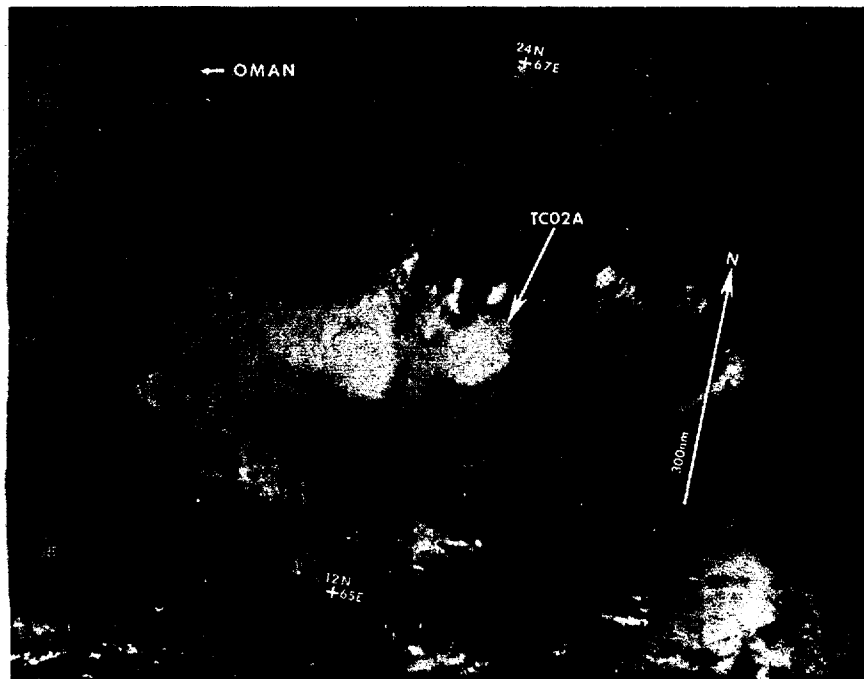


Figure 3-02A-1. Tropical Cyclone 02A near peak intensity. The low-level circulation center is just at the edge of the central cloud mass (290533Z May DMSP visual imagery).

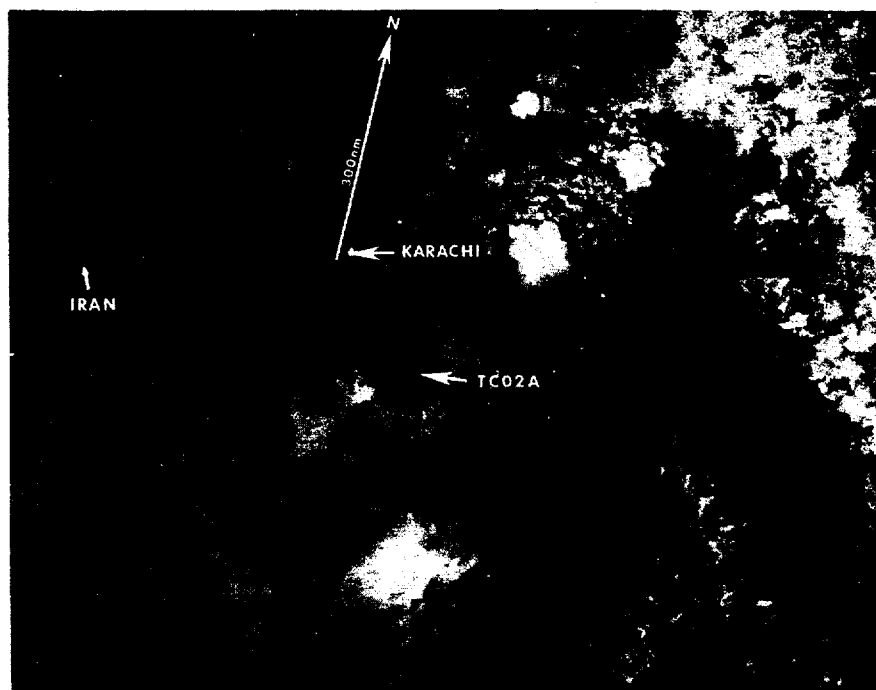
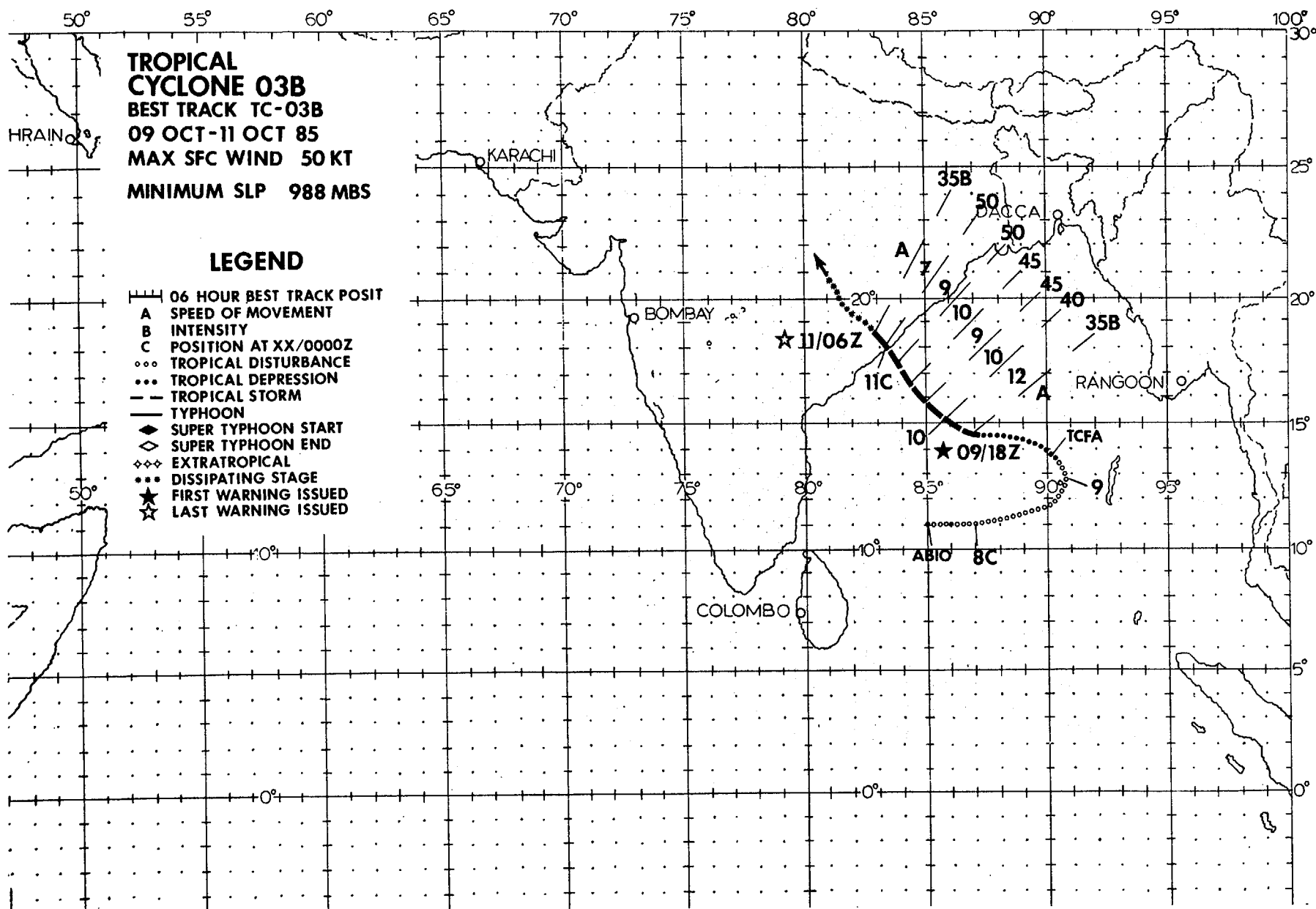


Figure 3-02A-2. Nighttime moonlight image of 02A weakening off the west coast of India. The low-level circulation center is completely exposed (301753Z May DMSP visual imagery).



TROPICAL CYCLONE 03B

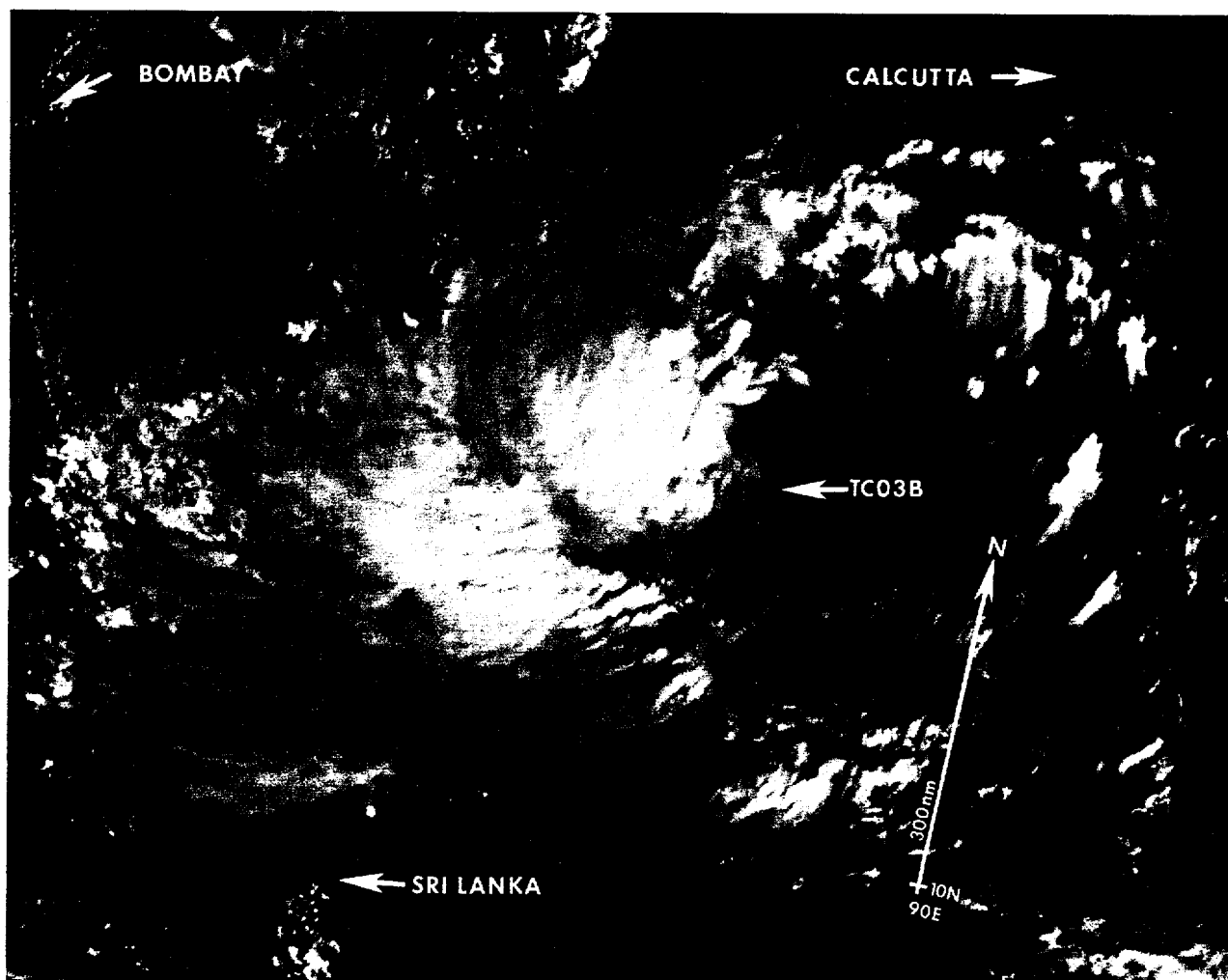
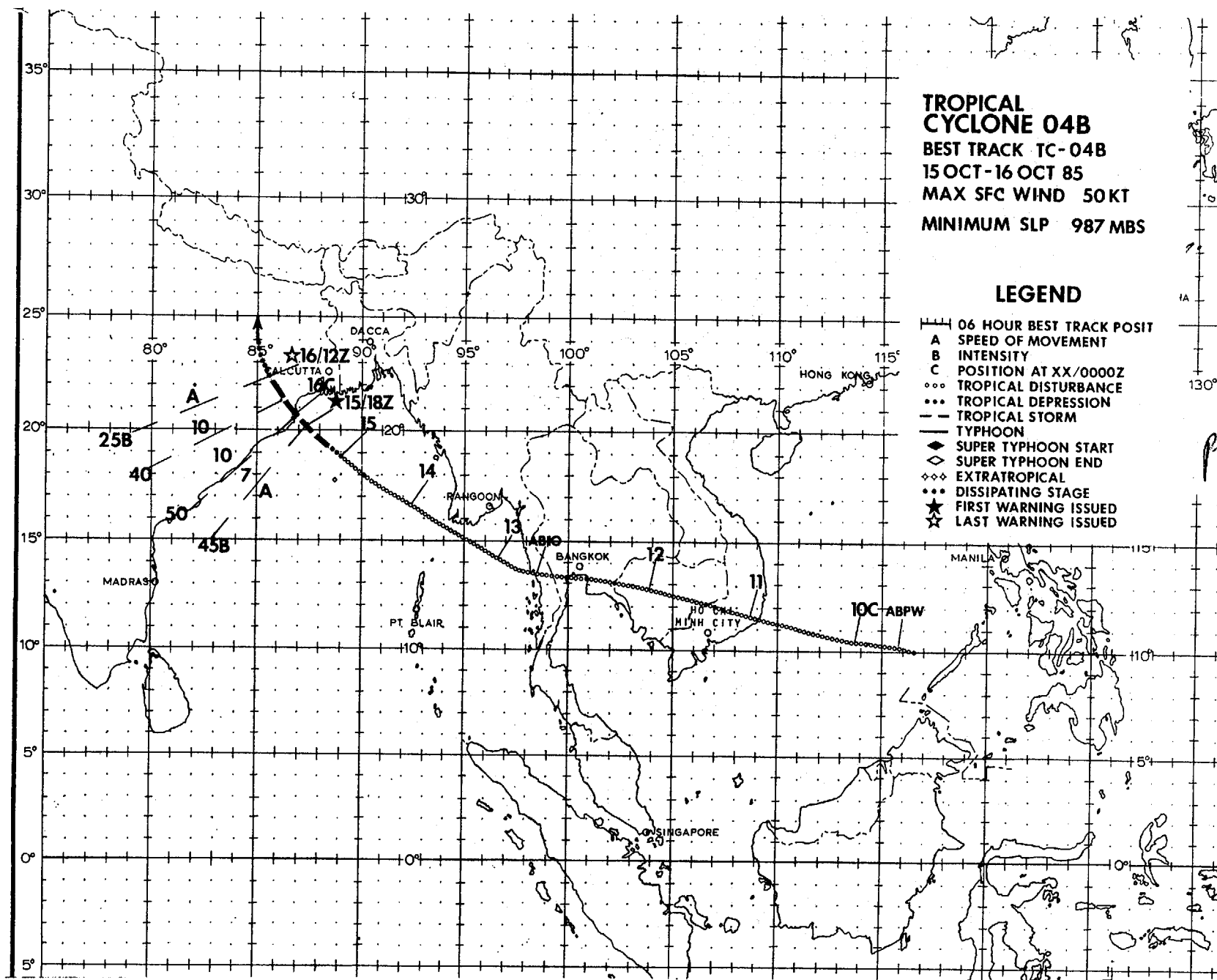


Figure 3-03B-1. Developing in early October, Tropical Cyclone 03B was the first of four tropical cyclones to develop during the Fall transition season. After an initial movement to the east during its formative stage, Tropical Cyclone 03B turned and followed a climatological track to the northwest. The Tropical Cyclone reached a maximum intensity of 50 kt (26 m/s) just prior to making landfall near Visakhapatnam, India (WMO 43149) at 102200Z. There were no reports of damage or injuries from this cyclone. The [above] imagery shows Tropical Cyclone 03B as it consolidated in the Bay of Bengal. At this time the intensity was 40 kt (21 m/s) (100409Z October DMSP visual imagery).



TROPICAL CYCLONE 04B

Despite being in warning status for only 18 hours, Tropical Cyclone 04B had a long life. It was first detected on 9 October, almost a week before the initial warning was issued, as an area of poorly organized convection in the South China Sea. The Tropical Disturbance was developing in the active monsoon trough, midway between Tropical Cyclone 03B in the Bay of Bengal, and a disturbance in the Philippine Sea that would soon develop into Typhoon Cecil.

Satellite fixes of an upper-level circulation center, based on the extrapolation of cirrus and convective curvature, followed the progress of the system as it moved closer to Vietnam. For the next two days, the system continued to move west-northwestward across the Southeast Asian Peninsula. It emerged in the Andaman Sea late on the 12th, still a poorly organized area of convection. The disturbances westward progress was also reflected at the surface, where a 10 to 15 kt (5 to 8 m/s), 1004 mb low pressure center was present.

During the 13th and 14th, the disturbance turned to the northwest, crossed the northern Andaman Sea and entered the Bay of Bengal. Upper-level support remained relatively weak and diffuse. Positioning by satellite imagery, hampered by mid- to high-level cloudiness, was accomplished on these two days mostly by analysis of spiral band curvature and extrapolation of a poorly defined low-level circulation center. With conditions favorable for slow intensification, the minimum sea-level pressure dropped from 1004 mb on the 12th to an estimated 1000 mb late on the 14th. Surface winds showed a corresponding rise, increasing to 25 kt (13 m/s). Early forecasts on the 14th predicted the system would cross the North Orissa-West Bengal Coast late on the 15th.

Early on the 15th, available data showed little change. Synoptic data at 150000Z showed a 30 kt (15 m/s) surface circulation in the north central Bay of Bengal with an upper-level anticyclone located approximately 80 nm (148 km) to the northeast. Since earlier positions had indicated greater separation between the upper- and lower-level systems, this may have signaled the beginning of increased organization. Still, available synoptic data showed no further decrease in pressure nor significant increase in surface winds. On satellite imagery, the system remained broad and diffuse, showing little improvement in organization over the past 24- to 48-hours (Figure 3-31-1). Meanwhile, coastal Bangladesh, with fresh memories of Tropical Cyclone 01B, which killed

over 6,000 people in May, braced for the current cyclone still expected to hit the coast late on the 15th. Port cities like Chittagong (WMO 41978), Khulna (WMO 41930) and others were advised to raise cautionary signals and fishing boats were advised to stay near the coast.

As 151200Z data became available, it was obvious that the system had, indeed, developed over the past 6- to 12-hours. Synoptic data from ships located a rapidly developing cyclone about 180 nm (333 km) south of Calcutta (WMO 42809). Minimum sea-level pressure was estimated to be near 990 mb and winds had increased to 45 kt (23 m/s). At 151555Z, an abbreviated Tropical Cyclone Warning Bulletin was issued by JTWC to reflect the latest data which indicated a cyclone had formed. By then, more port cities had hoisted warning signals, low-lying areas were preparing for a possible storm surge of 4 to 7 ft (1 to 2 m) above sea-level, and more fishing boats and trawlers had sought shelter.

At 151800Z, JTWC issued the first complete warning on Tropical Cyclone 04B. Subsequent ship reports had indicated a continued fall in the mean sea-level pressure and confirmed surface winds of 45 kt (23 m/s). Satellite imagery at 151649Z showed a dramatic increase in organization and convection over the past 12-hours. The strongest convection was already onshore, but the low-level circulation center remained offshore and was located on the northeast edge of the strong convection.

By 160000Z, Tropical Cyclone 04B had reached maximum intensity as it made landfall on the coast of India approximately 55 nm (102 km) south of Balasore (WMO 42895) and about 140 nm (259 km) southwest of Calcutta. A large area of strong convection remained associated with the system (Figure 3-04B-2). However, shearing conditions had already begun to disrupt vertical organization and, as the system continued to track inland, more and more convection and organization were lost. The final warning was issued at 161200Z.

At least 38 people were killed, with over 200 reported still missing as late as six days after the storm struck the coast. Most of the missing were from the east Indian state of Orissa where a village was completely washed away by flood waters. Heavy rain-induced flooding combined with storm-induced high tides to swamp offshore islands cutting-off access to more than 500 villages.

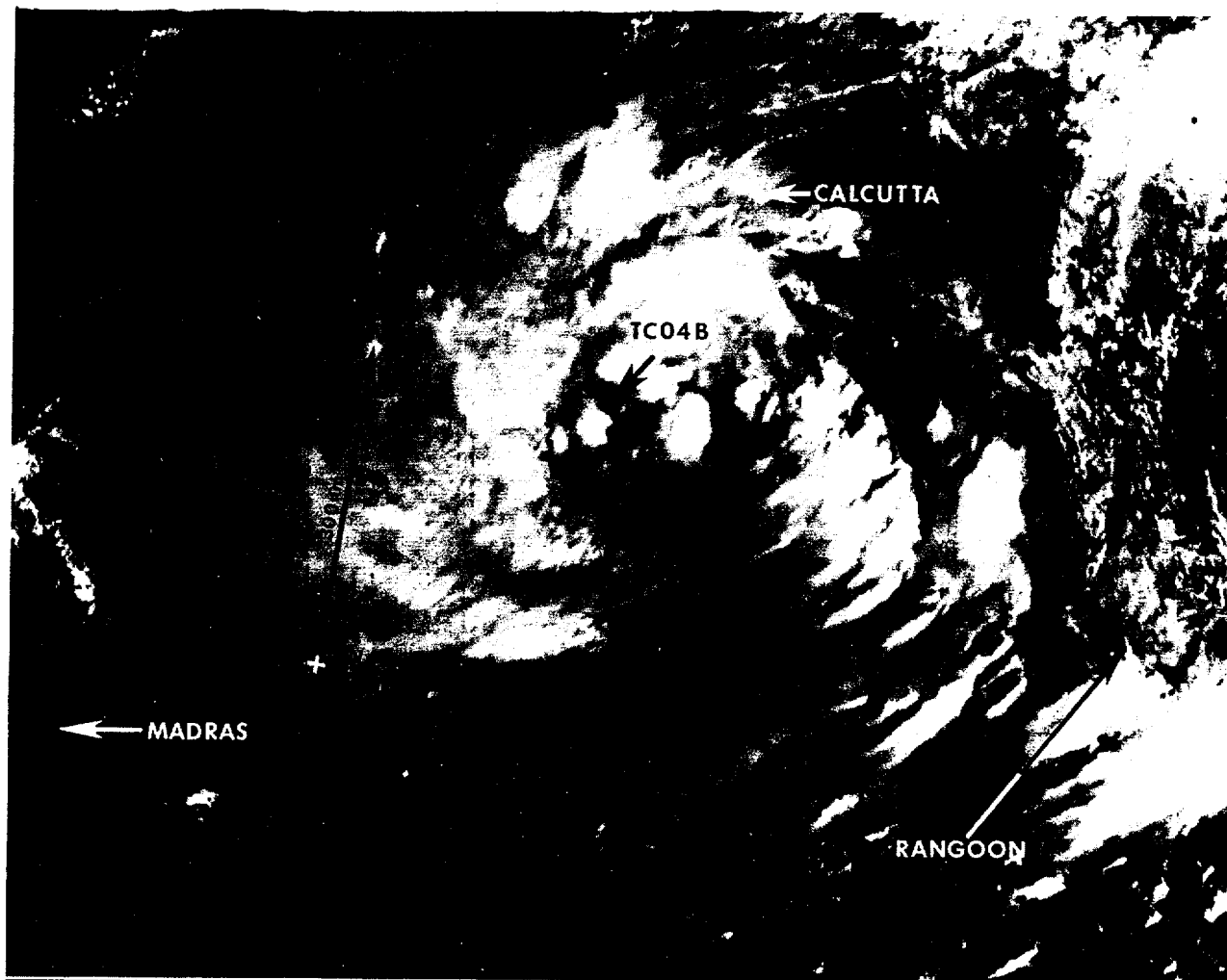


Figure 3-04B-1. The Tropical Disturbance in the Bay of Bengal just prior to undergoing rapid development. The Dvorak intensity estimate is 25 kt (13 m/s) (150408Z October DMSP visual imagery).

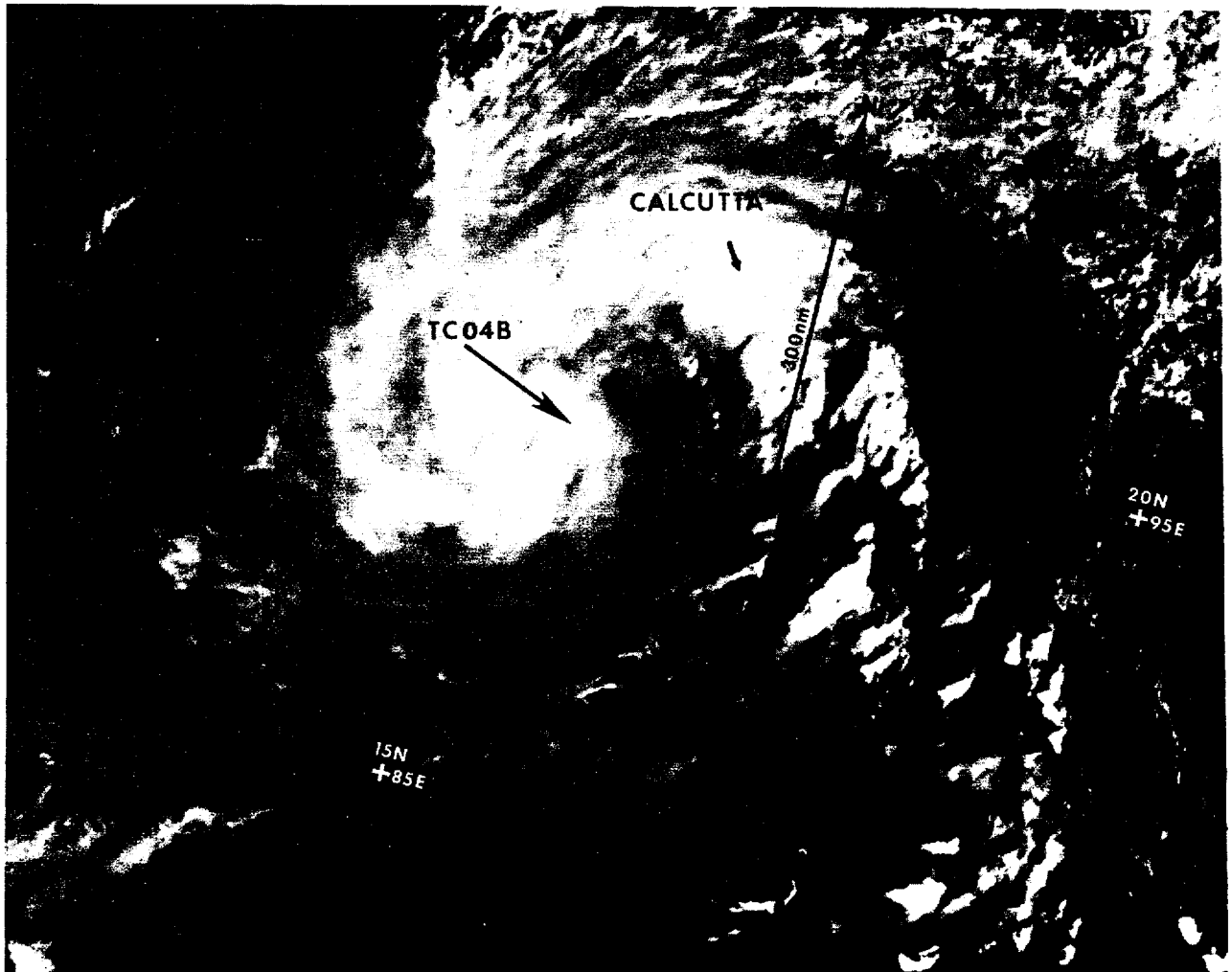


Figure 3-04B-2. Tropical Cyclone 04B just after it made landfall over eastern India. There is a dramatic increase in organization as compared to the imagery in Figure 3-31-1 (160348Z October DMSP visual imagery).

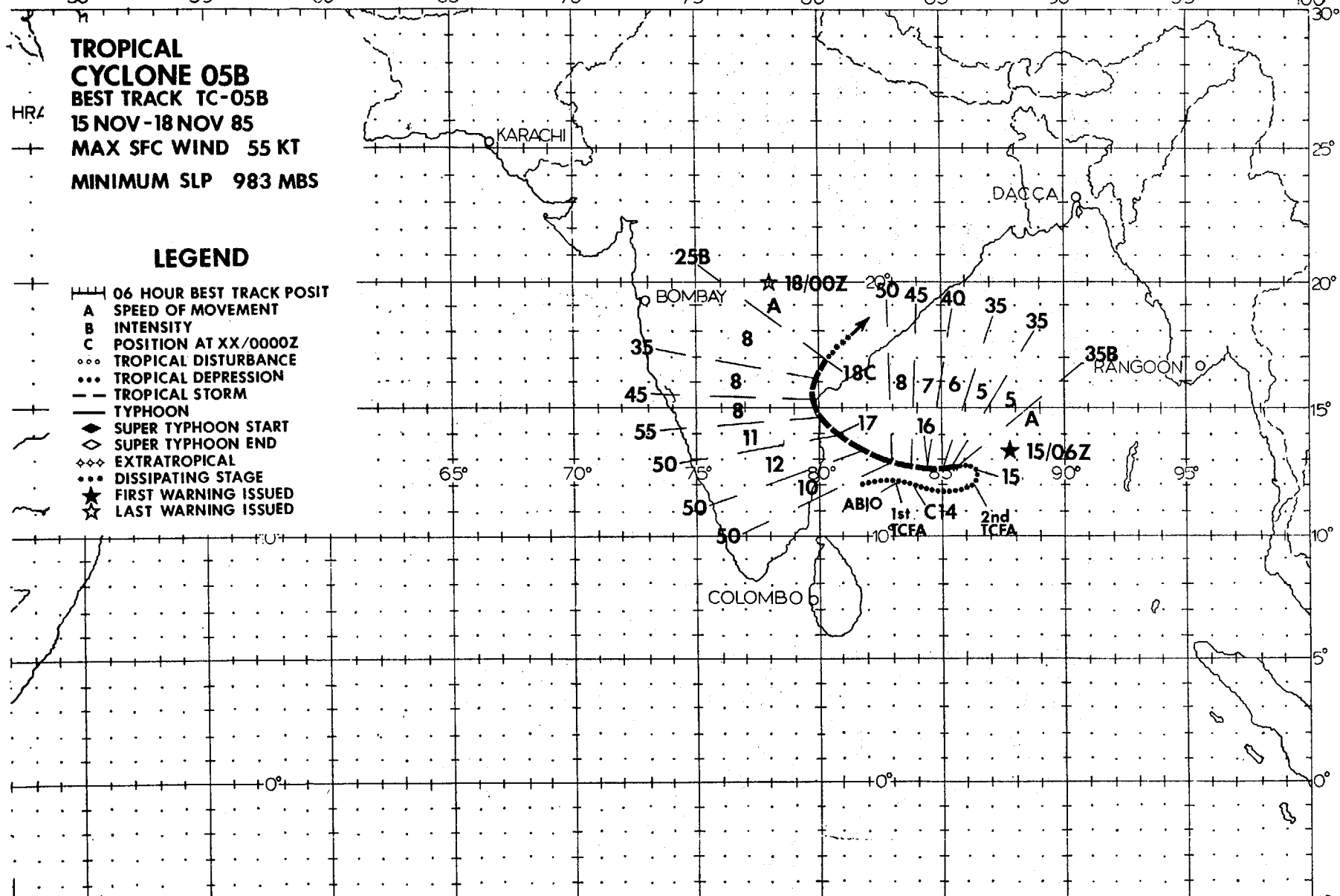
50° 55° 60° 65° 70° 75° 80° 85° 90° 95° 100°

**TROPICAL
CYCLONE 05B**
BEST TRACK TC-05B
15 NOV-18 NOV 85
MAX SFC WIND 55 KT
MINIMUM SLP 983 MBS

LEGEND

- 06 HOUR BEST TRACK POSIT
- A SPEED OF MOVEMENT
- B INTENSITY
- C POSITION AT XX/0000Z
- ... TROPICAL DISTURBANCE
- ... TROPICAL DEPRESSION
- TROPICAL STORM
- TYPHOON
- ◇ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- ◇◇ EXTRATROPICAL
- ... DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ☆ LAST WARNING ISSUED

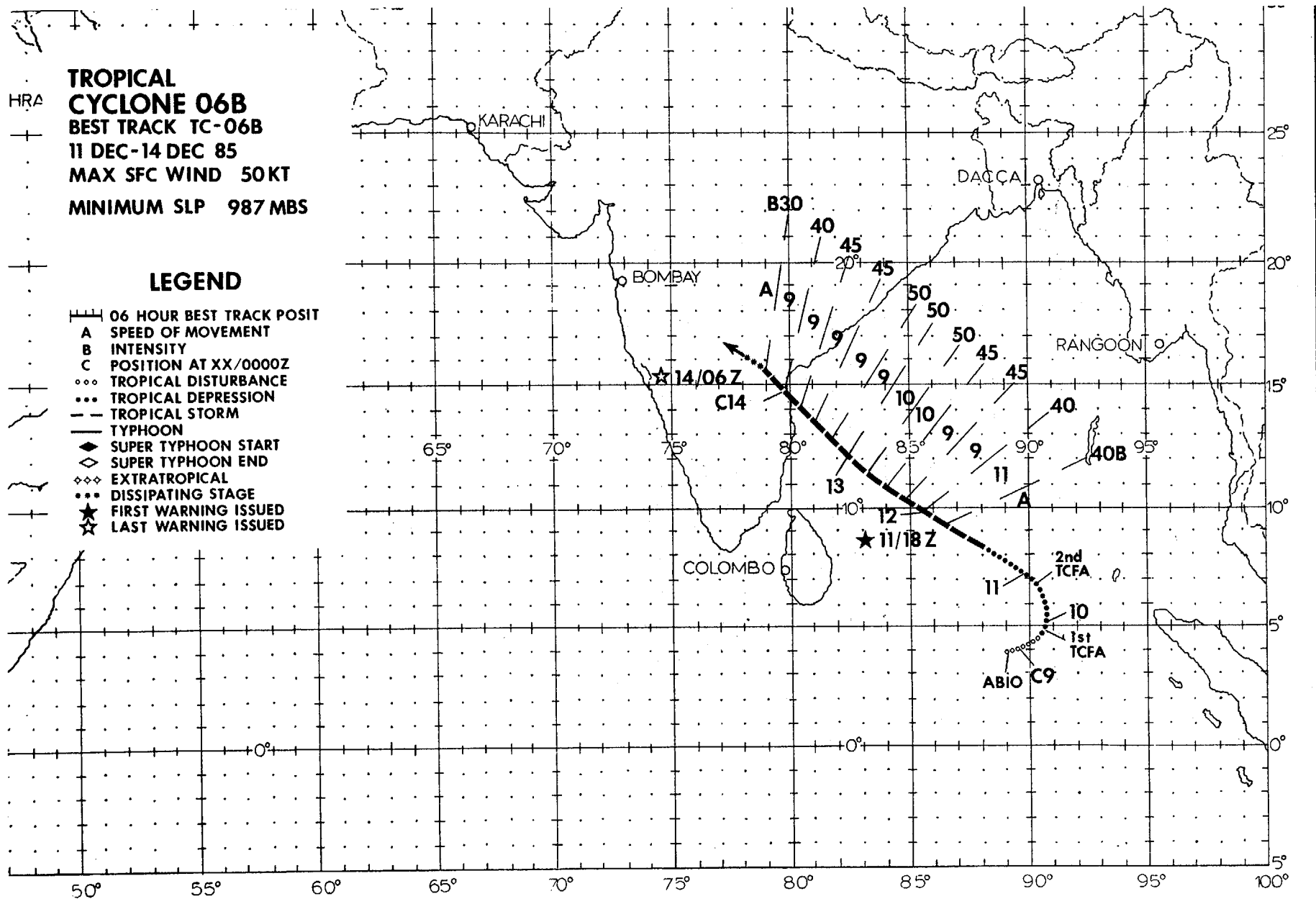
134



TROPICAL CYCLONE 05B

Tropical Cyclone 05B formed as a monsoon depression on the southern periphery of the monsoon trough approximately 120 nm (222 km) east-southeast of Madras, India. The system was initially thought to be associated with a disturbance that formed on the east Indian coast near Madras. However, post-analysis of satellite fixes and imagery indicate that the first disturbance formed near the western extent of the monsoon trough on 111200Z, then went ashore on about 120600Z. Therefore, it was determined that the first system was not part of the disturbance that eventually became Tropical Cyclone 05B. At 130600Z, a small area of convection on the southern extent of the monsoon trough developed into a cyclone of about 25 kt (13 m/s). A TCFA was issued at 131800Z as the system remained at 25 kt (13 m/s) and moved east along the southern periphery of the monsoon trough. A second TCFA was issued at 141800Z as the cyclone remained at the same intensity and continued to move east at about 9 kt (5 m/s). Tropical Cyclone 05B finally began to intensify slightly when it reached the eastern extent of the monsoon trough at about 150000Z. Subsequently, the system slowed to about 6 kt (3 m/s), began to move north, and intensified to 35 kts (18 m/s), prompting the issuance of the first warning at 150600Z.

At 151200Z, it was apparent that Tropical Cyclone 05B had begun to move west toward India under the influence of low- to mid-level easterlies to the north of the monsoon trough. At this point, the system continued to intensify slowly and began to accelerate, turning to the west-northwest. Tropical Cyclone 05B reached a maximum intensity of 55 kt (28 m/s) just prior to landfall at 170600Z, 90 nm (167 km) north of Madras. No reports of damage or loss of life due to Tropical Cyclone 05B were received.



TROPICAL CYCLONE 06B

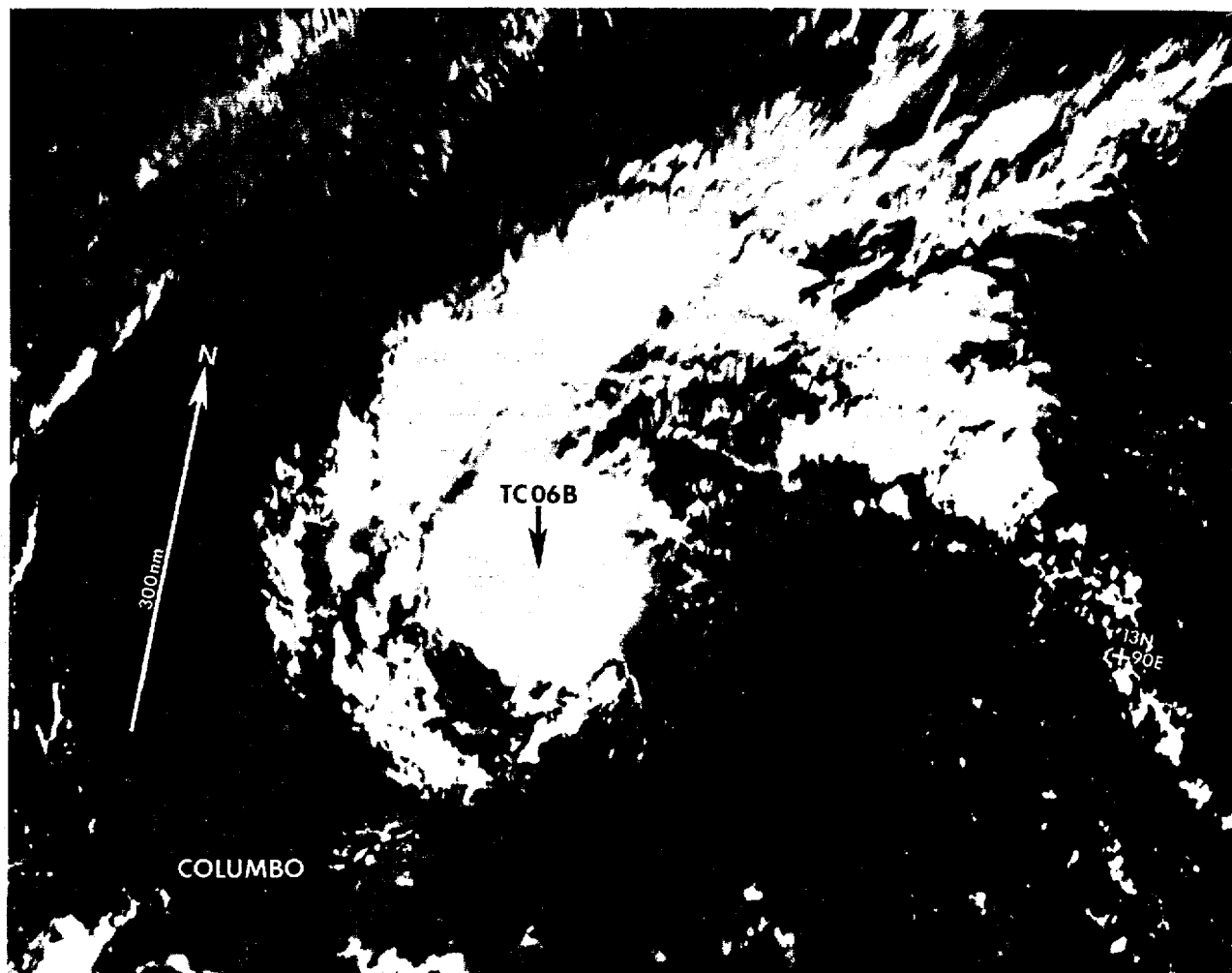


Figure 3-06B-1. Tropical Cyclone 06B formed in the monsoon trough, intensified, and moved northwestward across the Bay of Bengal. In the satellite image, the low-level cumulus lines that are spiralling into the circulation center can be seen along the southern edge of the central dense overcast (130426Z December DMSP visual imagery).

CHAPTER IV - Summary of South Pacific and South Indian Ocean Tropical Cyclones

1. GENERAL

This is the first year that Southern Hemisphere tropical cyclones are included in the Annual Tropical Cyclone Report. In retrospect, the JTWC area of responsibility (AOR) was expanded on 1 October 1980 to include the Southern Hemisphere from 180 degrees longitude westward to the east coast of Africa. Details on tropical cyclones in this region for the July 1980 to June 1982 are contained in Diercks et al, (1982). For the July 1982 through June 1984 period, reference the NOCC/JTWC TECH NOTE 86-1. As in earlier reports, data on tropical cyclones forming in, or moving into, the South Pacific Ocean east of 180 degrees, which is the Naval Western Oceanography Center (NAVWESTOCEANCEN) AOR, are included for completeness.

JTWC provides the sequential numbering for all South Pacific and South Indian Ocean significant tropical cyclones. The current convention (as stated

in USCINCPACINST 3140.1 (series)) for labelling tropical cyclones that develop in the South Indian Ocean (west of 135 degrees east longitude) is to add the suffix "S" to the assigned tropical cyclone number, while those originating in the South Pacific Ocean (east of 135 degrees east longitude) receive a "P" suffix. The "P" suffix also applies to significant tropical cyclones which form east of the 180 degrees in the South Pacific Ocean. Also, it should be noted that to encompass the Southern Hemisphere tropical cyclone season, which occurs from January through April, the limits of each tropical cyclone year are defined as 1 July to 30 June. Thus, the 1985 Southern Hemisphere tropical cyclone year is from 1 July 1984 to 30 June 1985. (This is in contrast to the convention for labelling Northern Hemisphere tropical cyclones which is based on the calendar year - 1 January to 31 December - to include the seasonal activity from May through December.)

TABLE 4-1.

SOUTH PACIFIC AND SOUTH INDIAN OCEAN

1985 SIGNIFICANT TROPICAL CYCLONES

TROPICAL CYCLONE	PERIOD OF WARNING	CALENDAR DAYS OF WARNING	NUMBER OF WARNINGS ISSUED	MAXIMUM SURFACE WINDS - KT (M/S)	ESTIMATED MSLP - MB	BEST TRACK DISTANCE TRAVELED - NM (KM)
01S -----	11 NOV - 14 NOV	4	9	50 (26)	987	2026 (3752)
02S BOBALAHY	03 DEC - 07 DEC	5	10	55 (28)	983	1208 (2237)
03S EMMA	10 DEC - 12 DEC	3	6	45 (23)	990	1375 (2547)
04P -----	12 DEC - 13 DEC	2	4	35 (18)	996	845 (1565)
05S FRANK	23 DEC - 27 DEC	5	10	75 (39)	968	569 (1054)
06P -----	26 DEC - 27 DEC	2	2	45 (23)	990	464 (859)
07P MONICA	27 DEC - 29 DEC	3	5	65 (33)	971	1322 (2448)
08P -----	29 DEC - 31 DEC	3	5	45 (23)	990	948 (1756)
09P DRENA	11 JAN - 13 JAN	3	6	50 (26)	988	612 (1133)
10S CELESTINA	12 JAN - 21 JAN	10	20	65 (33)	975	1692 (3134)
11P ERIC	14 JAN - 18 JAN	5	8	100 (51)	950	3030 (5612)
12S -----	15 JAN - 17 JAN	3	4	35 (18)	996	874 (1619)
13P NIGEL	16 JAN - 19 JAN	4	8	105 (54)	937	2414 (4471)
14P ODETTE	17 JAN - 22 JAN	6	11	100 (51)	942	1701 (3150)
15S DITRA	27 JAN - 31 JAN	5	9	70 (36)	971	1154 (2137)
16P FREDIA	28 JAN - 30 JAN	3	6	75 (39)	966	2035 (3769)
17S GERTIE	30 JAN - 31 JAN	2	4	55 (28)	985	432 (800)
18P -----	02 FEB - 06 FEB	5	9	35 (18)	996	941 (1743)
19S ESITERA	05 FEB - 10 FEB	6	11	50 (26)	987	1612 (2985)
20S HUBERT	12 FEB - 17 FEB	6	11	55 (28)	983	2408 (4460)
21S FELISKA	14 FEB - 19 FEB	6	11	50 (26)	987	511 (946)
22S ISOBEL	14 FEB - 21 FEB	8	15	50 (26)	987	1416 (2622)
23S GERIMENA	14 FEB - 25 FEB	12	23	65 (33)	981	1298 (2404)
24S -----	19 FEB - 20 FEB	2	4	35 (18)	996	756 (1400)
25S JACOB	19 FEB - 26 FEB	8	15	75 (39)	966	2422 (4486)
26P PIERRE	20 FEB - 22 FEB	3	6	45 (23)	990	978 (1811)
27P GAVIN	05 MAR - 07 MAR	3	5	55 (28)	983	1539 (2850)
28S KIRSTY	07 MAR - 14 MAR	8	17	115 (59)	930	1389 (2572)
29S LINDSAY	08 MAR - 10 MAR	3	5	55 (28)	970	579 (1072)
30P HINA	13 MAR - 17 MAR	5	10	135 (69)	920	2469 (4573)
31P SANDY	20 MAR - 25 MAR	6	12	120 (62)	920	2391 (4428)
32P TANYA	29 MAR - 01 APR	4	10	60 (31)	979	935 (1732)
33S HELISAONINA	11 APR - 16 APR	6	12	110 (57)	932	1769 (3276)
34S GRETTEL	11 APR - 14 APR	4	6	45 (23)	988	483 (895)
35S MARGOT	12 APR - 17 APR	6	11	70 (36)	970	1111 (2058)
1985 TOTALS:		98*	320			

*OVERLAPING DAYS INCLUDED ONLY ONCE IN SUM.

NOTE: NAMES OF CYCLONES GIVEN BY REGIONAL WARNING CENTERS (NANDI, BRISBANE, DARWIN, PERTH AND MAUPITIUS) AND APPENDED TO JTWC WARNINGS, WHEN AVAILABLE.

2. SOUTH PACIFIC AND SOUTH INDIAN OCEAN TROPICAL CYCLONES

The 1985 year (1 July 1984 through 30 June 1985) was unusually active, with 35 tropical cyclones (see Table 4-1 and pages 142 through 146) reaching warning status. This exceeded the total of 30 tropical cyclones for 1984 (1 July 1983 - 30 June 1984) and proved to be the busiest year to date for JTWC. Six tropical cyclones occurred in the South Pacific east of 165 degrees east longitude, which matched the long term mean. The Australian area (105 to 165 degrees east longitude) accounted for 15 tropical cyclones as compared to the climatological mean of 10.3 - five more than normal. Fourteen tropical cyclones developed in the South Indian Ocean, which is almost twice the long term mean of 8.4 cyclones (See Tables 4-2 and 4-3). This represents the highest total for this area since at least the 1958-1959 season (Gray, 1979). In this regard, meteorological satellite surveillance of tropical cyclones has been updating climatologies since the early 1960s. (This meteorological watch from space detects tropical cyclones that might have previously gone undetected over the conventional data sparse oceanic areas.) Thus, tropical cyclone climatologies should benefit from

increased surveillance from space in some areas, for example, the South Indian Ocean.

Caveat: Intensity estimates for southern hemisphere tropical cyclones are derived primarily from satellite imagery evaluation (Dvorak, 1984) and from intensity estimates reported by other regional warning centers. Only, in very rare instances are the intensity estimates based on surface observational data. Estimates of the minimum sea-level pressure are usually derived from the Atkinson and Holliday (1977) relationship between the maximum sustained one-minute surface wind and the minimum sea-level pressure (Table 4-4). This relationship has been shown to be representative for tropical cyclones in the western North Pacific and is also used by the Australian regional warning centers to provide intensity estimates. However, since these pressure estimates are usually based on wind intensities that were derived from interpretation of satellite imagery, considerable caution should be exercised when using these resultant pressure values in future tropical cyclone work.

TABLE 4-2. FREQUENCY OF TROPICAL CYCLONES BY MONTH AND YEAR FOR SOUTH PACIFIC AND INDIAN OCEAN

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
(1959 - 1978) AVERAGE*	---	---	---	0.4	1.5	3.6	6.1	5.8	4.7	2.1	0.5	---	24.7
1981	0	0	0	1	3	2	6	5	3	3	1	0	24
1982	1	0	0	1	1	3	9	4	2	3	1	0	25
1983	1	0	0	1	1	3	5	6	3	5	0	0	25
1984	1	0	0	1	2	5	5	10	4	2	0	0	30
1985	0	0	0	0	1	7	9	9	6	3	0	0	35
(1981 - 1985) AVERAGE	0.6	0	0	0.8	1.6	4.0	6.8	6.8	3.6	3.2	0.4	0	27.8
CASES	3	0	0	4	8	20	34	34	18	16	2	0	139

* (GRAY, 1979)

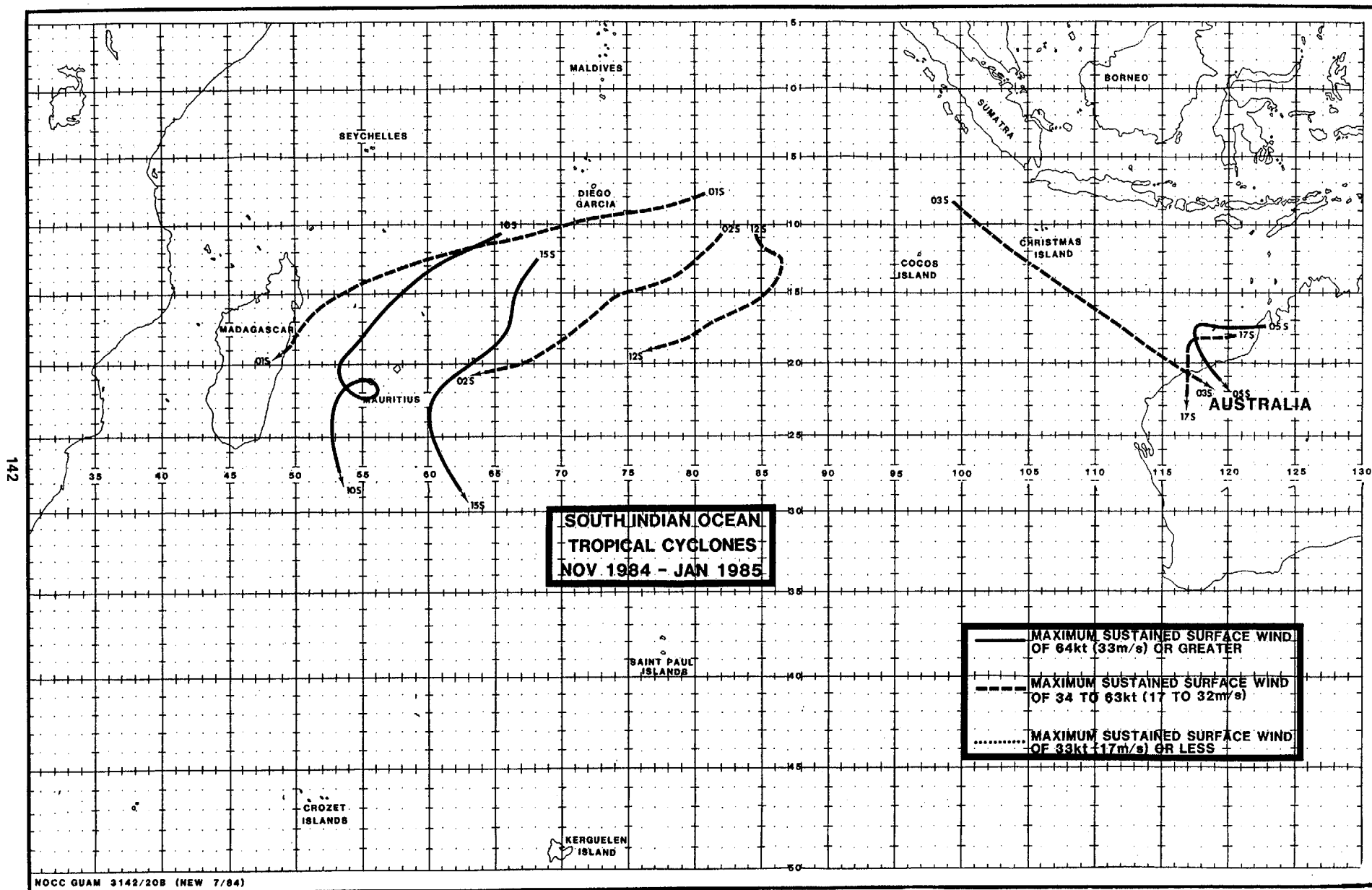
TABLE 4-3. YEARLY VARIATION OF TROPICAL CYCLONES BY OCEAN BASIN

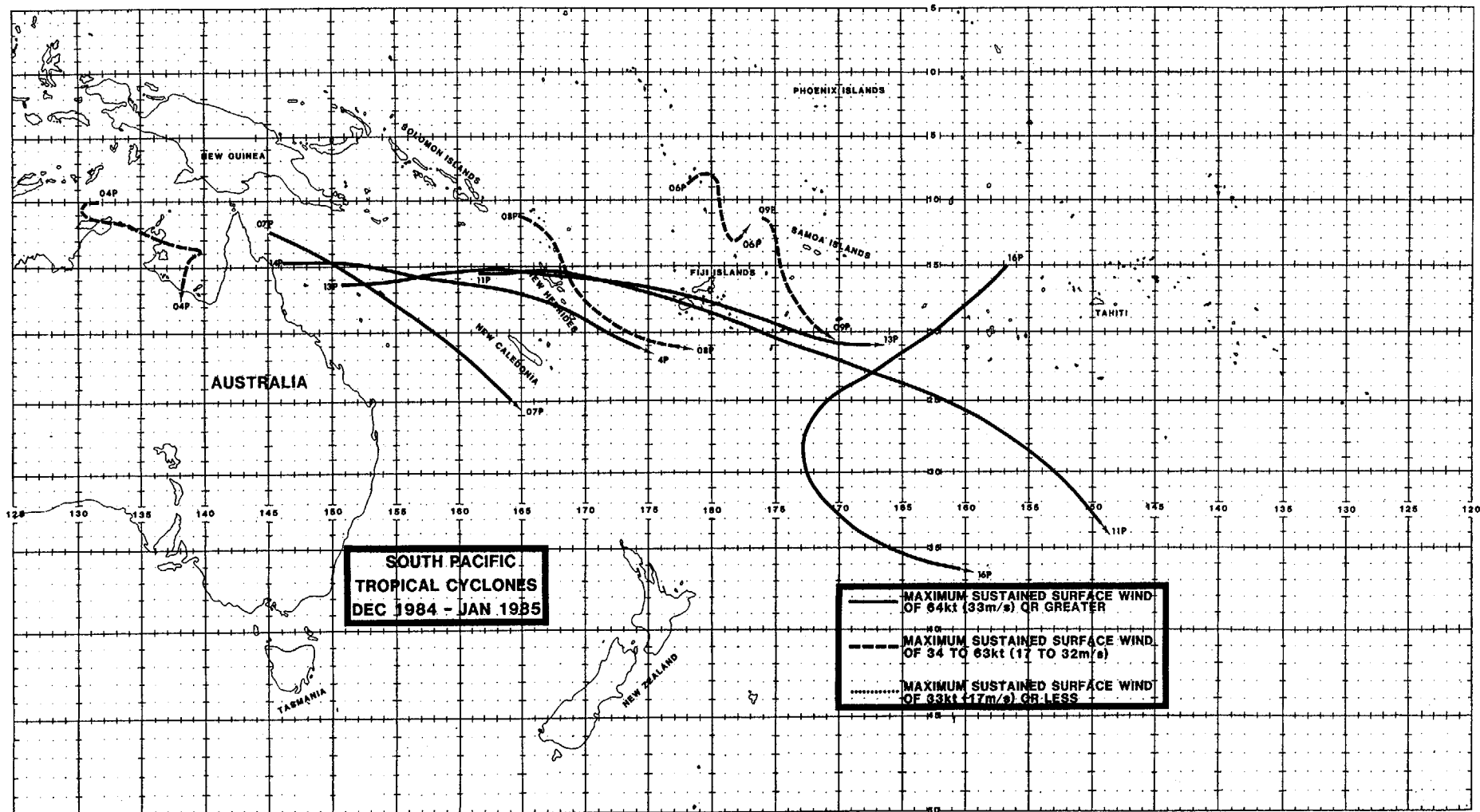
YEAR	(105E WESTWARD) SOUTH INDIAN	(105E-165E) AUSTRALIAN	(165E EASTWARD) SOUTH PACIFIC	TOTAL
(1959 - 1978) AVERAGE*	8.4	10.3	5.9	24.6
1981	13	8	3	24
1982	12	11	2	25
1983	7	6	12	25
1984	14	14	2	30
1985	14	15	6	35
(1981 - 1985) AVERAGE	12.0	10.8	5.0	27.8
CASES	60	54	25	139

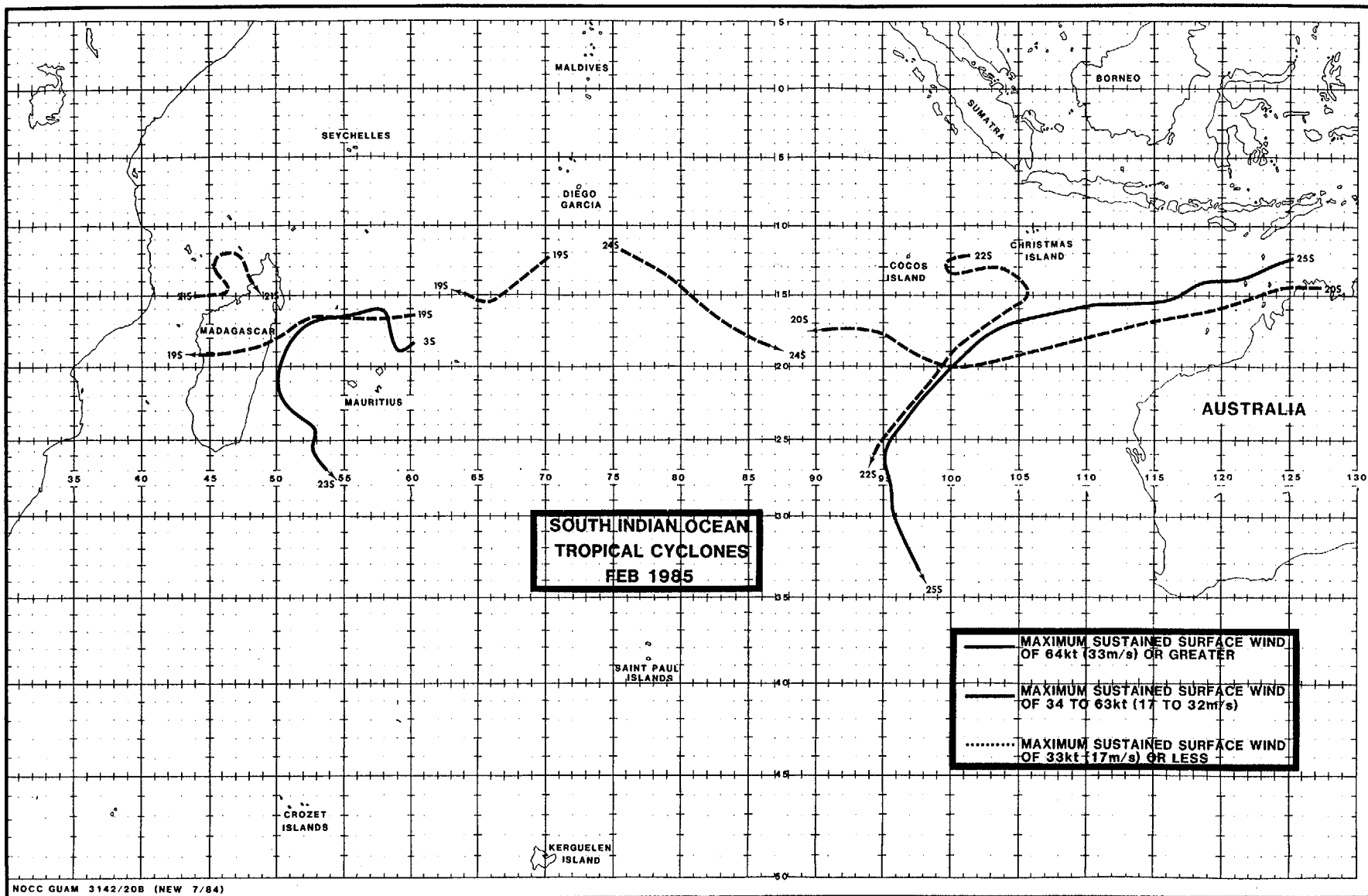
* (GRAY, 1979)

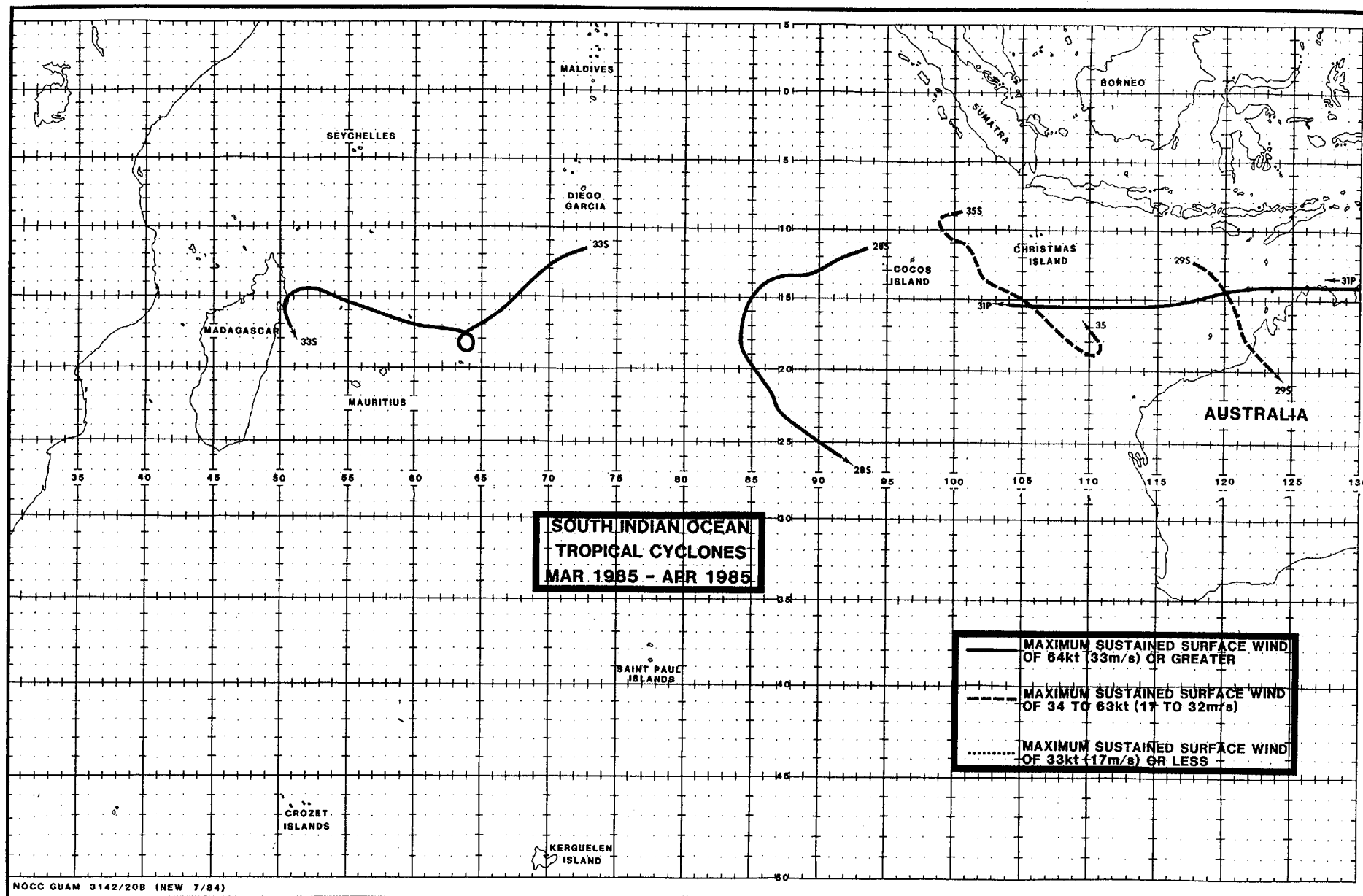
TABLE 4-4. MAXIMUM SUSTAINED SURFACE WIND VERSUS MINIMUM SEA-LEVEL PRESSURE (ATKINSON AND HOLLIDAY, 1977).

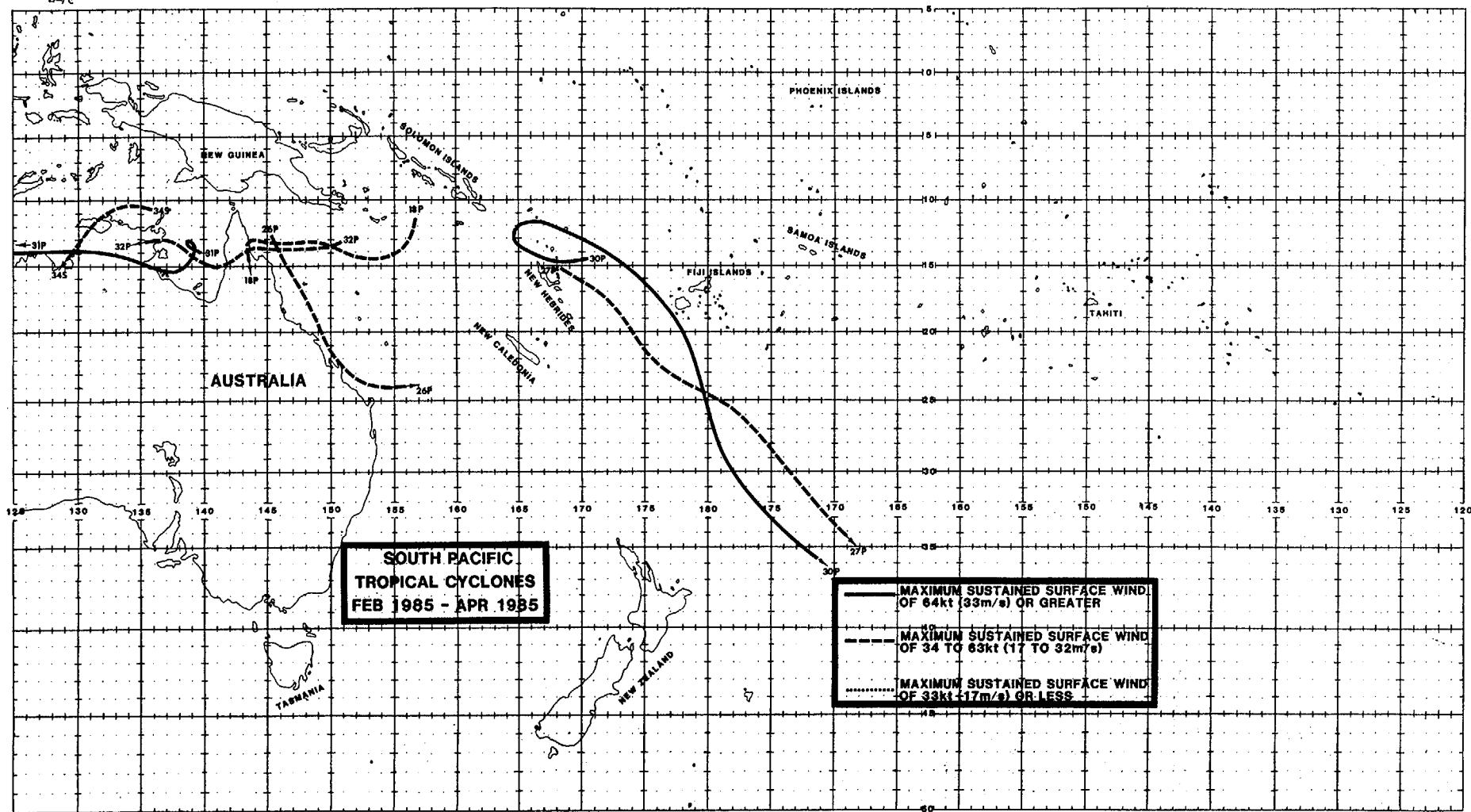
<u>MAXIMUM SUSTAINED SURFACE WIND (KT)</u>	<u>EQUIVALENT MINIMUM SEA-LEVEL PRESSURE (MB)</u>
30	1000
35	997
40	994
45	991
50	987
55	984
60	980
65	976
70	972
75	967
80	963
85	958
90	953
95	948
100	943
105	938
110	933
115	927
120	922
125	916
130	910
135	904
140	898
145	892
150	885
155	879
160	872
165	865
170	858











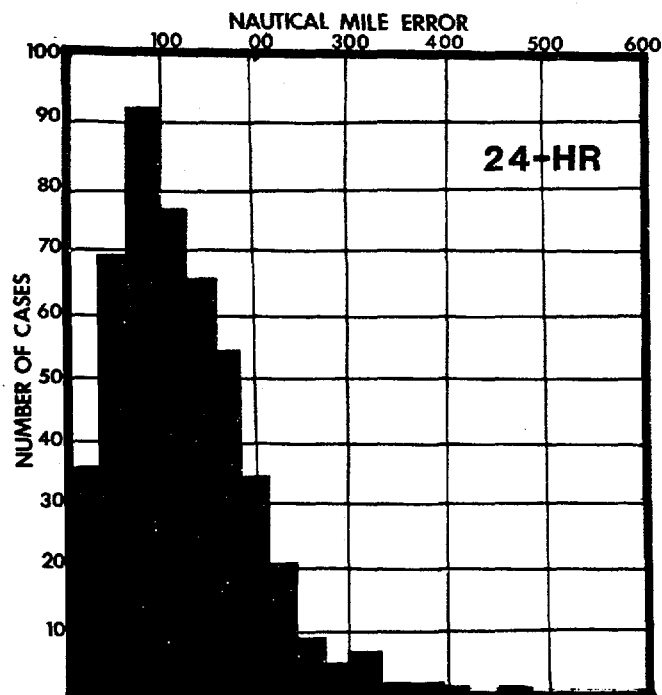
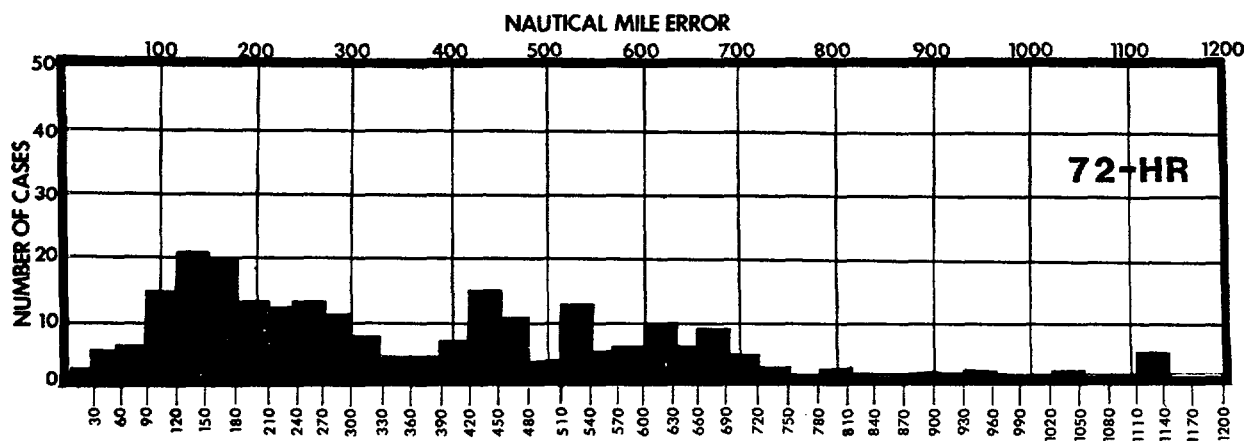
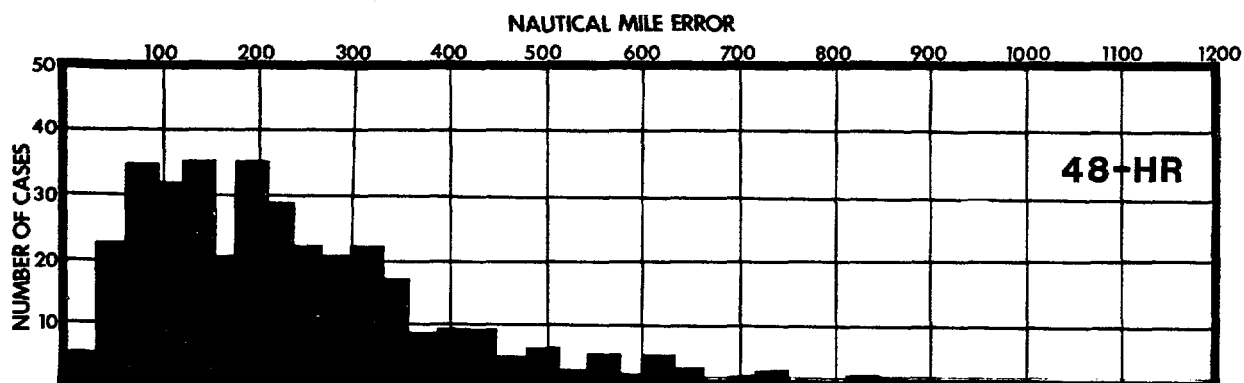


Figure 5-2. Frequency distribution of the 24-, 48-, and 72-hour forecast errors in 30 nm increments for all significant tropical cyclones in the western North Pacific during 1985.

FORECAST ERRORS (nm)

	<u>24-HR</u>	<u>48-HR</u>	<u>72-HR</u>
MEAN:	117	231	367
MEDIAN:	107	202	296
STANDARD DEVIATION:	72.6	153.3	254.5
CASES:	477	356	241



CHAPTER V - SUMMARY OF FORECAST VERIFICATION

1. ANNUAL FORECAST VERIFICATION

a. Western North Pacific Ocean

The positions given for warning times and those at the 24-, 48-, and 72-hour forecast times were verified against the final best track positions at the same valid times. The resultant vector and right angle (track) errors (illustrated in Figure 5-1) were then calculated for each tropical cyclone and are presented in Table 5-1. Figure 5-2 provides the frequency distributions of vector errors in 30 nm increments for 24-, 48-, and 72-hour forecasts of all

1985 tropical cyclones in the western North Pacific. A summation of the mean vector and right angle errors, as calculated for all tropical cyclones in each year, is shown in Table 5-2. A comparison of the annual mean vector errors for all tropical cyclones as compared to those tropical cyclones that reached typhoon intensity can be seen directly in Table 5-3. The annual mean vector errors for 1985 as compared to the ten previous years are graphed in Figure 5-3.

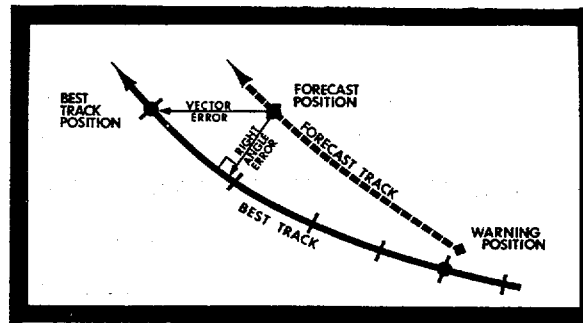


Figure 5-1. Illustration of the method to determine vector error and right angle error.

	WARNING			24-HOUR			48-HOUR			72-HOUR		
	VECTOR ERROR	RT ANGLE ERROR	NR OF HOURS	VECTOR ERROR	RT ANGLE ERROR	NR OF HOURS	VECTOR ERROR	RT ANGLE ERROR	NR OF HOURS	VECTOR ERROR	RT ANGLE ERROR	NR OF HOURS
01W, TS ELIZIE	29	12	9	201	58	5	484	155	1	-	-	-
02W, TS FANIAN	35	7	16	87	30	12	158	51	8	191	25	4
03W, TY GAV	17	9	22	132	55	17	259	79	14	371	65	8
04W, TD GAV	48	27	10	177	110	6	213	-	2	-	-	-
05W, TY HAL	15	12	22	137	109	19	380	347	13	630	591	11
06W, TY IYMA	15	11	26	120	71	22	216	173	18	416	273	14
07W, TY JEFF	18	13	40	132	80	30	342	170	21	639	345	13
08W, TY KIT	14	9	33	115	56	28	305	156	22	523	259	15
09W, TS LEE	18	12	14	128	51	10	293	77	6	657	17	2
10W, TY MAMIE	26	14	17	120	70	13	229	147	9	266	122	4
11W, TY NELSON	10	9	26	64	47	22	132	88	17	182	148	14
12W, TY ODESSA	15	8	37	146	66	33	238	111	26	272	128	21
13W, TY PAT	16	8	20	155	44	16	331	122	12	514	258	8
14W, TS RUBY	13	12	15	166	110	10	318	137	6	377	27	2
02C, TY SKIP	16	12	33	129	85	29	311	248	25	605	473	20
15W, TY TESS	19	15	22	122	70	18	97	56	14	141	115	10
16W, TS VAL	31	10	13	160	84	9	129	104	5	249	-	1
17W, TS WINONA	18	14	11	87	69	7	140	136	3	-	-	-
18W, TY ANDY	9	6	16	44	30	12	87	63	8	120	84	4
19W, TY BRENDA	17	12	23	93	43	19	245	106	15	436	230	11
20W, TY CECIL	14	11	16	104	93	13	179	159	9	196	139	2
21W, STY DUF	10	8	33	63	32	29	80	31	25	131	68	21
22W, TS ELLIS	16	10	17	149	117	13	363	311	9	583	430	5
23W, TY FAYE	15	7	38	104	58	34	242	136	30	414	231	26
24W, TS GORDON	37	16	23	114	51	17	159	58	11	238	80	6
25W, TY HOPE	19	15	26	123	83	22	201	124	18	159	102	14
26W, TS IRVING	35	18	14	132	73	12	163	41	9	170	51	5
ALL FORECASTS	18	11	592	117	66	477	231	134	356	367	214	241

TABLE 5-2

ANNUAL MEAN FORECAST ERRORS (NM) FOR THE WESTERN NORTH PACIFIC

YEAR	24-HOUR		48-HOUR		72-HOUR	
	VECTOR	RIGHT ANGLE	VECTOR	RIGHT ANGLE	VECTOR	RIGHT ANGLE
1971	111	64	212	118	317	117
1972	117	72	245	146	381	210
1973	108	74	197	134	253	162
1974	120	78	226	157	348	245
1975	138	84	288	181	450	290
1976	117	71	230	132	338	202
1977	148	83	283	157	407	228
1978	127	75	271	179	410	297
1979	124	77	226	151	316	223
1980	126	79	243	164	389	287
1981*	123	75	220	119	334	168
1982*	113	67	237	139	341	206
1983*	117	72	259	152	405	237
1984*	117	66	233	137	363	231
1985*	117	66	231	134	367	214

* The technique for calculating right angle error was revised in 1981; therefore, a direct correlation in right angle statistics cannot be made for the errors computed before 1981 and the errors computed since 1981.

TABLE 5-3. ANNUAL MEAN FORECAST ERRORS (NM) FOR WESTERN NORTH PACIFIC

YEAR	24-HOUR		48-HOUR		72-HOUR	
	ALL	TYPHOON*	ALL	TYPHOON*	ALL	TYPHOON*
1950-58		170				
1959		117**		267**		
1960		177**		354**		
1961		136		274		
1962		144		287		476
1963		127		246		374
1964		133		284		429
1965		151		303		418
1966		136		280		432
1967		125		276		414
1968		105		229		337
1969		111		237		349
1970	104	98	190	181	279	272
1971	111	99	212	203	317	308
1972	117	116	245	245	381	382
1973	108	102	197	193	253	245
1974	120	114	226	218	348	351
1975	138	129	288	279	450	442
1976	117	117	230	232	338	336
1977	148	140	283	266	407	390
1978	127	120	271	241	410	459
1979	124	113	226	219	316	319
1980	126	116	243	221	389	362
1981	123	117	220	215	334	342
1982	113	114	237	229	341	337
1983	117	110	259	247	405	384
1984	117	110	233	228	363	361
1985	117	112	231	228	367	355

* For Typhoons only while winds were over 35 kt (18 m/sec).

** Forecast positions north of 35 N were not verified.

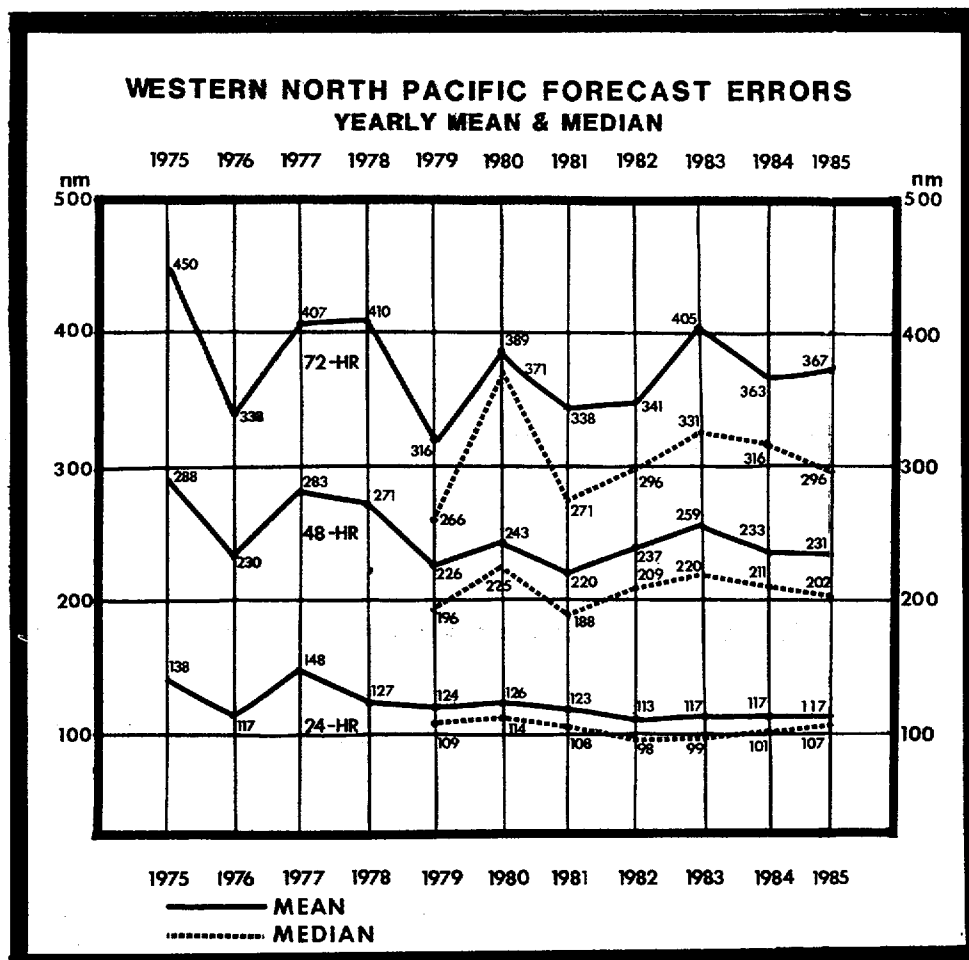


Figure 5-3. Annual mean and median vector errors (nm) for all tropical cyclones in the western North Pacific.

b. North Indian Ocean

The positions given for warning times and those at the 24-, 48-, and 72-hour valid times were verified for tropical cyclones in the North Indian Ocean by the same methods used for the western North Pacific. It should be noted that due to the low number of North Indian Ocean tropical cyclones, these error statistics should not be taken as representative of any trend.

Table 5-4 is the forecast error summary for the North Indian Ocean. Table 5-5 contains the annual average of forecast errors for each year through 1974. Vector errors are plotted in Figure 5-4 (Seventy-two hour forecast errors were evaluated for the first time in 1979). There were no verifying 72-hour forecasts in 1983 and 1985.

TABLE 5-4.

FORECAST ERROR SUMMARY FOR THE NORTH INDIAN OCEAN
SIGNIFICANT TROPICAL CYCLONES FOR 1985. (ERROR IN NM)

		WARNING			24-HOUR			48-HOUR			72-HOUR		
		POSIT ERROR	RT ANGLE ERROR	NR OF WRNGS	POSIT ERROR	RT ANGLE ERROR	NR OF WRNGS	POSIT ERROR	RT ANGLE ERROR	NR OF WRNGS	POSIT ERROR	RT ANGLE ERROR	NR OF WRNGS
1.	TC 01B	33	14	8	134	29	4						
2.	TC 02A	24	14	12	61	38	9	115	--	4			
3.	TC 03B	26	20	7	141	42	3						
4.	TC 04B	18	8	4									
5.	TC 05B	47	16	12	188	71	8	369	109	4			
6.	TC 06B	21	16	11	113	57	6						
ALL FORECAST:		24	14	12	61	38	9	115	--	4			

TABLE 5-5

ANNUAL MEAN FORECAST ERRORS FOR THE NORTH INDIAN OCEAN

YEAR	24-HOUR		48-HOUR		72-HOUR	
	VECTOR	RIGHT ANGLE	VECTOR	RIGHT ANGLE	VECTOR	RIGHT ANGLE
1971*	232	-	410	-	-	-
1972*	224	101	292	112	-	-
1973*	182	99	299	160	-	-
1974*	137	81	238	146	-	-
1975	145	99	228	144	-	-
1976	138	108	204	159	-	-
1977	122	94	292	214	-	-
1978	133	86	202	128	-	-
1979	151	99	270	202	437	371
1980	115	73	93	87	167	126
1981**	109	65	176	103	197	73
1982**	138	66	368	175	762	404
1983**	117	46	153	67	-	-
1984**	154	71	274	127	388	159
1985**	123	51	242	109	-	-

* The western Bay of Bengal and the Arabian Sea were not included in the JTWC area of responsibility until the 1975 tropical cyclone season.

** The technique for calculating right angle error was revised in 1981; therefore, a direct correlation in right angle statistics cannot be made for the errors computed before 1981 and the errors computed since 1981.

c. South Pacific and Indian Oceans

The positions given for warning times and those at the 24- and 48-hour valid times were verified for tropical cyclones in the South Pacific and South Indian Oceans by the same methods used for the western North Pacific.

Table 5-6 is the forecast error summary for the South Pacific and Indian Oceans and Table 5-7 contains the annual average of forecast errors for each year since 1981. Vector errors are plotted in Figures 5-5 (Seventy-two hours forecasts are not issued in the southern hemisphere).

	WARNING			24-HOUR			48-HOUR		
	POSIT ERROR	RT ANGLE ERROR	NR OF WRNGS	POSIT ERROR	RT ANGLE ERROR	NR OF WRNGS	POSIT ERROR	RT ANGLE ERROR	NR OF WRNGS
TC 01S ----	53	18	8	105	38	6	180	78	5
TC 02S BOBALAHY	29	22	10	105	76	9	181	121	7
TC 03S EMMA	32	19	6	148	46	4	428	67	2
TC 04P ----	35	19	4	209	152	2	-	-	-
TC 05S FRANK	22	19	10	94	66	8	241	180	6
TC 06P ----	54	29	1	107	77	1	214	116	1
	45	26	5	135	90	3	235	206	1
TC 07P MONICA	43	22	5	176	48	5	259	57	1
TC 08P ----	21	21	1	91	55	1	-	-	-
	23	23	4	195	167	2	-	-	-
TC 09P DRENA	54	37	6	99	62	5	106	57	3
TC 10S CELESTINA	42	27	20	142	85	18	228	110	13
TC 11P ERIC	31	22	11	239	58	9	510	145	7
	67	67	1	221	216	1	400	396	1
TC 12S ----	50	47	4	138	33	3	165	22	1
TC 13P NIGEL	21	17	11	105	43	9	193	58	7
TC 14P ODDETTE	28	14	10	98	42	8	120	55	6
TC 15S DITRA	28	16	9	122	59	8	145	90	6
TC 16P FREDIA	42	23	6	187	71	4	359	305	2
TC 17S GERTIE	18	19	4	152	104	2	-	-	-
TC 18P ----	50	32	9	146	124	7	219	142	4
TC 19S ESITERA	64	37	10	152	67	8	201	91	5
TC 20S HUBERT	24	17	11	142	89	10	375	229	9
TC 21S FELIKSA	37	5	1	135	105	1	-	-	-
	33	19	10	145	65	8	220	129	5
TC 22S ISOBEL	54	26	15	179	94	13	242	130	11
TC 23S GERIMENA	46	31	23	94	53	22	119	58	20
TC 24S ----	110	76	4	407	239	3	1124	613	1
TC 25S JACOB	20	14	15	80	66	13	152	113	11
TC 26P PIERRE	31	16	6	157	86	5	173	110	3
TC 27P GAVIN	62	56	8	203	131	6	182	159	2
TC 28S KIRSTY	27	16	16	101	68	14	232	161	12
TC 29S LINDSAY	39	23	5	218	99	3	565	235	1
TC 30P HINA	29	18	13	160	94	11	410	184	9
TC 31P SANDY	20	9	12	109	68	10	194	132	9
TC 32P TANYA	30	16	10	60	34	9	82	58	9
TC 33S HELISAONINA	32	21	11	192	110	10	403	243	9
TC 34S GRETTEL	30	18	6	102	94	4	231	-	2
TC 35S MARGOT	28	21	11	178	119	10	404	237	8
ALL FORECASTS:	36	23	332	138	78	273	242	133	199

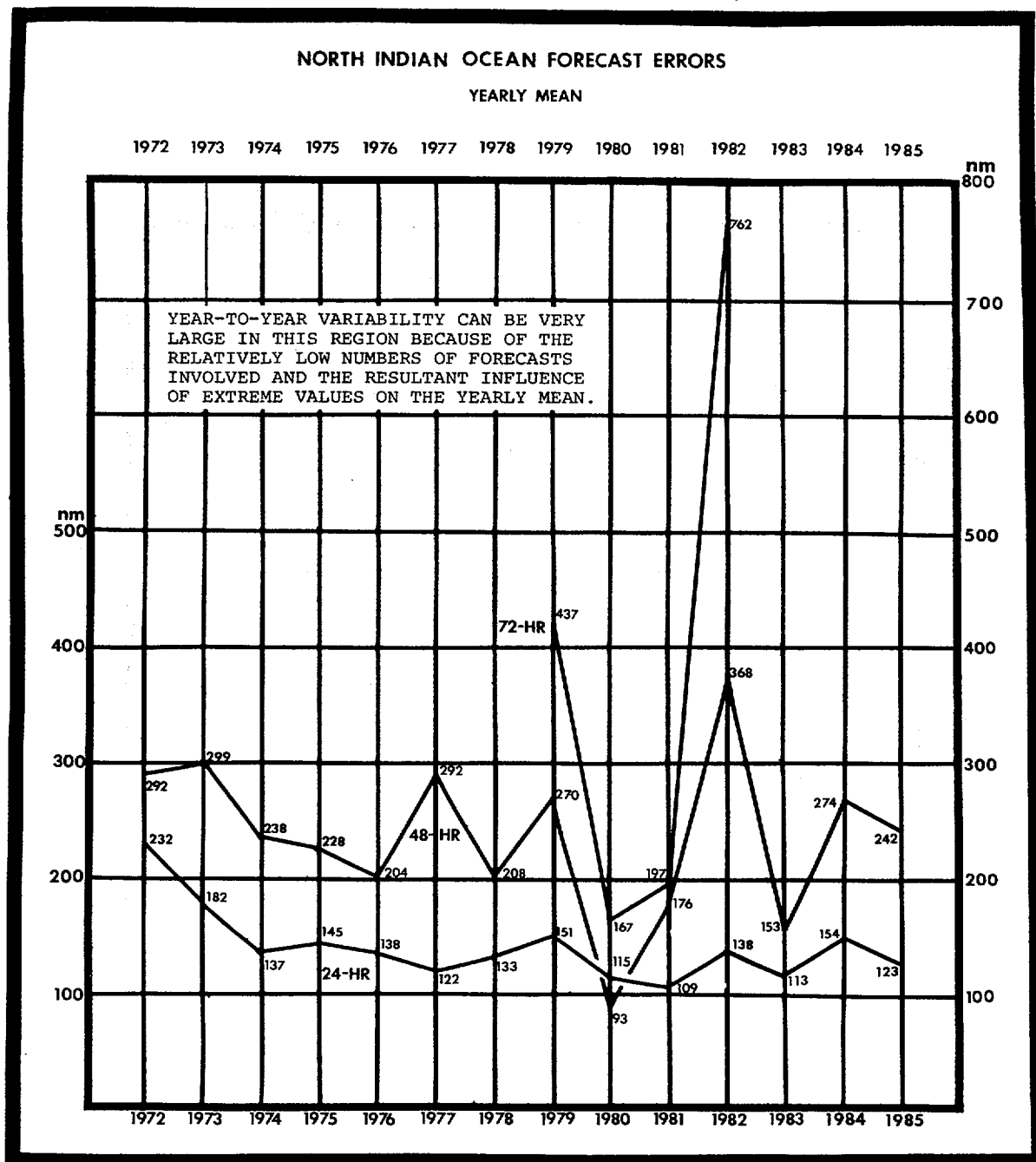


Figure 5-4. Annual mean vector errors (nm) for all tropical cyclones in the North Indian Ocean.

2. COMPARISON OF OBJECTIVE TECHNIQUES

a. General

Objective techniques used by JTWC are divided into five main categories:

- (1) extrapolation;
- (2) climatological and analog techniques;
- (3) model output statistics;
- (4) dynamic models; and
- (5) empirical and analytical techniques;

In September 1981, JTWC began to initialize its array of objective forecast techniques (described below) on the six-hour-old preliminary best track position (an interpolative process) rather than the forecast (partially extrapolated) warning position, e.g. the 0600Z warning is now supported by objective techniques developed from the 0000Z preliminary best track position. This operational change has yielded several advantages:

*techniques can now be requested much earlier in the warning development time line, i.e. as soon as the track can be approximated by one or more fix positions after the valid time of the previous warning;

*receipt of these techniques is virtually assured prior to the development of the next warning; and

*improved (mean) forecast accuracy. This latter aspect arises because JTWC now has a more reliable approximation of the short-term tropical cyclone movement. Further, since most of the objective techniques are biased for persistence, this new procedure optimizes their performance and provides more consistent guidance on short-term movement, indirectly yielding a more accurate initial position estimate as well as lowering 24-hour forecast errors.

b. Description of Objective Techniques

(1) XTRP -- Forecast positions for 24- and 48-hours are derived from the extension of a straight line which connects the most recent and 12-hour old preliminary best track positions.

(2) CLIM -- A climatological aid providing 24-, 48-, and 72-hour tropical cyclone forecast positions (and intensity changes in the western North Pacific) based upon the position of the tropical cyclone. The output is based upon data records from 1945 to 1981 for the western North Pacific Ocean and 1900 to 1981 for the North Indian Ocean.

(3) TPAC -- Forecast positions are generated from a blend of climatology and persistence. The 24- and 48-hour positions are equally weighted between climatology and persistence and the 72-hour position is one quarter persistence and three quarters climatology. Persistence is a straight line extension of a line connecting the current and 12-hour old positions. Climatology is based on data from 1945 to 1981 for the western North Pacific Ocean and 1900 to 1981 for the North Indian Ocean.

(4) TYAN 78 -- An updated analog program which combines the earlier versions TYFN 75 and INJAN 74. The program scans a 30-year climatology with a similar history (within a specified acceptance envelope) to the current tropical cyclone. For the western North Pacific Ocean, three forecasts of position and intensity are provided for 24-, 48-, and 72-hours: RECR - a weighted mean of all tropical cyclones which were categorized as "recurving" during their best track period; STRA - a weighted mean of all accepted tropical cyclones which were categorized as moving "straight" (westward) during their best track period; TOTL - a weighted mean of all accepted tropical cyclones, including those used in the RECR and STRA forecasts. For the North Indian Ocean, a single (total) forecast track is provided for the 12-hour intervals to 72 hours.

(5) COSMOS -- A model output statistics (MOS) routine based on the geostrophic steering at the 850-, 700-, and 500-mb levels. The steering is derived from the HATTRACK point advection model run on Global prognostic fields from the FLENUMOCEANCEN NOGAPS prediction system. The MOS forecast is then blended with the 6-hour past movement to generate the forecast track.

(6) OTCM -- (One-way Interactive Tropical Cyclone Model) A course-mesh, three-layer in the vertical, primitive equation model with a 205 km grid spacing over a 6400 X 4700 km domain. The model's fields are computed around a bogus, digitized cyclone vortex using FLENUMOCEANCEN Numerical Variational Analysis (NVA) or NOGAPS prognostic fields for the specified valid time. The past motion of the tropical cyclone is compared to initial steering fields and a bias correction is computed and applied to the model. FLENUMOCEANCEN NOGAPS global prognostic fields are used at 12-hour intervals to update the model's boundaries. The resultant forecast positions are derived by locating the 850 mb vortex at six-hour intervals to 72-hours.

(7) NTCM -- (Nested Tropical Cyclone Model) A primitive equation model with properties similar to the OTCM. The NTCM differs by containing a finer scale "nested" grid, initializing on NVA analysis fields only, not containing a (persistence) bias correction, and being a channel model which runs independent of FLENUMOCEANCEN prognostic fields (not requiring updating of its boundaries). The "nested grid" covers a 1200 X 1200 km area with a 41 km grid spacing which moves within the course mesh domain to keep an 850 mb vortex at its center.

(8) TAPT -- An empirical technique which utilizes upper-tropospheric wind fields to estimate acceleration associated with the tropical cyclones interaction with the mid-latitude westerlies. It includes guidelines for duration of acceleration, upper-limits, and probable path of the cyclone.

(9) CLIP -- A statistical regression technique based on climatology, current intensity and position and past movement. This technique is used as a crude measure of real forecast skill when verifying forecast accuracy.

TABLE 5-7.

ANNUAL MEAN FORECAST ERRORS (NM) FOR SOUTH PACIFIC AND
SOUTH INDIAN OCEANS

YEAR	24-HOUR		48-HOUR	
	VECTOR	RIGHT ANGLE	VECTOR	RIGHT ANGLE
1981	165	119	315	216
1982	144	91	274	174
1983	154	84	288	150
1984	133	73	231	124
1985	138	78	242	133

SOUTH PACIFIC AND SOUTH INDIAN OCEAN FORECAST ERRORS YEARLY MEAN AND MEDIAN

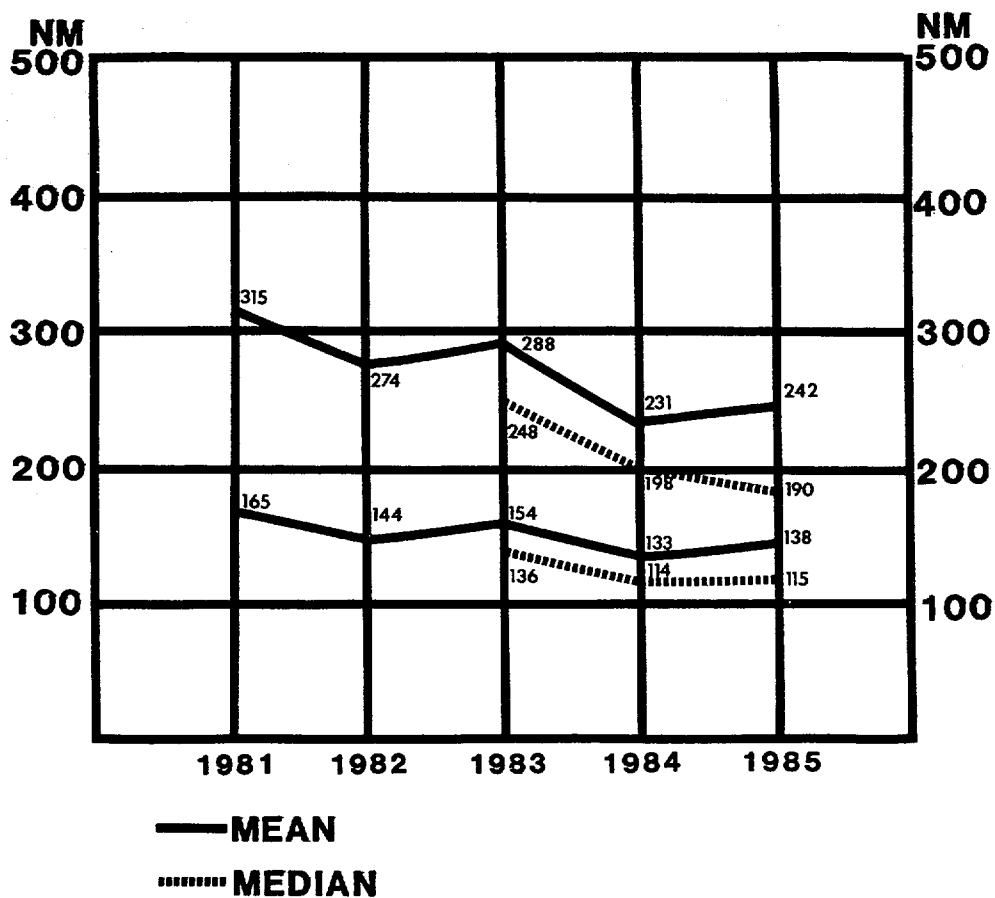


Figure 5-5. Annual mean and median vector errors (nm) for all tropical cyclones in the South Pacific and South Indian Oceans.

(10) THETA E — An empirically derived relationship between a tropical cyclone's minimum sea-level pressure (MSLP) and 700 mb equivalent potential temperature (Theta-E) was developed by Sikora (1976) and Dunnavan (1981). By monitoring MSLP and trends, the forecaster can evaluate the potential for sudden, rapid deepening of a tropical cyclone.

(11) WIND RADIUS — Following an analytic model of the radial profiles of sea-level pressures and winds in mature tropical cyclones (Holland, 1980), a set of radii for 30-, 50-, and 100-knot winds based on the tropical cyclone's maximum winds have been produced to aid the forecaster in determining forecast wind radii.

(12) DVORAK — An estimation of tropical cyclone's current and 24-hour forecast intensity is made from interpolation of satellite imagery (Dvorak, 1984) and provided to the forecaster. These intensity estimates are used in conjunction with other intensity-related data and trends to forecast tropical cyclone intensity.

JTWC currently uses TPAC, TAPT, TYAN78, COSMOS, OTCM and NTCM operationally to develop track forecasts.

c. Testing and Results

A comparison of selected techniques is included in Table 5-8 for all western North Pacific tropical cyclones, Table 5-9 for all North Indian Ocean tropical cyclones, and Table 5-10 for the South Pacific and South Indian Ocean tropical cyclones. In these tables, "X-axis" refers to techniques listed vertically. The example in the 449 cases available for a (homogeneous) comparison, the average vector error at 24 hours was 123 nm (228 km) for COSMOS and 117 nm (217 km) for OTCM. The difference of 5 nm (9 km) is shown in the lower right. (Differences are not always exact, due to computational round-off which occurs for each of the cases available for comparison).

TABLE 5-9. 1985 ERROR STATISTICS FOR SELECTED OBJECTIVE TECHNIQUES IN THE NORTH INDIAN OCEAN

24-HOUR FORECAST ERRORS (NM)

	JTWC	TOTL	CLIP	RECR	COSM	NTCM	OTCM	TPAC	CLIM	XTRP	HPAC
JTWC	30 123										
TOTL	28 126	29 105									
CLIP	0 0	0 0	0 0								
RECR	0 0	0 0	0 0	0 0							
COSM	0 0	0 0	0 0	0 0	0 0						
NTCM	20 120	21 104	0 0	0 0	0 0	21 105					
OTCM	29 123	29 105	0 0	0 0	0 0	21 105	30 94				
TPAC	29 123	29 105	0 0	0 0	0 0	21 105	30 94	30 101			
CLIM	29 123	29 105	0 0	0 0	0 0	21 105	30 94	30 101	30 132		
XTRP	29 123	29 105	0 0	0 0	0 0	21 105	30 94	30 101	30 132	30 133	
HPAC	29 123	29 105	0 0	0 0	0 0	21 105	30 94	30 101	30 132	30 133	30 99

NUMBER OF CASES	X-AXIS TECHNIQUE ERROR
Y-AXIS TECHNIQUE ERROR	ERROR DIFFERENCE Y - X

48-HOUR FORECAST ERRORS (NM)

	JTWC	TOTL	CLIP	RECR	COSM	NTCM	OTCM	TPAC	CLIM	XTRP	HPAC
JTWC	8 242										
TOTL	8 242	12 181									
CLIP	0 0	0 0	0 0								
RECR	0 0	0 0	0 0	0 0							
COSM	0 0	0 0	0 0	0 0	0 0						
NTCM	6 203	7 174	0 0	0 0	0 0	7 216					
OTCM	6 270	8 219	0 0	0 0	0 0	6 240	8 195				
TPAC	8 242	12 181	0 0	0 0	0 0	7 216	8 195	12 189			
CLIM	8 242	12 181	0 0	0 0	0 0	7 216	8 195	12 189	12 309		
XTRP	8 242	12 181	0 0	0 0	0 0	7 216	8 195	12 189	12 309	12 227	
HPAC	8 242	12 181	0 0	0 0	0 0	7 216	8 195	12 189	12 309	12 227	12 189

JTWC - OFFICIAL JTWC FORECAST
TOTL - ANALOG (TYAN 78)
NTCM - NESTED TROPICAL CYCLONE MODEL
OTCM - ONE-WAY TROPICAL CYCLONE MODEL
TPAC - CLIM AND PERSISTENCE BLEND
CLIM - CLIMATOLOGY
XTRP - 12-HOUR EXTRAPOLATION
HPAC - MEAN OF XTRP AND CLIM

72-HOUR FORECAST ERRORS (NM)

	JTWC	TOTL	CLIP	RECR	COSM	NTCM	OTCM	TPAC	CLIM
JTWC	0 0								
TOTL	0 0	1 350							
CLIP	0 0	0 0	0 0						
RECR	0 0	0 0	0 0	0 0					
COSM	0 0	0 0	0 0	0 0	0 0				
NTCM	0 0	0 0	0 0	0 0	0 0	0 0			
OTCM	0 0	0 0	0 0	0 0	0 0	0 0	0 0		
TPAC	0 0	1 350	0 0	0 0	0 0	0 0	0 0	1 489	
CLIM	0 0	1 350	0 0	0 0	0 0	0 0	0 0	1 489	1 639

TABLE 5-8. 1985 ERROR STATISTICS FOR SELECTED OBJECTIVE TECHNIQUES IN THE WESTERN NORTH PACIFIC OCEAN

24-HOUR FORECAST ERRORS (NM)

	JTWC	TOTL	CLIP	RECR	COSM	NTCM	OTCM	TPAC	CLIM	XTRP	HPAC
JTWC	477 117	117 0									
TOTL	455 120	117 3	463 120	120 0							
CLIP	333 122	116 6	329 121	121 0	338 122	122 0					
RECR	429 132	117 14	434 132	119 13	308 132	122 9	436 132	132 0			
COSM	449 123	118 6	442 124	120 4	323 125	121 4	421 124	132 -7	457 124	124 0	
NTCM	368 122	116 6	359 123	121 2	337 124	121 3	338 124	133 -8	359 123	123 1	373 123
OTCM	460 115	116 0	450 116	118 -1	327 117	120 -2	426 117	130 -12	449 117	123 -5	363 115
TPAC	465 122	117 5	456 121	119 2	330 121	121 0	430 122	131 -8	448 122	123 -1	365 123
CLIM	468 160	117 43	458 160	119 40	331 161	121 39	431 160	131 29	450 159	123 36	366 163
XTRP	465 128	117 12	456 128	119 9	330 128	121 7	429 128	131 -1	447 129	123 6	363 127
HPAC	465 120	117 3	456 120	119 1	330 121	121 0	429 121	131 -9	447 120	123 -2	363 121

NUMBER OF CASES	X-AXIS TECHNIQUE ERROR
Y-AXIS TECHNIQUE ERROR	ERROR DIFFERENCE Y - X

48-HOUR FORECAST ERRORS (NM)

	JTWC	TOTL	CLIP	RECR	COSM	NTCM	OTCM	TPAC	CLIM	XTRP	HPAC
JTWC	356 231	231 0									
TOTL	342 249	231 18	365 249	249 0							
CLIP	250 255	232 23	263 253	251 2	268 253	253 0					
RECR	319 265	231 34	339 268	247 20	243 271	255 16	339 268	268 0			
COSM	333 236	236 0	346 240	252 -11	254 247	254 -6	327 240	267 -25	355 238	238 0	
NTCM	276 231	234 -2	286 231	252 -20	267 231	253 -20	266 235	275 -39	281 233	239 -5	294 231
OTCM	338 234	232 2	348 234	248 -12	253 228	248 -19	326 239	265 -25	345 236	235 1	280 227
TPAC	348 235	231 4	359 236	248 -11	262 235	252 -16	334 238	267 -28	348 236	237 0	288 237
CLIM	349 296	231 65	361 301	248 52	263 301	252 48	335 304	268 37	350 298	237 61	289 308
XTRP	347 271	231 40	359 268	248 21	262 266	252 14	333 268	267 1	348 273	237 35	287 267
HPAC	347 234	231 3	359 235	248 -12	262 235	252 -16	333 236	267 -29	348 234	237 -2	287 236

JTWC - OFFICIAL JTWC FORECAST
TOTL - TOTAL (TYAN 78)
CLIP - CLIPPER
RECR - RECURVER (TYAN 78)
COSM - COSMOS (MOG)
NTCM - NESTED TROPICAL CYCLONE MODEL
OTCM - ONE-WAY TROPICAL CYCLONE MODEL
TPAC - CLIM AND PERSISTENCE BLEND
CLIM - CLIMATOLOGY
XTRP - 12-HOUR EXTRAPOLATION
HPAC - MEAN OF XTRP AND CLIM

72-HOUR FORECAST ERRORS (NM)

	JTWC	TOTL	CLIP	RECR	COSM	NTCM	OTCM	TPAC	CLIM
JTWC	241 367	367 0							
TOTL	228 373	363 11	266 374	374 0					
CLIP	168 357	357 0	190 367	370 -2	195 368	368 0			
RECR	217 408	371 37	249 413	375 38	181 417	373 44	250 414	414 0	
COSM	226 367	373 -5	253 386	377 8	186 406	370 36	242 395	412 -16	263 380
NTCM	186 345	367 -21	208 353	374 -21	194 348	370 -20	196 357	412 -55	207 353
OTCM	188 397	358 40	212 398	364 34	147 389	349 40	198 400	407 -6	213 403
TPAC	232 374	369 5	258 378	376 1	188 369	371 -1	245 372	413 -41	256 375
CLIM	234 421	367 54	261 426	375 51	190 415	369 46	246 418	413 5	258 421

TABLE 5-10. 1985 ERROR STATISTICS FOR SELECTED OBJECTIVE TECHNIQUES IN THE SOUTH INDIAN AND SOUTH PACIFIC OCEANS

24-HOUR FORECAST ERRORS (NM)

	JTWC	TOTL	CLIP	RECR	COSM	NTCM	OTCM	TPAC	CLIM	XTRP	HPAC
JTWC	273 138 0										
TOTL	196 112	128 -15 112	112 0								
CLIP	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
RECR	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
COSM	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
NTCM	213 144	140 4	167 133	114 20	0 0	0 0	0 0	0 0	0 0	0 0	0 0
OTCM	213 139	135 4	175 135	110 25	0 0	0 0	0 0	0 0	0 0	0 0	0 0
TPAC	235 132	135 -1	197 125	112 13	0 0	0 0	0 0	0 0	0 0	0 0	0 0
CLIM	236 184	134 50	198 172	112 60	0 0	0 0	0 0	0 0	0 0	0 0	0 0
XTRP	236 116	134 -17	197 111	112 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
HPAC	235 131	134 -2	197 124	112 12	0 0	0 0	0 0	0 0	0 0	0 0	0 0

NUMBER OF CASES	X-AXIS TECHNIQUE ERROR
Y-AXIS TECHNIQUE ERROR	ERROR DIFFERENCE Y - X

48-HOUR FORECAST ERRORS (NM)

	JTWC	TOTL	CLIP	RECR	COSM	NTCM	OTCM	TPAC	CLIM	XTRP	HPAC
JTWC	199 242	242 0									
TOTL	148 232	225 7	160 242	242 0							
CLIP	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
RECR	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
COSM	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
NTCM	163 269	252 18	136 256	249 7	0 0	0 0	0 0	0 0	0 0	0 0	0 0
OTCM	158 292	243 50	137 288	243 45	0 0	0 0	0 0	0 0	0 0	0 0	0 0
TPAC	177 267	244 23	159 258	243 15	0 0	0 0	0 0	0 0	0 0	0 0	0 0
CLIM	178 351	244 108	160 347	242 104	0 0	0 0	0 0	0 0	0 0	0 0	0 0
XTRP	181 251	244 7	159 234	243 -8	0 0	0 0	0 0	0 0	0 0	0 0	0 0
HPAC	177 266	243 23	159 257	243 14	0 0	0 0	0 0	0 0	0 0	0 0	0 0

JTWC - OFFICIAL JTWC FORECAST
TOTL - ANALOG (TYAN 78)
CLIP - CLIPPER
RECR - RECURVER (TYAN 78)
COSM - COSMOS (MOS)
NTCM - NESTED TROPICAL CYCLONE MODEL
OTCM - ONE-WAY TROPICAL CYCLONE MODEL
TPAC - CLIM AND PERSISTENCE BLEND
CLIM - CLIMATOLOGY
XTRP - 12-HOUR EXTRAPOLATION
HPAC - MEAN OF XTRP AND CLIM

72-HOUR FORECAST ERRORS (NM)

	JTWC	TOTL	CLIP	RECR	COSM	NTCM	OTCM	TPAC	CLIM
JTWC	0 0	0 0							
TOTL	0 0	0 0	122 351	351 0					
CLIP	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
RECR	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
COSM	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
NTCM	0 0	0 0	104 394	357 37	0 0	0 0	0 0	0 0	0 0
OTCM	0 0	0 0	101 456	340 116	0 0	0 0	0 0	0 0	0 0
TPAC	0 0	0 0	122 424	351 73	0 0	0 0	0 0	0 0	0 0
CLIM	0 0	0 0	122 503	351 152	0 0	0 0	0 0	0 0	0 0

CHAPTER VI - APPLIED TROPICAL CYCLONE RESEARCH SUMMARY

The following articles delineate the extent of the research program at the Naval Environmental Prediction Research Facility (NAVENVPREDRSCHFAC) dedicated to supporting the operations at Joint Typhoon Warning Center (JTWC). There are three major research departments at NAVENVPREDRSCHFAC, each contributing to the overall program; research on current and future tropical cyclone models is performed in the Numerical Modeling Department, the Tactical Applications Department conducts statistical application studies, and the Satellite Processing and Display Department develops computer interactive techniques.

TROPICAL CYCLONE AIDS (TCAIDS) FOR SATELLITE-DATA PROCESSING AND DISPLAY SYSTEM (SPADS)

(Tsui, T. and A. Truschke, NAVENVPREDRSCHFAC)

TCAIDS is a system residing on SPADS composed of all existing tropical cyclone utility routines. Most of these routines use digital satellite data together with the environmental information to assist forecasters in making a low cost and timely tropical cyclone forecast. TCAIDS includes two tropical cyclone movement aids, one intensity forecasting aid, one satellite image rotation utility, and a 16-image looping display utility. The movement forecast aids are the satellite IR pattern regression routine — ADAPT forecaster and the National Hurricane Center's Climatology-Persistence (CLIPER) routine. The intensity forecast aid uses the tropical cyclone spiral characteristics to predict the growth of the storm. This intensity forecasting program also provides various image enhancement routines.

NORTH PACIFIC TROPICAL CYCLONE CLIMATOLOGY

(Tsui, T. and R. Miller, NAVENVPREDRSCHFAC)

A tropical cyclone climatology for the North Pacific has been developed. Data used for the western basin were taken from the JTWC Tropical Cyclone Data Base and covered a period of 40 years, 1945-1984. Eastern basin data spanned the 34 year period 1949-1982 and were obtained from the Consolidated World-Wide Tropical Cyclone Data Base, National Climatic Data Center, Ashville, North Carolina. Storms for both basins were sorted according to month/day of the year into twenty-four 31-day overlapping periods. For each period, four charts are supplied: 1) actual storm paths; 2) mean storm paths; 3) average storm speed; and 4) storm constancy and frequency.

ADAPTION OF CSUM

(Tsui, T. and A. Truschke, NAVENVPREDRSCHFAC)

CSUM is a statistical tropical cyclone prediction model developed by Matsumoto and Gray (Colorado State University), and has been implemented into the JTWC combined ARQ procedure. CSUM incorporates climatology, persistence, and the Navy Operational Global Atmospheric Prediction System (NOGAPS) 500 mb height fields to forecast up to 72-hour tropical cyclone movement. In the operation, tropical cyclones are stratified on their position relative to the 500 mb subtropical ridge or their motions to better define the environmental influences on the cyclones. The 72-hour forecast track is segmented into three 24-hour time frames to permit the application of updated persistence and synoptic data relative to the

new cyclone position. Testing of the optional version of the model is now underway.

ENVIRONMENTAL INFLUENCES ON TROPICAL CYCLONE INTENSIFICATION

(Merrill, R. and W. Gray, Colorado State University)

A study examining the observed upper-tropospheric environmental flow difference between intensifying and non-intensifying storms has been completed. Upper-tropospheric wind observations are composited for 28 tropical cyclones according to their intensity tendencies. A rotated coordinate system based on the outflow jet location is used so that the asymmetric flow structure is preserved. Little difference is observed in total outflow on the synoptic scale. However, intensifying storms have a less constricted outflow with evidence of lateral connections with the surrounding flow.

EVALUATION OF JTWC OBJECTIVE AIDS

(Tsui, T. and R. Miller, NAVENVPREDRSCHFAC)

Evaluation of all JTWC objective aids is now underway. The complete evaluation of all aids will include 1978-1984 performances. Performances since 1967 will also be investigated; the study however will be limited to those aids existing in the JTWC data file. The evaluation will expand from the forecast error (mean vector error) to cross-track/-along-track errors, track/speed errors and timing errors. In addition, the evaluation will concentrate on the combined performance of the least forecast error distance and the most consistent heading forecast. Statistical tests on the significance of the results will be carried out to clarify the meaning of the performance differences.

NAVY TACTICAL APPLICATIONS GUIDE (NTAG) VOL. 6, PART I:

TROPICAL WEATHER ANALYSIS AND FORECAST APPLICATIONS

(Fett, R., NAVENVPREDRSCHFAC)

Studies were completed for this volume, based largely on Defense Meteorological Satellite Program (DMSP) data. The volume contains a number of new research results including a method of precisely locating the positions of equatorial troughs by satellite. Studies are presently being finalized in preparation for the printing process with anticipated distribution of Vol. 6, Part I, in the autumn of 1986. Additional studies currently under investigation in Vol. 6, Part II, relate exclusively to the tropical cyclone problem and will be published at a later date.

THE ADVANCED TROPICAL CYCLONE MODEL (ATCM)

(Hodur, R., NAVENVPREDRSCHFAC)

The Advanced Tropical Cyclone Model (ATCM) is being developed using the recommendations made at the tropical cyclone workshop held in Monterey, California (January, 1985). First, the Navy Operational Regional Atmospheric Prediction System

(NORAPS) is the framework for the ATCM. Second, the ATCM will have a uniform resolution of 80 km or less with at least 10 levels. Third, the domain of the model will cover the entire WESTPAC area. Using this approach, the ATCM will only need to be run once per watch, since all tropical systems can be included in the model domain. This also allows interactions to occur between storms during multiple storm situations.

The current work on the ATCM is geared toward defining the initial conditions of the large-scale flow and the circulation of the tropical cyclone. The large-scale flow will be defined by running the ATCM with an update cycle every watch. This approach has two advantages. First, all features forecast by ATCM are retained from one forecast to the next. Second, the first guess fields will be consistent with the ATCM model equations. Two approaches are being examined for the initial tropical cyclone circulation. The first is to allow the model to develop the storm structure in a no-flow environment, and then to add this circulation into the large-scale flow. The second is to let the model spin-up the tropical cyclone(s) with the large-scale flow using conventional data. Encouraging results were obtained using the latter technique in the western Atlantic, in the fall of 1985.

TROPICAL CYCLONE PREDICTION STUDIES

(Elsberry, R. L., Chan, J. C.-L., and J. E. Peak, NAVPGSCOL)

The performance of tropical cyclone forecast aids under different environmental conditions and for various cyclone characteristics has been studied. Based on a rating system for cross-track and along-track errors, the One-way Tropical Cyclone Model (OTCM) and the Nested Tropical Cyclone Model (NTCM) generally produce the most accurate forecasts at 72-hours. Empirical Orthogonal Function (EOF) analyses of the wind fields around western North Pacific tropical cyclones have been used to derive a statistical-synoptic track prediction scheme. The 72-hour errors are competitive with the JTWC official forecasts. Further improvement is obtained by

stratifying the situations according to past storm motion. A similar improvement can be obtained if the wind-based EOF's are used to stratify the situation. An objective technique has been tested for estimating the warning position of the tropical cyclone from the fixes received during the previous 6-hours. Weighting factors for different observational platforms and for the time of the fix have been incorporated. The objective positions are generally superior to the JTWC operational positions during 1981 and 1982 and are nearly as good as the JTWC during 1983. The causes of the anomalous track guidance received during Super Typhoon Abby (1983) have also been examined. The intensity and enormous circulation of this super typhoon are suggested as the reasons for the failure of the objective aids during a period when Abby was moving almost normal to the steering flow.

THE NAVY TWO-WAY INTERACTIVE NESTED TROPICAL CYCLONE MODEL (NTCM)

(Fiorino, M., NAVENVRSPREDFAC)

A new version of the NTCM was tested in a research mode during the 1985 WESTPAC season. This version (NTCM3.0) has three features: 1) One-way influence boundary conditions on the course grid with forcing from the NOGAPS wind forecasts; 2) A vortex and heating specification procedure that insures a more realistic storm evolution; and 3) A pre-forecast modification of the steering flow that accounts for the observed current motion.

The operational version of the NTCM was changed in the early part of the season based on experience with NTCM3.0. The new operational version (NTCM2.2) differs from the 1984 version (NTCM2.1) in that the bias-corrector was activated and a serious program error was corrected, which affected the interaction between the fine and course meshes.

Although the time-dependent boundary version of NTCM3.0 was shown to be superior to its channel model equivalent and to NTCM2.1, the comparisons of NTCM2.2 and NTCM3.0 revealed little advantage to the new version of the model during the 1985 season.

ANNEX A TROPICAL CYCLONE TRACK AND FIX DATA

1. WESTERN NORTH PACIFIC CYCLONE DATA

TROPICAL STORM ELSIE BEST TRACK DATA

MO/DA/HR	BEST TRACK			WARNING			ERRORS			24 HOUR FORECAST			48 HOUR FORECAST			72 HOUR FORECAST		
	POSIT	WIND		POSIT	WIND		DST	WIND		POSIT	WIND	DST	POSIT	WIND	DST	POSIT	WIND	DST
010600Z	4.1 155.1	20	0.0	0.0	0.0	0.0	-0.	0.	0.0	0.0	0.0	-0.	0.	0.0	0.0	0.0	0.0	-0.
010600Z	4.5 155.5	20	0.0	0.0	0.0	0.0	-0.	0.	0.0	0.0	0.0	-0.	0.	0.0	0.0	0.0	0.0	-0.
010612Z	4.9 155.1	20	0.0	0.0	0.0	0.0	-0.	0.	0.0	0.0	0.0	-0.	0.	0.0	0.0	0.0	0.0	-0.
010618Z	5.4 154.6	25	0.0	0.0	0.0	0.0	-0.	0.	0.0	0.0	0.0	-0.	0.	0.0	0.0	0.0	0.0	-0.
010700Z	5.9 154.1	30	5.9	154.1	30	0.	0.	0.	7.4	150.8	45	199	15	9.2	147.3	60	484	40
010706Z	6.7 153.2	35	6.1	153.2	35	51.	0.	0.	7.5	151.3	50	217	25	0.0	0.0	0.0	0.0	-0.
010712Z	8.0 152.0	40	7.4	152.0	40	47.	0.	0.	9.7	149.8	55	238	30	0.0	0.0	0.0	0.0	-0.
010718Z	9.2 150.9	35	9.3	150.9	40	6.	5.	14.7	147.5	55	59	35	0.0	0.0	0.0	0.0	0.0	-0.
010800Z	10.5 149.6	30	10.6	149.8	30	13.	0.	15.8	146.6	40	133	20	0.0	0.0	0.0	0.0	0.0	-0.
010806Z	12.0 148.5	25	11.8	148.7	25	17.	0.	0.0	0.0	0.	0.	0.	0.0	0.0	0.0	0.0	0.0	-0.
010812Z	13.8 147.9	25	13.4	148.0	25	25	0.	0.0	0.0	0.	0.	0.	0.0	0.0	0.0	0.0	0.0	-0.
010818Z	15.5 148.1	25	14.8	147.4	25	58.	5.	0.0	0.0	0.	0.	0.	0.0	0.0	0.0	0.0	0.0	-0.
010900Z	17.2 148.4	20	16.8	147.8	20	42.	0.	0.0	0.0	0.	0.	0.	0.0	0.0	0.0	0.0	0.0	-0.

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	29.	201.	484.	0.	0.	0.	0.	0.
AVG RIGHT ANGLE ERROR	12.	53.	155.	0.	0.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	1.	25.	40.	0.	0.	0.	0.	0.
AVG INTENSITY BIAS	1.	25.	40.	0.	0.	0.	0.	0.
NUMBER OF FORECASTS	9	5	1	0	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 976. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 14. KNOTS

TROPICAL STORM ELSIE FIX POSITIONS FOR CYCLONE NO. 1

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCXY	DVORAK CODE	COMMENTS	SITE
1	060000	3.8N 155.9E	PCN 6	T0.5/0.5	INIT OBS	PGTU
2	060300	4.4N 155.8E	PCN 6			PGTU
3	060600	3.9N 155.2E	PCN 6			PGTU
4	060900	4.6N 154.4E	PCN 6		ULCC FIX	PGTU
5	061200	5.0N 153.9E	PCN 6		ULCC FIX	PGTU
6	061500	5.5N 153.0E	PCN 6	T1.0/1.0	INIT OBS	PGTU
7	062100	6.0N 152.5E	PCN 6			PGTU
8	070000	5.8N 154.1E	PCN 6			PGTU
9	070300	6.0N 153.9E	PCN 6	T2.0/2.0 /D1.5/27HRS		PGTU
10	070600	6.3N 153.5E	PCN 6		ULCC FIX	PGTU
11	070900	6.6N 153.0E	PCN 6		ULCC FIX	PGTU
12	071200	8.5N 152.1E	PCN 6			PGTU
13	071600	9.9N 150.7E	PCN 6	T2.0/2.0 /D1.0/24HRS		PGTU
14	071800	10.4N 150.0E	PCN 6			PGTU
15	072041	10.8N 149.9E	PCN 6			PGTU
16	080000	10.1N 148.8E	PCN 6	T2.0/2.0 /S0.0/22HRS		PGTU
17	080047	10.2N 149.0E	PCN 5			PGTU
18	080300	11.0N 148.5E	PCN 6			PGTU
19	080600	12.1N 147.8E	PCN 6			PGTU
20	080900	12.9N 147.6E	PCN 6		ULCC FIX	PGTU
21	080921	13.0N 148.2E	PCN 6		ULCC FIX	PGTU
22	081200	13.9N 148.1E	PCN 6		ULCC FIX	PGTU
23	082020	16.2N 149.4E	PCN 6		ULCC FIX	PGTU

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS MSLP	MAX-SFC-UND VEL/BRG/RNG	MAX-FLT-LVL-UND DIR-VEL/BRG/RNG	ACCXY NAV/MET	EYE SHAPE	EYE ORIENT- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	062238	5.8N 154.4E	1500FT		1002	25 330 70	050 33 330 70	10 5			+25 +25 +24 28	1
2	072128	10.3N 150.4E	1500FT		1003	30 170 94	230 29 170 94	6 10			+23 +25 +34 26	2
3	072355	10.2N 149.6E	1500FT		1003	30 050 90	120 32 060 95	10 10			+24 +24 +20 27	2

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
* 1	070600	6.0N 154.0E	035	045	91339 91334 91348

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

**TROPICAL STORM FABIAN
BEST TRACK DATA**

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	ERRORS	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS
					DST	DST	DST			DST	DST			DST	DST			DST	DST
					WIND	WIND	WIND			WIND	WIND			WIND	WIND			WIND	WIND
010806Z	12.4 134.0	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
010812Z	12.1 134.2	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
010818Z	11.8 134.4	45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
010900Z	11.3 134.6	50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
010906Z	10.5 135.2	55	10.7	135.0	50	17	15	10.7	135.0	50	199	15	10.7	135.0	50	224	10	10.7	135.0
010912Z	9.9 135.9	55	10.6	135.0	55	168	15	10.6	135.0	55	210	15	10.6	135.0	50	242	15	10.6	135.0
010918Z	9.4 136.7	45	10.6	135.0	55	124	10	10.6	135.0	55	213	15	10.6	135.0	50	251	15	10.6	135.0
011000Z	9.2 137.5	45	9.0	137.5	45	12	0	9.4	138.7	40	22	0	10.1	139.0	35	54	5	10.1	139.0
011006Z	9.2 138.0	45	9.4	138.4	45	27	0	10.2	139.6	40	62	0	11.3	139.9	35	142	5	0.0	0.0
011012Z	9.3 138.3	40	9.6	138.6	45	25	5	10.2	139.3	40	35	5	11.0	139.6	35	123	10	0.0	0.0
011018Z	9.4 138.4	40	9.6	138.7	50	21	10	10.0	139.4	45	35	10	10.7	139.9	40	131	15	0.0	0.0
011100Z	9.7 138.7	40	9.5	138.5	45	12	5	10.5	138.1	45	32	10	10.4	139.1	40	97	20	0.0	0.0
011106Z	9.9 139.0	40	9.7	138.4	45	55	10	10.4	137.4	50	101	15	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011112Z	9.7 139.0	35	9.9	138.1	45	55	5	9.5	138.3	40	18	15	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011118Z	9.5 139.1	35	9.5	138.3	30	47	5	9.5	138.3	40	18	15	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011200Z	9.2 139.0	30	9.0	138.8	30	17	0	9.5	138.0	25	19	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011206Z	9.0 139.8	30	9.1	138.9	30	8	0	9.0	138.0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011212Z	9.2 138.6	25	9.1	138.9	30	19	5	9.0	138.0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011218Z	9.2 138.3	25	9.1	138.9	25	36	0	9.0	138.0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011300Z	9.3 137.9	20	9.2	138.8	20	54	0	9.0	138.0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	35	87	152	191	0	0	0	0
AVG RIGHT ANGLE ERROR	3	30	51	25	0	0	0	0
AVG INTENSITY MAGNITUDE ERROR	4	10	12	19	0	0	0	0
AVG INTENSITY BIAS	3	10	12	19	0	0	0	0
NUMBER OF FORECASTS	16	12	8	4	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 507. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 4. KNOTS

**TROPICAL STORM FABIAN
FIX POSITIONS FOR CYCLONE NO. 2**

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	040000	4.2N 131.2E	PCN 6	T1.0/1.0	INIT OBS	PGTW
2	040300	4.7N 130.8E	PCN 6			PGTW
3	040600	4.9N 130.1E	PCN 6			PGTW
4	040900	4.8N 129.8E	PCN 6			PGTW
* 5	041200	3.0N 131.1E	PCN 6		ULCC FIX	PGTW
* 6	041500	8.9N 129.4E	PCN 6	T2.5/2.5	INIT OBS	PGTW
* 7	041800	9.4N 128.9E	PCN 6			PGTW
* 8	042230	8.5N 127.4E	PCN 5		ULCC FIX	PGTW
* 9	042230	9.8N 128.2E	PCN 5	T3.0/3.0	INIT OBS ULCC FIX	RODN
* 10	050000	10.4N 127.7E	PCN 6	T2.0/2.0 /D1.0/24HRS		PGTW
* 11	050300	10.8N 128.3E	PCN 6			PGTW
* 12	050600	11.7N 128.3E	PCN 6			PGTW
13	050734	7.8N 130.0E	PCN 6		EXP LLCC ULCC 12.5N 127.2E	PGTW
14	050900	7.9N 129.9E	PCN 6		ULCC 11.9N 128.5E	PGTW
15	051025	8.0N 129.7E	PCN 6			PGTW
* 16	051109	12.1N 128.1E	PCN 6		ULCC FIX	RODN
* 17	051200	18.3N 129.8E	PCN 6			PGTW
* 18	051428	12.9N 129.9E	PCN 6		ULCC FIX	RODN
* 19	051600	13.9N 135.9E	PCN 6	T1.5/2.5 /W1.0/24HRS	ULCC FIX	RODN
* 20	051800	14.4N 133.3E	PCN 6		ULCC FIX	PGTW
* 21	052206	12.8N 133.1E	PCN 6		SCNDRY CIRCLTN 15.0N 134.8E	PGTW
* 22	060000	14.8N 132.9E	PCN 6	T3.0/3.0-/D1.0/24HRS		PGTW
* 23	060123	14.9N 133.5E	PCN 5			PGTW
* 24	060300	14.6N 133.2E	PCN 6			PGTW
* 25	060600	12.8N 132.8E	PCN 6		ULCC FIX	PGTW
* 26	061003	12.9N 133.7E	PCN 5		ULCC FIX	PGTW
* 27	061200	13.6N 134.1E	PCN 6		ULCC FIX	PGTW
* 28	061408	14.4N 134.7E	PCN 6			PGTW
29	061600	11.2N 135.0E	PCN 6	T2.5/2.5 /D1.0/24HRS	ULCC 15.4N 135.6E	PGTW
30	070000	12.1N 135.3E	PCN 6	T2.5/2.5+/W0.5/24HRS		PGTW
31	070107	9.8N 133.6E	PCN 5	T2.5/2.5	INIT OBS	RODN
32	070300	11.2N 134.9E	PCN 6			PGTW
33	070600	10.4N 135.1E	PCN 6		ULCC FIX	PGTW
* 34	071020	9.8N 132.5E	PCN 6		ULCC FIX	RODN
35	071600	10.0N 136.5E	PCN 6	T1.5/2.0 /W1.0/24HRS	ULCC 12.9N 136.3E	PGTW
36	071800	10.0N 136.3E	PCN 6		ULAC 14.0N 136.3E	PGTW
37	072258	14.1N 134.7E	PCN 5	T3.0/3.0 /D0.5/22HRS		RODN
38	080047	12.4N 133.8E	PCN 5	T2.5/2.5 /S0.0/25HRS		PGTW
39	080300	12.6N 133.9E	PCN 6			PGTW
40	080600	12.3N 134.1E	PCN 6			PGTW
41	080956	11.7N 134.4E	PCN 6		ULCC FIX	PGTW
42	082234	11.7N 134.2E	PCN 5			PGTW
43	090027	11.1N 134.4E	PCN 5			PGTW
44	090300	10.6N 134.9E	PCN 4		EXP LLCC	PGTW
45	090600	10.4N 135.0E	PCN 4			PGTW
46	090643	10.3N 134.9E	PCN 3			PGTW
* 47	090900	10.9N 134.8E	PCN 3		ULCC FIX	PGTW
* 48	091200	10.4N 133.5E	PCN 6			PGTW
* 49	091307	10.7N 137.8E	PCN 6			PGTW
* 50	091600	10.6N 134.3E	PCN 6	T3.0/3.0	INIT OBS ULCC FIX	PGTW
* 51	091800	16.4N 134.4E	PCN 5		ULCC FIX	PGTW
52	100007	9.0N 137.6E	PCN 5	T3.0/3.0 /D0.5/24HRS	EXP LLCC	PGTW
53	100300	9.3N 137.8E	PCN 4		EXP LLCC	PGTW
54	100600	9.4N 138.2E	PCN 4		EXP LLCC	PGTW
55	100631	9.5N 138.3E	PCN 3		EXP LLCC	PGTW
56	100900	9.5N 138.0E	PCN 6			PGTW
57	101200	9.7N 138.6E	PCN 4			PGTW
58	101247	9.5N 138.8E	PCN 3			PGTW
59	101800	9.5N 138.7E	PCN 6	T3.5/3.5 /D0.5/26HRS		PGTW
60	102118	9.5N 139.1E	PCN 6		ULCC 09.2N 136.4E	PGTW
61	110000	9.4N 138.6E	PCN 6	T3.0/3.0 /S0.0/24HRS	ULCC 09.4N 136.0E	PGTW
62	110128	9.4N 138.5E	PCN 5			PGTW
63	110442	9.6N 138.4E	PCN 5			PGTW
64	110600	9.7N 138.6E	PCN 5			PGTW
65	110618	9.5N 138.7E	PCN 5			PGTW
66	110959	9.7N 137.9E	PCN 5			PGTW

[illegible]

AIRCRAFT FIXES

T	MSN NO.
7	3
8	6
	7
	7
8	8
	8
	10

SYNOPTIC FIXES

COMMENTS

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON GAY
BEST TRACK DATA

MO/DA/HR	POSIT	WIND		POSIT	WIND	ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST		ERRORS	
		WIND	POSIT			DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
052000Z	11.5	131.9	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
052006Z	11.5	132.0	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
052012Z	12.3	132.0	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
052018Z	12.7	132.1	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
052100Z	13.1	132.1	35	13.0	131.8	35	19.0	5.0	14.5	131.1	45	63.0	0.0	16.2	129.9	45	98.0	-20.0	17.8
052106Z	13.6	132.1	35	13.3	131.7	40	29.0	5.0	14.9	130.8	50	72.0	0.0	16.6	129.6	50	120.0	-15.0	18.3
052112Z	14.1	132.1	35	14.6	132.0	45	38.0	5.0	15.2	131.1	55	78.0	0.0	16.6	129.4	50	60.0	-20.0	19.6
052118Z	14.5	132.1	40	14.6	132.0	45	38.0	5.0	16.6	130.9	55	36.0	0.0	18.4	129.3	50	75.0	-30.0	20.1
052200Z	14.9	132.1	45	14.6	132.1	45	18.0	0.0	15.5	131.3	50	152.0	-15.0	16.7	130.0	50	249.0	-40.0	18.4
052206Z	15.6	131.8	50	15.2	132.1	45	30.0	-5.0	16.6	131.5	45	162.0	-20.0	18.5	129.9	45	184.0	-55.0	20.0
052212Z	16.3	131.4	50	16.1	131.7	45	30.0	-5.0	17.8	130.4	45	95.0	-20.0	19.2	128.9	40	282.0	-60.0	20.3
052218Z	17.2	130.8	55	17.1	130.8	45	30.0	-5.0	19.1	129.9	55	31.0	-20.0	20.6	126.9	50	274.0	-45.0	22.5
052300Z	17.8	130.2	65	17.3	130.3	55	6.0	-10.0	20.1	127.8	65	67.0	-20.0	20.2	126.8	65	326.0	-25.0	0.0
052306Z	18.6	129.6	65	18.7	129.8	55	13.0	-10.0	21.5	126.8	65	134.0	-35.0	20.3	127.5	65	345.0	-15.0	0.0
052312Z	19.0	129.3	70	19.2	129.3	65	12.0	-10.0	21.8	126.7	80	160.0	-20.0	20.4	128.2	70	422.0	-5.0	0.0
052318Z	19.6	128.8	80	19.8	129.3	70	12.0	-10.0	22.5	126.7	80	206.0	-15.0	20.5	129.4	65	447.0	0.0	0.0
052400Z	20.0	128.3	90	20.6	129.6	85	11.0	-10.0	23.5	126.7	85	222.0	-5.0	20.5	131.2	65	463.0	0.0	0.0
052406Z	21.5	129.2	100	21.5	129.0	100	11.0	0.0	24.5	130.5	90	181.0	10.0	20.5	133.8	65	362.0	10.0	0.0
052412Z	22.4	130.0	100	22.4	130.1	100	6.0	0.0	25.9	134.4	85	109.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0
052418Z	23.4	130.8	95	23.3	130.6	95	13.0	0.0	26.5	135.4	75	162.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0
052500Z	24.8	132.0	90	24.7	132.0	85	20.0	0.0	31.0	135.4	55	42.0	-5.0	0.0	0.0	0.0	0.0	0.0	0.0
052506Z	26.0	133.4	80	26.5	133.0	75	25.0	-5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
052512Z	27.6	133.1	75	27.4	134.8	70	25.0	-5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
052518Z	29.0	136.8	65	28.9	137.1	65	17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
052600Z	30.0	138.4	60	30.0	138.4	60	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
052606Z	30.7	139.8	55	31.6	140.1	50	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	17.	112.	259.	371.	17.	112.	259.	371.
AVG RIGHT ANGLE ERROR	9.	55.	79.	65.	9.	55.	79.	65.
AVG INTENSITY MAGNITUDE ERROR	13.	25.	43.	33.	13.	25.	43.	33.
AVG INTENSITY BIAS	-2.	-9.	-23.	-43.	-2.	-9.	-23.	-43.
NUMBER OF FORECASTS	22	17	14	8	22	17	14	8

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1464. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 10. KNOTS

TYPHOON GAY
FIX POSITIONS FOR CYCLONE NO. 3

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	161800	8.3N 136.4E	PCN 6	T1.0/1.0	INIT OBS ULCC FIX	PGTU
2	170000	8.6N 135.3E	PCN 6	T1.0/1.0	INIT OBS ULCC 8.7N 134.9E	PGTU
3	181200	9.3N 131.9E	PCN 6		ULCC FIX	PGTU
4	181600	9.1N 131.7E	PCN 6		ULCC FIX	PGTU
5	181800	9.1N 131.8E	PCN 6	T1.0/1.0	INIT OBS ULCC FIX	PGTU
6	182100	9.1N 132.1E	PCN 6		ULCC FIX	PGTU
7	190000	9.8N 131.0E	PCN 6		ULCC 8.8N 132.4E	PGTU
8	190300	9.8N 131.0E	PCN 6	T2.0/2.0	INIT OBS ULCC 9.0N 133.1E	PGTU
9	190529	9.5N 131.4E	PCN 6	T2.0/2.0	INIT OBS	RPMK
10	190600	9.3N 132.3E	PCN 6			PGTU
11	190900	9.2N 132.5E	PCN 6			PGTU
12	191052	8.8N 131.4E	PCN 5			RPMK
13	191200	9.0N 132.8E	PCN 6			PGTU
14	191309	8.9N 131.7E	PCN 6			RODN
15	191600	9.2N 131.2E	PCN 6	T1.0/1.0+/S0.0/22HRS	ULCC 9.1N 132.1E	PGTU
16	191800	9.1N 132.2E	PCN 6			PGTU
17	192111	8.9N 132.8E	PCN 6			RODN
18	200000	10.3N 132.3E	PCN 6		ULCC FIX	PGTU
19	200150	12.3N 132.8E	PCN 6			RODN
20	200150	11.5N 132.2E	PCN 3	T2.0/2.0 /S0.0/20HRS		RPMK
21	200300	13.1N 132.9E	PCN 6	T2.0/2.0 /S0.0/24HRS	ULCC 10.5N 132.2E	PGTU
22	200518	10.5N 131.7E	PCN 4			PGTU
23	200518	10.5N 131.7E	PCN 4	T2.0/2.0 /S0.0/24HRS	EXP LLCC	RPMK
24	200600	13.0N 131.7E	PCN 6		ULCC 10.9N 132.6E	PGTU
25	200900	13.4N 131.8E	PCN 6		ULCC 10.9N 131.9E	PGTU
26	200951	12.3N 131.6E	PCN 3		EXP LLCC	RPMK
27	201200	12.0N 132.6E	PCN 6			PGTU
28	201600	12.5N 132.2E	PCN 6	T2.0/2.0-/D1.0/24HRS		PGTU
29	201804	13.1N 133.1E	PCN 5			RODN
30	201804	12.8N 132.5E	PCN 6			PGTU
31	202049	12.5N 130.3E	PCN 6			RPMK
32	202306	13.4N 131.8E	PCN 5			PGTU
33	202306	12.9N 131.8E	PCN 3			RPMK
34	210000	12.8N 131.9E	PCN 6	T2.5/2.5 /D0.5/21HRS		PGTU
35	210130	13.1N 131.6E	PCN 3	T2.5/2.5 /D0.5/24HRS		RPMK
36	210300	13.0N 131.9E	PCN 6			PGTU
37	210507	13.3N 131.8E	PCN 6			RPMK
38	210600	13.5N 131.8E	PCN 6			PGTU
39	210900	13.4N 132.5E	PCN 6			PGTU
40	210929	14.7N 132.0E	PCN 6			RPMK
41	211003	13.8N 132.2E	PCN 6			PGTU
42	211003	14.2N 131.7E	PCN 5			RPMK
43	211200	14.1N 132.3E	PCN 6			PGTU
44	211600	14.5N 132.5E	PCN 6		ULCC FIX	PGTU
45	211753	14.8N 131.9E	PCN 4			RODN
46	211800	14.5N 132.2E	PCN 6	T2.5/2.5 /D0.5/26HRS	ULCC FIX	PGTU
47	212242	14.7N 131.1E	PCN 5	T4.0/4.0 /D1.0/21HRS		RODN
48	212242	14.1N 131.9E	PCN 5			PGTU
49	220000	14.4N 132.1E	PCN 6			PGTU
50	220109	15.5N 132.0E	PCN 3	T3.0/3.0 /D0.5/24HRS	ULCC FIX	RODN
51	220110	14.8N 132.2E	PCN 6			RPMK
52	220300	14.8N 132.2E	PCN 6	T2.5/2.5 /S0.0/24HRS		PGTU
53	220450	15.1N 132.1E	PCN 6		EXP LLCC	PGTU
54	220600	15.6N 131.8E	PCN 6		ULCC FIX	PGTU
55	220900	15.9N 131.7E	PCN 6		ULCC FIX	PGTU
56	220908	14.9N 131.8E	PCN 6		ULCC FIX	RPMK
57	220939	15.8N 131.9E	PCN 6		ULCC FIX	PGTU
58	221200	16.1N 131.6E	PCN 6		ULCC FIX	PGTU
59	221350	15.7N 132.2E	PCN 5			RPMK

60	221600	16.7N	131.5E	PCN 6	T3.0/3.0 /D0.5/22HRS	ULCC FIX	PGTW
61	221742	17.5N	130.5E	PCN 6		ULCC FIX	PGTW
62	221742	16.7N	130.7E	PCN 6			RPNK
63	222100	17.5N	130.6E	PCN 6		ULCC FIX	PGTW
64	222148	17.8N	131.0E	PCN 3	T4.0/4.0 /S0.0/23HRS		RODN
65	222217	17.4N	130.5E	PCN 5			PGTW
66	230000	18.0N	130.2E	PCN 6	T4.0/4.0-/D1.0/24HRS	ULCC FIX	PGTW
67	230049	18.1N	130.9E	PCN 3	T3.5/3.5-/D1.0/24HRS		RPNK
68	230300	18.5N	130.0E	PCN 6		ULCC FIX	PGTW
69	230446	18.5N	129.8E	PCN 2			PGTW
70	230600	18.5N	129.8E	PCN 4		ULCC FIX	PGTW
71	230900	18.7N	129.8E	PCN 4		RGD EYE	PGTW
72	230915	18.7N	129.5E	PCN 2		WELL DEFINED EYE	PGTW
73	231028	18.9N	129.6E	PCN 4			RODN
74	231200	19.2N	129.4E	PCN 4			PGTW
75	231230	19.3N	129.3E	PCN 4		ULCC FIX	RSKO
76	231600	19.2N	129.2E	PCN 6	T4.0/4.0 /D1.0/24HRS	ULCC FIX	PGTW
77	231731	19.0N	128.9E	PCN 6			RSKO
78	231800	19.5N	129.7E	PCN 6		ULCC FIX	PGTW
79	232100	19.8N	128.9E	PCN 6		ULCC FIX	PGTW
80	232127	20.2N	128.7E	PCN 1	T4.0/4.0 /D0.5/21HRS		RPNK
81	232153	20.2N	129.2E	PCN 2			PGTW
82	240000	20.4N	129.0E	PCN 2	T5.0/5.0-/D1.0/24HRS	60 PCT EYEWALL	PGTW
83	240029	20.4N	128.7E	PCN 2	T5.0/5.0-/D1.0/27HRS	EYE FIX	RODN
84	240300	21.0N	129.0E	PCN 2		EYE FIX	PGTW
85	240600	21.5N	129.2E	PCN 2		EYE FIX	PGTW
86	240617	21.6N	128.8E	PCN 1	T4.5/4.5-/D1.0/29HRS	EYE FIX	RPNK
87	240900	21.8N	129.8E	PCN 2		EYE FIX	PGTW
* 88	241032	22.1N	130.5E	PCN 4		EYE FIX	PGTW
89	241200	22.4N	130.1E	PCN 4			PGTW
90	241309	22.6N	129.9E	PCN 2		EYE FIX	RSKO
91	241600	22.7N	130.6E	PCN 4	T5.0/5.0-/D1.0/24HRS	ULCC FIX	PGTW
92	241720	23.0N	130.7E	PCN 4		ULCC FIX	PGTW
93	241720	23.3N	130.8E	PCN 4		ULCC FIX	RSKO
94	242100	23.4N	131.4E	PCN 6		ULCC FIX	PGTW
95	242105	24.5N	132.1E	PCN 3	T4.0/5.0 /W1.0/24HRS		RODN
96	242310	24.5N	132.3E	PCN 5			RODN
97	250000	24.7N	132.1E	PCN 6	T3.5/4.5 /W1.5/24HRS		PGTW
98	250150	25.2N	133.0E	PCN 5	T3.5/4.5 /W1.0/24HRS		RPNK
99	250300	25.2N	132.6E	PCN 6			PGTW
100	250424	25.4N	132.6E	PCN 5		ULCC 25.8N 133.1E	PGTW
101	250600	25.6N	132.8E	PCN 6			PGTW
102	250900	27.1N	134.1E	PCN 6		EYEWALL OPN SE-S-SW	PGTW
103	250945	27.3N	134.8E	PCN 6			RSKO
104	251007	27.4N	134.2E	PCN 6		ULCC FIX	PGTW
105	251200	27.8N	135.3E	PCN 6			PGTW
106	251249	27.9N	135.1E	PCN 6			RSKO
107	251600	29.0N	137.0E	PCN 6	T4.0/5.0 /W1.0/24HRS	ULCC FIX	PGTW
* 108	251710	29.4N	137.7E	PCN 6		ULCC FIX	PGTW
109	251710	30.0N	138.1E	PCN 4		ULCC FIX	RSKO
* 110	251800	29.7N	137.9E	PCN 6		ULCC FIX LLCC 28.6N 136.6E	PGTW
111	252044	29.4N	137.9E	PCN 3			RODN
112	252100	29.3N	138.1E	PCN 6			PGTW
113	252246	30.0N	138.1E	PCN 3			PGTW
114	260000	30.5N	139.0E	PCN 6			PGTW
115	260413	30.8N	139.1E	PCN 3		EXP LLCC	PGTW
116	260600	30.8N	139.5E	PCN 6			PGTW
117	260900	30.9N	140.9E	PCN 6			PGTW
118	260924	30.7N	140.3E	PCN 5			RODN
119	260943	30.9N	140.6E	PCN 6			PGTW
120	261200	31.1N	141.7E	PCN 6			PGTW
121	261600	30.3N	140.9E	PCN 4			PGTW
122	261800	30.6N	141.5E	PCN 4			PGTW
123	262221	29.9N	143.2E	PCN 4			PGTW
124	270000	30.0N	143.6E	PCN 6			PGTW
125	270300	30.0N	144.5E	PCN 6			PGTW
126	270600	30.0N	144.9E	PCN 6			PGTW
127	280300	29.2N	147.4E	PCN 4		EXP LLCC	PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS MSLP	MAX-SFC-UND VEL/BRG/RNG	MAX-FLT-LVL-UND DIR/VEL/BRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	230830	18.8N 129.6E	700MB	2832	971	65 030 10	120 72 030 15	4 2	CIRCULAR	15	+11 +16 + 9	1
2	232103	20.1N 128.8E	700MB	2729		50 030 8	330 86 190 12	4 4	CIRCULAR	15	+11 +18 +12	2
3	232311	20.5N 128.7E	700MB	2706	957	90 280 7	110 90 030 15	4 4	CIRCULAR	18	+13 +18 +12	3
4	240548	21.5N 129.2E	700MB	2656		100 250 10	330 101 250 10		CIRCULAR	13	+17 +19 +16	4
5	240818	21.9N 129.7E	700MB	2651	952	100 330 10	360 79 330 10		ELLIPTICAL	20 10 360	+18 +15 +13	5
6	242059	24.1N 131.2E	700MB	2833		90 280 7	300 80 190 22				+11 +22 +12	6
7	242334	24.7N 131.9E	700MB	2844		80 300 30	310 80 230 22				+12 +20 + 7	7
8	250901	27.1N 133.9E	700MB	2855	974	100 270 40	190 74 110 30	10 10			+11 +16 + 9	8
9	251139	27.0N 135.0E	700MB	2873	979		170 65 040 45	10 10			+ 9 +14 +12	9
10	252327	30.6N 138.4E	700MB	2900	983	50 250 70	320 55 250 72	5 10			+10 +12 +10	10

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL DEPRESSION 04
BEST TRACK DATA

MO/DA/HR	BEST TRACK		WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST		ERRORS	
	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
061700Z	16.6 112.6	25	0.0 0.0	0.0	-0.0	0.0	0.0 0.0	0.0	-0.0	0.0	0.0 0.0	0.0	-0.0	0.0	0.0 0.0	0.0	-0.0	0.0
061705Z	16.3 112.2	25	0.0 0.0	0.0	-0.0	0.0	0.0 0.0	0.0	-0.0	0.0	0.0 0.0	0.0	-0.0	0.0	0.0 0.0	0.0	-0.0	0.0
061710Z	16.0 111.9	25	0.0 0.0	0.0	-0.0	0.0	0.0 0.0	0.0	-0.0	0.0	0.0 0.0	0.0	-0.0	0.0	0.0 0.0	0.0	-0.0	0.0
061715Z	16.0 110.9	25	0.0 0.0	0.0	-0.0	0.0	0.0 0.0	0.0	-0.0	0.0	0.0 0.0	0.0	-0.0	0.0	0.0 0.0	0.0	-0.0	0.0
061800Z	16.0 110.5	30	16.7 110.2	30	45.0	0.0 17.6 108.1	40.0	161.0	10.0 18.7 106.3	40.0	228.0	10.0 0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0
061805Z	16.2 110.2	30	16.5 109.9	30	25.0	0.0 17.1 107.9	40.0	184.0	10.0 18.1 106.1	30.0	198.0	5.0 0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0
061810Z	16.4 110.1	30	16.5 109.3	30	45.0	0.0 17.2 106.9	30.0	247.0	0.0 0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0
061815Z	16.6 110.4	30	16.5 109.1	30	75.0	0.0 16.5 108.4	30.0	183.0	0.0 0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0
061900Z	16.6 110.7	30	16.5 110.0	30	41.0	0.0 16.5 109.4	30.0	164.0	0.0 0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0
061905Z	16.9 111.1	30	17.0 110.6	30	34.0	0.0 17.5 110.0	30.0	121.0	5.0 0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0
061910Z	17.6 111.2	30	17.3 110.8	30	29.0	0.0 0.0 0.0	0.0	-0.0	0.0 0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0
061915Z	18.4 110.0	30	17.5 110.8	30	54.0	0.0 0.0 0.0	0.0	-0.0	0.0 0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0
062000Z	19.1 110.3	30	18.0 110.5	30	67.0	0.0 0.0 0.0	0.0	-0.0	0.0 0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0
062005Z	19.4 109.3	25	19.4 110.4	25	62.0	0.0 0.0 0.0	0.0	-0.0	0.0 0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0 0.0	0.0	-0.0	0.0

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	48.0	177.0	213.0	0.0	0.0	0.0	0.0	0.0
AVG RIGHT ANGLE ERROR	27.0	110.0	0.0	0.0	0.0	0.0	0.0	0.0
AVG INTENSITY MAGNITUDE ERROR	0.0	4.0	8.0	0.0	0.0	0.0	0.0	0.0
AVG INTENSITY BIAS	0.0	4.0	8.0	0.0	0.0	0.0	0.0	0.0
NUMBER OF FORECASTS	10	6	2	0	0	0	0	0
DISTANCE TRAVELED BY TROPICAL CYCLONE IS 441. NM								
AVERAGE SPEED OF TROPICAL CYCLONE IS 6. KNOTS								

TROPICAL DEPRESSION TD04W
FIX POSITIONS FOR CYCLONE NO. 4

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	170000	16.8N 112.5E	PCN 4	T1.5/1.5	INIT OBS	PGTW
2	170231	15.9N 112.4E	PCN 3	T1.5/1.5	INIT OBS EXP LLCC	RPMK
3	170300	16.0N 112.4E	PCN 4		EXP LLCC	PGTW
4	170600	16.6N 112.3E	PCN 6			PGTW
5	171055	16.1N 112.6E	PCN 5			RPMK
6	171055	15.4N 108.1E	PCN 6			RODN
7	171511	15.8N 110.0E	PCN 5	T1.5/1.5	INIT OBS	RPMK
8	171600	15.4N 110.2E	PCN 6	T1.5/1.5	INIT OBS ULCC FIX	PGTW
9	171800	16.6N 111.1E	PCN 6			PGTW
10	172243	16.8N 110.3E	PCN 6	T2.0/2.0 /D0.5/20HRS		RPMK
11	180000	16.5N 110.8E	PCN 6	T2.5/2.5 /D1.0/24HRS		PGTW
12	180210	16.4N 110.4E	PCN 3		EXP LLCC	RPMK
13	180210	16.4N 110.4E	PCN 3	T2.5/2.5	INIT OBS	RODN
14	180300	16.2N 110.2E	PCN 6			PGTW
15	180600	16.4N 109.9E	PCN 6			PGTW
16	180900	16.8N 109.7E	PCN 6			PGTW
17	181122	15.9N 108.2E	PCN 6		ULCC FIX	RODN
18	181200	16.7N 108.6E	PCN 6		ULCC FIX	PGTW
19	181451	16.8N 107.8E	PCN 5			RPMK
20	181800	16.2N 110.4E	PCN 6		EXP LLCC	PGTW
21	181939	16.5N 110.5E	PCN 3			PGTW
22	182100	16.8N 110.6E	PCN 4			RPMK
23	182221	16.8N 110.6E	PCN 3	T2.0/2.0 /S0.0/20HRS	EXP LLCC	PGTW
24	182300	16.8N 110.5E	PCN 3	T1.0/1.0	INIT OBS	RKSO
25	190000	17.0N 110.9E	PCN 6		EXP LLCC	PGTW
26	190150	17.2N 110.5E	PCN 5			RKSO
27	190300	17.1N 110.7E	PCN 6	T2.0/2.5 /W0.5/27HRS	EXP LLCC	PGTW
28	190600	17.6N 111.0E	PCN 6			PGTW
29	190642	16.6N 111.5E	PCN 5	T2.5/2.5 /S0.0/28HRS		RODN
30	190900	17.7N 111.3E	PCN 6			PGTW
31	191101	17.2N 111.5E	PCN 4		EXP LLCC	RPMK
32	191101	18.1N 111.1E	PCN 5			RODN
33	191148	17.0N 111.6E	PCN 3			RPMK
34	191928	19.4N 109.1E	PCN 4		EXP LLCC	RPMK
35	192200	17.1N 111.6E	PCN 6			RKSO
36	200000	19.2N 110.6E	PCN 6		EXP LLCC	PGTW
37	200026	19.2N 110.3E	PCN 3	T1.5/2.0 /W0.5/26HRS	EXP LLCC	PGTW
38	200300	18.9N 110.2E	PCN 6			PGTW
39	200600	19.2N 110.2E	PCN 6			PGTW
40	200631	19.2N 111.4E	PCN 6			RKSO

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	170600	16.0N 112.0E	020	030	59985 59981
2	170900	16.2N 111.8E	020	015	59985 59981
3	171200	16.3N 111.3E	020	015	59985 59981
4	171800	16.5N 111.0E	020	045	59985 59981

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON HAL
BEST TRACK DATA

MO/DA/HR	BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
061906Z	14.2 133.5	35	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
061912Z	14.3 132.5	30	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
061918Z	14.5 131.5	35	14.5 132.5	30	55.0	-5.0	15.2 129.1	55.0	68.0	-20.0	19.2 120.0	12.0	65.0	145.0	-30.0	22.0 123.7	80.0	253.0	-10.0	0.0
062000Z	14.8 130.6	45	15.1 130.8	45	21.0	0.0	18.5 126.7	65.0	133.0	-20.0	23.1 124.0	85.0	287.0	0.0	27.0 124.5	100.0	518.0	0.0	0.0	0.0
062006Z	15.1 129.8	65	15.4 129.8	65	16.0	-10.0	18.6 125.2	99.0	123.0	-5.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062012Z	15.4 129.0	65	15.6 129.0	65	13.0	0.0	18.0 126.1	99.0	123.0	-5.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062018Z	15.8 128.0	75	16.2 128.3	70	30.0	-5.0	18.6 125.2	99.0	137.0	-10.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062100Z	16.2 126.0	85	16.3 126.0	85	13.0	0.0	19.2 123.1	105.0	108.0	20.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062106Z	16.7 124.0	90	16.9 124.0	90	17.0	0.0	21.2 121.3	105.0	132.0	25.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062112Z	17.8 124.0	95	17.9 124.0	95	6.0	0.0	21.2 121.3	105.0	132.0	25.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062118Z	18.7 122.0	95	18.8 122.0	95	8.0	0.0	23.4 118.3	99.0	211.0	-10.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062200Z	19.1 121.0	85	19.3 121.0	90	12.0	-5.0	23.4 118.3	99.0	152.0	-10.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062206Z	19.2 120.0	80	19.4 120.0	85	20.0	15.0	23.4 118.3	99.0	187.0	-5.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062212Z	19.6 119.7	80	19.7 119.7	85	13.0	0.0	23.4 118.3	99.0	224.0	5.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062218Z	20.3 118.9	90	20.5 118.9	90	12.0	0.0	23.4 118.3	99.0	224.0	5.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062300Z	20.9 117.9	100	21.1 117.9	100	16.0	0.0	23.4 118.3	99.0	224.0	5.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062306Z	21.4 117.0	95	21.6 117.0	100	16.0	0.0	23.4 118.3	99.0	224.0	5.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062312Z	21.5 116.0	90	21.7 116.0	90	20.0	-10.0	23.4 118.3	99.0	224.0	5.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062318Z	21.8 115.0	85	22.0 115.0	80	13.0	0.0	23.4 118.3	99.0	224.0	5.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062400Z	22.2 115.4	80	22.4 115.4	80	13.0	0.0	23.4 118.3	99.0	224.0	5.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062406Z	22.8 115.3	75	23.0 115.3	75	13.0	0.0	23.4 118.3	99.0	224.0	5.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062412Z	23.3 115.0	80	23.5 115.0	80	13.0	0.0	23.4 118.3	99.0	224.0	5.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062418Z	23.9 114.8	30	24.1 114.8	30	13.0	0.0	23.4 118.3	99.0	224.0	5.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062500Z	24.0 114.8	30	24.2 114.8	30	13.0	0.0	23.4 118.3	99.0	224.0	5.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0
062506Z	24.2 114.8	30	24.4 114.8	30	13.0	0.0	23.4 118.3	99.0	224.0	5.0	23.9 110.0	110.0	300.0	30.0	28.0 124.7	115.0	535.0	20.0	0.0	0.0

ALL FORECASTS
WRNG 24-HR 48-HR 72-HR
AVG FORECAST POSIT ERROR 15. 137. 386. 630.
AVG RIGHT ANGLE ERROR 11. 109. 347. 591.
AVG INTENSITY MAGNITUDE ERROR 4. 13. 17. 17.
AVG INTENSITY BIAS -1. -5. 5. 10.
NUMBER OF FORECASTS 22 19 13 11

TYPHOONS WHILE OVER 35 KTS
WRNG 24-HR 48-HR 72-HR
15. 145. 380. 528.
11. 115. 347. 490.
4. 15. 17. 16.
-1. -15. 5. 7.
21 17 13 9

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1305. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 9. KNOTS

TYPHOON HAL
FIX POSITIONS FOR CYCLONE NO. 5

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	131800	5.5N 151.5E	PCN 6	T0.0/0.0	INIT OBS	PGTW
2	132100	5.3N 151.1E	PCN 6			PGTW
3	140000	4.5N 151.7E	PCN 6			PGTW
4	140300	4.8N 151.4E	PCN 6			PGTW
5	140600	5.0N 150.8E	PCN 6	T1.0/1.0	INIT OBS	PGTW
6	140900	5.1N 151.0E	PCN 6			PGTW
7	141200	4.4N 147.4E	PCN 6			PGTW
8	141500	3.3N 147.4E	PCN 6			PGTW
9	150000	5.8N 140.8E	PCN 6		ULCC FIX	PGTW
10	150130	17.3N 137.5E	PCN 6	T1.0/1.0	INIT OBS	PGTW
11	150543	5.1N 140.4E	PCN 6		ULCC FIX	PMTK
12	160000	6.3N 146.9E	PCN 6	T1.0/1.0 /S0.0/24HRS		PMTK
13	160900	8.1N 144.3E	PCN 6		ULCC FIX	PMTK
14	161200	7.1N 144.2E	PCN 6			PMTK
15	170900	11.0N 139.7E	PCN 6			PMTK
16	171200	10.3N 139.7E	PCN 6	T1.0/1.0	INIT OBS ULCC FIX	PMTK
17	171600	10.6N 139.4E	PCN 6		ULCC FIX	PMTK
18	171800	11.0N 139.0E	PCN 6		ULCC FIX	PMTK
19	172100	11.4N 139.1E	PCN 6		ULCC FIX	PMTK
20	180028	12.4N 139.1E	PCN 6	T1.5/1.5	INIT OBS	RODN
21	180600	12.6N 138.4E	PCN 6	T1.0/1.0	INIT OBS	RODN
22	180941	12.7N 139.1E	PCN 6			RODN
23	181309	13.8N 139.3E	PCN 6			RODN
24	181600	13.4N 136.3E	PCN 6			RODN
25	182040	12.6N 137.0E	PCN 6	T2.0/2.0 /D1.0/28HRS	ULCC FIX	RODN
26	182100	15.9N 135.9E	PCN 6		ULCC FIX	RODN
27	182128	15.8N 136.1E	PCN 6			RODN
28	190000	15.2N 134.9E	PCN 6			RODN
29	190008	16.3N 134.4E	PCN 6	T2.0/2.0 /D0.5/24HRS		RODN
30	190600	13.4N 133.5E	PCN 6	T2.0/2.0 /D1.0/24HRS		RODN
31	190900	13.6N 132.0E	PCN 6			RODN
32	190920	14.0N 133.2E	PCN 6			RODN
33	191007	14.0N 132.6E	PCN 6		ULCC FIX	RODN
34	191200	13.9N 132.3E	PCN 6			RODN
35	191600	13.7N 132.3E	PCN 6	T2.5/2.5+/D0.5/24HRS	PSBL SCNDRY 14.3N 132.8E	RODN
36	191746	14.0N 132.3E	PCN 6		ULCC FIX	RODN
37	192100	15.1N 132.6E	PCN 6			RODN
38	192245	15.0N 131.1E	PCN 6			RODN
39	200000	14.5N 130.9E	PCN 6			RODN
40	200129	15.1N 130.0E	PCN 6	T3.0/3.0 /D1.0/25HRS		RODN
41	200300	15.9N 130.2E	PCN 6	T3.0/3.0 /D1.0/21HRS	EXP LLCC	RODN
42	200449	14.9N 130.5E	PCN 6			RODN
43	200600	15.5N 129.9E	PCN 6			RODN
44	200900	15.7N 129.9E	PCN 6			RODN
45	201200	15.7N 129.2E	PCN 6			RODN
46	201410	15.7N 129.5E	PCN 6			RODN
47	201735	16.2N 128.2E	PCN 6			RODN
48	201800	16.2N 128.3E	PCN 6	T3.5/3.5 /D1.0/26HRS		RODN
49	202100	16.2N 127.4E	PCN 6		ULCC FIX	RODN
50	202221	16.3N 127.3E	PCN 6			RODN
51	210100	16.6N 126.6E	PCN 6			RODN
52	210109	16.8N 126.0E	PCN 6	T4.5/4.5 /D1.5/24HRS		RODN
53	210200	16.6N 126.2E	PCN 6	T4.0/4.0 /D1.0/24HRS		RODN
54	210500	16.7N 125.9E	PCN 6			RODN
55	210621	16.7N 125.9E	PCN 6	T5.0/5.0	INIT OBS	RODN
56	210621	17.4N 125.3E	PCN 6	T4.5/4.5	INIT OBS	RODN
57	211019	18.0N 125.0E	PCN 6	T4.5/4.5 /D1.5/28HRS		RODN
58	211059	18.1N 124.8E	PCN 6			RODN
59	211100	16.8N 124.8E	PCN 6			RODN
60	211200	17.8N 124.2E	PCN 6	T4.5/4.5 /D1.0/18HRS		RODN
61	211600	18.1N 123.7E	PCN 6			RODN

31942	73008
31914	72508
30914	72508
10912	52706
70914	72607
10973	53006
31974	72807
30974	72910
10913	53006
30912	73008
10923	53006
30944	73007
10913	53007
30972	73506
10913	53007
30912	73666
10914	53006
30912	73008
10914	53006
20912	73185
20912	73104
10914	50000
20912	73605
20912	73666
10914	73668
10914	73607
24854	73405
4154	83505
51114	83605
11114	83606
////	83506
////	83405
////	83606
////	83506
////	83405
////	83405

[illegible]

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS			
1	240900	23.0N 115.2E	040	018	59501	59293	59117	45005
2	241200	23.2N 115.1E	030	030	59501	59293	59117	45005
3	241500	23.8N 115.2E	030	045	59501	59293	59117	45005
4	241800	23.9N 114.7E	060	040	59501	59293	59117	45005

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON IRMA
BEST TRACK DATA

MO/DA/HR	BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
062412Z	8.1 135.9	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062418Z	8.8 134.9	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062500Z	9.4 134.0	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062506Z	9.9 133.3	45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062512Z	10.4 132.5	50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062518Z	11.0 132.0	55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062600Z	11.5 131.5	60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062606Z	12.3 131.0	60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062612Z	13.1 130.5	60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062618Z	13.9 130.0	60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062700Z	14.9 130.0	60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062706Z	15.8 130.0	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062712Z	16.7 129.7	75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062718Z	17.7 129.7	75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062800Z	18.6 129.7	75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062806Z	20.0 129.8	80	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062812Z	21.3 129.9	80	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062818Z	22.8 130.0	85	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062900Z	23.4 130.1	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062906Z	25.7 130.2	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062912Z	27.0 130.5	85	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
062918Z	28.2 131.0	80	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
063000Z	29.4 131.9	75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
063006Z	30.9 133.4	75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
063012Z	32.4 135.5	75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
063018Z	34.8 138.7	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
070100Z	37.7 142.5	60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
070106Z	40.1 146.5	55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	15.	120.	216.	416.	11.	71.	173.	273.
AVG RIGHT ANGLE ERROR	11.	71.	173.	273.	11.	71.	173.	273.
AVG INTENSITY MAGNITUDE ERROR	1.	6.	13.	15.	1.	6.	13.	15.
AVG INTENSITY BIAS	26.	22.	18.	14.	26.	22.	18.	14.
NUMBER OF FORECASTS	26	22	18	14	26	22	18	14

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 2413. NM

AVERAGE SPEED OF TROPICAL CYCLONE IS 15. KNOTS

TYPHOON IRMA
FIX POSITIONS FOR CYCLONE NO. 6

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	231800	7.8N 136.2E	PCN 6	T1.0/1.0	INIT OBS	PGTW
2	232100	7.6N 134.8E	PCN 6		ULCC FIX	PGTW
3	232400	7.4N 137.3E	PCN 6		ULCC FIX	PGTW
4	240300	7.4N 136.6E	PCN 6	T1.5/1.5	INIT OBS ULCC FIX	PGTW
5	240548	8.0N 136.1E	PCN 5		ULCC FIX	PGTW
6	240548	7.8N 135.5E	PCN 5	T1.0/1.0	INIT OBS	RPMK
7	240900	8.6N 135.8E	PCN 6		ULCC FIX	PGTW
8	241249	8.4N 134.7E	PCN 6		ULCC FIX	PGTW
9	241600	9.1N 134.8E	PCN 6	T2.0/2.0+/D1.0/21HRS	ULCC FIX	PGTW
10	241800	9.2N 134.7E	PCN 6		ULCC FIX	PGTW
11	242100	9.8N 134.0E	PCN 6			PGTW
12	242155	9.5N 134.2E	PCN 3	T3.0/3.0	INIT OBS	RODN
13	242225	9.6N 134.1E	PCN 5			PGTW
14	250000	9.6N 133.5E	PCN 6	T2.5/2.5 /D1.0/21HRS		RODN
15	250129	10.0N 134.3E	PCN 3		ULCC FIX	PGTW
16	250300	9.7N 132.8E	PCN 6			PGTW
17	250537	10.0N 133.1E	PCN 5			PGTW
18	250537	9.8N 133.0E	PCN 5	T2.5/2.5 /D1.5/24HRS		RPMK
19	250900	10.5N 132.6E	PCN 4		ULCC FIX	PGTW
20	251200	10.8N 131.7E	PCN 4		ULCC FIX	PGTW
21	251500	11.1N 130.9E	PCN 6	T3.0/3.0 /D0.1/24HRS		PGTW
22	251800	11.3N 130.5E	PCN 6		ULCC FIX	PGTW
23	252100	11.3N 130.5E	PCN 6		ULCC FIX	PGTW
24	252100	10.8N 130.6E	PCN 5			RPMK
25	252100	10.8N 131.4E	PCN 6			PGTW
26	252134	10.7N 131.5E	PCN 5	T3.5/3.5+/D0.5/24HRS		RODN
27	260000	11.5N 130.9E	PCN 4	T3.0/3.0 /D0.5/24HRS		PGTW
28	260109	11.6N 130.9E	PCN 3			PGTW
29	260300	12.0N 130.8E	PCN 6			PGTW
30	260527	12.4N 130.8E	PCN 3			PGTW
31	260527	12.0N 131.8E	PCN 6	T3.0/3.0 /D0.5/24HRS		RPMK
32	260900	12.8N 130.6E	PCN 6			PGTW
33	261014	13.0N 130.5E	PCN 6		ULCC 13.0N 131.5E	RODN
34	261038	12.9N 131.5E	PCN 6			PGTW
35	261200	13.2N 130.3E	PCN 6		ULCC 13.0N 130.9E	PGTW
36	261350	13.4N 130.7E	PCN 6		ULCC FIX	PGTW
37	261600	14.2N 130.8E	PCN 4	T4.0/4.0 /D1.0/24HRS		PGTW
38	261800	14.3N 130.6E	PCN 4		ULCC FIX	PGTW
39	261812	14.5N 130.5E	PCN 6			PGTW
40	261812	14.4N 130.4E	PCN 6			RODN
41	262100	14.7N 130.4E	PCN 6			PGTW
42	262112	14.9N 130.5E	PCN 6			PGTW
43	262317	15.2N 130.2E	PCN 3			RODN
44	270000	15.0N 130.2E	PCN 6	T4.0/4.0 /D1.0/24HRS	EYE FIX	PGTW
45	270049	15.3N 130.3E	PCN 5			PGTW
46	270049	15.2N 130.0E	PCN 1	T4.0/4.0 /D0.5/26HRS	EYE FIX	RODN
47	270300	15.2N 130.1E	PCN 6			PGTW
48	270516	15.7N 130.2E	PCN 3		EYE FIX	PGTW
49	270516	15.9N 130.0E	PCN 3	T4.0/4.0 /D1.0/24HRS		RPMK
50	270600	15.8N 130.0E	PCN 4		EYE FIX	PGTW
51	270952	16.4N 129.6E	PCN 4			PGTW
52	271014	16.6N 129.7E	PCN 3		ULCC FIX	RPMK
53	271200	16.9N 129.5E	PCN 2		EYE WALL 30 NM DIA	PGTW
54	271327	17.2N 129.4E	PCN 4			PGTW
55	271600	17.5N 129.3E	PCN 2	T4.5/4.5 /D0.5/24HRS	EYE FIX	PGTW

AIRCRAFT FIXES

RADAR FIXES

173

33	292200	29.2N	131.5E	LAND
34	2922300	29.2N	131.7E	LAND
35	292300	29.1N	131.5E	LAND
36	2923300	29.1N	131.6E	LAND
37	300000	29.3N	131.9E	LAND
38	3000300	29.3N	131.8E	LAND
39	300100	29.4N	132.1E	LAND
40	300100	29.8N	132.0E	LAND
41	300200	29.5N	132.5E	LAND
42	3002300	29.5N	132.5E	LAND
43	300300	30.3N	132.5E	LAND
44	300400	30.2N	132.4E	LAND
45	300400	30.4N	132.7E	LAND
46	300500	30.3N	132.5E	LAND
47	3005300	30.3N	132.5E	LAND
48	300600	30.5N	133.1E	LAND
49	300600	30.9N	133.4E	LAND
50	300700	31.0N	133.8E	LAND
51	300700	31.0N	133.7E	LAND
52	300715	31.0N	133.3E	LAND
53	300800	31.0N	134.1E	LAND
54	300800	31.1N	134.0E	LAND
55	300800	31.3N	133.9E	LAND
56	300900	31.4N	134.3E	LAND
57	300900	31.6N	134.4E	LAND
58	301000	31.6N	134.5E	LAND
59	301000	31.9N	134.7E	LAND
60	301100	31.9N	135.0E	LAND
61	301100	32.2N	135.1E	LAND
62	301200	32.3N	135.3E	LAND
63	301200	32.5N	135.4E	LAND
64	301300	32.5N	135.5E	LAND
65	301300	32.8N	135.9E	LAND
66	301400	33.0N	136.3E	LAND
67	301400	33.1N	136.3E	LAND
68	301500	33.5N	136.7E	LAND
69	301500	33.5N	136.7E	LAND
70	301600	33.5N	136.9E	LAND
71	301700	34.1N	138.2E	LAND
72	301700	34.2N	138.1E	LAND
73	301800	34.2N	138.1E	LAND
74	301900	35.3N	139.6E	LAND
75	302000	35.8N	140.1E	LAND
76	302100	36.6N	140.6E	LAND
77	302100	36.6N	140.6E	LAND
78	302200	36.6N	141.8E	LAND
79	302300	37.1N	142.3E	LAND
80	302300	37.6N	141.9E	LAND
81	010000	38.2N	142.8E	LAND
82	010000	38.2N	142.8E	LAND
83	010100	39.5N	142.3E	LAND

551912	50314
555911	50711
10722	50314
105941	50314
20612	50514
65941	50413
11512	50316
51962	50522
55162	50422
65142	50416
65142	50424
65111	50622
55111	50722
65111	50816
55112	50524
55112	50524
55112	50422
75114	50516
55511	50624
55511	50532
55511	50532
55511	50538
55513	50527
55513	50630
55513	50527
65113	50427
65113	50622
30941	50638
61114	50443
61113	50643
61113	50549
61113	50549
61113	50546
65113	50543
65113	50546
65113	50450
65113	50450
65113	50455
65113	50255

30.	6N	131	0E	47869
30.	6N	129	5E	47909
31.	3N	131	9E	
30.	6N	131	0E	47869
30.	6N	129	5E	47909
31.	3N	131	9E	
28.	4N	129	5E	47909
30.	6N	131	0E	47869
31.	3N	131	9E	
31.	6N	131	0E	47869
30.	6N	131	0E	47869
31.	3N	131	9E	
31.	3N	131	0E	47869
31.	3N	131	9E	
30.	6N	131	0E	47869
30.	6N	131	0E	47869
31.	3N	131	9E	
30.	6N	131	0E	47869
31.	3N	131	9E	
31.	3N	131	0E	47869
31.	3N	131	9E	
33.	3N	134	2E	47899
33.	3N	131	9E	
33.	3N	134	2E	47899
33.	3N	138	7E	47639
33.	3N	134	2E	47899
33.	3N	138	7E	47639
33.	3N	134	2E	47899
33.	3N	138	7E	47639
33.	3N	134	2E	47899
33.	3N	138	7E	47639
33.	3N	138	7E	47639
33.	3N	138	7E	47639
33.	6N	138	8E	47639
33.	3N	138	7E	47639
33.	3N	138	7E	47639
33.	3N	138	7E	47639
33.	7N	138	8E	47572
33.	3N	138	7E	47639
33.	3N	138	7E	47639
33.	3N	138	7E	47639
33.	3N	140	9E	47590
33.	3N	138	7E	47639
33.	3N	140	9E	47590
33.	3N	140	9E	47590

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON JEFF
BEST TRACK DATA

[illegible]

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	18.	132.	342.	639.	19.	130.	283.	439.
AVG FORECAST NEGAT ERROR	13.	80.	170.	345.	13.	85.	135.	177.
AVG INTENSITY MAGNITUDE ERROR	-2.	1.	1.	2.	-2.	-0.	15.	31.
AVG INTENSITY BIAS	40.	30	21	13	37	26	17	9
NUMBER OF FORECASTS								

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 2668. NM

AVERAGE SPEED OF TROPICAL CYCLONE IS 9. KNOTS

TYPHOON JEFF
FIX POSITIONS FOR CYCLONE NO. 7

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCR	DVORAK CODE	COMMENTS	SITE
*	1	202100	18.1N 149.6E	PCN 6		
*	2	202327	18.4N 150.5E	PCN 5		
*	3	210000	18.4N 150.7E	PCN 6		
*	4	210300	19.2N 150.0E	PCN 6		
*	5	210420	19.9N 149.2E	PCN 5		
*	6	210600	20.2N 149.3E	PCN 6		
*	7	210807	20.7N 147.8E	PCN 6		
*	8	210906	20.7N 146.7E	PCN 6	ULCC FIX	
*	9	211203	21.4N 146.6E	PCN 6	ULCC FIX	
10	10	211600	20.8N 146.5E	PCN 6	ULCC FIX	
11	11	211706	21.0N 145.9E	PCN 5	ULCC FIX	
*	12	212047	20.8N 145.8E	PCN 6	ULCC FIX	
*	13	212100	20.2N 146.9E	PCN 5		
*	14	212145	20.7N 147.0E	PCN 5	ULCC FIX	
15	15	220000	20.4N 146.0E	PCN 5		
16	16	220049	20.5N 145.6E	PCN 5		
17	17	220300	20.4N 146.6E	PCN 4		
18	18	220600	20.2N 145.3E	PCN 6		
19	19	220927	20.5N 145.0E	PCN 6		
20	20	221025	20.5N 144.8E	PCN 6		
21	21	221200	20.5N 144.4E	PCN 6		
22	22	221329	20.5N 145.0E	PCN 6	ULCC 23.5N 145.2E	
23	23	221600	20.5N 144.4E	PCN 6		
24	24	221655	20.7N 144.2E	PCN 6		
25	25	221800	20.8N 144.5E	PCN 6		
26	26	222025	20.4N 145.5E	PCN 6		
27	27	222304	20.9N 145.2E	PCN 5		
28	28	222305	20.5N 145.2E	PCN 5		
29	29	230000	20.5N 145.2E	PCN 6		
30	30	230359	24.5N 145.8E	PCN 5		
31	31	230600	24.5N 146.2E	PCN 6		
32	32	230905	25.3N 146.5E	PCN 6		
33	33	231003	25.5N 146.9E	PCN 6		
34	34	231200	25.8N 146.8E	PCN 6	ULAC 25.6N 146.5E	
35	35	231309	25.9N 147.2E	PCN 6		
36	36	231600	25.2N 147.5E	PCN 6		
37	37	231644	25.8N 147.6E	PCN 6	ULCC FIX	

38	231800	25.7N	147.9E	PCN 6	T3.5/3.5 /D1.5/26HRS	ULAC 26.3N 147.9E	PGTW
39	231800	25.8N	148.3E	PCN 6		EXP LLCC ULAC 27.0N 147.4E	PGTW
40	231800	25.9N	147.7E	PCN 6		EXP LLCC ULAC 27.1N 148.0E	PGTW
41	240000	26.0N	147.8E	PCN 4	T2.5/3.0-/W1.0/24HRS	EXP LLCC ULAC 28.0N 148.0E	PGTW
42	240347	26.1N	147.8E	PCN 6		ULCC FIX	PGTW
43	240600	26.2N	147.9E	PCN 6		ULCC FIX	PGTW
44	240900	26.3N	147.8E	PCN 6		ULCC FIX	PGTW
45	240941	26.4N	147.9E	PCN 6		ULCC FIX	PGTW
46	241200	26.5N	147.8E	PCN 6		ULCC FIX	PGTW
47	241248	26.6N	148.2E	PCN 6	T2.5/3.5 /W1.0/22HRS	ULCC FIX	PGTW
48	241600	26.7N	147.0E	PCN 6		ULCC FIX	PGTW
49	241634	26.8N	146.6E	PCN 4		ULCC FIX	PGTW
50	241800	26.9N	146.6E	PCN 6		ULCC FIX	PGTW
51	241943	27.0N	146.0E	PCN 6		ULCC FIX	PGTW
52	242100	27.1N	145.3E	PCN 6		ULCC FIX	PGTW
53	242221	27.2N	145.0E	PCN 3	T1.5/1.5	PSBL EXP LLCC	PGTW
54	242347	27.3N	144.8E	PCN 3		EXP LLCC	PGTW
55	242348	27.4N	144.9E	PCN 3		INIT OBS	PGTW
56	250000	27.5N	144.8E	PCN 4		EXP LLCC	PGTW
57	250337	27.6N	144.8E	PCN 4	T2.5/2.5-/S0.0/24HRS		PGTW
58	250600	27.7N	144.5E	PCN 6			PGTW
59	250823	27.8N	144.4E	PCN 6			PGTW
60	250900	27.9N	144.3E	PCN 6			PGTW
61	250919	28.0N	144.1E	PCN 6			PGTW
62	251200	28.1N	143.9E	PCN 6	T1.5/1.5	INIT OBS	PGTW
63	251228	28.2N	143.9E	PCN 6		EXP LLCC	PGTW
64	251228	28.3N	143.9E	PCN 6	T1.5/2.5 /W1.0/24HRS		PGTW
65	251600	28.4N	143.9E	PCN 6			PGTW
66	251804	28.5N	143.9E	PCN 6			PGTW
67	251859	28.6N	143.9E	PCN 6			PGTW
68	252159	28.7N	143.9E	PCN 6			PGTW
69	252327	28.8N	143.9E	PCN 6			PGTW
70	252327	28.9N	143.9E	PCN 6	T1.5/1.5 /S0.0/24HRS	EXP LLCC	PGTW
71	260100	29.0N	140.4E	PCN 3		EXP LLCC	PGTW
72	260300	29.1N	139.8E	PCN 4	T0.0/1.0 /W2.5/24HRS		PGTW
73	260508	29.2N	139.4E	PCN 3		EXP LLCC	PGTW
74	260508	29.3N	139.3E	PCN 3	T1.5/1.5	INIT OBS	PGTW
75	260943	29.4N	138.5E	PCN 4		EXP LLCC	PGTW
76	261039	29.5N	138.4E	PCN 5		EXP LLCC	PGTW
77	261200	29.6N	137.9E	PCN 6		EXP LLCC	PGTW
78	261600	29.7N	136.7E	PCN 6	T1.5/1.5 /S0.0/24HRS		PGTW
79	261754	29.8N	136.6E	PCN 6		PSBL SCNDRY LLCC 26.0N 133.6E	PGTW
80	261754	29.9N	136.9E	PCN 5		ULAC 25.8N 134.6E	PGTW
81	262100	30.0N	134.7E	PCN 6			PGTW
82	262318	30.1N	133.5E	PCN 5			PGTW
83	270048	30.2N	133.5E	PCN 3	T3.0/3.0 /D1.5/25HRS		PGTW
84	270048	30.3N	133.2E	PCN 3	T2.5/2.5 /D2.5/22HRS		PGTW
85	270300	30.4N	133.1E	PCN 6			PGTW
86	270458	30.5N	132.5E	PCN 6			PGTW
87	270600	30.6N	132.8E	PCN 6			PGTW
88	270921	30.7N	132.0E	PCN 6		ULCC FIX	PGTW
89	270921	30.8N	131.6E	PCN 6		ULAC 24.6N 131.4E	PGTW
90	271017	30.9N	131.8E	PCN 6		ULAC 24.6N 131.4E	PGTW
91	271200	31.0N	131.3E	PCN 6		ULCC FIX	PGTW
92	271229	31.1N	131.8E	PCN 6		ULCC FIX	PGTW
93	271300	31.2N	130.8E	PCN 6		ULCC FIX	PGTW
94	271743	31.3N	129.9E	PCN 6		ULCC FIX	PGTW
95	271743	31.4N	130.7E	PCN 6	T2.5/2.5 /D1.0/25HRS	EYE FIX	PGTW
96	272100	31.5N	130.0E	PCN 6			PGTW
97	272256	31.6N	129.0E	PCN 3	T3.0/3.0+/S0.0/23HRS		PGTW
98	272256	31.7N	129.0E	PCN 6			PGTW
99	280000	31.8N	129.0E	PCN 6			PGTW
100	280028	31.9N	128.5E	PCN 3			PGTW
101	280210	32.0N	128.3E	PCN 3	T3.0/3.0	INIT OBS EXP LLCC	PGTW
102	280300	32.1N	128.5E	PCN 6			PGTW
103	280600	32.2N	127.4E	PCN 6	T3.0/3.0 /D0.5/29HRS		PGTW
104	280900	32.3N	127.2E	PCN 6		ULCC FIX	PGTW
105	281136	32.4N	126.7E	PCN 3		EXP LLCC	PGTW
106	281136	32.5N	126.4E	PCN 6		ULCC FIX	PGTW
107	281200	32.6N	126.7E	PCN 6		ULCC FIX	PGTW
108	281450	32.7N	126.6E	PCN 6	T3.5/3.5-/D1.0/23HRS	ULCC FIX	PGTW
109	281600	32.8N	126.3E	PCN 6		ULCC FIX	PGTW
110	281800	32.9N	126.2E	PCN 6		ULCC FIX	PGTW
111	282100	33.0N	125.4E	PCN 6		ULCC FIX	PGTW
112	282140	33.1N	125.3E	PCN 6		ULCC FIX	PGTW
113	290000	33.2N	125.0E	PCN 6		ULCC FIX	PGTW
114	290016	33.3N	124.9E	PCN 6	T4.0/4.0-/D1.0/24HRS	PSBL EYE FORMING	PGTW
115	290016	33.4N	124.7E	PCN 6	T3.5/3.5	INIT OBS	PGTW
116	290149	33.5N	124.7E	PCN 6			PGTW
117	290300	33.6N	124.5E	PCN 6			PGTW
118	290600	33.7N	124.2E	PCN 6	T4.5/4.5-/D1.5/24HRS	RAGGED EYE FIX	PGTW
119	290618	33.8N	124.3E	PCN 3			PGTW
120	290900	33.9N	124.0E	PCN 4			PGTW
121	291020	34.0N	123.9E	PCN 4			PGTW
122	291114	34.1N	123.5E	PCN 3			PGTW
123	291114	34.2N	123.9E	PCN 4		ULCC FIX	PGTW
124	291200	34.3N	123.8E	PCN 4			PGTW
125	291430	34.4N	123.5E	PCN 1			PGTW
126	291600	34.5N	123.2E	PCN 6	T4.0/4.0-/D0.5/24HRS		PGTW
127	291800	34.6N	123.1E	PCN 6		ULCC FIX	PGTW
128	292100	34.7N	122.7E	PCN 6		ULCC FIX	PGTW
129	292118	34.8N	123.1E	PCN 6			PGTW
130	292354	34.9N	122.6E	PCN 3	T4.0/4.0	INIT OBS EYE FIX EYE OPN WEST	PMTK
131	292354	35.0N	122.4E	PCN 1	T4.5/4.5 /D1.0/24HRS	EYE FIX EYE OPN SW	RKSO
132	300000	35.1N	122.5E	PCN 6		ULCC FIX	PGTW
133	300300	35.2N	122.0E	PCN 2		EYE FIX	PGTW
134	300600	35.3N	121.7E	PCN 6	T4.5/4.5 /S0.0/24HRS		PGTW
135	300607	35.4N	122.0E	PCN 1		EYE FIX	PMTK
136	300900	35.5N	121.8E	PCN 4		ULCC FIX	PGTW
137	300959	35.6N	121.5E	PCN 4			PGTW
138	301052	35.7N	121.6E	PCN 6			PGTW
139	301200	35.8N	121.7E	PCN 6			PGTW
140	301400	35.9N	121.4E	PCN 1		EYE FIX	PGTW
141	301600	36.0N	121.0E	PCN 6			PGTW
142	301800	36.1N	121.1E	PCN 6			PGTW
143	301853	36.2N	121.0E	PCN 6		ULCC FIX	RKSO
144	302100	36.3N	121.4E	PCN 6	T3.5/3.5	ULCC FIX	PGTW
145	302239	36.4N	121.2E	PCN 4		INIT OBS	PGTW
146	302339	36.5N	121.0E	PCN 3		ULCC FIX	PGTW
147	310000	36.6N	120.7E	PCN 6		ULCC FIX	PGTW
148	310108	36.7N	120.4E	PCN 3		ULCC FIX	PGTW
149	310109	36.8N	120.7E	PCN 5		ULCC FIX	PMTK
150	310300	36.9N	120.5E	PCN 6		ULCC FIX	PGTW
151	310556	37.0N	120.7E	PCN 5			PMTK
152	310556	37.1N	120.6E	PCN 3			RKSO
153	310600	37.2N	120.6E	PCN 6			PGTW
154	310900	37.3N	120.9E	PCN 6			PGTW

```
ULCC  FIX
ULCC  FIX
ULCC  FIX
```

```

ULCC  FIX
INIT  OBS  ULCC  FIX
ULCC  FIX
INIT  OBS
ULCC  FIX

```

ULCC FIX

T3.0/3.0

T3.5/3.5

T3.0/3.0

13.073.0

PARTIALLY EXP LLCC

EXP LLCC

NO.	TIME (Z)	FIX POSITION	RADAR	ACCY	EYE SHAPE	EYE DIAM	RADAR-CODE ASUAR TDDFF	COMMENTS	RADAR POSITION	SITE IMO NO.
1	072100	00N 129.6E	LAND				55//3 52708		006.2N 127.8E	47937
2	072200	00N 129.7E	LAND				65//3 72511		006.2N 127.8E	47937
3	080100	00N 128.6E	LAND				55//3 72712		006.2N 127.8E	47937
4	080200	00N 128.4E	LAND				55//3 72714		006.2N 127.8E	47937
5	080300	04.9N 128.2E	LAND				55//2 72611		006.2N 127.8E	47937
6	080400	04.7N 127.7E	LAND				35//3 57777		004.8N 125.3E	47927
7	080400	05.0N 128.0E	LAND				55//1 72711		006.2N 127.8E	47937
8	080425	03N 128.0E	LAND	POOR					004.8N 127.8E	47937
9	080500	05.1N 127.8E	LAND				55//1 72811		006.2N 127.8E	47937
10	080500	04.8N 127.5E	LAND				55//4 52914		004.8N 125.3E	47927
11	080515	04.8N 127.9E	LAND	GOOD		25			006.1N 127.7E	47937
12	080600	04.6N 127.9E	LAND				35//3 51814		006.1N 127.7E	47937
13	080600	05.0N 127.6E	LAND				55//1 72811		006.2N 125.3E	47927
14	080700	04.8N 127.4E	LAND				35//4 53322		004.8N 125.3E	47927
15	080700	04.8N 127.4E	LAND				55//1 72512		004.8N 127.8E	47937
16	080715	04.8N 127.3E	LAND	GOOD		25			006.1N 127.7E	47937
17	080800	04.7N 127.3E	LAND				65//2 72312		004.8N 125.3E	47927
18	080800	04.8N 127.0E	LAND				35//4 52722		004.8N 125.3E	47927
19	080900	04.7N 127.2E	LAND				65//2 72308		006.2N 127.8E	47937
20	080900	04.7N 126.9E	LAND	POOR		25		YOZADAKE 280900Z	004.8N 125.3E	47927
21	081000	05.0N 126.9E	LAND				65//3 52219		006.1N 127.7E	47937
22	081000	04.5N 126.6E	LAND				65//2 72404		004.8N 125.3E	47927
23	081000	04.7N 127.2E	LAND				65//3 57777		006.2N 127.8E	47937
24	081100	04.6N 126.8E	LAND				65//1 72716		004.8N 125.3E	47927
25	081100	04.7N 126.9E	LAND	FAIR		50		YOZADAKE 281100Z	006.2N 127.8E	47937
26	081200	04.5N 126.9E	LAND				65//13 40000		006.1N 127.7E	47937
27	081200	04.7N 126.8E	LAND				65//3 50104		004.8N 125.3E	47927
28	081200	04.7N 126.8E	LAND				65//3 72709		006.2N 127.8E	47937
29	081300	04.8N 126.7E	LAND				65//3 53211		004.8N 125.3E	47927
30	081300	04.8N 126.7E	LAND				65//2 72709		004.8N 125.3E	47927
31	081300	04.8N 126.5E	LAND				65//3 52711		006.2N 127.8E	47937
32	081400	04.8N 126.5E	LAND				65//1 72908		004.8N 125.3E	47927
33	081400	04.8N 126.5E	LAND				65//13 72811		006.2N 127.8E	47937
34	081500	04.7N 126.2E	LAND				65//1 73111		004.8N 125.3E	47927
35	081500	05.0N 126.4E	LAND				65//3 52908		006.2N 127.8E	47937
36	081500	04.8N 126.3E	LAND				65//1 72809		004.8N 125.3E	47927
37	081600	04.8N 126.2E	LAND				65//3 52511		006.2N 127.8E	47937
38	081600	04.8N 126.2E	LAND				65//2 72908		004.8N 125.3E	47927
39	081700	04.9N 126.1E	LAND				65//3 53108		006.2N 127.8E	47937
40	081700	04.9N 126.1E	LAND				65//3 42916		004.8N 125.3E	47927
41	081800	05.0N 125.9E	LAND				55//3 52911		004.8N 125.3E	47927
42	081800	05.0N 125.9E	LAND				65//2 72808		006.2N 127.8E	47937
43	081800	05.0N 125.9E	LAND				65//14 52208		004.8N 125.3E	47927
44	081900	05.2N 125.8E	LAND				65//2 73111		006.2N 127.8E	47937
45	081900	05.0N 125.7E	LAND				65//3 52311		004.8N 125.3E	47927
46	082000	05.0N 125.5E	LAND				65//14 52618		004.8N 125.3E	47927
47	082000	05.0N 125.5E	LAND				55//3 52711		006.2N 127.8E	47937
48	082000	05.0N 125.5E	LAND				65//2 73014		004.8N 125.3E	47927
49	082000	05.0N 125.4E	LAND				65//1 72709		006.2N 127.8E	47937
50	082100	05.1N 125.4E	LAND				65//2 72809		004.8N 125.3E	47927
51	082100	05.0N 125.5E	LAND				55//3 50000		006.2N 127.8E	47937
52	082100	05.1N 125.3E	LAND				65//13 73009		004.8N 125.3E	47927
53	082200	05.4N 125.3E	LAND				65//3 52516		006.2N 127.8E	47937
54	082200	05.2N 125.4E	LAND				65//3 72704		004.8N 125.3E	47927
55	082200	05.2N 125.4E	LAND				65//23 73508		004.8N 125.3E	47927
56	082300	05.3N 125.3E	LAND				65//3 73204		006.2N 127.8E	47937
57	082300	05.3N 125.3E	LAND				25//3 50114		004.8N 125.3E	47927
58	082300	05.3N 125.3E	LAND				65//1 73204		006.2N 127.8E	47937
59	082400	05.4N 125.3E	LAND				35//3 73205		004.8N 125.3E	47927
60	082400	05.1N 125.1E	LAND				55//3 72709		004.8N 125.3E	47927
61	080100	05.3N 124.9E	LAND				65//3 53111		006.2N 127.8E	47937
62	080200	05.3N 124.9E	LAND				65//1 52410		004.8N 125.3E	47927
63	080200	05.3N 124.9E	LAND				75//2 52712		006.2N 127.8E	47937
64	080300	05.4N 124.5E	LAND				35//3 52916		004.8N 125.3E	47927
65	080400	05.5N 124.4E	LAND				65//3 73113		006.2N 127.8E	47937
66	080400	05.5N 124.4E	LAND				35//3 50000		004.8N 125.3E	47927
67	080400	05.6N 124.4E	LAND				65//3 54963		004.8N 125.3E	47927
68	080500	05.5N 124.3E	LAND				35//3 50000		006.2N 127.8E	47937
69	080500	05.4N 124.3E	LAND				65//3 72708		004.8N 125.3E	47927
70	080600	05.3N 124.3E	LAND				65//3 50000		006.2N 127.8E	47937
71	080600	05.4N 124.3E	LAND				65//3 72708		004.8N 125.3E	47927
72	080700	05.6N 124.4E	LAND	GOOD		40		MOV 3020	006.2N 127.8E	47937
73	080700	05.4N 124.3E	LAND				65//3 72705		004.8N 125.3E	47927
74	080700	05.6N 124.4E	LAND				65//3 53011		006.2N 127.8E	47937
75	080700	05.4N 124.3E	LAND				65//3 53011		004.8N 125.3E	47927
76	080720	05.6N 124.4E	LAND				65//3 53011		006.2N 127.8E	47937
77	080800	05.7N 124.2E	LAND				65//3 53011		004.8N 125.3E	47927
78	080800	05.3N 124.2E	LAND				65//3 53011		006.2N 127.8E	47937
79	080800	05.7N 124.3E	LAND				34933 50411		004.8N 125.3E	47927
80	080830	05.7N 124.3E	LAND				65//3 57777		006.2N 127.8E	47937
81	080900	05.7N 124.3E	LAND				25//4 52711		004.8N 125.3E	47927
82	080900	05.7N 124.1E	LAND	FAIR		60		MOV 3515	006.2N 127.8E	47937
83	080900	05.8N 124.0E	LAND				22923 53016		004.8N 125.3E	47927
84	080930	05.8N 124.3E	LAND				67//3 52909		006.2N 127.8E	47937
85	081000	05.7N 124.2E	LAND	FAIR		40			004.8N 125.3E	47927
86	081000	05.8N 123.9E	LAND				55//4 53108		006.2N 127.8E	47937
87	081030	05.8N 124.1E	LAND				65//3 52807		004.8N 125.3E	47927
88	081100	05.8N 124.1E	LAND				65//2 53408		006.2N 127.8E	47937
89	081100	05.8N 124.0E	LAND				25923 52305		004.8N 125.3E	47927
90	081200	05.0N 123.7E	LAND				65//2 52808		006.2N 127.8E	47937
91	081200	05.0N 123.8E	LAND				22363 53106		004.8N 125.3E	47927
92	081300	05.0N 123.5E	LAND				65//2 52814		006.2N 127.8E	47937
93	081340	05.6N 124.1E	LAND				65//2 53408		004.8N 125.3E	47927
94	081400	05.2N 123.3E	LAND				65//2 53311		006.2N 127.8E	47937
95	081430	05.3N 123.3E	LAND				65//2 53203		004.8N 125.3E	47927
96	081500	05.2N 123.2E	LAND				65//2 52808		006.2N 127.8E	47937
97	081500	05.4N 122.9E	LAND				35963 53414		004.8N 125.3E	47927
98	082214	05.7N 122.7E	ACFT	FAIR					006.2N 127.8E	47937
99	073335	05.5N 120.2E	LAND	POOR					006.4N 127.8E	47931

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	301800	28.6N 120.7E	050	020	58653 58659 58646 58666
2	302100	29.0N 120.7E	040	015	58653 58556 58549
3	310000	29.3N 120.8E	040	015	58556 58553 58549
4	310300	29.7N 120.5E	030	020	58556 58457 58549
5	310600	30.0N 120.5E	030	025	58457 58556 58549
6	310900	30.5N 120.5E	030	015	58457 58464 58358 58445
7	311200	30.8N 120.2E	030	030	58457 58445 58358 58345
8	311800	31.6N 120.3E	030	040	58345 58367 58265 58251
9	312100	32.0N 120.6E	030	015	58259 58349 58358 58251
10	010000	32.3N 120.8E	030	015	58259 58251 58343
11	010300	32.8N 121.0E	020	030	58251 58265 58150
12	010600	33.2N 121.0E	020	030	58251 58259 58150

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON KIT
BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND
072106Z	20.8 145.9	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
072112Z	20.8 145.9	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
072118Z	20.8 144.1	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080100Z	20.1 143.8	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080106Z	20.1 142.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080112Z	20.3 140.7	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080118Z	20.9 139.9	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080200Z	23.7 137.7	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080206Z	24.5 136.6	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080212Z	25.0 135.8	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080218Z	25.5 135.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080300Z	25.9 134.7	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080306Z	25.8 134.1	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080312Z	25.8 133.3	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080318Z	25.7 133.6	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080400Z	27.5 133.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080406Z	27.7 132.8	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080412Z	27.7 132.5	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080418Z	27.7 132.3	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080500Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080506Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080512Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080518Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080600Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080606Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080612Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080618Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080700Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080706Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080712Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080718Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080800Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080806Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080812Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080818Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080900Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080906Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080912Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
080918Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
081000Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
081006Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
081012Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
081018Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
081100Z	28.1 132.0	20	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ALL FORECASTS					TYPHOONS WHILE OVER 35 KTS				
AVG FORECAST POSIT ERROR	14.	118.	305.	523.	WRNG	24-HR	48-HR	72-HR	
AVG RIGHT ANGLE ERROR	9.	56.	156.	259.	10.	115.	305.	523.	
AVG INTENSITY MAGNITUDE ERROR	1.	7.	19.	33.	1.	7.	19.	33.	
AVG INTENSITY BIAS	0.	0.	-15.	-25.	0.	0.	-15.	-25.	
NUMBER OF FORECASTS	33	28	22	15	29	28	22	15	

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1953. NM

AVERAGE SPEED OF TROPICAL CYCLONE IS 8. KNOTS

TYPHOON KIT
FIX POSITIONS FOR CYCLONE NO. 8

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	310300	20.9N 145.5E	PCN 6	T1.0/1.0	INIT OBS	PGTW
2	310600	20.8N 146.0E	PCN 6			PGTW
3	310900	21.1N 145.9E	PCN 6			PGTW
4	311200	21.3N 145.9E	PCN 5			PGTW
5	311600	20.8N 144.2E	PCN 6	T1.5/1.5	INIT OBS ULCC FIX	PGTW
6	311700	21.2N 144.5E	PCN 6			PGTW
7	311800	20.6N 144.5E	PCN 6			PGTW
8	312036	20.3N 143.5E	PCN 6		ULCC FIX	PGTW
9	312129	21.0N 143.8E	PCN 6			PGTW
10	010048	21.7N 143.1E	PCN 5			PGTW
11	010300	21.9N 142.9E	PCN 6	T1.5/1.5 /D0.5/24HRS		PGTW
12	010403	20.8N 140.9E	PCN 5	T2.0/2.0	INIT OBS	PGTW
13	010916	20.2N 141.0E	PCN 6			PGTW
14	011008	20.1N 141.0E	PCN 6			PGTW
15	011200	20.8N 140.2E	PCN 6			PGTW
16	011329	20.5N 141.1E	PCN 6			PGTW
17	011600	20.9N 139.3E	PCN 6	T1.5/1.5 /S0.0/24HRS		PGTW
18	011649	23.0N 139.2E	PCN 6			PGTW
19	011800	23.0N 138.7E	PCN 6			PGTW
20	012056	22.7N 138.2E	PCN 6			PGTW
21	012248	23.5N 138.1E	PCN 5			PGTW
22	020028	24.1N 137.7E	PCN 3			PGTW
23	020300	24.8N 137.4E	PCN 4	T1.5/1.5 /S0.0/24HRS		PGTW
24	020535	24.5N 137.1E	PCN 5		EXP LLCC	PGTW
25	020855	24.9N 136.2E	PCN 6			PGTW
26	021308	25.4N 135.8E	PCN 6			PGTW
27	021600	25.8N 135.8E	PCN 6			PGTW
28	021825	25.6N 135.3E	PCN 6	T2.0/2.0 /D0.5/24HRS		PGTW
29	022130	25.3N 134.7E	PCN 6			PGTW
30	022226	25.3N 134.7E	PCN 6			PGTW
31	030000	26.0N 134.4E	PCN 6			PGTW
32	030300	27.1N 134.4E	PCN 6	T2.0/2.0 /D0.5/24HRS		PGTW
33	030524	27.3N 134.2E	PCN 6			PGTW
34	030900	28.0N 134.5E	PCN 6			PGTW
35	030924	27.9N 134.0E	PCN 6			PGTW
36	031015	27.7N 134.3E	PCN 5	T2.0/2.0	INIT OBS	PGTW
37	031106	28.0N 134.0E	PCN 6			RPMK
38	031200	28.1N 134.0E	PCN 6			RPMK
39	031430	28.0N 133.2E	PCN 5			PGTW
40	031600	28.1N 134.0E	PCN 6	T2.0/2.0 /S0.0/24HRS		RODN
41	031810	28.0N 133.4E	PCN 6			PGTW
42	031810	27.9N 132.8E	PCN 3			PGTW
43	032114	27.8N 133.4E	PCN 6			RPMK
44	032345	27.5N 133.3E	PCN 3			RPMK

45	032345	27.7N	133.1E	PCN 5	T2.0/2.0	INIT OBS EXP LLCC	RODN
46	040129	27.4N	132.9E	PCN 5			PGTW
47	040129	28.2N	133.0E	PCN 5	T1.5/1.5	INIT OBS ULCC FIX	RKSO
48	040300	27.7N	132.5E	PCN 6	T2.5/2.5 /D0.5/24HRS		PGTW
49	040513	28.0N	132.9E	PCN 5		ULCC FIX	PGTW
50	040500	27.9N	132.8E	PCN 5		ULCC FIX	PGTW
51	040500	28.0N	132.9E	PCN 5			PGTW
52	040544	27.8N	132.6E	PCN 5			PGTW
53	041044	27.7N	132.0E	PCN 3		PARTIALLY EXP LLCC	RPMK
54	041200	27.9N	133.0E	PCN 6			PGTW
55	041600	27.9N	132.7E	PCN 6	T2.0/2.0 /S0.0/24HRS		PGTW
56	041759	27.5N	132.7E	PCN 5			PGTW
57	041759	27.9N	132.1E	PCN 5			RKSO
58	042053	28.2N	132.0E	PCN 5			RKSO
59	042100	28.2N	131.3E	PCN 6			PGTW
60	042323	28.4N	132.1E	PCN 5			PGTW
61	042323	28.4N	132.0E	PCN 5	T3.5/3.5 /D2.0/22HRS		RKSO
62	050000	28.3N	131.9E	PCN 5			PGTW
63	050108	28.4N	132.0E	PCN 5	T3.5/3.5 /D1.5/25HRS		PGTW
64	050108	28.1N	132.1E	PCN 5	T3.5/3.5 /D1.0/24HRS		RODN
65	050300	28.4N	132.1E	PCN 5			PGTW
66	050502	28.3N	131.6E	PCN 5			RODN
67	050502	28.4N	131.7E	PCN 5			PGTW
68	050600	28.5N	131.4E	PCN 5		ULCC FIX	PGTW
69	050929	28.6N	131.8E	PCN 4		ULCC FIX	RODN
70	051021	28.6N	131.1E	PCN 6		ULCC FIX	PGTW
71	051022	28.6N	131.5E	PCN 6		ULCC FIX	PGTW
72	051200	28.7N	131.7E	PCN 5		ULCC FIX	PGTW
73	051349	29.4N	131.4E	PCN 6	T2.5/2.5 /D0.5/24HRS		PGTW
74	051600	29.0N	131.6E	PCN 6		EYE FIX	PGTW
75	051748	28.9N	131.9E	PCN 5		ULCC FIX	RKSO
76	051749	29.1N	132.0E	PCN 6		ULCC FIX	PGTW
77	052031	29.3N	132.1E	PCN 5		ULCC FIX	RODN
78	052100	28.8N	132.0E	PCN 3	T3.5/3.5 /S0.0/24HRS	INIT OBS	RKSO
79	052301	28.9N	132.0E	PCN 3	T3.5/3.5 /S0.0/24HRS	EYE FIX	PGTW
80	052301	28.9N	132.2E	PCN 3	T4.0/4.0 /D0.5/21HRS		RPMK
81	060000	28.9N	132.2E	PCN 3	T3.5/3.5		PGTW
82	060048	29.0N	132.3E	PCN 2		EYE OPN SW	RODN
83	060300	29.0N	132.3E	PCN 1		EYE FIX SNM	PGTW
84	060451	29.0N	132.6E	PCN 1		EYE FIX EYE DIA 3NM	RKSO
85	060500	29.2N	132.4E	PCN 1		EYE FIX EYE DIA 3NM	RODN
86	060911	29.0N	132.8E	PCN 2		EYE FIX	PGTW
87	061052	29.1N	132.5E	PCN 1	T4.0/4.0 /D1.5/24HRS		RKSO
88	061200	29.2N	132.5E	PCN 2		EYE FIX	PGTW
89	061329	29.2N	132.5E	PCN 2		EYE FIX	RKSO
90	061329	29.3N	132.5E	PCN 1		EYE FIX	PGTW
91	061600	29.3N	132.5E	PCN 2		EYE FIX	PGTW
92	061737	29.2N	132.1E	PCN 4		POOR EYE DEFINITION	RODN
93	061800	29.3N	132.2E	PCN 1	T4.5/4.5 /D1.0/23HRS	POOR EYE DEFINITION	PGTW
94	062010	29.3N	132.2E	PCN 1		EYE FIX	RODN
95	062100	29.5N	132.4E	PCN 2	T4.5/4.5 /D0.5/27HRS		PGTW
96	062239	29.7N	132.1E	PCN 1		EYE FIX 10NM	RODN
97	070028	29.7N	132.1E	PCN 1		EYE FIX	PGTW
98	070300	29.9N	132.1E	PCN 2		EYE FIX	PGTW
99	070440	29.9N	131.8E	PCN 2		EYE FIX	RODN
100	070600	30.0N	132.2E	PCN 1		EYE FIX	RPMK
101	070900	30.1N	131.9E	PCN 2		EYE FIX	PGTW
102	070933	30.1N	131.3E	PCN 2	T4.5/4.5 /D0.5/26HRS		PGTW
103	071031	30.2N	131.1E	PCN 2		EYE FIX	RKSO
104	071200	30.2N	130.6E	PCN 2		EYE FIX	PGTW
105	071308	30.2N	130.9E	PCN 3		ULCC FIX	PGTW
106	071726	30.3N	130.1E	PCN 3	T4.0/4.0	INIT OBS	RKSO
107	071726	30.4N	130.1E	PCN 3	T4.0/4.0 /W0.5/25HRS		PGTW
108	072100	30.5N	130.5E	PCN 1	T4.0/4.0	INIT OBS RGD EYE FIX	RPMK
109	072130	30.4N	130.4E	PCN 4			RODN
110	072359	30.4N	130.0E	PCN 5		EYE FIX	PGTW
111	072359	30.6N	129.9E	PCN 1		EYE FIX	PGTW
112	080000	30.6N	129.3E	PCN 1	T4.5/4.5 /S0.0/25HRS		RKSO
113	080008	30.8N	129.6E	PCN 4		VIS EYE (POORLY DEFINED)	PGTW
114	080300	31.0N	129.1E	PCN 6			PGTW
115	080430	30.9N	129.1E	PCN 1		EYE FIX	PGTW
116	080430	31.0N	129.1E	PCN 2		EYE FIX	RPMK
117	080600	31.2N	128.7E	PCN 2		EYE FIX	PGTW
118	080900	31.1N	128.2E	PCN 6	T4.5/4.5 /S0.0/23HRS		RKSO
119	081010	31.2N	127.8E	PCN 6			PGTW
120	081057	31.4N	127.5E	PCN 5			RKSO
121	081200	31.8N	127.0E	PCN 3	T3.0/4.0 /W1.0/21HRS	PARTIALLY EXP LLCC	PGTW
122	081430	32.2N	127.0E	PCN 1	T4.0/4.0 /S0.0/24HRS	RGD EYE FIX	RPMK
123	081600	32.2N	127.0E	PCN 3			RODN
124	081800	32.3N	127.0E	PCN 3		PARTIALLY EXP LLCC	PGTW
125	081858	32.0N	127.2E	PCN 6			RKSO
126	082100	32.4N	126.7E	PCN 6	T4.0/4.0 /S0.0/25HRS		PGTW
127	082109	32.3N	126.6E	PCN 6			PGTW
128	082109	32.5N	127.2E	PCN 1	T4.5/4.5 /S0.0/29HRS	EYE FIX	RODN
129	082337	33.0N	126.5E	PCN 4			PGTW
130	082337	33.2N	126.2E	PCN 2		EYEWALL OPN ESE	RKSO
131	090000	33.2N	126.2E	PCN 1			PGTW
132	090129	33.5N	125.9E	PCN 6	T3.5/4.5 /W1.0/24HRS		RKSO
133	090300	33.7N	125.9E	PCN 6		ULCC FIX	PGTW
134	090600	33.1N	126.3E	PCN 5			RKSO
135	090601	33.7N	126.1E	PCN 6			PGTW
136	090948	33.9N	125.8E	PCN 3	T3.0/3.0 /W0.5/26HRS		RODN
137	091200	34.3N	126.4E	PCN 3		EYE FIX OPN SW	PGTW
138	091409	35.1N	126.5E	PCN 3	T3.0/4.0 /W1.0/26HRS		RPMK
139	091600	35.1N	126.5E	PCN 3	T3.5/4.5 /W1.0/18HRS	EXP LLCC	PGTW
140	091800	35.2N	127.0E	PCN 4			RPMK
141	091847	35.5N	127.0E	PCN 6			RODN
142	092100	35.5N	127.0E	PCN 6			PGTW
143	092314	36.7N	128.8E	PCN 6		ULCC FIX	RODN
144	100000	36.1N	129.5E	PCN 6			RODN
145	100108	37.0N	128.4E	PCN 5		ULCC FIX	RKSO
146	100300	36.9N	128.6E	PCN 6			PGTW
147	100550	37.2N	129.9E	PCN 6	T2.5/3.0 /W1.0/24HRS		RODN
148	100550	38.1N	129.5E	PCN 6			PGTW
149	100600	39.0N	130.2E	PCN 6			RKSO
150	100900	39.2N	130.5E	PCN 5			PGTW
151	101013	40.4N	131.1E	PCN 5			RKSO
152	101100	40.6N	131.6E	PCN 5			PGTW
153	101109	41.0N	131.2E	PCN 5			RKSO
154	101200	40.9N	132.1E	PCN 6			PGTW
155	101349						
156	101600						
157	101800						
158	101836						
159	102026						
160	102100						
161	102253						
162	110000						

163 110048 41.7N 133.7E PCN 5
164 110300 41.0N 133.6E PCN 6
165 110600 42.5N 133.6E PCN 6

T2.5/3.0 /W1.0/24HRS

PARTIALLY EXP LLCC

RODN
PGTW
PGTW

TYPHOON KIT
FIX POSITIONS FOR CYCLONE NO. 8

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRV NAV/MET	EYE SHAPE	EYE ORIENT- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	020516	24.1N 136.6E	1500FT		1005	20 110 86	170 30 110 86	8 15			+25 +26 +23	24 2
2	022204	25.8N 134.6E	1500FT		1000	22 270 30	290 28 200 45	15			+26 +27 +25	33 3
3	030040	25.9N 134.5E	1500FT		1000	25 070 30	290 28 180 32	15			+27 +26 +25	28 4
4	030645	26.3N 134.1E	1500FT		998	35 180 12	240 28 180 14	15			+27 +26 +25	27 4
5	030944	26.5N 134.1E	1500FT		998	40 340 20	110 32 060 39	15			+27 +26 +25	27 4
6	032221	26.5N 133.2E	1500FT		999	40 360 10	100 35 360 34	15			+27 +26 +25	27 4
7	040027	27.5N 133.1E	1500FT		999	35 100 15	180 37 100 35	15	CIRCULAR	35	+24 +26 +26	29 5
8	040637	27.7N 132.8E	1500FT		994	35 230 50	230 34 140 25	15	CIRCULAR	25	+24 +26 +26	37 6
9	040927	28.5N 132.5E	1500FT		994	40 060 40	120 38 060 39	15	CIRCULAR	15	+24 +26 +26	29 5
10	042110	28.5N 131.9E	1500FT		993	50 110 12	220 47 110 10	15	CIRCULAR	12	+25 +27 +25	30 6
11	050020	28.1N 131.9E	1500FT		994	65 100 20	170 41 070 13	15	CIRCULAR	13	+25 +27 +25	33 7
12	050639	28.4N 132.0E	1500FT		990	60 270 10	340 54 270 10	15	CIRCULAR	15	+25 +27 +25	28 8
13	050935	28.5N 132.0E	700MB	2973	984	60 300 12	220 57 130 25	15	CONCENTRIC	4 20	+13 +14 +14	8 9
14	052137	28.8N 132.1E	700MB	2963		60 130 15	220 57 130 25	15	CIRCULAR	10	+12 +14 +12	9 9
15	060034	29.0N 132.2E	700MB	2945	983	60 010 15	130 59 010 17	15	CIRCULAR	12	+12 +14 +10	10 10
16	060634	29.0N 132.5E	700MB	2838	970	50 290 10	230 71 120 10	15	CIRCULAR	10	+14 +16 +14	29 10
17	060940	29.1N 132.6E	700MB	2781	961	70 130 4	830 78 140 8	15	CIRCULAR	10	+15 +18 +13	11 11
18	062135	29.3N 132.3E	700MB	2773		90 300 6	250 83 170 15	15	ELLIPTICAL	12 8	+13 +15 +11	12 11
19	070030	29.3N 132.3E	700MB	2776	966	80 270 6	350 74 090 16	15	ELLIPTICAL	15 10 330	+14 +14 +13	11 11
20	070630	29.6N 132.4E	700MB	2782		70 260 10	230 70 130 15	15	CIRCULAR	10	+11 +15 +12	12 12
21	070913	29.9N 132.0E	700MB	2792	966	85 030 10	130 77 030 8	15	CIRCULAR	10	+13 +15 +15	13 13
22	080048	30.4N 130.6E	700MB	2793		55 060 8	350 76 060 16	15	CIRCULAR	10	+14 +16 +16	22 14
23	080611	30.8N 129.5E	700MB	2748	965	65 230 30	240 79 110 10	15	ELLIPTICAL	13 10 110	+11 +17 +12	13 13
24	080858	30.9N 129.1E	700MB	2729	959	50 120 30	150 86 090 10	15	CIRCULAR	10	+12 +17 +12	14 14
25	082136	31.1N 127.5E	700MB	2853		65 210 50	290 55 140 10	15	CIRCULAR	12	+12 +18 +14	15 15
26	090027	32.2N 126.6E	700MB	2809	971	75 050 50	150 75 050 28	15	CIRCULAR	25	+10 +18 +12	27 16
27	090611	32.2N 126.6E	700MB	2853	966	75 050 50	330 74 230 17	15	CIRCULAR	25	+11 +19 +11	26 16
28	090923	32.8N 126.6E	700MB	2827	968	75 050 50	330 74 230 17	15	CIRCULAR	25		

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRV	EYE SHAPE	EYE DIAM	RADAR-CODE ASUAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	040300	28.1N 132.7E	LAND				65//1////		28.4N 129.5E	47909
2	040400	28.2N 132.7E	LAND				65//2 53605		28.4N 129.5E	47909
3	040500	28.2N 132.7E	LAND				65//1 50000		28.4N 129.5E	47909
4	040700	27.8N 132.5E	LAND				65//1 50000		28.4N 129.5E	47909
5	041100	27.8N 132.6E	LAND				65//2 50000		28.4N 129.5E	47909
6	041200	27.9N 132.6E	LAND				65//2 50000		28.4N 129.5E	47909
7	041300	27.9N 132.6E	LAND				65//2 50305		28.4N 129.5E	47909
8	041400	27.9N 132.0E	LAND				65//2 52732		28.4N 129.5E	47909
9	041500	27.9N 131.9E	LAND				65//3 51205		28.4N 129.5E	47909
10	041800	27.6N 132.1E	LAND				65//3 53116		28.4N 129.5E	47909
11	041900	27.7N 131.9E	LAND				65//3 50216		28.4N 129.5E	47909
12	042000	28.1N 132.0E	LAND				65//3 55111		28.4N 129.5E	47909
13	042100	27.9N 132.1E	LAND				65//3 55111		28.4N 129.5E	47909
14	042200	27.8N 132.1E	LAND				65//3 55111		28.4N 129.5E	47909
15	042300	27.9N 132.1E	LAND				30973 50000		28.4N 129.5E	47909
16	050000	28.0N 132.0E	LAND				30783 50000		28.4N 129.5E	47909
17	050100	28.0N 132.0E	LAND				55//63 50000		28.4N 129.5E	47909
18	050200	28.1N 132.0E	LAND				55//63 50000		28.4N 129.5E	47909
19	050300	28.2N 132.0E	LAND				55//63 53605		28.4N 129.5E	47909
20	050300	28.2N 131.9E	LAND				55//3 53211		30.6N 131.0E	47869
21	050400	28.2N 132.0E	LAND				55//3 50000		28.4N 129.5E	47909
22	050400	28.3N 131.9E	LAND				55//3 53605		30.6N 131.0E	47869
23	050500	28.3N 132.0E	LAND				55//3 53605		28.4N 129.5E	47909
24	050500	28.3N 132.0E	LAND				55//3 50000		30.6N 131.0E	47869
25	050600	28.4N 132.0E	LAND				65//3 53603		28.4N 129.5E	47909
26	050600	28.4N 131.9E	LAND				55//3 53605		30.6N 131.0E	47869
27	050700	28.5N 132.2E	LAND				55//3 50603		28.4N 129.5E	47909
28	050700	28.5N 132.2E	LAND				55//3 50000		30.6N 131.0E	47869
29	050800	28.5N 131.9E	LAND				65//3 52805		28.4N 129.5E	47909
30	050800	28.5N 132.0E	LAND				55//3 50305		30.6N 131.0E	47869
31	050900	28.5N 132.0E	LAND				55//3 32204		28.4N 129.5E	47909
32	050900	28.5N 132.0E	LAND				55//3 50000		30.6N 131.0E	47869
33	051000	28.5N 132.0E	LAND				55//3 50000		28.4N 129.5E	47909
34	051400	28.7N 131.9E	LAND				65//1 53605		30.6N 131.0E	47869
35	051400	28.6N 131.9E	LAND				55//2 50000		28.4N 129.5E	47909
36	051600	28.7N 131.9E	LAND				55//2 50000		30.6N 131.0E	47869
37	051600	28.6N 131.9E	LAND				55//2 50000		28.4N 129.5E	47909
38	051700	28.7N 131.9E	LAND				65//2 50000		30.6N 131.0E	47869
39	051700	28.7N 131.8E	LAND				55//2 53305		28.4N 129.5E	47909
40	051800	28.7N 131.8E	LAND				55//2 50000		30.6N 131.0E	47869
41	051800	28.7N 131.8E	LAND				55//2 50000		28.4N 129.5E	47909
42	051900	28.7N 131.8E	LAND				55//2 50000		30.6N 131.0E	47869
43	051900	28.7N 131.8E	LAND				55//2 50000		28.4N 129.5E	47909
44	052000	28.7N 131.9E	LAND				55//2 50000		30.6N 131.0E	47869
45	052000	28.8N 131.9E	LAND				55//2 50000		28.4N 129.5E	47909
46	052100	28.7N 132.0E	LAND				55//2 50408		30.6N 131.0E	47869
47	052100	28.8N 131.9E	LAND				51202 50905		28.4N 129.5E	47909
48	052200	28.8N 132.1E	LAND				51//2 50000		30.6N 131.0E	47869
49	052200	28.8N 132.0E	LAND				43603 43603		28.4N 129.5E	47909
50	052300	28.8N 132.1E	LAND				211401 50505		30.6N 131.0E	47869
51	052300	28.8N 132.1E	LAND				52312 48905		28.4N 129.5E	47909
52	052300	28.8N 132.1E	LAND				10321 50905		30.6N 131.0E	47869
53	060000	28.9N 132.2E	LAND				50312 50505		28.4N 129.5E	47909
54	060000	30.8N 129.4E	LAND	GOOD		15	10211 50000	MOV 3005 SEBURI	33.4N 130.4E	47869
55	060000	30.8N 129.4E	LAND				50312 50000		30.6N 131.0E	47869
56	060100	28.8N 132.2E	LAND				10311 53605		28.4N 129.5E	47909
57	060200	28.9N 132.4E	LAND				10312 50311		30.6N 131.0E	47869
58	060200	28.9N 132.4E	LAND				10592 50905		28.4N 129.5E	47909
59	060300	29.0N 132.4E	LAND				5//2 50305		30.6N 131.0E	47869
60	060300	28.9N 132.2E	LAND				20632 50000		28.4N 129.5E	47909
61	060400	29.0N 132.4E	LAND				5//2 50000		30.6N 131.0E	47869
62	060400	28.9N 132.3E	LAND				10281 50000		28.4N 129.5E	47909
63	060500	29.0N 132.4E	LAND				50372 50000		30.6N 131.0E	47869
64	060500	28.9N 132.3E	LAND				10331 50000		28.4N 129.5E	47909
65	060600	29.0N 132.5E	LAND				52412 50000		30.6N 131.0E	47869
66	060600	29.0N 132.4E	LAND				10311 50605		28.4N 129.5E	47909
67	060700	29.1N 132.6E	LAND				50412 50505		30.6N 131.0E	47869
68	060700	29.1N 132.4E	LAND				10311 53610		28.4N 129.5E	47909
69	060800	29.1N 132.6E	LAND				50412 50000		30.6N 131.0E	47869
70	060800	29.0N 132.5E	LAND				10311 51405		28.4N 129.5E	47909
71	060900	29.2N 132.5E	LAND				40412 50505		30.6N 131.0E	47869
72	060900	29.0N 132.6E	LAND				10311 50000		28.4N 129.5E	47909
73	061000	29.0N 132.7E	LAND				50412 50000		30.6N 131.0E	47869
74	061000	29.0N 132.5E	LAND				10312 50000		28.4N 129.5E	47909
75	061100	29.0N 132.7E	LAND				50312 50000		30.6N 131.0E	47869
76	061100	29.0N 132.5E	LAND				70211 50000		28.4N 129.5E	47909
77	061200	29.1N 132.7E	LAND				50412 50000		30.6N 131.0E	47869
78	061200	29.1N 132.5E	LAND				10211 53605		28.4N 129.5E	47909
79	061300	29.1N 132.6E	LAND				50412 50000		30.6N 131.0E	47869
80	061300	29.1N 132.5E	LAND				10311 50000		28.4N 129.5E	47909
81	061400	29.1N 132.6E	LAND				50412 50000		30.6N 131.0E	47869
82	061400	29.1N 132.4E	LAND				10221 52705		28.4N 129.5E	47909
83	061500	29.1N 132.5E	LAND				50322 50000		30.6N 131.0E	47869
84	061500	29.1N 132.4E	LAND				10211 50000		28.4N 129.5E	47909
85	061700	29.2N 132.4E	LAND				50312 53205		30.6N 131.0E	47869
86	061700	29.2N 132.3E	LAND				10211 35005		28.4N 129.5E	47909
87	061800	29.2N 132.4E	LAND				50312 50000		30.6N 131.0E	47869
88	061800	29.2N 132.3E	LAND				10211 50000		28.4N 129.5E	47909
89	061800	29.2N 132.5E	LAND				50312 50000		30.6N 131.0E	47869

236	090600	32.6N 126.6E	LAND	GOOD	35	MOV 3016	34.2N 130.8E	47762
237	090800	32.8N 126.5E	LAND	GOOD	35	MOV 3510	32.7N 128.8E	47844
238	091000	32.8N 126.4E	LAND	GOOD	30	MOV 3410	32.7N 128.8E	47844
239	091200	32.9N 126.3E	LAND	GOOD	30	MOV 3410	32.7N 128.8E	47844
240	091500	33.2N 126.0E	LAND	POOR	30	MOV 3415	32.7N 128.8E	47844
241	091505	33.8N 126.5E	LAND	POOR			35.9N 126.6E	47141
242	091535	33.9N 126.4E	LAND	POOR			35.9N 126.6E	47141
243	091605	34.1N 126.0E	LAND	POOR			35.9N 126.6E	47141
244	091830	33.5N 126.0E	LAND	FAIR			35.1N 126.8E	47158
245	091635	34.1N 126.0E	LAND	POOR		SPRL BARL BANA	35.9N 126.6E	47141
246	091735	34.3N 125.7E	LAND	POOR			35.9N 126.6E	47141
247	091735	33.5N 127.0E	LAND	FAIR		SPRL BAND AREA	35.1N 126.8E	47158
248	091835	34.5N 125.8E	LAND	POOR			35.9N 126.6E	47141
249	091835	33.5N 127.0E	LAND	FAIR		SPRL BAND AREA	35.1N 126.8E	47158
250	091905	34.5N 126.0E	LAND	POOR			35.9N 126.6E	47141
251	091935	34.5N 126.0E	LAND	POOR		EYE FIX DIFFUSE	35.9N 126.6E	47141
252	091950	33.9N 126.0E	LAND	FAIR		SPRL BAND AREA	35.1N 126.8E	47158
253	092035	34.1N 126.3E	LAND	FAIR			35.1N 126.8E	47158
254	092100	33.8N 126.1E	LAND	POOR	20	MOV 3620	32.7N 128.8E	47844
255	092130	34.2N 126.3E	LAND	POOR		SPRL BAND AREA	35.1N 126.8E	47158
256	092230	34.3N 126.4E	LAND	POOR		SPRL BAND AREA	35.1N 126.8E	47158

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASUAR TDDFF	COMMENTS	RADAR POSITION	SITE WHO NO
1	080400	30.8N 129.8E	LAND				10411 53113		33.4N 130.3E	47806
2	080500	30.8N 129.6E	LAND				10411 52711		33.4N 130.3E	47806
3	080600	30.8N 129.5E	LAND				10411 52705		33.4N 130.3E	47806
4	080700	30.8N 129.4E	LAND				10411 52805		33.4N 130.3E	47806
5	080800	30.9N 129.4E	LAND				10411 53005		33.4N 130.3E	47806
6	080900	30.9N 129.1E	LAND				10411 52711		33.4N 130.3E	47806
7	081000	30.9N 129.0E	LAND				10611 52708		33.4N 130.3E	47806
8	081100	30.9N 128.9E	LAND				10611 52805		33.4N 130.3E	47806
9	081200	31.0N 128.7E	LAND				20641 53011		33.4N 130.3E	47806
10	081300	31.1N 128.6E	LAND				20711 52705		33.4N 130.3E	47806
11	081400	31.1N 128.4E	LAND				20711 52911		33.4N 130.3E	47806
12	081500	31.2N 128.3E	LAND				21711 53011		33.4N 130.3E	47806
13	081600	31.2N 128.2E	LAND				21621 53005		33.4N 130.3E	47806
14	081700	31.4N 128.1E	LAND				21541 53011		33.4N 130.3E	47806
15	081800	31.5N 127.9E	LAND				45111 53113		33.4N 130.3E	47806
16	081900	31.6N 127.8E	LAND				55111 53108		33.4N 130.3E	47806
17	082000	31.6N 127.6E	LAND				55111 52708		33.4N 130.3E	47806
18	082100	31.7N 127.6E	LAND				55111 53508		33.4N 130.3E	47806
19	082200	31.9N 127.4E	LAND				55111 53413		33.4N 130.3E	47806
20	082300	32.0N 127.3E	LAND				65111 53411		33.4N 130.3E	47806
21	090000	32.1N 127.1E	LAND				65111 53211		33.4N 130.3E	47806
22	090100	32.2N 126.9E	LAND				65111 53011		33.4N 130.3E	47806
23	090200	32.2N 126.7E	LAND				65111 52711		33.4N 130.3E	47806
24	090300	32.3N 126.6E	LAND				65111 53111		33.4N 130.3E	47806
25	090400	32.4N 126.6E	LAND				55111 50211		33.4N 130.3E	47806
26	090500	32.6N 126.7E	LAND				55111 50111		33.4N 130.3E	47806
27	090600	32.6N 126.6E	LAND				54111 53305		33.4N 130.3E	47806
28	090700	32.6N 126.6E	LAND				55111 50000		33.4N 130.3E	47806
29	090800	32.6N 126.6E	LAND				55111 53005		33.4N 130.3E	47806
30	090900	32.6N 126.5E	LAND				55111 53505		33.4N 130.3E	47806
31	091000	32.9N 126.3E	LAND				55111 53411		33.4N 130.3E	47806
32	091100	33.0N 126.3E	LAND				65111 53408		33.4N 130.3E	47806
33	091200	33.1N 126.3E	LAND				65111 53605		33.4N 130.3E	47806

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	092100	34.2N 126.2E	065	036	47165 47158 47182 47189
2	100000	34.5N 126.6E	065	015	47165 47158 47182 47189
3	100500	35.4N 126.8E	060	015	47158 47165 47133 47189
4	100900	36.4N 128.0E	045	015	47133 47135 47143

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL STORM LEE
BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND		POSIT	WIND	ERRORS		POSIT	WIND	ERRORS		POSIT	WIND	ERRORS		POSIT	WIND	ERRORS	
081006Z	22.7 131.3	25	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	
081012Z	22.8 131.1	25	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	
081018Z	22.9 130.8	25	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	
081024Z	23.1 130.5	30	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	
081030Z	23.4 130.2	35	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	
081100Z	23.9 129.7	40	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	
081112Z	24.7 129.1	45	23.3	130.2	30	6.0	-5.2	128.5	50	132.0	15.3	26.4	126.6	65	29.1	126.3	75	620.30	
081124Z	25.5 128.7	50	23.8	129.8	40	8.0	-6.8	127.8	65	168.0	15.3	27.2	126.2	85	30.5	126.0	95	694.70	
081130Z	26.4 128.0	55	24.4	129.1	45	6.0	-6.7	127.3	70	67.0	15.3	30.7	126.2	90	33.1	126.0	0.0	0.0	
081200Z	27.6 128.0	60	25.0	128.8	50	0.0	-6.8	125.5	65	65.0	32.8	124.4	92.9	30.0	33.0	0.0	0.0	0.0	
081206Z	28.8 127.1	65	25.5	128.5	55	4.5	-6.8	125.9	65	65.0	32.8	124.4	92.9	30.0	33.0	0.0	0.0	0.0	
081212Z	29.7 126.3	60	26.0	127.7	60	16.0	-6.8	126.6	65	92.0	36.1	127.0	95.0	35.4	33.0	0.0	0.0	0.0	
081300Z	29.7 126.3	60	30.0	126.1	60	21.0	-6.8	126.9	65	140.0	55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
081306Z	30.9 125.6	60	30.4	125.3	60	21.0	-6.8	124.9	65	122.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
081312Z	32.2 124.9	60	31.4	125.3	60	24.0	-6.8	124.9	65	176.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
081318Z	34.0 124.3	60	32.4	125.3	60	31.0	-6.8	125.8	65	285.0	38.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
081400Z	36.4 124.6	55	34.0	124.4	60	16.0	-6.8	125.8	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
081406Z	39.4 125.4	45	36.3	124.2	55	0.0	-6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
081412Z	42.0 127.6	25	39.5	125.1	40	15.0	-5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		25	41.8	127.1	25	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
AVG FORECAST POSIT ERROR	WRNG	24-HR	48-HR	WRNG	24-HR	48-HR	72-HR
18	129	293	657	0	0	0	0
12	51	77	17	0	0	0	0
1	11	23	50	0	0	0	0
-1	11	23	50	0	0	0	0
14	10	6	2	0	0	0	0
DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1307. NM							
AVERAGE SPEED OF TROPICAL CYCLONE IS 13. K/SUT							

TROPICAL STORM LEE
FIX POSITIONS FOR CYCLONE NO. 9

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	092315	23.5N 129.7E	PCN 5	T1.0/1.0	INIT OBS PART EXP LLCC	PGTW
2	100300	23.7N 129.8E	PCN 6			PGTW
3	100550	23.6N 130.6E	PCN 5			PGTW
4	101013	23.3N 131.5E	PCN 6	T1.0/1.0	INIT OBS	RPMK
5	101349	23.3N 132.0E	PCN 6			PGTW
6	101600	23.3N 131.8E	PCN 6	T1.5/1.5	INIT OBS	PGTW
7	102253	23.4N 130.2E	PCN 5			PGTW
8	110048	23.5N 130.3E	PCN 3	T1.5/1.5	INIT OBS	RODN
9	110048	23.0N 130.1E	PCN 5		ULAC 21.0N 129.1E	PGTW
10	110300	23.4N 130.1E	PCN 6	T1.5/1.5 /D0.5/27HRS	ULAC 21.0N 130.1E	PGTW
11	110539	23.1N 131.3E	PCN 5			PGTW
12	110900	23.8N 130.7E	PCN 6			PGTW
13	110951	23.3N 130.3E	PCN 6			PGTW
14	111047	23.9N 130.2E	PCN			RPMK
15	111200	23.1N 129.6E	PCN			PGTW
16	111329	23.2N 129.1E	PCN			PGTW
17	111600	23.8N 128.9E	PCN	T2.5/2.5 /D1.0/24HRS		PGTW
18	111825	23.1N 129.3E	PCN			RKSO
19	112125	23.4N 129.7E	PCN			PGTW
20	112100	23.4N 129.9E	PCN			PGTW
21	112146	23.4N 129.6E	PCN			PGTW
22	120028	23.7N 128.7E	PCN 5			PGTW
23	120300	23.5N 127.9E	PCN 6			PGTW
24	120529	23.1N 128.4E	PCN 5	T2.5/2.5 /D1.0/26HRS		PGTW
25	120529	23.2N 128.0E	PCN 5	T2.5/2.5	INIT OBS	RPMK
26	120900	23.0N 128.4E	PCN 6		ULCC FIX	PGTW
27	121026	23.7N 127.6E	PCN 6			RPMK
28	121111	23.6N 128.7E	PCN 5			RKSO
29	121111	23.5N 128.4E	PCN 6			RODN
30	121200	23.3N 127.9E	PCN 6			PGTW
31	121450	23.0N 128.7E	PCN 6			RODN
32	121600	23.5N 127.9E	PCN 6	T3.5/3.5 /D1.0/24HRS		PGTW
33	121800	23.8N 127.5E	PCN 6			PGTW
34	121814	23.8N 128.3E	PCN			PGTW
35	122350	23.9N 127.3E	PCN 5			RKSO
36	122350	30.2N 128.0E	PCN 5	T2.5/2.5	INTI OBS	RODN
37	130000	30.2N 128.8E	PCN 4	T3.0/3.0-/D0.5/19HRS	PART EXP LLCC	PGTW
38	130149	29.4N 128.1E	PCN	T3.0/3.0	INIT OBS	RKSO
39	130300	31.2N 128.7E	PCN			PGTW
40	130518	31.4N 128.3E	PCN			PGTW
41	130518	30.7N 128.1E	PCN 3		PART EXP LLCC	RKSO
42	130900	30.5N 128.0E	PCN 6		ULAC 32.3N 127.0E	PGTW
43	131005	30.7N 128.1E	PCN 6		PART EXP LLCC	PGTW
44	131200	31.7N 128.8E	PCN 6		PART EXP LLCC	PGTW
45	131420	33.4N 124.1E	PCN 6			RODN
46	131600	33.3N 125.1E	PCN 6	T3.5/3.5-/S0.0/24HRS	PART EXP LLCC	PGTW
47	131804	34.5N 123.6E	PCN 4		PART EXP LLCC	PGTW
48	131804	34.2N 123.2E	PCN 6			RODN
49	132100	35.7N 124.3E	PCN 6		ULCC FIX	PGTW
50	132329	36.3N 123.6E	PCN 3	T3.5/3.5-/D1.0/18HRS	EXP LLCC	RPMK
51	140000	36.6N 124.5E	PCN 6			PGTW
52	140129	37.2N 125.0E	PCN 5	T3.0/3.0 /S0.0/24HRS		RKSO
53	140300	37.9N 125.2E	PCN 6			PGTW
54	140507	40.1N 125.4E	PCN 5			RODN
55	140600	40.1N 126.3E	PCN 6			PGTW
56	140900	40.3N 126.5E	PCN 6			PGTW
57	140943	41.4N 126.4E	PCN 5			RKSO
58	141027	42.7N 127.6E	PCN 6		ULCC FIX	RKSO
59	141125	43.1N 128.1E	PCN 6			RKSO
60	141200	41.8N 127.7E	PCN 6			PGTW
61	141600	42.6N 128.6E	PCN 6			PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS HELP	NAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRV NAV/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	10P650	22.8N 131.3E	1500FT		997	10 040	45 120 23 040	45 10 30			+26 +26 +24	1
*	110019	22.1N 130.6E	700MB	3053	997	6 330	80 250 27 230	100 20 30			+12 +12 +5	2
3	110656	22.6N 130.0E	1500FT		992	40 350	80 300 39 350	150 20 30			+28 +27 +26	28
4	110933	22.4N 129.9E	1500FT		991	15 310	70 310 27 270	150 20 30			+27 +26 +26	28
5	112203	22.3N 128.8E	1500FT		990	50 060	60 140 51 060	200 10 10			+26 +26 +26	28
6	120034	22.7N 128.5E	1500FT		990	50 120	90 180 51 120	200 10 10			+13 +15 +6	4
*	120042	22.5N 127.6E	700MB	3015	989	45 040	40 130 41 040	40 10 10			+25 +26 +25	5
8	120340	22.4N 128.0E	1500FT		989	25 190	90 290 26 190	200 10 10			+14 +19 +28	6
9	122146	22.2N 126.3E	700MB	2984		60 080	70 140 63 080	200 10 10			+24 +26 +25	
10	130021	22.8N 126.0E	1500FT			40 360	65 100 50 360	200 10 10				

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRV	EYE SHAPE	EYE DIAM	RADOB-CODE ASUAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	120300	26.1N 128.9E	LAND				5///3 ////		26.2N 127.8E	47937
3	120400	26.1N 128.9E	LAND				5///3 50000		26.2N 127.8E	47937
4	120500	26.2N 128.8E	LAND	POOR		35		MOV 0215	26.3N 126.8E	47929
5	120500	26.1N 128.8E	LAND				55///3 53611		26.2N 127.8E	47937
6	120500	26.3N 128.9E	LAND				6///1 50000		26.4N 129.5E	47909
7	120600	26.2N 128.9E	LAND				55///2 73604		26.2N 127.8E	47937
8	120607	26.2N 128.8E	LAND	POOR			6///2 50305		26.4N 129.5E	47909
9	120700	26.4N 128.9E	LAND				55///3 73608		26.4N 127.8E	47931
10	120700	26.4N 128.8E	LAND				6///2 53411		26.2N 127.8E	47937
11	120800	27.1N 128.9E	LAND				55///3 73616		26.4N 129.5E	47909
12	120800	26.6N 128.8E	LAND				5///2 53610		26.2N 127.8E	47937
13	120900	27.3N 128.9E	LAND				55///3 73620		26.4N 129.5E	47909
14	120900	27.2N 128.6E	LAND				6///2 53532		26.2N 127.8E	47937
15	121000	27.6N 128.4E	LAND				6///2 53427		26.4N 129.5E	47909
16	121100	28.1N 128.1E	LAND				6///2 53330		26.2N 127.8E	47937
17	121200	28.5N 127.5E	LAND				6///2 53132		26.4N 129.5E	47909
18	122100	29.0N 127.2E	LAND				5///5 53528		26.2N 127.8E	47937
19	130800	32.5N 125.1E	LAND				6///1 73317		31.2N 121.5E	58367
20	132130	35.0N 124.9E	LAND	FAIR					35.9N 126.6E	47141
21	132205	36.0N 124.9E	LAND	FAIR					35.9N 126.6E	47141
22	132230	36.2N 125.0E	LAND	POOR					35.9N 126.6E	47141
23	132305	36.3N 125.0E	LAND	POOR					35.9N 126.6E	47141
24	132335	36.3N 125.0E	LAND	POOR					35.9N 126.6E	47141
25	140005	36.5N 125.0E	LAND	POOR					35.9N 126.6E	47141
26	140035	36.8N 125.2E	LAND	POOR					35.9N 126.6E	47141
27	140105	36.9N 125.2E	LAND	POOR					35.9N 126.6E	47141
28	140135	37.0N 125.2E	LAND	POOR					35.9N 126.6E	47141

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON NAMIE
BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST*				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS		
					DST WIND			DST WIND			DST WIND			DST WIND			DST WIND		
081506Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081512Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081518Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081524Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081530Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081536Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081542Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081548Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081554Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081600Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081612Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081618Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081624Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081630Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081636Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081642Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081648Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081654Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081700Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081706Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081712Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081718Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081724Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081730Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081736Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081742Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081748Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081800Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081806Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081812Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081818Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081824Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081830Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081836Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081842Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081848Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081854Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081900Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081906Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081912Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081918Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081924Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081930Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081936Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081942Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081948Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
081954Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
082000Z	25.2 124.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

ALL FORECASTS				TYPHOONS WHILE OVER			
WRNG	24-HR	48-HR	72-HR	WRNG	+4-HR	48-HR	72-HR
26	120	229	266	25	115	203	245
14	70	147	122	13	73	139	91
1	9	18	29	1	10	14	23
0	9	18	29	0	10	14	23
17	13	9	4	15	11	7	3

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1335. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 12. KNOTS

TYPHOON NAMIE
FIX POSITIONS FOR CYCLONE NO. 10

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	150600	25.8N 125.2E	PCN 6	T1.5/1.5	INIT OBS	RODN
2	150900	25.8N 124.5E	PCN 6	T1.0/1.0	INIT OBS	PGTW
3	151200	25.8N 125.0E	PCN 6			PGTW
4	151349	25.8N 125.5E	PCN 6			PGTW
5	151600	25.8N 125.4E	PCN 6			PGTW
6	151800	25.8N 125.4E	PCN 6			PGTW
7	152100	25.8N 125.0E	PCN 6			PGTW
8	152245	25.4N 125.3E	PCN 6		PARTIALLY EXP LLCC	PGTW
9	160000	25.5N 125.7E	PCN 6			PGTW
10	160026	25.3N 125.6E	PCN 6			RODN
11	160026	25.3N 125.6E	PCN 6	T2.5/2.5	INIT OBS	RPMK
12	160048	25.3N 125.6E	PCN 6			PGTW
13	160300	25.3N 125.0E	PCN 6	T2.5/2.5	INIT OBS	PGTW
14	160500	25.8N 125.3E	PCN 6			PGTW
15	160527	27.0N 125.2E	PCN 5	T2.5/2.5 /D1.0/24HRS		RODN
16	160900	27.3N 125.2E	PCN 6			PGTW
17	161042	27.3N 125.0E	PCN 3			RODN
18	161124	26.8N 125.1E	PCN 5		ULCC FIX	RKSO
19	161124	26.8N 125.4E	PCN 5			RPMK
20	161200	27.4N 125.1E	PCN 6	T2.5/2.5 /D1.5/27HRS		PGTW
21	161328	27.2N 125.2E	PCN 5			PGTW
22	161600	27.5N 125.8E	PCN 6			PGTW
23	161800	27.7N 125.7E	PCN 6			PGTW
24	161913	27.7N 125.1E	PCN 5			RKSO
25	162100	28.6N 125.8E	PCN 6			PGTW
26	162141	28.3N 125.4E	PCN 3		WELL DEFINED CENTER	PGTW
27	170000	28.4N 125.8E	PCN 6			PGTW
28	170004	28.9N 125.4E	PCN 3			RODN
29	170004	28.3N 125.9E	PCN 3	T3.5/3.5-/D1.0/24HRS	PARTIALLY EXP LLCC	RPMK
30	170028	28.2N 125.5E	PCN 5			PGTW
31	170300	29.1N 125.0E	PCN 4	T3.0/3.0 /D0.5/24HRS	PARTIALLY EXP LLCC	PGTW
32	170600	29.0N 124.6E	PCN 6			PGTW
33	170617	29.0N 124.6E	PCN 3	T3.0/3.0	INIT OBS PARTIALLY EXP LLCC	RKSO
34	170900	29.3N 124.3E	PCN 6			PGTW
35	171021	29.3N 124.1E	PCN 4			PGTW
36	171102	29.2N 124.5E	PCN 3			RKSO
37	171200	29.4N 123.9E	PCN 6			PGTW
38	171450	29.7N 123.7E	PCN 4			RKSO
39	171600	29.5N 123.3E	PCN 6	T3.0/3.0-/D0.5/28HRS		PGTW
40	171800	29.5N 123.1E	PCN 6			PGTW
41	171902	30.2N 123.0E	PCN 3			RODN
42	172100	29.9N 123.1E	PCN 6			PGTW
43	172342	31.2N 122.3E	PCN 3	T4.0/4.0	INIT OBS	RO

PGTW
PGTW
RKSO
PGTW
RKSO
PGTW
RKSO
RKSO

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON NELSON BEST TRACK DATA

MO/DA/HR	BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
081612Z	16.9	143	16.9	143	16.9	143	16.9	143	16.9	143	16.9	143	16.9	143	16.9	143	16.9	143	16.9	143
081613Z	17.1	142	17.1	142	17.1	142	17.1	142	17.1	142	17.1	142	17.1	142	17.1	142	17.1	142	17.1	142
081614Z	17.3	141	17.3	141	17.3	141	17.3	141	17.3	141	17.3	141	17.3	141	17.3	141	17.3	141	17.3	141
081615Z	17.5	140	17.5	140	17.5	140	17.5	140	17.5	140	17.5	140	17.5	140	17.5	140	17.5	140	17.5	140
081616Z	17.7	139	17.7	139	17.7	139	17.7	139	17.7	139	17.7	139	17.7	139	17.7	139	17.7	139	17.7	139
081617Z	17.9	138	17.9	138	17.9	138	17.9	138	17.9	138	17.9	138	17.9	138	17.9	138	17.9	138	17.9	138
081618Z	18.1	137	18.1	137	18.1	137	18.1	137	18.1	137	18.1	137	18.1	137	18.1	137	18.1	137	18.1	137
081619Z	18.3	136	18.3	136	18.3	136	18.3	136	18.3	136	18.3	136	18.3	136	18.3	136	18.3	136	18.3	136
081620Z	18.5	135	18.5	135	18.5	135	18.5	135	18.5	135	18.5	135	18.5	135	18.5	135	18.5	135	18.5	135
081621Z	18.7	134	18.7	134	18.7	134	18.7	134	18.7	134	18.7	134	18.7	134	18.7	134	18.7	134	18.7	134
081622Z	18.9	133	18.9	133	18.9	133	18.9	133	18.9	133	18.9	133	18.9	133	18.9	133	18.9	133	18.9	133
081623Z	19.1	132	19.1	132	19.1	132	19.1	132	19.1	132	19.1	132	19.1	132	19.1	132	19.1	132	19.1	132
081624Z	19.3	131	19.3	131	19.3	131	19.3	131	19.3	131	19.3	131	19.3	131	19.3	131	19.3	131	19.3	131
081625Z	19.5	130	19.5	130	19.5	130	19.5	130	19.5	130	19.5	130	19.5	130	19.5	130	19.5	130	19.5	130
081626Z	19.7	129	19.7	129	19.7	129	19.7	129	19.7	129	19.7	129	19.7	129	19.7	129	19.7	129	19.7	129
081627Z	19.9	128	19.9	128	19.9	128	19.9	128	19.9	128	19.9	128	19.9	128	19.9	128	19.9	128	19.9	128
081628Z	20.1	127	20.1	127	20.1	127	20.1	127	20.1	127	20.1	127	20.1	127	20.1	127	20.1	127	20.1	127
081629Z	20.3	126	20.3	126	20.3	126	20.3	126	20.3	126	20.3	126	20.3	126	20.3	126	20.3	126	20.3	126
081630Z	20.5	125	20.5	125	20.5	125	20.5	125	20.5	125	20.5	125	20.5	125	20.5	125	20.5	125	20.5	125
081631Z	20.7	124	20.7	124	20.7	124	20.7	124	20.7	124	20.7	124	20.7	124	20.7	124	20.7	124	20.7	124
081632Z	20.9	123	20.9	123	20.9	123	20.9	123	20.9	123	20.9	123	20.9	123	20.9	123	20.9	123	20.9	123
081633Z	21.1	122	21.1	122	21.1	122	21.1	122	21.1	122	21.1	122	21.1	122	21.1	122	21.1	122	21.1	122
081634Z	21.3	121	21.3	121	21.3	121	21.3	121	21.3	121	21.3	121	21.3	121	21.3	121	21.3	121	21.3	121
081635Z	21.5	120	21.5	120	21.5	120	21.5	120	21.5	120	21.5	120	21.5	120	21.5	120	21.5	120	21.5	120
081636Z	21.7	119	21.7	119	21.7	119	21.7	119	21.7	119	21.7	119	21.7	119	21.7	119	21.7	119	21.7	119
081637Z	21.9	118	21.9	118	21.9	118	21.9	118	21.9	118	21.9	118	21.9	118	21.9	118	21.9	118	21.9	118
081638Z	22.1	117	22.1	117	22.1	117	22.1	117	22.1	117	22.1	117	22.1	117	22.1	117	22.1	117	22.1	117
081639Z	22.3	116	22.3	116	22.3	116	22.3	116	22.3	116	22.3	116	22.3	116	22.3	116	22.3	116	22.3	116
081640Z	22.5	115	22.5	115	22.5	115	22.5	115	22.5	115	22.5	115	22.5	115	22.5	115	22.5	115	22.5	115

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	10.	64.	132.	182.	10.	64.	132.	182.
AVG RIGHT ANGLE ERROR	9.	47.	88.	148.	9.	47.	88.	148.
AVG INTENSITY MAGNITUDE ERROR	2.	11.	13.	8.	2.	11.	13.	8.
AVG INTENSITY BIAS	-1.	6.	13.	6.	-1.	6.	13.	6.
NUMBER OF FORECASTS	26	22	17	14	25	22	17	14

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1676. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 9. KNOTS

TYPHOON NELSON FIX POSITIONS FOR CYCLONE NO. 11

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
*	2	152245	13.2N 142.1E	PCN 6	T1.0/1.0	PGTW
	3	160300	15.8N 142.2E	PCN 6	T1.0/1.0	PGTW
	4	160901	17.1N 143.6E	PCN 6		PGTW
	5	160943	17.2N 143.7E	PCN 6		PGTW
	6	161200	17.4N 143.7E	PCN 6		PGTW
	7	161328	17.3N 143.4E	PCN 6		PGTW
	8	161731	17.4N 143.5E	PCN 6		PGTW
*	9	162100	16.7N 142.7E	PCN 6		PGTW
*	10	162223	17.4N 143.3E	PCN 6		PGTW
	11	170028	18.6N 142.4E	PCN 6		PGTW
	12	170435	19.4N 142.5E	PCN 6		PGTW
	13	170600	19.6N 141.8E	PCN 6		PGTW
	14	170900	19.9N 141.8E	PCN 6		PGTW
	15	171200	20.1N 141.3E	PCN 6		PGTW
	16	171600	20.0N 141.5E	PCN 6		PGTW
	17	171720	20.2N 141.1E	PCN 6		PGTW
	18	172120	20.5N 140.1E	PCN 6		PGTW
	19	172201	20.5N 139.7E	PCN 6		PGTW
	20	180007	20.5N 139.8E	PCN 6		PGTW
	21	180423	21.5N 140.0E	PCN 6		PGTW
	22	180600	21.3N 139.9E	PCN 6		PGTW
	23	180900	22.4N 139.0E	PCN 6		PGTW
	24	181000	22.4N 138.7E	PCN 6		PGTW
	25	181200	22.5N 138.5E	PCN 6		PGTW
	26	181248	22.5N 138.1E	PCN 6		PGTW
	27	181600	22.7N 137.7E	PCN 6		PGTW
	28	181709	22.6N 137.6E	PCN 6		PGTW
	29	181709	22.6N 137.6E	PCN 6		PGTW
	30	182058	22.4N 136.9E	PCN 6		PGTW
	31	182100	22.3N 136.4E	PCN 6		PGTW
	32	182300	22.3N 136.8E	PCN 6		PGTW
	33	182300	22.5N 136.8E	PCN 6		PGTW
	34	190128	23.3N 136.2E	PCN 6		PGTW
	35	190300	23.3N 136.1E	PCN 6		PGTW
	36	190555	23.6N 136.1E	PCN 6		PGTW
	37	190555	23.0N 135.9E	PCN 6		PGTW
	38	190938	23.1N 135.0E	PCN 6		PGTW
	39	191018	23.2N 134.9E	PCN 6		PGTW
	40	191018	23.9N 135.2E	PCN 6		PGTW
	41	191200	23.1N 134.0E	PCN 6		PGTW
	42	191400	22.8N 134.3E	PCN 6		PGTW
	43	191600	23.0N 133.8E	PCN 6		PGTW
	44	191800	22.9N 133.7E	PCN 6		PGTW
	45	191841	22.8N 133.3E	PCN 6		PGTW
	46	192037	23.0N 133.5E	PCN 6		PGTW
	47	192258	23.0N 133.3E	PCN 6		PGTW
	48	200000	22.9N 133.2E	PCN 6		PGTW
	49	200544	23.1N 132.4E	PCN 4		PGTW
	50	200544	23.2N 132.2E	PCN 4		PGTW
	51	200917	23.0N 131.9E	PCN 4		PGTW

TYPHOON ODESSA
BEST TRACK DATA

ALL FORECASTS					TYPHOONS WHILE OVER 35 KTS				
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR	
AVG FORECAST POSIT ERROR	15.	146.	238.	272.	13.	146.	238.	272.	
AVG RIGHT ANGLE ERROR	8.	11.	12.	12.	6.	11.	11.	12.	
AVG INTENSITY MAGNITUDE ERROR	4.	12.	13.	13.	5.	12.	13.	13.	
AVG INTENSITY BIAS	-1.	-1.	2.	9.	-1.	-1.	2.	9.	
NUMBER OF FORECASTS	37	33	26	21	35	33	26	21	
DISTANCE TRAVELED BY TROPICAL CYCLONE IS 2328. NM									
AVERAGE SPEED OF TROPICAL CYCLONE IS 10. KNOTS									

SATELLITE FIXES

191

50	262206	27.7N	141.8E	PCN 1						EYE WIDTH 12 NM LENGTH 15 NM	PGTW
51	270027	27.9N	141.1E	PCN 1						EYE 12 NM DIA	PGTW
52	270300	28.0N	141.0E	PCN 2						EYE 12 NM	PGTW
53	270429	28.2N	140.8E	PCN 2						EYE 12 NM	PGTW
54	270600	28.3N	140.7E	PCN 2						CIRCULAR EYE	PGTW
55	270900	28.5N	140.4E	PCN 2						EYE FIX	PGTW
56	271011	28.5N	140.2E	PCN 1						INIT OBS EYE FIX	RPMK
57	271200	28.3N	140.0E	PCN 1						EYE FIX	PGTW
58	271308	28.2N	139.9E	PCN 1						ELONGATED EYE	RKSO
59	271600	28.1N	139.6E	PCN 2						EYE FIX	PGTW
60	271714	28.2N	139.5E	PCN 1						EYE FIX	RKSO
61	271800	28.3N	139.1E	PCN 2						EYE FIX	PGTW
62	272100	28.2N	139.1E	PCN 2						EYE FIX	PGTW
63	272109	28.1N	139.2E	PCN 1						EYE FIX	RODN
64	272303	28.0N	139.3E	PCN 1						INIT OBS EYE FIX	RKSO
65	272325	28.1N	139.0E	PCN 1						INIT OBS EYE 20 NM	RODN
66	272325	28.0N	139.2E	PCN 1						INIT OBS	RPMK
67	280000	28.2N	138.8E	PCN 2						EYE FIX	PGTW
68	280300	28.3N	138.3E	PCN 2						EYE FIX	PGTW
69	280417	28.2N	137.8E	PCN 1						EYE FIX	RODN
70	280600	28.2N	137.9E	PCN 2						EYE FIX	PGTW
71	280900	28.3N	137.5E	PCN 2						EYE FIX	PGTW
72	280949	28.2N	137.4E	PCN 1						EYE FIX	PGTW
73	281200	28.4N	137.0E	PCN 2						EYE FIX	PGTW
74	281248	28.3N	136.5E	PCN 1						EYE FIX	PGTW
75	281600	28.5N	136.3E	PCN 2						EYE FIX	PGTW
76	281800	28.6N	136.1E	PCN 2						EYE FIX	PGTW
77	282048	28.8N	135.6E	PCN 1						EYE FIX	PGTW
78	282303	28.9N	135.2E	PCN 1						EYE FIX	PGTW
79	282347	28.9N	134.8E	PCN 1						EYE FIX	PGTW
80	290128	29.3N	135.1E	PCN 1						EYE 12 NM DIA	RODN
81	290128	29.3N	134.9E	PCN 1						EYE FIX	RPMK
82	290300	29.3N	134.4E	PCN 2						EYE FIX	PGTW
83	290407	29.5N	134.2E	PCN 1						EYE FIX	PGTW
84	290549	29.7N	133.6E	PCN 1						EYE FIX	RPMK
85	290600	29.6N	133.8E	PCN 1						EYE FIX	PGTW
86	290928	30.3N	132.6E	PCN 1						EYE FIX	PGTW
87	291002	30.0N	132.6E	PCN 1						EYE 5 NM	PGTW
88	291200	30.0N	132.4E	PCN 4							PGTW
89	291200	30.2N	130.6E	PCN 6							PGTW
90	291800	30.4N	130.0E	PCN 6							PGTW
91	292100	30.8N	129.1E	PCN 6							PGTW
92	292208	30.4N	128.7E	PCN 3							RODN
93	292241	30.4N	128.4E	PCN 5							PGTW
94	300000	30.4N	128.2E	PCN 4							RODN
95	300108	30.4N	128.0E	PCN 5							PGTW
96	300538	30.3N	126.6E	PCN 5							RPMK
97	300600	30.3N	126.6E	PCN 6							PGTW
98	300900	29.9N	126.2E	PCN 4							PGTW
99	301048	30.0N	125.7E	PCN 1							RKSO
100	301121	30.2N	125.9E	PCN 3							RKSO
101	301121	29.8N	125.6E	PCN 5							RODN
102	301200	29.9N	125.7E	PCN 6							PGTW
103	301348	29.8N	125.0E	PCN 5							PGTW
104	301600	29.7N	125.0E	PCN 6							PGTW
105	301824	29.7N	125.3E	PCN 1							RPMK
106	301824	29.8N	125.3E	PCN 1							PGTW
107	302100	29.9N	125.7E	PCN 1							RPMK
108	310001	30.7N	126.1E	PCN 1							PGTW
109	310001	30.4N	126.7E	PCN 5							RODN
110	310001	30.4N	126.3E	PCN 5							RKSO
111	310048	30.1N	126.0E	PCN 3							RPMK
112	310048	30.1N	126.3E	PCN 6							RKSO
113	310300	30.5N	126.7E	PCN 6							PGTW
114	310527	30.7N	127.2E	PCN 6							PGTW
115	310527	30.9N	127.6E	PCN 5							RPMK
116	310900	32.2N	128.2E	PCN 6							PGTW
117	311027	32.5N	129.0E	PCN 6							RODN
118	311059	32.3N	128.8E	PCN 5							RPMK
119	311200	32.4N	129.0E	PCN 6							PGTW
120	311328	32.5N	129.2E	PCN 4							PGTW
121	311600	33.3N	129.3E	PCN 6							PGTW
122	311800	34.4N	129.3E	PCN 5							RPMK
123	311813	34.3N	129.8E	PCN 5							PGTW
124	312100	34.9N	130.3E	PCN 6							RPMK
125	312339	35.4N	131.7E	PCN 5							PGTW
126	010000	35.5N	131.3E	PCN 6							RODN
127	010027	35.7N	132.2E	PCN 5							PGTW
128	010300	36.2N	132.9E	PCN 6							RODN
129	010517	36.6N	133.6E	PCN 1							PGTW
130	010600	36.7N	133.6E	PCN 1							RODN
131	011005	37.7N	136.6E	PCN 3							PGTW
132	011037	38.0N	136.3E	PCN 3							RKSO
133	011100	37.6N	136.7E	PCN 6							RODN
134	011200	37.6N	136.7E	PCN 6							RKSO
135	011200	37.6N	136.7E	PCN 6							PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCR NAV/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	232249	16.9N 143.1E	1500FT	1200	55 120 30	190 55 120 03	4 2				+25 +28 +24	1
2	240735	17.6N 143.6E	1500FT	993	45 160 10		1				+25 +25 +19	
3	240836	17.6N 143.6E	1500FT	992	50 020 15		1				+24 +25 +20	
4	242055	20.3N 144.1E	700MB	2979	65 040 30	290 61 180 26	10 10	CIRCULAR	20		+11 +14 +8	
5	242340	20.9N 143.9E	700MB	2955	80 130 10	200 77 130 10	10 10	CIRCULAR	15		+11 +16 +10	
6	250530	21.9N 143.5E	700MB	2924	70 170 20	110 77 030 10	10 10				+11 +16 +10	
7	250806	22.2N 143.4E	700MB	2910	70 180 15	300 51 200 20	10 5	CIRCULAR	10		+12 +18 +6	
8	252115	24.6N 142.6E	700MB	2916	80 180 10	240 78 190 7	7	CIRCULAR	30		+10 +16 +9	
9	252347	25.0N 142.5E	700MB	2884	85 150 10	050 58 120 11	1	CIRCULAR	30		+11 +17 +7	
10	260909	26.4N 142.2E	700MB	2810	30 200 17	200 64 200 17	1	ELLIPTICAL	15 050		+12 +15 +4	
11	261148	27.1N 141.3E	700MB	2791	45 040 40	210 90 140 16	10 1	CIRCULAR	23		+10 +16 +9	
12	262150	27.8N 141.1E	700MB	2762	60 060 5	290 60 220 12	10 1	CIRCULAR	14		+11 +17 +5	
13	262354	27.8N 141.1E	700MB	2783	70 100 5	160 55 080 50	10 1	CIRCULAR	13		+11 +14 +9	
14	270857	28.3N 140.4E	700MB	2772	60 060 5	160 55 080 50	10 1	CIRCULAR	10		+11 +14 +9	
15	272018	28.3N 139.4E	700MB	2791	40 040 30	130 57 040 15	10 1	CIRCULAR	10		+11 +14 +9	
16	272331	28.3N 138.8E	700MB	2799	65 140 8	050 60 340 15	10 1	CIRCULAR	15		+11 +14 +7	
17	280830	28.2N 137.5E	700MB	2749	90 170 2	320 57 270 30	10 1	CIRCULAR	10		+12 +17 +7	
18	281101	28.3N 137.1E	700MB	2752	80 180 8	130 83 030 30	10 1	CIRCULAR	14		+11 +15 +13	
19	282232	28.8N 135.3E	700MB	2695	55 210 40	270 71 210 15	10 1	CIRCULAR	10		+12 +14 +10	
20	290607	30.7N 133.6E	700MB	2759	50 030 60	130 90 060 15	4 4	CONCENTRIC	08 20		+11 +18 +12	
21	292035	30.3N 129.0E	700MB	2772	90 090 10	170 86 090 10	10 1	CIRCULAR	10		+11 +22 +10	
22	292311	30.3N 128.3E	700MB	2768	90 090 5	280 71 030 15	10 1	CIRCULAR	30		+12 +17 +11	
23	300605	30.3N 126.5E	700MB	2810	70 120 0	110 85 030 10	10 1				+11 +20 +10	
24	300841	30.3N 125.1E	700MB	2848	40 180 30	160 32 060 60	10 1				+12 +15 +10	
25	310909	31.7N 127.8E	700MB	3024		230 44 140 60	5 5	CIRCULAR	20		+13 +14 +10	
26	311148	32.5N 128.7E	700MB	3041	986							

28 312107 34.9N 130.7E 700MB 3040
29 312118 35.4N 131.5E 700MB 3052
30 010523 36.9N 133.5E 700MB 3097
31 010621 37.2N 135.3E 700MB 3086

35 180 5 210 60 060 60 5 2
36 300 15 170 40 040 45 5 4
45 170 60 190 51 100 50 2 20
40 190 35 380 47 180 50 2 20

+11 +12 + 8 18
+10 +11 + 7 18
+10 + 9 + 9 19
+ 9 + 9 + 9 19

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRV	EYE SHAPE	EYE DIAM	RADOB-CODE ASUAR	TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	290400	29.4N 134.1E	LAND				20311	53116		30.6N 131.0E	47869
2	290500	29.4N 133.7E	LAND				20311	52819		30.6N 131.0E	47869
3	290600	29.5N 133.6E	LAND				20311	52911		30.6N 131.0E	47869
4	290700	29.6N 133.3E	LAND				20311	52916		30.6N 131.0E	47869
5	290800	29.7N 133.1E	LAND				20311	52916		30.6N 131.0E	47869
6	290900	29.8N 132.8E	LAND	GOOD		30			MOV 2825	30.6N 131.0E	47869
7	291000	29.8N 132.8E	LAND				20311	52916		30.6N 131.0E	47869
8	291100	29.8N 132.9E	LAND				10301	52816		28.4N 129.5E	47909
9	291200	29.8N 133.0E	LAND	GOOD		25			MOV 3025	31.3N 131.9E	47909
10	291300	29.9N 132.5E	LAND				10311	52916		28.4N 129.5E	47909
11	291400	29.9N 132.5E	LAND				20432	52816		30.6N 131.0E	47869
12	291500	29.9N 132.5E	LAND	GOOD		25			MOV 3040	31.3N 131.9E	47909
13	291600	29.9N 132.1E	LAND				20411	52819		28.4N 129.5E	47909
14	291700	30.0N 132.2E	LAND				10311	52819		30.6N 131.0E	47869
15	291800	30.0N 132.2E	LAND	GOOD		20			MOV 2930	31.3N 131.9E	47909
16	291900	30.0N 131.9E	LAND				10311	52816		28.4N 129.5E	47909
17	292000	30.0N 131.8E	LAND				20512	52816		30.6N 131.0E	47869
18	292100	30.0N 131.9E	LAND	GOOD		20			MOV 2830	31.3N 131.9E	47909
19	292200	30.1N 131.4E	LAND				20322	52922		28.4N 129.5E	47909
20	292300	30.1N 131.5E	LAND				10311	52819		30.6N 131.0E	47869
21	292400	30.1N 131.2E	LAND	GOOD		20			MOV 2930	31.3N 131.9E	47909
22	292500	30.1N 131.2E	LAND				10341	52722		28.4N 129.5E	47909
23	292600	30.1N 131.0E	LAND				20311	52722		30.6N 131.0E	47869
24	292700	30.1N 131.2E	LAND	GOOD		20			MOV 2835	31.3N 131.9E	47909
25	292800	30.1N 130.7E	LAND				20311	52816		28.4N 129.5E	47909
26	292900	30.1N 130.8E	LAND				10311	52722		30.6N 131.0E	47869
27	293000	30.1N 130.8E	LAND	GOOD		15			MOV 2830	31.3N 131.9E	47909
28	293100	30.2N 130.5E	LAND				25/51	52922		28.4N 129.5E	47909
29	293200	30.2N 130.3E	LAND				20311	52922		30.6N 131.0E	47869
30	293300	30.3N 130.0E	LAND	GOOD		10			MOV 2940	31.3N 131.9E	47909
31	293400	30.3N 130.0E	LAND				20311	52819		28.4N 129.5E	47909
32	293500	30.3N 130.1E	LAND				20141	52822		30.6N 131.0E	47869
33	293600	30.3N 130.0E	LAND	GOOD		5			MOV 2730	31.3N 131.9E	47909
34	293700	30.3N 129.7E	LAND				20311	52816		28.4N 129.5E	47909
35	293800	30.4N 129.5E	LAND	GOOD		20			MOV 2940	30.6N 131.0E	47869
36	293900	30.3N 129.8E	LAND				10271	52716		34.2N 130.8E	47762
37	294000	30.3N 129.5E	LAND				10212	52719		30.6N 131.0E	47869
38	294100	30.2N 129.4E	LAND	GOOD		10			MOV 2830	34.2N 130.8E	47762
39	294200	30.3N 129.4E	LAND				20312	52716		30.6N 131.0E	47869
40	294300	30.3N 129.2E	LAND	GOOD		10			MOV 2830	34.2N 130.8E	47762
41	294400	30.4N 128.8E	LAND				20312	52816		30.6N 131.0E	47869
42	294500	30.3N 128.9E	LAND	GOOD		20			MOV 2830	34.2N 130.8E	47762
43	294600	30.4N 128.5E	LAND				20312	52714		30.6N 131.0E	47869
44	294700	30.3N 128.5E	LAND	GOOD		20			MOV 2830	34.2N 130.8E	47762
45	294800	30.3N 128.6E	LAND				21311	52716		30.6N 131.0E	47869
46	294900	30.5N 128.3E	LAND				21311	53016		34.2N 130.8E	47762
47	295000	30.3N 128.2E	LAND	GOOD		20			MOV 2830	34.2N 130.8E	47762
48	295100	30.4N 128.2E	LAND				20432	52716		30.6N 131.0E	47869
49	295200	30.4N 127.9E	LAND				20412	52716		30.6N 131.0E	47869
50	295300	30.3N 128.0E	LAND	GOOD		15			MOV 2820	30.6N 131.0E	47869
51	295400	30.4N 128.0E	LAND				20612	52519		30.6N 131.0E	47869
52	295500	30.4N 127.7E	LAND				22612	52713		30.6N 131.0E	47869
53	295600	30.3N 127.7E	LAND	GOOD		30			MOV 2820	34.2N 130.8E	47762
54	295700	30.4N 127.5E	LAND				20532	52719		30.6N 131.0E	47869
55	295800	30.3N 127.4E	LAND				22612	52616		30.6N 131.0E	47869
56	295900	30.4N 127.1E	LAND				20432	52722		30.6N 131.0E	47869
57	296000	30.3N 127.4E	LAND	GOOD		35			MOV 2720	32.7N 128.8E	47844
58	296100	30.4N 127.0E	LAND				20512	52708		30.6N 131.0E	47869
59	296200	30.4N 127.0E	LAND				21512	52811		32.7N 128.8E	47844
60	296300	30.3N 127.1E	LAND	GOOD		35			MOV 2725	30.6N 131.0E	47869
61	296400	30.4N 127.0E	LAND				52511	52711		32.7N 128.8E	47844
62	296500	30.3N 127.0E	LAND	GOOD		30			MOV 2720	30.6N 131.0E	47869
63	296600	30.4N 126.7E	LAND				52711	52813		32.7N 128.8E	47844
64	296700	30.3N 126.5E	LAND	GOOD		30			MOV 2720	30.6N 131.0E	47869
65	296800	30.3N 126.5E	LAND				50411	52611		32.7N 128.8E	47844
66	296900	30.2N 126.6E	LAND	FAIR		30			MOV 2820	32.7N 128.8E	47844
67	297000	31.8N 128.2E	LAND				20611	50613		33.4N 130.3E	47806
68	297100	31.8N 128.2E	LAND				20611	50613		33.4N 130.3E	47806
69	297200	31.9N 128.6E	LAND				22861	50719		33.4N 130.3E	47806
70	297300	31.9N 128.6E	LAND				22861	50719		33.4N 130.3E	47806
71	297400	32.3N 128.7E	LAND				25111	50222		33.4N 130.3E	47806
72	297500	32.4N 128.7E	LAND				55541	50322		33.4N 130.3E	47806
73	297600	32.6N 128.8E	LAND				55541	50322		33.4N 130.3E	47806
74	297700	32.5N 128.8E	LAND				25541	50611		33.4N 130.3E	47806
75	297800	32.7N 129.0E	LAND				67111	50511		33.4N 130.3E	47806
76	297900	32.9N 129.1E	LAND				55561	50327		33.4N 130.3E	47806
77	298000	32.9N 129.1E	LAND				67111	50516		33.4N 130.3E	47806
78	298100	32.9N 129.5E	LAND				67111	50522		33.4N 130.3E	47806
79	298200	33.6N 129.7E	LAND				22511	50124		34.3N 132.6E	47792
80	298300	33.6N 129.6E	LAND				67111	50124		33.4N 130.3E	47806
81	298400	34.0N 129.6E	LAND				22831	50619		34.3N 132.6E	47792
82	298500	34.1N 129.7E	LAND				20311	50116		33.4N 130.3E	47806
83	298600	34.0N 129.7E	LAND	FAIR						33.4N 130.3E	47806
84	298700	34.1N 130.0E	LAND				21511	50422		33.4N 130.3E	47806
85	298800	34.1N 130.1E	LAND				22871	50622		33.4N 130.3E	47806
86	298900	34.1N 130.0E	LAND	FAIR						33.4N 130.3E	47806
87	299000	34.5N 130.2E	LAND				12871	50222		33.4N 130.3E	47806
88	299100	34.3N 130.2E	LAND				22511	50422		33.4N 130.3E	47806
89	299200	34.3N 130.3E	LAND	FAIR						33.8N 130.3E	47803
90	299300	34.6N 130.4E	LAND	FAIR						33.8N 130.3E	47803
91	299400	34.5N 130.4E	LAND				24111	50416		33.8N 130.3E	47806
92	299500	34.6N 130.4E	LAND				12811	50511		33.8N 130.3E	47806
93	299600	34.5N 130.6E	LAND				32901	50511		33.8N 130.3E	47806
94	299700	34.7N 130.7E	LAND	FAIR						33.8N 130.3E	47803
95	299800	34.7N 130.7E	LAND				24111	50522		33.4N 130.3E	47806
96	299900	34.7N 130.7E	LAND				24651	50314		35.5N 133.1E	47791

130	010600	36.5N	134.5E	LAND		5///1	50730		36.2N	136.2E	47705
131	010600	36.4N	134.3E	LAND		65///	50922		35.5N	133.1E	47791
132	010600	36.7N	133.9E	LAND	POOR				35.8N	135.3E	
133	010700	36.5N	134.5E	LAND		65///	50716		35.5N	133.1E	47791
134	010700	36.8N	134.8E	LAND		///	50632		34.6N	135.7E	47773
135	010700	36.5N	134.9E	LAND		5///1	60725		36.2N	136.2E	47705
136	010800	36.8N	134.9E	LAND		65///	50527		35.5N	133.1E	47791
137	010900	37.1N	135.5E	LAND		///	///		37.7N	138.8E	47572
138	011000	37.2N	136.0E	LAND		///	///		37.7N	138.8E	47572
139	011100	37.3N	136.4E	LAND		///	///		37.7N	138.8E	47572
140	011200	37.6N	137.0E	LAND		///	///		37.7N	138.8E	47572
141	011300	37.6N	137.2E	LAND		///	///		37.7N	138.8E	47572
142	011400	37.6N	137.6E	LAND		///	///		37.7N	138.8E	47572
143	011500	37.7N	138.4E	LAND		///	///		37.7N	138.8E	47572
144	313200	35.2N	131.4E	LAND		12811	50624		35.5N	133.1E	47791

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON PAT
BEST TRACK DATA

MO/DA/HR	BEST TRACK		WARNING		ERRORS		24 HOUR FORECAST		48 HOUR FORECAST		72 HOUR FORECAST	
	POSIT	WIND	POSIT	WIND	DST WIND	POSIT	WIND	DST WIND	POSIT	WIND	DST WIND	POSIT
082700Z	21.3	125.8	45	121.3	126.0	45	125.8	126.0	45	125.8	126.0	45
082706Z	21.6	126.6	55	121.3	126.0	55	126.6	126.0	55	126.6	126.0	55
082712Z	21.9	127.4	55	121.3	126.0	55	127.4	126.0	55	127.4	126.0	55
082718Z	22.2	128.2	55	121.3	126.0	55	128.2	126.0	55	128.2	126.0	55
082800Z	22.5	129.0	60	121.3	126.0	60	129.0	126.0	60	129.0	126.0	60
082806Z	22.8	129.8	60	121.3	126.0	60	129.8	126.0	60	129.8	126.0	60
082812Z	23.1	130.6	60	121.3	126.0	60	130.6	126.0	60	130.6	126.0	60
082818Z	23.4	131.4	60	121.3	126.0	60	131.4	126.0	60	131.4	126.0	60
082900Z	23.7	132.2	60	121.3	126.0	60	132.2	126.0	60	132.2	126.0	60
082906Z	24.0	133.0	60	121.3	126.0	60	133.0	126.0	60	133.0	126.0	60
082912Z	24.3	133.8	60	121.3	126.0	60	133.8	126.0	60	133.8	126.0	60
082918Z	24.6	134.6	60	121.3	126.0	60	134.6	126.0	60	134.6	126.0	60
083000Z	24.9	135.4	60	121.3	126.0	60	135.4	126.0	60	135.4	126.0	60
083006Z	25.2	136.2	60	121.3	126.0	60	136.2	126.0	60	136.2	126.0	60
083012Z	25.5	137.0	60	121.3	126.0	60	137.0	126.0	60	137.0	126.0	60
083018Z	25.8	137.8	60	121.3	126.0	60	137.8	126.0	60	137.8	126.0	60
083100Z	26.1	138.6	60	121.3	126.0	60	138.6	126.0	60	138.6	126.0	60
083106Z	26.4	139.4	60	121.3	126.0	60	139.4	126.0	60	139.4	126.0	60
083112Z	26.7	140.2	60	121.3	126.0	60	140.2	126.0	60	140.2	126.0	60
083118Z	27.0	141.0	60	121.3	126.0	60	141.0	126.0	60	141.0	126.0	60

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	16.	155.	331.	514.	16.	155.	331.	514.
AVG RIGHT ANGLE ERROR	8.	44.	122.	259.	8.	44.	122.	259.
AVG INTENSITY MAGNITUDE ERROR	5.	5.	10.	10.	5.	5.	10.	10.
AVG INTENSITY BIAS	0.	3.	8.	8.	0.	3.	8.	8.
NUMBER OF FORECASTS	20	16	12	8	20	16	12	8

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1337. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 12. KNOTS

TYPHOON PAT
FIX POSITIONS FOR CYCLONE NO. 13

SATELLITE FIXES

FIX NO.	TIME	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	241747	23.0N 123.5E	PCN 5	T1.0/1.0	INIT OBS	PGTU
2	250108	23.3N 124.4E	PCN 6			PJTU
3	251348	23.5N 122.8E	PCN 4	T1.0/1.0 /S0.0/20HRS	EXP LLCC	PJTU
4	252152	23.1N 122.0E	PCN 1	T1.5/1.5	INIT OBS	RPMK
5	252152	23.1N 122.0E	PCN 1	T1.5/1.5	INIT OBS	RODN
6	260009	22.7N 121.9E	PCN 1			RPMK
7	260009	22.7N 121.9E	PCN 1			RODN
8	260229	22.3N 122.1E	PCN 1			RPMK
9	260229	22.3N 122.1E	PCN 1			RODN
10	261328	21.3N 124.9E	PCN 1			PJTU
11	261907	21.6N 126.0E	PCN 1			RODN
12	262131	21.6N 126.0E	PCN 1	T2.5/2.5	INIT OBS	RODN
13	262347	21.4N 126.0E	PCN 1	T2.5/2.5 /D1.0/26HRS		RPMK
14	270000	21.1N 125.9E	PCN 1			PJTU
15	270209	21.1N 126.1E	PCN 5		EXP LLCC	RPMK
16	270300	21.0N 126.3E	PCN 6	T3.0/3.0	INIT OBS	PJTU
17	270600	21.4N 126.3E	PCN 6			PJTU
18	270611	21.6N 126.7E	PCN 5			RPMK
19	270900	21.8N 127.1E	PCN 6			PJTU
20	271011	21.9N 127.5E	PCN 5			RPMK
21	271200	22.1N 127.5E	PCN 6			PJTU
22	271449	22.0N 127.4E	PCN 5			RKSO
23	271600	21.7N 128.1E	PCN 6	T3.0/3.0	INIT OBS	PJTU
24	271800	22.0N 128.1E	PCN 6			PJTU
25	271856	22.4N 128.0E	PCN 5			RKSO
26	272009	22.5N 129.1E	PCN 3		EXP LLCC	RODN
27	272100	22.8N 128.3E	PCN 6			PJTU
28	272325	23.1N 129.3E	PCN 3	T3.5/3.5 /D1.0/24HRS		RPMK
29	272325	23.7N 129.3E	PCN 5	T3.5/3.5 /D1.0/26HRS		RODN
30	280000	23.7N 129.3E	PCN 6			PJTU
31	280149	23.1N 129.3E	PCN 3			RPMK
32	280300	23.1N 129.2E	PCN 4	T4.0/4.0 /D1.0/24HRS		PJTU
33	280600	23.9N 129.5E	PCN 5		EYE FORMING	RPMK
34	280600	23.0N 129.4E	PCN 3	T3.5/3.5	INIT OBS	RKSO
35	280600	23.0N 129.6E	PCN 4			PJTU
36	280900	23.5N 129.8E	PCN 4			PJTU
37	280949	23.1N 129.8E	PCN 3		DEVELOPING EYE	PJTU
38	281200	23.2N 129.9E	PCN 4			PJTU
39	281429	23.1N 129.9E	PCN 5		PARTIAL EYE WALL	RPMK
40	281429	23.1N 129.9E	PCN 5		PSBL EYE WALL	RODN
41	281600	23.3N 130.2E	PCN 6			PJTU
42	281800	23.3N 130.3E	PCN 4	T4.0/4.0 /D1.0/24HRS		PJTU
43	282048	23.4N 130.4E	PCN 5			PJTU
44	282303	23.5N 130.1E	PCN 5			PJTU
45	282303	23.5N 129.8E	PCN 2			RKSO
46	290128	23.6N 130.4E	PCN 3		BANDING EYE FORMING	PJTU
47	290128	23.7N 130.4E	PCN 1	T4.5/4.5 /D1.0/26HRS	RAGGED EYE LARGE EYE WALL	RPMK
48	290128	23.7N 130.5E	PCN 1	T4.0/4.0 /D0.5/26HRS	EYE FORMING	RODN
49	290300	23.8N 130.4E	PCN 2		BANDING EYE	PJTU
50	290549	23.8N 130.4E	PCN 1		RAGGED EYE	RPMK
51	290549	23.8N 130.4E	PCN 1	T4.5/4.5 /D0.5/27HRS	BANDING EYE	PJTU
52	290549	23.8N 130.4E	PCN 1			RODN
53	290928	24.0N 130.5E	PCN 2		EYE FIX	PJTU
54	291002	24.1N 130.7E	PCN 1		18 NM RAGGED EYE	PJTU
55	291200	24.3N 130.8E	PCN 2			PJTU
56	291409	24.4N 130.8E	PCN 1		19 NM EYE	PJTU
57	291600	24.5N 130.9E	PCN 2	T4.5/4.5 /D0.5/24HRS	STADIUM EYE 25NM INNER EYE 6N	PJTU
58	291834	24.8N 131.1E	PCN 1			PJTU
59	292100	25.3N 131.2E	PCN 2		EYE FIX	PJTU
60	292208	25.4N 131.4E	PCN 1	T4.0/4.0 /D0.5/24HRS	EYE FIX	RODN
61	292241	25.6N 130.7E	PCN 1	T5.5/5.5 /D1.5/21HRS	SMALL EYE FIX	RODN

56	301900	31.3N 130.3E	LAND	GOOD	40	20942 53522	MOV 3635	31.3N 131.9E	47989
57	302000	31.7N 130.3E	LAND			2182/ 53624		33.4N 129.5E	47806
58	302000	31.7N 130.3E	LAND			11912 53622		33.4N 130.3E	47869
59	302000	31.7N 130.3E	LAND					30.6N 131.0E	47869
60	302000	31.6N 130.2E	LAND	GOOD	40	2455/ 53522	MOV 3540	31.3N 131.9E	47806
61	302100	32.0N 130.2E	LAND			65/62 53622		33.4N 130.3E	47869
62	302100	32.1N 130.3E	LAND			23/5/ 53632		30.6N 131.0E	47806
63	302200	32.6N 130.2E	LAND			20401 /3622		33.4N 130.3E	47792
64	302300	32.9N 130.2E	LAND			5/11/ 53319		34.3N 132.6E	47806
65	302300	32.7N 130.1E	LAND			20411 53611		33.4N 130.3E	47792
66	310000	33.1N 130.2E	LAND			20/1 43627		34.3N 132.6E	47792
67	310100	33.8N 130.2E	LAND			5/11/ 5/11/		33.4N 130.3E	47806
68	310100	33.5N 130.1E	LAND			229/1 50314		34.3N 132.6E	47792
69	310200	34.0N 130.3E	LAND			6/11/ 50222		33.4N 130.3E	47806
70	310200	33.9N 130.2E	LAND					33.8N 130.3E	47806
71	310200	34.0N 130.2E	LAND	POOR		6/11/ 50122		34.3N 132.6E	47792
72	310300	34.3N 130.3E	LAND			60/61 53622		33.8N 130.3E	47803
73	310300	34.3N 130.4E	LAND			65/41 53622		34.3N 132.6E	47792
74	310300	34.1N 130.0E	LAND	FAIR		6/11/ 51024		33.4N 130.3E	47806
75	310400	34.6N 130.4E	LAND			65/11/ 11/11/		35.5N 133.1E	47791
76	310400	34.6N 130.3E	LAND			65/11/ 53616		35.5N 133.1E	47806
77	310400	34.8N 130.7E	LAND			6/11/ 50222		33.4N 130.3E	47791
78	310400	34.5N 130.2E	LAND	FAIR		65/11/ 53619		33.4N 130.3E	47806
79	310500	35.1N 130.7E	LAND			6/11/ 50324		35.5N 133.1E	47791
80	310500	35.0N 130.4E	LAND			55/2 54038		33.4N 130.3E	47806
81	310600	35.4N 130.7E	LAND			50432 45317		35.5N 133.1E	47791
82	310600	35.4N 130.7E	LAND			55/2 50219		35.5N 133.1E	47791
83	310800	36.2N 131.2E	LAND			55/2 50322		35.5N 133.1E	47791
84	310800	36.2N 131.4E	LAND			55/2 50327		35.5N 133.1E	47791
85	310900	36.5N 131.3E	LAND					35.5N 133.1E	47791
86	311000	36.8N 131.5E	LAND					35.5N 133.1E	47791
87	311100	37.2N 131.8E	LAND					35.5N 133.1E	47791
88	311200	37.6N 132.0E	LAND					35.5N 133.1E	47791

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	010600	41.8N 141.1E	025	006	47431 47544 47423

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

**TROPICAL STORM RUBY
BEST TRACK DATA**

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND		POSIT	WIND		ERRORS DST WIND	POSIT	WIND	ERRORS DST WIND	POSIT	WIND	ERRORS DST WIND	POSIT	WIND	ERRORS DST WIND			
082700Z	21.6	139.0	25	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0			
082706Z	21.6	140.0	25	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0			
082712Z	21.6	141.0	25	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0			
082718Z	21.6	142.0	25	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0			
082800Z	23.7	143.6	50	23.8	143.7	50	8.1	27.5	144.7	70	114	15	30.4	143.3	85	193			
082806Z	24.7	143.9	50	24.7	144.1	55	11	28.5	144.3	75	130	20	31.1	142.3	85	192			
082812Z	25.7	143.9	50	25.7	144.0	55	5	29.3	143.8	80	120	25	31.5	141.6	90	190			
082818Z	26.8	143.3	50	26.7	143.5	60	12	30.0	143.5	80	120	25	31.5	139.3	90	188			
082900Z	29.9	142.6	60	29.8	142.7	60	20	31.1	139.4	65	97	15	31.8	139.3	65	97			
082906Z	29.9	141.3	50	29.9	141.0	50	20	31.1	137.4	65	174	15	31.8	135.5	65	97			
082912Z	29.9	141.3	50	29.9	141.0	50	20	31.1	137.4	65	174	15	31.8	135.5	65	97			
082918Z	30.9	140.7	55	30.9	140.5	50	10	31.4	136.4	60	221	20	0.0	0.0	0.0	0.0			
083000Z	32.1	140.1	50	32.2	139.9	50	12	33.2	134.9	50	360	5	0.0	0.0	0.0	0.0			
083006Z	33.5	139.8	50	33.5	139.4	55	20	38.0	140.9	35	107	-10	0.0	0.0	0.0	0.0			
083012Z	34.7	139.7	50	34.7	139.6	55	5	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0			
083018Z	36.1	140.0	40	36.0	140.0	45	10	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0			
083100Z	37.7	141.8	45	37.7	141.8	45	23	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0			
083106Z	39.2	142.6	45	39.2	142.3	45	23	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0			

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	12.	166.	318.	377.	0.	0.	0.	0.
AVG RIGHT ANGLE ERROR	11.	110.	137.	27.	0.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	2.	17.	33.	40.	0.	0.	0.	0.
AVG INTENSITY BIAS	2.	15.	33.	40.	0.	0.	0.	0.
NUMBER OF FORECASTS	14	10	6	2	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1310. NM

AVERAGE SPEED OF TROPICAL CYCLONE IS 13. KNOTS

TROPICAL STORM RUBY
FIX POSITIONS FOR CYCLONE NO. 14

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	270429	22.0N 139.4E	PCN 6	T1.0/1.0	INIT OBS	PGTU
2	270600	22.2N 139.5E	PCN 6			PGTU
3	271200	21.8N 140.4E	PCN 6			PGTU
4	271600	22.2N 141.9E	PCN 6	T1.5/1.5	INIT OBS	PGTU
5	271714	22.0N 142.8E	PCN 5			RKSO
6	271800	21.8N 142.9E	PCN 6			PGTU
7	272100	21.3N 143.3E	PCN 6			RODN
8	272109	22.5N 143.8E	PCN 5			PGTU
9	280000	24.0N 143.8E	PCN 6			PGTU
10	280300	24.0N 143.6E	PCN 6	T2.5/2.5 /D1.5/24HRS		RODN
11	280417	24.4N 144.0E	PCN 5	T2.5/2.5	INIT OBS	PGTU
12	280600	24.5N 143.5E	PCN 6			PGTU
13	280900	25.1N 144.3E	PCN 6			PGTU
14	280949	25.7N 144.3E	PCN 6			PGTU
15	281200	26.4N 144.0E	PCN 6			PGTU
16	281248	26.6N 143.5E	PCN 6			PGTU
17	281600	26.3N 143.4E	PCN 6	T3.0/3.0 /D1.5/24HRS	PART EXP LLCC	PGTU
18	281800	26.7N 145.9E	PCN 6			PGTU
19	282043	27.0N 142.9E	PCN 5			PGTU
20	282303	27.5N 142.8E	PCN 5			RKSO
21	282303	27.2N 143.1E	PCN 5	T3.5/3.5	INIT OBS	RODN
22	282326	28.0N 140.1E	PCN 3	T3.5/3.5	INIT OBS EYE FORMING	PGTU
23	282347	27.7N 142.6E	PCN 5			PGTU
24	290407	28.2N 142.7E	PCN 5	T3.0/3.0 /D0.5/25HRS		PGTU
25	290600	28.9N 142.0E	PCN 6			PGTU
26	290928	29.6N 141.3E	PCN 4		EXP LLCC	PGTU
27	291002	29.4N 141.4E	PCN 6			PGTU
28	291227	29.8N 141.0E	PCN 6			PGTU
29	291653	30.5N 140.4E	PCN 5	T2.5/2.5+/S0.0/24HRS		PGTU
30	291800	30.7N 140.4E	PCN 6		ULCC FIX	PGTU
31	292100	31.5N 140.0E	PCN 6			PGTU
32	300000	32.0N 140.2E	PCN 6			PGTU
33	300356	32.9N 139.8E	PCN 5	T3.5/3.5-/D0.5/24HRS		PGTU
34	300538	33.8N 139.7E	PCN 5	T3.0/3.0	INIT OBS	RPMP
35	300600	33.8N 140.0E	PCN 6			PGTU
36	300900	33.8N 139.6E	PCN 6			PGTU
37	300940	34.1N 139.5E	PCN 3		ULCC FIX	PGTU
38	301200	34.7N 139.5E	PCN 6		ULCC FIX	PGTU
39	301600	35.6N 140.0E	PCN 6		ULCC FIX	PGTU
40	301800	36.0N 140.2E	PCN 6		ULCC FIX	PGTU
41	302005	36.8N 140.7E	PCN 6		ULCC FIX	PGTU
42	310000	38.1N 141.0E	PCN 6		ULCC FIX	PGTU
43	310300	38.8N 141.6E	PCN 6			PGTU
44	310600	39.3N 142.5E	PCN 6	T2.5/3.5 /W1.0/26HRS		PGTU
45	310900	39.6N 143.5E	PCN 6			PGTU
46	311200	39.8N 144.7E	PCN 6			PGTU
47	311600	40.2N 146.7E	PCN 6	T2.5/2.5	INIT OBS	PGTU
48	311800	40.4N 148.3E	PCN 6			PGTU
49	311813	40.7N 148.8E	PCN 6		ULCC FIX	RKSO
50	311944	40.5N 149.9E	PCN 6		ULCC FIX	RKSO
51	010000	41.5N 150.3E	PCN 6		EXP LLCC	PGTU
52	010600	42.1N 155.7E	PCN 6	T1.5/2.5 /W1.0/24HRS	EXP LLCC	PGTU

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRV NAV/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	280020	23.9N 143.7E	700MB	2943	982	65 320 10	320 44 320 15	10 5	ELLIPTICAL	15 10 090	+ +15 +10	1
2	282105	27.3N 142.9E	700MB	3003		07 020 15	190 64 090 29	4 3			+11 +19 + 9	2
3	282347	27.8N 142.7E	700MB	3051	992	45 310 50	300 37 210 73	6 4			+15 +19 + 8	3
4	290532	28.9N 142.0E	700MB	3044		40 320 60	090 38 320 60	10 4			+12 +15 +10	4

CIRCULAR 30

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASUAR	TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO
1	292200	31.7N 140.5E	LAND				20711	53519		35.3N 138.7E	47639
2	292300	32.0N 140.4E	LAND				55742	53417		35.3N 138.7E	47639
3	292330	32.1N 140.2E	LAND							35.3N 138.7E	47639
4	300000	32.3N 140.2E	LAND	GOOD		20	11772	53319	MOV 3320	35.2N 140.1E	47639
5	300100	32.4N 139.9E	LAND				11482	53016		35.3N 138.7E	47639
6	300200	32.6N 140.0E	LAND				11741	51016		35.3N 138.7E	47639
7	300300	32.9N 139.9E	LAND				11832	53619		35.3N 138.7E	47639
8	300400	33.1N 139.9E	LAND				10611	53616		35.3N 138.7E	47639
9	300430	33.1N 139.8E	LAND	GOOD		20			MOV 0930	35.3N 138.7E	47639
10	300500	33.3N 139.7E	LAND	GOOD		20			MOV 3430	35.2N 140.1E	47639
11	300500	33.3N 139.8E	LAND				11612	53316		35.3N 138.7E	47639
12	300600	33.5N 139.7E	LAND	GOOD		20			MOV 3630	35.2N 140.1E	47639
13	300600	33.5N 139.7E	LAND				65772	53511	MOV 3620	35.3N 138.7E	47639
14	300700	33.7N 139.7E	LAND	GOOD		10	65772	53511		35.3N 138.7E	47639
15	300700	33.7N 139.7E	LAND				65772	53511		35.3N 138.7E	47639
16	300800	33.9N 139.7E	LAND				65772	53511		35.3N 138.7E	47639
17	300830	34.0N 139.7E	LAND	GOOD		20			MOV 3620	35.2N 140.1E	47639
18	300900	34.2N 139.6E	LAND				65772	53511		35.3N 138.7E	47639
19	301000	34.3N 139.6E	LAND	GOOD		40			MOV 3625	35.2N 140.1E	47639
20	301000	34.3N 139.5E	LAND				55771	53411		35.3N 138.7E	47639
21	301035	34.5N 139.6E	LAND	FAIR					MOV 1715	35.3N 138.7E	47639
22	301100	34.4N 139.4E	LAND	FAIR		40			MOV 3425	35.2N 140.1E	47642
23	301100	34.5N 139.5E	LAND				55772	53614		35.3N 138.7E	47639
24	301200	34.7N 139.7E	LAND				67772	50216		35.3N 138.7E	47639
25	301235	35.0N 139.6E	LAND			28			MOV 1810	35.3N 138.7E	47639
26	301300	34.9N 139.7E	LAND				45773	53611		35.3N 138.7E	47639
27	301400	35.2N 139.8E	LAND				45773	50216		35.3N 138.7E	47639
28	301435	35.3N 139.7E	LAND	POOR					MOV 1815	35.7N 139.3E	47642
29	301500	35.5N 139.9E	LAND	FAIR					MOV 0240	35.2N 140.4E	47715
30	301500	35.6N 140.0E	LAND				67772	50227		35.3N 138.7E	47639
31	301535	35.6N 139.8E	LAND	FAIR					MOV 2015	35.7N 139.3E	47642
32	301600	35.7N 139.9E	LAND				45772	53408		35.3N 138.7E	47639
33	301600	35.7N 139.8E	LAND				75777	50227		37.7N 138.8E	47572
34	301700	36.0N 140.2E	LAND				45772	50322		35.3N 138.7E	47639
35	301740	36.1N 140.1E	LAND				75777	50322		35.3N 138.7E	47639
36	301800	36.4N 140.2E	LAND				67772	50122		35.3N 138.7E	47639
37	301800	36.3N 140.3E	LAND				75777				

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON SKIP02C
BEST TRACK DATA

NO/DA/HR	BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
083018Z	12.8	180.8	35	12.8	180.5	30	18	-5	13.0	174.5	45	191	-10	13.5	169.6	50	402	-20	14.0	164.6
083100Z	13.6	178.9	30	12.9	179.3	30	48	-5	13.8	174.3	45	168	-10	14.0	168.8	55	415	-5	13.8	163.2
083105Z	14.4	177.7	40	14.5	177.7	35	13	-5	16.0	173.1	50	162	-10	15.0	167.5	60	434	10	14.5	161.5
083112Z	15.1	176.4	45	15.0	176.7	40	12	-5	17.0	172.8	50	201	-15	16.4	165.9	60	403	10	15.4	161.6
083118Z	15.6	176.4	55	15.0	176.7	50	12	-5	17.3	172.9	65	143	-5	17.8	168.3	70	275	20	17.0	162.8
090100Z	16.0	176.1	55	15.8	175.9	55	17	-5	16.9	172.8	70	131	10	17.0	167.3	80	312	30	16.1	161.8
090106Z	16.5	175.9	60	15.8	175.9	55	42	-5	17.0	172.7	75	111	25	17.0	167.1	85	302	35	16.0	161.3
090112Z	16.9	175.7	65	17.2	175.6	65	19	-5	18.1	172.8	85	83	15	17.4	168.7	90	294	30	17.1	164.5
090118Z	17.3	175.4	70	17.6	175.3	65	85	-5	18.1	172.8	70	21	30	17.5	168.7	80	206	35	17.2	164.5
090200Z	17.5	175.0	60	17.8	174.8	70	81	10	17.8	171.4	75	79	25	17.4	167.3	85	281	40	17.2	163.2
090206Z	17.7	174.5	50	17.7	174.4	60	6	10	17.7	171.3	70	82	20	17.3	166.8	85	326	45	17.1	161.5
090212Z	18.1	173.7	50	18.0	173.9	55	13	10	18.5	169.3	75	141	20	18.3	164.8	85	426	40	17.6	160.0
090218Z	18.3	173.1	50	18.2	172.9	55	13	5	18.8	169.3	65	131	20	18.3	164.5	75	493	30	18.0	159.5
090300Z	18.6	172.5	50	18.4	172.4	50	13	0	19.4	170.4	50	72	5	20.7	168.4	60	310	15	20.7	164.1
090306Z	18.9	172.0	50	18.9	172.0	50	0	0	20.3	170.2	50	62	10	21.0	167.4	60	412	15	20.8	163.6
090312Z	19.4	171.6	50	19.0	171.4	50	17	0	20.5	169.5	55	117	10	22.1	167.2	60	442	10	21.1	163.8
090318Z	19.8	171.3	45	19.3	171.1	50	13	5	21.4	169.4	50	84	0	22.1	167.4	55	427	0	22.2	164.8
090400Z	20.4	171.1	45	20.5	171.5	50	23	5	22.9	171.1	50	161	0	24.9	170.9	45	202	-10	22.7	164.8
090406Z	20.9	171.1	40	21.0	171.4	50	18	10	23.0	171.1	45	195	0	25.2	171.2	40	197	-15	22.7	173.4
090412Z	21.5	171.3	45	21.4	171.4	45	8	0	23.4	171.3	40	187	-10	25.2	171.4	35	192	-25	22.7	181.2
090418Z	22.3	170.5	45	22.0	172.9	50	23	0	23.4	170.5	40	99	-15	25.1	170.7	40	192	-25	22.7	181.2
090500Z	22.9	173.8	45	22.0	173.7	50	8	0	23.4	170.5	40	154	-30	25.4	170.3	40	194	-40	22.7	181.2
090506Z	23.6	174.6	45	22.7	174.6	50	6	0	23.6	172.1	40	129	-15	30.5	179.5	40	191	-35	22.7	181.2
090512Z	23.6	174.7	50	23.3	175.1	50	23	0	23.7	177.4	50	142	-10	32.4	179.9	45	144	-25	22.7	181.2
090518Z	24.4	175.1	55	23.4	175.1	55	30	0	23.8	177.7	50	143	-15	33.4	180.4	45	125	-20	22.7	181.2
090600Z	25.3	174.6	55	23.5	174.6	60	15	0	23.9	174.6	50	148	-25	33.4	180.4	45	125	-20	22.7	181.2
090606Z	25.3	174.6	55	23.5	174.6	60	15	0	23.9	174.6	50	148	-25	33.4	180.4	45	125	-20	22.7	181.2
090612Z	27.2	174.8	60	22.7	174.7	60	6	0	31.5	176.5	50	121	-20	33.4	180.4	45	125	-20	22.7	181.2
090618Z	28.6	174.9	65	22.8	174.9	55	12	-10	32.6	177.4	45	160	-20	33.4	180.4	45	125	-20	22.7	181.2
090700Z	30.0	175.1	80	30.0	175.0	65	21	-15	33.4	176.5	50	121	-20	33.4	180.4	45	125	-20	22.7	181.2
090706Z	31.4	176.1	75	31.0	175.7	70	8	0	33.4	176.5	50	121	-20	33.4	180.4	45	125	-20	22.7	181.2
090712Z	33.4	177.3	70	33.3	177.3	70	6	0	33.4	176.5	50	121	-20	33.4	180.4	45	125	-20	22.7	181.2
090718Z	35.0	178.8	65	35.0	178.9	65	5	0	33.4	176.5	50	121	-20	33.4	180.4	45	125	-20	22.7	181.2

ALL FORECASTS					TYPHOONS WHILE OVER 35 KTS				
WRNG	24-HR	48-HR	72-HR		WRNG	24-HR	48-HR	72-HR	
AVG FORECAST POSIT ERROR	15	12	8	685	15	12	8	685	
AVG RIGHT ANGLE ERROR	15	85	248	473	15	85	248	473	
AVG INTENSITY MAGNITUDE ERROR	4	14	23	32	4	14	23	32	
AVG INTENSITY BIAS	0	-1	6	20	0	-1	6	20	
NUMBER OF FORECASTS	33	29	25	20	33	29	25	20	

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1822. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 9. KNOTS

TYPHOON SKIP02C
FIX POSITIONS FOR CYCLONE NO. 2

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	301800	12.9N 179.9E	PCN 6		ULCC FIX	PGTW
2	301824	12.9N 179.3W	PCN 6	T2.5/2.5 /D1.5/25HRS	ULAC 12.6N 179.4W	KGUC
3	302100	13.3N 179.3E	PCN 6		ULCC FIX	PGTW
4	310000	13.7N 178.8E	PCN 4	T2.5/2.5	INIT OBS ULAC 13.7N 178.9E	PGTW
5	310300	14.2N 178.0E	PCN 6			PGTW
6	310600	14.7N 177.6E	PCN 6		ULAC 14.8N 177.6E	KGUC
7	310704	14.4N 177.3E	PCN 6			PGTW
8	310900	14.9N 177.3E	PCN 6			KGUC
9	311005	15.0N 176.9E	PCN 6			PGTW
10	311200	15.3N 176.4E	PCN 6			KGUC
11	311443	15.6N 176.4E	PCN 2		PART EYE WALL ULAC 15.6 177.6	KGUC
12	311600	15.4N 176.7E	PCN 6	T3.5/3.5	INIT OBS	PGTW
13	311800	15.6N 176.5E	PCN 6			PGTW
14	311802	15.6N 176.1E	PCN 6			KGUC
15	312100	15.5N 176.3E	PCN 6		ULCC FIX	PGTW
16	312245	15.7N 176.1E	PCN 2	T3.5/3.5 /D1.0/28HRS	EYE FIX	KGUC
17	312246	15.7N 176.0E	PCN 4		DEVELOPING EYE	PGTW
18	010000	15.8N 176.0E	PCN 6			PGTW
19	010152	16.0N 176.1E	PCN 2		EYE FIX	KGUC
20	010300	15.8N 176.0E	PCN 6			PGTW
21	010600	16.0N 176.2E	PCN 6	T3.5/3.5 /D1.0/30HRS		KGUC
22	010642	16.6N 175.4E	PCN 6			PGTW
23	010900	16.8N 175.7E	PCN 6			KGUC
24	011126	17.0N 175.9E	PCN 6		EYE FIX	PGTW
25	011126	16.9N 176.0E	PCN 4	T4.5/4.5	INIT OBS PSBL EYE	KGUC
26	011438	17.1N 175.5E	PCN 6			KGUC
27	011600	17.0N 175.5E	PCN 6	T4.5/4.5 /D1.0/24HRS		PGTW
28	011741	17.3N 174.4E	PCN 2			KGUC
29	011800	17.2N 175.3E	PCN 6			PGTW
30	012100	17.5N 175.3E	PCN 6			PGTW
31	012225	17.3N 174.6E	PCN 6		ULAC 18.8N 175.3E	KGUC
32	020000	17.4N 175.1E	PCN 4	T4.0/4.0 /D0.5/18HRS		PGTW
33	020300	17.5N 174.8E	PCN 4		EXP LLCC	PGTW
34	020324	17.7N 174.6E	PCN 6		EXP LLCC	PGTW
35	020600	17.8N 174.6E	PCN 4			KGUC
36	020621	17.4N 173.5E	PCN 6			PGTW
37	020900	18.1N 174.3E	PCN 6			KGUC
38	021106	18.1N 173.7E	PCN 6	T4.0/4.5 /W0.5/24HRS		PGTW
39	021200	18.1N 173.8E	PCN 6			KGUC
40	021427	18.1N 173.5E	PCN 6		ULAC 18.7N 173.8E	PGTW
41	021600	18.2N 173.8E	PCN 6			KGUC
42	021800	18.2N 172.8E	PCN 6	T3.5/4.5+/W1.0/26HRS		PGTW
43	021901	18.3N 172.8E	PCN 4		PART EXP LLCC	PGTW
44	022114	18.3N 172.5E	PCN 4		PART EXP LLCC	PGTW
45	022205	18.3N 172.6E	PCN 4	T2.5/2.5 /S0.0/24HRS	EXP LLCC ULAC 19.6N 172.9E	KGUC
46	030000	18.4N 172.5E	PCN 6			PGTW
47	030312	18.8N 172.1E	PCN 6	T3.0/4.0 /W1.0/27HRS		PGTW
48	030312	18.8N 172.2E	PCN 6			KGUC
49	030600	18.9N 172.1E	PCN 4			PGTW
50	030741	19.1N 171.5E	PCN 6		ULAC 20.0N 174.9E	KGUC
51	030900	19.0N 171.8E	PCN 6			PGTW
52	031045	18.7N 171.8E	PCN 6	T4.0/4.0 /S0.0/24HRS	ULAC 18.8N 172.0E	KGUC
53	031200	19.2N 171.4E	PCN 6			PGTW
54	031558	19.3N 170.8E	PCN 6	T3.5/3.5 /S0.0/22HRS		PGTW
55	031558	19.0N 170.7E	PCN 6		ULAC 20.0N 172.4E	KGUC

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS HSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRV NAV/RET	EYE SHAPE	EYE DIAM	ORIENTATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	011153	17.2N 175.6E	700MB	2930	979		300 69 040 10	10 5	CIRCULAR	20		+10 +19 +10	2
2	012055	17.5N 175.2E	700MB	2950	992	75 050 10	300 48 220 10	8 8				+ 9 +19 + 3	3
3	012551	17.5N 175.1E	700MB	3010	996	75 050 10	300 48 220 10	8 8				+ 9 +19 + 3	4
4	020733	17.8N 174.4E	700MB	3072	996	35 210 40	320 53 210 44	8 5				+13 +17 + 8	5
5	021004	18.1N 173.7E	700MB	3062			120 54 070 35	8 5				+10 +17 +12	6
6	021824	18.3N 173.0E	1500FT		994	55 040 15	130 57 040 8	8 1				+ +25 +24	27
7	022141	18.3N 172.6E	1500FT		994	50 320 15	020 54 320 10	8 1				+24 +25 +25	28
8	030857	18.9N 173.5E	1500FT		998	50 320 15	040 53 315 15	10 3				+25 +27 +28	29
9	031818	20.0N 171.5E	1500FT		998	45 040 40	130 60 040 20	10 3				+ +29 +28	30
10	032103	20.2N 171.5E	1500FT		998	50 300 8	210 48 110 11	10 2				+ +28 +26	31
11	040532	20.9N 171.4E	1500FT		996	35 010 30	080 38 010 23	8 1				+25 +26 +26	32
12	040805	21.1N 170.7E	700MB	3113	1010	55 050 15	340 36 110 30	8 4				+10 +11 + 7	33
13	042302	21.6N 170.6E	1500FT		997	55 050 15	210 37 060 28	8 4				+25 +26 +26	34
14	042328	22.6N 173.6E	1500FT		1002	35 300 30	280 34 040 25	6 2				+25 +25 +25	35
15	050615	22.7N 174.7E	1500FT		994	55 040 15	180 42 040 16	12 1				+23 +26 +25	36
16	050815	23.4N 174.8E	700MB	2982	982		150 57 130 15	8 2	CIRCULAR	30		+ 8 +16 + 4	10
17	055121	23.9N 174.6E	1500FT		989	60 170 25	130 77 020 20	5 5	CIRCULAR	60		+24 +26 +22	11
18	061003	25.1N 174.7E	1500FT		997	80 060 15	130 77 020 20	5 5	CIRCULAR	60	40 030	+10 +16 + 4	12
19	062039	25.4N 174.9E	700MB	2888		80 060 25	170 92 060 30	8 2	CIRCULAR	16		+10 +16	13
20	062310	30.1N 175.0E	700MB	2870	974	80 030 10	330 75 060 10	12 3	CIRCULAR	15		+10 +15	14

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON TESS
BEST TRACK DATA

MO/DA/HR	BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
090118Z	15.0	134.0	0.0	0.0	15.0	132.7	0.0	0.0	15.0	129.0	0.0	0.0	15.0	125.0	0.0	0.0	15.0	121.0	0.0	0.0
090100Z	15.0	132.0	0.0	0.0	15.0	132.7	0.0	0.0	15.0	129.0	0.0	0.0	15.0	125.0	0.0	0.0	15.0	121.0	0.0	0.0
090106Z	15.1	131.1	0.0	0.0	15.1	129.9	0.0	0.0	15.1	126.3	0.0	0.0	15.1	122.4	0.0	0.0	15.1	118.4	0.0	0.0
090112Z	15.3	129.0	0.0	0.0	15.3	127.7	0.0	0.0	15.3	124.3	0.0	0.0	15.3	120.4	0.0	0.0	15.3	116.4	0.0	0.0
090118Z	15.3	127.0	0.0	0.0	15.3	125.7	0.0	0.0	15.3	122.3	0.0	0.0	15.3	118.4	0.0	0.0	15.3	114.4	0.0	0.0
090200Z	14.7	126.0	0.0	0.0	14.7	124.7	0.0	0.0	14.7	121.3	0.0	0.0	14.7	117.4	0.0	0.0	14.7	113.4	0.0	0.0
090206Z	14.6	125.0	0.0	0.0	14.6	123.7	0.0	0.0	14.6	120.3	0.0	0.0	14.6	116.4	0.0	0.0	14.6	112.4	0.0	0.0
090212Z	14.8	124.0	0.0	0.0	14.8	122.7	0.0	0.0	14.8	119.3	0.0	0.0	14.8	115.4	0.0	0.0	14.8	111.4	0.0	0.0
090218Z	15.0	123.0	0.0	0.0	15.0	121.7	0.0	0.0	15.0	118.3	0.0	0.0	15.0	114.4	0.0	0.0	15.0	110.4	0.0	0.0
090300Z	15.8	122.0	0.0	0.0	15.8	120.7	0.0	0.0	15.8	117.3	0.0	0.0	15.8	113.4	0.0	0.0	15.8	109.4	0.0	0.0
090306Z	16.4	121.0	0.0	0.0	16.4	119.7	0.0	0.0	16.4	116.3	0.0	0.0	16.4	112.4	0.0	0.0	16.4	108.4	0.0	0.0
090312Z	17.3	120.0	0.0	0.0	17.3	118.7	0.0	0.0	17.3	115.3	0.0	0.0	17.3	111.4	0.0	0.0	17.3	107.4	0.0	0.0
090318Z	17.7	119.0	0.0	0.0	17.7	117.7	0.0	0.0	17.7	114.3	0.0	0.0	17.7	110.4	0.0	0.0	17.7	106.4	0.0	0.0
090400Z	18.2	118.0	0.0	0.0	18.2	116.7	0.0	0.0	18.2	113.3	0.0	0.0	18.2	109.4	0.0	0.0	18.2	105.4	0.0	0.0
090406Z	18.6	117.0	0.0	0.0	18.6	115.7	0.0	0.0	18.6	112.3	0.0	0.0	18.6	108.4	0.0	0.0	18.6	104.4	0.0	0.0
090412Z	18.9	116.0	0.0	0.0	18.9	114.7	0.0	0.0	18.9	111.3	0.0	0.0	18.9	107.4	0.0	0.0	18.9	103.4	0.0	0.0
090418Z	19.1	114.7	0.0	0.0	19.1	113.4	0.0	0.0	19.1	110.0	0.0	0.0	19.1	106.1	0.0	0.0	19.1	102.1	0.0	0.0
090500Z	19.4	113.0	0.0	0.0	19.4	111.7	0.0	0.0	19.4	108.3	0.0	0.0	19.4	104.4	0.0	0.0	19.4	100.4	0.0	0.0
090506Z	20.0	112.0	0.0	0.0	20.0	110.7	0.0	0.0	20.0	107.3	0.0	0.0	20.0	103.4	0.0	0.0	20.0	99.4	0.0	0.0
090512Z	20.6	111.0	0.0	0.0	20.6	109.7	0.0	0.0	20.6	106.3	0.0	0.0	20.6	102.4	0.0	0.0	20.6	98.4	0.0	0.0
090518Z	21.2	110.0	0.0	0.0	21.2	108.7	0.0	0.0	21.2	105.3	0.0	0.0	21.2	101.4	0.0	0.0	21.2	97.4	0.0	0.0
090600Z	21.8	109.0	0.0	0.0	21.8	107.7	0.0	0.0	21.8	104.3	0.0	0.0	21.8	100.4	0.0	0.0	21.8	96.4	0.0	0.0
090606Z	22.6	111.7	0.0	0.0	22.6	111.7	0.0	0.0	22.6	108.3	0.0	0.0	22.6	104.4	0.0	0.0	22.6	100.4	0.0	0.0

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	URNG	24-HR	48-HR	72-HR	URNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	1.9	122.0	97.0	141.0	21.0	123.0	92.0	146.0
AVG RIGHT ANGLE ERROR	15.0	70.0	56.0	115.0	15.0	68.0	55.0	118.0
AVG INTENSITY MAGNITUDE ERROR	3.0	12.0	12.0	25.0	2.0	10.0	10.0	23.0
AVG INTENSITY BIAS	2.0	1.0	1.0	14.0	2.0	1.0	1.0	11.0
NUMBER OF FORECASTS	22	18	14	10	20	17	13	9

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1470. NM

AVERAGE SPEED OF TROPICAL CYCLONE IS 11. KNOTS

TYPHOON TESS
FIX POSITIONS FOR CYCLONE NO. 15

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	301348	16.4N 138.6E	PCN 5	T1.0/1.0	INIT OBS ULCC FIX	PGTU
2	301800	14.3N 138.8E	PCN 5		ULCC FIX	PGTU
3	310048	10.9N 136.0E	PCN 5			PGTU
4	310527	10.5N 134.0E	PCN 5	T1.0/1.0	INIT OBS	PGTU
5	311459	15.3N 133.0E	PCN 5			PGTU
6	311600	15.3N 133.0E	PCN 5			PGTU
7	311813	14.6N 133.1E	PCN 6	T2.0/2.0 /D1.0/28HRS		PGTU
8	312100	15.7N 132.5E	PCN 6			PGTU
9	010027	15.1N 131.8E	PCN 6			PGTU
10	010300	15.4N 131.6E	PCN 6			PGTU
11	010600	15.5N 130.4E	PCN 6	T1.5/1.5 /D0.5/25HRS		PGTU
12	010900	15.1N 129.9E	PCN 6			PGTU
13	011005	15.4N 129.6E	PCN 6			PGTU
14	011037	15.6N 129.3E	PCN 6			PGTU
15	011200	15.5N 129.2E	PCN 6			PGTU
16	011308	15.5N 128.6E	PCN 6			PGTU
17	011500	15.3N 127.8E	PCN 6	T3.0/3.0 /D1.0/22HRS		PGTU
18	011800	15.0N 126.9E	PCN 6			PGTU
19	011802	15.0N 126.9E	PCN 6			PGTU
20	012100	14.7N 126.0E	PCN 4			PGTU
21	012317	14.6N 125.1E	PCN 4			PGTU
22	020000	14.6N 125.0E	PCN 4	T3.5/3.5 /D2.0/18HRS		PGTU
23	020148	14.6N 125.3E	PCN 3	T3.5/3.5	INIT OBS	RODN
24	020300	14.5N 125.7E	PCN 6			PGTU
25	020506	14.5N 126.1E	PCN 6	T3.5/3.5	INIT OBS	RPMK
26	020600	14.6N 125.3E	PCN 4			PGTU
27	020900	14.7N 124.5E	PCN 6			PGTU
28	020944	14.7N 124.4E	PCN 6			PGTU
29	021200	14.9N 124.1E	PCN 6			PGTU
30	021429	14.7N 123.4E	PCN 5		ULCC FIX	RPMK
31	021600	14.9N 123.5E	PCN 5	T4.0/4.0 /D1.0/24HRS		PGTU
32	021751	14.8N 123.2E	PCN 5			RPMK
33	021751	15.0N 123.1E	PCN 5			PGTU
34	022100	15.2N 122.7E	PCN 5			PGTU
35	022224	14.9N 122.9E	PCN 5	T3.5/3.5 /S0.0/18HRS		RPMK
36	022555	15.5N 122.5E	PCN 5		ULCC FIX	PGTU
37	030000	15.4N 122.5E	PCN 5			PGTU
38	030128	15.2N 122.7E	PCN 5	T3.5/3.5 /S0.0/20HRS		RPMK
39	030128	15.4N 122.4E	PCN 5	T3.5/3.5 /S0.0/25HRS		PGTU
40	030128	15.7N 122.0E	PCN 6	T4.0/4.0 /D0.5/24HRS		ULCC FIX
41	030600	16.5N 122.4E	PCN 6		ULCC FIX	PGTU
42	030636	16.5N 122.1E	PCN 5		ULCC FIX	RODN
43	030900	16.8N 122.4E	PCN 6			PGTU
44	031104	17.6N 121.6E	PCN 4			RODN
45	031134	17.1N 121.2E	PCN 5			RPMK
46	031409	17.3N 120.0E	PCN 6			PGTU
47	031600	17.1N 119.8E	PCN 6			PGTU
48	031800	17.2N 119.3E	PCN 6	T3.0/4.0+/W1.0/26HRS		PGTU
49	031923	17.7N 120.0E	PCN 5			RPMK
50	032100	17.6N 119.2E	PCN 5		ULCC FIX	PGTU
51	040000	18.0N 118.5E	PCN 5			PGTU
52	040014	17.9N 118.5E	PCN 5	T3.5/3.5+/S0.0/24HRS		RPMK
53	040108	18.1N 118.7E	PCN 5	T3.0/3.5+/W0.5/24HRS		PGTU
54	040249	18.2N 117.7E	PCN 6			RPMK
55	040300	18.2N 118.0E	PCN 6			PGTU
56	040600	18.7N 116.8E	PCN 6		ULCC FIX	PGTU
57	040900	18.9N 116.7E	PCN 6			PGTU
58	041043	19.3N 116.2E	PCN 6			RPMK
59	041113	19.2N 115.9E	PCN 5			RKSO
60	041200	19.3N 115.7E	PCN 6			PGTU
61	041530	19.0N 115.3E	PCN 4		EXP LLCC	RODN

AIRCRAFT FIXES:

RADAR FIXES

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL STORM VAL
BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	DST WIND	POSIT	WIND	DST WIND	POSIT	WIND	DST WIND	POSIT	WIND	DST WIND	POSIT	WIND	DST WIND	POSIT	WIND
091306Z	14.2 141.7	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
091312Z	14.7 140.8	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
091318Z	15.4 139.7	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
091400Z	16.2 138.5	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
091406Z	17.4 137.4	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
091412Z	18.4 136.1	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
091418Z	18.2 135.9	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
091500Z	18.1 132.0	35	18.0	131.9	35	3.0	18.2	124.7	55	192	10	18.9	118.8	65	181	20	19.7	113.3	90
091506Z	19.5 130.6	40	19.5	131.0	35	23	-5	19.5	124.7	55	132	10	19.5	118.7	65	143	25	0.0	0.0
091512Z	20.6 129.0	40	20.6	129.3	45	29	5	21.0	123.3	60	84	10	20.5	117.9	70	91	35	0.0	0.0
091518Z	21.2 127.0	45	20.9	127.7	45	43	0	21.6	121.6	65	129	15	21.9	116.6	80	55	50	0.0	0.0
091600Z	21.4 124.9	45	21.5	125.4	45	29	0	22.0	117.9	50	175	24	21.3	113.5	30	175	10	0.0	0.0
091606Z	21.2 123.0	45	21.3	123.3	45	6	0	23.0	115.3	50	269	10	0.0	0.0	0	-0	0	0.0	0.0
091612Z	21.3 121.0	50	21.3	121.1	50	34	0	23.3	114.8	55	231	30	0.0	0.0	0	-0	0	0.0	0.0
091618Z	21.3 121.0	50	21.3	119.9	50	73	0	23.3	114.1	55	195	30	0.0	0.0	0	-0	0	0.0	0.0
091700Z	21.4 120.0	45	21.5	119.9	45	73	0	23.3	113.7	45	131	30	0.0	0.0	0	-0	0	0.0	0.0
091706Z	21.6 119.0	45	21.6	120.0	45	6	5	0.0	0.0	-0	0	0	0.0	0.0	0	-0	0	0.0	0.0
091712Z	21.7 118.0	35	21.8	119.0	40	13	0	0.0	0.0	-0	0	0	0.0	0.0	0	-0	0	0.0	0.0
091718Z	22.0 117.0	30	22.0	118.0	40	41	10	0.0	0.0	-0	0	0	0.0	0.0	0	-0	0	0.0	0.0
091800Z	23.0 116.0	20	23.0	115.0	25	13	0	0.0	0.0	-0	0	0	0.0	0.0	0	-0	0	0.0	0.0

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
AVG FORECAST POSIT ERROR	WRNG	24-HR	48-HR	WRNG	24-HR	48-HR	72-HR
AVG RIGHT ANGLE ERROR	31	160	129	0	0	0	0
AVG INTENSITY MAGNITUDE ERROR	10	84	104	0	0	0	0
AVG INTENSITY ERROR	3	16	28	0	0	0	0
NUMBER OF FORECASTS	13	9	5	0	0	0	0
DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1630. NM							
AVERAGE SPEED OF TROPICAL CYCLONE IS 14. KNOTS							

TROPICAL STORM VAL
FIX POSITIONS FOR CYCLONE NO. 16

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
* 1	122100	11.4N 146.9E	PCN 6	T1.0/1.0	INIT OBS	PGTU
* 2	130300	9.0N 144.5E	PCN 6	T1.0/1.0	INIT OBS	PGTU
* 3	130449	14.2N 141.0E	PCN 6			PGTU
* 4	130600	14.4N 141.2E	PCN 6			PGTU
* 5	130912	14.4N 141.4E	PCN 6			PGTU
* 6	131200	14.6N 141.4E	PCN 6			PGTU
* 7	131600	15.3N 140.0E	PCN 6	T1.5/1.5	INIT OBS	PGTU
* 8	131734	15.2N 139.9E	PCN 6			PGTU
* 9	132011	15.0N 139.8E	PCN 6			PGTU
* 10	132100	15.3N 139.5E	PCN 6			PGTU
* 11	140000	16.3N 138.6E	PCN 6			PGTU
* 12	140107	16.7N 138.3E	PCN 5			PGTU
* 13	140300	16.4N 137.6E	PCN 6	T1.5/1.5 /D0.5/24HRS		PGTU
* 14	140438	17.1N 137.2E	PCN 5			PGTU
* 15	140600	17.4N 137.1E	PCN 6			PGTU
* 16	140900	17.9N 136.8E	PCN 6		ULCC FIX	PGTU
* 17	141200	18.1N 136.4E	PCN 6		ULCC FIX	PGTU
* 18	141348	18.7N 135.2E	PCN 6		ULCC FIX	PGTU
* 19	141724	18.7N 134.5E	PCN 6		ULCC FIX	PGTU
* 20	141800	18.8N 134.5E	PCN 6	T2.0/2.0 /D0.5/26HRS		PGTU
* 21	142100	17.9N 134.0E	PCN 6		ULAC FIX	PGTU
* 22	142131	17.6N 133.5E	PCN 6		ULAC FIX	PGTU
* 23	150000	17.7N 132.2E	PCN 6		ULAC FIX	PGTU
* 24	150047	18.0N 131.2E	PCN 4			PGTU
* 25	150300	18.8N 131.1E	PCN 6	T2.5/2.5+/D1.0/24HRS		PGTU
* 26	150600	20.4N 130.6E	PCN 6		ULAC FIX	PGTU
* 27	150609	20.4N 130.4E	PCN 6			PGTU
* 28	150900	20.2N 129.8E	PCN 6		ULCC FIX	PGTU
* 29	151011	20.3N 130.0E	PCN 5		ULCC FIX	PGTU
* 30	151200	20.6N 129.4E	PCN 6		ULCC FIX	PGTU
* 31	151328	20.9N 129.1E	PCN 6		ULCC FIX	PGTU
* 32	151600	21.0N 127.9E	PCN 6	T3.0/3.0 /D1.0/22HRS		PGTU
* 33	151800	21.1N 127.5E	PCN 6		ULCC FIX	PGTU
* 34	151855	21.7N 127.2E	PCN 6			PGTU
* 35	151855	22.0N 127.2E	PCN 6		ULCC FIX	PGTU
* 36	152110	20.9N 126.8E	PCN 6		ULCC FIX	PGTU
* 37	160000	22.2N 125.8E	PCN 6		ULCC FIX	PGTU
* 38	160208	21.4N 124.3E	PCN 3	T3.5/3.5	INIT OBS EXP LLCC	PGTU
* 39	160208	21.3N 124.6E	PCN 3		EXP LLCC	PGTU
* 40	160300	21.3N 124.1E	PCN 4	T2.5/2.5-/S0.0/24HRS	EXP LLCC	PGTU
* 41	160558	21.2N 123.3E	PCN 4		EXP LLCC	PGTU
* 42	160558	21.1N 123.0E	PCN 3		EXP LLCC	PGTU
* 43	160900	21.0N 122.6E	PCN 6			PGTU
* 44	160950	21.0N 122.4E	PCN 6			PGTU
* 45	161200	21.0N 121.9E	PCN 6			PGTU
* 46	161449	21.2N 121.0E	PCN 6			PGTU
* 47	161600	21.1N 121.0E	PCN 6	T3.0/3.0 /S0.0/24HRS		PGTU
* 48	161800	21.2N 120.3E	PCN 6			PGTU
* 49	162100	21.0N 121.1E	PCN 6		EXP LLCC	PGTU
* 50	170000	21.4N 121.0E	PCN 6			PGTU
* 51	170148	21.6N 121.1E	PCN 3	T3.5/3.5 /S0.0/24HRS		PGTU
* 52	170300	21.6N 120.4E	PCN 6	T3.0/3.0-/D0.5/24HRS		PGTU
* 53	170548	22.2N 120.2E	PCN 6			PGTU
* 54	170548	21.6N 120.1E	PCN 4		EXP LLCC	PGTU
* 55	170600	21.5N 120.0E	PCN 4		EXP LLCC	PGTU
* 56	170900	21.7N 119.8E	PCN 6			PGTU
* 57	171110	21.6N 118.9E	PCN 5			PGTU
* 58	171200	21.5N 119.6E	PCN 6			PGTU
* 59	171428	21.7N 117.1E	PCN 6			PGTU
* 60	171600	21.8N 118.7E	PCN 6	T1.5/3.0 /W1.5/24HRS		PGTU
* 61	171800	21.8N 118.4E	PCN 6			PGTU
* 62	172100	21.9N 116.8E	PCN 6		EXP LLCC	PGTU
* 63	180011	23.1N 116.2E	PCN 5			PGTU

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRV NAV/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	150007	17.9N 131.9E	1500FT		1004	45 060 13	120 47 070 150	8 10			+25 +26 +23	3
2	150736	19.2N 130.0E	1500FT		1002	45 080 60	140 48 080 30	16 3			+23 +23 +23	15
3	160230	21.3N 124.3E	1500FT		999	35 300 20	150 42 040 90	4 1			+25 +26 +26 26	7

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

**TROPICAL STORM WINONA
BEST TRACK DATA**

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	ERRORS	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS
					DST	DST	DST			DST	DST			DST	DST			DST	DST
091900Z	14.8 115.0	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
091906Z	15.2 114.7	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
091912Z	16.2 114.2	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
091918Z	16.7 113.3	25	16.4	113.2	25	19	0.0	18.3	110.3	40	85	20.3	108.3	30	129	-15	0.0	0.0	0.0
092000Z	17.3 112.7	30	16.6	113.0	30	45	0.0	17.7	110.4	40	128	0.0	108.3	35	170	-5	0.0	0.0	0.0
092006Z	17.9 112.4	30	17.8	112.3	30	18	0.0	19.3	109.6	25	95	20.9	108.0	30	122	-5	0.0	0.0	0.0
092012Z	18.4 112.0	30	18.5	111.7	30	18	0.0	20.7	109.6	30	81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092018Z	18.8 111.7	35	19.1	111.2	30	34	-5	21.0	109.3	30	68	-15	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092100Z	19.5 111.6	40	19.5	111.4	40	11	0.0	21.8	110.8	40	49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092106Z	20.0 111.4	50	20.1	111.6	45	13	-5	22.6	111.6	35	104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092112Z	20.4 111.4	50	20.5	111.4	50	23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092118Z	20.9 110.5	45	20.7	110.8	45	21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092200Z	21.2 110.2	40	21.3	110.3	40	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092206Z	21.7 110.0	35	21.7	110.0	35	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
URNG	24-HR	48-HR	72-HR	URNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	18	87	140	0	0	0	0
AVG RIGHT ANGLE ERROR	14	69	136	0	0	0	0
AVG INTENSITY MAGNITUDE ERROR	1	9	8	0	0	0	0
AVG INTENSITY BIAS	-1	-8	-8	0	0	0	0
NUMBER OF FORECASTS	11	7	3	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 518. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 7. KNOTS

**TROPICAL STORM WINONA
FIX POSITIONS FOR CYCLONE NO. 17**

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCUR	DVORAK CODE	COMMENTS	SITE
1	180300	10.6N 114.6E	PCN 6	T1.0/1.0	ULCC FIX	PGTU
2	190000	14.6N 114.8E	PCN 6		INIT OBS	PGTU
3	190249	15.9N 114.9E	PCN 5	T1.0/1.0	INIT OBS	RPMK
4	190300	15.2N 115.0E	PCN 6	T2.5/2.5		PGTU
5	190600	15.9N 114.4E	PCN 6			PGTU
6	190900	16.2N 113.9E	PCN 6		ULCC FIX	PGTU
7	191200	15.9N 113.8E	PCN 6		ULCC FIX	PGTU
8	191600	16.3N 113.3E	PCN 6	T2.5/2.5	INIT OBS	PGTU
9	191800	16.6N 113.2E	PCN 6		ULCC FIX	PGTU
10	192100	16.4N 112.8E	PCN 6		ULCC FIX	PGTU
11	192307	16.5N 113.3E	PCN 5	T2.0/2.0 /D1.0/20HRS	ULCC FIX	RPMK
12	192307	16.5N 113.2E	PCN 5	T2.5/2.5	INIT OBS	RODN
13	200000	16.5N 112.9E	PCN 6		ULCC FIX	PGTU
14	200228	17.6N 112.7E	PCN 3			RPMK
15	200300	17.6N 112.7E	PCN 4	T2.5/2.5-/50.0/24HRS		PGTU
16	200600	17.8N 112.3E	PCN 4			PGTU
17	200900	18.1N 112.2E	PCN 6		EXP LLCC	PGTU
18	201200	18.5N 111.8E	PCN 6			PGTU
19	201600	18.9N 111.4E	PCN 6	T2.0/2.5-/W0.5/25HRS		PGTU
20	201800	19.1N 111.4E	PCN 6			PGTU
21	201942	19.2N 112.0E	PCN 6			RODN
22	202100	19.4N 111.5E	PCN 6			PGTU
23	210000	19.4N 111.6E	PCN 4			PGTU
24	210046	19.8N 112.0E	PCN 6			RODN
25	210208	19.4N 110.9E	PCN 3	T3.0/3.0 /D1.0/24HRS		RPMK
26	210300	19.5N 111.9E	PCN 6	T3.5/3.5-/D1.0/24HRS		PGTU
27	210600	20.0N 111.7E	PCN 6			PGTU
28	210646	20.2N 111.5E	PCN 3			RODN
29	210900	20.2N 111.5E	PCN 6			PGTU
30	211126	20.4N 110.6E	PCN 5		PSBL EYE	RPMK
31	211126	20.5N 111.3E	PCN 4			RODN
32	211200	20.4N 111.2E	PCN 6			PGTU
33	211449	20.9N 111.0E	PCN 6	T3.0/3.0-/D1.0/24HRS		RPMK
34	211600	20.4N 110.8E	PCN 6			PGTU
35	211800	20.5N 110.5E	PCN 6			PGTU
36	211932	21.3N 110.5E	PCN 4			RODN
37	212100	20.7N 110.6E	PCN 6			PGTU
38	212225	21.2N 110.3E	PCN 5			RPMK
39	220000	21.2N 110.5E	PCN 6			PGTU
40	220024	21.7N 110.6E	PCN 5			RPMK
41	220148	20.9N 109.9E	PCN 5			RKSO
42	220300	21.3N 110.2E	PCN 6			PGTU
43	220600	21.6N 110.1E	PCN 6			PGTU
44	220636	21.6N 110.0E	PCN 6		ULCC FIX	RKSO
45	220900	21.9N 110.2E	PCN 6		ULCC FIX	PGTU
46	221105	22.3N 110.1E	PCN 5		ULCC FIX	RKSO
47	230000	22.7N 110.6E	PCN 6			PGTU

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCUR	EYE SHAPE	EYE DIAM	RADOB-CODE ASUAR TDDFF	COMMENTS	RADAR POSITION	SITE
1	192100	16.9N 112.7E	LAND				21442 52906		16.8N 112.3E	59981
2	192200	16.9N 112.6E	LAND				21442 52906		16.8N 112.3E	59981
3	192300	17.2N 112.6E	LAND				21442 53006		16.8N 112.3E	59981
4	200000	17.3N 112.5E	LAND				21562 52906		16.8N 112.3E	59981
5	200100	17.4N 112.4E	LAND				21562 53206		16.8N 112.3E	59981
6	200200	17.5N 112.3E	LAND				10422 53406		16.8N 112.3E	59981
7	200300	17.6N 112.3E	LAND				10422 53506		16.8N 112.3E	59981
8	200400	17.7N 112.3E	LAND				24352 53506		16.8N 112.3E	59981
9	200500	17.8N 112.2E	LAND				24542 53006		16.8N 112.3E	59981
10	200600	17.8N 112.3E	LAND				24542 53302		16.8N 112.3E	59981
11	200700	17.8N 112.3E	LAND				24512 53502		16.8N 112.3E	59981
12	200900	17.9N 112.4E	LAND				24512 53604		16.8N 112.3E	59981
13	201100	18.2N 112.2E	LAND				24665 53406		16.8N 112.3E	59981
14	201200	18.3N 112.1E	LAND				34763 53406		16.8N 112.3E	59981
15	201200	18.3N 112.3E	LAND				67/2 43403		16.8N 112.3E	59758
16	201400	18.6N 111.9E	LAND				12883 53406		16.8N 112.3E	59981
17	201500	18.7N 111.9E	LAND				12873 53306		16.8N 112.3E	59981
18	201700	19.0N 111.9E	LAND				24643 53408		16.8N 112.3E	59981
19	201800	19.0N 111.8E	LAND				24459 83306		16.8N 112.3E	59981

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	211800	20.7N 110.5E	040	030	56658 59647 59754
2	220000	21.2N 110.2E	040	010	59658 59647
3	220600	21.6N 110.2E	035	025	59658 59446

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON ANDY
BEST TRACK DATA

MO/DA/HR	BEST TRACK			WARNING			24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS			
092700Z	18.4 117.3	25	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0			
092706Z	18.6 116.6	25	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0			
092712Z	18.7 116.0	30	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0			
092718Z	18.9 115.5	30	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0			
092800Z	19.2 115.0	30	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0.0 0.0 0.0	0.0 0.0 0.0			
092806Z	19.2 114.4	35	19.5 114.4 30	18.5 111.9 50	-5 117	-20 20.5 110.2 45	156 -20 20.2 108.2 40	157 -25										
092812Z	19.0 113.7	40	19.3 114.0 40	18.5 111.9 50	87 -20	19.6 109.8 50	120 -15 19.5 107.7 50	129 0										
092818Z	18.8 112.9	45	18.9 113.0 45	8 19.1 110.4 55	40 -10	19.2 108.3 50	72 -20 19.2 106.6 50	101 10										
092900Z	18.7 112.2	50	18.6 112.2 50	6 18.5 109.9 60	31 -5	18.6 107.8 50	42 -20 18.9 106.1 60	93 35										
092906Z	18.7 111.5	55	18.6 111.5 65	6 18.7 109.2 60	35 -10	18.3 106.1 65	61 15 0.0 0.0 0.0	-0 0										
092912Z	18.7 110.7	60	18.8 110.9 65	13 -5 18.9 108.5 55	48 -10	18.3 106.1 65	61 15 0.0 0.0 0.0	-0 0										
092918Z	18.5 110.1	65	18.5 110.0 65	6 0 18.4 107.1 70	44 0	18.5 104.2 40	103 0 0.0 0.0 0.0	-0 0										
093000Z	18.3 109.4	65	18.3 109.4 65	0 0 18.4 106.8 70	26 0	18.5 104.3 30	87 5 0.0 0.0 0.0	-0 0										
093006Z	18.2 108.5	65	18.2 108.7 65	11 0 18.2 106.3 70	26 0	18.5 104.3 30	87 5 0.0 0.0 0.0	-0 0										
093012Z	18.1 108.4	65	18.1 108.3 65	8 0 17.9 105.3 70	19 0	18.0 104.0 0	0 0 0.0 0.0 0.0	-0 0										
093018Z	18.1 107.8	70	18.0 107.9 70	8 0 17.7 105.0 70	19 0	18.0 104.0 0	0 0 0.0 0.0 0.0	-0 0										
100100Z	18.2 107.0	70	18.1 107.1 70	8 0 18.1 104.5 30	63 5	0.0 0.0 0.0	0.0 0.0 0.0	-0 0										
100106Z	18.0 106.7	65	18.1 106.5 65	13 0 0.0 0.0 0.0	0 0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0 0										
100112Z	17.9 106.3	50	17.9 106.2 50	8 0 0.0 0.0 0.0	0 0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0 0										
100118Z	17.7 105.8	40	17.7 105.8 40	0 0 0.0 0.0 0.0	0 0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0 0										
100200Z	17.5 105.4	25	17.6 105.3 25	8 0 0.0 0.0 0.0	0 0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	-0 0										

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	9	44	87	120	9	42	87	129
AVG RIGHT ANGLE ERROR	6	30	63	84	6	30	63	91
AVG INTENSITY MAGNITUDE ERROR	1	9	13	18	1	10	14	18
AVG INTENSITY BIAS	-1	-3	-6	5	-1	-3	-8	5
NUMBER OF FORECASTS	16	12	8	4	15	11	7	3

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 705. NM

AVERAGE SPEED OF TROPICAL CYCLONE IS 6. KNOTS

TYPHOON ANDY
FIX POSITIONS FOR CYCLONE NO. 18

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	251849	16.4N 122.9E	PCN 5			RKSO
2	270000	18.4N 116.9E	PCN 5	T2.0/2.0	INIT OBS	PQTW
3	270300	18.5N 116.8E	PCN 5		PART EXP LLCC	PQTW
4	270542	18.4N 114.4E	PCN 4		PART EXP LLCC	PQTW
5	270600	18.5N 116.5E	PCN 4		PART EXP LLCC	PQTW
6	271100	19.1N 113.9E	PCN 6	T1.0/1.0	INIT OBS ULCC FIX	RPMK
7	271827	18.6N 114.9E	PCN 5			RKSO
8	272158	19.0N 115.4E	PCN 3	T1.5/1.5 /D0.5/11HRS		RPMK
9	272354	19.2N 115.3E	PCN 3	T2.5/2.5	INIT OBS PART EXP LLCC	RODN
10	280127	19.6N 114.6E	PCN 5	T3.0/3.0 /D1.0/26HRS		PQTW
11	280127	19.6N 115.2E	PCN 3	T2.0/2.0	INIT OBS	RKSO
12	280300	19.3N 114.5E	PCN 6		ULCC FIX	PQTW
13	280600	18.7N 114.2E	PCN 6		ULCC FIX	PQTW
14	280713	18.5N 114.2E	PCN 5	T2.0/2.0 /D1.0/20HRS	ULCC FIX	RPMK
15	280900	18.6N 113.8E	PCN 6		ULCC FIX	PQTW
16	281038	19.4N 114.8E	PCN 5			RODN
17	281200	19.0N 113.7E	PCN 6		ULCC FIX	PQTW
18	281408	19.0N 113.2E	PCN 6			RODN
19	281600	18.8N 112.8E	PCN 6	T3.5/3.5	INIT OBS ULCC FIX	PQTW
20	281800	18.7N 112.7E	PCN 6		ULCC FIX	PQTW
21	281959	18.4N 112.7E	PCN 6			RPMK
22	282100	18.7N 112.7E	PCN 6			PQTW
23	290000	18.6N 112.2E	PCN 4			PQTW
24	290248	18.7N 112.1E	PCN 1	T4.0/4.0 /D1.5/27HRS	EYE FIX	RODN
25	290300	18.6N 111.7E	PCN 4	T4.0/4.0 /D1.0/26HRS		PQTW
26	290600	18.6N 111.5E	PCN 4			PQTW
27	290721	18.9N 111.5E	PCN 1		EYE FIX	RODN
28	290900	18.9N 111.0E	PCN 2		EYE FIX	PQTW
29	291200	18.8N 110.9E	PCN 2		EYE FIX	PQTW
30	291529	18.6N 110.4E	PCN 1		EYE FIX	RODN
31	291600	18.6N 110.2E	PCN 2	T4.5/4.5-/D1.0/24HRS	EYE FIX	PQTW
32	291800	18.5N 110.2E	PCN 2		EYE FIX	PQTW
33	291948	18.6N 109.9E	PCN 1		EYE FIX	RODN
34	292100	18.4N 109.7E	PCN 1		EYE FIX	PQTW
35	300000	18.3N 109.4E	PCN 2		EYE FIX	PQTW
36	300228	18.1N 109.2E	PCN 1	T4.5/4.5	INIT OBS EYE FIX	RPMK
37	300300	18.2N 109.2E	PCN 2	T4.5/4.5-/D0.5/24HRS	EYE FIX	PQTW
38	300600	18.2N 108.7E	PCN 2		EYE FIX	PQTW
39	300608	18.1N 108.7E	PCN 3			RPMK
40	300900	18.4N 108.4E	PCN 6		ULCC FIX	PQTW
41	301137	18.1N 108.5E	PCN 3		EYE FIX	RPMK
42	301137	18.1N 109.1E	PCN 3			RODN
43	301200	18.1N 108.5E	PCN 4			PQTW
44	301508	17.9N 108.2E	PCN 4			RODN
45	301600	18.1N 108.2E	PCN 6		ULCC FIX	PQTW
46	301800	18.0N 108.1E	PCN 6	T4.0/4.5-/W0.5/26HRS		PQTW
47	301936	18.1N 107.9E	PCN 5			RODN
48	302100	18.4N 107.8E	PCN 6			PQTW
49	302235	18.3N 107.2E	PCN 5			RODN
50	010000	18.1N 107.3E	PCN 6			PQTW
51	010208	18.3N 107.2E	PCN 5	T3.5/4.5 /W1.0/24HRS	ULCC FIX	RPMK
52	010300	18.0N 107.1E	PCN 5	T3.0/3.5 /W1.5/24HRS		PQTW
53	010600	18.2N 106.7E	PCN 5			PQTW
54	010640	18.2N 106.9E	PCN 5			RPMK
55	010900	18.0N 106.4E	PCN 6		ULCC FIX	PQTW
56	011115	17.9N 106.4E	PCN 5			RODN
57	011116	17.6N 106.7E	PCN 5		PART EXP LLCC	RPMK
58	011200	17.8N 106.3E	PCN 6		ULCC FIX	PQTW
59	011448	17.6N 106.6E	PCN 5		ULCC FIX	RPMK
60	011926	16.9N 106.1E	PCN 5			RODN

RADAR FIXES										
FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRV	EYE SHAPE	EYE DIAM	RADOB-CODE ASUAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	260200	17.7N 122.0E	LAND				1096/ 532//	EYE 50 PRCNT CIRCLR OPN S	16.3N 120.6E	98321
2	281400	18.3N 112.8E	LAND				21382 32811		16.8N 112.3E	59981
3	281500	18.8N 112.7E	LAND				21632 52706		16.8N 112.3E	59981
4	281800	18.7N 112.5E	LAND				11482 53206		16.8N 112.3E	59981
5	281900	18.7N 112.4E	LAND				24542 53206		16.8N 112.3E	59981
6	282100	18.6N 112.2E	LAND				12412 52806		16.8N 112.3E	59981
7	282300	18.5N 112.0E	LAND				11184 52707		16.8N 112.3E	59981
8	290100	18.6N 111.8E	LAND				10384 52806		16.8N 112.3E	59981
9	290200	18.6N 111.7E	LAND				11375 52706		16.8N 112.3E	59981
10	290500	18.7N 111.5E	LAND				24832 52806		16.8N 112.3E	59981
11	290600	18.8N 111.4E	LAND				10522 52806		16.8N 112.3E	59981
12	290700	18.8N 111.3E	LAND				14512 52808		16.8N 112.3E	59981
13	290900	18.8N 110.9E	LAND				22641 52810		16.8N 112.3E	59981
14	291000	18.8N 110.8E	LAND				22641 52708		16.8N 112.3E	59981

SYNOPTIC FIXES						
FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS	
1	281200	18.2N 113.3E	040	040	59981 AND SHIPS	
2	291500	18.5N 110.4E	065	055	59948 59855 59981 59838 59845	

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON BRENDA
BEST TRACK DATA

MO/DA/HR	BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
092906Z	16.7	132.3	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092912Z	16.5	132.3	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092918Z	16.4	131.6	25	16.5	131.6	25	0.0	0.0	16.8	128.8	40	31	17.3	125.4	50	185	18.2	122.1	80	245
093000Z	16.1	131.0	25	16.4	130.9	25	19	0.0	16.6	128.1	45	104	17.3	124.8	55	236	18.3	121.6	80	224
093006Z	16.0	130.7	30	16.0	130.7	30	159	0.0	16.1	127.3	50	153	17.0	123.6	70	276	19.0	120.0	75	259
093012Z	16.1	130.4	35	15.8	129.6	35	150	0.0	15.9	127.1	60	166	16.7	123.5	70	251	18.4	119.7	55	283
093018Z	16.3	130.1	45	15.8	130.0	40	111	0.0	15.7	125.5	55	120	16.2	125.2	55	185	17.5	121.5	60	341
100100Z	16.7	129.9	55	16.0	129.9	50	42	0.0	16.2	128.1	65	106	16.7	124.9	70	175	18.1	121.0	60	401
100106Z	17.4	129.6	60	17.1	129.3	55	25	0.0	16.8	127.9	70	21	18.6	124.9	90	119	18.9	121.2	75	433
100112Z	17.9	129.1	60	18.0	129.0	55	18	0.0	16.9	126.8	75	63	19.0	122.4	90	101	19.3	119.0	95	377
100118Z	17.9	128.6	65	17.7	128.0	60	17	0.0	18.2	126.8	80	25	19.0	122.9	90	222	19.3	118.8	90	627
100200Z	17.8	128.9	70	17.7	128.7	70	13	0.0	18.4	126.7	85	107	19.5	123.0	90	306	20.1	119.4	90	722
100206Z	18.4	128.2	75	18.1	128.2	70	18	0.0	19.1	126.5	90	150	20.0	123.0	90	331	21.6	118.8	85	879
100212Z	18.8	127.3	80	18.8	127.2	75	16	0.0	20.4	124.3	95	87	20.3	121.9	95	279	22.0	118.0	80	900
100218Z	19.1	126.3	80	19.4	126.4	75	19	0.0	21.6	123.4	95	87	20.3	121.7	95	303	22.0	118.0	80	900
100300Z	19.6	125.3	85	19.5	125.5	85	18	0.0	21.8	122.8	105	168	20.7	121.7	95	430	22.5	118.0	80	900
100306Z	20.5	124.3	90	20.5	124.3	90	0	0.0	22.5	121.9	95	48	20.7	124.0	35	275	22.0	118.0	80	900
100312Z	21.6	123.4	90	21.5	123.5	90	8	0.0	22.6	121.9	90	109	20.5	124.0	0	0	22.0	118.0	80	900
100318Z	23.0	123.0	90	22.7	123.0	90	18	0.0	23.6	123.0	90	117	20.5	124.0	0	0	22.0	118.0	80	900
100400Z	24.6	122.7	90	24.5	122.7	90	6	0.0	31.7	125.8	90	12	20.5	124.0	0	0	22.0	118.0	80	900
100406Z	26.0	122.6	90	26.3	122.6	90	18	0.0	33.5	127.5	70	31	20.5	124.0	0	0	22.0	118.0	80	900
100412Z	27.8	123.2	85	27.8	123.1	90	5	0.0	0.0	0.0	0.0	0	20.5	124.0	0	0	22.0	118.0	80	900
100418Z	29.7	124.3	80	29.4	124.2	85	19	0.0	0.0	0.0	0.0	0	20.5	124.0	0	0	22.0	118.0	80	900
100500Z	31.8	126.0	70	31.9	126.0	70	0	0.0	0.0	0.0	0.0	0	20.5	124.0	0	0	22.0	118.0	80	900
100506Z	33.8	128.0	65	33.8	128.0	65	10	0.0	0.0	0.0	0.0	0	20.5	124.0	0	0	22.0	118.0	80	900

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	17	93	245	436	17	93	245	436
AVG RIGHT ANGLE ERROR	12	43	106	230	12	43	106	230
AVG INTENSITY MAGNITUDE ERROR	2	6	17	8	2	6	17	8
AVG INTENSITY BIAS	-1	0	1	-6	-1	0	1	-6
NUMBER OF FORECASTS	23	19	15	11	20	19	15	11

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1551. NM

AVERAGE SPEED OF TROPICAL CYCLONE IS 11. KNOTS

TYPHOON BRENDA
FIX POSITIONS FOR CYCLONE NO. 19

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	251600	5.3N 156.6E	PCN 6	T0.5/0.5	INIT OBS	PGTW
2	260300	8.3N 150.3E	PCN 6	T1.5/1.5	INIT OBS	PGTW
3	261200	9.9N 152.3E	PCN 6		ULCC FIX	PGTW
4	261656	10.8N 145.9E	PCN 6		ULCC FIX	PGTW
5	262038	13.4N 144.2E	PCN 6		ULCC FIX	PGTW
6	270359	15.1N 143.1E	PCN 6	T1.0/1.5+/W0.5/24HRS	ULCC FIX	PGTW
7	271247	14.9N 141.7E	PCN 6		ULCC FIX	PGTW
8	272213	14.5N 140.2E	PCN 6		ULCC FIX	PGTW
9	273346	15.0N 140.2E	PCN 6		ULCC FIX	PGTW
10	280000	15.3N 139.7E	PCN 6		ULCC FIX	PGTW
11	280300	16.9N 139.0E	PCN 6	T1.5/1.5 /D0.5/23HRS	ULCC FIX	PGTW
12	280900	16.9N 138.9E	PCN 6		ULCC FIX	PGTW
13	282100	16.5N 137.4E	PCN 6			PGTW
14	290000	16.6N 137.3E	PCN 6			PGTW
15	290107	16.5N 137.1E	PCN 5			PGTW
16	290300	17.1N 134.4E	PCN 6	T1.5/1.5+/S0.0/24HRS		PGTW
17	290520	16.3N 133.5E	PCN 5			PGTW
18	290900	17.0N 132.9E	PCN 6			PGTW
19	291017	17.1N 132.9E	PCN 6			PGTW
20	291200	16.9N 132.4E	PCN 6	T1.5/1.5	INIT OBS	PGTW
21	291347	16.9N 132.3E	PCN 5			PGTW
22	291600	17.0N 131.5E	PCN 6			PGTW
23	291806	16.7N 131.7E	PCN 6			PGTW
24	292116	17.0N 131.5E	PCN 6			PGTW
25	300047	16.3N 130.8E	PCN 6			PGTW
26	300306	16.0N 130.2E	PCN 6	T2.5/2.5 /D1.0/24HRS		PGTW
27	300509	16.0N 130.1E	PCN 5			PGTW
28	300509	16.8N 129.8E	PCN 6	T1.5/1.5	INIT OBS	RPMK
29	300956	15.7N 129.9E	PCN 5			PGTW
30	301200	16.1N 129.3E	PCN 6	T2.5/2.5 /D1.0/24HRS		PGTW
31	301327	15.9N 129.1E	PCN 5			PGTW
32	301600	16.2N 128.7E	PCN 6		ULCC FIX	PGTW
33	301754	16.2N 128.7E	PCN 5		ULCC FIX	PGTW
34	301755	15.8N 128.6E	PCN 5			RODN
35	302100	16.5N 129.0E	PCN 6			PGTW
36	010000	16.1N 129.4E	PCN 5			PGTW
37	010026	16.5N 130.2E	PCN 4		EXP LLCC	PMTK
38	010208	15.9N 129.8E	PCN 5	T2.5/2.5 /D1.0/21HRS		PMTK
39	010300	16.4N 129.8E	PCN 4	T3.5/3.5 /D1.0/24HRS	PART EXP LLCC	PMTK
40	010458	17.4N 129.8E	PCN 4		EXP LLCC	PMTK
41	010609	17.5N 129.4E	PCN 6			PMTK
42	011307	18.0N 129.5E	PCN 3	T3.0/3.0 /D0.5/25HRS	EXP LLCC	PMTK
43	011600	18.5N 129.3E	PCN 5			PMTK
44	011744	18.5N 129.1E	PCN 6			PMTK
45	011744	18.0N 127.2E	PCN 6		ULCC FIX	RODN
46	012100	17.8N 128.5E	PCN 6			PMTK
47	012214	18.1N 129.9E	PCN 5	T3.5/3.5	INIT OBS	RODN
48	020000	17.8N 128.5E	PCN 6			PMTK
49	020147	18.0N 128.3E	PCN 5			PMTK
50	020147	17.4N 128.6E	PCN 5	T3.5/3.5 /D1.0/24HRS		PMTK
51	020300	18.3N 128.1E	PCN 6	T4.0/4.0+/D0.5/24HRS		PMTK
52	020447	18.5N 128.0E	PCN 5			PMTK
53	020630	17.6N 127.8E	PCN 5			PMTK
54	020900	18.9N 127.7E	PCN 5			PMTK
55	021054	18.4N 127.2E	PCN 5			PMTK
56	021105	19.1N 127.3E	PCN 5			PMTK
57	021200	19.0N 127.0E	PCN 6			PMTW

AIRCRAFT FIXES

RADAR FIXES

211

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	050600	34.0N 128.1E	055	050	47168 47162 47800 47182 47805 47843
2	050900	34.7N 128.9E	050	040	47168 47800 47805 47843 47182
3	051200	35.3N 130.1E	045	050	47152 47138 47800 47755
4	051500	36.3N 131.2E	040	075	47115 47138 47152 47755 47740

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON CECIL
BEST TRACK DATA

MO/DA/HR	BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
101206Z	10.7	128.3	30	0.0	11.0	118.0	30	0.0	10.0	118.0	30	0.0	10.0	118.0	30	0.0	10.0	118.0	30	0.0
101212Z	11.1	119.0	35	10.5	118.0	30	0.0	0.0	10.0	114.1	45	160	-15	11.0	109.7	60	268	-20	13.9	106.2
101218Z	11.4	117.9	40	10.8	118.0	35	36	-5	11.0	113.2	55	172	-10	12.5	109.0	55	256	-30	0.0	0.0
101300Z	11.7	117.1	45	11.8	116.9	50	13	-5	11.5	112.4	70	181	0	12.5	108.2	45	264	-50	0.0	0.0
101306Z	12.0	116.0	55	12.0	116.0	55	21	-5	12.0	115.3	75	183	-5	12.5	108.4	45	241	-55	0.0	0.0
101312Z	12.6	115.0	60	12.4	116.0	55	13	-5	13.0	113.3	75	67	-5	14.1	109.3	55	144	-35	15.5	106.3
101318Z	13.0	115.3	65	12.7	115.4	60	19	-5	13.7	112.5	75	67	-10	14.6	108.5	45	135	-55	0.0	0.0
101400Z	13.4	114.8	70	13.4	114.9	70	16	0	14.7	112.1	90	43	-15	15.5	107.6	45	104	-45	0.0	0.0
101406Z	13.9	114.3	75	14.0	114.1	75	13	0	15.3	110.7	95	36	-15	16.6	106.3	50	57	0	0.0	0.0
101412Z	14.4	113.5	80	14.4	113.5	80	0	-5	16.0	108.0	95	21	-5	19.1	105.5	75	141	45	0.0	0.0
101418Z	14.8	112.7	85	14.8	112.7	80	0	-5	16.6	106.0	95	83	-5	0.0	0.0	0	0	0	0.0	0.0
101500Z	15.3	111.7	95	15.3	111.7	90	0	-5	17.6	108.0	95	83	-5	0.0	0.0	0	0	0	0.0	0.0
101506Z	15.9	110.6	100	16.0	110.7	100	8	0	18.7	106.6	95	123	-45	0.0	0.0	0	0	0	0.0	0.0
101512Z	16.5	109.3	100	16.7	109.4	100	13	0	20.1	105.0	50	186	-20	0.0	0.0	0	0	0	0.0	0.0
101518Z	16.8	108.0	100	17.0	108.2	100	17	0	0.0	0.0	0	0	-0	0.0	0.0	0	0	0	0.0	0.0
101600Z	17.0	106.7	90	17.2	106.5	90	17	0	0.0	0.0	0	0	-0	0.0	0.0	0	0	0	0.0	0.0
101606Z	17.0	105.4	50	17.1	105.5	50	8	0	0.0	0.0	0	0	-0	0.0	0.0	0	0	0	0.0	0.0
101612Z	17.1	104.2	30	0.0	0.0	0	-0	0	0.0	0.0	0	0	-0	0.0	0.0	0	0	0	0.0	0.0

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	11	93	159	139	14	97	184	238
AVG RIGHT ANGLE ERROR	11	93	159	139	11	85	163	187
AVG INTENSITY MAGNITUDE ERROR	2	10	37	45	2	9	36	80
AVG INTENSITY BIAS	-2	1	-27	-45	-2	-1	-36	-80
NUMBER OF FORECASTS	16	13	9	2	16	12	8	1

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1034. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 10. KNOTS

TYPHOON CECIL
FIX POSITIONS FOR CYCLONE NO. 20

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCUR	DVORAK CODE	COMMENTS	SITE
1	081800	5.8N 138.8E	PCN 6	T1.5/1.5	INIT OBS ULCC FIX	PGTW
2	091200	5.3N 135.4E	PCN 6		ULCC FIX	PGTW
3	100000	7.3N 132.3E	PCN 6			PGTW
4	100400	7.6N 130.9E	PCN 6			PGTW
5	101200	8.1N 131.7E	PCN 6			PGTW
6	101600	8.6N 130.2E	PCN 6	T1.5/1.5	INIT OBS	PGTW
7	101800	8.6N 129.7E	PCN 6			PGTW
8	111600	9.5N 121.4E	PCN 6	T2.0/2.0 /D0.5/24HRS		PGTW
9	111800	9.6N 121.1E	PCN 6			PGTW
10	120147	10.7N 119.8E	PCN 6	T1.5/1.5	INIT OBS	PGTW
11	120400	10.6N 120.9E	PCN 6			PGTW
12	120600	10.9N 120.4E	PCN 6			PGTW
13	120617	11.2N 120.0E	PCN 6	T1.5/1.5	INIT OBS	RODN
14	120900	10.4N 119.2E	PCN 6		ULCC FIX	PGTW
15	121044	11.2N 119.8E	PCN 6		ULCC FIX	RPMK
16	121200	10.6N 119.1E	PCN 6			PGTW
17	121428	11.0N 118.8E	PCN 6			RPMK
18	121600	10.7N 118.8E	PCN 6	T2.5/2.5 /D0.5/24HRS	ULCC FIX	PGTW
19	121800	10.9N 118.2E	PCN 6			PGTW
20	121909	11.3N 117.9E	PCN 5			RODN
21	122100	11.8N 117.2E	PCN 6		ULCC FIX	PGTW
22	130000	12.0N 117.0E	PCN 4	T3.5/3.5 /D2.0/23HRS		PGTW
23	130127	12.1N 116.7E	PCN 3	T3.5/3.5	INIT OBS	RPMK
24	130400	12.0N 116.6E	PCN 4		PSBL EYE ULCC FIX	PGTW
25	130600	11.9N 116.5E	PCN 4		PSBL EYE	PGTW
26	130612	12.1N 116.7E	PCN 3	T3.0/3.0 /D1.5/25HRS	ULCC FIX	RODN
27	131200	12.2N 115.7E	PCN 6			PGTW
28	131208	12.2N 116.0E	PCN 5			RPMK
29	131600	12.5N 115.6E	PCN 6	T3.5/3.5 /D1.0/24HRS		PGTW
30	131800	12.7N 115.5E	PCN 6		ULCC FIX	PGTW
31	131858	13.6N 115.2E	PCN 5			RODN
32	132003	13.8N 115.1E	PCN 5			RPMK
33	140000	13.0N 114.4E	PCN 4	T4.5/4.5 /D1.0/24HRS	ULCC FIX	PGTW
34	140248	13.9N 114.8E	PCN 1	T4.5/4.5 /D1.0/25HRS	SMALL EYE	RPMK
35	140300	13.7N 114.5E	PCN 0		SMALL EYE	PGTW
36	140600	13.9N 114.1E	PCN 0		EYE	PGTW
37	140612	14.0N 114.4E	PCN 0		EYE FIX	RPMK
38	140900	14.1N 113.7E	PCN 0		SMALL EYE	PGTW
39	141146	14.1N 113.6E	PCN 5		ULCC FIX	RPMK
40	141200	14.4N 113.4E	PCN 5		RAGGED EYE	PGTW
41	141528	14.0N 113.4E	PCN 5		ULCC FIX	RPMK
42	141600	14.6N 113.0E	PCN 4	T4.5/4.5 /D1.0/24HRS		PGTW
43	141800	14.8N 112.8E	PCN 2		SMALL EYE	PGTW
44	141848	15.2N 112.6E	PCN 1		DEVLPG EYE	RODN
45	142100	15.1N 112.4E	PCN 0		EYE FIX	PGTW
46	142241	15.3N 111.8E	PCN 1	T5.5/5.5 /D1.0/20HRS	EYE FIX	RPMK
47	150000	15.4N 111.7E	PCN 0	T5.5/5.5 /D1.0/24HRS	EYE FIX	PGTW
48	150026	15.3N 111.7E	PCN 1		INIT OBS	RODN
49	150227	15.5N 111.4E	PCN 1	T5.5/5.5 /D1.0/24HRS	SMALL EYE	RPMK
50	150227	15.5N 110.9E	PCN 1		RAGGED EYE 30 NM	RODN
51	150300	15.7N 111.1E	PCN 0		EYE FIX	PGTW
52	150600	16.0N 110.7E	PCN 0		EYE FIX	PGTW
53	150733	15.9N 110.3E	PCN 1		.4 DEG EYE	RPMK
54	150845	16.4N 109.2E	PCN 0		30 NM EYE	RPMK
55	150900	16.4N 110.1E	PCN 0		EYE FIX	PGTW
56	151121	16.7N 109.5E	PCN 0		EYE 30 NM	RODN
57	151200	16.6N 109.6E	PCN 0		EYE FIX	PGTW
58	151508	16.7N 108.5E	PCN 1		30 NM EYE	RPMK
59	151600	16.7N 108.4E	PCN 0	T5.5/5.5 /D1.0/24HRS	EYE FIX	PGTW
60	151800	16.8N 108.1E	PCN 0		EYE FIX	PGTW
61	152100	16.9N 107.4E	PCN 4			RODN
62	152220	17.1N 106.9E	PCN 4			RPMK
63	160000	16.8N 106.6E	PCN 3			PGTW
64	160000	17.1N 106.8E	PCN 4			RPMK
65	160207	16.8N 106.2E	PCN 4			PGTW
66	160207	17.0N 106.2E	PCN 3			RPMK

67 160300 17.0N 106.0E PCN 4
 68 160600 16.6N 104.9E PCN 6
 69 160722 17.2N 105.5E PCN 5
 70 161448 17.1N 102.2E PCN 4

ULCC FIX

PGTW
 PGTW
 RODN
 RKSO

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS MSLP	MAX-SFC-UND VEL/DRG/RNG	MAX-FLT-LVL-UND DIR/VEL/DRG/RNG	ACCRV NAV/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	110222	9.4N 128.3E	1500FT		1006	22 360 19	070 30 360 19	3 15			+24 +24 +23 28	1
2	130000	11.8N 117.0E	700MB	2990	990	60 310 45	060 52 310 45	5 10	CIRCULAR	40	+12 +14 +10	3
3	130156	12.0N 116.8E	700MB	2987		80 030 50	130 38 060 90	5 10			+10 +13 +13	3
4	130824	12.4N 116.4E	700MB	2954	984	65 140 120	230 39 140 60	2 10	CIRCULAR	20	+11 +13 +3	4
5	132115	13.3N 115.1E	700MB	2886	975	45 320 95	140 64 090 10	10 5			+13 +13 +13	5
6	140044	13.4N 114.9E	700MB	2874	974	75 150 15	210 67 150 15	5 5	ELLIPTICAL	40 20 030	+13 +15 +13	5
7	140618	13.9N 114.2E	700MB	2821	968	80 950 18	150 62 950 18	8 5	CIRCULAR	20	+15 +15 + 6	6
8	140851	14.0N 114.0E	700MB	2775	963	60 110 60	180 90 110 30	8 5	ELLIPTICAL	15 5 100	+11 +17 + 6	6

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRV	EYE SHAPE	EYE DIAM	RADOB-CODE ASMAR TDDFF	COMMENTS	RADAR POSITION	SITE UNO NO.
1	150300	15.5N 110.9E	LAND				108/2 ////		16.8N 112.3E	59981
2	150400	15.5N 110.8E	LAND				10785 53108		16.8N 112.3E	59981
3	150500	15.7N 110.7E	LAND				10772 53208		16.8N 112.3E	59981
4	150600	15.8N 110.5E	LAND				10772 53109		16.8N 112.3E	59981
5	150700	15.9N 110.4E	LAND				10782 5309/		16.8N 112.3E	59981
6	150900	16.3N 109.8E	LAND				10772 53111		16.8N 112.3E	59981
7	151000	16.4N 109.5E	LAND				10862 53011		16.8N 112.3E	59981
8	161000	17.0N 105.0E	LAND				/6/// ////		17.1N 104.1E	48356

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

SUPER TYPHOON DOT
BEST TRACK DATA

MO/DA/HR	BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
101118Z	7.0	155.5	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101200Z	8.0	154.3	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101206Z	8.7	152.9	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101212Z	9.4	151.4	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101218Z	10.0	149.9	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101300Z	10.5	148.3	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101306Z	10.9	146.6	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101312Z	11.2	145.0	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101318Z	11.4	143.6	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101400Z	11.6	142.3	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101406Z	11.8	141.2	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101412Z	12.2	140.1	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101418Z	12.7	139.0	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101500Z	13.1	137.7	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101506Z	13.4	136.9	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101512Z	13.6	135.6	110	13.7	135.6	110	13.7	135.6	110	13.7	135.6	110	13.7	135.6	110	13.7	135.6	110	13.7	135.6
101518Z	13.8	134.7	125	13.8	134.7	125	13.8	134.7	125	13.8	134.7	125	13.8	134.7	125	13.8	134.7	125	13.8	134.7
101600Z	14.1	133.7	140	14.1	133.7	140	14.1	133.7	140	14.1	133.7	140	14.1	133.7	140	14.1	133.7	140	14.1	133.7
101606Z	14.5	132.4	145	14.5	132.4	145	14.5	132.4	145	14.5	132.4	145	14.5	132.4	145	14.5	132.4	145	14.5	132.4
101612Z	14.6	131.2	150	14.6	131.2	150	14.6	131.2	150	14.6	131.2	150	14.6	131.2	150	14.6	131.2	150	14.6	131.2
101618Z	14.7	129.9	150	14.8	130.0	150	14.8	130.0	150	14.8	130.0	150	14.8	130.0	150	14.8	130.0	150	14.8	130.0
101700Z	14.6	128.5	150	14.8	128.6	150	14.8	128.6	150	14.8	128.6	150	14.8	128.6	150	14.8	128.6	150	14.8	128.6
101706Z	14.5	127.3	145	14.7	127.7	135	14.7	127.7	135	14.7	127.7	135	14.7	127.7	135	14.7	127.7	135	14.7	127.7
101712Z	14.3	126.0	148	14.7	126.6	140	14.7	126.6	140	14.7	126.6	140	14.7	126.6	140	14.7	126.6	140	14.7	126.6
101718Z	14.3	125.0	148	14.7	125.6	140	14.7	125.6	140	14.7	125.6	140	14.7	125.6	140	14.7	125.6	140	14.7	125.6
101800Z	14.5	124.3	130	14.4	124.3	130	14.4	124.3	130	14.4	124.3	130	14.4	124.3	130	14.4	124.3	130	14.4	124.3
101806Z	14.7	123.4	120	14.5	123.3	120	14.5	123.3	120	14.5	123.3	120	14.5	123.3	120	14.5	123.3	120	14.5	123.3
101812Z	15.1	122.3	110	15.0	122.4	110	15.0	122.4	110	15.0	122.4	110	15.0	122.4	110	15.0	122.4	110	15.0	122.4
101818Z	15.0	120.9	110	15.0	120.9	110	15.0	120.9	110	15.0	120.9	110	15.0	120.9	110	15.0	120.9	110	15.0	120.9
101900Z	15.6	119.4	85	15.5	119.0	80	15.5	119.0	80	15.5	119.0	80	15.5	119.0	80	15.5	119.0	80	15.5	119.0
101906Z	15.8	118.6	70	15.8	118.4	85	15.8	118.4	85	15.8	118.4	85	15.8	118.4	85	15.8	118.4	85	15.8	118.4
101912Z	16.0	117.7	75	16.1	117.6	75	16.1	117.6	75	16.1	117.6	75	16.1	117.6	75	16.1	117.6	75	16.1	117.6
101918Z	16.6	116.7	80	16.3	116.5	80	16.3	116.5	80	16.3	116.5	80	16.3	116.5	80	16.3	116.5	80	16.3	116.5
102000Z	17.5	115.4	70	17.5	115.6	80	17.5	115.6	80	17.5	115.6	80	17.5	115.6	80	17.5	115.6	80	17.5	115.6
102006Z	17.3	114.1	85	17.5	114.6	85	17.5	114.6	85	17.5	114.6	85	17.5	114.6	85	17.5	114.6	85	17.5	114.6
102012Z	17.7	112.7	90	17.6	112.7	85	17.6	112.7	85	17.6	112.7	85	17.6	112.7	85	17.6	112.7	85	17.6	112.7
102018Z	17.9	111.1	90	17.9	111.2	85	17.9	111.2	85	17.9	111.2	85	17.9	111.2	85	17.9	111.2	85	17.9	111.2
102100Z	18.2	109.4	80	18.3	109.5	85	18.3	109.5	85	18.3	109.5	85	18.3	109.5	85	18.3	109.5	85	18.3	109.5
102106Z	18.4	107.7	80	18.6	107.7	80	18.6	107.7	80	18.6	107.7	80	18.6	107.7	80	18.6	107.7	80	18.6	107.7
102112Z	18.8	106.0	60	18.8	106.0	70	18.8	106.0	70	18.8	106.0	70	18.8	106.0	70	18.8	106.0	70	18.8	106.0
102118Z	18.9	104.8	40	19.0	105.3	55	19.0	105.3	55	19.0	105.3	55	19.0	105.3	55	19.0	105.3	55	19.0	105.3

AVG FORECAST POSIT ERROR	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS	WRNG	24-HR	48-HR	72-HR
	WRNG	24-HR	48-HR	72-HR					
AVG FORECAST POSIT ERROR	10	63	80	131	10	63	80	131	
AVG RIGHT ANGLE ERROR	8	35	31	68	8	35	31	68	
AVG INTENSITY MAGNITUDE ERROR	4	15	26	29	4	15	26	29	
AVG INTENSITY BIAS	2	5	4	8	2	5	4	8	
NUMBER OF FORECASTS	33	29	25	21	33	29	25	21	
DISTANCE TRAVELED BY TROPICAL CYCLONE IS 3074. NM									
AVERAGE SPEED OF TROPICAL CYCLONE IS 13. KNOTS									

SUPER TYPHOON DOT
FIX POSITIONS FOR CYCLONE NO. 21

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	111200	5.5N 155.9E	PCN 6	T1.0/1.0	INIT OBS	PGTU
2	111600	6.7N 155.5E	PCN 6			PGTU
3	111800	6.9N 155.2E	PCN 6			PGTU
4	120006	8.7N 153.8E	PCN 6	T1.5/1.5	INIT OBS	PGTU
5	120400	8.5N 153.0E	PCN 6			PGTU
6	120600	8.6N 153.0E	PCN 6			PGTU
7	120900	8.8N 152.8E	PCN 6			PGTU
8	121200	9.0N 151.5E	PCN 6		ULCC FIX	PGTU
9	121246	8.5N 151.2E	PCN 6		ULCC FIX	PGTU
10	121600	9.6N 150.5E	PCN 6	T1.5/1.5 /D0.5/28HRS		PGTU
11	121800	9.4N 150.3E	PCN 6		ULCC FIX	PGTU
12	122100	9.7N 150.6E	PCN 6		ULCC FIX	PGTU
13	130000	10.5N 148.8E	PCN 6	T2.5/2.5 /D1.0/24HRS		PGTU
14	130400	11.4N 147.5E	PCN 6		ULCC FIX	PGTU
15	130431	11.1N 147.7E	PCN 5		ULCC FIX	RODN
16	130600	10.9N 146.3E	PCN 6		ULCC FIX	PGTU
17	130900	10.1N 145.9E	PCN 6		ULCC FIX	PGTU
18	131027	11.1N 145.2E	PCN 4			RODN
19	131200	11.3N 145.1E	PCN 6		ULCC FIX	PGTU
20	131600	11.4N 143.6E	PCN 6	T2.0/2.0+/D0.5/24HRS	ULCC FIX	PGTU
21	131716	11.9N 143.4E	PCN 5			RPMK
22	131800	11.5N 143.4E	PCN 6		ULCC FIX	PGTU
23	132307	11.8N 142.5E	PCN 4	T3.5/3.5	INIT OBS	RODN
24	140000	11.9N 142.6E	PCN 4	T3.5/3.5+/D1.0/24HRS		PGTU
25	140300	11.8N 141.5E	PCN 4		PSBL IR EYE	PGTU
26	140600	11.7N 140.8E	PCN 4			PGTU
27	140900	11.9N 140.7E	PCN 4			PGTU
28	141200	12.0N 140.6E	PCN 4			PGTU
29	141600	12.5N 139.7E	PCN 6	T4.0/4.0+/D2.0/24HRS		PGTU
30	141705	12.6N 138.9E	PCN 4			RODN
31	141800	13.1N 139.0E	PCN 6			PGTU
32	142100	13.1N 138.5E	PCN 2		RAGGED EYE	PGTU
33	142100	13.2N 138.1E	PCN 1		EYE 30 NM DIA RAGGED EYE	RODN
34	142245	13.1N 138.1E	PCN 1	T4.5/4.5+/D1.0/25HRS	EYE FIX	RODN
35	150000	13.2N 138.0E	PCN 2	T5.0/5.0 /D1.5/24HRS	RAGGED EYE	PGTU
36	150046	13.1N 137.5E	PCN 2	T4.5/4.5	INIT OBS 12 NM DIA RAGGED EYE	RPMK
37	150300	13.2N 137.2E	PCN 2		EYE FIX	PGTU
38	150551	13.4N 136.4E	PCN 2		EYE .5 DEG	RPMK
39	150600	13.3N 136.7E	PCN 2		EYE FIX	PGTU
40	150900	13.7N 136.2E	PCN 2		WELL DEFINED EYE	PGTU
41	150940	13.6N 136.1E	PCN 2		EYE 30 NM DIA	RPMK
42	151200	13.7N 135.7E	PCN 2		WELL DEFINED EYE	PGTU
43	151600	13.6N 135.1E	PCN 2	T6.5/6.5 /D2.5/24HRS	WELL DEFINED EYE	PGTU
44	151655	14.0N 134.1E	PCN 2		EYE FIX	RODN
45	151800	13.6N 134.9E	PCN 2		WELL DEFINED EYE	PGTU
46	152039	13.6N 133.9E	PCN 2		EYE FIX	RPMK
47	152100	13.8N 134.5E	PCN 2		EYE FIX	PGTU
48	152223	13.9N 133.9E	PCN 2	T5.5/5.5 /D1.0/23HRS	WELL DEFINED 20 NM DIA EYE	RPMK
49	160000	14.0N 133.9E	PCN 2	T7.5/7.5-/D2.5/24HRS		PGTU

50	160026	14.2N	133.6E	PCN 1	T7.0/7.0 /D2.5/25HRS	WELL DEFINED EYE	RODN
51	160300	14.3N	133.3E	PCN 1		EYE FIX	PGTW
52	160540	14.2N	132.4E	PCN 2		20 NM DIA EYE	RPMK
53	160540	14.2N	132.6E	PCN 1		20 NM EYE	RODN
54	160600	14.6N	132.6E	PCN 2		EYE FIX	PGTW
55	160900	14.6N	132.1E	PCN 2		WELL DEFINED EYE	PGTW
56	160918	14.6N	131.3E	PCN 1		20 NM EYE	RODN
57	161102	14.6N	131.6E	PCN 1		SMALL EYE	RPMK
58	161200	14.6N	131.3E	PCN 2		EYE LOW/LVL 6NM UPPER LVL 18NM	PGTW
59	161600	14.7N	130.3E	PCN 2	T7.0/7.0 /D0.5/24HRS	WELL DEFINED EYE	PGTW
60	161800	14.7N	129.0E	PCN 1		WELL DEFINED EYE	PGTW
61	161826	14.8N	129.7E	PCN 1			RKSO
62	162100	14.7N	129.4E	PCN 2		WELL DEFINED 18 NM EYE	PGTW
63	162159	14.8N	129.0E	PCN 1	T7.0/7.0	INIT OBS EYE FIX	RKSO
64	162342	14.8N	128.7E	PCN 1		18 NM EYE	RPMK
65	170000	14.8N	128.7E	PCN 2			RODN
66	170147	14.7N	128.4E	PCN 1	T7.0/7.0-/D1.5/27HRS	EYE FIX	PGTW
67	170147	14.5N	128.3E	PCN 1	T7.5/7.5 /D0.5/25HRS	WELL DEFINED EYE	PGTW
68	170300	14.7N	128.0E	PCN 2	T7.5/7.0-/S0.0/24HRS	SCNDRY EYE/L 20NM DIA APPROX.	RPMK
69	170529	14.4N	127.7E	PCN 1		16NM ELLIPTICAL EYE	PGTW
70	170600	14.6N	127.4E	PCN 2			RODN
71	170900	14.5N	126.8E	PCN 2			PGTW
72	171039	14.3N	126.7E	PCN 1			RODN
73	171200	14.3N	126.3E	PCN 2			PGTW
74	171427	14.3N	126.0E	PCN 1			RODN
75	171600	14.3N	125.4E	PCN 2	T7.0/7.0-/S0.0/24HRS	WELL DEFINED EYE	PGTW
76	171800	14.3N	125.1E	PCN 2		EYE FIX	PGTW
77	171815	14.4N	125.3E	PCN 2			RKSO
78	172100	14.3N	124.7E	PCN 2		ILL DEFINED EYE	PGTW
79	172137	14.3N	124.5E	PCN 2			RKSO
80	180000	14.4N	124.1E	PCN 2	T6.5/7.0 /W0.5/24HRS	RAGGED EYE	PGTW
81	180126	14.4N	123.8E	PCN 1		16NM EYE	PGTW
82	180126	14.5N	124.1E	PCN 1	T7.0/7.0-/W0.5/24HRS	EYE OPN SE	RODN
83	180127	14.5N	124.3E	PCN 2		EYE FIX	RPMK
84	180300	14.3N	123.8E	PCN 4	T6.5/7.0 /W1.0/24HRS	ILL DEFINED EYE	PGTW
85	180518	14.5N	123.1E	PCN 3			PGTW
86	180518	14.7N	123.0E	PCN 3			RODN
87	180900	14.7N	123.0E	PCN 6			PGTW
88	181017	14.8N	122.7E	PCN 4			PGTW
89	181017	15.0N	122.6E	PCN 3			RODN
90	181200	15.0N	122.6E	PCN 6			PGTW
91	181407	15.0N	121.8E	PCN 4			PGTW
92	181600	15.5N	121.4E	PCN 6			PGTW
93	181804	15.2N	120.1E	PCN 6			RKSO
94	181804	15.5N	120.0E	PCN 6	T5.5/6.5+/W1.5/26HRS	ULCC FIX	PGTW
95	182100	15.3N	119.7E	PCN 6			PGTW
96	190000	15.6N	118.8E	PCN 6			PGTW
97	190106	15.6N	118.6E	PCN 4			PGTW
98	190300	16.0N	119.1E	PCN 4	T4.5/5.5+/W2.0/24HRS		PGTW
99	190600	16.2N	118.6E	PCN 4			PGTW
100	190900	15.9N	118.0E	PCN 6			PGTW
101	191137	15.9N	118.2E	PCN 5		RAGGED 20NM EYE	RPMK
102	191137	16.1N	118.3E	PCN 4			RODN
103	191200	16.1N	117.8E	PCN 6			PGTW
104	191347	16.6N	117.3E	PCN 6			PGTW
105	191600	16.5N	116.9E	PCN 6	T4.5/5.5+/W1.0/22HRS		PGTW
106	191800	16.5N	116.6E	PCN 6			PGTW
107	191935	16.9N	116.0E	PCN 6			RODN
108	192100	16.6N	115.2E	PCN 4		PSBL DEVELPNG EYE	PGTW
109	192306	17.4N	115.8E	PCN 4			RPMK
110	192352	17.5N	115.6E	PCN 3	T4.5/4.5	INIT OBS	RPMK
111	192352	17.2N	115.5E	PCN 3	T4.5/4.5	INIT OBS	RODN
112	200000	17.1N	115.3E	PCN 4			PGTW
113	200227	17.2N	115.1E	PCN 3			RPMK
114	200300	17.3N	114.9E	PCN 4	T5.5/5.5 /D1.0/24HRS		PGTW
115	200600	17.3N	114.1E	PCN 4			PGTW
116	200639	17.7N	114.1E	PCN 1		12NM EYE	RPMK
117	200900	17.2N	113.0E	PCN 4			PGTW
118	201049	17.6N	112.9E	PCN 2		EYE WALL	RKSO
119	201116	17.7N	113.2E	PCN 1		EYE FIX	RPMK
120	201116	17.7N	112.8E	PCN 1		ILL DEFINED EYE	RODN
121	201200	17.6N	112.9E	PCN 2		24 NM EYE POORLY DEFINED	PGTW
122	201508	17.7N	112.2E	PCN 1		SMALL EYE	RODN
123	201508	17.7N	111.9E	PCN 1			PGTW
124	201600	17.8N	111.9E	PCN 2	T5.5/5.5-/D1.0/24HRS		RODN
125	201800	18.0N	111.2E	PCN 4			PGTW
126	201923	18.2N	110.8E	PCN 3		PSBL SMALL EYE	PGTW
127	202100	18.2N	110.5E	PCN 2		SMALL EYE	RPMK
128	202215	18.1N	109.5E	PCN 3			RODN
129	202328	18.5N	108.8E	PCN 4			RPMK
130	210000	18.4N	109.4E	PCN 4		ULCC FIX	PGTW
131	210200	18.1N	108.2E	PCN 3			RODN
132	210207	18.4N	108.5E	PCN 3	T4.0/4.5-/W0.5/28HRS		RPMK
133	210300	18.4N	108.5E	PCN 6	T4.0/4.5-/W0.5/26HRS		PGTW
134	210600	18.4N	107.6E	PCN 6	T4.0/5.0-/W1.5/24HRS		PGTW
135	210628	18.2N	107.2E	PCN 3		ULCC FIX	RODN
136	210900	18.5N	106.6E	PCN 6			PGTW
137	211105	18.4N	105.7E	PCN 6			RPMK
138	211200	18.8N	105.0E	PCN 6		PART EXP LLCC	PGTW
139	211447	18.1N	104.5E	PCN 3			RODN
140	211600	18.9N	105.6E	PCN 6	T3.5/4.0-/W1.5/24HRS	ULCC FIX	PGTW
141	211800	18.8N	105.6E	PCN 6		PART EXP LLCC	PGTW
142	211914	19.0N	104.7E	PCN 6			RPMK
143	212100	18.9N	104.5E	PCN 6		ULCC FIX	PGTW
144	212335	19.0N	103.3E	PCN 6			RPMK

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS HSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRV MAY/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.	
1	132204	11.5N 142.7E	1500FT		992	50 070 25	070 67 070 25	10 3			+24 +27 +26	2	
2	140027	11.8N 141.2E	1700MB		992	50 310 20	350 60 310 20	7 1	CIRCULAR	15	+25 +28 +26	2	
3	140530	11.8N 141.2E	700MB	2975		65 060 40	120 55 060 43	10 1			+13 +15 +10	4	
4	140804	11.9N 141.0E	700MB	2976	982	45 190 30	260 54 190 20	10 4			+11 +16 +9	7	
5	142130	13.0N 138.4E	700MB	2865	975	70 300 28	080 60 180 72	2 3	CONCENTRIC	10 30	+12 +14 +13	5	
6	150022	13.1N 137.8E	700MB	2827	969	80 130 10	220 70 130 17	12 2	CIRCULAR	25	+13 +16 +8	5	
7	150615	13.5N 136.7E	700MB	2669		95 060 8	130 88 060 18	10 1	CIRCULAR	25	+9 +17 +11	7	
8	150853	13.4N 136.2E	700MB	2598			240 32 170 15	10 2			+9 +20 +8	7	
9	152102	14.0N 134.4E	700MB	2268			130 320 12	130 145 090 24	8 1	CIRCULAR	15	+14 +30 +11	8
10	152340	14.1N 133.7E	700MB	2243	969	110 270 6	010 117 310 10	10 1	CIRCULAR	18	+13 +30 +8	8	
11	160959	14.6N 131.6E	700MB	2127			160 115 110 25	4 1	CONCENTRIC	25 15	+13 +28 +10	10	
12	161214	14.6N 131.1E	700MB	2193	897		110 108 350 24	4 1	CONCENTRIC	15 25	+11 +27 +5	11	
13	162307	14.7N 128.6E	700MB	2178	897	130 270 10	360 98 270 13	5 10	CIRCULAR	10	+12 +22 +6	10	
14	170905	14.4N 126.7E	700MB	2232		110 080 9	360 106 250 12	15 2	CIRCULAR	15	+13 +20 +16	12	
15	171200	14.3N 126.3E	700MB	2233	908		060 109 330 12	10 1	CIRCULAR	12	+13 +18 +17	12	
16	172116	14.4N 124.6E	700MB	2312		45 130 90	020 93 130 30	10 1	CIRCULAR	13	+18 +21 +16	13	
17	172353	14.4N 124.3E	700MB	2352	915	100 270 10	340 102 270 30	10 2	ELLIPTICAL	13 10 330	+13 +20 +16	13	
18	180534	14.7N 123.5E	700MB	2440	926	100 360 8	080 99 360 8	5 4	ELLIPTICAL	15 10 360	+14 +18 +16	14	
19	180828	14.8N 123.2E	700MB	2455		50 040 106	120 99 360 8	4 5	CIRCULAR	15	+12 +16 +16	14	

20	190916	15.9N	118.4E	700MB	2894	979	50	340	50	070	61	340	55	10	2	CIRCULAR	30	40	+12	+14	+11	15
21	191152	16.2N	117.6E	700MB	2905					160	64	080	77	10		CONCENTRIC	10	40	+10	+15	+13	15
22	192111	16.5N	116.3E	700MB	2831					140	76	050	80	10		ELLIPTICAL	15	10	+13	+15	+12	16
23	192335	17.0N	114.8E	700MB	2821	970	70	120	95	180	79	160	44	10		ELLIPTICAL	15	5	+11	+16	+11	16
24	200331	17.3N	113.7E	700MB	2755	962	75	040	21	190	66	110	60	5		ELLIPTICAL	15	10	+14	+14	+9	17

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASUAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	171200	14.3N 126.3E	LAND				10623 52510		14.0N 124.3E	98447
2	171500	14.4N 125.8E	LAND				10613 52813	EYE CIRCULAR OPN 50 PRCNT	14.0N 124.3E	98447
3	171600	14.4N 125.6E	LAND				10613 52619		14.0N 124.3E	98447
4	171700	14.4N 125.3E	LAND				10422 52910		14.0N 124.3E	98447
5	171700	14.7N 125.2E	LAND				20612 52712		14.0N 124.3E	98447
6	171800	14.8N 125.3E	LAND				10412 52709		14.0N 124.3E	98447
7	172100	14.6N 124.9E	LAND				20572 52709		14.1N 123.0E	98440
8	172200	14.4N 124.7E	LAND				10511 52511		14.0N 124.3E	98447
9	172300	14.6N 124.4E	LAND				20481 52712		14.1N 123.0E	98440
10	180000	14.5N 124.4E	LAND				20412 52712		14.1N 123.0E	98440
11	180300	14.6N 123.9E	LAND				40403 52714		14.1N 123.0E	98440
12	180300	14.6N 124.4E	LAND				40403 52714		14.1N 123.0E	98440
13	180500	14.7N 123.9E	LAND				20411 42911		16.3N 120.6E	98321
14	180700	14.9N 123.7E	LAND				20411 52911	EYE 100 PRCNT CIR EYEWL SE GOOD	16.3N 120.6E	98321
15	180800	14.9N 123.6E	LAND				20411 52912	EYE 100 PRCNT CIR EYEWL SE GOOD	16.3N 120.6E	98321
16	180830	15.0N 123.5E	LAND				20411 52910		16.3N 120.6E	98321
17	180900	15.0N 123.4E	LAND				20415 52910		16.3N 120.6E	98321
18	181000	15.0N 122.8E	LAND				20212 53218		16.3N 120.6E	98321
19	181100	15.1N 122.5E	LAND				20212 52916		14.1N 123.0E	98440
20	181125	15.0N 122.5E	LAND	POOR					15.2N 120.6E	98327
21	181200	15.3N 122.8E	LAND				10211 42806		16.3N 120.6E	98321
22	181200	15.1N 122.3E	LAND				20233 52912		14.1N 123.0E	98440
23	181210	15.0N 122.4E	LAND	FAIR					15.2N 120.6E	98327
24	181235	15.1N 122.2E	LAND	FAIR					15.2N 120.6E	98327
25	181300	15.3N 122.5E	LAND				10211 42809		16.3N 120.6E	98321
26	181335	15.2N 122.1E	LAND	POOR					15.2N 120.6E	98327
27	181400	15.2N 122.0E	LAND				30411 53211		14.1N 123.0E	98440
28	181400	15.3N 122.4E	LAND				10211 42707		16.3N 120.6E	98321
29	181410	15.3N 122.0E	LAND	POOR					15.2N 120.6E	98327
30	181435	15.3N 121.8E	LAND	FAIR					15.2N 120.6E	98327
31	181510	15.4N 121.6E	LAND	FAIR					15.2N 120.6E	98327
32	181535	15.5N 121.5E	LAND	FAIR					15.2N 120.6E	98327
33	181638	15.5N 121.1E	LAND	FAIR					15.2N 120.6E	98327
34	181828	15.6N 120.5E	LAND	GOOD					15.2N 120.6E	98327
35	181900	15.4N 120.6E	LAND				40403 52614		16.3N 120.6E	98321
36	182000	15.3N 120.1E	LAND				10211 42610		16.3N 120.6E	98321
37	182030	15.3N 119.9E	LAND				10211 42712		16.3N 120.6E	98321
38	182100	15.4N 119.8E	LAND				15000 42906		16.3N 120.6E	98321
39	182200	15.4N 119.7E	LAND				10209 42704		16.3N 120.6E	98321
40	190000	15.4N 119.3E	LAND				20333 62714		16.3N 120.6E	98321
41	190100	15.4N 119.0E	LAND				20233 42705		16.3N 120.6E	98321
42	190200	15.4N 118.9E	LAND				20482 42704		16.3N 120.6E	98321
43	190700	15.5N 118.3E	LAND				10611 32994		16.3N 120.6E	98321
44	190800	15.8N 118.2E	LAND				10611 43408		16.3N 120.6E	98321
45	190900	15.9N 118.1E	LAND				10611 43204		16.3N 120.6E	98321
46	191000	15.9N 118.2E	LAND				10611 42712		16.3N 120.6E	98321
47	191200	16.1N 117.4E	LAND				11184 73210		16.8N 112.3E	59981
48	200500	17.2N 114.0E	LAND						16.8N 112.3E	59981
49	200600	17.3N 113.9E	LAND				12294 52911		16.8N 112.3E	59981
50	200700	17.3N 113.8E	LAND				12274 52910		16.8N 112.3E	59981
51	200800	17.4N 113.6E	LAND				12274 53010		16.8N 112.3E	59981
52	201213	17.7N 112.9E	ACFT					15 NM EYE	17.6N 114.4E	
53	201500	17.8N 111.8E	LAND	GOOD			10183 52812		16.8N 112.3E	59981
54	201800	18.0N 111.0E	LAND				10173 52911		16.8N 112.3E	59981
55	201900	18.1N 110.8E	LAND				10173 52912		16.8N 112.3E	59981
56	202000	18.1N 110.4E	LAND				10173 52814		16.8N 112.3E	59981
57	202100	18.2N 110.2E	LAND				34362 52814		16.8N 112.3E	59981

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

**TROPICAL STORM ELLIS
BEST TRACK DATA**

MO/DA/HR	BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND		
101400Z	6.1 159.0	10	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	
101405Z	6.1 159.0	10	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	
101410Z	7.1 157.1	10	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	
101415Z	7.6 156.1	15	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	
101500Z	8.1 155.4	20	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	
101505Z	8.6 154.7	20	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	
101510Z	8.6 154.0	25	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	
101515Z	9.3 153.3	30	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	
101600Z	10.1 152.8	35	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	
101605Z	10.6 152.0	35	10.7 151.9	40	11.1 151.9	40	11.5 150.1	55	59	15	12.8 145.3	75	343	25	13.6 140.1	100	621	60		
101610Z	10.8 151.1	35	10.8 151.1	40	10.8 151.1	40	12.8 148.6	160	168	15	14.1 144.8	80	458	30	15.3 139.5	100	715	60		
101615Z	10.8 150.3	40	10.8 150.3	45	10.8 150.3	45	11.7 149.9	155	165	15	12.9 147.3	70	458	30	15.6 139.9	95	681	55		
101618Z	10.8 150.3	40	10.8 150.3	45	10.8 150.3	45	11.7 148.8	155	165	15	12.9 147.3	70	458	30	15.6 139.9	95	681	55		
101700Z	10.8 150.3	40	10.8 150.3	45	10.8 150.3	45	11.7 148.8	155	165	15	12.9 147.3	70	458	30	15.6 139.9	95	681	55		
101705Z	10.8 150.3	40	10.8 150.3	45	10.8 150.3	45	11.7 148.8	155	165	15	12.9 147.3	70	458	30	15.6 139.9	95	681	55		
101710Z	10.8 150.3	40	10.8 150.3	45	10.8 150.3	45	11.7 148.8	155	165	15	12.9 147.3	70	458	30	15.6 139.9	95	681	55		
101715Z	10.8 150.3	40	10.8 150.3	45	10.8 150.3	45	11.7 148.8	155	165	15	12.9 147.3	70	458	30	15.6 139.9	95	681	55		
101800Z	9.3 149.0	50	9.3 149.0	55	9.3 149.0	55	10.3 148.6	80	193	40	10.9 145.6	100	283	70	0.0 0.0	0.0	0.0	0.0		
101805Z	8.7 149.7	50	8.7 149.7	55	8.7 149.7	55	9.6 147.9	80	180	40	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0		
101810Z	8.0 149.3	50	8.0 149.3	55	8.0 149.3	55	8.6 147.5	75	135	30	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0		
101815Z	7.7 148.3	45	7.7 148.3	45	7.7 148.3	45	8.6 147.5	75	135	30	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0		
101900Z	7.1 148.0	40	7.1 148.0	40	7.1 148.0	40	6.4 144.8	60	32	30	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0		
101905Z	6.6 147.8	40	6.6 147.8	40	6.6 147.8	40	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0		
101910Z	6.6 147.0	40	6.6 147.0	40	6.6 147.0	40	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0		
101915Z	6.6 146.3	35	6.6 146.3	35	6.6 146.3	35	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0		
102000Z	6.0 145.3	30	6.0 145.3	30	6.0 145.3	30	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0		

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
AVG FORECAST POSIT ERROR	16.	149.	363.	0.	0.	0.	0.
AVG RIGHT ANGLE ERROR	10.	117.	311.	0.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	6.	23.	41.	0.	0.	0.	0.
AVG INTENSITY BIAS	6.	23.	41.	0.	0.	0.	0.
NUMBER OF FORECASTS	17	13	9	0	0	0	0
DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1046. NM							
AVERAGE SPEED OF TROPICAL CYCLONE IS 7. KNOTS							

**TROPICAL STORM ELLIS
FIX POSITIONS FOR CYCLONE NO. 22**

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	150000	8.2N 155.4E	PCN 6	T1.0/1.0	INIT OBS	PGTW
2	150300	8.5N 155.1E	PCN 6			PGTW
3	151200	7.7N 152.8E	PCN 6			PGTW
4	151600	8.7N 153.7E	PCN 6	T1.5/1.5	INIT OBS	PGTW
5	151800	8.1N 153.3E	PCN 6			PGTW
6	152030	8.8N 153.3E	PCN 6	T2.0/2.0	INIT OBS	PGTW
7	152100	8.7N 153.2E	PCN 6			PGTW
8	152230	9.3N 153.2E	PCN 6	T1.5/1.5	INIT OBS	PGTW
9	160000	9.9N 152.9E	PCN 4	T2.5/2.5 /D1.5/24HRS	EXP LLCC	PGTW
10	160026	10.2N 152.9E	PCN 3	T3.0/3.0	EXP LLCC	PGTW
11	160300	10.4N 152.2E	PCN 4			PGTW
12	160600	10.8N 152.1E	PCN 4			PGTW
13	160900	10.8N 151.8E	PCN 6			PGTW
14	161200	11.0N 151.6E	PCN 6			PGTW
15	161600	11.1N 150.9E	PCN 6	T2.5/2.5 /D1.0/24HRS	EXP LLCC	PGTW
16	161644	11.6N 150.8E	PCN 4			PGTW
17	161800	11.3N 150.9E	PCN 6			PGTW
18	162100	11.0N 150.8E	PCN 6			PGTW
19	162201	10.9N 151.2E	PCN 6	T2.5/2.5 /W1.0/26HRS		PGTW
20	170000	10.3N 150.4E	PCN 6			PGTW
21	170300	10.7N 150.7E	PCN 4	T3.0/3.0+/D0.5/24HRS	PART EXP LLCC	PGTW
22	170600	10.5N 150.6E	PCN 6			PGTW
23	170857	10.8N 151.5E	PCN 6			PGTW
24	170900	10.7N 150.6E	PCN 6			PGTW
25	171200	10.8N 150.4E	PCN 6			PGTW
26	171600	10.2N 150.0E	PCN 6	T3.0/3.0+/D0.5/24HRS		PGTW
27	171800	10.3N 149.9E	PCN 6			PGTW
28	171956	10.0N 150.7E	PCN 6			PGTW
29	172100	9.7N 150.7E	PCN 6			PGTW
30	180000	9.4N 150.8E	PCN 6			PGTW
31	180300	9.3N 149.5E	PCN 6	T3.5/3.5 /D0.5/24HRS		PGTW
32	180519	9.3N 149.3E	PCN 6			PGTW
33	180600	9.5N 149.5E	PCN 6			PGTW
34	180836	8.6N 149.6E	PCN 6			PGTW
35	181225	8.5N 149.6E	PCN 6			PGTW
36	181225	8.4N 149.6E	PCN 5			PGTW
37	181622	8.1N 148.9E	PCN 5	T3.5/3.5 /D0.5/24HRS		PGTW
38	181800	7.8N 148.6E	PCN 6			PGTW
39	182100	7.7N 148.4E	PCN 6			PGTW
40	182325	7.4N 148.5E	PCN 6			PGTW
41	190300	7.7N 148.3E	PCN 6	T3.5/3.5 /S0.0/24HRS		PGTW
42	190503	6.9N 148.1E	PCN 6			PGTW
43	190600	6.8N 148.0E	PCN 6			PGTW
44	190815	7.3N 147.6E	PCN 6			PGTW
45	190932	7.0N 147.5E	PCN 5			PGTW
46	191205	7.0N 147.3E	PCN 5			PGTW
47	191611	7.4N 146.6E	PCN 6	T3.5/3.5 /S0.0/24HRS		PGTW
48	191800	6.9N 146.5E	PCN 6			PGTW
49	192030	6.7N 146.7E	PCN 6			PGTW
50	192055	6.8N 146.4E	PCN 6			PGTW
51	200000	6.2N 145.7E	PCN 6			PGTW
52	200300	7.0N 145.9E	PCN 6	T2.5/3.0+/W1.0/24HRS		PGTW
53	200457	7.6N 145.9E	PCN 6			PGTW
54	200600	7.9N 145.9E	PCN 6			PGTW
55	200908	8.0N 145.8E	PCN 6			PGTW
56	201200	8.1N 145.5E	PCN 6			PGTW
57	202034	8.7N 140.8E	PCN 6			PGTW
58	210000	10.4N 139.2E	PCN 6			PGTW
59	210025	10.4N 139.2E	PCN 5	T2.5/2.5	INIT OBS	PGTW
60	210025	9.7N 139.6E	PCN 5			PGTW
61	210300	10.2N 138.9E	PCN 6	T2.5/2.5 /S0.0/24HRS		PGTW

62 210600 10.6N 138.4E PCN 6
63 210900 11.5N 138.2E PCN 6
64 210915 11.5N 135.2E PCN 6

ULCC FIX
ULCC FIX
ULCC FIX

PGTW
PGTW
PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRV NAV/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	160458	10.7N 152.1E	1500FT		1000	45 040 15	170 35 070 50	2 2			+24 +25 +23 25	1
2	170532	10.7N 150.6E	1500FT		995	40 220 40	300 39 220 10	10 5	CIRCULAR	20	+26 +27 +23 28	3
3	170735	10.7N 150.5E	1500FT		997	45 170 25	270 44 120 12	8 5	CIRCULAR	15	+25 +27 +23 28	3
4	172200	8.4N 150.0E	1500FT		997	65 360 30	070 75 360 32	4 1			+26 +26 +22 28	5
5	172345	8.3N 149.8E	700MB	3075	999	60 240 30	170 53 120 40	4 1			+11 +14 +4 7	7
6	180900	8.5N 150.1E	700MB	3071			100 38 360 26	10 10			+9 +11 +10 7	7
7	181159	8.3N 149.3E	700MB	3081	1000		150 49 750 51	8 8	ELLIPTICAL	60 40 010	+9 +15 +6 29	8
8	182045	7.4N 148.5E	1500FT		997	45 350 40	320 51 230 19	7 3			+26 +27 +24 29	8
9	182323	7.2N 148.3E	1500FT		997	30 060 20	140 42 060 30	8 8			+25 +27 +24 29	9
10	190626	6.5N 147.9E	1500FT		998	45 340 50	060 42 350 34	4 4			+24 +27 +25 9	9
11	190858	6.4N 147.5E	700MB	3119	1002		160 38 080 20	2 4			+11 +13 +9 11	11
12	192120	6.2N 145.5E	700MB	3153	1008	35 010 90	140 44 010 90	5 5			+10 +10 +6 28	11
13	192350	6.2N 145.2E	1500FT		1007	10 140 60	190 27 140 13	5 10			+24 +26 +21 25	14
14	210307	8.9N 138.8E	1500FT		1007	15 060 50	170 15 160 30	5 10			+26 +26 +24 25	14

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	140000	6.5N 159.0E	010	060	91353 91348
2	141200	6.9N 157.0E	010	070	91348 91338 91353 91334
3	150000	7.9N 154.8E	020	170	91338 91334 91348 91353 91426 UYDO JJQI

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON FAYE
BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND		POSIT	WIND		ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS			
102300Z	16.8	125.9	30	1	125.4	30	34.0	13.4	122.8	30	25.0	105.0	-20.0	14.0	119.0	35.0			
102306Z	16.8	125.9	30	1	125.5	30	42.0	13.5	122.8	30	25.0	172.0	-10.0	14.0	119.0	35.0			
102312Z	14.6	124.9	30	1	125.5	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102318Z	14.6	124.9	30	1	125.5	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102400Z	15.1	126.0	30	1	126.0	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102406Z	15.1	126.0	30	1	126.0	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102412Z	15.1	126.0	30	1	126.0	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102418Z	15.1	126.0	30	1	126.0	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102500Z	17.7	126.1	30	1	126.1	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102506Z	18.0	126.1	30	1	126.1	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102512Z	18.0	126.1	30	1	126.1	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102518Z	18.0	126.1	30	1	126.1	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102600Z	18.0	126.1	30	1	126.1	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102606Z	18.0	126.1	30	1	126.1	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102612Z	18.0	126.1	30	1	126.1	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102618Z	18.0	126.1	30	1	126.1	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102700Z	19.1	127.2	30	1	127.2	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102706Z	19.1	127.2	30	1	127.2	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102712Z	19.1	127.2	30	1	127.2	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102718Z	19.1	127.2	30	1	127.2	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102800Z	19.1	127.2	30	1	127.2	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102806Z	19.1	127.2	30	1	127.2	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102812Z	19.1	127.2	30	1	127.2	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102818Z	19.1	127.2	30	1	127.2	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102900Z	20.0	128.3	30	1	128.3	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102912Z	22.2	125.4	30	1	125.4	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
102918Z	22.2	125.4	30	1	125.4	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
103000Z	22.2	125.4	30	1	125.4	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
103006Z	22.2	125.4	30	1	125.4	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
103012Z	22.2	125.4	30	1	125.4	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
103018Z	22.2	125.4	30	1	125.4	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
103100Z	24.7	128.4	30	1	128.4	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
103106Z	24.7	128.4	30	1	128.4	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
103112Z	24.7	128.4	30	1	128.4	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
103118Z	24.7	128.4	30	1	128.4	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
110100Z	27.1	134.4	30	1	134.4	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
110106Z	27.1	134.4	30	1	134.4	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
110112Z	27.1	134.4	30	1	134.4	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
110118Z	27.1	134.4	30	1	134.4	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
110200Z	28.1	138.1	30	1	138.1	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
110206Z	28.1	138.1	30	1	138.1	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
110212Z	28.1	138.1	30	1	138.1	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			
110218Z	28.1	138.1	30	1	138.1	30	13.0	16.0	123.0	30	25.0	142.0	-10.0	14.0	119.0	35.0			

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	15.	104.	242.	414.	12.	106.	242.	414.
AVG RIGHT ANGLE ERROR	7.	58.	136.	231.	7.	57.	136.	231.
AVG INTENSITY MAGNITUDE ERROR	13.	20.	27.	29.	13.	20.	27.	29.
AVG INTENSITY BIAS	-9.	-4.	-13.	-13.	-9.	-4.	-13.	-13.
NUMBER OF FORECASTS	38	34	30	26	34	32	27	26

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1849. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 8. KNOTS

TYPHOON FAYE
 FIX POSITIONS FOR CYCLONE NO. 23

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	221332	13.1N 125.4E	PCN 6	T1.5/1.5	INIT OBS	PGTW
2	230000	13.4N 125.0E	PCN 6			PGTW
3	230126	13.1N 125.4E	PCN 5			PGTW
4	230300	13.4N 124.9E	PCN 6			PGTW
5	230607	13.6N 125.2E	PCN 5			PGTW
6	230900	14.1N 124.1E	PCN 6			PGTW
7	231012	13.9N 124.3E	PCN 6			PGTW
8	231200	14.6N 124.1E	PCN 6			PGTW
9	231407	14.7N 123.3E	PCN 3			PGTW
10	231600	14.7N 123.3E	PCN 4	T2.5/2.5	INIT OBS	PGTW
11	231800	14.9N 122.5E	PCN 4			PGTW
12	231852	14.7N 122.7E	PCN 3			RPMK
13	232111	15.0N 121.9E	PCN 6			PGTW
14	232215	15.1N 121.7E	PCN 5			PGTW
15	240000	15.1N 121.7E	PCN 6	T2.5/2.5-/D1.0/26HRS		PGTW
16	240106	15.0N 122.0E	PCN 3			PGTW
17	240107	15.1N 121.3E	PCN 5			RPMK
18	240300	15.1N 121.7E	PCN 6			PGTW
19	240556	15.6N 121.6E	PCN 5			PGTW
20	240556	15.8N 122.1E	PCN 5	T2.0/2.0	INIT OBS	RODN
21	240556	15.6N 121.4E	PCN 5			RPMK
22	240951	16.3N 121.1E	PCN 6		ULCC FIX	PGTW
23	241200	16.4N 120.9E	PCN 6		ULCC FIX	PGTW
24	241346	17.1N 120.4E	PCN 5		ULCC FIX	PGTW
25	241600	17.5N 120.2E	PCN 5	T1.0/2.0+/W1.5/24HRS	ULCC FIX	PGTW
26	241841	17.5N 119.9E	PCN 6		ULCC FIX	PGTW
27	242100	18.4N 120.1E	PCN 6		ULCC FIX	PGTW
28	242231	17.7N 119.9E	PCN 6	T1.0/1.0	INIT OBS	RPMK
29	242331	18.6N 118.8E	PCN 3			RODN
30	242331	18.2N 119.5E	PCN 5			RPMK
31	250000	18.5N 118.8E	PCN 4		PART EXP LLCC	PGTW
32	250227	18.0N 118.9E	PCN 3	T2.5/2.5 /D0.5/22HRS		RODN
33	250300	17.7N 118.5E	PCN 4	T2.5/2.5 /S0.0/27HRS	PART IXP LLCC	PGTW
34	250545	17.7N 118.8E	PCN 3		PART EXP LLCC	PGTW
35	250545	17.7N 118.7E	PCN 5	T2.5/2.5	INIT OBS EXP LLCC	RKSO
36	251029	18.4N 118.6E	PCN 6		ULCC FIX	PGTW
37	251111	18.4N 119.8E	PCN 5		ULCC FIX	RPMK
38	251111	18.3N 119.3E	PCN 5		ULCC FIX	RODN
39	251507	18.2N 119.9E	PCN 5			RODN
40	251600	19.4N 120.1E	PCN 5	T3.0/3.0-/D2.0/24HRS	ULCC FIX	PGTW
41	251831	18.2N 119.8E	PCN 6		ULCC FIX	PGTW
42	252100	18.1N 119.4E	PCN 5			PGTW
43	252210	18.5N 119.2E	PCN 6			PGTW
44	252307	18.4N 120.6E	PCN 5			RKSO
45	260000	18.5N 119.4E	PCN 6			PGTW
46	260206	19.2N 121.8E	PCN 5	T2.5/2.5 /S0.0/24HRS		RODN
47	260300	18.5N 120.4E	PCN 6	T3.0/3.0 /D0.5/24HRS		PGTW
48	260534	18.1N 120.2E	PCN 5			PGTW
49	260534	18.2N 121.1E	PCN 5	T2.5/2.5 /S0.0/24HRS	EXP LLCC	RKSO

AIRCRAFT FIXES

221

16	280523	19.54	123.1E	700MB	2984		40	180	60	260	70	150	23	4	1	CIRCULAR	30	+10	+15	+9	11
17	280827	19.8N	123.4E	700MB	2959	985	70	300	10	290	72	150	23	4	1	CIRCULAR	30	+10	+15	+9	11
18	281109	20.0N	123.9E	700MB	2928		40	300	50	160	45	080	23	10	1	CIRCULAR	25	+9	+15	+8	12
19	280613	19.7N	123.4E	700MB	2937	979	80	300	12	180	66	070	15	10	1	CIRCULAR	30	+9	+17	+4	12
20	280907	20.15N	124.6E	700MB	2933	972	80	300	12	180	66	070	15	10	1	CIRCULAR	30	+13	+10	+7	13
21	281111	20.27N	124.7E	700MB	2777		20	040	120	140	109	030	13	10	1	CIRCULAR	30	+10	+10	+9	13
22	300016	20.0N	123.9E	700MB	2797	963	110	330	6	240	103	180	8	10	1	CIRCULAR	25	+10	+21	+9	14
23	300007	20.0N	123.9E	700MB	2821	967	100	340	6	180	96	070	8	10	1	CIRCULAR	25	+12	+20	+9	15
24	300355	20.1N	123.4E	700MB	2941	969	60	320	9	190	85	250	8	10	1	CIRCULAR	20	+11	+22	+7	15
25	302135	20.50N	123.1E	700MB	3102		90	300	9	190	85	250	8	10	1	CIRCULAR	20	+12	+20	+9	15
26	310020	20.20N	123.1E	700MB	3102		90	300	9	190	85	250	8	10	1	CIRCULAR	20	+12	+20	+9	15
27	310611	20.0N	123.9E	1500FT		996	80	080	10	140	60	080	8	10	1			+4	+15	+9	16
28	310830	20.0N	123.9E	1500FT		994	80	080	10	140	60	080	8	10	1			+4	+15	+9	17
29	310840	20.0N	123.9E	1500FT		994	80	080	10	140	60	080	8	10	1			+4	+15	+9	17
30	010240	20.0N	123.9E	1500FT		1003	55	150	10	070	45	350	10	10	1			+4	+15	+9	17
31	010537	20.0N	123.9E	1500FT		1004	40	220	15	330	40	220	10	10	1			+4	+15	+9	17

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRV	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR	TDIFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	231600	14.6N 123.4E	LAND				4///	4///		16.3N 120.6E	98321
2	231730	14.8N 123.4E	LAND				4///	53403		16.3N 120.6E	98321
3	231800	14.9N 123.9E	LAND				1060	53012		16.3N 120.6E	98321
4	231800	14.7N 123.9E	LAND				11150	53217		14.1N 123.0E	98440
5	231830	14.9N 123.1E	LAND				1067	53217		16.3N 120.6E	98321
6	231900	14.9N 122.9E	LAND				1079	52716		16.3N 120.6E	98321
7	231900	14.9N 122.9E	LAND				21430	53218		14.1N 123.0E	98440
8	231930	14.9N 122.9E	LAND				1077	52715		16.3N 120.6E	98321
9	232000	14.8N 122.9E	LAND				1071	52612		16.3N 120.6E	98321
10	232030	14.8N 122.9E	LAND				1065	52711		16.3N 120.6E	98321
11	232100	14.8N 122.9E	LAND				1061	52612		16.3N 120.6E	98321
12	232100	14.6N 122.9E	LAND				21330	53021	EYE OPN SW	14.1N 123.0E	98440
13	232130	14.8N 122.9E	LAND				1065	52711		16.3N 120.6E	98321
14	232200	14.8N 122.9E	LAND				1061	53617		16.3N 120.6E	98321
15	232200	14.8N 122.9E	LAND				21230	53108	EYE OPN U	16.3N 120.6E	98321
16	232230	14.9N 122.4E	LAND				10551	52905	EYE 70 PCT CIR OPN SE	16.3N 120.6E	98321
17	232300	15.0N 120.3E	LAND				1163	53210	100 PCT ELIP DIA 40/20	16.3N 120.6E	98321
18	232300	15.0N 120.3E	LAND				1067	53211	EYE 80 PCT CIR OPN NE	16.3N 120.6E	98321
19	240000	15.0N 120.6E	LAND				21230	53211	EYE OPN NE	14.1N 123.0E	98440
20	240000	15.0N 120.6E	LAND				1083	53210	EYE OPN NU	16.3N 120.6E	98321
21	240030	15.2N 120.6E	LAND				21420	53212	EYE 80 PCT CIR OPN NE	14.1N 123.0E	98440
22	240300	15.3N 120.9E	LAND				1091	53616	EYE ELIP OPN NU	16.3N 120.6E	98321
23	240330	15.6N 120.9E	LAND				1091	53620	EYE 100 PCT CIR GOOD	16.3N 120.6E	98321
24	240400	15.9N 120.9E	LAND				1091	53618		16.3N 120.6E	98321
25	240430	16.0N 120.9E	LAND				1041	63619		16.3N 120.6E	98321
26	240800	16.8N 122.1E	LAND				1061	63625		16.3N 120.6E	98321
27	240830	17.1N 121.8E	LAND				4///	70524		16.3N 120.6E	98321
28	241400	18.1N 121.1E	LAND				4///	70524		16.3N 120.6E	98321
29	250600	18.4N 118.7E	LAND				4///	70524		16.3N 120.6E	98321
30	250600	18.8N 120.1E	LAND				4///	70524		16.3N 120.6E	98321
31	260630	18.5N 120.9E	ACFT							18.8N 119.9E	
32	260630	18.5N 120.9E	ACFT							18.8N 119.9E	
33	260907	21.5N 100.7E	ACFT							24.3N 124.2E	47918
34	290600	21.2N 104.3E	LAND				51913	40119		24.3N 124.2E	47918
35	290700	21.4N 104.3E	LAND				20883	50308		24.3N 124.2E	47918
36	290800	21.4N 104.3E	LAND				20913	50903		24.3N 124.2E	47918
37	290900	21.4N 104.3E	LAND				20814	70605		24.3N 124.2E	47918
38	291000	21.5N 104.7E	LAND				2502	5///		24.3N 124.2E	47918
39	291000	21.5N 104.7E	LAND				21912	70707		24.3N 124.2E	47918
40	291100	21.6N 104.9E	LAND				65///	56014		24.8N 125.3E	47927
41	291100	21.6N 104.9E	LAND				21912	70609		24.8N 125.3E	47927
42	291200	21.6N 104.9E	LAND				65///	50000		24.8N 125.3E	47927
43	291200	21.6N 104.9E	LAND				21813	70607		24.8N 125.3E	47927
44	291300	21.7N 125.0E	LAND				65///	54008		24.8N 125.3E	47927
45	291300	21.6N 125.0E	LAND				20814	70607		24.8N 125.3E	47927
46	291400	21.8N 125.1E	LAND							24.8N 125.3E	47927
47	291400	21.7N 125.1E	LAND							24.8N 125.3E	47927
48	291500	21.9N 125.2E	LAND				21914	70607		24.8N 125.3E	47927
49	291500	21.9N 125.2E	LAND				20874	50206		24.8N 125.3E	47927
50	291600	21.9N 125.2E	LAND				20624	70307		24.8N 125.3E	47927
51	291600	21.9N 125.2E	LAND				20813	50000		24.8N 125.3E	47927
52	291700	22.1N 125.4E	LAND				20813	50107		24.8N 125.3E	47927
53	291700	22.1N 125.4E	LAND				65///	50514		24.8N 125.3E	47927
54	291800	22.2N 125.4E	LAND				21913	72008		24.8N 125.3E	47927
55	291800	22.2N 125.4E	LAND				21722	70509		24.8N 125.3E	47927
56	291800	22.2N 125.4E	LAND				3///	50111	MOV 0420	24.8N 125.3E	47927
57	291900	22.3N 125.7E	LAND	POOR					MOV 0420	24.8N 125.3E	47927
58	291900	22.3N 125.5E	LAND	POOR			21914	50311		24.8N 125.3E	47927
59	291900	22.3N 125.5E	LAND				20813	70510		24.8N 125.3E	47927
60	292000	22.4N 125.7E	LAND				21813	70610		24.8N 125.3E	47927
61	292000	22.4N 125.7E	LAND				21814	50611	MOV 3610	24.8N 125.3E	47927
62	292000	22.4N 125.7E	LAND	POOR					MOV 0120	24.8N 125.3E	47927
63	292100	22.6N 125.8E	LAND	POOR			21913	50108		24.8N 125.3E	47927
64	292100	22.5N 125.7E	LAND				20823	70407		24.8N 125.3E	47927
65	292100	22.5N 125.8E	LAND				21813	70407		24.8N 125.3E	47927
66	292200	22.6N 125.9E	LAND				21813	50510		24.8N 125.3E	47927
67	292200	22.6N 125.9E	LAND							24.8N 125.3E	47927
68	292200	22.6N 125.8E	LAND	POOR					MOV 0910	24.8N 125.3E	47927
69	292300	22.7N 125.9E	LAND	POOR			21873	50108	MOV 0515	24.8N 125.3E	47927
70	292300	22.7N 125.9E	LAND				20813	70307		24.8N 125.3E	47927
71	292300	22.7N 125.9E	LAND				20813	70407		24.8N 125.3E	47927
72	300000	22.7N 125.9E	LAND				21914	50308		24.8N 125.3E	47927
73	300000	22.8N 126.0E	LAND						MOV 0320	24.8N 125.3E	47927
74	300000	22.8N 126.0E	LAND	POOR					MOV 0320		

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

**TROPICAL STORM GORDON
BEST TRACK DATA**

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND		POSIT	WIND	ERRORS		POSIT	WIND	ERRORS		POSIT	WIND	ERRORS		POSIT	WIND	ERRORS	
111918Z	6.8 108.1	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
112000Z	6.8 109.2	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
112005Z	8.2 110.2	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
112012Z	8.1 111.0	30	0.1	110.4	30.	70.	0.	10.6	109.7	49.	220.	5.	11.6	108.5	45.	275.	15.	12.0	
112018Z	8.0 111.6	35	0.4	110.4	30.	110.	-5.	10.7	109.7	40.	218.	10.	11.7	108.5	45.	261.	15.	0.0	
112100Z	8.0 112.1	35	8.2	112.0	30.	13.	-5.	9.2	113.0	35.	27.	5.	10.5	112.0	45.	61.	15.	11.2	
112106Z	8.1 112.3	35	8.7	112.0	35.	38.	-5.	10.3	112.1	40.	82.	10.	11.0	110.7	45.	119.	15.	11.6	
112112Z	8.3 112.5	35	9.5	112.5	35.	78.	0.	11.0	110.8	40.	148.	10.	11.8	109.1	45.	220.	15.	12.4	
112118Z	8.6 112.7	30	10.5	112.7	35.	96.	0.	11.6	111.0	45.	155.	15.	12.8	109.4	50.	228.	15.	13.9	
112200Z	8.8 112.8	30	10.8	113.0	35.	121.	5.	12.6	111.8	40.	187.	10.	14.1	109.8	35.	250.	0.	16.4	
112206Z	9.0 112.5	30	9.3	112.8	30.	125.	0.	10.5	112.9	25.	55.	-5.	0.0	0.0	0.	0.	0.	0.	
112212Z	9.1 112.4	30	9.3	112.8	30.	127.	-5.	0.0	0.0	0.	0.	0.	0.0	0.0	0.	0.	0.	0.	
112218Z	9.3 112.2	30	9.3	112.8	25.	36.	-5.	0.0	0.0	0.	0.	0.	0.0	0.0	0.	0.	0.	0.	
112300Z	9.5 112.2	30	9.3	112.3	25.	13.	-5.	10.0	111.6	20.	67.	-15.	0.0	0.0	0.	0.	0.	0.	
112306Z	9.8 112.3	30	9.5	112.0	35.	19.	-5.	10.2	110.8	40.	115.	5.	11.0	108.3	45.	136.	5.	0.0	
112312Z	10.1 112.4	30	9.7	112.4	40.	24.	10.	10.5	111.8	45.	81.	10.	11.5	110.0	50.	75.	15.	0.0	
112318Z	10.4 112.4	35	10.9	112.2	40.	13.	10.	11.4	110.7	50.	72.	10.	11.8	108.7	35.	72.	5.	0.0	
112400Z	10.8 112.4	35	10.7	112.0	40.	24.	10.	12.1	110.7	50.	19.	5.	13.1	109.0	35.	47.	15.	0.0	
112406Z	11.3 112.4	35	11.0	112.4	45.	18.	10.	12.4	111.7	50.	88.	10.	0.0	0.0	0.	0.	0.	0.	
112412Z	11.8 112.2	35	11.7	112.4	45.	13.	10.	13.5	111.2	55.	118.	20.	0.0	0.0	0.	0.	0.	0.	
112418Z	12.1 111.7	40	11.8	112.2	40.	40.	10.	13.0	111.0	55.	164.	25.	0.0	0.0	0.	0.	0.	0.	
112500Z	12.5 111.0	40	12.0	111.0	40.	36.	-5.	13.0	110.3	50.	113.	30.	0.0	0.0	0.	0.	0.	0.	
112506Z	12.3 110.2	40	12.3	110.4	45.	12.	-5.	0.0	0.0	0.	0.	0.	0.0	0.0	0.	0.	0.	0.	
112512Z	12.6 109.4	35	12.6	109.4	30.	0.	-5.	0.0	0.0	0.	0.	0.	0.0	0.0	0.	0.	0.	0.	
112518Z	13.0 108.8	30	13.0	108.6	25.	12.	-5.	0.0	0.0	0.	0.	0.	0.0	0.0	0.	0.	0.	0.	
112600Z	13.5 108.3	20	13.3	108.5	20.	17.	0.	0.0	0.0	0.	0.	0.	0.0	0.0	0.	0.	0.	0.	

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	37.	114.	159.	0.	0.	0.	0.
AVG RIGHT ANGLE ERROR	16.	51.	58.	0.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	4.	12.	11.	0.	0.	0.	0.
AVG INTENSITY BIAS	1.	-1.	0.	0.	0.	0.	0.
NUMBER OF FORECASTS	23	17	11	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 797. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 5. KNOTS

**TROPICAL STORM GORDON
FIX POSITIONS FOR CYCLONE NO. 24**

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	200205	7.8N 110.2E	PCN 5	T2.5/2.5	INIT OBS	RODN
2	200208	9.3N 111.3E	PCN 6			KGWC
3	200308	8.2N 109.4E	PCN 6	T2.0/2.0	INIT OBS	PGTW
4	200600	8.4N 110.0E	PCN 6			PGTW
5	200900	8.8N 110.0E	PCN 6			PGTW
* 6	201200	9.2N 110.5E	PCN 6			PGTW
* 7	201445	8.8N 110.8E	PCN 6		ULAC 09.1N 110.1E	KGWC
* 8	201600	9.3N 110.5E	PCN 6			PGTW
* 9	201800	9.4N 110.4E	PCN 6	T2.0/2.0	INIT OBS	PGTW
* 10	201855	9.4N 110.8E	PCN 6		ULAC 09.6N 110.1E	KGWC
* 11	201855	9.8N 109.9E	PCN 5			RODN
* 12	202100	9.8N 110.3E	PCN 6			PGTW
13	202303	8.0N 112.0E	PCN 4		ULAC 10.0N 110.3E	KGWC
14	202303	8.0N 112.0E	PCN 4			RODN
15	210000	8.0N 112.1E	PCN 4		EXP LLCC	PGTW
16	210145	8.0N 112.2E	PCN 3	T2.5/2.5 /D0.5/24HRS		KGWC
17	210145	8.0N 112.2E	PCN 3	T2.5/2.5 /D0.5/24HRS		RODN
18	210300	8.6N 112.2E	PCN 4	T2.5/2.5 /D0.5/24HRS	PART EXP LLCC	PGTW
19	210600	8.8N 112.5E	PCN 6			PGTW
* 20	210740	9.2N 113.1E	PCN 6			KGWC
* 21	210900	9.4N 112.6E	PCN 6			PGTW
* 22	211143	10.0N 113.7E	PCN 6		ULAC 10.1N 111.7E	KGWC
* 23	211200	9.8N 112.1E	PCN 6		ULAC 10.1N 111.0E	PGTW
* 24	211425	9.9N 113.2E	PCN 4		EXP LLCC	KGWC
* 25	211426	10.3N 112.7E	PCN 5			RODN
* 26	211600	10.4N 112.4E	PCN 6	T2.5/2.5 /D0.5/24HRS		PGTW
* 27	211800	10.2N 112.8E	PCN 6			PGTW
* 28	211844	10.3N 113.4E	PCN 6		ULCC 11.5N 111.9E	KGWC
* 29	211844	11.1N 112.6E	PCN 5			RODN
* 30	212242	10.6N 113.5E	PCN 6			KGWC
31	220000	9.9N 112.6E	PCN 6		ULCC FIX	PGTW
32	220300	9.1N 113.3E	PCN 6	T1.5/2.5+/W1.0/24HRS		PGTW
33	220306	8.9N 113.5E	PCN 3	T2.5/2.5 /S0.0/25HRS	PART EXP LLCC ULAC 10.3N 113.	KGWC
34	220600	9.0N 112.9E	PCN 6			PGTW
* 35	220730	9.3N 113.3E	PCN 5			KGWC
* 36	220900	9.2N 113.3E	PCN 6			PGTW
* 37	221055	9.7N 114.5E	PCN 6			RODN
* 38	221122	9.0N 113.1E	PCN 6		ULAC 08.9N 111.7E	KGWC
* 39	221200	9.2N 112.5E	PCN 6			PGTW
* 40	221405	8.3N 113.4E	PCN 4		EXP LLCC	KGWC
* 41	221600	9.0N 112.5E	PCN 6	T1.5/2.5 /W1.0/24HRS		PGTW
* 42	221800	9.2N 112.6E	PCN 6			PGTW
* 43	221833	8.5N 113.1E	PCN 4		ULAC 08.8N 112.0E	KGWC
* 44	222220	8.6N 113.0E	PCN 6		ULAC 08.6N 111.2E	KGWC
* 45	222220	9.7N 110.8E	PCN 6			RODN
46	230000	9.2N 112.1E	PCN 4		EXP LLCC	PGTW
47	230245	9.0N 112.4E	PCN 5	T2.5/2.5 /S0.0/24HRS	ULAC 09.0N 111.3E	KGWC
48	230245	9.2N 113.2E	PCN 6	T2.0/2.0	INIT OBS	RODN
49	230300	8.9N 112.4E	PCN 6	T2.0/2.0 /D0.5/24HRS	EXP LLCC	PGTW
50	230600	9.4N 112.6E	PCN 4		EXP LLCC	PGTW
51	230719	9.5N 112.8E	PCN 6		EXP LLCC ULAC 09.9N 111.4E	KGWC
52	230900	9.6N 112.8E	PCN 6			PGTW
53	231031	10.7N 111.8E	PCN 6		ULCC FIX	RODN
54	231100	10.1N 112.6E	PCN 4		EXP LLCC ULAC 11.0N 111.9E	KGWC
55	231101	9.8N 112.7E	PCN 5		EXP LLCC	RODN
56	231200	9.8N 112.6E	PCN 6		ULCC 10.7N 111.9E	PGTW
57	231526	10.5N 112.1E	PCN 4	T2.5/2.5	INIT OBS EXP LLCC	KGWC
58	231600	10.2N 112.5E	PCN 6		ULCC 11.2N 111.8E	PGTW
59	231800	10.6N 112.4E	PCN 6	T2.5/2.5 /D1.0/26HRS	ULCC 11.6N 111.7E	PGTW

60	232100	10.7N	112.3E	PCN 6		EXP LLCC		PGTU
61	232159	10.6N	112.2E	PCN 4		EXP LLCC ULAC 11.0N 111.6E		KGUC
62	232200	10.6N	112.2E	PCN 4		EXP LLCC		PGTU
63	240000	10.8N	112.3E	PCN 4		EXP LLCC		PGTU
64	240225	10.8N	112.3E	PCN 4	T2.5/2.5 /S0.0/24HRS	EXP LLCC ULAC 11.3N 110.9E		KGUC
65	240225	10.8N	112.3E	PCN 4	T2.5/2.5 /D0.5/24HRS			RODN
66	240300	10.9N	112.4E	PCN 4	T2.5/2.5 /D0.5/24HRS	EXP LLCC		PGTU
67	240600	11.2N	112.8E	PCN 6		PART EXP LLCC ULAC 11.2N 111.		KGUC
68	240708	11.1N	112.9E	PCN 3				RODN
69	240708	11.4N	112.2E	PCN 3				PGTU
70	240900	11.5N	112.5E	PCN 6				PGTU
71	241039	11.7N	112.3E	PCN 3				RODN
72	241200	11.9N	112.0E	PCN 6		EXP LLCC		PGTU
73	241200	11.5N	112.3E	PCN 6		ULCC 12.0N 111.0E		PGTU
74	241506	11.5N	112.3E	PCN 5				RODN
75	241600	11.6N	112.2E	PCN 6	T2.5/2.5 /S0.0/22HRS	ULCC 12.2N 110.8E		PGTU
76	241800	11.8N	112.2E	PCN 6		EXP LLCC		PGTU
77	250000	12.2N	111.5E	PCN 4				RODN
78	250205	11.3N	110.3E	PCN 4	T3.0/3.0 /D0.5/24HRS			PGTU
79	250300	12.3N	110.6E	PCN 4	T3.0/3.0 /D0.5/24HRS			PGTU
80	250600	12.4N	110.2E	PCN 4		ULCC FIX		PGTU
81	250900	12.3N	109.8E	PCN 4		ULCC FIX		PGTU
82	251200	13.0N	108.6E	PCN 4		ULCC FIX		PGTU
83	251446	13.9N	108.0E	PCN 5		ULCC FIX		RODN
84	251943	12.3N	108.0E	PCN 5		ULCC FIX		PGTU
85	252100	12.9N	108.8E	PCN 6				RODN
86	260000	13.5N	108.9E	PCN 6				PGTU

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRV NAV/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSH NO.
1	220454	9.3N 112.5E	1500FT		1006	25 270 42	190 27 090 78	2 23			+24 +24 +24 26	1
2	230116	9.4N 112.4E	1500FT		1003	35 130 90	250 43 130 110	0 15			+23 +24 +22 27	2
3	240159	10.8N 112.4E	1500FT		1002	45 220 30	250 37 170 45	2 3			+26 +26 +26 26	3

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON HOPE
BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	
121700Z	9.2 140.0	20	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
121705Z	9.4 139.4	25	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
121710Z	9.7 138.8	30	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
121715Z	10.1 138.2	35	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
121800Z	10.4 137.8	40	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
121805Z	10.7 137.3	50	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
121810Z	11.2 136.9	60	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
121815Z	11.6 136.7	65	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
121900Z	12.1 136.5	65	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
121905Z	12.7 136.1	65	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
121910Z	13.4 135.6	75	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
121915Z	13.6 134.9	85	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122000Z	13.7 133.6	95	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122005Z	13.6 132.4	100	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122010Z	13.7 131.3	100	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122015Z	13.7 130.0	90	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122100Z	13.8 129.0	85	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122105Z	13.8 128.8	75	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122110Z	13.9 127.0	65	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122115Z	14.4 126.3	65	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122200Z	15.1 125.0	65	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122205Z	15.0 124.0	65	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122210Z	16.7 123.7	65	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122215Z	17.4 122.1	65	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122300Z	18.1 120.6	70	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122305Z	18.7 119.7	70	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122310Z	19.1 118.8	70	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122315Z	18.5 118.0	70	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122400Z	18.2 130.8	50	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	URNG	24-HR	48-HR	72-HR	URNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	19	123	201	159	19	123	201	159
AVG RIGHT ANGLE ERROR	15	83	124	102	15	83	124	102
AVG INTENSITY MAGNITUDE ERROR	3	14	15	15	3	14	15	15
AVG INTENSITY BIAS	26	12	-12	-12	26	12	-12	-12
NUMBER OF FORECASTS	26	22	18	14	26	22	18	14

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1444. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 9. KNOTS

TYPHOON HOPE
FIX POSITIONS FOR CYCLONE NO. 25

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
* 1	162100	7.9N 138.3E	PCN 6	T1.0/1.0	INIT OBS	PGTU
2	170123	9.3N 139.5E	PCN 6			PGTU
3	170441	9.2N 140.4E	PCN 6	T2.0/2.0	INIT OBS	PGTU
4	170600	9.6N 139.7E	PCN 6			PGTU
5	170900	10.8N 139.2E	PCN 6			PGTU
6	171200	10.2N 138.8E	PCN 6			PGTU
7	171600	10.8N 138.3E	PCN 6	T2.0/2.0-/D1.0/19HRS	ULCC 10.3N 137.6E	PGTU
8	172100	10.8N 137.7E	PCN 6			PGTU
9	180000	10.5N 137.3E	PCN 6			PGTU
10	180103	10.7N 137.9E	PCN 6	T2.0/2.0	INIT OBS	RPMK
11	180300	10.5N 137.1E	PCN 6	T3.0/3.0 /D1.0/22HRS		PGTU
12	180600	10.6N 137.0E	PCN 6			PGTU
13	180900	10.8N 137.2E	PCN 6			PGTU
14	181200	11.2N 137.1E	PCN 6			PGTU
15	181344	11.0N 137.2E	PCN 6			PGTU
16	181716	11.3N 136.5E	PCN 6	T4.0/4.0 /D2.0/25HRS		PGTU
17	182100	11.4N 136.5E	PCN 6			PGTU
18	190000	11.6N 136.8E	PCN 4			PGTU
19	190300	12.4N 136.3E	PCN 4	T4.5/4.5-/D1.5/24HRS	BANDNG TYPE EYE	PGTU
20	190600	12.8N 136.2E	PCN 4		BANDNG TYPE EYE	PGTU
21	190900	12.8N 136.0E	PCN 4	T4.5/4.5	INIT OBS	RODN
22	191200	13.1N 135.8E	PCN 4			PGTU
23	191013	13.1N 135.8E	PCN 4			RPMK
24	191200	13.2N 135.9E	PCN 2		DEVL PNG EYE	PGTU
25	191323	14.2N 135.7E	PCN 5	T4.5/4.5	INIT OBS DEVL PNG EYE	RODN
26	191600	13.7N 135.5E	PCN 6	T4.5/4.5 /D0.5/23HRS		PGTU
27	191800	13.7N 135.3E	PCN 4			PGTU
28	192100	13.7N 134.5E	PCN 4			PGTU
29	192112	13.7N 134.1E	PCN 4		EYE	PGTU
30	192112	14.1N 134.7E	PCN 4			RPMK
31	200000	14.0N 133.5E	PCN 4		BANDNG EYE	PGTU
32	200022	13.8N 133.6E	PCN 4		EYE 30NM	PGTU
33	200022	14.0N 133.2E	PCN 4	T4.0/4.0	INIT OBS BANDNG EYE	RPMK
34	200300	13.9N 133.0E	PCN 4	T5.0/5.0 /D0.5/24HRS	EYE 35NM	PGTU
35	200600	13.6N 132.5E	PCN 4		RGD EYE	PGTU
36	200900	13.7N 132.1E	PCN 4			PGTU
37	200952	13.7N 131.5E	PCN 4			PGTU
38	201200	13.8N 131.3E	PCN 6			PGTU
39	201303	13.8N 130.7E	PCN 6			PGTU
40	201600	13.9N 130.5E	PCN 6	T4.5/4.5 /S0.0/24HRS		PGTU
41	201836	14.1N 130.2E	PCN 4			PGTU
42	201836	13.9N 130.0E	PCN 4		DVL PNG EYE	RODN
43	202100	13.8N 130.6E	PCN 6			PGTU
44	210000	13.4N 129.8E	PCN 6			PGTU
45	210143	13.6N 128.4E	PCN 5			PGTU
46	210300	13.8N 128.3E	PCN 6	T4.5/5.0 /W0.5/24HRS		PGTU
47	210540	13.7N 127.9E	PCN 5			PGTU
48	210600	13.8N 128.1E	PCN 6			PGTU
49	210900	14.3N 127.9E	PCN 6			PGTU
50	211200	14.1N 127.1E	PCN 5		ULCC FIX	PGTU
51	211424	14.5N 126.5E	PCN 5			RPMK
52	211600	14.5N 126.5E	PCN 6	T3.5/4.5 /W1.0/24HRS	ULCC FIX	PGTU
53	211800	14.5N 126.4E	PCN 6		ULCC FIX	PGTU
54	211826	14.4N 126.4E	PCN 6			RODN
55	212100	14.6N 126.0E	PCN 6			PGTU
56	212211	15.0N 125.7E	PCN 4	T3.0/4.0 /W1.0/21HRS		RPMK

**TROPICAL STORM IRVING
BEST TRACK DATA**

MO/DA/HR	BEST TRACK			WARNING			24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND		POSIT	WIND		POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
121606Z	7.6 114.6	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121612Z	7.5 114.9	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121618Z	7.5 115.0	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121700Z	7.5 115.0	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121706Z	7.5 115.0	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121712Z	8.0 115.0	45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121718Z	8.0 114.9	50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121800Z	7.8 114.4	55	7.9 114.7	60	1.0	5.0	8.1 113.7	70	32	20	8.5 112.1	75	77	30	9.4 110.4	85	157	30
121806Z	7.6 114.4	60	7.9 114.5	65	1.0	5.0	8.1 113.6	70	27	25	8.5 112.0	75	120	30	9.5 110.2	85	154	35
121812Z	7.3 114.3	55	8.0 113.9	60	4.8	5.0	8.4 112.0	70	27	25	9.1 109.7	70	25	30	9.7 107.5	65	127	35
121818Z	7.2 113.9	55	8.0 113.7	50	4.9	5.0	8.1 112.8	65	83	20	8.6 110.5	55	112	20	9.5 107.3	50	167	20
121900Z	7.6 113.9	50	7.5 113.5	50	3.8	0.0	7.8 112.6	45	170	5	7.4 111.4	45	208	10	7.6 110.3	45	277	20
121906Z	8.3 113.9	45	7.7 113.4	45	3.8	0.0	8.1 111.9	40	168	0	8.2 110.7	35	211	5	0.0	0.0	0.0	0.0
121912Z	8.6 113.9	40	7.9 113.1	45	5.0	0.0	8.7 110.7	40	120	5	9.4 109.0	35	211	5	0.0	0.0	0.0	0.0
121918Z	8.8 111.6	45	8.0 112.6	45	7.6	0.0	9.9 109.2	45	51	10	10.5 107.1	40	273	15	0.0	0.0	0.0	0.0
122000Z	9.0 110.9	45	8.5 111.4	45	4.2	0.0	11.3 105.8	30	233	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122006Z	9.2 110.1	45	9.3 109.7	45	17	0.0	11.3 105.3	25	275	-5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122012Z	9.4 109.4	40	9.6 109.2	40	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122018Z	9.4 108.8	35	9.7 108.5	40	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122100Z	9.0 108.3	35	9.7 108.1	35	44	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122106Z	8.3 107.0	30	8.8 107.6	30	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122112Z	7.9 106.6	30	8.0 106.6	30	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122118Z	6.8 106.6	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122200Z	6.1 105.9	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	35.	132.	163.	170.	0.	0.	0.	0.
AVG RIGHT ANGLE ERROR	18.	73.	41.	51.	0.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	2.	10.	17.	28.	0.	0.	0.	0.
AVG INTENSITY BIAS	2.	19.	17.	28.	0.	0.	0.	0.
NUMBER OF FORECASTS	14	12	9	5	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 806. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 6. KNOTS

**TROPICAL STORM IRVING
FIX POSITIONS FOR CYCLONE NO. 26**

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	160600	7.6N 114.5E	PCN 6	T1.0/1.0	INIT OBS	PGTW
2	160900	7.6N 114.6E	PCN 6			PGTW
3	161200	7.4N 114.1E	PCN 6			PGTW
4	161500	7.5N 114.7E	PCN 6	T1.5/1.5	INIT OBS	PGTW
5	161800	7.6N 114.9E	PCN 6			PGTW
6	162100	7.6N 115.3E	PCN 6			PGTW
7	170000	7.6N 115.5E	PCN 6			PGTW
8	170600	7.9N 115.1E	PCN 6	T2.5/2.5--/D1.5/24HRS		PGTW
9	170900	7.8N 115.0E	PCN 6			PGTW
10	171056	7.8N 115.6E	PCN 3	T3.0/3.0	INIT OBS	RODN
11	171200	7.9N 115.2E	PCN 6			RODN
12	171404	8.2N 115.5E	PCN 5	T2.5/2.5--/D1.0/24HRS	PART EXP LLCC	PGTW
13	171600	8.1N 115.2E	PCN 6			RODN
14	171909	7.9N 115.2E	PCN 6			PGTW
15	172100	8.6N 114.6E	PCN 6			RODN
16	180000	8.1N 114.6E	PCN 6			PGTW
17	180300	8.1N 114.3E	PCN 6	T3.0/3.0 /D0.5/21HRS		PGTW
18	180600	8.1N 114.3E	PCN 6			PGTW
19	180513	8.0N 114.3E	PCN 6	T3.5/3.5	INIT OBS	RODN
20	180900	8.1N 114.1E	PCN 6			PGTW
21	181200	8.0N 113.9E	PCN 6			PGTW
22	181800	7.9N 113.8E	PCN 6	T3.0/3.0--/D0.5/26HRS		PGTW
23	181858	9.2N 113.8E	PCN 3	T3.0/3.0	INIT OBS	RODN
24	182100	7.7N 113.5E	PCN 6			PGTW
25	182314	8.1N 113.6E	PCN 6			PGTW
26	190000	8.2N 113.6E	PCN 6			PGTW
27	190300	8.2N 113.6E	PCN 6	T2.5/3.0 /W0.5/24HRS		PGTW
28	190600	8.6N 113.3E	PCN 6			PGTW
29	190900	8.7N 111.9E	PCN 6		ULCC FIX	PGTW
30	191013	8.7N 113.2E	PCN 4			RPMK
31	191200	8.8N 112.6E	PCN 6			PGTW
32	191600	8.6N 112.0E	PCN 6	T2.5/3.0 /W0.5/22HRS		PGTW
33	191800	8.6N 112.1E	PCN 6			RODN
34	191847	9.0N 112.1E	PCN 5	T2.5/3.0 /W0.5/24HRS		PGTW
35	192100	9.0N 111.4E	PCN 6			PGTW
36	192253	9.0N 111.5E	PCN 4	T2.5/3.0 /W0.5/20HRS		RPMK
37	200000	9.3N 111.4E	PCN 6			PGTW
38	200204	9.0N 109.9E	PCN 5			RPMK
39	200300	9.3N 110.3E	PCN 4	T3.0/3.0--/D0.5/24HRS		PGTW
40	200600	9.5N 110.0E	PCN 6			PGTW
41	200900	9.4N 109.8E	PCN 6			PGTW
42	201133	9.3N 109.8E	PCN 5			RPMK
43	201200	9.6N 109.3E	PCN 6			PGTW
44	201444	9.1N 109.2E	PCN 5	T2.5/2.5 /S0.0/24HRS	PART EXP LLCC	RPMK
45	201600	9.4N 109.2E	PCN 6			PGTW
46	201800	9.4N 108.7E	PCN 6			PGTW
47	202100	9.6N 108.8E	PCN 6			PGTW
48	202232	9.3N 108.8E	PCN 4	T2.0/2.5 /W0.5/24HRS	PART EXP LLCC	RPMK
49	210000	9.5N 108.8E	PCN 6			PGTW
50	210300	8.1N 108.3E	PCN 4	T2.0/2.5 /W1.0/24HRS	EXP LLCC	RPMK
51	210325	8.3N 108.1E	PCN 3		PART EXP LLCC	RPMK
52	210600	8.8N 108.0E	PCN 4		EXP LLCC	PGTW
53	210900	7.9N 107.9E	PCN 6		EXP LLCC	PGTW
54	211200	7.4N 107.5E	PCN 6		EXP LLCC	PGTW
55	211424	7.3N 106.1E	PCN 5			RPMK
56	211600	6.8N 106.7E	PCN 6	T2.0/2.5 /W0.5/24HRS	EXP LLCC	PGTW
57	211800	6.7N 106.5E	PCN 6		EXP LLCC	PGTW
58	212100	6.5N 106.1E	PCN 6			PGTW
59	220600	5.0N 104.8E	PCN 6	T0.0/1.0 /W2.0/27HRS	EXP LLCC	PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRV NAV/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	180114	7.9N 114.6E	1500FT		994	60 060 14	150 70 060 14	2 2			+24 +27 +24	1
2	182116	7.2N 114.7E	700MB	3044			090 43 070 45	50 10			+14 +18 + 7	2
3	182321	7.5N 113.5E	700MB	3023		50 050 45	100 41 070 10	2 1			+ + +	2

NOTICE - THE ASTERISKS (X) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

2. NORTH INDIAN OCEAN CYCLONE DATA

TROPICAL CYCLONE 01B BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND		POSIT	WIND		ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS			
052218Z	16.2	87.8	30	0.0	0.0		-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0			
052300Z	16.6	87.1	30	0.0	0.0		-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0			
052306Z	17.1	88.4	35	0.0	0.0		-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0			
052312Z	17.7	88.0	40	17.3	88.0	40	52.0	18.7	88.6	55.0	148.0	0.0	0.0	0.0	0.0	0.0			
052318Z	18.3	88.3	45	17.8	88.3	45	38.0	19.3	89.7	65.0	143.0	0.0	0.0	0.0	0.0	0.0			
052400Z	19.0	89.3	45	18.9	88.6	50	69.0	20.3	89.5	70.0	163.0	10.0	0.0	0.0	0.0	0.0			
052406Z	19.7	90.0	50	19.0	90.0	50	6.0	22.7	90.0	60.0	82.0	30.0	0.0	0.0	0.0	0.0			
052412Z	20.5	90.4	55	20.5	90.2	55	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
052418Z	21.4	90.9	60	21.0	90.4	60	37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
052500Z	22.5	91.2	60	22.4	91.2	60	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
052506Z	23.9	91.6	30	23.2	91.4	40	43.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
AVG FORECAST POSIT ERROR	URNG	24-HR	48-HR	72-HR	AVG FORECAST POSIT ERROR	URNG	24-HR
33	134	0	0	0	0	0	0
14	29	0	0	0	0	0	0
11	11	0	0	0	0	0	0
11	11	0	0	0	0	0	0
4	4	0	0	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 515. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 9. KNOTS

TROPICAL CYCLONE 01B
FIX POSITIONS FOR CYCLONE NO. 1

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCR	DVORAK CODE	COMMENTS	SITE
1	211800	13.7N 89.1E	PCN 6	T1.5/1.5	INIT OBS	PGTW
2	220430	15.2N 89.6E	PCN 5		ULAC 15.5N 89.9E INIT OBS	KGUC
3	221712	15.5N 87.2E	PCN 6	T2.5/2.5	INIT OBS	KGUC
4	221800	16.9N 87.9E	PCN 6	T2.0/2.0 /D0.5/24HRS		PGTW
5	222106	16.6N 87.8E	PCN 6			KGUC
6	230110	16.6N 87.5E	PCN 6			KGUC
7	230442	16.9N 87.9E	PCN 5	T3.0/3.0 /D1.5/24HRS		KGUC
8	230600	16.9N 87.7E	PCN 6			PGTW
9	230809	17.2N 88.4E	PCN 5			KGUC
* 10	231200	17.5N 87.6E	PCN 6		ULAC 17.4N 087.2E	PGTW
* 11	231209	17.6N 87.6E	PCN 6		ULCC FIX	KGUC
* 12	231600	17.5N 87.5E	PCN 6		ULAC 16.8N 89.1E	PGTW
* 13	231652	17.8N 89.7E	PCN 4	T3.0/3.0 /D0.5/24HRS		KGUC
* 14	231800	17.5N 87.4E	PCN 6	T2.5/2.5 /D0.5/24HRS		PGTW
* 15	232100	18.2N 88.1E	PCN 6		ULCC FIX	PGTW
* 16	240000	18.5N 88.5E	PCN 6			PGTW
17	240049	19.4N 90.2E	PCN 6		ULAC 18.4N 89.3E	KGUC
18	240300	19.6N 90.2E	PCN 6			PGTW
19	240351	19.5N 89.6E	PCN 6	T3.0/3.0 /S0.0/24HRS		KGUC
20	240600	19.7N 90.0E	PCN 6			PGTW
21	240759	20.0N 90.1E	PCN 6		ULAC 19.1N 90.0E	KGUC
22	240900	19.9N 89.5E	PCN 6			PGTW
23	241143	20.3N 90.0E	PCN 6		ULAC FIX	KGUC
24	241200	20.1N 89.7E	PCN 6		ULCC 18.4N 90.0E	PGTW
25	241600	20.6N 90.9E	PCN 6			PGTW
26	241632	20.7N 90.0E	PCN 6	T3.5/3.5 /D0.5/24HRS	ULAC 21.0N 90.3E	KGUC
27	241800	20.9N 91.3E	PCN 6	T3.5/3.5 /D1.0/24HRS		PGTW
28	242044	22.3N 91.0E	PCN 6			KGUC
29	242100	21.1N 91.4E	PCN 6			PGTW
30	250000	22.9N 91.3E	PCN 6		ULAC 22.6N 091.4E	PGTW
* 31	250028	21.2N 90.7E	PCN 6			KGUC
32	250300	23.5N 91.3E	PCN 5			PGTW
33	250331	23.3N 91.4E	PCN 5			KGUC
34	250600	24.0N 91.6E	PCN 6			PGTW
35	250748	24.0N 92.3E	PCN 6			KGUC
36	251308	24.5N 93.7E	PCN 6			KGUC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 02A BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND		POSIT	WIND		ERRORS	ERRORS	POSIT	WIND		ERRORS	ERRORS	POSIT	WIND		ERRORS	ERRORS	
052806Z	15.1	67.4	30	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	
052812Z	15.8	67.5	35	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	
052818Z	16.5	67.6	40	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	
052900Z	17.2	67.7	45	17.4	67.5	45	16.7	20.9	67.9	55.0	15.0	24.2	71.8	30	205.0	-10.0	0.0	0.0	
052906Z	17.9	67.8	45	18.7	67.9	50	48.0	22.2	67.3	45.0	135.0	15.0	24.0	0.0	0.0	0.0	0.0	0.0	
052912Z	18.6	68.1	50	18.6	67.9	50	11.0	22.1	68.8	60.0	29.0	24.3	70.8	30	112.0	0.0	0.0	0.0	
052918Z	19.3	68.3	50	18.8	67.6	50	50.0	21.1	68.1	60.0	61.0	20.0	24.2	70.2	30	67.7	5.0	0.0	
053000Z	20.1	68.5	50	19.5	68.0	50	46.0	22.0	68.8	60.0	53.0	20.0	24.3	70.8	45.0	77.0	25.0	0.0	
053006Z	20.8	68.4	45	20.8	68.3	50	16.0	23.7	69.9	50.0	81.0	15.0	24.0	70.0	0.0	0.0	0.0	0.0	
053012Z	21.4	68.3	40	21.3	68.5	45	16.0	24.4	67.0	30.0	72.0	5.0	24.0	70.0	0.0	0.0	0.0	0.0	
053018Z	22.1	68.3	40	22.7	68.3	45	16.0	24.6	69.7	30.0	45.0	5.0	24.0	70.0	0.0	0.0	0.0	0.0	
053100Z	22.8	68.4	40	23.5	68.3	45	16.0	24.7	69.4	35.0	45.0	5.0	24.0	70.0	0.0	0.0	0.0	0.0	
053106Z	23.3	68.5	35	23.5	68.4	45	13.0	24.7	69.4	35.0	45.0	5.0	24.0	70.0	0.0	0.0	0.0	0.0	
053112Z	23.9	68.8	30	24.0	68.4	35	16.0	24.7	69.4	35.0	45.0	5.0	24.0	70.0	0.0	0.0	0.0	0.0	
053118Z	24.4	69.1	25	24.0	68.4	30	16.0	24.7	69.4	35.0	45.0	5.0	24.0	70.0	0.0	0.0	0.0	0.0	
050100Z	24.8	69.5	20	24.0	68.4	30	-0.0	24.7	69.4	35.0	45.0	5.0	24.0	70.0	0.0	0.0	0.0	0.0	

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
AVG FORECAST POSIT ERROR	URNG	24-HR	48-HR	72-HR	AVG FORECAST POSIT ERROR	URNG	24-HR
24	61	115	0	0	0	0	0
14	38	0	0	0	0	0	0
4	12	10	0	0	0	0	0
4	12	5	0	0	0	0	0
12	9	4	0	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 609. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 7. KNOTS

TROPICAL CYCLONE 02A FIX POSITIONS FOR CYCLONE NO. 2

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	260634	11.1N 64.6E	PCN 5	T1.5/1.5	INIT OBS	KGUC
2	261733	12.0N 66.4E	PCN 6			KGUC
3	270617	13.1N 69.0E	PCN 5	T1.0/1.5 /W0.5/24HRS		KGUC
4	271712	14.6N 69.5E	PCN 6			KGUC
5	280553	15.0N 67.1E	PCN 3	T2.0/2.0 /D1.0/24HRS	EXP LLCC ULAC 14.9N 66.0E	KGUC
6	281345	16.0N 67.0E	PCN 4		EXP LLCC ULAC 15.2N 65.5E	KGUC
7	281833	16.5N 67.8E	PCN 3	T3.0/3.0	INIT OBS ULAC 15.9N 62.6E	KGUC
8	282143	17.1N 67.6E	PCN 6			KGUC
* 9	290225	18.3N 68.4E	PCN 5			KGUC
10	290533	17.9N 68.1E	PCN 5	T3.0/3.0 /D1.0/24HRS	ULAC 17.4N 67.5E	KGUC
11	291029	18.4N 67.5E	PCN 5		ULAC 18.2N 66.5E	KGUC
12	291324	18.3N 67.4E	PCN 6			KGUC
13	291813	19.4N 68.6E	PCN 3	T3.0/3.0 /S0.0/24HRS	ULAC 19.0N 67.1E	KGUC
14	292132	19.9N 68.8E	PCN 6			KGUC
15	300205	20.5N 68.2E	PCN 5			KGUC
16	300512	21.4N 68.3E	PCN 5	T2.0/3.0 /W1.0/24HRS	ULAC 20.0N 67.7E	KGUC
17	301018	21.3N 68.0E	PCN 5		ULAC 20.9N 67.4E	KGUC
18	301444	21.6N 68.5E	PCN 5		ULAC 20.6N 65.5E	KGUC
19	301753	22.1N 68.1E	PCN 5	T1.5/2.5 /W1.5/24HRS	ULAC 21.1N 66.8E	KGUC
20	302309	23.0N 68.7E	PCN 5		EXP LLCC	KGUC
21	310143	23.8N 68.4E	PCN 5			KGUC
22	310452	23.2N 68.3E	PCN 3	T1.0/2.0 /W1.0/24HRS	EXP LLCC	KGUC
23	311423	24.1N 69.1E	PCN 6			KGUC
24	311838	24.6N 68.7E	PCN 5			KGUC
25	010432	24.9N 70.2E	PCN 5			KGUC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 03B BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND		POSIT	WIND		ERRORS	POSIT	WIND		ERRORS	POSIT	WIND		ERRORS	POSIT	WIND		ERRORS
100818Z	11.8	90.4	20	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0
100900Z	12.8	90.8	20	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0
100906Z	13.8	90.1	25	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0
100912Z	14.2	88.6	30	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0
100918Z	14.6	86.9	35	14.3	87.4	35	34	0.0	15.9	83.8	35	30	0.0	0.0	0.0	0.0	0.0	0.0	-0.0
101000Z	15.1	85.7	40	14.0	85.6	40	13	0.0	17.0	80.7	40	25	160	-20	0.0	0.0	0.0	0.0	-0.0
101006Z	15.8	85.0	45	16.1	84.1	45	55	0.0	18.8	79.6	45	25	184	-10	0.0	0.0	0.0	0.0	-0.0
101012Z	16.4	84.3	45	16.3	84.1	45	58	0.0	0.0	0.0	45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0
101018Z	17.2	83.7	50	17.1	83.3	50	29	0.0	0.0	0.0	45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0
101100Z	18.0	83.0	50	17.5	82.0	45	36	0.0	0.0	0.0	45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0
101106Z	18.4	82.0	35	18.5	82.0	35	8	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0

	ALL FORECASTS					TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR		WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	26.	141.	0.	0.		0.	0.	0.	0.
AVG RIGHT ANGLE ERROR	20.	42.	0.	0.		0.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	1.	10.	0.	0.		0.	0.	0.	0.
AVG INTENSITY BIAS	-1.	-10.	0.	0.		0.	0.	0.	0.
NUMBER OF FORECASTS	7	3	0	0		0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 667. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 11. KNOTS

TROPICAL CYCLONE 03B FIX POSITIONS FOR CYCLONE NO. 3

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	081600	11.3N 91.5E	PCN 6	T1.0/1.0	INIT OBS ULCC FIX	PGTW
2	081800	11.3N 91.3E	PCN 6		ULCC FIX	PGTW
* 3	090000	11.4N 90.2E	PCN 6			PGTW
* 4	090300	11.7N 88.9E	PCN 6			PGTW
5	090429	13.6N 91.4E	PCN 5	T1.5/1.5	INIT OBS ULAC 13.5N 089.2E	KGUC
* 6	090600	11.9N 89.4E	PCN 6	T1.5/1.5	INIT OBS	PGTW
7	090838	13.9N 89.9E	PCN 6		ULCC 13.8N 087.9E	KGUC
8	090900	13.8N 88.8E	PCN 6		ULCC FIX	PGTW
9	091200	13.7N 88.4E	PCN 6		ULCC FIX	PGTW
10	091329	14.6N 88.4E	PCN 6		ULCC 14.2N 088.2E	KGUC
11	091709	14.3N 87.1E	PCN 6		INIT OBS ULAC 14.4N 086.8E	KGUC
12	091800	14.3N 86.4E	PCN 6	T2.5/2.5 /D1.5/26HRS	ULCC FIX	PGTW
13	092100	14.5N 86.7E	PCN 6			PGTW
14	100027	16.0N 85.6E	PCN 6		ULAC 15.8N 085.0E	KGUC
15	100409	16.2N 84.5E	PCN 5	T2.5/2.5 /D1.0/24HRS	ULAC 15.7N 084.6E	KGUC
16	100827	16.2N 84.1E	PCN 3		PART EXP LLCC ULAC 16.3N 083.	KGUC
17	101307	16.5N 84.1E	PCN 6		ULAC 16.2N 083.1E	KGUC
18	101649	17.5N 83.2E	PCN 6		ULAC 16.4N 082.4E	KGUC
19	110006	18.1N 83.4E	PCN 6	T3.5/3.5 /D1.0/24HRS	ULAC 18.6N 080.1E	KGUC
20	110348	18.1N 82.9E	PCN 6		ULAC 18.6N 080.1E	KGUC
21	110816	20.2N 79.1E	PCN 6			KGUC
22	111246	20.8N 78.8E	PCN 3			KGUC
23	111629	20.5N 78.2E	PCN 5			KGUC
24	112101	20.8N 78.4E	PCN 5			KGUC

25 120126 22.0N 78.4E PCN 5
26 120509 22.3N 77.6E PCN 5

KGWC
KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 04B
BEST TRACK DATA

MO/DA/HR	BEST TRACK			WARNING			24 HOUR FORECAST			48 HOUR FORECAST			72 HOUR FORECAST		
	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND
101500Z	18.9	83.1	30	0.0	0.0	0.0	-0.	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0
101506Z	19.3	88.5	40	0.0	0.0	0.0	-0.	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0
101512Z	19.7	88.0	45	0.0	0.0	0.0	-0.	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0
101518Z	20.2	87.4	45	19.8	87.9	45.	37.	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0
101600Z	20.6	86.8	50	20.5	86.9	50.	8.	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0
101606Z	21.3	85.2	40	21.3	85.8	40.	22.	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0
101612Z	22.4	85.5	25	22.4	85.4	25.	6.	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	18.	0.	0.	0.	0.	0.	0.	0.
AVG RIGHT ANGLE ERROR	8.	0.	0.	0.	0.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	0.	0.	0.	0.	0.	0.	0.	0.
AVG INTENSITY BIAS	0.	0.	0.	0.	0.	0.	0.	0.
NUMBER OF FORECASTS	4	0	0	0	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 296. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 8. KNOTS

TROPICAL CYCLONE 04B
FIX POSITIONS FOR CYCLONE NO. 4

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	090900	9.8N 116.2E	PCN 6		ULCC FIX	PGTU
2	091200	9.4N 116.4E	PCN 6	T0.5/0.5	INIT OBS ULCC FIX	PGTU
3	100000	9.8N 111.8E	PCN 6		ULCC FIX	PGTU
4	100400	9.1N 109.8E	PCN 6		ULCC FIX	PGTU
5	100600	10.8N 111.5E	PCN 6	T0.5/0.5	INIT OBS	PGTU
6	100900	11.1N 111.4E	PCN 6			PGTU
7	122100	13.9N 97.6E	PCN 6		ULCC FIX	PGTU
8	130304	14.4N 96.5E	PCN 5	T1.5/1.5	INIT OBS	KGWC
9	130754	15.3N 95.1E	PCN 5	T1.5/1.5	INIT OBS ULAC 14.8N 091.6E	KGWC
* 10	141200	17.5N 87.1E	PCN 6	T1.5/1.5	INIT OBS	PGTU
* 11	141709	18.9N 89.1E	PCN 6	T1.0/1.5 /W0.5/25HRS		KGWC
* 12	141800	17.0N 86.2E	PCN 6			PGTU
13	150408	19.4N 88.4E	PCN 5	T1.0/1.0 /S0.0/24HRS		KGWC
14	151649	20.0N 87.2E	PCN 6	T2.5/2.5	INIT OBS ULAC 19.7N 086.7E	KGWC
15	152018	20.2N 87.1E	PCN 6		ULAC 20.0N 086.5E	KGWC
16	160001	21.1N 87.7E	PCN 6			KGWC
17	160348	21.7N 85.8E	PCN 5			KGWC
18	160904	21.9N 85.8E	PCN 5			KGWC
19	161241	22.6N 85.5E	PCN 6			KGWC
20	161628	23.3N 85.0E	PCN 6		ULAC 22.7N 084.9E	KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 05B
BEST TRACK DATA

MO/DA/HR	BEST TRACK			WARNING			24 HOUR FORECAST			48 HOUR FORECAST			72 HOUR FORECAST		
	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND
111306Z	12.0	81.0	0.0	0.0	0.0	0.0	-0.	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0
111312Z	12.1	82.5	25	0.0	0.0	0.0	-0.	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0
111318Z	12.1	83.1	25	0.0	0.0	0.0	-0.	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0
111400Z	12.0	83.9	25	0.0	0.0	0.0	-0.	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0
111406Z	11.8	84.7	25	0.0	0.0	0.0	-0.	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0
111412Z	11.8	85.5	25	0.0	0.0	0.0	-0.	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0
111418Z	12.0	86.2	25	0.0	0.0	0.0	-0.	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0
111500Z	12.5	86.4	30	0.0	0.0	0.0	-0.	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0
111506Z	12.8	85.9	35	12.9	86.4	35.	30.	0.0	13.5	87.8	45.	244.	14.2	88.9	50.
111512Z	12.8	85.5	35	12.8	86.7	40.	70.	0.0	13.4	88.1	50.	299.	14.1	89.0	55.
111518Z	12.7	85.0	35	12.8	85.1	40.	8.	0.0	13.0	83.4	45.	85.	13.2	88.2	50.
111600Z	12.6	84.4	40	12.8	84.4	45.	12.	0.0	13.1	81.8	55.	67.	13.6	79.9	65.
111606Z	12.7	83.7	45	12.7	83.9	45.	12.	0.0	12.8	81.8	60.	151.	13.0	80.0	60.
111612Z	13.0	83.0	50	12.1	83.1	55.	54.	0.0	11.8	80.6	65.	221.	12.0	80.0	60.
111618Z	13.4	82.0	50	12.6	83.3	55.	85.	0.0	12.3	81.0	60.	243.	11.0	80.0	60.
111700Z	13.9	81.0	50	13.6	82.0	55.	83.	0.0	13.8	79.7	60.	193.	10.0	80.0	60.
111706Z	14.7	80.1	55	13.8	80.8	55.	68.	0.0	0.0	0.0	0.	-0.	0.0	0.0	0.0
111712Z	15.4	79.8	45	15.0	79.6	50.	27.	0.0	0.0	0.0	0.	-0.	0.0	0.0	0.0
111718Z	16.2	79.9	35	15.8	79.4	35.	38.	0.0	0.0	0.0	0.	-0.	0.0	0.0	0.0
111800Z	16.9	80.4	25	16.5	79.2	25.	73.	0.0	0.0	0.0	0.	-0.	0.0	0.0	0.0

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	47.	188.	369.	0.	0.	0.	0.	0.
AVG RIGHT ANGLE ERROR	16.	71.	109.	0.	0.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	3.	12.	18.	0.	0.	0.	0.	0.
AVG INTENSITY BIAS	3.	11.	15.	0.	0.	0.	0.	0.
NUMBER OF FORECASTS	12	8	4	0	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 843. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 7. KNOTS

TROPICAL CYCLONE 05B
FIX POSITIONS FOR CYCLONE NO. 5

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	130427	11.8N 81.6E	PCN 3	T1.5/1.5	INIT OBS EXP LLCC	KGWC
2	131708	11.8N 82.6E	PCN 6			KGWC
3	132153	12.8N 82.8E	PCN 6			KGWC
4	132351	12.3N 83.3E	PCN 6			KGWC
5	140407	11.8N 84.4E	PCN 3	T1.0/1.5 /U0.5/24HRS	EXP LLCC	KGWC
6	140856	11.8N 85.3E	PCN 3		EXP LLCC	KGWC
7	141231	11.6N 85.7E	PCN 6			KGWC
8	141647	11.9N 86.0E	PCN 6			KGWC
9	142142	12.3N 86.3E	PCN 5			KGWC
10	150111	12.7N 86.4E	PCN 5		ULAC 14.1N 086.7E	KGWC
11	150347	12.8N 86.2E	PCN 5	T2.5/2.5 /D1.5/24HRS	ULAC 13.4N 086.7E	KGWC
12	150846	12.6N 86.5E	PCN 5		ULAC 13.1N 086.3E	KGWC
13	150846	12.6N 86.3E	PCN 5	T2.5/2.5 /D1.0/24HRS		KGWC
14	151209	12.2N 86.1E	PCN 5			FJDG
15	151627	12.8N 85.1E	PCN 6	T2.5/2.5	INIT OBS	KGWC
16	152131	12.4N 84.1E	PCN 6			KGWC
17	160050	12.7N 84.4E	PCN 6			KGWC
18	160326	12.5N 83.9E	PCN 6	T3.0/3.0 /D0.5/24HRS	ULAC 12.0N 085.6E	KGWC
19	160829	12.0N 82.9E	PCN 5		ULAC 11.9N 085.1E	KGWC
20	160835	12.4N 84.0E	PCN 5			FJDG
21	161329	12.9N 83.6E	PCN 5		ULAC 12.5N 084.3E	KGWC
22	161507	13.2N 83.0E	PCN 5	T3.0/3.0 /D0.5/24HRS	ULAC 12.5N 084.3E	KGWC
23	162120	13.6N 81.6E	PCN 6		ULAC 12.2N 084.0E	KGWC
24	170028	13.8N 80.6E	PCN 6		ULAC 12.8N 082.5E	KGWC
25	170047	14.5N 81.0E	PCN 5	T4.0/4.0 /D1.0/24HRS	ULAC 13.2N 081.8E	KGWC
26	170834	15.0N 79.9E	PCN 5		ULAC 14.9N 081.5E	KGWC
27	171308	15.4N 79.7E	PCN 5		ULAC 15.2N 080.5E	KGWC
28	171728	15.5N 79.6E	PCN 5		ULAC 15.4N 079.8E	KGWC
29	172107	16.4N 79.0E	PCN 5			KGWC
30	180007	17.1N 81.0E	PCN 5		ULAC PSBL 17.0N 082.1E	KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 06B
BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	ERRORS	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS
120906Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120912Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120918Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121000Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121006Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121012Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121018Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121100Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121106Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121112Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121118Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121200Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121206Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121212Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121218Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121300Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121306Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121312Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121318Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121400Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121406Z	4.0	00.0	00.0	00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	21.	113.	0.	0.	0.	0.	0.
AVG RIGHT ANGLE ERROR	16.	57.	0.	0.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	1.	8.	0.	0.	0.	0.	0.
AVG INTENSITY BIAS	1.	6.	0.	0.	0.	0.	0.
NUMBER OF FORECASTS	11.	6.	0.	0.	0.	0.	0.

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1025. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 9. KNOTS

TROPICAL CYCLONE 06B
FIX POSITIONS FOR CYCLONE NO. 6

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	080801	4.0N 87.1E	PCN 5	T1.5/1.5	INIT OBS	FJDG
2	090406	4.2N 89.9E	PCN 5	T1.5/1.5	INIT OBS	KGWC
3	090600	4.6N 90.3E	PCN 5	T1.0/1.0	INIT OBS ULAC 03.7N 090.4E	KGWC
4	091200	4.3N 90.2E	PCN 6		ULCC FIX	PJTU
5	091600	4.5N 90.1E	PCN 6	T1.0/1.0	INIT OBS	PJTU
6	091646	3.9N 90.5E	PCN 6		ULCC 04.0N 089.7E	KGWC
7	091800	4.9N 90.0E	PCN 6			PJTU
8	092030	4.5N 91.3E	PCN 6		ULCC 04.9N 091.3E	KGWC
9	092100	4.3N 90.7E	PCN 6			PJTU
10	100000	5.2N 90.8E	PCN 5			KGWC
11	100045	5.2N 90.8E	PCN 5		ULAC 05.0N 091.2E	PJTU
12	100300	5.2N 90.8E	PCN 5	T2.0/2.0 /D1.0/20HRS		KGWC
13	100345	5.2N 90.8E	PCN 5	T2.5/2.5 /D1.0/24HRS	ULAC 05.2N 090.7E	PJTU
14	100600	5.4N 90.5E	PCN 6			KGWC
15	100900	5.7N 90.7E	PCN 6			PJTU

* 16	100921	5.9N	89.0E	PCN 6	ULAC 05.6N 089.7E	KGWC
17	101143	5.4N	90.4E	PCN 6	ULAC 05.3N 089.6E	KGWC
18	101200	5.9N	90.6E	PCN 6		PGTW
19	101600	6.2N	90.5E	PCN 6		PGTW
20	101626	6.3N	90.8E	PCN 6	T2.0/2.0 /D1.0/24HRS	INIT OBS ULAC 05.6N 090.4E
21	101800	6.5N	90.4E	PCN 6	T2.5/2.5	ULAC 06.3N 090.3E
22	102024	6.9N	90.6E	PCN 6		ULAC 06.8N 090.0E
23	102100	6.5N	90.2E	PCN 6		ULAC 07.1N 089.4E
24	110000	6.5N	89.4E	PCN 6		
25	110023	7.7N	89.2E	PCN 6		
26	110300	7.9N	89.5E	PCN 6	T2.0/2.5 /W0.5/24HRS	
27	110325	7.7N	89.3E	PCN 6	T2.0/2.0 /S0.0/27HRS	
28	110600	7.8N	88.3E	PCN 6		
29	110900	8.5N	89.0E	PCN 6	T3.5/3.5+/D2.0/27HRS	
30	110902	8.2N	88.4E	PCN 6		PART EXP LLCC ULAC 07.9N 088.
31	110910	8.3N	87.5E	PCN 6		ULCC FIX
32	111200	8.9N	87.4E	PCN 6		ULAC 08.2N 087.1E
33	111303	8.9N	86.8E	PCN 6	T2.5/2.5 /D0.5/24HRS	ULAC 08.8N 086.4E
34	111600	8.4N	86.7E	PCN 6	T3.0/3.0 /D0.5/24HRS	ULCC FIX
35	111605	8.9N	86.4E	PCN 6		ULAC 10.5N 084.7E
36	111800	10.8N	85.6E	PCN 6		ULAC 09.6N 085.1E
* 37	112156	9.5N	85.2E	PCN 6		ULAC 09.3N 084.5E
38	120000	10.3N	85.3E	PCN 6	T3.0/3.0 /D1.0/25HRS	
39	120002	10.0N	84.9E	PCN 6		ULAC 10.0N 083.9E
40	120446	10.0N	85.0E	PCN 6	T3.5/3.5 /S0.0/24HRS	
41	120600	11.5N	84.5E	PCN 6		ULCC FIX
42	120808	10.4N	84.0E	PCN 6		ULAC 11.1N 083.7E
43	120859	9.8N	84.2E	PCN 6		ULCC FIX
44	120900	10.4N	84.1E	PCN 6		ULAC 11.0N 083.6E
45	121200	11.4N	84.0E	PCN 6		ULAC 11.3N 082.5E
46	121242	10.9N	83.2E	PCN 6	T2.5/3.0 /W0.5/24HRS	
47	121600	11.9N	83.7E	PCN 6		
48	121727	12.4N	83.0E	PCN 6		
49	122145	12.3N	82.0E	PCN 6	T3.0/3.0 /W0.0/24HRS	
50	130122	12.6N	82.0E	PCN 6		ULAC 13.9N 081.6E
51	130426	13.1N	81.6E	PCN 6		ULAC 13.4N 080.6E
52	130848	12.5N	81.0E	PCN 6		ULAC 14.0N 080.7E
53	130849	13.8N	81.3E	PCN 6		ULAC 15.0N 080.3E
54	131221	14.1N	80.6E	PCN 6		
55	131706	14.6N	80.5E	PCN 6		
56	132134	14.8N	78.8E	PCN 6		
57	140405	15.6N	79.0E	PCN 5		
58	140838					

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

3. SOUTH PACIFIC and SOUTH INDIAN OCEAN CYCLONE DATA

TROPICAL CYCLONE 01S BEST TRACK DATA

MO/DA/HR	BEST TRACK			WARNING			24 HOUR FORECAST			48 HOUR FORECAST			72 HOUR FORECAST		
	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS
110906Z	7.8	30.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110918Z	8.6	38.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111006Z	9.1	76.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111018Z	9.4	74.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111106Z	9.9	71.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111118Z	10.4	69.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111206Z	11.1	67.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111218Z	11.6	64.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111306Z	12.3	61.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111318Z	13.5	57.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111406Z	14.3	55.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111418Z	15.0	53.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111506Z	15.7	52.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111518Z	16.8	51.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111606Z	17.8	50.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111618Z	18.6	49.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111706Z	19.1	49.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	53.	105.	180.	0.	0.	0.	0.	0.
AVG RIGHT ANGLE ERROR	18.	38.	78.	0.	0.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	7.	14.	34.	0.	0.	0.	0.	0.
AVG INTENSITY BIAS	2.	14.	34.	0.	0.	0.	0.	0.
NUMBER OF FORECASTS	8	6	5	0	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 2026. NM

AVERAGE SPEED OF TROPICAL CYCLONE IS 11. KNOTS

TROPICAL CYCLONE 01S
FIX POSITIONS FOR CYCLONE NO. 1

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCR	DVORAK CODE	COMMENTS	SITE
1	050600	6.45 85.0E	PCN 5	T1.5/1.5	INIT OBS	PQW
2	080427	6.15 84.8E	PCN 5	T1.0/1.0	INIT OBS	KGWC
3	081707	6.05 81.7E	PCN 5		ULAC 06.55 080.7E	KGWC
4	090407	6.05 81.2E	PCN 6	T2.0/2.0 /D1.0/24HRS	EXP LLCC ULAC 08.1S 080.5E	KGWC
5	091647	6.05 78.5E	PCN 5		ULAC 09.55 078.5E	KGWC
* 6	092203	10.15 76.6E	PCN 5			FJDG
7	100041	8.35 77.3E	PCN 6		ULAC 08.55 077.0E	KGWC
8	100528	8.55 76.7E	PCN 4	T2.0/2.0 /S0.0/25HRS	ULAC 09.75 076.2E	KGWC
* 9	101048	10.45 74.5E	PCN 5	T2.0/2.0	INIT OBS	FJDG
10	101321	9.35 75.4E	PCN 5			KGWC
* 11	101627	9.65 73.3E	PCN 5		ULAC 10.25 073.9E	KGWC
12	102332	9.25 73.4E	PCN 6			KGWC
13	110201	9.75 72.8E	PCN 6			KGWC
14	110211	10.05 72.5E	PCN 5			FJDG
15	110508	9.45 72.0E	PCN 6	T4.0/4.0+/D2.0/24HRS		KGWC
16	111035	10.75 70.8E	PCN 5	T3.0/3.0 /D1.0/24HRS		FJDG
17	111035	10.05 70.1E	PCN 5			KGWC
18	111300	10.45 69.9E	PCN 5			KGWC
19	111748	10.65 69.8E	PCN 5			KGWC
20	112320	11.05 69.0E	PCN 5	T2.5/2.5 /D0.1/24HRS		FJDG
21	120140	11.25 68.4E	PCN 5			KGWC
22	120629	11.65 68.0E	PCN 5	T2.5/3.5 /W1.5/24HRS		KGWC
23	121204	12.05 66.0E	PCN 5	T4.0/4.0		FJDG
24	121204	11.35 66.0E	PCN 5			KGWC
25	121420	11.35 66.4E	PCN 6			KGWC
26	121728	11.65 65.1E	PCN 6			KGWC
27	122307	11.55 63.3E	PCN 5			KGWC
28	122308	11.75 63.4E	PCN 5	T2.5/2.5 /D1.0/24HRS		FJDG
29	130300	12.05 62.7E	PCN 6			KGWC
30	130608	12.85 61.7E	PCN 6	T2.0/2.5 /W0.5/24HRS	ULAC 11.8S 063.1E	KGWC
* 31	131152	11.65 61.8E	PCN 5	T1.5/1.5		FJDG
32	131152	13.25 59.4E	PCN 4		ULAC 11.0S 060.1E	KGWC
33	131359	13.25 58.6E	PCN 4		ULAC 11.9S 060.5E	KGWC
34	140239	14.15 55.7E	PCN 6		ULAC 13.1S 057.3E	KGWC
35	140730	14.55 55.7E	PCN 5	T1.5/2.0 /W0.5/25HRS	ULAC 12.9S 056.5E	KGWC
* 36	141829	17.55 51.0E	PCN 6		ULAC 15.1S 052.6E	KGWC
37	150709	15.65 51.6E	PCN 3	T1.5/1.5 /S0.0/25HRS	EXP LLCC	KGWC
38	151809	17.55 51.1E	PCN 6			KGWC
39	160649	18.35 50.9E	PCN 3	T2.0/2.0 /D0.5/24HRS	EXP LLCC ULAC 19.8S 051.2E	KGWC
40	161930	18.05 49.8E	PCN 6			KGWC
41	170629	19.35 49.2E	PCN 3	T0.5/1.5 /W1.5/24HRS	EXP LLCC	KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 025
BEST TRACK DATA

MO/DA/HR	BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
120206Z	10.8	22.1	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120218Z	10.8	21.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120230Z	12.0	21.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120318Z	13.2	29.4	40.0	13.0	30.0	35.0	40.0	38.0	14.0	79.0	45.0	232.0	17.1	78.0	55.0	328.0	0.0	0.0	0.0	0.0
120406Z	14.4	77.3	45.0	15.0	77.0	50.0	38.0	38.0	10.0	16.5	71.0	80.0	25.0	19.0	67.0	90.0	142.0	45.0	0.0	0.0
120418Z	14.9	75.0	55.0	15.0	75.0	60.0	30.0	30.0	10.0	16.0	69.1	80.0	25.0	17.1	65.1	90.0	250.0	50.0	0.0	0.0
120506Z	15.7	73.5	55.0	15.0	72.1	55.0	30.0	30.0	10.0	16.0	68.0	65.0	20.0	18.0	65.0	75.0	171.0	45.0	0.0	0.0
120518Z	16.7	72.3	55.0	15.0	72.1	55.0	30.0	30.0	10.0	16.0	68.0	65.0	20.0	18.0	65.0	75.0	171.0	45.0	0.0	0.0
120606Z	17.9	71.1	55.0	17.1	71.0	55.0	30.0	30.0	10.0	16.0	68.0	65.0	20.0	18.0	65.0	75.0	171.0	45.0	0.0	0.0
120618Z	18.9	70.1	45.0	18.0	70.0	50.0	30.0	30.0	10.0	16.0	68.0	65.0	20.0	18.0	65.0	75.0	171.0	45.0	0.0	0.0
120706Z	19.8	67.5	30.0	19.0	67.3	35.0	13.0	13.0	5.0	21.2	63.8	20.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120718Z	20.3	65.8	25.0	20.4	65.1	25.0	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120806Z	20.7	64.2	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	23.0	105	181	0	0	0	0	0
AVG RIGHT ANGLE ERROR	22.0	76	121	0	0	0	0	0
AVG INTENSITY MAGNITUDE ERROR	5	16	32	0	0	0	0	0
AVG INTENSITY BIAS	4	14	32	0	0	0	0	0
NUMBER OF FORECASTS	10	9	7	0	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1208. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 8. KNOTS

TROPICAL CYCLONE 025
FIX POSITIONS FOR CYCLONE NO. 2

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	280428	6.05 90.3E	PCN 5	T1.0/1.0	INIT OBS ULAC 06.85 089.5E	KGWC
2	281200	7.65 88.4E	PCN 6	T1.5/1.5	INIT OBS	PGTW
3	281527	7.15 89.9E	PCN 6		ULAC 08.05 088.8E	KGWC
4	281600	8.25 89.2E	PCN 6			PGTW
5	281800	8.15 90.6E	PCN 6			PGTW
6	290300	7.55 88.6E	PCN 6	T1.5/1.5	INIT OBS ULCC FIX	PGTW
7	290408	6.75 89.5E	PCN 5	T1.5/1.5 /D0.5/24HRS		KGWC
8	290600	7.25 88.7E	PCN 6		ULCC FIX	PGTW
9	291648	7.65 90.0E	PCN 5	T1.5/1.5	INIT OBS	KGWC
10	300347	8.15 89.3E	PCN 5	T1.5/1.5 /S0.0/24HRS		KGWC
11	301628	8.15 84.7E	PCN 6			PGTW
12	010300	9.35 82.6E	PCN 6	T1.5/1.5	INIT OBS ULCC FIX	KGWC
13	010509	9.35 82.8E	PCN 6	T2.5/2.5 /D1.0/25HRS	ULAC 09.85 081.6E	PGTW
14	010600	9.55 81.7E	PCN 6		ULCC FIX	PGTW
15	010900	9.55 83.1E	PCN 6			PGTW
16	011240	9.55 83.1E	PCN 6		ULAC 10.55 079.8E	KGWC
17	011600	10.45 81.1E	PCN 6	T1.5/1.5	INIT OBS	PGTW
18	011608	9.55 82.5E	PCN 6		ULAC 10.35 081.0E	KGWC
19	012100	10.65 81.3E	PCN 6		ULCC FIX	PGTW
20	012233	11.75 82.0E	PCN 5	T2.0/2.0	INIT OBS	FJDG
21	020000	10.85 81.5E	PCN 6			PGTW
22	020120	10.25 82.9E	PCN 6		ULAC 09.95 081.2E	KGWC
23	020448	10.55 82.1E	PCN 6	T2.0/2.5 /W0.5/24HRS	ULAC 11.35 080.3E	KGWC
24	021117	12.05 81.5E	PCN 5	T2.5/2.5 /W0.5/24HRS		FJDG
25	021200	12.05 81.3E	PCN 6		ULCC FIX	PGTW
26	021219	11.05 82.2E	PCN 6		ULAC 10.85 080.0E	KGWC
27	021547	11.85 81.0E	PCN 6		ULAC 11.85 081.9E	KGWC
28	021600	12.15 81.1E	PCN 6	T1.0/1.5+/W0.5/24HRS		PGTW
29	021800	12.25 80.9E	PCN 6		ULCC FIX	PGTW
30	030000	12.85 80.6E	PCN 6			PGTW
31	030059	12.15 80.6E	PCN 6		ULAC 12.15 078.8E	KGWC
32	030140	13.65 81.8E	PCN 5	T2.5/2.5 /D0.5/14HRS		FJDG
33	030428	12.65 80.1E	PCN 6	T2.5/2.5 /D0.5/24HRS	ULAC 13.85 079.7E	KGWC
34	031104	13.55 78.6E	PCN 5			KGWC
35	031105	13.55 78.6E	PCN 5	T4.0/4.0+/D1.5/11HRS		FJDG
36	031339	14.75 77.1E	PCN 5		ULAC 14.85 078.3E	KGWC
37	031709	14.75 77.1E	PCN 5			KGWC
38	032207	14.95 76.1E	PCN 5		ULAC 15.15 076.2E	FJDG
39	032208	15.25 76.9E	PCN 6			KGWC
40	040219	14.75 75.7E	PCN 6		ULAC 14.05 076.0E	FJDG
41	040549	15.05 75.4E	PCN 6	T3.0/3.0 /D0.5/25HRS		KGWC
42	041052	15.25 74.1E	PCN 5			KGWC
43	041052	16.55 73.8E	PCN 5	T2.5/2.5 /S0.0/24HRS		FJDG
44	041318	15.05 74.2E	PCN 6		ULAC 16.05 073.5E	KGWC
45	041648	14.95 73.7E	PCN 4	T3.0/3.0	INIT OBS EXP LLCC	KGWC
46	042337	15.45 73.5E	PCN 6		ULAC 16.45 073.0E	KGWC
47	050158	16.85 72.7E	PCN 2		EYE FIX ULAC 16.95 073.0E	KGWC
48	050237	17.45 73.0E	PCN 4	T3.5/3.5 /S0.0/16HRS		FJDG
49	050529	17.05 73.0E	PCN 6	T3.5/3.5 /D0.5/24HRS		KGWC
50	051039	17.95 71.9E	PCN 6			KGWC
51	051628	17.35 71.0E	PCN 6		ULAC 17.95 071.2E	KGWC
52	060137	17.85 70.9E	PCN 6		EXP LLCC ULAC 19.45 071.3E	KGWC
53	060213	19.85 72.0E	PCN 3	T2.5/2.5 /S0.0/14HRS		FJDG
54	060509	18.25 70.4E	PCN 4	T2.0/3.0 /W1.5/24HRS	EXP LLCC ULAC 20.05 071.7E	KGWC
55	061235	18.75 69.5E	PCN 4		EXP LLCC	KGWC
56	061451	19.25 70.0E	PCN 5	T2.0/2.5-/W0.5/11HRS		FJDG
57	061749	18.85 69.0E	PCN 4		EXP LLCC	KGWC
58	070115	19.35 67.5E	PCN 4		EXP LLCC	KGWC
59	070630	19.65 67.6E	PCN 4	T0.5/1.5 /W1.5/25HRS		KGWC
60	071355	20.15 66.0E	PCN 4		EXP LLCC	KGWC
61	071729	20.15 65.5E	PCN 4		EXP LLCC	KGWC
62	080235	20.85 64.4E	PCN 3		EXP LLCC	KGWC
63	080610	20.45 64.3E	PCN 3		EXP LLCC	KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

**TROPICAL CYCLONE 03S
BEST TRACK DATA**

MO/DA/HR	BEST TRACK			WARNING			24 HOUR FORECAST			48 HOUR FORECAST			72 HOUR FORECAST		
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT
120806Z	8.4 98.5	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120818Z	9.7 100.0	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120906Z	10.8 102.0	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120918Z	11.9 103.7	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121006Z	13.0 105.1	35	12.5	104.8	35	35	0.0	13.7 107.2	55	192	10.14	109.5	65	468	25
121018Z	14.1 106.8	45	14.1	106.8	45	0.0	0.0	15.5 110.2	65	204	20.16	113.3	35	388	60
121106Z	15.9 109.0	45	15.3	109.3	45	40	0.0	15.0 114.3	55	141	15.0	0.0	0.0	0.0	0.0
121118Z	18.0 112.0	45	18.1	112.0	45	24	0.0	22.4 117.7	30	57	5.0	0.0	0.0	0.0	0.0
121206Z	20.0 115.0	40	20.4	115.3	45	29	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121218Z	21.5 118.0	25	22.6	117.9	20	66	-5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ALL FORECASTS					TYPHOONS WHILE OVER 35 KTS				
AVG FORECAST POSIT ERROR	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR	
35	148	428	0	0	0	0	0	0	
AVG RIGHT ANGLE ERROR	19	46	67	0	0	0	0	0	
AVG INTENSITY MAGNITUDE ERROR	2	13	43	0	0	0	0	0	
AVG INTENSITY BIAS	0	13	43	0	0	0	0	0	
NUMBER OF FORECASTS	6	4	2	0	0	0	0	0	
DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1375. NM									
AVERAGE SPEED OF TROPICAL CYCLONE IS 13. KNOTS									

TROPICAL CYCLONE 03S
FIX POSITIONS FOR CYCLONE NO. 3

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	080000	7.9S 97.9E	PCN 6		ULCC FIX	PGTW
2	080300	8.4S 98.2E	PCN 6	T1.0/1.0	INIT OBS ULCC FIX	PGTW
3	080600	8.7S 98.2E	PCN 6		ULCC FIX	PGTW
4	081200	9.6S 99.7E	PCN 6			PGTW
5	081600	9.7S 100.0E	PCN 6			PGTW
6	081800	9.6S 100.1E	PCN 6	T1.0/1.0	INIT OBS	PGTW
7	090000	10.3S 100.9E	PCN 6		ULCC FIX	PGTW
8	090300	10.6S 101.8E	PCN 6		ULCC FIX	PGTW
* 9	090408	10.7S 103.7E	PCN 5	T1.0/1.0	INIT OBS ULAC 10.3S 102.8E	KGWC
10	090600	10.8S 102.7E	PCN 6	T1.5/1.5 /D0.5/27HRS	ULCC FIX	PGTW
11	090900	11.4S 102.8E	PCN 6		ULCC FIX	PGTW
12	091200	11.2S 103.3E	PCN 6		ULCC FIX	PGTW
* 13	091507	11.3S 105.1E	PCN 6		ULAC 10.7S 103.8E	KGWC
14	091800	11.9S 103.8E	PCN 6	T2.0/2.0 /D1.0/24HRS	ULCC FIX	PGTW
15	092100	12.5S 104.2E	PCN 6		ULCC FIX	PGTW
16	100000	12.6S 104.0E	PCN 6			PGTW
17	100300	12.5S 104.1E	PCN 6	T2.5/2.5 /D1.0/21HRS		PGTW
18	100348	12.5S 105.4E	PCN 5	T2.5/2.5 /D1.5/24HRS	ULAC 12.2S 105.6E	KGWC
19	100600	12.6S 104.5E	PCN 6		ULCC FIX	PGTW
20	100900	12.8S 105.2E	PCN 6		ULCC FIX	PGTW
* 21	100937	13.7S 104.3E	PCN 5		ULAC 14.4S 105.2E	KGWC
22	101110	13.9S 105.3E	PCN 5		ULAC 13.0S 105.6E	KGWC
23	101200	13.5S 106.1E	PCN 5		ULCC FIX	PGTW
24	101447	14.1S 106.7E	PCN 5	T3.0/3.0	INIT OBS ULAC 13.4S 106.3E	KGWC
25	101600	13.8S 106.7E	PCN 6	T3.0/3.0 /D1.0/22HRS	ULCC FIX	PGTW
26	101800	13.8S 107.0E	PCN 6		ULCC FIX	PGTW
27	102039	14.0S 108.0E	PCN 6		ULAC 13.2S 107.6E	KGWC
28	102100	14.1S 107.4E	PCN 6		ULCC FIX	PGTW
29	102350	14.8S 108.5E	PCN 6			KGWC
30	110000	14.1S 107.7E	PCN 6		ULCC FIX	PGTW
31	110328	15.4S 109.5E	PCN 6	T3.5/3.5 /D1.0/24HRS		KGWC
32	110600	15.7S 109.2E	PCN 6	T2.5/2.5 /S0.0/27HRS		PGTW
33	110900	16.6S 109.9E	PCN 6			PGTW
34	110924	16.7S 109.8E	PCN 6			KGWC
35	111049	16.7S 111.3E	PCN 6			KGWC
36	111200	16.9S 110.6E	PCN 6		ULCC FIX	PGTW
37	111427	17.8S 112.5E	PCN 6	T2.5/3.5 /W0.5/24HRS		KGWC
38	111600	17.4S 111.3E	PCN 6	T3.0/3.0+/S0.0/24HRS	ULCC FIX	PGTW
39	111800	18.1S 112.0E	PCN 6		ULCC FIX	PGTW
40	112027	19.2S 113.6E	PCN 6		ULAC 12.5S 111.0E	KGWC
41	112100	18.3S 112.9E	PCN 6		ULCC FIX	PGTW
42	112329	18.3S 114.0E	PCN 3		ULAC 19.6S 115.1E	KGWC
43	120000	19.3S 113.9E	PCN 6			PGTW
44	120300	19.7S 115.0E	PCN 6			PGTW
45	120307	19.4S 114.8E	PCN 3	T2.5/3.5 /W1.0/24HRS	ULAC 22.0S 116.9E	KGWC
46	120900	20.2S 116.9E	PCN 6			PGTW
47	121200	20.9S 117.4E	PCN 6			PGTW
48	130000	21.7S 118.9E	PCN 4			PGTW

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	121800	22.6S 117.9E	020	130	94312 94300

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 04P
BEST TRACK DATA

MO/DA/HR	BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
120806Z	10.1	131.7	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120818Z	10.3	130.5	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120906Z	11.1	130.3	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120918Z	11.2	131.1	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121006Z	11.7	132.2	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121018Z	11.7	133.3	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121106Z	12.8	135.7	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121118Z	13.8	138.6	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121206Z	14.3	139.8	35	14.1	139.7	35	31.	0.	14.8	143.3	25	290.	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121218Z	15.0	138.6	30	14.2	139.1	30	56.	0.	15.2	139.8	40	129.	20.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121306Z	15.8	138.4	25	15.7	138.9	30	89.	5.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121318Z	16.7	138.2	20	16.4	138.5	20	25.	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	35.	209.	0.	0.	0.	0.	0.	0.
AVG RIGHT ANGLE ERROR	19.	152.	0.	0.	0.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	1.	10.	0.	0.	0.	0.	0.	0.
AVG INTENSITY BIAS	4	2	0	0	0	0	0	0
NUMBER OF FORECASTS	4	2	0	0	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 845. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 6. KNOTS

TROPICAL CYCLONE 04P
FIX POSITIONS FOR CYCLONE NO. 4

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	070126	9.35 135.2E	PCN 6	T1.0/1.0	INIT OBS ULAC 09.25 134.7E	KGWC
2	070600	10.05 133.3E	PCN 6	T0.0/0.0	INIT OBS	PGTW
3	071406	10.05 131.5E	PCN 6		ULAC 10.05 132.4E	KGWC
4	071800	9.85 131.5E	PCN 6			PGTW
5	080000	10.25 131.6E	PCN 6		ULCC FIX	PGTW
6	080105	10.55 129.2E	PCN 5	T1.5/1.5 /D0.5/24HRS		KGWC
7	080300	10.35 131.8E	PCN 6	T1.0/1.0-/D1.0/21HRS	ULCC FIX	PGTW
8	081200	10.35 131.5E	PCN 6			PGTW
9	081600	10.45 131.6E	PCN 6	T2.0/2.0	INIT OBS	PGTW
10	081800	10.55 131.4E	PCN 6			PGTW
11	090000	10.85 131.0E	PCN 6		ULCC FIX	PGTW
12	090045	10.85 130.5E	PCN 5	T2.5/2.5 /D1.0/24HRS	ULAC 11.95 132.5E	KGWC
13	090300	10.95 130.1E	PCN 6	T1.5/1.5 /D0.5/24HRS	ULCC FIX	PGTW
14	091200	10.85 131.1E	PCN 6	T1.5/2.0 /W0.5/26HRS	ULCC FIX	PGTW
* 15	091326	10.75 129.4E	PCN 5			KGWC
16	100000	11.05 132.5E	PCN 6			PGTW
17	100206	11.25 132.5E	PCN 5	T2.5/2.5 /S0.0/25HRS	ULAC 11.35 134.1E	KGWC
18	100300	11.15 132.6E	PCN 6	T2.0/2.0 /D0.5/24HRS		PGTW
19	100929	11.05 131.8E	PCN 5			KGWC
20	101306	11.15 132.8E	PCN 6	T2.0/2.0	INIT OBS ULAC 12.05 134.6E	KGWC
* 21	101600	11.65 131.4E	PCN 6	T1.0/1.5 /W0.5/24HRS		PGTW
22	101857	11.05 133.1E	PCN 6			KGWC
* 23	102209	11.55 133.0E	PCN 6			KGWC
* 24	110000	12.55 134.9E	PCN 6			PGTW
25	110146	12.95 134.9E	PCN 5			KGWC
26	111200	13.55 137.6E	PCN 6		ULCC FIX	PGTW
27	111245	12.95 137.0E	PCN 6			KGWC
28	111600	13.65 138.2E	PCN 6	T2.0/2.0-/D1.0/24HRS	ULCC FIX	PGTW
29	111845	13.85 139.7E	PCN 6			KGWC
30	112148	14.05 139.7E	PCN 6		ULAC 14.05 140.3E	KGWC
31	120000	14.25 139.6E	PCN 6			PGTW
32	120126	13.75 138.7E	PCN 5	T3.0/3.0	INIT OBS ULAC 13.35 139.1E	KGWC
33	120300	14.05 139.1E	PCN 6	T2.0/2.0	INIT OBS	PGTW
34	120846	13.95 139.2E	PCN 6			KGWC
35	120900	13.95 139.6E	PCN 6		ULCC FIX	PGTW
36	121200	14.15 140.0E	PCN 6		ULCC FIX	PGTW
37	121225	13.85 138.2E	PCN 6	T2.5/2.5	INIT OBS ULAC 12.95 139.3E	KGWC
38	121600	13.95 138.2E	PCN 6	T1.5/2.0+/W0.5/24HRS	ULCC FIX	PGTW
39	121800	14.15 138.1E	PCN 6			PGTW
* 40	121832	12.65 138.0E	PCN 6		ULAC 12.65 139.1E	KGWC
41	122100	14.15 137.3E	PCN 6		ULCC FIX	PGTW
* 42	122126	14.85 135.4E	PCN 6		EXP LLCC ULAC 12.05 130.4E	KGWC
43	130000	14.95 138.8E	PCN 6			PGTW
44	130106	15.35 137.5E	PCN 5	T2.5/3.0 /W0.5/24HRS	ULAC 15.85 140.8E	KGWC
* 45	130300	14.35 138.5E	PCN 6	T1.5/2.0 /W0.5/24HRS		PGTW
46	130600	16.35 138.0E	PCN 6			PGTW
* 47	130717	17.45 136.2E	PCN 6		ULAC 13.45 136.5E	KGWC
* 48	130825	15.35 135.3E	PCN 6			KGWC
49	130900	16.15 138.9E	PCN 6			PGTW
* 50	131308	16.85 136.8E	PCN 6			KGWC
51	140045	18.05 137.3E	PCN 5			KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 055
BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND		POSIT	WIND		ERRORS	POSIT	WIND		ERRORS	POSIT	WIND		ERRORS	POSIT	WIND		ERRORS
122212Z	17.5 122.9	20	0	0	0	0	-0	0	0	0	0	0	0	0	0	0	0	0	0
122300Z	17.6 121.7	30	17.6	121.8	40	6	10	18.5	120.2	55	64	10	7	118.0	65	132	-5	0.0	0.0
122312Z	17.7 120.7	40	18.2	120.6	50	31	10	19.4	118.4	60	108	20	8	115.7	70	207	-5	0.0	0.0
122400Z	17.6 119.6	50	17.9	119.8	55	21	15	18.3	117.8	65	48	19	5	115.6	75	130	-5	0.0	0.0
122412Z	17.6 118.5	50	17.7	118.3	75	13	15	18.1	115.7	100	104	25	18	7	115.2	110	263	45	0.0
122500Z	17.5 117.8	70	17.6	117.5	80	18	10	18.1	115.2	100	132	25	19	4	112.7	100	333	50	0.0
122512Z	17.8 117.5	75	17.8	116.6	80	51	-5	18.8	114.7	75	178	10	19	9	112.9	65	381	35	0.0
122600Z	18.3 117.6	75	18.5	117.3	70	17	-5	19.8	117.8	65	53	15	0	0	0	0	-0	0.0	0.0
122612Z	19.3 117.8	65	19.2	117.8	65	6	0	20.4	119.0	50	66	20	0	0	0	0	-0	0.0	0.0
122700Z	20.4 118.5	50	20.1	118.7	60	21	10	0	0	0	-0	0	0	0	0	0	-0	0.0	0.0
122712Z	21.4 119.0	30	21.6	118.9	30	36	0	0	0	0	-0	0	0	0	0	0	-0	0.0	0.0

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	22	94	241	0	0	0	0
AVG RIGHT ANGLE ERROR	19	66	180	0	0	0	0
AVG INTENSITY MAGNITUDE ERROR	7	13	23	0	0	0	0
AVG INTENSITY BIAS	6	12	20	0	0	0	0
NUMBER OF FORECASTS	10	8	6	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 569. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 5. KNOTS

TROPICAL CYCLONE 55
FIX POSITIONS FOR CYCLONE NO. 5

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	220600	17.25 123.0E	PCN 6			PGTW
2	220900	17.55 122.8E	PCN 6			PGTW
3	221600	17.75 122.6E	PCN 6			PGTW
4	221800	17.45 122.6E	PCN 6			PGTW
5	230000	17.35 121.6E	PCN 6	T2.0/2.0	INIT OBS ULCC 17.45 122.4E	PGTW
6	230248	17.35 121.8E	PCN 5	T1.5/1.5	INIT OBS ULAC 17.35 121.3E	KGWC
7	230300	17.55 121.2E	PCN 6			PGTW
8	230600	17.65 121.0E	PCN 6		ULCC 17.75 120.9E	KGWC
9	230835	17.75 120.8E	PCN 6		ULAC 17.85 120.6E	PGTW
10	230900	18.05 120.8E	PCN 6			PGTW
11	231200	17.95 120.7E	PCN 6			KGWC
12	231347	17.75 120.4E	PCN 6			KGWC
13	231937	17.45 120.4E	PCN 6			KGWC
14	232237	18.05 120.6E	PCN 6			PGTW
15	240000	17.75 119.8E	PCN 6			KGWC
16	240227	17.65 119.3E	PCN 6	T2.5/2.5 /D1.0/24HRS		PGTW
17	240300	17.65 119.2E	PCN 6	T3.5/3.5 /D1.5/27HRS		KGWC
18	240600	17.55 119.0E	PCN 6		EYE FIX	PGTW
19	240822	17.35 118.7E	PCN 5			KGWC
20	240900	17.75 118.6E	PCN 4			PGTW
21	241200	17.85 118.3E	PCN 4			PGTW
22	241326	17.65 118.3E	PCN 6	T3.0/3.0	INIT OBS	KGWC
23	241600	17.85 118.3E	PCN 4	T4.0/4.0	INIT OBS	PGTW
24	241800	18.05 118.1E	PCN 6			PGTW
25	241925	17.65 118.1E	PCN 5			KGWC
26	242100	17.65 117.9E	PCN 6			PGTW
27	242215	17.75 117.5E	PCN 1		EYE FIX	KGWC
28	250000	17.45 117.6E	PCN 2		EYE FIX	PGTW
29	250207	17.45 117.6E	PCN 1	T4.0/4.0 /D1.5/24HRS		KGWC
30	250300	17.45 117.4E	PCN 2	T4.5/4.5 /D1.0/24HRS	EYE DIA 24NM	PGTW
31	250600	17.65 117.1E	PCN 1		EYE FIX	KGWC
32	250810	17.55 117.1E	PCN 4			PGTW
33	250900	17.85 116.9E	PCN 4			PGTW
34	251200	18.15 116.9E	PCN 4			KGWC
35	251448	17.95 117.6E	PCN 6	T2.5/3.0 /U1.0/25HRS		PGTW
36	251600	18.25 116.9E	PCN 6	T4.5/4.5 /D0.5/24HRS		PGTW
37	251800	18.25 116.9E	PCN 6			KGWC
38	251912	18.45 117.1E	PCN 6			PGTW
39	252100	18.45 116.7E	PCN 6			KGWC
40	252335	18.35 117.9E	PCN 2		EYE DIA 18NM	PGTW
41	250000	18.35 117.4E	PCN 2		EYE DIA 10NM ULCC FIX	KGWC
42	250300	18.75 117.6E	PCN 2	T4.5/4.5 /S0.0/24HRS	EYE DIA 06NM	PGTW
43	250328	18.75 117.9E	PCN 5	T3.5/4.0 /W0.5/25HRS		KGWC
44	250600	18.95 117.5E	PCN 4			PGTW
45	250757	19.15 117.5E	PCN 5		ULCC FIX	KGWC
46	250900	19.25 117.4E	PCN 4			PGTW
47	251034	19.35 117.5E	PCN 5			KGWC
48	251055	17.85 117.2E	PCN 5			KGWC
49	251200	19.35 118.0E	PCN 4		ULCC FIX	PGTW
50	251427	19.65 118.1E	PCN 6	T2.0/2.5 /W0.5/24HRS		KGWC
51	251600	19.75 118.4E	PCN 6	T3.5/4.5 /W1.0/24HRS	ULCC FIX	PGTW
52	251800	19.95 118.3E	PCN 6		ULCC FIX	KGWC
53	251900	20.05 118.1E	PCN 6			PGTW
54	252100	19.95 118.7E	PCN 6		ULCC FIX	KGWC
55	252314	20.35 119.5E	PCN 6			PGTW
56	250000	20.35 118.4E	PCN 6			PGTW
57	250300	20.55 118.2E	PCN 4		EXP LLCC	KGWC
58	250308	20.75 118.7E	PCN 5			PGTW
59	250500	20.95 119.5E	PCN 4		EXP LLCC	KGWC
60	250744	21.15 119.5E	PCN 5			PGTW
61	250906	21.15 118.6E	PCN 4		EXP LLCC	KGWC
62	251013	21.15 118.8E	PCN 5			PGTW
63	251200	21.15 118.9E	PCN 4		EXP LLCC	KGWC
64	2512100	21.05 120.2E	PCN 4		EXP LLCC	PGTW

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WHO NO.
1	232200	17.55 119.9E	LAND						17.9S 122.6E	94203
2	240400	17.65 119.1E	LAND				1/4// /2707		20.4S 118.6E	94312
3	241000	17.65 118.5E	LAND				3111// /2705		20.4S 118.6E	94312
4	241600	17.65 118.1E	LAND				2/8// /2704		20.4S 118.6E	94312
5	242200	17.45 117.6E	LAND				2//// /2904		20.4S 118.6E	94312
6	260100	18.65 117.3E	LAND				2//// /1504		20.4S 118.6E	94312
7	260800	19.35 117.5E	LAND				1/3// /1710		20.4S 118.6E	94312
8	261600	19.55 117.7E	LAND				1/9// /405		20.4S 118.6E	94312

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	240600	17.6S 118.8E	060	010	94207

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 06P
BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND		POSIT	WIND		DST	WIND	POSIT	WIND		DST	WIND	POSIT	WIND		DST	WIND	
122612Z	8.4	178.6	30	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122700Z	8.0	180.0	40	8.4	179.9	40	25.0	0.0	8.6	181.9	55	199.0	15.0	9.0	183.9	65	235.0	40.0	
122712Z	9.7	180.5	45	9.1	180.8	40	40.0	-5.0	10.0	182.0	30	186.0	-5.0	0.0	0.0	0.0	0.0	0.0	
122800Z	11.8	181.0	40	10.7	181.1	35	66.0	-6.0	12.6	182.3	25	19.0	0.0	0.0	0.0	0.0	0.0	0.0	
122812Z	13.1	181.9	35	11.7	181.5	35	87.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
122900Z	12.7	182.6	25	12.7	182.5	30	6.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
45	135	235	0	0	0	0	0
26	96	206	0	0	0	0	0
3	7	40	0	0	0	0	0
-1	3	40	0	0	0	0	0
5	3	1	0	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 464. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 8. KNOTS

TROPICAL CYCLONE 06P
FIX POSITIONS FOR CYCLONE NO. 6

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCY	DVORAK CODE	COMMENTS	SITE
1	260000	8.8S 177.9E	PCN 6	T1.0/1.0	INIT OBS	PGTU
2	260300	9.0S 177.9E	PCN 6			PGTU
3	260600	9.1S 178.1E	PCN 6		ULCC FIX	PGTU
4	260900	9.0S 177.9E	PCN 6		ULCC FIX	PGTU
5	261200	8.7S 178.6E	PCN 6		ULCC FIX	PGTU
6	261600	8.7S 178.9E	PCN 6		ULCC FIX	PGTU
7	261800	8.1S 179.1E	PCN 6	T2.5/2.5	INIT OBS ULCC FIX	PGTU
8	262100	8.1S 179.4E	PCN 6			PGTU
9	262200	8.1S 179.8W	PCN 6	T1.5/1.5	INIT OBS ULAC 07.8S 179.4E	KGWC
10	270000	8.3S 179.9E	PCN 6	T3.0/3.0 /D2.0/24HRS		PGTU
11	270300	8.6S 179.8W	PCN 4			PGTU
12	270600	8.8S 179.7W	PCN 6		ULCC FIX 07.7S 179.9E	PGTU
13	270600	8.2S 179.8W	PCN 6		ULAC 07.8S 179.8E	KGWC
* 14	270900	7.5S 179.7W	PCN 6		ULCC FIX	PGTU
* 15	271000	7.5S 179.6W	PCN 6		ULAC 07.1S 180.0E	KGWC
* 16	271200	7.5S 179.7W	PCN 6			PGTU
* 17	272100	9.9S 179.7W	PCN 6		ULCC FIX	PGTU
* 18	272100	9.5S 179.8W	PCN 5	T1.5/1.5 /S0.0/24HRS		KGWC
19	280000	12.2S 179.0W	PCN 4	T3.0/3.0 /S0.0/24HRS	EXP LLCC	PGTU
20	280300	12.8S 178.6W	PCN 4		EXP LLCC	PGTU
21	280600	13.2S 178.7W	PCN 4		ULCC 11.7S 178.7W	PGTU
* 22	280900	11.8S 178.8W	PCN 6		ULCC FIX	PGTU
* 23	281000	11.7S 178.1W	PCN 6			KGWC
* 24	281200	11.6S 178.3W	PCN 6		ULCC FIX	PGTU
25	282300	12.7S 177.8W	PCN 6	T0.0/1.0 /W1.5/26HRS		KGWC

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	261200	8.4S 178.9E	045	010	WMO 91643
2	261800	8.8S 178.8E	035	030	WMO 91643

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 07P
BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	ERRORS	WIND	POSIT	WIND	ERRORS	WIND	POSIT	WIND	ERRORS	WIND	POSIT	WIND	ERRORS		
122518Z	12.7 145.8	25	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
122606Z	13.8 147.8	30	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
122618Z	15.0 150.5	35	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
122706Z	16.0 152.0	55	16.1 152.0	45	31.1	-5.0	18.0 152.7	55	18.0	3.0	21.4 161.6	30	25.0	4.0	0.0	0.0	0.0		
122718Z	18.4 155.0	65	18.2 154.2	50	64.1	-15.0	21.4 155.6	70	16.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
122806Z	20.3 158.1	65	19.6 156.4	60	107.5	-5.0	22.2 160.7	75	25.5	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
122818Z	22.1 160.9	55	22.0 161.0	55	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
122906Z	25.0 164.2	40	25.0 164.1	40	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	22.0	48.0	57.0	0.0	0.0	0.0	0.0
AVG RIGHT ANGLE ERROR	5.0	17.0	40.0	0.0	0.0	0.0	0.0
AVG INTENSITY MAGNITUDE ERROR	-5.0	17.0	40.0	0.0	0.0	0.0	0.0
AVG INTENSITY BIAS	5.0	3.0	1.0	0.0	0.0	0.0	0.0
NUMBER OF FORECASTS	13	1	0	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1322. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 16. KNOTS

TROPICAL CYCLONE 07P
FIX POSITIONS FOR CYCLONE NO. 7

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	251200	12.1S 143.8E	PCN 6			PGTW
2	251600	12.3S 144.3E	PCN 6			PGTW
3	251800	12.6S 144.6E	PCN 6	T1.5/1.5	INIT OBS	PGTW
4	252100	13.0S 145.4E	PCN 6			PGTW
5	260000	13.0S 146.6E	PCN 6		ULCC FIX	PGTW
6	260005	12.0S 148.0E	PCN 5	T1.0/1.0	INIT OBS ULAC 13.3S 149.4E	KGWC
7	260300	13.3S 146.7E	PCN 6	T1.5/1.5	INIT OBS	PGTW
8	260600	13.9S 147.2E	PCN 6		ULCC 15.1S 148.7E	KGWC
9	260853	13.0S 147.8E	PCN 6		ULAC 14.1S 148.4E	PGTW
10	260900	14.8S 148.7E	PCN 6		ULCC FIX	PGTW
11	261200	15.0S 149.0E	PCN 6		ULCC FIX	KGWC
12	261246	13.0S 148.5E	PCN 6		ULCC FIX	PGTW
13	261600	15.1S 149.9E	PCN 6		ULAC 17.0S 151.6E	KGWC
14	261718	14.3S 149.9E	PCN 6		ULCC FIX	PGTW
15	261800	16.1S 150.4E	PCN 6	T2.5/2.5 /D1.0/24HRS	ULAC 17.2S 151.2E	KGWC
16	261952	14.9S 150.5E	PCN 5		ULCC FIX	PGTW
17	262100	15.0S 149.0E	PCN 6		ULAC 16.9S 151.2E	KGWC
18	262345	15.5S 151.6E	PCN 5	T2.5/2.5 /D1.5/24HRS	ULCC FIX	PGTW
19	270000	16.0S 150.6E	PCN 6			PGTW
20	270300	15.9S 152.4E	PCN 4	T3.0/3.0 /D1.5/24HRS		PGTW
21	270600	16.1S 152.8E	PCN 6		ULAC 17.4S 152.3E	KGWC
22	270832	17.4S 152.9E	PCN 6		ULCC FIX	PGTW
23	270900	16.6S 153.2E	PCN 6		ULCC FIX	PGTW
24	271200	17.5S 153.0E	PCN 6		INIT OBS ULAC 17.3S 153.0S	KGWC
25	271226	17.1S 153.3E	PCN 6	T3.0/3.0	ULAC 18.5S 153.7E	KGWC
26	271705	17.9S 154.3E	PCN 6		ULCC FIX	PGTW
27	271800	18.1S 154.3E	PCN 6	T3.5/3.5 /D1.0/24HRS		PGTW
28	272100	18.5S 155.1E	PCN 6			KGWC
29	272325	18.8S 155.8E	PCN 6	T3.5/3.5 /D1.0/24HRS		PGTW
30	280000	18.9S 156.2E	PCN 6		ULCC FIX	KGWC
31	280300	18.9S 156.4E	PCN 6	T4.0/4.0 /D1.0/24HRS		PGTW
32	280600	19.5S 157.7E	PCN 6		ULCC FIX	PGTW
33	280810	20.1S 158.4E	PCN 6		ULCC FIX	PGTW
34	280900	20.7S 159.3E	PCN 6			KGWC
35	281024	21.9S 159.1E	PCN 6	T2.5/3.0 /W0.5/22HRS		PGTW
36	281200	21.3S 160.3E	PCN 6		ULCC FIX	KGWC
37	281600	22.5S 162.4E	PCN 6	T3.5/3.5 /S0.0/22HRS		PGTW
38	281853	23.4S 162.3E	PCN 6		ULCC FIX	KGWC
39	281800	23.2S 163.1E	PCN 6		ULCC FIX	PGTW
40	282305	22.6S 161.8E	PCN 4	T2.0/3.0 /W1.5/24HRS		KGWC
41	290749	25.9S 164.8E	PCN 6			PGTW
42	291004	27.3S 161.7E	PCN 6			KGWC
43	300026	31.2S 161.9E	PCN 3		EXP LLCC	KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

**TROPICAL CYCLONE 08P
BEST TRACK DATA**

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND
122612Z	11.4 165.0	20	0.0 0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122700Z	12.1 166.4	25	0.0 0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122712Z	13.7 167.3	30	0.0 0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122800Z	15.4 168.3	30	0.0 0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122812Z	17.0 169.6	40	17.1 169.6	40	24.0	0.0	21.5 171.5	50	170.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122900Z	18.0 171.7	45	18.0 171.7	45	11.0	0.0	23.8 174.4	40	220.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122912Z	20.0 174.2	40	20.4 173.9	45	21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
123000Z	21.0 177.2	25	21.4 176.6	30	36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
23	195	0	0	0	0	0	0
20	167	0	0	0	0	0	0
3	18	0	0	0	0	0	0
4	2	0	0	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 948. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 11. KNOTS

**TROPICAL CYCLONE 08P
FIX POSITIONS FOR CYCLONE NO. 8**

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	260000	11.0S 164.2E	PCN 6	T0.0/0.0	INIT OBS	PGTW
2	260300	11.2S 164.0E	PCN 6			PGTW
3	260600	11.2S 165.4E	PCN 6		ULCC FIX	PGTW
4	260900	11.4S 165.5E	PCN 6		ULCC FIX	PGTW
5	261200	11.3S 164.8E	PCN 6		ULCC FIX	PGTW
* 6	261600	10.9S 163.7E	PCN 6		ULCC FIX	PGTW
7	261800	11.5S 165.1E	PCN 6	T1.0/1.0	INIT OBS ULCC FIX	PGTW
8	262100	12.1S 166.0E	PCN 6		ULCC FIX	PGTW
9	262345	11.9S 166.6E	PCN 5	T1.5/1.5	INIT OBS ULAC 12.6S 166.4E	KGWC
10	270000	11.6S 166.4E	PCN 6	T2.0/2.0 /D2.0/24HRS	ULCC FIX	PGTW
11	270300	12.4S 166.7E	PCN 6		ULCC FIX	PGTW
12	270600	12.7S 167.0E	PCN 6			PGTW
13	270900	13.0S 167.2E	PCN 6		ULCC FIX	PGTW
14	271044	13.6S 166.4E	PCN 6		ULAC 13.4S 166.6E	KGWC
15	271200	13.3S 167.3E	PCN 6			PGTW
16	271300	14.0S 167.8E	PCN 6			PGTW
17	271930	14.9S 168.6E	PCN 6		ULAC 14.8S 167.9E	KGWC
18	272100	14.9S 168.8E	PCN 6			PGTW
19	272325	15.3S 168.9E	PCN 6	T1.5/1.5 /S0.0/24HRS	ULAC 15.0S 168.3E	KGWC
20	280000	15.7S 168.3E	PCN 6	T2.5/2.5 /D0.5/24HRS		PGTW
21	280300	15.5S 168.6E	PCN 6		ULCC FIX	KGWC
22	280408	15.8S 168.8E	PCN 6		ULCC FIX	PGTW
23	280600	15.9S 168.9E	PCN 6			KGWC
24	280629	15.9S 168.4E	PCN 6		ULCC FIX	PGTW
25	280900	16.9S 169.0E	PCN 6		ULAC 17.4S 168.4E	KGWC
* 26	281024	17.3S 167.9E	PCN 6		ULCC FIX	PGTW
27	281200	17.2S 169.4E	PCN 6		ULCC FIX	PGTW
28	281600	17.6S 169.6E	PCN 6	T3.0/3.0	INIT OBS ULCC FIX	KGWC
29	281653	18.5S 169.7E	PCN 6		ULAC 18.9S 170.3E	PGTW
30	281800	17.8S 170.1E	PCN 6		ULCC FIX	KGWC
31	281909	18.0S 171.7E	PCN 5		ULAC 18.6S 171.6E	PGTW
32	282100	18.4S 171.2E	PCN 6		ULCC FIX	KGWC
33	282305	18.4S 172.0E	PCN 6	T3.0/3.0 /D1.5/24HRS	ULAC 18.8S 171.5E	PGTW
34	290000	19.2S 172.3E	PCN 6	T3.0/3.0 /D0.5/24HRS		PGTW
35	290300	19.7S 172.7E	PCN 6			PGTW
36	290600	19.6S 173.3E	PCN 6		ULAC 19.4S 167.7E	KGWC
37	290608	19.8S 173.3E	PCN 6			PGTW
38	290900	19.9S 173.3E	PCN 6			KGWC
39	291004	20.2S 173.4E	PCN 6	T3.0/3.0	INIT OBS	PGTW
40	291200	20.2S 173.8E	PCN 6		ULCC FIX	KGWC
41	291600	20.5S 174.6E	PCN 6		ULCC 21.1S 174.9E	PGTW
42	291640	20.1S 174.8E	PCN 6			KGWC
43	291800	20.8S 175.0E	PCN 6	T1.5/2.5 /U1.5/26HRS		PGTW
44	291848	20.6S 175.6E	PCN 6		ULAC 21.5S 175.4E	KGWC
45	292244	21.0S 177.0E	PCN 4	T2.5/3.0 /U0.5/24HRS	EXP LLCC	KGWC
46	300944	19.7S 179.2W	PCN 6			KGWC
47	302224	18.4S 177.5W	PCN 4		EXP LLCC	KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

**TROPICAL CYCLONE 09P
BEST TRACK DATA**

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	ERRORS	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS
011000Z	11.4 184.1	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011012Z	12.0 184.7	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011100Z	13.2 185.0	35	12.4 184.6	35	53	0.0	0.0	14.4 183.8	45	158	0.0	16.8 184.0	55	183	10	0.0	0.0	0.0	0.0
011112Z	14.7 185.3	40	14.4 184.8	40	34	0.0	0.0	16.7 184.5	45	108	-5	19.1 186.8	55	40	15	0.0	0.0	0.0	0.0
011200Z	16.2 185.8	45	16.1 186.0	40	13	-5	0.0	17.9 186.4	40	31	-5	18.9 188.0	35	95	5	0.0	0.0	0.0	0.0
011212Z	17.2 186.3	50	17.5 186.5	50	21	0	0.0	18.5 187.0	45	41	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011300Z	18.1 186.9	45	18.4 187.2	40	103	-5	0.0	17.7 189.0	30	156	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011312Z	19.0 187.5	40	19.8 186.0	35	98	-5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011400Z	20.3 188.8	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	54	99	106	0	0	0	0
AVG RIGHT ANGLE ERROR	37	62	57	0	0	0	0
AVG INTENSITY MAGNITUDE ERROR	3	3	10	0	0	0	0
AVG INTENSITY BIAS	-3	-1	10	0	0	0	0
NUMBER OF FORECASTS	6	5	3	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 612. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 6. KNOTS

TROPICAL CYCLONE 09P
FIX POSITIONS FOR CYCLONE NO. 9

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	092015	11.55 177.0W				PHNL
2	092225	11.25 176.2W	PCN 6	T1.5/1.5	INIT OBS ULAC 11.55 175.7W	KGUC
3	100215	11.95 175.5W				PHNL
4	100924	11.15 174.9W	PCN 6		ULAC 11.65 174.2W	KGUC
5	102204	12.25 175.2W	PCN 6	T2.5/2.5 /D1.0/24HRS	ULAC 12.95 175.1W	KGUC
6	110903	14.15 175.2W	PCN 6			KGUC
7	111743	15.55 174.6W	PCN 6			KGUC
8	112144	15.85 174.0W	PCN 6	T3.5/3.5 /D1.0/24HRS		KGUC
9	120215	16.55 174.2W				PHNL
10	120614	16.85 173.9W	PCN 6			KGUC
11	120827	17.05 174.0W				PHNL
12	122020	16.05 175.0W				PHNL
* 13	122124	17.60 173.4W	PCN 4	T2.5/2.5 /W1.0/24HRS	EXP LLCC ULAC 16.05 172.8W	KGUC
14	130215	18.00 173.7W				PHNL
15	130553	18.35 172.5W	PCN 6		EXP LLCC	KGUC
* 16	131004	19.55 174.1W	PCN 6		EXP LLCC	KGUC
17	131833	19.55 172.0W	PCN 6	T3.0/3.0 /D0.5/21HRS		KGUC
18	132045	19.55 171.5W				PHNL
19	132104	19.95 172.1W	PCN 4	T1.5/2.5 /W1.5/24HRS		KGUC
20	140944	22.35 168.2W	PCN 4			KGUC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

**TROPICAL CYCLONE 10S
BEST TRACK DATA**

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	ERRORS	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS
011006Z	10.9 65.7	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011018Z	11.4 64.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011106Z	12.0 62.9	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011118Z	12.7 61.2	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011206Z	13.8 59.7	45	13.5 59.5	40	21	-5	0.0	16.3 55.3	70	92	10	20.1 52.3	80	161	25	0.0	0.0	0.0	0.0
011218Z	15.0 58.3	55	14.9 57.8	50	30	-5	0.0	17.7 54.2	75	88	10	21.9 53.7	85	164	35	0.0	0.0	0.0	0.0
011306Z	16.2 56.3	60	16.5 57.4	60	34	0	0.0	19.6 55.0	80	78	25	22.4 55.2	80	210	30	0.0	0.0	0.0	0.0
011318Z	18.3 55.7	65	17.8 55.7	65	24	0	0.0	20.5 55.9	75	93	25	22.3 55.3	45	114	10	0.0	0.0	0.0	0.0
011406Z	18.3 54.9	55	19.2 54.1	65	71	10	0.0	22.5 54.4	50	182	5	24.4 50.4	40	244	-15	0.0	0.0	0.0	0.0
011418Z	19.2 53.1	50	19.0 54.2	50	12	0	0.0	20.7 52.7	40	79	-15	22.4 50.9	30	280	-15	0.0	0.0	0.0	0.0
011506Z	19.8 53.7	50	20.0 53.5	45	16	-5	0.0	21.5 52.3	35	79	-20	23.4 50.7	25	293	-30	0.0	0.0	0.0	0.0
011518Z	20.7 53.4	55	20.7 53.1	55	17	0	0.0	22.6 52.6	35	141	-20	24.5 50.0	0	0	0	0.0	0.0	0.0	0.0
011606Z	21.7 53.7	55	21.7 52.6	55	68	0	0.0	23.0 51.1	30	235	-25	24.5 50.8	45	325	5	0.0	0.0	0.0	0.0
011618Z	22.2 53.4	55	22.1 52.4	48	31	-15	0.0	23.0 50.9	30	134	-20	24.5 50.0	0	0	0	0.0	0.0	0.0	0.0
011706Z	22.4 55.7	55	22.7 57.1	45	80	-10	0.0	24.3 51.5	30	387	-10	25.1 51.1	50	0	0	0.0	0.0	0.0	0.0
011718Z	21.8 55.6	55	22.2 56.3	55	19	0	0.0	22.9 50.9	30	131	20	25.1 51.1	50	208	10	0.0	0.0	0.0	0.0
011806Z	21.9 55.3	55	22.2 56.3	55	10	0	0.0	23.0 50.9	30	66	15	24.1 50.7	35	239	-10	0.0	0.0	0.0	0.0
011818Z	21.9 54.5	35	22.1 54.7	45	26	10	0.0	23.0 50.9	30	74	0	24.3 54.5	35	33	-5	0.0	0.0	0.0	0.0
011906Z	21.6 53.9	35	22.1 53.4	45	30	10	0.0	21.6 51.0	35	135	0	21.6 49.0	20	335	-10	0.0	0.0	0.0	0.0
011918Z	22.0 53.4	40	22.1 51.7	40	95	0	0.0	22.5 51.7	30	205	-5	22.7 48.4	25	388	-10	0.0	0.0	0.0	0.0
012006Z	23.1 52.9	40	22.1 53.2	40	62	0	0.0	23.3 51.8	35	224	0	23.3 51.8	0	0	0	0.0	0.0	0.0	0.0
012018Z	24.4 52.8	35	23.3 51.5	35	58	0	0.0	24.7 52.0	35	177	0	24.7 52.0	0	0	0	0.0	0.0	0.0	0.0
012106Z	25.9 52.0	35	24.7 51.0	35	9	0	0.0	25.9 52.0	35	0	0	25.9 52.0	0	0	0	0.0	0.0	0.0	0.0
012118Z	27.4 53.3	35	27.4 53.0	30	16	-5	0.0	27.4 53.3	35	0	0	27.4 53.3	0	0	0	0.0	0.0	0.0	0.0

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	42	142	228	0	0	0	0
AVG RIGHT ANGLE ERROR	27	85	110	0	0	0	0
AVG INTENSITY MAGNITUDE ERROR	4	12	17	0	0	0	0
AVG INTENSITY BIAS	-0	0	0	0	0	0	0
NUMBER OF FORECASTS	20	18	13	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1692. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 6. KNOTS

TROPICAL CYCLONE 10S
FIX POSITIONS FOR CYCLONE NO. 10

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	100510	11.05 66.0E	PCN 6	T1.0/1.0	INIT OBS	KGWC
2	110631	11.85 63.3E	PCN 6	T2.0/2.0 /D1.0/25HRS		KGWC
* 3	111730	12.95 60.7E	PCN 6		ULAC 13.15 61.0E	KGWC
4	120201	14.85 59.7E	PCN 6			KGWC
5	120611	14.15 59.6E	PCN 6	T3.5/3.5 /D1.5/24HRS		KGWC
* 6	121115	15.05 60.9E	PCN 5	T3.5/3.5	INIT OBS	KGWC
7	121441	15.15 58.8E	PCN 6		ULAC 15.4S 058.4E	FJDG
8	121852	15.05 58.4E	PCN 6	T3.5/3.5	ULAC 15.1S 058.3E	KGWC
9	122355	15.75 57.8E	PCN 6			KGWC
10	130321	15.95 57.8E	PCN 6			KGWC
11	130551	16.25 56.9E	PCN 6	T3.5/3.5 /S0.0/24HRS	EYE FIX	KGWC
12	131240	16.85 56.0E	PCN 2		EYE FIX	KGWC
13	131420	17.25 56.0E	PCN 6			KGWC
14	131831	17.15 55.5E	PCN 6	T4.0/4.0 /D0.5/24HRS		KGWC
15	140300	18.25 55.5E	PCN 6			KGWC
16	140712	18.65 54.9E	PCN 6	T2.5/3.5 /W1.0/24HRS	EXP LLCC ULAC 18.9S 055.2E	KGWC
17	141058	19.05 55.0E	PCN 5	T3.5/3.5 /D0.5/24HRS		FJDG
18	141358	19.45 54.0E	PCN 6		ULAC 19.5S 053.3E	KGWC
19	141811	19.35 53.9E	PCN 6		ULAC 19.0S 053.9E	KGWC
20	150238	19.85 54.1E	PCN 6			KGWC
21	150652	20.05 53.7E	PCN 5	T3.0/3.0 /D0.5/24HRS		KGWC
22	151047	20.85 53.2E	PCN 5	T3.5/3.5 /D0.5/24HRS		FJDG
23	151215	19.95 53.4E	PCN 6		ULAC 20.0S 053.0E	KGWC
24	151337	20.15 53.2E	PCN 6		ULAC 20.2S 053.0E	KGWC
25	151751	20.15 53.8E	PCN 6	T3.5/3.5 /D0.5/24HRS	ULAC 21.0S 052.7E	KGWC
* 26	160217	20.75 54.5E	PCN 6		ULAC 20.9S 53.9E	KGWC
27	160632	20.95 53.7E	PCN 5	T3.0/3.0 /S0.0/24HRS	ULAC 21.6S 053.7E	FJDG
28	161038	22.35 53.5E	PCN 5	T3.0/3.0 /D0.5/24HRS		KGWC
29	161202	21.45 54.7E	PCN 6			KGWC
30	161457	22.05 54.7E	PCN 6			KGWC
31	161731	21.85 55.4E	PCN 6	T3.5/3.5 /S0.0/24HRS		KGWC
32	170337	22.25 56.6E	PCN 5			KGWC
33	170611	22.35 56.2E	PCN 5	T4.5/4.5 /D1.5/24HRS		KGWC
* 34	171026	23.05 57.1E	PCN 5	T3.0/3.0 /S0.0/24HRS		FJDG
35	171150	21.95 56.3E	PCN 6			KGWC
36	171436	21.75 56.3E	PCN 6			KGWC
37	171825	22.15 56.5E	PCN 6	T4.5/4.5 /D1.0/25HRS		KGWC
38	180316	20.75 54.9E	PCN 5		EXP LLCC	KGWC
39	180733	20.95 55.4E	PCN 5	T2.5/3.5 /W2.0/25HRS	EXP LLCC ULAC 23.2S 054.6E	KGWC
40	181015	21.05 56.0E	PCN 5	T2.5/3.5 /W2.0/25HRS		FJDG
41	181415	21.55 54.5E	PCN 4		EXP LLCC ULAC 22.4S 054.5E	KGWC
* 42	181832	22.25 54.3E	PCN 4		EXP LLCC	KGWC
43	190022	21.85 53.7E	PCN 4		EXP LLCC	KGWC
44	190255	21.55 53.5E	PCN 4		EXP LLCC ULAC 23.2S 054.3E	KGWC
45	190712	22.25 53.5E	PCN 4	T2.0/2.5 /W0.5/24HRS	ULAC 22.2S 054.8E	KGWC
* 46	191306	22.45 51.8E	PCN 4			KGWC
47	191811	22.05 53.2E	PCN 4			KGWC
48	200233	22.05 53.4E	PCN 4		ULAC 23.8S 054.7E	KGWC
49	200652	23.35 53.4E	PCN 3	T2.5/2.5 /D0.5/24HRS	ULAC 25.0S 052.8E	KGWC
50	201054	23.05 52.7E	PCN 3		ULAC 24.7S 052.2E	KGWC
51	201751	24.25 53.5E	PCN 4	T2.0/2.5 /W0.5/12HRS	ULAC 24.5S 051.8E	KGWC
* 52	210353	24.85 54.5E	PCN 6		ULAC 25.5S 52.8E	KGWC
53	210632	25.95 53.4E	PCN 3	T0.5/1.5 /W2.0/24HRS		KGWC
54	211452	26.85 52.4E	PCN 3			KGWC
55	211731	27.15 54.1E	PCN 6	T2.5/2.5 /D0.5/24HRS	ULAC 26.5S 053.7E	KGWC
56	220332	29.05 56.0E	PCN 4			KGWC

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	180600	21.4S 55.2E	050	025	61980 61984

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 11P
BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST ERRORS				48 HOUR FORECAST ERRORS				72 HOUR FORECAST ERRORS			
MO/DA/HR	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	
011200Z	15.9 161.1	25	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	
011212Z	15.6 161.6	25	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	
011300Z	15.6 162.0	25	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	
011312Z	15.6 163.0	25	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	
011400Z	15.5 163.8	25	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	
011412Z	15.4 165.0	30	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	
011500Z	15.4 166.1	40	16.3 166.2	45	54.	5.5	18.0 169.1	65	132.	5.	21.3 172.8	45	279.	-45.	0.0 0.0	0.0	-0.	0.0	
011512Z	15.5 167.1	50	15.5 167.6	55	122.	-5.	18.6 170.2	75	131.	-6.	18.8 173.6	60	255.	-40.	0.0 0.0	0.0	-0.	0.0	
011600Z	15.9 169.8	60	16.0 169.3	65	35.	-15.	17.7 172.2	85	131.	-15.	19.0 177.0	70	256.	-25.	0.0 0.0	0.0	-0.	0.0	
011612Z	16.3 171.1	70	16.3 171.3	75	29.	-10.	18.0 174.7	85	130.	-15.	19.0 177.0	70	256.	-25.	0.0 0.0	0.0	-0.	0.0	
011700Z	16.9 174.4	90	16.9 174.6	85	11.	-5.	19.3 180.3	90	186.	-5.	22.3 185.8	70	556.	10.	0.0 0.0	0.0	-0.	0.0	
011712Z	18.1 178.0	100	18.0 177.9	90	8.	-10.	20.7 184.6	70	278.	-5.	23.7 191.2	55	661.	10.	0.0 0.0	0.0	-0.	0.0	
011800Z	20.0 183.5	90	20.0 182.5	75	56.	-15.	24.0 190.5	50	285.	-10.	27.5 198.7	35	710.	5.	0.0 0.0	0.0	-0.	0.0	
011812Z	21.9 189.4	75	21.8 189.0	90	23.	15.	23.5 194.0	35	526.	30.	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	
011900Z	24.1 195.7	60	24.1 195.0	60	45.	0.	23.3 205.4	30	333.	0.	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	
011912Z	27.4 202.7	45	27.2 202.5	40	16.	-5.	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	
012000Z	33.6 210.5	30	33.7 211.5	30	50.	0.	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	0.0 0.0	0.0	-0.	0.0	

	ALL FORECASTS		TYPHOONS WHILE OVER 35 KTS
	WRNG 24-HR 48-HR 72-HR		WRNG 24-HR 48-HR 72-HR
AVG FORECAST POSIT ERROR	31. 239. 510. 0.		29. 228. 476. 0.
AVG RIGHT ANGLE ERROR	22. 58. 145. 0.		22. 59. 148. 0.
AVG INTENSITY MAGNITUDE ERROR	7. 9. 20. 0.		8. 10. 23. 0.
AVG INTENSITY BIAS	-2. -1. -13. 0.		-3. -1. -16. 0.
NUMBER OF FORECASTS	11 9 7 0		10 8 6 0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 3030. NM

AVERAGE SPEED OF TROPICAL CYCLONE IS 16. KNOTS

TROPICAL CYCLONE 11P
FIX POSITIONS FOR CYCLONE NO. 11

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	110617	14.35 152.8E	PCN 5	T1.0/1.0	INIT OBS	KGWC
2	112326	15.45 161.3E	PCN 6	T2.0/2.0 /D1.0/17HRS	ULAC 14.6S 161.3E	KGWC
3	121025	15.25 161.3E	PCN 6		ULAC 15.3S 164.1E	KGWC
* 4	121200	15.85 163.4E	PCN 6		ULCC FIX	PGTW
5	121600	15.65 162.5E	PCN 6			PGTW
6	122100	15.35 162.4E	PCN 6			PGTW
7	122305	15.55 162.2E	PCN 6	T2.0/2.0 /S0.0/24HRS		KGWC
8	130000	15.65 162.6E	PCN 6	T1.0/1.0	INIT OBS	PGTW
9	130600	15.55 162.0E	PCN 6		ULAC 16.3S 163.1E	KGWC
* 10	131146	17.25 162.8E	PCN 6			PGTW
* 11	131600	16.45 162.5E	PCN 6	T1.5/1.5		KGWC
12	132245	15.95 163.3E	PCN 6	T2.0/2.0 /S0.0/24HRS		PGTW
* 13	140000	15.75 161.8E	PCN 6	T2.0/2.0 /D1.0/24HRS		PGTW
* 14	140300	15.85 162.1E	PCN 6			KGWC
* 15	140713	16.95 162.5E	PCN 6			PGTW
16	140900	14.95 163.9E	PCN 6		ULAC 15.0S 164.6E	KGWC
17	141125	15.85 163.0E	PCN 6			PGTW
18	141200	15.95 163.0E	PCN 6	T2.5/2.5 /D1.0/24HRS		PGTW
19	141600	15.95 165.4E	PCN 6		ULAC 15.6S 165.7E	KGWC
20	141642	15.85 164.7E	PCN 6			PGTW
21	141800	16.15 165.8E	PCN 6		ULAC 13.5S 167.8E	KGWC
* 22	141953	14.25 167.8E	PCN 6			PGTW
23	142100	16.15 165.6E	PCN 6			KGWC
24	150000	16.25 166.2E	PCN 6	T3.0/3.0 /D1.0/24HRS		PGTW
25	150006	14.75 166.4E	PCN 6	T3.5/3.5 /D1.5/25HRS		KGWC
* 26	150300	16.55 166.9E	PCN 6		ULCC 15.2S 167.5E	PGTW
27	150600	15.25 166.7E	PCN 6			KGWC
* 28	150652	14.25 167.6E	PCN 6		ULCC FIX	PGTW
29	150900	14.95 168.0E	PCN 6		INIT OBS	KGWC
30	151105	14.85 168.1E	PCN 6	T3.5/3.5		PGTW
31	151200	14.75 168.5E	PCN 6		ULAC 15.7S 167.3E	KGWC
32	151630	15.85 167.3E	PCN 6			PGTW
33	151800	15.45 168.6E	PCN 6	T3.5/3.5 /D1.0/26HRS		KGWC
34	151932	16.15 169.0E	PCN 6			KGWC
35	152346	15.95 169.7E	PCN 6	T3.5/3.5 /S0.0/24HRS		PGTW
36	160000	15.75 169.1E	PCN 6	T4.0/4.0 /D1.0/24HRS		KGWC
37	160300	16.05 169.8E	PCN 6		ULCC FIX	PGTW
* 38	160600	16.35 170.0E	PCN 6		ULCC FIX	PGTW
39	160630	16.45 170.6E	PCN 6		ULAC 17.0S 169.4E	KGWC
40	160900	16.05 170.3E	PCN 6		ULCC FIX	PGTW
41	161045	16.45 171.5E	PCN 6	T4.5/4.5 /D1.0/24HRS		KGWC
42	161200	16.25 170.9E	PCN 6		ULCC FIX	PGTW
43	161600	16.15 171.0E	PCN 6	T3.5/3.5 /S0.0/22HRS		KGWC
44	161617	16.45 172.8E	PCN 6		EYE FIX	KGWC
45	161910	16.55 172.7E	PCN 6			KGWC
46	162326	17.05 174.3E	PCN 2	T5.5/5.5 /D2.0/24HRS		KGWC
47	170000	16.95 174.6E	PCN 2			PGTW
48	170300	17.35 175.4E	PCN 2	T5.0/5.0 /D1.0/27HRS		PGTW
49	170600	17.55 176.3E	PCN 4			PGTW
50	170609	17.55 176.1E	PCN 2			KGWC
51	171025	18.35 178.0E	PCN 2	T5.5/5.5 /D1.0/24HRS		KGWC
52	171200	17.85 178.0E	PCN 4		EYE FIX	PGTW
* 53	171605	18.75 178.8E	PCN 6			KGWC
54	171849	19.45 178.6E	PCN 2			KGWC
55	172305	20.25 177.0E	PCN 2	T4.0/5.0 /W1.5/24HRS		KGWC
* 56	180548	21.05 172.9E	PCN 6		ULAC 21.2S 172.6E	KGWC
* 57	180823	21.85 171.0E	PCN 6		ULAC 22.1S 170.4E	KGWC
58	182104	23.15 165.9E	PCN 4	T3.5/5.0 /W2.0/22HRS		KGWC
59	190803	26.25 159.3E	PCN 4	T2.0/3.0 /W2.0/22HRS		KGWC
60	191625	29.55 154.1E	PCN 6		EXP LLCC	KGWC
61	192044	32.35 151.6E	PCN 6		EXP LLCC	KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 12S
BEST TRACK DATA

MO/DA/HR	BEST TRACK		WARNING		24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND		
011206Z	10.8	84.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
011218Z	11.7	86.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
011306Z	12.6	86.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
011318Z	13.5	86.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
011406Z	14.0	86.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
011418Z	14.6	85.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
011506Z	14.9	85.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
011518Z	15.6	84.8	35	16.4	85.1	35	57	17.1	82.9	55	104	20	17.8	79.6		
011606Z	16.2	83.2	35	16.8	84.0	35	58	17.5	81.5	45	158	15	18.0	78.0		
011618Z	17.3	81.1	35	16.5	81.0	35	48	16.6	76.1	30	153	5	18.0	76.0		
011706Z	18.4	78.9	35	17.8	79.1	35	38	15.0	70.0	0	0	0	18.0	74.0		
011718Z	19.0	77.0	25	16.0	0.0	0	0	0.0	0.0	0	0	0	18.0	72.0		

	ALL FORECASTS		TYPHOONS WHILE OVER 35 KTS
	WRNG 24-HR 48-HR 72-HR		WRNG 24-HR 48-HR 72-HR
AVG FORECAST POSIT ERROR	50. 138. 165. 0.		0. 0. 0. 0.
AVG RIGHT ANGLE ERROR	47. 33. 22. 0.		0. 0. 0. 0.
AVG INTENSITY MAGNITUDE ERROR	0. 13. 45. 0.		0. 0. 0. 0.
AVG INTENSITY BIAS	0. 13. 45. 0.		0. 0. 0. 0.
NUMBER OF FORECASTS	4 3 1 0		0 0 0 0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 874. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 7. KNOTS

TROPICAL CYCLONE 12S
FIX POSITIONS FOR CYCLONE NO. 12

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
* 1	140531	14.0S 83.6E	PCN 4	T1.5/1.5 /S0.0/25HRS	INIT OBS	KGWC
2	141600	13.9S 85.0E	PCN 6		ULAC 13.2S 085.7E	PGTW
3	141630	14.5S 85.8E	PCN 6			KGWC
4	141800	13.8S 85.4E	PCN 6			PGTW
5	142100	14.5S 85.2E	PCN 6			PGTW
6	150000	14.2S 86.2E	PCN 6		ULCC FIX	PGTW
7	150300	13.8S 86.2E	PCN 6	T2.0/2.0	INIT OBS ULCC FIX	PGTW
* 8	150510	14.8S 87.0E	PCN 6	T2.5/2.5 /D1.0/24HRS	ULAC 13.8S 086.0E	KGWC
9	150600	13.8S 85.5E	PCN 6		ULCC 14.2S 085.9E	PGTW
* 10	151033	16.1S 86.2E	PCN 6		ULAC 14.8S 085.7E	KGWC
* 11	151156	16.3S 86.2E	PCN 6			KGWC
12	151200	15.0S 85.5E	PCN 6	T2.5/2.5 /D1.0/20HRS	ULCC FIX	PGTW
13	151600	15.6S 85.2E	PCN 6	T2.5/2.5	INIT OBS	KGWC
14	151800	15.0S 84.7E	PCN 6			PGTW
15	160036	15.9S 84.0E	PCN 6		ULAC 16.2S 085.0E	KGWC
16	160450	15.8S 83.4E	PCN 4	T2.0/2.5 /W0.5/24HRS	ULAC 17.6S 086.8E	KGWC
17	160600	16.1S 83.0E	PCN 6	T1.5/2.0 /W0.5/27HRS	EXP LLCC	PGTW
18	160854	16.2S 82.7E	PCN 5	T2.5/2.5 /D0.5/24HRS	EXP LLCC	FJDG
19	161020	16.4S 82.6E	PCN 4		ULAC 17.5S 082.3E	KGWC
20	161316	16.7S 81.7E	PCN 4			KGWC
21	161731	16.9S 81.0E	PCN 6		EXP LLCC	KGWC
22	162731	17.3S 80.3E	PCN 4			KGWC
23	170156	18.4S 80.1E	PCN 4			KGWC
24	170430	18.5S 79.1E	PCN 4	T3.0/3.0 /D1.0/24HRS		KGWC
25	171150	18.7S 77.5E	PCN 4		EXP LLCC	KGWC
26	171254	18.7S 77.6E	PCN 4		EXP LLCC	KGWC
27	171710	18.7S 77.3E	PCN 4		EXP LLCC	KGWC
28	180551	20.0S 75.9E	PCN 4	T0.5/1.5 /W2.5/24HRS		KGWC
29	190531	20.3S 68.8E	PCN 4	T0.5/0.5 /S0.0/24HRS		KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 13P
BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND		POSIT	WIND		ERRORS	POSIT	WIND		ERRORS	POSIT	WIND		ERRORS	POSIT	WIND		ERRORS
011400Z	16.4 150.9	25	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0
011412Z	16.5 151.0	25	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0
011500Z	16.6 152.9	25	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0
011512Z	16.3 154.5	30	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0
011600Z	16.1 156.1	35	16.1 155.7	35	23.0	0.0	16.4 158.6	50	171.1	-15.0	16.8 161.3	65	359.0	-15.0	0.0	0.0	0.0	0.0	-0.0
011612Z	16.0 158.7	50	16.1 158.3	50	24.0	0.0	16.4 162.6	70	125.0	-5.0	17.8 167.0	80	267.0	-10.0	0.0	0.0	0.0	0.0	-0.0
011700Z	15.8 161.5	65	15.9 161.5	65	6.0	0.0	16.3 167.4	90	51.0	10.0	17.6 173.5	105	114.0	15.0	0.0	0.0	0.0	0.0	-0.0
011712Z	15.6 164.0	75	15.6 164.0	75	6.0	0.0	16.0 171.1	105	8.0	15.0	17.4 177.7	100	143.0	15.0	0.0	0.0	0.0	0.0	-0.0
011800Z	15.6 167.9	80	15.0 167.9	80	0.0	0.0	16.5 174.0	105	29.0	0.0	18.8 182.9	30	121.0	20.0	0.0	0.0	0.0	0.0	-0.0
011812Z	15.9 171.2	90	15.9 171.1	90	6.0	0.0	17.5 178.5	100	98.0	15.0	20.7 186.7	75	143.0	35.0	0.0	0.0	0.0	0.0	-0.0
011900Z	16.8 175.3	105	16.9 175.1	100	13.0	-5.0	20.1 183.6	80	82.0	20.0	24.3 193.0	50	208.0	20.0	0.0	0.0	0.0	0.0	-0.0
011912Z	18.1 180.1	85	18.3 179.9	90	17.0	5.0	22.3 189.7	65	123.0	25.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0
012000Z	19.5 184.9	60	19.5 185.0	60	6.0	20.0	24.0 195.5	50	257.0	20.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0
012012Z	20.3 189.2	40	20.8 189.3	60	31.0	20.0	0.0 0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0
012100Z	20.9 192.3	30	22.0 191.0	55	98.0	25.0	0.0 0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
AVG FORECAST POSIT ERROR	WRNG	24-HR	48-HR	WRNG	24-HR	48-HR	72-HR
AVG RIGHT ANGLE ERROR	21	105	193	0	0	0	0
AVG INTENSITY MAGNITUDE ERROR	7	43	58	0	0	0	0
AVG INTENSITY BIAS	6	9	9	0	0	0	0
NUMBER OF FORECASTS	11	9	7	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 2414. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 14. KNOTS

TROPICAL CYCLONE 13P
FIX POSITIONS FOR CYCLONE NO. 13

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	130047	16.5S 150.0E	PCN 6	T1.0/1.0	INIT OBS	KGWC
2	131800	16.2S 152.1E	PCN 6	T1.0/1.0	INIT OBS ULCC FIX	PGTW
3	140000	16.3S 151.5E	PCN 6	T1.0/1.0	INIT OBS	PGTW
4	140026	16.5S 151.7E	PCN 6	T2.5/2.5 /D1.5/24HRS		KGWC
5	140300	16.5S 151.7E	PCN 6		ULCC FIX	PGTW
6	140600	16.5S 151.0E	PCN 6			PGTW
7	140713	16.5S 151.7E	PCN 6			KGWC
8	140900	16.5S 151.2E	PCN 6			PGTW
9	141125	16.9S 150.8E	PCN 6	T1.5/1.5	INIT OBS	KGWC
10	141600	17.0S 150.6E	PCN 6			PGTW
11	141800	17.2S 150.9E	PCN 6	T1.0/1.0 /S0.0/24HRS		PGTW
12	141824	16.8S 151.5E	PCN 6			KGWC
* 13	141953	17.5S 156.0E	PCN 6			KGWC
14	142100	17.1S 153.1E	PCN 6			PGTW
15	150000	16.4S 152.4E	PCN 6	T1.0/1.0 /S0.0/24HRS		PGTW
16	150006	16.2S 152.5E	PCN 5	T1.5/2.5 /W1.0/24HRS	ULAC 16.6S 153.0E	KGWC
17	150300	16.5S 152.8E	PCN 6			PGTW

18	150600	16.55	153.00	PCN 6		ULCC 16.25 153.5E	PGTW
19	150833	16.55	154.10	PCN 6			KGUC
20	150900	16.15	154.10	PCN 6		ULCC FIX	PGTW
21	151105	16.05	154.00	PCN 6	T1.5/1.5 /S0.0/24HRS	ULAC 16.45 154.0E	KGUC
22	151200	16.05	154.25	PCN 6		ULCC FIX	PGTW
23	151300	16.05	154.45	PCN 6	T2.0/2.0 /D1.0/24HRS		PGTW
24	151313	16.05	155.35	PCN 6		ULAC 16.25 154.5E	KGUC
25	151332	16.05	155.10	PCN 6		ULAC 15.85 154.6E	KGUC
26	152346	16.05	155.10	PCN 6	T3.0/3.0 /D1.5/24HRS		PGTW
27	160000	16.05	155.70	PCN 6	T2.5/2.5 /D1.5/24HRS		PGTW
28	160300	16.05	156.20	PCN 6		ULCC FIX	PGTW
29	160600	16.15	157.00	PCN 6		ULAC 16.35 158.3E	KGUC
30	160812	16.05	158.20	PCN 6		ULCC FIX	PGTW
31	160900	16.05	157.70	PCN 6		INIT OBS	KGUC
32	161045	16.15	157.00	PCN 6	T3.5/3.5	ULCC FIX	PGTW
33	161200	16.15	158.10	PCN 6		ULCC FIX	PGTW
34	161600	15.85	158.90	PCN 6	T3.0/3.0 /D1.0/22HRS		KGUC
35	161759	16.05	160.10	PCN 6		ULCC FIX	PGTW
36	161910	15.75	161.00	PCN 6			KGUC
37	162326	15.75	161.40	PCN 6	T4.0/4.0 /D1.0/24HRS	EYE FIX	KGUC
38	170000	15.85	161.50	PCN 6			PGTW
39	170300	15.85	162.20	PCN 6	T4.0/4.0 /D1.5/27HRS		PGTW
40	170600	15.75	163.00	PCN 6		EYE FIX	PGTW
41	171025	15.45	163.90	PCN 6	T5.0/5.0 /D1.5/24HRS	EYE FIX	KGUC
42	171200	15.55	164.55	PCN 6		EYE FIX	PGTW
43	171605	15.45	165.50	PCN 6		EYE FIX	KGUC
44	171800	15.55	166.10	PCN 6	T4.5/4.5 /D1.5/26HRS	EYE FIX	PGTW
45	172100	15.60	166.40	PCN 6		EYE FIX	KGUC
46	172400	15.75	166.90	PCN 6			PGTW
47	172305	15.75	167.00	PCN 6	T4.5/4.5 /D0.5/24HRS	EYE FIX	KGUC
48	180000	15.65	167.90	PCN 6		ULCC FIX	PGTW
49	180300	15.75	168.50	PCN 6	T4.5/4.5 /D0.5/24HRS		PGTW
50	180600	15.85	169.40	PCN 6		EYE FIX	PGTW
51	180729	15.85	170.10	PCN 6		EYE FIX	KGUC

TROPICAL CYCLONE 14P
BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS		
011618Z	14.8 146.3	25	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
011706Z	14.8 149.0	45	14.8	148.6	40.0	23.0	-5.0	14.9	153.5	70.0	63.0	-10.0	15.2	158.8	90.0	64.0	-10.0		
011718Z	14.8 151.8	65	14.8	151.8	65.0	0.0	0.0	15.2	157.8	95.0	99.0	5.0	15.9	164.3	105.0	172.0	15.0		
011806Z	15.0 154.4	80	15.0	154.4	80.0	0.0	0.0	16.8	160.6	105.0	132.0	5.0	18.7	168.0	105.0	209.0	30.0		
011818Z	15.0 156.3	90	15.0	156.3	90.0	0.0	0.0	17.1	161.0	115.0	38.0	25.0	18.9	167.9	100.0	46.0	45.0		
011906Z	16.2 158.4	100	16.4	158.3	105.0	13.0	5.0	17.8	162.9	115.0	119.0	40.0	20.3	169.6	115.0	125.0	75.0		
011918Z	16.6 161.4	90	16.5	161.3	95.0	8.0	5.0	17.6	167.4	80.0	71.0	25.0	19.9	173.3	70.0	104.0	45.0		
012006Z	17.0 164.8	75	17.3	165.0	70.0	21.0	-5.0	20.1	173.3	50.0	105.0	10.0	0.0	0.0	0.0	-0.0	0.0		
012018Z	18.3 168.4	55	18.1	168.6	60.0	17.0	22.0	0.0	177.1	45.0	156.0	20.0	0.0	0.0	0.0	-0.0	0.0		
012106Z	21.0 171.7	40	20.6	172.0	60.0	51.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0		
012118Z	21.3 174.4	25	22.9	176.1	30.0	135.0	5.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0		

ALL FORECASTS					TYPHOONS WHILE OVER 35 KTS				
WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR		
AVG FORECAST POSIT ERROR	28.0	98.0	120.0	0.0	0.0	0.0	0.0		
AVG RIGHT ANGLE ERROR	14.0	42.0	55.0	0.0	0.0	0.0	0.0		
AVG INTENSITY MAGNITUDE ERROR	4.0	15.0	37.0	0.0	0.0	0.0	0.0		
AVG INTENSITY BIAS	2.0	15.0	33.0	0.0	0.0	0.0	0.0		
NUMBER OF FORECASTS	10	8	6	0	0	0	0		

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1701. NM

AVERAGE SPEED OF TROPICAL CYCLONE IS 14. KNOTS

TROPICAL CYCLONE 14P
FIX POSITIONS FOR CYCLONE NO. 14

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	150300	13.35 140.9E	PCN 6	T1.5/1.5	INIT OBS	PGTW
2	151200	13.45 142.5E	PCN 6		ULCC FIX	PGTW
3	151600	13.85 142.9E	PCN 6			PGTW
4	151800	13.85 142.9E	PCN 6			PGTW
5	160900	15.55 144.1E	PCN 6			PGTW
6	170000	14.65 147.3E	PCN 6			PGTW
7	170300	14.85 148.0E	PCN 6	T3.0/3.0	INIT OBS	PGTW
8	170600	14.85 149.1E	PCN 6			PGTW
9	170844	14.45 149.1E	PCN 6			KGUC
10	170750	15.45 149.6E	PCN 6	T2.5/2.5 /D1.0/12HRS	ULAC 14.6 149.0E	KGUC
11	171200	14.85 150.6E	PCN 6			PGTW
12	171206	13.95 150.6E	PCN 6			KGUC
13	171747	14.85 151.9E	PCN 1	T3.0/3.0	INIT OBS	KGUC
14	171800	14.85 151.7E	PCN 2		EYE FIX	KGUC
15	172031	15.05 152.4E	PCN 2	T4.0/4.0	INIT OBS EYE FIX	PGTW
16	172100	14.95 152.4E	PCN 2		EYE FIX	KGUC
17	180000	15.05 153.1E	PCN 2			PGTW
18	180047	15.15 153.9E	PCN 1	T4.5/4.5 /D1.5/21HRS	EYE FIX	KGUC
19	180300	15.45 153.7E	PCN 2	T4.5/4.5 /D2.0/20HRS		PGTW
20	180600	15.55 154.4E	PCN 2		EYE FIX	PGTW
21	180729	15.75 154.4E	PCN 2		EYE FIX	KGUC
22	180900	15.75 155.0E	PCN 2		EYE FIX	PGTW
23	181146	15.85 155.1E	PCN 2	T4.5/4.5 /D1.5/24HRS	EYE FIX	KGUC
24	181200	15.85 155.3E	PCN 2		EYE FIX	PGTW
25	181600	16.05 155.9E	PCN 2			PGTW
26	181734	16.05 156.4E	PCN 2		EYE FIX	KGUC
27	181800	16.05 156.3E	PCN 2	T5.0/5.0 /D1.0/24HRS		PGTW
28	182009	16.15 156.5E	PCN 2		EYE FIX	KGUC
29	182100	16.15 156.7E	PCN 4			PGTW
30	190000	16.25 157.2E	PCN 4	T5.5/5.5 /D1.0/24HRS		PGTW
31	190027	16.15 157.3E	PCN 1	T5.5/5.5 /D1.0/24HRS	EYE FIX	KGUC
32	190300	16.15 157.6E	PCN 4			PGTW
33	190600	16.05 158.0E	PCN 2		EYE FIX	PGTW
34	190703	16.05 158.0E	PCN 2		EYE FIX	KGUC
35	190900	16.35 159.0E	PCN 2		EYE FIX	PGTW
36	191126	16.35 159.5E	PCN 2	T5.0/5.0 /D0.5/24HRS		KGUC
37	191200	16.35 159.7E	PCN 2		EYE FIX	PGTW

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

[illegible]

TROPICAL CYCLONE 15S
FIX POSITIONS FOR CYCLONE NO. 15

FIX NO.	TIME (Z)	FIX POSITION	ACCR	DVORAK CODE	COMMENTS	SITE
1	251751	11.9S 68.8E	PCN 6	T1.0/1.0	INIT OBS	KGWC
2	260632	13.4S 68.0E	PCN 5	T2.5/2.5 /D1.5/24HRS		KGWC
3	261138	14.0S 67.4E	PCN 6		ULAC 13.9S 068.1E	KGWC
4	261306	14.0S 66.8E	PCN 6		ULAC 14.0S 067.8E	KGWC
5	261731	14.5S 66.7E	PCN 6		ULAC 15.2S 068.2E	KGWC
6	270612	15.9S 67.4E	PCN 6	T3.0/3.0 /D0.5/24HRS	ULAC 15.9S 067.5E	KGWC
7	271020	16.2S 68.0E	PCN 5	T2.5/2.5 /D1.0/24HRS		FJDG
8	271426	16.4S 68.2E	PCN 6			KGWC
9	271711	16.1S 65.6E	PCN 6	T3.5/3.5	INIT OBS ULAC 15.9S 065.2E	KGWC
10	280010	16.6S 66.2E	PCN 6		ULAC 16.5S 065.5E	KGWC
11	280306	16.4S 65.9E	PCN 6			KGWC
12	280551	16.3S 65.8E	PCN 6	T3.5/3.5 /D0.5/24HRS	ULAC 16.5S 065.3E	KGWC
13	281009	16.1S 64.5E	PCN 6	T3.5/3.5 /D0.5/24HRS		KGWC
14	281113	17.0S 64.5E	PCN 6			FJDG
15	281405	17.4S 66.1E	PCN 4			KGWC
16	281605	17.8S 66.1E	PCN 6	T4.5/4.5 /D1.0/24HRS		KGWC
17	282358	18.1S 66.0E	PCN 4			KGWC
18	290245	18.4S 65.6E	PCN 6		ULAC 19.0S 064.3E	KGWC
19	290531	18.5S 64.7E	PCN 6	T3.0/3.5 /W0.5/24HRS	ULAC 19.4S 064.8E	KGWC
20	290958	19.4S 65.0E	PCN 5	T4.0/4.0 /D0.5/24HRS		FJDG
21	291243	19.4S 63.7E	PCN 6			KGWC
22	291343	19.6S 63.9E	PCN 6		RGD EYE OPN N	KGWC
23	291812	19.6S 63.6E	PCN 6	T4.5/4.5 /S0.0/25HRS		KGWC
24	292345	20.6S 63.5E	PCN 6			KGWC
25	300223	20.6S 63.4E	PCN 6		ULAC 20.5S 062.9E	KGWC
26	300652	20.0S 62.5E	PCN 5	T3.0/3.5 /S0.0/25HRS	ULAC 21.2S 063.0E	KGWC
27	301322	20.0S 62.7E	PCN 6		ULAC 20.1S 062.7E	KGWC
28	301751	21.1S 61.2E	PCN 4	T2.5/3.5 /W1.0/24HRS	EXP LLCC ULAC 23.4S 062.6E	KGWC
29	302333	21.4S 60.6E	PCN 4		EXP LLCC	KGWC
30	310302	21.7S 60.8E	PCN 4		EXP LLCC	KGWC
31	310632	22.3S 60.8E	PCN 3	T1.0/2.0 /W2.0/24HRS	EXP LLCC	KGWC
32	311100	22.6S 62.8E			EXP LLCC	NPQC
33	311731	22.9S 61.0E	PCN 3		ULAC 27.8S 061.7E	KGWC
34	010612	30.7S 63.9E	PCN 4	T1.5/1.5 /D0.5/24HRS	EXP LLCC ULAC 31.7S 066.1E	KGWC
35	011711	34.4S 67.0E	PCN 5		ULAC 36.0S 070.4E	KGWC
36	020552	36.2S 74.5E	PCN 6	T0.0/1.0 /W1.5/24HRS		KGWC

248

HURRICANE 16P BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS		
012412Z	15.8 203.4	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
012500Z	15.8 202.7	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
012512Z	16.8 201.7	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
012600Z	17.7 200.3	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
012612Z	19.4 198.4	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
012700Z	20.7 196.3	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
012712Z	22.1 194.1	45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
012800Z	23.8 191.7	60	23.4	192.3	55	41	-5	29.0	187.5	80	30	-5	37.0	189.0	70	226	20		
012812Z	25.8 189.2	75	25.8	189.2	60	2	-15	34.7	188.3	40	229	-25	40.8	190.8	30	493	-5		
012900Z	28.5 187.6	75	28.5	188.0	65	21	-10	32.9	186.9	50	271	0	0.0	0.0	0	0.0	0.0		
012912Z	30.9 187.8	60	30.8	189.1	65	67	0	35.8	195.1	40	215	5	0.0	0.0	0	0.0	0.0		
013000Z	34.2 192.1	50	34.7	192.1	30	30	-20	0.0	0.0	0	-0	0	0.0	0.0	0	-0	0.0		
013012Z	36.2 199.5	35	37.3	198.2	40	91	5	0.0	0.0	0	-0	0	0.0	0.0	0	-0	0.0		

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
42	187	359	0	42	187	359	0
23	71	305	0	23	71	305	0
9	9	13	0	9	9	13	0
-8	-4	8	0	-8	-4	8	0
6	4	2	0	6	4	2	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 2035. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 14. KNOTS

HURRICANE 16P FIX POSITIONS FOR CYCLONE NO. 16

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	232104	14.25 157.1W	PCN 6	T1.0/1.0	INIT OBS ULAC 12.5S 156.9W	KGWC
2	242044	15.55 156.4W	PCN 3	T2.0/2.0 /D1.0/24HRS	ULAC 14.5S 157.0W	KGWC
3	252023	17.25 159.2W	PCN 4	T2.5/2.5 /D0.5/24HRS		KGWC
4	260439	18.15 160.4W	PCN 4	T2.5/2.5 /D0.5/24HRS	ULAC 17.9S 160.2W	KGWC
* 5	260904	19.05 162.2W	PCN 4		ULAC 18.2S 161.5W	KGWC
6	262005	20.35 162.0W				PHNL
7	262145	20.15 162.7W	PCN 6	T2.0/2.5 /W0.5/24HRS	ULAC 20.5S 162.5W	KGWC
8	270215	20.55 163.5W				PHNL
9	272124	23.45 166.7W	PCN 2	T3.5/3.5 /D1.5/24HRS		KGWC
10	280215	24.65 169.1W				PHNL
11	280243	24.35 168.9W	PCN 2	T3.5/3.5 /D1.5/24HRS	EYE FIX	KGWC
12	280538	25.15 169.7W	PCN 20		EYE FIX	KGWC
13	280823	26.25 170.5W	PCN 20	T4.5/4.5 /D2.0/47HRS	EYE FIX	KGWC
14	281528	26.55 171.5W	PCN 20		EYE FIX	KGWC
15	281818	27.15 171.6W	PCN 20		EYE FIX	KGWC
16	282346	28.45 172.1W	PCN 1	T3.0/4.0 /W0.5/25HRS		KGWC
17	282300	28.05 172.0W				NPOC
18	290230	29.05 172.5W				PHNL
19	290517	29.55 172.4W	PCN 2		EYE FIX	KGWC
20	290945	30.55 173.7W	PCN 4	T3.5/4.0 /W1.0/24HRS		KGWC
21	291515	32.05 170.5W	PCN 4		EXP LLCC	KGWC
22	292225	33.55 168.7W	PCN 3	T3.0/4.0 /S0.0/24HRS	ULAC 34.0S 167.6W	KGWC
23	300455	35.55 164.9W	PCN 6		ULAC 35.0S 163.8W	KGWC
24	300743	35.75 163.0W	PCN 6	T1.5/2.5 /W1.5/24HRS	ULAC 35.4S 162.1W	KGWC
* 25	301200	35.05 168.0W				NPOC
26	302204	37.05 154.5W	PCN 6			KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 17S BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND		POSIT	WIND		ERRORS	ERRORS	POSIT	WIND		POSIT	WIND		ERRORS	ERRORS	POSIT	WIND	
012900Z	18.1 120.6	25	0.0	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
012912Z	18.3 119.1	35	0.0	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
013000Z	18.2 118.0	45	18.3	118.1	35	8	-10.	19.3	115.5	45	104.	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
013012Z	19.5 117.1	55	19.4	116.8	50	18	-5	19.6	114.8	55	200	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
013100Z	20.3 117.0	45	20.0	116.5	50	33	5	0.0	0.0	0.	-0.	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
013112Z	22.3 116.9	35	22.2	116.7	50	13	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
18	152	0	0	0	0	0	0
19	104	0	0	0	0	0	0
9	10	0	0	0	0	0	0
1	10	0	0	0	0	0	0
4	2	0	0	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 432. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 7. KNOTS

TROPICAL CYCLONE 17S
FIX POSITIONS FOR CYCLONE NO. 17

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	290208	18.2S 120.0E	PCN 5	T1.5/1.5	INIT OBS ULAC 17.8S 118.1E	KGWC
2	290737	18.7S 119.8E	PCN 5		ULAC 18.4S 117.5E	KGWC
3	291021	18.7S 119.5E	PCN 5		ULAC 18.9S 118.5E	KGWC
4	291307	18.6S 118.9E	PCN 6		ULAC 18.0S 118.2E	KGWC
5	292021	17.7S 118.5E	PCN 6			KGWC
6	292301	18.0S 118.2E	PCN 5			KGWC
7	300148	18.4S 117.8E	PCN 1	T3.5/3.5 /D2.0/24HRS		KGWC
8	300300	20.8S 116.9E	PCN 6	T4.0/4.0	INIT OBS	PHIK
9	300906	18.4S 117.0E	PCN 1		RGD EYE	KGWC
10	300959	18.4S 117.1E	PCN 1		RGD EYE	KGWC
11	301429	18.9S 117.4E	PCN 4	T3.5/3.5	INIT OBS	KGWC
12	302009	19.6S 117.3E	PCN 6			KGWC
13	302239	20.1S 117.1E	PCN 6			KGWC
14	310309	21.1S 117.1E	PCN 1		EYE DIA .6 NM	KGWC
15	310958	22.0S 116.7E	PCN 3			KGWC
16	311200	22.2S 116.8E	PCN 6			PHIK
17	311408	22.8S 117.1E	PCN 4			KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 18P
BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND		POSIT	WIND		ERRORS	POSIT	WIND		ERRORS	POSIT	WIND		ERRORS	POSIT	WIND		ERRORS
020200Z	11.6	156.7	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
020212Z	13.5	156.0	35	12.5	156.0	35	60	0.0	12.6	152.7	60	109	25	14.8	150.2	75	178	40	0.0
020300Z	14.4	153.8	35	13.9	154.2	40	38	5	14.2	151.6	45	97	10	16.0	149.5	50	258	15	0.0
020312Z	14.1	151.8	35	14.1	152.0	45	13	10	15.2	149.2	50	146	15	16.8	147.0	50	249	15	0.0
020400Z	13.5	150.1	35	14.2	150.4	40	45	5	15.2	147.7	50	146	15	16.5	144.7	35	191	5	0.0
020412Z	13.4	147.5	35	13.9	148.0	35	42	0	14.8	144.2	30	95	5	0.0	0.0	0.0	0.0	0.0	0.0
020500Z	13.6	145.8	35	13.4	144.8	35	60	0	13.6	140.9	35	158	5	0.0	0.0	0.0	0.0	0.0	0.0
020512Z	13.3	144.7	35	13.5	143.0	30	100	5	14.1	138.9	50	270	25	0.0	0.0	0.0	0.0	0.0	0.0
020600Z	13.5	143.6	35	13.3	142.0	30	83	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
020612Z	14.7	143.5	25	14.7	143.6	25	6	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	50.	146.	219.	0.	0.	0.	0.	0.
AVG RIGHT ANGLE ERROR	32.	124.	142.	0.	0.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	0.	14.	19.	0.	0.	0.	0.	0.
AVG INTENSITY BIAS	0.	13.	19.	0.	0.	0.	0.	0.
NUMBER OF FORECASTS	9	7	4	0	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 941. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 9. KNOTS

TROPICAL CYCLONE 18P
FIX POSITIONS FOR CYCLONE NO. 18

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	311800	15.3S 161.8E	PCN 5			PHIK
2	011800	15.3S 160.8E	PCN 6			PHIK
* 3	012306	12.8S 156.2E	PCN 6	T1.0/1.0	INIT OBS ULAC 13.2S 160.2E	KGWC
* 4	020000	13.2S 160.2E	PCN 6			PHIK
* 5	020300	12.7S 158.6E	PCN 6	T3.0/3.0	INIT OBS	PHIK
6	020714	12.3S 156.0E	PCN 6		ULAC 13.4S 156.2E	KGWC
7	020900	13.0S 156.9E	PCN 4			RODN
8	021146	13.3S 155.8E	PCN 6		ULAC 14.2S 155.5E	KGWC
* 9	021200	13.8S 155.8E	PCN 6			KGWC
10	021749	13.8S 155.8E	PCN 6		ULAC 14.2S 154.7E	PHIK
11	021800	14.4S 154.7E	PCN 6			PHIK
12	021954	13.3S 154.2E	PCN 6		ULAC 13.7S 155.0E	KGWC
13	030000	14.2S 154.5E	PCN 6			PHIK
14	030027	14.0S 153.9E	PCN 5	T2.5/2.5 /D1.5/25HRS	ULAC 14.2S 154.4E	KGWC
* 15	030300	14.5S 154.6E	PCN 6	T2.0/2.0 /U1.0/24HRS		PHIK
16	030730	14.2S 151.5E	PCN 4	T2.5/2.5	INIT OBS	RODN
17	030834	13.7S 150.7E	PCN 6		ULAC 14.0S 153.2E	KGWC
18	031126	13.8S 150.0E	PCN 6	T2.5/2.5	INIT OBS ULAC 13.4S 152.8E	KGWC
* 19	031200	14.8S 153.7E	PCN 6			PHIK
20	031600	14.2S 150.7E	PCN 6	T2.0/2.0	INIT OBS ULCC FIX	PCTU
21	031600	14.3S 150.8E	PCN 6			RPMK
22	031736	13.9S 150.8E	PCN 6		ULAC 13.0S 150.1E	KGWC
* 23	031800	14.7S 153.1E	PCN 6			PHIK
24	031800	13.9S 150.5E	PCN 6		ULCC FIX	PCTU
25	032100	14.5S 151.1E	PCN 6			RPMK
26	032114	13.5S 150.6E	PCN 6		ULAC 14.0S 151.1E	KGWC
27	040000	13.8S 150.2E	PCN 6			PCTU
28	040007	13.0S 149.6E	PCN 5	T2.5/2.5 /S0.0/24HRS	ULAC 12.9S 151.5E	KGWC
29	040300	13.0S 149.8E	PCN 6	T2.5/2.5	INIT OBS	PCTU
30	040600	12.8S 149.3E	PCN 6			PCTU
31	040813	13.1S 147.7E	PCN 6		ULAC 12.0S 149.7E	KGWC
32	040900	13.4S 145.1E	PCN 6			PCTU
33	041200	13.4S 147.6E	PCN 6			PCTU
34	041247	13.7S 146.8E	PCN 6	T2.0/2.5 /W0.5/24HRS	ULAC 14.5S 148.0E	KGWC
35	041724	14.4S 146.2E	PCN 6		ULAC 13.4S 147.5E	KGWC
* 36	042053	12.4S 145.2E	PCN 6			KGWC
37	042100	14.0S 145.8E	PCN 6		ULCC FIX	PCTU
38	050128	13.8S 146.1E	PCN 5	T3.0/3.0 /D0.5/25HRS		KGWC
39	050300	13.4S 145.1E	PCN 6	T2.5/2.5+/S0.0/24HRS		PCTU
40	050752	12.9S 146.4E	PCN 6			KGWC
41	051200	13.6S 144.9E	PCN 6		ULCC FIX	PCTU

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

FIX NO.	TIME (Z)	POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	041752	13.25	68.8E	PCN 6		
2	050157	13.65	68.7E	PCN 6	INIT OBS ULAC 13.7S 070.5E	KGWC
3	050632	12.85	70.1E	PCN 3		KGWC
4	051114	12.55	69.3E	PCN 4	EXP LLCC	KGWC
5	051256	12.95	69.1E	PCN 4	EXP LLCC	KGWC
6	051731	13.05	68.8E	PCN 4	EXP LLCC	KGWC
7	052353	13.45	67.3E	PCN 6		KGWC
8	052812	14.85	67.0E	PCN 6	T1.5/1.5 /S0.0/24HRS	KGWC
9	061014	14.40	67.40E	PCN 6	T2.5/2.5 /D1.0/24HRS	FJDG
10	061102	15.25	67.6E	PCN 4		KGWC
11	061416	15.85	66.3E	PCN 4	EXP LLCC	KGWC
12	061711	15.55	65.5E	PCN 4	EXP LLCC ULAC 14.5S 062.1E	KGWC
13	062346	15.95	65.4E	PCN 3	EXP LLCC	KGWC
14	070256	14.45	64.2E	PCN 3	EXP LLCC	KGWC
15	070552	14.75	64.0E	PCN 4	T1.5/1.5 /S0.0/24HRS	KGWC
16	071003	14.35	60.0E	PCN 5	T2.5/2.5 /S0.0/24HRS	FJDG
17	071231	15.55	61.9E	PCN 4		KGWC
18	071355	15.85	61.2E	PCN 4	EXP LLCC	KGWC
19	071832	16.55	60.6E	PCN 4	EXP LLCC ULAC 15.0S 059.5E	KGWC
20	080235	16.45	57.4E	PCN 6	EXP LLCC ULAC 15.1S 058.4E	KGWC
21	080713	16.15	55.7E	PCN 5	ULAC 16.0S 056.9E	KGWC
22	081812	15.75	53.0E	PCN 6	ULAC 16.3S 055.7E	KGWC
23	090103	17.05	52.0E	PCN 6	INIT OBS ULAC 16.1S 052.0E	KGWC
24	090354	17.55	51.3E	PCN 6		KGWC
25	090453	17.11	51.1E	PCN 6	ULAC 17.8S 051.8E	KGWC
26	091123	17.55	55.4E	PCN 5	ULAC 18.2S 051.1E	FJDG
27	091206	17.45	51.8E	PCN 6		KGWC
28	091453	18.45	50.9E	PCN 5		KGWC
29	091752	18.45	49.7E	PCN 5		KGWC
30	100334	17.55	50.3E	PCN 6	T4.0/4.0 /D1.0/24HRS	KGWC
31	100632	19.15	47.8E	PCN 6		KGWC
32	101113	17.75	45.0E	PCN 5	ULAC 16.0S 050.1E	FJDG
33	101335	19.45	46.2E	PCN 5		KGWC
34	101425	19.65	45.7E	PCN 6		KGWC
35	101913	19.15	44.9E	PCN 6		KGWC
36	110753	19.45	43.9E	PCN 5	T0.5/0.5+	KGWC
					INIT OBS	

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	081800	16.9S 56.0E	035	090	61976 61995 SHIP
2	090000	16.8S 55.3E	040	070	61976 61995 61984
3	090630	17.0S 53.8E	035	080	61976 61995 61984

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 205 BEST TRACK DATA

MO/DA/HR	BEST TRACK			WARNING			24 HOUR FORECAST			48 HOUR FORECAST			72 HOUR FORECAST		
	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND
021018Z	14.5	127.2	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
021106Z	14.5	126.0	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
021118Z	14.7	124.3	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
021206Z	15.1	122.6	35	15.1	122.2	35	23	0.0	16.2	118.0	45	13	11.5	115.1	55
021218Z	15.9	120.4	45	16.0	120.7	45	18	0.0	17.7	116.9	65	14	11.3	113.2	70
021306Z	16.3	117.8	55	16.6	117.6	55	21	0.0	18.8	113.2	75	13	10.9	109.1	95
021318Z	16.9	114.6	55	16.8	114.6	55	16	0.0	18.8	108.7	55	7	10.4	104.3	95
021406Z	17.8	111.0	55	18.0	110.8	55	17	0.0	20.5	104.9	40	6	9.9	99.9	35
021418Z	18.8	107.4	55	19.2	107.5	55	25	0.0	22.5	102.3	55	20	9.9	99.9	45
021506Z	19.7	103.7	55	19.6	103.8	60	13	10	22.3	97.6	45	23	9.4	94.2	35
021518Z	20.6	99.9	40	20.5	101.5	45	95	0.0	23.0	93.1	35	38	9.5	95.3	25
021606Z	21.7	96.5	30	21.6	96.6	40	17	0.0	19.7	89.1	30	9	8.4	84.8	30
021618Z	22.5	93.1	30	22.4	93.1	30	12	0.0	20.4	87.4	30	8	8.0	80.0	0
021706Z	23.7	90.3	25	23.6	90.5	30	17	0.0	0.0	0.0	0.0	0	0.0	0.0	0
021718Z	24.3	88.0	20	24.2	88.0	0	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0
021806Z	25.1	86.1	20	25.0	86.0	0	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
AVG FORECAST POSIT ERROR	AVG RIGHT ANGLE ERROR	AVG INTENSITY MAGNITUDE ERROR	AVG INTENSITY BIAS	NUMBER OF FORECASTS	AVG FORECAST POSIT ERROR	AVG RIGHT ANGLE ERROR	AVG INTENSITY MAGNITUDE ERROR
2.4	17	4	3	11	2.4	17	4
142	89	10	6	10	142	89	10
375	229	12	12	9	375	229	12

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 2408. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 13. KNOTS

TROPICAL CYCLONE 205 FIX POSITIONS FOR CYCLONE NO. 20

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	101800	14.5S 127.3E	PCN 6			PGTW
2	102100	14.5S 126.8E	PCN 6			PGTW
3	110000	14.3S 126.6E	PCN 6			PGTW
4	110240	14.0S 126.4E	PCN 6		ULCC 14.4S 126.2E	PGTW
5	110300	14.0S 126.3E	PCN 6		EXP LLCC	KGWC
6	110600	14.1S 126.3E	PCN 6		ULCC FIX	PGTW
7	110817	14.3S 125.5E	PCN 6		EXP LLCC ULCC 13.9S 125.6E	PGTW
8	110900	15.3S 125.0E	PCN 6			KGWC
9	110907	14.0S 125.2E	PCN 6		ULCC 13.9S 125.2E	PGTW
10	111200	14.5S 125.5E	PCN 6			KGWC
11	111348	14.6S 124.6E	PCN 6			PGTW
12	111600	14.3S 124.9E	PCN 6		ULAC 13.9S 123.6E	KGWC
13	111800	14.4S 124.6E	PCN 6	T2.0/2.0	INIT OBS	PGTW
14	111920	15.2S 124.2E	PCN 6			PGTW
15	112100	14.4S 124.2E	PCN 6		ULAC 13.6S 124.3E	KGWC
16	112147	15.0S 123.6E	PCN 6			PGTW
17	120000	15.1S 123.2E	PCN 6		ULAC 12.8S 123.4E	KGWC
18	120229	14.9S 122.4E	PCN 6	T1.5/1.5	INIT OBS ULAC 13.7S 122.2E	PGTW
19	120300	15.0S 123.0E	PCN 6	T2.0/2.0	INIT OBS	KGWC
20	120600	15.0S 122.4E	PCN 6			PGTW
21	120804	15.2S 121.4E	PCN 6		ULAC 15.5S 122.5E	KGWC
22	120900	15.0S 122.0E	PCN 6			PGTW
23	121027	15.4S 121.8E	PCN 6		ULAC 15.9S 122.5E	KGWC
24	121200	15.4S 121.6E	PCN 6			PGTW
25	121328	16.6S 120.0E	PCN 6	T2.5/2.5	INIT OBS ULCC 15.5S 121.1E	KGWC
26	121600	15.8S 121.0E	PCN 6	T3.0/3.0 /D1.0/24HRS		PGTW
27	121800	15.8S 120.8E	PCN 6			PGTW
28	121907	16.8S 119.9E	PCN 6		ULAC 15.3S 121.0E	KGWC
29	122100	16.0S 120.1E	PCN 6			PGTW
30	122307	16.4S 119.0E	PCN 6		ULAC 15.3S 119.9E	KGWC
31	130000	16.0S 119.2E	PCN 6		ULCC FIX	PGTW
32	130209	16.1S 118.3E	PCN 6	T2.5/2.5 /D1.0/24HRS		KGWC
33	130300	16.0S 118.3E	PCN 6	T3.5/3.5 /D1.5/24HRS		PGTW
34	130600	16.3S 117.6E	PCN 6		ULCC FIX	PGTW
35	130752	16.4S 117.4E	PCN 6			KGWC
36	130900	16.5S 116.8E	PCN 6		ULCC FIX	PGTW
37	131006	16.3S 116.5E	PCN 6		EYE FIX	KGWC
38	131200	16.6S 116.1E	PCN 6		ULCC FIX	PGTW
39	131449	16.5S 115.5E	PCN 6	T3.0/3.0 /D0.5/25HRS		KGWC
40	131600	16.7S 115.1E	PCN 6	T3.0/3.0 /S0.0/24HRS		PGTW
41	131800	16.9S 114.6E	PCN 6			KGWC
42	132036	16.7S 113.4E	PCN 6			PGTW
43	132245	17.2S 112.5E	PCN 6			KGWC
44	140000	17.4S 111.6E	PCN 6		ULCC FIX	PGTW
45	140300	17.8S 111.3E	PCN 6	T3.0/3.5 /U0.5/24HRS		KGWC
46	140330	17.6S 111.3E	PCN 6	T3.5/3.5 /D0.5/25HRS		PGTW
47	140600	18.0S 110.6E	PCN 6			KGWC
48	140900	18.2S 110.0E	PCN 6		ULCC FIX	PGTW
49	140921	18.1S 109.6E	PCN 6			KGWC
50	141126	17.8S 109.3E	PCN 6			PGTW
51	141200	18.5S 109.3E	PCN 6			KGWC
52	141429	18.8S 108.5E	PCN 6			PGTW
53	142024	18.9S 107.1E	PCN 6	T4.0/4.0 /D1.0/24HRS		KGWC
54	150000	19.1S 105.4E	PCN 6			PGTW

11	150130	14.75	46.3E	PCN 6		ULAC 14.8S 046.1E	KGWC
12	150329	14.95	46.3E	PCN 3		EXP LLCC ULAC 14.2S 046.2E	KGWC
13	150532	13.85	45.7E	PCN 4	T3.0/3.0 /D0.5/24HRS		KGWC
14	151232	13.55	45.6E	PCN 6			KGWC
15	151427	13.45	45.0E	PCN 5			KGWC
16	151553	12.45	46.6E	PCN 4	T3.0/3.5 /W0.5/24HRS	EXP LLCC	KGWC
17	151913	12.15	45.5E	PCN 5	T3.5/3.5 /D1.0/24HRS	ULAC 13.2S 045.7E	KGWC
18	160114	12.55	45.6E	PCN 6		ULAC 11.8S 043.7E	KGWC
19	160307	12.55	45.5E	PCN 5		ULAC 12.2S 044.3E	KGWC
20	160745	12.55	45.9E	PCN 3	T2.5/3.0 /W0.5/25HRS	EXP LLCC ULAC 11.5S 042.5E	KGWC
21	161547	12.35	46.6E	PCN 4		EXP LLCC ULAC 13.9S 044.8E	KGWC
22	170104	12.45	47.4E	PCN 4			KGWC
23	170246	12.05	47.0E	PCN 4		EXP LLCC	KGWC
24	170723	12.45	47.3E	PCN 5	T2.5/2.5 /S0.0/24HRS		KGWC
25	171526	12.45	47.3E	PCN 5			KGWC
26	171832	12.25	46.3E	PCN 5			KGWC
27	180052	12.15	46.6E	PCN 6	T2.0/2.5 /W0.5/24HRS		KGWC
28	180406	13.15	48.1E	PCN 6			KGWC
29	180713	13.45	48.0E	PCN 6	T1.5/2.5 /W1.0/24HRS		KGWC
30	181127	14.45	52.7E	PCN 5	T2.0/2.0	INIT OBS	KGWC
31	181505	13.85	47.9E	PCN 6			FJDG
32	181812	14.05	48.0E	PCN 6			KGWC

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
* 1	180000	12.15 47.7E	035	045	61968

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 22S BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	
021306Z	12.1 101.2	25	0.0 0.0 0.0	12.1 101.2	25	0.0 0.0 0.0	12.1 101.2	25	0.0 0.0 0.0	12.1 101.2	25	0.0 0.0 0.0	12.1 101.2	25	0.0 0.0 0.0	12.1 101.2	25	0.0 0.0 0.0	
021318Z	12.3 99.7	30	0.0 0.0 0.0	12.3 99.7	30	0.0 0.0 0.0	12.3 99.7	30	0.0 0.0 0.0	12.3 99.7	30	0.0 0.0 0.0	12.3 99.7	30	0.0 0.0 0.0	12.3 99.7	30	0.0 0.0 0.0	
021405Z	13.3 100.8	40	13.0 100.2 35	13.3 100.8	40	13.0 100.2 35	13.3 100.8	40	13.0 100.2 35	13.3 100.8	40	13.0 100.2 35	13.3 100.8	40	13.0 100.2 35	13.3 100.8	40	13.0 100.2 35	
021418Z	13.1 101.6	40	14.4 99.4 40	13.1 101.6	40	14.4 99.4 40	13.1 101.6	40	14.4 99.4 40	13.1 101.6	40	14.4 99.4 40	13.1 101.6	40	14.4 99.4 40	13.1 101.6	40	14.4 99.4 40	
021506Z	13.0 102.6	40	13.1 100.1 40	13.0 102.6	40	13.1 100.1 40	13.0 102.6	40	13.1 100.1 40	13.0 102.6	40	13.1 100.1 40	13.0 102.6	40	13.1 100.1 40	13.0 102.6	40	13.1 100.1 40	
021518Z	13.1 103.8	45	14.0 100.9 40	13.1 103.8	45	14.0 100.9 40	13.1 103.8	45	14.0 100.9 40	13.1 103.8	45	14.0 100.9 40	13.1 103.8	45	14.0 100.9 40	13.1 103.8	45	14.0 100.9 40	
021606Z	12.9 105.0	45	13.8 105.1 45	12.9 105.0	45	13.8 105.1 45	12.9 105.0	45	13.8 105.1 45	12.9 105.0	45	13.8 105.1 45	12.9 105.0	45	13.8 105.1 45	12.9 105.0	45	13.8 105.1 45	
021618Z	12.6 105.0	50	14.8 106.3 50	12.6 105.0	50	14.8 106.3 50	12.6 105.0	50	14.8 106.3 50	12.6 105.0	50	14.8 106.3 50	12.6 105.0	50	14.8 106.3 50	12.6 105.0	50	14.8 106.3 50	
021706Z	12.0 104.2	45	15.9 104.5 45	12.0 104.2	45	15.9 104.5 45	12.0 104.2	45	15.9 104.5 45	12.0 104.2	45	15.9 104.5 45	12.0 104.2	45	15.9 104.5 45	12.0 104.2	45	15.9 104.5 45	
021718Z	12.8 103.1	45	17.2 103.2 45	12.8 103.1	45	17.2 103.2 45	12.8 103.1	45	17.2 103.2 45	12.8 103.1	45	17.2 103.2 45	12.8 103.1	45	17.2 103.2 45	12.8 103.1	45	17.2 103.2 45	
021806Z	17.6 101.9	45	17.9 101.2 45	17.6 101.9	45	17.9 101.2 45	17.6 101.9	45	17.9 101.2 45	17.6 101.9	45	17.9 101.2 45	17.6 101.9	45	17.9 101.2 45	17.6 101.9	45	17.9 101.2 45	
021818Z	18.5 100.7	45	18.5 100.5 45	18.5 100.7	45	18.5 100.5 45	18.5 100.7	45	18.5 100.5 45	18.5 100.7	45	18.5 100.5 45	18.5 100.7	45	18.5 100.5 45	18.5 100.7	45	18.5 100.5 45	
021906Z	19.7 99.9	40	19.5 99.6 40	19.7 99.9	40	19.5 99.6 40	19.7 99.9	40	19.5 99.6 40	19.7 99.9	40	19.5 99.6 40	19.7 99.9	40	19.5 99.6 40	19.7 99.9	40	19.5 99.6 40	
021918Z	20.7 99.2	40	20.6 99.7 40	20.7 99.2	40	20.6 99.7 40	20.7 99.2	40	20.6 99.7 40	20.7 99.2	40	20.6 99.7 40	20.7 99.2	40	20.6 99.7 40	20.7 99.2	40	20.6 99.7 40	
022006Z	21.8 98.2	40	21.8 98.8 40	21.8 98.2	40	21.8 98.8 40	21.8 98.2	40	21.8 98.8 40	21.8 98.2	40	21.8 98.8 40	21.8 98.2	40	21.8 98.8 40	21.8 98.2	40	21.8 98.8 40	
022018Z	23.5 96.4	35	23.7 97.2 30	23.5 96.4	35	23.7 97.2 30	23.5 96.4	35	23.7 97.2 30	23.5 96.4	35	23.7 97.2 30	23.5 96.4	35	23.7 97.2 30	23.5 96.4	35	23.7 97.2 30	
022106Z	26.0 94.5	30	25.8 94.6 30	26.0 94.5	30	25.8 94.6 30	26.0 94.5	30	25.8 94.6 30	26.0 94.5	30	25.8 94.6 30	26.0 94.5	30	25.8 94.6 30	26.0 94.5	30	25.8 94.6 30	

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS				
AVG FORECAST POSIT ERROR	URNG	24-HR	48-HR	72-HR	URNG	24-HR	48-HR	72-HR
54	54	179	242	0	0	0	0	0
AVG RIGHT ANGLE ERROR	26	94	130	0	0	0	0	0
AVG INTENSITY MAGNITUDE ERROR	1	6	8	0	0	0	0	0
AVG INTENSITY FIAS	-1	-0	0	0	0	0	0	0
NUMBER OF FORECASTS	15	13	11	0	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1416. NM

AVERAGE SPEED OF TROPICAL CYCLONE IS 7. KNOTS

TROPICAL CYCLONE 22S FIX POSITIONS FOR CYCLONE NO. 22

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCR	DVORAK CODE	COMMENTS	SITE
1	130000	11.45 102.6E	PCN 6		ULCC FIX	PGTW
2	130300	11.55 101.4E	PCN 6	T1.5/1.5	INIT OBS ULCC FIX	PGTW
3	130900	12.15 101.1E	PCN 6		ULCC FIX	PGTW
4	131200	12.25 100.2E	PCN 6		ULCC FIX	PGTW
5	131440	12.75 99.9E	PCN 6	T1.5/1.5	INIT OBS ULAC 12.2S 099.7E	KGWC
6	131600	12.55 99.4E	PCN 6	T1.5/1.5	INIT OBS	PGTW
7	131800	12.75 98.8E	PCN 6			PGTW
8	132036	12.95 98.8E	PCN 6			KGWC
9	140000	13.35 101.1E	PCN 6			PGTW
10	140027	12.55 99.8E	PCN 6		ULAC 12.5S 100.6E	KGWC
11	140300	13.35 100.9E	PCN 6	T3.0/3.0 /D1.5/24HRS	ULCC FIX	PGTW
12	140330	13.65 100.0E	PCN 5	T1.5/1.5	INIT OBS ULAC 12.7S 100.1E	KGWC
13	140600	13.65 101.2E	PCN 6			PGTW
14	140900	14.05 101.3E	PCN 6			PGTW
15	140921	12.55 99.7E	PCN 5			KGWC
16	141126	13.25 99.6E	PCN 6			KGWC
17	141429	13.95 99.9E	PCN 6			KGWC
18	142024	13.65 99.8E	PCN 6			KGWC
19	150000	12.25 102.1E	PCN 6			PGTW
20	150006	13.45 100.0E	PCN 6			KGWC
21	150300	12.85 102.4E	PCN 4	T2.5/3.0 /W0.5/24HRS	EXP LLCC	PGTW
22	150310	13.15 100.0E	PCN 5	T1.0/1.5 /W0.5/24HRS	ULAC 12.6S 100.4E	KGWC
23	150600	13.05 102.6E	PCN 4		EXP LLCC	PGTW
24	150900	12.95 102.4E	PCN 6			PGTW
25	150903	12.55 99.9E	PCN 5			KGWC
26	151200	12.95 103.0E	PCN 6			PGTW
27	151500	12.85 102.0E	PCN 6	T2.5/2.5	ULAC 12.7S 103.3E	KGWC
28	151500	13.05 103.6E	PCN 6	T3.0/3.0	INIT OBS	PGTW
29	151800	13.05 103.9E	PCN 6			PGTW
30	15201	13.05 103.6E	PCN 6			KGWC
31	152100	13.35 104.1E	PCN 6			PGTW

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	
			DST WIND			DST WIND			DST WIND			DST WIND			DST WIND			DST WIND	
021300Z	18	25	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021312Z	18	25	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021324Z	18	25	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021336Z	18	25	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021348Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021400Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021412Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021424Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021436Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021448Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021500Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021512Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021524Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021536Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021548Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021600Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021612Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021624Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021636Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021648Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021700Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021712Z	16	35	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0
021724Z	16	35	0.0	0.0	-0.														

255

TROPICAL CYCLONE 23S
FIX POSITIONS FOR CYCLONE NO. 23

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	120552	16.35 62.9E	PCN 6	T1.5/1.5	INIT OBS	KGWC
2	121832	17.55 60.4E	PCN 6			KGWC
3	130013	18.25 59.9E	PCN 6		ULAC 13.15 059.3E	KGWC
4	130713	19.15 59.0E	PCN 5	T1.0/1.5 /W0.5/24HRS		KGWC
5	131258	19.45 59.3E	PCN 5			KGWC
6	131328	19.50 59.8E	PCN 6			KGWC
7	131812	19.75 59.8E	PCN 6			KGWC
8	140000	17.00 59.0E	PCN 6			KGWC
9	140203	17.00 59.0E	PCN 6			KGWC
10	140653	16.25 57.0E	PCN 6	T1.5/1.5 /D0.5/25HRS		KGWC
11	141030	15.55 56.0E	PCN 6	T1.0/1.0	INIT OBS	KGWC
12	141245	15.45 56.1E	PCN 6		ULAC 15.15 057.2E	FJDG
13	141448	15.35 57.7E	PCN 6			KGWC
14	141752	15.75 57.3E	PCN 6	T2.5/2.5	INIT OBS	KGWC
15	142348	16.05 56.9E	PCN 6		ULAC 15.05 056.6E	KGWC
16	150329	16.25 57.8E	PCN 6			KGWC
17	150632	15.95 57.9E	PCN 4	T1.5/1.5 /S0.0/24HRS	EXP LLCC	KGWC
18	151019	16.15 57.9E	PCN 5	T1.5/1.5 /W0.5/24HRS		KGWC
19	151237	16.35 57.5E	PCN 6		ULAC 15.95 057.8E	FJDG
20	151427	16.55 56.5E	PCN 6			KGWC
21	151732	16.55 56.0E	PCN 6	T2.5/2.5 /S0.0/24HRS		KGWC
22	152335	15.95 55.8E	PCN 6		ULAC 15.65 055.5E	KGWC
23	160515	16.05 55.9E	PCN 5		ULAC 15.65 055.7E	KGWC
24	160612	15.85 55.7E	PCN 5	T3.0/3.0 /D1.5/24HRS	ULAC 15.25 055.6E	KGWC
25	161008	15.25 54.0E	PCN 5			FJDG
26	161220	15.45 54.8E	PCN 6		ULAC 15.35 055.2E	KGWC
27	161406	15.35 54.6E	PCN 6			KGWC
28	161853	16.75 55.3E	PCN 6	T2.5/2.5 /S0.0/25HRS		KGWC
29	162322	16.95 55.6E	PCN 6			KGWC
30	170246	16.35 55.0E	PCN 4		EXP LLCC	KGWC
31	170733	16.75 55.7E	PCN 5	T2.0/3.0 /W1.0/24HRS		KGWC
32	171207	16.95 55.0E	PCN 4		ULAC 16.75 053.7E	KGWC
33	171832	17.55 55.0E	PCN 4	T1.5/2.5 /W1.0/24HRS	EXP LLCC ULAC 17.05 052.0E	KGWC
34	180032	17.75 54.8E	PCN 4		EXP LLCC ULAC 16.95 051.9E	KGWC
35	180258	17.00 53.0E	PCN 5			KGWC
36	180713	17.65 53.3E	PCN 5	T1.5/2.0 /W0.5/24HRS	ULAC 16.05 051.8E	KGWC
37	181505	17.05 53.1E	PCN 5		ULAC 16.65 052.1E	KGWC
38	181812	16.25 52.9E	PCN 5	T2.5/2.5 /D1.0/24HRS	ULAC 16.35 052.4E	KGWC
39	182231	17.45 52.5E	PCN 5		ULAC 16.35 052.3E	KGWC
40	190345	16.95 52.8E	PCN 5		ULAC 16.35 052.0E	KGWC
41	190653	16.95 52.8E	PCN 5		ULAC 16.35 052.3E	KGWC
42	191117	16.95 52.3E	PCN 5		ULAC 16.35 052.0E	KGWC
43	191117	15.85 52.2E	PCN 5	T2.0/2.0 /S0.0/24HRS		FJDG
44	191443	16.35 52.2E	PCN 1		EYE FIX ULAC 16.45 052.6E	KGWC
45	191752	16.95 52.5E	PCN 6	T3.0/3.0 /D0.5/24HRS	ULAC 16.25 052.2E	KGWC
46	200324	17.45 52.2E	PCN 6			KGWC
47	200633	17.85 51.9E	PCN 6	T2.5/2.5 /S0.0/24HRS	ULAC 18.35 052.3E	KGWC
48	201106	18.95 50.6E	PCN 5			KGWC
49	201108	18.15 51.7E	PCN 5	T2.5/2.5 /S0.0/24HRS		FJDG
50	201423	18.55 50.5E	PCN 6			KGWC
51	201913	19.35 50.2E	PCN 6	T3.5/3.5 /D0.5/25HRS		KGWC
52	202210	20.05 51.0E	PCN 6			KGWC
53	2010302	20.85 50.5E	PCN 6			KGWC
54	2010754	20.65 50.8E	PCN 5	T3.0/3.0 /D0.5/25HRS		KGWC
55	2011056	21.45 50.1E	PCN 4		EYE FIX	KGWC
56	2011058	20.45 49.5E	PCN 4		EYE FIX	FJDG
57	2011401	21.45 48.8E	PCN 4		EYE FIX	KGWC
58	2011853	21.35 50.0E	PCN 5	T4.5/4.5 /D1.0/24HRS	EYE FIX	KGWC
59	202041	21.85 50.1E	PCN 5			KGWC
60	2020733	21.85 50.8E	PCN 5	T3.0/3.0 /S0.0/24HRS		KGWC
61	2021045	22.05 50.7E	PCN 5			KGWC
62	2021521	22.55 50.2E	PCN 5			KGWC
63	2021833	22.10 50.9E	PCN 5	T2.5/3.5 /W2.0/24HRS	ULAC 22.55 052.2E	KGWC
64	2022148	21.85 53.1E	PCN 5		EXP LLCC ULAC 22.55 053.0E	KGWC
65	2030410	22.45 50.6E	PCN 5		ULAC 22.75 054.2E	KGWC
66	2030713	22.85 51.3E	PCN 5	T2.5/3.0 /W0.5/24HRS	ULAC 23.85 051.8E	KGWC
67	2031034	22.75 52.4E	PCN 5		ULAC 23.05 051.5E	KGWC
68	2031500	23.05 51.6E	PCN 5		ULAC 24.05 052.1E	KGWC
69	2031812	23.25 52.5E	PCN 6	T3.0/3.0 /D0.5/24HRS	ULAC 24.65 052.2E	KGWC
70	2032320	23.45 53.2E	PCN 6		ULAC 24.55 052.6E	KGWC
71	2040340	24.35 52.6E	PCN 6			KGWC
72	240653	24.35 53.0E	PCN 5	T2.5/2.5 /S0.0/24HRS	ULAC 24.65 054.3E	KGWC
73	241023	24.45 53.2E	PCN 6		ULAC 24.85 054.6E	KGWC
74	241024	24.65 53.0E	PCN 5	T2.5/2.5	INIT OBS	FJDG
75	241438	24.35 53.8E	PCN 6			KGWC
76	241752	25.45 54.6E	PCN 6			KGWC
77	242127	26.15 53.9E	PCN 6		ULAC 27.05 055.6E	KGWC
78	250319	25.35 53.0E	PCN 3		EXP LLCC	KGWC
79	250633	25.45 52.8E	PCN 3	T1.0/2.0 /W1.5/24HRS	EXP LLCC	KGWC
80	251155	25.05 52.6E	PCN 4		EXP LLCC	KGWC
81	251732	25.95 53.0E	PCN 4		EXP LLCC	KGWC
82	260612	26.05 53.8E	PCN 6	T2.0/2.0 /D1.0/24HRS		KGWC
83	261712	27.05 53.0E	PCN 6			KGWC
84	270734	30.35 54.2E	PCN 6	T1.0/2.0 /W1.0/25HRS		KGWC
85	271833	30.75 53.2E	PCN 4			KGWC
86	280713	32.65 53.1E	PCN 3		EXP LLCC	KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 24S
BEST TRACK DATA

MO/DA/HR	BEST TRACK			WARNING			24 HOUR FORECAST			48 HOUR FORECAST			72 HOUR FORECAST		
	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND
021812Z	11.3	75.7	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
021900Z	12.8	77.6	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
021912Z	13.8	79.1	35	13.4	79.4	35	25.5	0.0	16.3	70.0	55	62.7	25	17.7	67.0
022000Z	15.2	80.8	35	15.4	80.4	35	26.6	5.0	18.3	79.2	35	42.7	10	0.0	0.0
022012Z	17.0	83.3	35	16.7	81.1	30	128	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
022100Z	18.6	86.7	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ALL FORECASTS
 WRNG 24-HR 48-HR 72-HR
 TYPHOONS WHILE OVER 35 KTS
 WRNG 24-HR 48-HR 72-HR

AVG FORECAST POSIT ERROR	110.	407.	1124.	0.	0.	0.	0.
AVG RIGHT ANGLE ERROR	76.	239.	613.	0.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	3.	18.	45.	0.	0.	0.	0.
AVG INTENSITY BIAS	4.	3.	1.	0.	0.	0.	0.
NUMBER OF FORECASTS	4	3	1	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 756. NM
 AVERAGE SPEED OF TROPICAL CYCLONE IS 13. KNOTS

TROPICAL CYCLONE 24S
 FIX POSITIONS FOR CYCLONE NO. 24

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	170552	13.05 73.6E	PCN 6	T1.5/1.5	INIT OBS	KGWC
2	170958	12.75 71.3E	PCN 5	T1.5/1.5	INIT OBS	KGWC
3	171651	12.25 70.0E	PCN 6		ULAC 11.9S 089.8E	KGWC
4	180532	12.35 75.3E	PCN 4	T2.5/2.5 /D1.0/24HRS	ULAC 11.5S 073.2E	KGWC
5	180947	11.55 76.2E	PCN 5	T2.0/2.0 /D0.5/24HRS		KGWC
6	181155	11.55 75.6E	PCN 4		ULAC 12.2S 073.4E	KGWC
7	181323	11.85 75.9E	PCN 6		ULAC 12.1S 073.8E	KGWC
8	181631	13.45 77.4E	PCN 4		INIT OBS ULAC 12.0S 74.9E	KGWC
9	190204	13.75 77.4E	PCN 6		ULAC 13.3S 074.6E	KGWC
10	190511	13.95 79.9E	PCN 4	T3.5/3.5 /D1.0/24HRS	ULAC 13.4S 74.0E	KGWC
11	190935	13.55 79.2E	PCN 5	T3.5/3.5 /D1.5/24HRS	ULAC 12.4S 71.7E	KGWC
12	190935	14.45 80.3E	PCN 4			KGWC
13	191302	15.05 79.9E	PCN 4	T1.5/2.5 /W1.0/27HRS	EXP LLCC ULAC 13.6S 71.8E	KGWC
14	191611	16.45 81.8E	PCN 4		EXP LLCC	KGWC
15	200142	16.35 82.5E	PCN 4		EXP LLCC	KGWC
16	200451	16.35 82.5E	PCN 4		EXP LLCC	KGWC
17	200924	16.35 82.5E	PCN 4		EXP LLCC	KGWC
18	200925	16.35 82.5E	PCN 5	T1.5/2.5 /W1.5/24HRS		KGWC
19	201241	18.4S 84.9E	PCN 4		EXP LLCC	FJDG
20	201550	18.4S 84.9E	PCN 6			KGWC
21	210431	18.7S 88.2E	PCN 6	T0.5/1.0 /W0.5/24HRS		KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 25S
 BEST TRACK DATA

MO/DA/HR	BEST TRACK		WARNING		24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS
021606Z	12.7 124.3	30	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
021618Z	13.5 120.8	25	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
021706Z	13.9 120.8	25	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
021718Z	14.1 119.1	30	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
021806Z	15.1 116.9	35	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
021818Z	15.1 116.9	35	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
021906Z	15.3 115.6	45	15.4 115.3	40	18.1 115.3	112.6	55	18.1 115.3	112.6	55	18.1 115.3	112.6	55	18.1 115.3	112.6	55
021918Z	15.4 114.0	55	15.3 113.7	45	18.1 115.3	112.6	55	18.1 115.3	112.6	55	18.1 115.3	112.6	55	18.1 115.3	112.6	55
022006Z	15.5 112.3	65	15.9 112.1	65	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75
022018Z	16.0 110.6	75	16.0 110.4	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75
022106Z	16.0 108.8	65	16.0 108.9	70	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75
022118Z	16.4 106.5	60	16.5 106.5	60	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75
022206Z	17.0 104.3	55	17.0 104.4	55	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75
022218Z	17.3 102.7	55	18.0 102.2	55	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75
022306Z	19.3 101.2	55	19.3 101.3	55	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75
022318Z	21.0 99.4	55	21.0 99.4	55	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75
022406Z	22.9 97.5	55	22.9 97.5	55	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75
022418Z	24.9 95.7	55	24.9 95.7	55	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75
022506Z	26.4 93.3	55	26.4 93.3	55	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75
022518Z	29.0 90.9	55	29.0 90.9	55	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75
022506Z	33.6 97.6	45	33.6 97.6	45	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75	21.1 107.1	109.1	75

ALL FORECASTS
 WRNG 24-HR 48-HR 72-HR
 TYPHOONS WHILE OVER 35 KTS
 WRNG 24-HR 48-HR 72-HR

AVG FORECAST POSIT ERROR	20.	80.	152.	0.	0.	0.	0.
AVG RIGHT ANGLE ERROR	14.	66.	113.	0.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	2.	9.	10.	0.	0.	0.	0.
AVG INTENSITY BIAS	-1.	13.	11.	0.	0.	0.	0.
NUMBER OF FORECASTS	15	13	11	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 2422. NM
 AVERAGE SPEED OF TROPICAL CYCLONE IS 10. KNOTS

TROPICAL CYCLONE 25S
 FIX POSITIONS FOR CYCLONE NO. 25

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	170000	14.35 121.5E	PCN 6	T1.0/1.0	INIT OBS	PGTW
2	170229	14.45 121.3E	PCN 6	T1.5/1.5	INIT OBS	KGWC
3	170843	14.05 118.7E	PCN 5		ULAC 12.8S 121.1E	KGWC
4	170900	14.45 119.4E	PCN 6			KGWC
5	171022	13.05 120.5E	PCN 6		ULAC 14.1S 117.4E	PJTW
6	171222	13.05 119.9E	PCN 6			KGWC
7	171328	13.05 119.9E	PCN 6		ULAC 13.3S 118.5E	PJTW
8	171600	13.85 119.5E	PCN 6	T1.0/1.0	INIT OBS	KGWC
9	171800	14.05 119.4E	PCN 6			PJTW
10	171946	14.05 119.4E	PCN 6		ULAC 13.5S 118.5E	PJTW
11	172302	14.75 118.1E	PCN 6		ULAC 15.4S 116.3E	KGWC
12	180000	15.25 117.4E	PCN 6			KGWC
13	180209	13.95 118.2E	PCN 5	T1.5/1.5 /S0.0/24HRS		PJTW
14	180300	15.45 116.7E	PCN 6	T1.0/1.0 /S0.0/27HRS		KGWC
15	180831	14.85 117.8E	PCN 6			PJTW

16	181001	14.55	117.5E	PCN 6		ULAC 14.4S 116.3E	KGWC
* 17	181200	15.65	115.8E	PCN 6		ULAC 14.0S 115.9E	PGTW
18	181449	15.45	117.9E	PCN 6			KGWC
* 19	181600	15.65	115.6E	PCN 6	T2.0/2.0 /D1.0/24HRS		PGTW
* 20	181800	15.35	115.3E	PCN 6			PGTW
* 21	182100	15.35	114.8E	PCN 6		ULAC 14.5S 117.2E	KGWC
22	182241	15.35	116.8E	PCN 6			PGTW
23	190000	14.95	116.7E	PCN 6	T3.0/3.0 /D2.0/24HRS		KGWC
24	190300	14.15	116.8E	PCN 6	T3.5/3.5 /D2.0/25HRS	ULAC 15.4S 113.9E	PGTW
25	190600	15.15	115.2E	PCN 6		ULAC 14.1S 114.9E	KGWC
26	190611	15.05	115.1E	PCN 5		ULAC 14.5S 114.2E	PGTW
27	190900	15.35	115.0E	PCN 4			KGWC
28	190939	14.95	113.9E	PCN 6		INIT OBS ULAC 16.5S 113.8E	PGTW
29	191200	15.35	114.3E	PCN 6	T3.5/3.5		KGWC
* 30	191429	17.15	113.3E	PCN 6	T3.5/3.5 /D1.5/24HRS	ULAC 15.0S 112.6E	PGTW
31	191600	15.35	114.0E	PCN 6			KGWC
32	191800	15.35	113.8E	PCN 6			PGTW
* 33	191856	16.85	112.8E	PCN 6			KGWC
34	192100	15.25	113.1E	PCN 6			PGTW
35	192220	14.85	112.5E	PCN 6			KGWC
36	200000	15.55	112.4E	PCN 6	T4.0/4.0 /D1.0/24HRS		PGTW
37	200300	14.85	112.7E	PCN 5	T3.5/3.5 /S0.0/24HRS		KGWC
38	200600	15.85	112.2E	PCN 6		ULCC FIX	PGTW
39	200742	15.15	112.0E	PCN 5		ULAC 16.3S 112.0E	KGWC
40	200900	15.85	111.7E	PCN 6			PGTW
41	201100	16.05	111.3E	PCN 6	T4.5/4.5 /D1.0/24HRS		KGWC
42	201200	16.15	111.3E	PCN 6			PGTW
43	201600	15.95	110.8E	PCN 6			KGWC
44	201800	15.95	110.4E	PCN 6			PGTW
* 45	201846	15.75	111.1E	PCN 6			KGWC
46	202100	16.05	109.7E	PCN 6		ULAC 16.8S 110.2E	PGTW
47	202340	16.05	109.2E	PCN 6		ULCC FIX	KGWC
48	210000	16.05	109.7E	PCN 6	T3.0/3.5 /W0.5/24HRS	ULCC FIX	PGTW
49	210249	16.05	109.9E	PCN 5	T3.5/4.0 /W0.5/24HRS	ULCC FIX	PGTW
50	210300	15.75	109.1E	PCN 6		ULCC FIX	KGWC
51	210600	16.15	108.9E	PCN 6		ULCC FIX	PGTW
52	210731	16.05	108.9E	PCN 5		ULCC FIX	KGWC
53	210900	16.25	108.3E	PCN 6		ULCC FIX	PGTW
54	211038	15.85	108.1E	PCN 6		ULCC FIX	KGWC
55	211200	16.25	107.7E	PCN 6	T3.5/3.5 /S0.0/48HRS	ULAC 16.6S 107.5E	PGTW
56	211530	16.95	107.0E	PCN 6	T3.0/3.5 /W1.5/24HRS	ULCC FIX	KGWC
57	211600	16.15	106.7E	PCN 6		ULCC FIX	PGTW
58	211800	16.35	106.1E	PCN 6		ULCC FIX	KGWC
59	211835	16.65	106.5E	PCN 6		ULCC FIX	PGTW
60	212100	16.15	105.6E	PCN 6		ULCC FIX	KGWC
61	212349	17.05	105.4E	PCN 5		ULCC FIX	PGTW
62	220000	16.05	105.2E	PCN 6	T3.5/3.5 /D0.5/24HRS	ULCC FIX	KGWC
63	220229	17.35	105.2E	PCN 6	T3.5/3.5 /S0.0/24HRS	ULCC FIX	PGTW
64	220300	16.85	104.8E	PCN 6		ULCC FIX	KGWC
65	220600	17.15	104.4E	PCN 6		ULCC FIX	PGTW
66	220721	17.55	103.4E	PCN 6		ULCC FIX	KGWC
67	220900	17.05	103.5E	PCN 6		ULAC 17.3S 103.5E	PGTW
68	221017	17.45	104.1E	PCN 6		ULCC FIX	KGWC
69	221200	17.05	102.9E	PCN 6	T3.0/3.5 /W0.5/24HRS	ULAC 17.4S 102.7E	PGTW
70	221510	18.45	102.2E	PCN 6	T3.0/3.5 /S0.0/24HRS	ULCC FIX	KGWC
71	221800	17.45	101.6E	PCN 6		ULAC 18.0S 102.3E	PGTW
72	221824	18.85	103.2E	PCN 6		ULCC FIX	KGWC
73	222100	17.85	101.0E	PCN 6		ULCC FIX	PGTW
* 74	230000	18.75	102.6E	PCN 4		EXP LLCC	KGWC
75	230039	19.05	102.4E	PCN 4		EXP LLCC	PGTW
76	230300	18.95	101.8E	PCN 4	T2.5/3.5 /W1.0/24HRS	EXP LLCC	KGWC
77	230350	19.05	101.9E	PCN 3	T2.5/3.5 /W1.0/25HRS	EXP LLCC	PGTW
78	230600	19.35	101.4E	PCN 4		EXP LLCC	KGWC
79	230710	19.45	101.6E	PCN 5		EXP LLCC	PGTW
80	230900	19.55	100.9E	PCN 6		EXP LLCC ULAC 18.6S 101.7E	KGWC
81	231137	20.55	100.1E	PCN 6			PGTW
82	231200	19.85	100.2E	PCN 6		ULAC 20.4S 099.0E	KGWC
83	231449	21.15	99.4E	PCN 6	T2.5/3.0 /W0.5/24HRS	EXP LLCC	PGTW
84	231800	20.65	99.1E	PCN 6		EXP LLCC	KGWC
85	231955	21.15	99.8E	PCN 5			PGTW
86	240000	22.05	98.1E	PCN 6			KGWC
87	240017	22.35	98.6E	PCN 6	T3.5/3.5 /D1.0/24HRS		PGTW
88	240300	22.55	97.8E	PCN 6	T3.5/3.5 /D1.0/24HRS		KGWC
89	240330	23.05	96.9E	PCN 6			PGTW
90	240600	23.05	96.9E	PCN 6		INIT OBS	KGWC
91	240841	23.25	96.8E	PCN 5			FJDG
92	240841	23.25	96.8E	PCN 5	T3.5/3.5		PGTW
93	240900	23.35	96.7E	PCN 6		ULCC FIX	KGWC
94	241116	23.75	96.5E	PCN 6			PGTW
95	241200	23.45	95.9E	PCN 6			KGWC
96	241429	24.65	96.2E	PCN 6	T2.5/2.5 /S0.0/24HRS	ULCC FIX	PGTW
97	241600	24.65	95.7E	PCN 6		ULCC FIX	KGWC
98	241800	24.75	95.4E	PCN 6		ULCC FIX	PGTW
99	241945	25.15	96.4E	PCN 6		ULAC 25.9S 095.5E	KGWC
100	242100	25.15	94.9E	PCN 6		ULCC FIX	PGTW
101	242356	25.75	95.7E	PCN 6		ULAC 25.9S 095.5E	KGWC
102	250000	26.05	95.4E	PCN 6		ULCC FIX	PGTW
103	250300	26.65	95.5E	PCN 6	T3.5/3.5 /S0.0/24HRS	ULCC FIX	KGWC
104	250451	26.75	96.0E	PCN 4	T2.5/3.5 /W1.0/25HRS	EXP LLCC	PGTW
105	250600	27.45	95.3E	PCN 6		EXP LLCC	KGWC
106	250830	27.55	95.5E	PCN 4		ULCC FIX	PGTW
107	250900	28.25	95.5E	PCN 6		EXP LLCC	KGWC
108	251055	28.25	95.2E	PCN 4		ULCC FIX	PGTW
109	251200	28.65	94.7E	PCN 6		ULCC FIX	KGWC
110	251550	28.75	94.3E	PCN 6	T2.0/2.5 /W0.5/25HRS		PGTW
111	251800	29.05	95.8E	PCN 6			KGWC
112	251934	30.05	96.0E	PCN 6			PGTW
113	252336	31.55	97.7E	PCN 6		ULAC 35.0S 100.3E	KGWC
114	260341	33.25	97.7E	PCN 6	T1.5/2.5 /W0.5/24HRS		PGTW
115	260600	35.45	98.2E	PCN 6	T2.5/3.0 /W1.0/27HRS		KGWC
116	261033	36.05	99.6E	PCN 6		EXP LLCC	PGTW
117	261530	37.55	102.8E	PCN 6		EXP LLCC	KGWC
118	270411			PCN 4			KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

**TROPICAL CYCLONE 26P
BEST TRACK DATA**

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	ERRORS	DST WIND	POSIT	WIND	ERRORS	DST WIND	POSIT	WIND	ERRORS	DST WIND	POSIT	WIND	ERRORS	DST WIND	
021906Z	12.5 145.2	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
021918Z	14.1 145.9	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
022006Z	15.5 146.7	35	15.2	146.7	40	18	5	17.2	143.6	60	164	20	20.5	150.7	70	188	40	0.0	
022018Z	17.7 148.0	45	17.4	147.9	45	34	0	21.4	150.0	55	70	20	24.1	152.9	50	61	25	0.0	
022106Z	20.4 149.5	40	20.3	149.5	35	79	0	24.8	153.0	35	100	5	28.3	155.0	30	271	10	0.0	
022118Z	22.3 150.8	35	23.4	151.7	35	18	5	24.8	153.5	30	157	10	0.0	0.0	0.0	0.0	0.0	0.0	
022206Z	23.4 152.0	30	23.3	151.7	25	32	0	0.0	0.0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	
022218Z	24.0 154.0	25	24.4	153.6	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	
022306Z	23.9 156.1	20	0.0	0.0	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	31	157	173	0	0	0	0
AVG RIGHT ANGLE ERROR	16	86	110	0	0	0	0
AVG INTENSITY MAGNITUDE ERROR	2	11	25	0	0	0	0
AVG INTENSITY BIAS	2	11	25	0	0	0	0
NUMBER OF FORECASTS	6	5	3	0	0	0	0
DISTANCE TRAVELED BY TROPICAL CYCLONE IS	978. NM						
AVERAGE SPEED OF TROPICAL CYCLONE IS	10. KNOTS						

**TROPICAL CYCLONE 26P
FIX POSITIONS FOR CYCLONE NO. 26**

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	170048	12.15 137.8E	PCN 5	T1.5/1.5	INIT OBS	KGWC
2	171328	15.05 138.0E	PCN 6		ULAC 15.1S 136.8E	KGWC
3	190300	12.45 145.2E	PCN 6	T1.0/1.0	INIT OBS	PGTW
4	190600	12.7S 145.3E	PCN 6			PGTW
5	191600	13.9S 145.5E	PCN 6			PGTW
6	191800	14.3S 145.9E	PCN 6			PGTW
7	192100	14.3S 146.3E	PCN 6		INIT OBS	PGTW
8	200000	14.4S 146.4E	PCN 6	T2.5/2.5 /D1.5/21HRS		PGTW
9	200128	14.6S 146.9E	PCN 6	T2.5/2.5	INIT OBS	KGWC
10	200300	14.9S 146.6E	PCN 4		ULCC FIX	PGTW
11	200418	14.8S 146.5E	PCN 6			KGWC
12	200500	15.5S 146.5E	PCN 4		ULCC FIX	PGTW
13	200900	16.0S 146.9E	PCN 4		ULCC FIX	PGTW
14	201200	16.4S 147.3E	PCN 6			PGTW
15	201227	16.8S 147.4E	PCN 6	T2.5/2.5	INIT OBS ULAC 16.8S 147.0E	KGWC
16	201600	17.2S 147.4E	PCN 6	T3.0/3.0 /D1.5/22HRS		PGTW
17	201704	17.0S 147.5E	PCN 6			KGWC
18	201800	17.5S 147.5E	PCN 6			PGTW
19	202017	18.3S 148.5E	PCN 2			KGWC
20	202100	17.9S 148.0E	PCN 6			PGTW
21	210000	18.5S 148.3E	PCN 6		ULCC FIX	KGWC
22	210108	19.3S 148.9E	PCN 5	T2.5/2.5 /S0.0/24HRS		PGTW
23	210300	19.5S 149.0E	PCN 6	T2.5/2.5 /S0.0/24HRS	ULCC FIX	KGWC
24	210407	19.9S 149.2E	PCN 6			PGTW
25	210600	20.3S 149.5E	PCN 6		ULCC FIX	KGWC
26	210900	21.4S 150.2E	PCN 6		ULCC FIX	PGTW
27	211200	22.4S 150.7E	PCN 6		ULCC FIX	PGTW
28	211207	23.1S 151.5E	PCN 6	T2.5/2.5 /S0.0/24HRS		KGWC
29	211511	23.3S 152.6E	PCN 6			KGWC
30	211600	24.0S 151.9E	PCN 6			PGTW
31	211800	25.0S 152.7E	PCN 6			KGWC
32	211956	25.3S 151.2E	PCN 6			PGTW
33	220000	25.1S 151.1E	PCN 4			KGWC
34	220048	25.3S 151.3E	PCN 3	T1.0/2.0 /W1.5/24HRS	EXP LLCC	PGTW
35	220300	25.3S 151.4E	PCN 4	T1.0/2.0 /W1.5/24HRS	EXP LLCC	KGWC
36	220600	24.6S 151.9E	PCN 4			PGTW
37	220836	24.3S 152.4E	PCN 4			PGTW
38	221200	24.5S 153.2E	PCN 6		EXP LLCC	KGWC
39	221600	24.0S 153.7E	PCN 6	T0.0/0.0	EXP LLCC	PGTW
40	221642	24.1S 153.0E	PCN 6		INIT OBS EXP LLCC	PGTW
41	222116	24.9S 154.3E	PCN 4			KGWC
42	230028	23.8S 155.1E	PCN 3	T0.0/1.0 /W1.0/24HRS	EXP LLCC	KGWC
43	230300	23.7S 155.6E	PCN 4	T0.0/1.0 /W1.0/24HRS	EXP LLCC	KGWC
44	230600	23.9S 156.2E	PCN 4		EXP LLCC	PGTW
45	240300	23.9S 158.7E	PCN 4		EXP LLCC	PGTW
46	250000	22.2S 160.9E	PCN 4	T0.0/0.0 /S0.0/24HRS	EXP LLCC	PGTW

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

**TROPICAL CYCLONE 27P
BEST TRACK DATA**

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
NO/DA/HR	POSIT	WIND	POSIT	WIND	ERRORS	WIND	POSIT	WIND	ERRORS	WIND	POSIT	WIND	ERRORS	WIND	POSIT	WIND	ERRORS		
030406Z	17.6 172.7	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
030418Z	17.6 172.0	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
030506Z	19.5 173.3	35	19.7	172.9	20	26	0	23.1	175.4	45	72	0	26.7	179.3	35	130	20		
030518Z	21.4 174.0	40	21.8	175.3	35	33	0	25.7	178.7	45	91	0	29.9	181.3	35	234	15		
030606Z	23.1 176.7	45	24.5	176.5	45	85	0	29.7	179.7	35	288	0	0.0	0.0	0.0	0.0	0.0		
030618Z	24.2 179.0	50	25.8	178.2	45	105	0	30.1	180.8	35	253	0	0.0	0.0	0.0	0.0	0.0		
030706Z	25.0 180.8	55	26.6	180.1	50	103	0	30.0	182.4	45	171	0	0.0	0.0	0.0	0.0	0.0		
030718Z	25.1 182.3	50	25.2	182.9	40	60	0	30.5	185.2	40	346	0	0.0	0.0	0.0	0.0	0.0		
030806Z	29.4 185.6	45	28.4	185.5	40	54	0	0.0	0.0	0	0	0	0.0	0.0	0.0	0.0	0.0		
030818Z	34.3 191.0	40	35.1	191.5	40	54	0	0.0	0.0	0	0	0	0.0	0.0	0.0	0.0	0.0		

ALL FORECASTS
 WRNG 24-HR 48-HR 72-HR
 62. 203. 182. 0.
 56. 131. 159. 0.
 -22. -7. -18. 0.
 8. 6. 2. 0.
 TVPHOONS WHILE OVER 35 KTS
 WRNG 24-HR 48-HR 72-HR
 0. 0. 0. 0.
 0. 0. 0. 0.
 0. 0. 0. 0.
 0. 0. 0. 0.
 0. 0. 0. 0.
 DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1539. NM
 AVERAGE SPEED OF TROPICAL CYCLONE IS 14. KNOTS

TROPICAL CYCLONE 27P
 FIX POSITIONS FOR CYCLONE NO. 27

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	020900	14.6S 172.0E	PCN 6	T1.0/1.0	INIT OBS	PGTW
2	021600	14.4S 169.4E	PCN 6		ULCC FIX	PGTW
3	022327	16.6S 171.4E	PCN 4	T1.5/1.5	INIT OBS EXP LLCC	KGWC
4	030000	17.0S 170.9E	PCN 4	T1.5/1.5	INIT OBS EXP LLCC	PGTW
5	030300	17.4S 170.7E	PCN 4		EXP LLCC	PGTW
6	030401	15.8S 170.6E	PCN 5			KGWC
7	030600	15.7S 170.7E	PCN 6			PGTW
8	030706	15.8S 169.3E	PCN 6			KGWC
9	030900	15.8S 170.6E	PCN 6			PGTW
10	031026	15.8S 169.1E	PCN 6		ULAC 16.9S 172.9E	KGWC
11	031505	16.0S 169.8E	PCN 6		ULAC 17.0S 172.0E	KGWC
12	031946	16.8S 170.4E	PCN 6		ULAC 16.8S 171.5E	KGWC
13	032307	17.0S 169.4E	PCN 5	T2.5/2.5 /D1.0/24HRS		KGWC
14	040000	17.0S 169.3E	PCN 6	T1.5/1.5 /S0.0/24HRS		PGTW
15	040300	17.0S 168.5E	PCN 6			PGTW
* 16	040600	17.0S 168.9E	PCN 6		ULCC 16.9S 171.4E	PGTW
17	040900	16.8S 171.2E	PCN 6		ULCC FIX	PGTW
18	041006	16.1S 171.3E	PCN 6	T2.5/2.5	INIT OBS ULAC 15.8S 171.3E	KGWC
19	041600	16.8S 171.6E	PCN 6		ULCC FIX	PGTW
20	042246	18.1S 172.7E	PCN 5	T3.0/3.0 /D0.5/24HRS	ULAC 18.5S 172.5E	KGWC
21	050000	19.1S 172.5E	PCN 6	T2.5/2.5 /D1.0/24HRS	ULCC FIX	PGTW
22	050300	19.3S 172.7E	PCN 6		ULCC FIX	PGTW
23	050600	19.8S 173.4E	PCN 6		ULCC FIX	PGTW
24	050623	20.3S 173.6E	PCN 6			KGWC
25	050945	20.7S 174.3E	PCN 6	T2.5/2.5 /S0.0/24HRS		KGWC
* 26	051443	19.8S 173.9E	PCN 6			PGTW
27	051800	19.6S 175.6E	PCN 6	T2.0/2.0	INIT OBS	KGWC
28	051903	20.6S 174.6E	PCN 6		ULAC 20.6S 174.9E	KGWC
29	052226	21.7S 175.4E	PCN 6	T3.0/3.0 /S0.0/24HRS	ULAC 21.8S 176.3E	PGTW
30	060000	21.8S 175.8E	PCN 6	T3.0/3.0 /D0.5/24HRS		PGTW
31	060300	21.3S 176.8E	PCN 6			KGWC
** 32	060329	21.3S 176.8E	PCN 6			PGTW
** 33	060600	21.7S 176.5E	PCN 6		ULCC 23.5S 178.0E	KGWC
* 34	060602	21.3S 176.5E	PCN 6		ULAC 23.5S 176.9E	PGTW
35	060900	21.3S 176.9E	PCN 6		ULCC 23.9S 177.6E	KGWC
36	060925	22.0S 177.1E	PCN 6	T3.5/3.5 /D1.0/24HRS		PGTW
37	061200	24.0S 178.0E	PCN 6		ULCC FIX	KGWC
38	061432	23.3S 178.4E	PCN 4		RGD EYE DIA 1 DEG	PGTW
39	061600	24.3S 179.0E	PCN 6	T2.5/2.5 /D0.5/24HRS	ULCC FIX	PGTW
40	062100	24.3S 179.6E	PCN 6		ULCC FIX	KGWC
41	062206	24.3S 179.4W	PCN 5	T3.5/3.5 /D0.5/24HRS	ULAC 24.7S 180.0E	PGTW
42	070000	25.0S 180.0E	PCN 4	T3.5/3.5 /D0.5/24HRS		KGWC
43	070318	24.3S 179.8E	PCN 6		ULAC 16.9S 172.9E	PGTW
44	070400	24.6S 180.0E	PCN 6		ULCC FIX	KGWC
45	070540	24.3S 179.8W	PCN 6			PGTW
46	070600	24.5S 179.8W	PCN 6		ULCC FIX	KGWC
47	070900	24.6S 179.0W	PCN 6		ULCC FIX	PGTW
48	070905	24.4S 179.1W	PCN 6	T3.5/3.5 /S0.0/24HRS	ULAC 24.9S 179.4W	KGWC
49	071200	25.0S 178.4W	PCN 6		ULCC FIX	PGTW
50	071422	25.0S 177.8W	PCN 6			KGWC
51	071821	25.0S 177.2W	PCN 6			KGWC
52	072146	25.0S 176.4W	PCN 6	T2.5/3.5 /W1.0/24HRS		KGWC
53	080307	25.0S 176.2W	PCN 6			KGWC
54	080519	25.0S 174.7W	PCN 6		ULAC 28.8S 173.7W	KGWC
55	080845	30.0S 172.5W	PCN 6	T3.0/3.5 /W0.5/24HRS	ULAC 30.2S 172.4W	KGWC
56	081411	30.0S 171.3W	PCN 6			KGWC
57	081759	31.1S 168.5W	PCN 6			KGWC
58	082125	30.0S 167.0W	PCN 4	T0.0/1.5 /W2.5/24HRS	EXP LLCC	KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 28S
 BEST TRACK DATA

MO/DA/HR	BEST TRACK			WARNING			24 HOUR FORECAST			48 HOUR FORECAST			72 HOUR FORECAST		
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	
030612Z	11.5	93.5	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
030700Z	12.1	91.0	35	12.0	0.0	0.0	85.7	45	111	-30	14.3	84.5	50	-20	
030712Z	12.9	90.0	40	12.0	0.0	0.0	87.3	55	59	-40	16.3	84.4	60	-20	
030800Z	13.6	88.6	45	13.0	0.0	0.0	84.3	70	93	-35	15.6	80.3	90	-238	
030812Z	13.7	86.9	95	13.9	0.0	0.0	82.6	85	149	-25	14.6	78.6	95	-375	
030900Z	14.3	85.0	105	13.7	0.0	0.0	80.9	100	251	-15	14.5	76.8	115	-518	
030912Z	15.3	84.3	110	16.5	0.0	0.0	82.9	125	122	10	16.9	79.6	125	-353	
031000Z	16.3	84.3	110	16.5	0.0	0.0	81.5	125	181	20	18.9	77.8	125	-457	
031012Z	17.8	84.2	115	17.6	0.0	0.0	84.3	125	41	35	21.6	84.3	115	-166	
031100Z	19.0	84.5	105	19.4	0.0	0.0	87.3	100	135	25	25.5	89.9	100	-252	
031112Z	19.8	85.0	90	19.2	0.0	0.0	85.9	70	21	0	23.1	85.7	60	-65	
031200Z	20.7	85.0	80	18.0	0.0	0.0	86.6	50	13	-5	24.1	87.5	40	-89	
031212Z	20.5	82.0	80	18.0	0.0	0.0	87.3	45	77	-5	23.9	89.1	35	-189	
031300Z	22.4	86.8	55	22.3	0.0	0.0	87.6	45	82	0	0.0	0.0	0	-0	
031312Z	23.5	87.8	0	22.9	0.0	0.0	90.7	40	76	0	0.0	0.0	0	-0	
031400Z	24.4	88.1	45	24.0	0.0	0.0	0.0	0	-0	0	0.0	0.0	0	-0	
031412Z	26.0	91.7	40	26.3	0.0	0.0	0.0	0	-0	0	0.0	0.0	0	-0	

ALL FORECASTS
 WRNG 24-HR 48-HR 72-HR
 27. 101. 232. 0.
 16. 68. 161. 0.
 8. 18. 29. 0.
 -4. -4. 4. 0.
 15 14 12 0.
 TVPHOONS WHILE OVER 35 KTS
 WRNG 24-HR 48-HR 72-HR
 0. 0. 0. 0.
 0. 0. 0. 0.
 0. 0. 0. 0.
 0. 0. 0. 0.
 0. 0. 0. 0.

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1389. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 7. KNOTS

TROPICAL CYCLONE 28S
FIX POSITIONS FOR CYCLONE NO. 28

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	040411	10.6S 98.8E	PCN 6	T1.5/1.5	INIT OBS	KGWC
2	041510	10.5S 99.2E	PCN 6		ULAC 12.05 098.0E	KGWC
3	060330	11.3S 95.1E	PCN 6	T3.0/3.0 /D0.5/24HRS		KGWC
4	060600	11.2S 94.3E	PCN 6	T1.5/1.5	INIT OBS	PGTW
5	060828	11.4S 93.1E	PCN 5	T2.5/2.5 /D1.0/24HRS		FJDG
6	061450	10.3S 97.3E	PCN 6	T2.5/2.5	INIT OBS	KGWC
7	061600	11.2S 92.2E	PCN 6	T2.0/2.0	INIT OBS ULCC FIX	PGTW
8	061611	12.0S 93.4E	PCN 6	T3.0/3.0 /D0.5/25HRS	ULCC FIX 12.35 092.4E	KGWC
9	061800	11.1S 91.9E	PCN 6		ULCC FIX	PGTW
10	062100	11.3S 91.8E	PCN 6		ULCC FIX	PGTW
11	062346	11.3S 91.8E	PCN 6			KGWC
12	070400	12.7S 91.8E	PCN 6	T3.0/3.0 /D1.5/22HRS		PGTW
13	070451	12.6S 91.5E	PCN 6	T3.5/3.5 /D0.5/25HRS		KGWC
14	070600	12.6S 91.7E	PCN 6		ULCC 12.1S 091.0E	PGTW
15	070818	10.7S 90.2E	PCN 5	T3.0/3.0 /D0.5/24HRS		FJDG
16	070824	12.2S 91.0E	PCN 6		ULAC 12.4S 091.0E	KGWC
17	070900	12.5S 91.2E	PCN 6		ULCC FIX	PGTW
18	071200	12.8S 90.9E	PCN 6		ULCC FIX	PGTW
19	071226	12.9S 90.7E	PCN 6			KGWC
20	071551	13.4S 89.7E	PCN 2	T4.5/4.5 /D1.5/24HRS	EYE FIX	KGWC
21	071600	13.1S 89.7E	PCN 6		ULCC FIX	PGTW
22	071800	13.4S 89.4E	PCN 6		ULCC FIX	PGTW
23	071928	13.8S 89.5E	PCN 4		EYE FIX	KGWC
24	072100	13.6S 88.7E	PCN 6		ULCC FIX	PGTW
25	080000	13.6S 87.5E	PCN 6			PGTW
26	080106	13.4S 88.6E	PCN 6		EYE FIX	KGWC
27	080400	13.5S 87.0E	PCN 6			PGTW
28	080431	13.5S 87.9E	PCN 6	T4.0/4.0 /D0.5/24HRS	EYE FIX	KGWC
29	080814	13.5S 87.5E	PCN 6		EYE FIX	KGWC
30	080814	13.1S 86.7E	PCN 6	T4.5/4.5 /D1.0/24HRS		FJDG
31	080900	13.0S 86.4E	PCN 6			PGTW
32	081200	13.0S 86.4E	PCN 6			PGTW
33	081205	13.0S 87.0E	PCN 4		EYE FIX	KGWC
34	081530	13.6S 86.4E	PCN 2	T5.5/5.5 /D1.0/25HRS	EYE FIX	KGWC
35	081600	14.0S 86.1E	PCN 6			PGTW
36	081800	14.0S 85.5E	PCN 6			PGTW
37	082059	14.3S 86.0E	PCN 6		EYE FIX	KGWC
38	082100	13.8S 85.3E	PCN 6			PGTW
39	090000	13.8S 84.7E	PCN 6			PGTW
40	090045	14.6S 85.5E	PCN 2		EYE DIA .5 DEG	KGWC
41	090400	14.5S 85.2E	PCN 2			PGTW
42	090411	14.6S 85.8E	PCN 2	T5.0/5.0 /D1.0/24HRS	EYE DIA .7 DEG	KGWC
43	090600	14.7S 85.1E	PCN 2			PGTW
44	090803	14.7S 85.3E	PCN 1		EYE DIA .6 DEG	KGWC
45	090945	15.1S 84.9E	PCN 1	T5.0/5.0 /D0.5/24HRS	EYE FIX	FJDG
46	091143	15.1S 85.0E	PCN 6		EYE DIA .7 DEG	KGWC
47	091200	15.4S 85.0E	PCN 6		EYE FIX	PGTW
48	091651	15.6S 84.9E	PCN 6	T6.5/6.5 /D1.0/25HRS	EYE DIA 3/4 DEG	KGWC
49	092048	16.5S 84.6E	PCN 6		EYE DIA 1/2 DEG	KGWC
50	092100	16.8S 84.6E	PCN 6		EYE FIX	PGTW
51	100000	16.7S 84.4E	PCN 6			PGTW
52	100023	16.7S 84.9E	PCN 6		EYE DIA .6 DEG	KGWC
53	100400	17.0S 84.1E	PCN 6			PGTW
54	100532	17.1S 84.8E	PCN 6	T6.5/6.5 /D1.5/25HRS		KGWC
55	100600	17.1S 84.0E	PCN 6			PGTW
56	100900	17.4S 84.9E	PCN 6			PGTW
57	100934	17.5S 84.4E	PCN 6			KGWC
58	100934	17.5S 84.4E	PCN 6	T6.0/6.0 /D1.0/24HRS	EYE FIX	FJDG
59	101302	17.7S 84.9E	PCN 6			KGWC
60	101600	18.4S 84.6E	PCN 6			PGTW
61	101631	18.4S 84.8E	PCN 6	T5.5/6.5 /W1.0/24HRS		KGWC
62	101800	18.6S 84.7E	PCN 6			PGTW
63	102038	18.8S 84.1E	PCN 6			KGWC
64	102100	18.9S 84.7E	PCN 2		EYE FIX	PGTW
65	110000	19.4S 85.3E	PCN 4			KGWC
66	110144	19.3S 84.4E	PCN 6			PGTW
67	110400	19.8S 85.0E	PCN 6		ULCC FIX	KGWC
68	110512	19.3S 84.7E	PCN 6	T4.0/5.0 /W2.5/24HRS		PGTW
69	110600	19.7S 85.5E	PCN 6		ULCC FIX	KGWC
70	110900	19.9S 85.5E	PCN 6		ULCC FIX	PGTW
71	110923	19.4S 85.1E	PCN 6			KGWC
72	111200	20.2S 86.1E	PCN 6			PGTW
73	111242	19.5S 85.1E	PCN 6		ULAC 21.2S 086.2E	KGWC
74	111600	21.3S 86.3E	PCN 6		ULCC FIX	PGTW
75	111611	20.1S 85.5E	PCN 4	T3.0/4.0 /W2.5/24HRS	EXP LLCC ULAC 22.3S 086.9E	KGWC
76	111800	22.1S 86.4E	PCN 6		ULCC FIX	PGTW
77	112027	20.4S 85.5E	PCN 4		EXP LLCC	KGWC
78	120122	20.3S 85.5E	PCN 4		EXP LLCC	KGWC
79	120400	20.3S 84.7E	PCN 6		EXP LLCC	PGTW
80	120452	20.5S 85.7E	PCN 4	T2.0/3.0 /W2.0/24HRS		KGWC
81	120600	20.9S 84.6E	PCN 6	T2.5/2.5	INIT OBS	PGTW
82	121221	20.8S 85.9E	PCN 6			KGWC
83	121550	21.7S 86.0E	PCN 6	T3.0/3.0 /S0.0/24HRS	ULAC 17.0S 087.1E	KGWC
84	122016	22.2S 86.6E	PCN 6		ULAC 22.6S 086.9E	KGWC
85	130101	22.6S 87.2E	PCN 4		EXP LLCC ULAC 22.8S 087.3E	KGWC
86	130300	22.1S 85.5E	PCN 4			PGTW
87	130431	23.3S 87.5E	PCN 4	T2.5/2.5 /D0.5/24HRS	EXP LLCC ULAC 23.3S 088.0E	KGWC
88	130902	23.9S 87.9E	PCN 6		ULAC 23.9S 087.2E	KGWC
89	131200	23.5S 87.4E	PCN 6		ULAC 24.0S 088.0E	KGWC
90	131530	23.8S 88.2E	PCN 6	T2.5/3.0 /W0.5/24HRS	ULAC 24.5S 088.9E	KGWC
91	132005	24.4S 89.2E	PCN 4		ULAC 25.4S 090.8E	KGWC
92	140040	24.4S 89.3E	PCN 4		EXP LLCC ULAC 26.3S 091.4E	KGWC
93	140411	25.0S 90.5E	PCN 5	T1.5/2.5 /W1.0/24HRS	EXP LLCC	KGWC
94	140852	25.0S 91.0E	PCN 5	T1.5/1.5 /W1.0/24HRS		FJDG
95	141138	25.0S 91.6E	PCN 4		EXP LLCC ULAC 27.2S 093.3E	KGWC
96	141510	26.7S 94.5E	PCN 4	T1.5/2.5 /W1.0/24HRS	EXP LLCC	KGWC
97	141954	26.7S 94.5E	PCN 4		EXP LLCC	KGWC
98	150351	26.7S 95.6E	PCN 3		EXP LLCC	KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

**TROPICAL CYCLONE 29S
BEST TRACK DATA**

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	ERRORS DST WIND	POSIT	WIND	ERRORS DST WIND	POSIT	WIND	ERRORS DST WIND	POSIT	WIND	ERRORS DST WIND	POSIT	WIND	ERRORS DST WIND		
030806Z	12.4 117.7	35	11.9 117.0	40	51. 5. 13.7	116.1	65. 280. 10.	15 3 115.0	80. 565. 35.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
030818Z	13.6 119.0	45	12.8 118.0	45	85. 0. 14.9	118.6	65. 266. 10.	0.0	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0	0.0		
030906Z	15.6 120.5	55	16.0 120.8	55	30. 0. 21.7	122.6	30. 108. -15.	0.0	0.0	0.0	0.0	-0.	0.0	0.0	0.0	0.0	0.0		
030918Z	18.2 121.7	55	18.5 121.7	55	18. -5. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
031006Z	20.1 123.5	45	20.2 123.7	45	13. 0. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS															
WRNG 24-HR 48-HR 72-HR				WRNG 24-HR 48-HR 72-HR															
AVG FORECAST POSIT ERROR				39. 218. 565. 0.				0. 0. 0. 0.											
AVG RIGHT ANGLE ERROR				23. 99. 235. 0.				0. 0. 0. 0.											
AVG INTENSITY MAGNITUDE ERROR				2. 12. 35. 0.				0. 0. 0. 0.											
AVG INTENSITY BIAS				0. 12. 35. 0.				0. 0. 0. 0.											
NUMBER OF FORECASTS				5 3 1 0				0 0 0 0											
DISTANCE TRAVELED BY TROPICAL CYCLONE IS				579. NM															
AVERAGE SPEED OF TROPICAL CYCLONE IS				12. KNOTS															

**TROPICAL CYCLONE 29S
FIX POSITIONS FOR CYCLONE NO. 29**

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	080000	12.0S 117.1E	PCN 6			PGTW
2	080250	12.0S 118.9E	PCN 5	T1.0/1.0	INIT OBS	KGUC
3	080400	11.7S 117.4E	PCN 6	T3.0/3.0	INIT OBS	PGTW
4	080600	11.9S 116.8E	PCN 6			PGTW
5	080632	13.1S 118.5E	PCN 5		ULAC 12.7S 117.3E	KGUC
6	081023	12.8S 118.5E	PCN 5		ULAC 13.1S 116.8E	KGUC
7	081200	11.9S 118.4E	PCN 5			PGTW
8	081349	13.3S 118.8E	PCN 5	T2.5/2.5	INIT OBS ULAC 13.0S 117.9E	KGUC
9	081735	12.7S 119.3E	PCN 5		ULAC 13.8S 118.7E	KGUC
10	081800	12.6S 119.9E	PCN 5	T3.0/3.0	INIT OBS	PGTW
11	082100	13.2S 119.5E	PCN 5			PGTW
12	082303	14.0S 120.2E	PCN 5		ULAC 13.9S 119.5E	KGUC
13	090000	14.4S 119.9E	PCN 5			PGTW
14	090230	14.7S 120.4E	PCN 5	T2.5/2.5 /D1.5/24HRS		KGUC
15	090400	15.4S 120.4E	PCN 5	T3.5/3.5-/D0.5/24HRS	ULAC 15.0S 120.4E	PGTW
16	090600	16.1S 120.5E	PCN 6			KGUC
17	090900	16.8S 120.8E	PCN 6			PGTW
18	091002	17.4S 120.8E	PCN 5			PGTW
19	091200	17.5S 121.1E	PCN 6			KGUC
20	091329	17.7S 121.0E	PCN 5	T3.5/3.5 /D1.0/24HRS		PGTW
21	091600	18.1S 121.5E	PCN 6			KGUC
22	091724	18.3S 122.5E	PCN 6			PGTW
23	092100	18.8S 122.0E	PCN 6			KGUC
24	092242	19.2S 123.0E	PCN 5			PGTW
25	100000	19.3S 122.3E	PCN 5			KGUC
26	100209	19.5S 123.1E	PCN 5			PGTW
27	100400	19.6S 123.0E	PCN 5			KGUC
28	100600	20.0S 123.5E	PCN 6			PGTW
29	101308	22.7S 125.2E	PCN 5		ULAC 23.9S 123.8E	KGUC
30	110149	24.4S 126.7E	PCN 5			KGUC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

**TROPICAL CYCLONE 30P
BEST TRACK DATA**

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND			
031200Z	14.7 170.4	25	0.0 0.0	0	-0	0.0 0.0	0.0	0	-0	0	0.0 0.0	0	-0	0	0.0 0.0	0			
031212Z	14.9 167.9	30	0.0 0.0	0	-0	0.0 0.0	0.0	0	-0	0	0.0 0.0	0	-0	0	0.0 0.0	0			
031300Z	14.1 166.1	40	14.4 165.9	40	21	0.14.5	162.4	55	176	-5	15.0 160.0	65	460	-35	0.0 0.0	0			
031312Z	13.3 165.0	50	12.9 164.9	45	25	0.12.0	162.3	55	212	-25	12.9 160.0	65	550	-55	0.0 0.0	0			
031400Z	12.5 164.6	60	13.0 164.6	55	30	0.12.4	163.5	75	224	-25	12.0 161.5	90	645	-40	0.0 0.0	0			
031412Z	11.8 165.9	80	11.4 165.6	65	30	0.15.0	168.3	90	180	-30	10.0 171.6	110	432	-25	0.0 0.0	0			
031500Z	12.1 167.3	100	11.7 167.4	80	25	0.11.8	170.7	110	177	-20	12.4 173.8	125	461	15	0.0 0.0	0			
031512Z	12.8 169.4	120	12.8 169.4	110	0	0.14.8	173.0	130	150	-5	19.1 175.1	130	385	40	0.0 0.0	0			
031600Z	14.3 172.3	130	14.2 172.3	125	0	0.18.3	177.4	135	169	0	22.6 182.4	120	400	50	0.0 0.0	0			
031612Z	16.4 175.0	135	16.3 175.1	140	0	0.21.8	180.7	110	183	0	22.8 186.5	80	245	30	0.0 0.0	0			
031700Z	19.3 177.3	110	19.1 177.4	125	13	0.15.6	182.4	95	189	0	34.7 186.4	70	115	35	0.0 0.0	0			
031712Z	24.2 179.3	90	23.6 179.2	115	36	0.25.5	183.2	75	166	15	0.0 0.0	0	-0	0	0.0 0.0	0			
031800Z	29.2 181.3	70	30.5 182.9	85	114	0.15.0	191.6	50	164	15	0.0 0.0	0	-0	0	0.0 0.0	0			
031812Z	32.5 184.5	50	33.0 185.0	65	39	0.0 0.0	0.0	0	-0	0	0.0 0.0	0	-0	0	0.0 0.0	0			
031900Z	35.7 188.4	35	35.5 187.9	35	27	0.0 0.0	0.0	0	-0	0	0.0 0.0	0	-0	0	0.0 0.0	0			
ALL FORECASTS																			
WRNG		24-HR	48-HR	72-HR	TYPHOONS WHILE OVER 35 KTS		WRNG		24-HR	48-HR	72-HR								
AVG FORECAST POSIT ERROR		29.	160.	410.	0.	0.		0.	0.	0.	0.								
AVG RIGHT ANGLE ERROR		18.	94.	184.	0.	0.		0.	0.	0.	0.								
AVG INTENSITY MAGNITUDE ERROR		10.	20.	36.	0.	0.		0.	0.	0.	0.								
AVG INTENSITY BIAS		13	11	9	0	0		0	0	0	0								
NUMBER OF FORECASTS		13	11	9	0	0		0	0	0	0								
DISTANCE TRAVELED BY TROPICAL CYCLONE IS 2469. NM																			
AVERAGE SPEED OF TROPICAL CYCLONE IS 15. KNOTS																			

TROPICAL CYCLONE 30P
FIX POSITIONS FOR CYCLONE NO. 30

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	102226	16.65 174.9E	PCN 1	T1.5/1.5		KGWC
2	111107	17.55 172.8E	PCN 6	T1.5/1.5	INIT OBS	KGWC
3	111800	14.75 171.8E	PCN 6	T1.5/1.5	INIT OBS	PGTU
4	112100	14.55 171.7E	PCN 6			PGTU
5	112346	15.15 170.8E	PCN 6			KGWC
6	120000	13.95 170.6E	PCN 6	T2.0/2.0 /D0.5/25HRS	ULCC FIX	PGTU
7	120400	14.75 169.5E	PCN 6		INIT OBS	PGTU
8	120600	15.35 169.0E	PCN 6	T1.5/1.5	ULCC 15.1S 168.3E	PGTU
9	120900	14.95 168.2E	PCN 6		ULCC FIX	PGTU
10	121046	14.95 169.2E	PCN 6			KGWC
11	121200	15.05 168.1E	PCN 6	T2.0/2.0 /D0.5/18HRS	ULCC FIX	PGTU
12	121510	14.85 167.1E	PCN 6			KGWC
13	121600	14.75 167.6E	PCN 6			PGTU
14	121800	14.75 167.2E	PCN 6			PGTU
15	121957	14.55 166.7E	PCN 5			KGWC
16	122100	14.65 166.4E	PCN 6			PGTU
17	122326	14.05 166.5E	PCN 6	T3.0/3.0 /D1.0/24HRS		KGWC
18	130000	14.25 165.9E	PCN 6	T3.0/3.0 /D1.5/20HRS	ULCC FIX	PGTU
19	130300	13.75 165.4E	PCN 6		ULCC FIX	PGTU
20	130600	13.35 165.1E	PCN 6		ULAC 13.4S 164.8E	KGWC
21	130656	13.55 166.1E	PCN 6			PGTU
22	130900	13.35 164.8E	PCN 6		INIT OBS ULAC 12.4S 164.7E	KGWC
23	131025	12.95 164.9E	PCN 6	T3.0/3.0		PGTU
24	131200	12.95 164.5E	PCN 6	T2.0/2.0 /S0.0/24HRS	ULAC 13.2S 165.0E	KGWC
25	131459	13.15 164.7E	PCN 6			PGTU
26	131600	13.35 164.7E	PCN 6		ULAC 12.6S 164.8E	KGWC
27	131936	13.05 164.8E	PCN 6			PGTU
28	132100	13.05 164.8E	PCN 6			KGWC
29	132306	13.05 164.7E	PCN 6	T4.0/4.0 /D1.0/24HRS	ULAC 12.3S 164.6E	PGTU
30	140000	12.75 164.5E	PCN 6		ULCC FIX	KGWC
31	140300	12.45 165.2E	PCN 6	T4.0/4.0 /D1.0/27HRS		PGTU
32	140345	12.45 164.9E	PCN 6		ULAC 12.4S 164.8E	KGWC
33	140600	12.05 165.4E	PCN 6			PGTU
34	140643	12.55 164.2E	PCN 6		ULAC 12.1S 164.2E	KGWC
35	140900	11.85 165.7E	PCN 6			PGTU
36	141200	11.25 166.0E	PCN 6	T4.5/4.5 /D2.5/24HRS		KGWC
37	141448	12.15 166.3E	PCN 6		ULAC 11.8S 166.9E	PGTU
38	141600	12.25 166.6E	PCN 6			KGWC
39	141800	12.35 166.7E	PCN 6			PGTU
40	141914	11.95 166.5E	PCN 6		EYE DIA 16 NM	KGWC
41	142100	12.25 167.0E	PCN 6		EYE FIX	PGTU
42	142247	12.05 167.0E	PCN 1	T5.5/5.5 /D1.5/24HRS		KGWC
43	150000	12.25 167.4E	PCN 6		EYE FIX	PGTU
44	150300	12.45 167.8E	PCN 6	T5.5/5.5 /D1.5/24HRS	EYE FIX	PGTU
45	150600	12.45 168.3E	PCN 6		EYE FIX	KGWC
46	150613	12.25 167.8E	PCN 6			PGTU
47	150900	12.65 168.3E	PCN 6		EYE DIA .2 DEG	KGWC
48	151127	12.75 169.1E	PCN 6	T6.5/6.5 /D3.5/49HRS		PGTU
49	151200	12.85 169.5E	PCN 6	T6.0/6.0 /D1.5/25HRS		KGWC
50	151427	13.15 170.4E	PCN 6	T5.5/5.5 /D1.5/24HRS	EYE DIA 12 NM	PGTU
51	151600	13.45 170.5E	PCN 6		EYE DIA 40 NM	KGWC
52	151800	13.65 170.9E	PCN 6		EYE FIX	PGTU
53	151850	13.75 171.1E	PCN 6		EYE DIA 15 NM	KGWC
54	152236	14.15 172.1E	PCN 6	T6.5/6.5 /D1.0/24HRS	EYE DIA .2 DEG	KGWC
55	160000	14.35 172.1E	PCN 6		EYE FIX	PGTU
56	160300	14.05 172.0E	PCN 6	T6.5/6.5 /D1.0/24HRS	EYE FIX	KGWC
57	160323	14.85 172.6E	PCN 6		EYE DIA .2 DEG	PGTU
58	160552	15.25 173.5E	PCN 6		EYE FIX	KGWC
59	160600	15.15 173.8E	PCN 6		EYE FIX	PGTU
60	160900	15.75 174.5E	PCN 6		EYE DIA .2 DEG	KGWC
61	160925	15.75 174.0E	PCN 6		EYE FIX	PGTU
62	161107	16.25 174.8E	PCN 6	T6.5/6.5 /S0.0/24HRS		KGWC
63	161200	16.45 175.1E	PCN 6	T7.0/7.0 /D1.0/24HRS		PGTU
64	161427	16.85 175.5E	PCN 6		EYE FIX	KGWC
65	161600	17.45 175.8E	PCN 6		EYE FIX	PGTU
66	161800	17.85 176.1E	PCN 6		EYE DIA 12 NM	KGWC
67	161832	17.95 176.3E	PCN 6			PGTU
68	162100	18.45 176.7E	PCN 6		EYE DIA 12 NM	KGWC
69	162205	18.65 176.8E	PCN 6	T6.0/6.5 /W0.5/24HRS		PGTU
70	170000	19.35 177.4E	PCN 6			KGWC
71	170300	20.55 178.1E	PCN 6			PGTU
72	170312	20.85 177.6E	PCN 6			KGWC
73	170530	21.55 178.0E	PCN 6			PGTU
74	170600	21.55 178.0E	PCN 6	T5.5/6.5 /W1.0/27HRS	EYE FIX	KGWC
75	170900	22.85 178.7E	PCN 6		EYE FIX	PGTU
76	170905	23.05 178.3E	PCN 6	T5.0/6.0 /W1.5/22HRS		KGWC
77	171200	24.15 179.4E	PCN 6	T5.0/6.0 /W2.0/24HRS		PGTU
78	171416	25.65 179.6E	PCN 6			KGWC
79	171600	27.05 179.9E	PCN 6			PGTU
80	171800	27.75 179.4E	PCN 6			PGTU
81	171811	27.95 179.8E	PCN 6			KGWC
82	172100	29.35 178.2E	PCN 6			PGTU
83	172146	28.95 179.7E	PCN 6	T3.5/4.5 /W2.5/24HRS	ULAC 29.3S 178.8E	KGWC
84	180000	28.95 178.3E	PCN 4		EXP LLCC	PGTU
85	180300	30.55 177.5E	PCN 4	T3.0/4.0 /W2.5/21HRS	EXP LLCC	PGTU
86	180301	30.75 178.0E	PCN 6			KGWC
87	180509	31.75 177.3E	PCN 6			KGWC
88	180845	31.75 175.7E	PCN 6	T2.5/3.5 /W2.5/24HRS		KGWC
89	181405	32.95 174.4E	PCN 6			KGWC
90	182125	34.65 173.1E	PCN 6			KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

**TROPICAL CYCLONE 31P
BEST TRACK DATA**

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND
031906Z	13.7 138.3	25	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
031918Z	14.1 139.1	30	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
032006Z	14.2 139.8	40	14.0	139.7	13.0	-5.0	14.5	140.7	45.0	118.0	-15.0	15.3	141.4	55.0	186.0	-35.0	0.0	0.0	0.0
032018Z	13.8 139.5	50	14.0	140.2	40.0	51.0	-10.0	15.0	140.8	50.0	164.0	-25.0	16.1	140.4	55.0	189.0	-50.0	0.0	0.0
032106Z	13.6 138.9	50	13.7	139.4	60.0	30.0	-0.0	13.2	138.3	75.0	134.0	-15.0	13.6	136.7	75.0	169.0	-45.0	0.0	0.0
032118Z	13.3 138.6	70	13.6	139.4	65.0	29.0	-10.0	14.0	136.4	70.0	148.0	-35.0	14.3	137.3	50.0	165.0	-60.0	0.0	0.0
032206Z	13.5 138.8	90	13.5	138.5	90.0	18.0	-0.0	13.7	137.9	110.0	97.0	-10.0	14.3	137.0	120.0	57.0	-20.0	0.0	0.0
032218Z	14.5 138.9	105	14.5	138.8	100.0	0.0	-5.0	16.5	139.1	110.0	113.0	-0.0	18.2	139.8	90.0	313.0	-20.0	0.0	0.0
032306Z	15.2 138.5	120	15.3	138.6	115.0	8.0	-5.0	17.3	138.4	85.0	162.0	-15.0	19.3	138.8	45.0	366.0	-5.0	0.0	0.0
032318Z	15.4 137.5	110	15.5	137.5	110.0	16.0	-0.0	16.3	135.6	75.0	78.0	-0.0	17.2	133.8	50.0	188.0	-20.0	0.0	0.0
032406Z	15.3 136.5	100	15.5	136.5	100.0	18.0	-0.0	16.1	134.5	50.0	84.0	-0.0	17.2	132.8	30.0	186.0	-10.0	0.0	0.0
032418Z	15.0 135.5	70	15.0	135.0	70.0	29.0	-0.0	14.6	132.1	30.0	88.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0
032506Z	14.7 134.6	50	14.6	134.2	45.0	24.0	-5.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0
032518Z	14.4 133.6	30	14.5	133.5	30.0	38.0	-0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0
032606Z	14.1 132.8	20	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0
033018Z	14.0 124.0	20	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0
033106Z	14.2 121.1	25	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0
033118Z	15.1 117.6	25	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0
040106Z	15.5 114.5	25	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0
040118Z	15.6 112.4	30	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0
040206Z	15.6 111.2	30	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0
040218Z	15.6 109.5	30	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0
040306Z	15.4 107.4	30	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0
040318Z	15.2 104.5	25	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0

ALL FORECASTS					TYPHOONS WHILE OVER 35 KTS				
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR	
AVG FORECAST POSIT ERROR	20.	109.	194.	0.	0.	0.	0.	0.	
AVG RIGHT ANGLE ERROR	9.	68.	132.	0.	0.	0.	0.	0.	
AVG INTENSITY MAGNITUDE ERROR	-3.	12.	29.	0.	0.	0.	0.	0.	
AVG INTENSITY BIAS	-3.	-1.	-14.	0.	0.	0.	0.	0.	
NUMBER OF FORECASTS	12	10	9	0	0	0	0	0	
DISTANCE TRAVELED BY TROPICAL CYCLONE IS 2306. NM									
AVERAGE SPEED OF TROPICAL CYCLONE IS 8. KNOTS									

**TROPICAL CYCLONE 31P
FIX POSITIONS FOR CYCLONE NO. 31**

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	180600	12.55 139.3E	PCN 6	T1.0/1.0	INIT OBS	PGTW
2	181800	13.28 138.9E	PCN 6	T0.5/0.5	INIT OBS ULCC FIX	PGTW
3	190000	13.55 138.8E	PCN 6			PGTW
4	190048	13.65 137.2E	PCN 6	T1.5/1.5	INIT OBS ULAC 13.55 137.0E	KGWC
5	190300	13.75 138.0E	PCN 6			PGTW
6	190600	13.75 139.0E	PCN 6	T2.0/2.0 /D1.0/24HRS		PGTW
7	190900	13.85 139.5E	PCN 6			PGTW
8	191200	14.15 138.8E	PCN 6			PGTW
9	191329	14.25 137.5E	PCN 6		ULAC 14.7S 138.3E	KGWC
10	191600	13.95 138.7E	PCN 6	T2.0/2.0 /D1.5/22HRS		PGTW
11	191718	14.35 137.5E	PCN 6		ULAC 14.9S 138.1E	KGWC
12	191800	13.75 139.0E	PCN 6			PGTW
13	192051	14.45 137.8E	PCN 6		ULAC 14.8S 137.6E	KGWC
14	200000	13.85 139.7E	PCN 6			PGTW
15	200028	14.75 138.5E	PCN 5	T2.5/2.5 /D1.0/24HRS		KGWC
16	200300	14.35 139.3E	PCN 6	T2.5/2.5 /D0.5/22HRS		PGTW
17	200600	13.95 139.7E	PCN 6			PGTW
18	200604	14.15 139.7E	PCN 5			KGWC
19	200900	13.85 140.1E	PCN 6			PGTW
20	200931	14.15 139.6E	PCN 6			KGWC
21	201200	13.95 140.4E	PCN 6			PGTW
22	201329	13.95 139.3E	PCN 6	T2.5/2.5	INIT OBS ULAC 13.6S 140.5E	KGWC
23	201600	14.05 139.3E	PCN 6	T3.0/3.0-/D1.0/24HRS		PGTW
24	201708	14.05 139.7E	PCN 6		ULAC 13.6S 139.9E	KGWC
25	201800	14.45 140.1E	PCN 6			PGTW
26	202100	14.35 139.2E	PCN 6			PGTW
27	202211	14.05 138.9E	PCN 3			KGWC
28	210000	13.95 138.6E	PCN 6		ULCC FIX	PGTW
29	210149	13.45 139.3E	PCN 5	T3.5/3.5 /D1.0/25HRS	ULAC 13.2S 138.7E	KGWC
30	210300	13.55 139.0E	PCN 6	T3.5/3.0 /D1.0/24HRS	ULCC FIX	PGTW
31	210600	13.45 139.0E	PCN 6			PGTW
32	210900	13.55 138.6E	PCN 6		ULAC 13.6S 138.1E	KGWC
33	210909	13.75 138.8E	PCN 6			PGTW
34	211200	13.45 138.5E	PCN 6			KGWC
35	211248	13.75 138.7E	PCN 6	T4.5/4.5 /D2.0/24HRS	ULAC 13.5S 138.7E	PGTW
36	211600	13.75 138.4E	PCN 2	T4.0/4.0 /D1.0/24HRS		KGWC
37	211657	13.25 138.6E	PCN 2			PGTW
38	211800	13.75 138.2E	PCN 5			KGWC
39	212150	13.25 138.7E	PCN 5			PGTW
40	220000	13.45 138.7E	PCN 6			KGWC
41	220129	13.35 138.9E	PCN 1	T5.0/5.0 /D1.5/24HRS	EYE FIX	PGTW
42	220300	13.45 138.9E	PCN 6	T5.0/5.0 /D1.5/24HRS	EYE DIA .5 DEG	KGWC
43	220600	13.75 138.5E	PCN 6			PGTW
44	220848	13.55 138.5E	PCN 6		EYE DIA 24 NM	KGWC
45	220900	13.75 138.8E	PCN 6			PGTW
46	221200	14.05 138.9E	PCN 6			KGWC
47	221228	13.95 138.8E	PCN 6	T6.5/6.5 /D2.0/24HRS	EYE DIA 18 NM	PGTW
48	221600	14.45 138.9E	PCN 6	T5.5/5.5 /D1.5/24HRS		KGWC
49	221646	14.25 138.9E	PCN 6			PGTW
50	221800	14.55 138.9E	PCN 6			KGWC
51	222100	14.75 138.8E	PCN 6			PGTW
52	222128	14.65 139.1E	PCN 1		EYE FIX	KGWC
53	230000	14.85 138.8E	PCN 2			PGTW
54	230109	14.75 138.8E	PCN 1	T4.5/5.0 /W0.5/24HRS		KGWC
55	230300	15.15 138.6E	PCN 2	T6.0/6.0-/D1.0/24HRS		PGTW
56	230600	15.25 138.5E	PCN 2			KGWC
57	230827	15.25 137.9E	PCN 4		EYE DIA 18 NM	PGTW
58	230900	15.75 138.3E	PCN 4			KGWC
59	231200	15.75 137.8E	PCN 6			PGTW

* 60	231208	15.45	137.2E	PCN 2	T5.0/6.0 /W1.5/24HRS	EYE FIX	KGUC
61	231600	15.75	137.6E	PCN 4	T6.0/6.0-/D0.5/24HRS	EYE FIX	PGTW
62	231635	15.55	137.9E	PCN 2			KGUC
63	231800	15.55	137.5E	PCN 4			PGTW
64	232100	15.55	137.2E	PCN 6			PGTW
65	232107	15.55	137.5E	PCN 2			KGUC
66	240000	15.65	137.0E	PCN 2			PGTW
67	240048	15.75	136.9E	PCN 1	T4.0/4.5 /W0.5/24HRS	EYE FIX	KGUC
68	240600	15.45	136.4E	PCN 4	T4.5/5.5 /W1.5/26HRS	EYE FIX	PGTW
69	240900	15.25	136.1E	PCN 4			KGUC
70	241300	15.15	135.8E	PCN 2			PGTW
71	241347	15.45	136.0E	PCN 6			KGUC
72	241359	15.15	135.8E	PCN 6			PGTW
73	241624	15.05	135.4E	PCN 6		ULAC 15.25 135.7E	KGUC
74	242046	14.95	135.0E	PCN 6		ULAC 15.35 136.0E	KGUC
75	250000	14.85	134.6E	PCN 6		ULAC 15.85 134.7E	KGUC
76	250209	14.45	134.9E	PCN 5			PGTW
77	250510	14.35	134.5E	PCN 5			KGUC
78	250600	15.05	134.2E	PCN 6			PGTW
79	250900	15.45	134.8E	PCN 6		ULCC FIX	PGTW
80	250926	14.55	134.2E	PCN 6			KGUC
81	251200	14.85	134.2E	PCN 6			PGTW
82	251309	14.55	134.1E	PCN 5			KGUC
83	251600	14.55	133.5E	PCN 6			PGTW
84	251756	14.55	133.7E	PCN 5		ULAC 15.35 134.6E	KGUC
85	251800	14.45	133.3E	PCN 6			PGTW
86	260000	14.15	133.4E	PCN 6			PGTW
87	260600	14.15	133.0E	PCN 6	T1.0/1.0	INIT OBS	PGTW
88	210300	13.45	121.8E	PCN 6			PGTW
89	210600	13.35	121.5E	PCN 6	T2.0/2.0+/D1.0/21HRS	INIT OBS ULAC 15.55 114.6E	PGTW
* 90	010000	14.85	117.7E	PCN 6	T1.5/1.5	INIT OBS ULAC 15.55 114.6E	KGUC
91	010310	14.95	115.7E	PCN 5		ULCC FIX	PGTW
* 92	010600	15.85	113.1E	PCN 6		ULCC FIX	PGTW
* 93	010900	16.45	110.9E	PCN 6		ULAC 15.35 111.3E	KGUC
94	011019	15.05	113.2E	PCN 6		INIT OBS ULCC FIX	PGTW
* 95	011200	15.75	113.0E	PCN 6	T2.0/2.0	ULAC 14.95 110.0E	KGUC
96	011410	14.75	113.0E	PCN 6			PGTW
97	011800	16.25	111.7E	PCN 6			KGUC
98	011822	15.05	112.6E	PCN 6			PGTW
99	012100	15.25	112.2E	PCN 6			KGUC
100	012300	14.95	112.2E	PCN 3			PGTW
101	020000	14.85	112.2E	PCN 6	T2.0/2.0 /S0.0/24HRS		KGUC
102	020250	15.85	112.0E	PCN 5	T1.5/1.5 /S0.0/24HRS		PGTW
103	020300	15.25	110.5E	PCN 6			KGUC
104	020600	15.55	110.2E	PCN 6			PGTW
105	020900	15.65	110.2E	PCN 6		ULCC 19.05 111.7E	KGUC
*106	020958	18.25	112.0E	PCN 6		ULAC 18.35 112.1E	PGTW
107	021200	15.95	110.4E	PCN 6	T1.5/2.0 /W0.5/24HRS	ULCC 19.45 112.4E	KGUC
*108	021349	19.25	112.0E	PCN 5			PGTW
109	021600	16.45	110.3E	PCN 6		ULCC 16.25 110.8E	KGUC
110	021800	15.55	110.0E	PCN 6			PGTW
*111	022100	15.95	110.1E	PCN 6			PGTW
112	022238	15.05	109.3E	PCN 6		ULAC 15.55 109.8E	KGUC
113	030230	15.35	108.8E	PCN 5	T1.5/1.5 /S0.0/24HRS	ULAC 16.65 109.2E	PGTW
114	030300	15.75	108.9E	PCN 6			KGUC
115	031510	15.25	104.9E	PCN 3		EXP LLCC	PGTW
116	040351	14.75	103.0E	PCN 6	T0.5/1.5 /W1.0/24HRS	EXP LLCC	KGUC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 32P
BEST TRACK DATA

MO/DA/HR	BEST TRACK			WARNING			24 HOUR FORECAST			48 HOUR FORECAST			72 HOUR FORECAST		
	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS
032812Z	13.4 150.4	25	0.0	13.7 148.7	35	-0.0	13.7 148.7	35	-0.0	13.7 148.7	35	-0.0	13.7 148.7	35	-0.0
032900Z	13.7 149.4	35	0.0	13.7 147.7	45	0.0	13.7 147.7	45	0.0	13.7 147.7	45	0.0	13.7 147.7	45	0.0
032912Z	13.8 148.3	45	0.0	13.7 147.7	45	0.0	13.7 147.7	45	0.0	13.7 147.7	45	0.0	13.7 147.7	45	0.0
033000Z	13.8 147.3	60	0.0	13.7 146.6	60	0.0	13.7 146.6	60	0.0	13.7 146.6	60	0.0	13.7 146.6	60	0.0
033012Z	13.8 146.3	60	0.0	13.7 145.3	65	0.0	13.7 145.3	65	0.0	13.7 145.3	65	0.0	13.7 145.3	65	0.0
033100Z	13.8 145.3	60	0.0	13.7 144.3	65	0.0	13.7 144.3	65	0.0	13.7 144.3	65	0.0	13.7 144.3	65	0.0
033112Z	13.8 144.3	55	0.0	13.7 143.3	65	0.0	13.7 143.3	65	0.0	13.7 143.3	65	0.0	13.7 143.3	65	0.0
040100Z	14.0 143.3	55	0.0	13.7 142.3	65	0.0	13.7 142.3	65	0.0	13.7 142.3	65	0.0	13.7 142.3	65	0.0
040112Z	14.4 142.3	60	0.0	13.7 141.3	65	0.0	13.7 141.3	65	0.0	13.7 141.3	65	0.0	13.7 141.3	65	0.0
040200Z	14.8 141.3	60	0.0	13.7 140.3	65	0.0	13.7 140.3	65	0.0	13.7 140.3	65	0.0	13.7 140.3	65	0.0
040212Z	15.0 140.3	60	0.0	13.7 139.3	65	0.0	13.7 139.3	65	0.0	13.7 139.3	65	0.0	13.7 139.3	65	0.0
040300Z	14.5 139.3	60	0.0	13.7 138.3	65	0.0	13.7 138.3	65	0.0	13.7 138.3	65	0.0	13.7 138.3	65	0.0
040312Z	13.8 137.3	60	0.0	13.7 136.3	65	0.0	13.7 136.3	65	0.0	13.7 136.3	65	0.0	13.7 136.3	65	0.0
040400Z	13.3 135.3	60	0.0	13.7 134.3	65	0.0	13.7 134.3	65	0.0	13.7 134.3	65	0.0	13.7 134.3	65	0.0
040412Z	13.3 135.1	60	0.0	13.7 133.3	65	0.0	13.7 133.3	65	0.0	13.7 133.3	65	0.0	13.7 133.3	65	0.0

ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR		WRNG	24-HR	48-HR
AVG FORECAST POSIT ERROR	30.	60.	82.		0.	0.	0.
AVG RIGHT ANGLE ERROR	16.	34.	58.		0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	5.	11.	15.		0.	0.	0.
AVG INTENSITY BIAS	4.	11.	15.		0.	0.	0.
NUMBER OF FORECASTS	10	9	9		0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 935. NM

AVERAGE SPEED OF TROPICAL CYCLONE IS 6. KNOTS

TROPICAL CYCLONE 32P
FIX POSITIONS FOR CYCLONE NO. 32

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCUR	DVORAK CODE	COMMENTS	SITE
1	271800	12.45 151.4E	PCN 6	T1.0/1.0	INIT OBS ULCC FIX	PGTW
2	272100	13.05 151.5E	PCN 6			PGTW
3	280000	13.85 151.5E	PCN 6	T1.0/1.0	INIT OBS	PGTW
4	280109	12.95 150.9E	PCN 5	T2.0/2.0	INIT OBS	KGUC
5	280300	14.05 151.7E	PCN 6			PGTW
6	280600	11.35 152.6E	PCN 6		ULCC FIX	PGTW
7	280822	12.95 150.0E	PCN 6			KGUC
8	280900	11.95 152.4E	PCN 6		ULCC FIX	PGTW
* 9	281200	12.45 152.0E	PCN 6		ULCC FIX	PGTW

10	281208	13.40	150.5E	PCN 6	T2.5/2.5	INIT OBS ULAC 13.0S 150.0E	KGUC
11	281208	13.40	150.5E	PCN 6		ULAC 13.0S 149.6E	KGUC
12	281208	13.40	150.5E	PCN 6	T2.0/2.0 /D1.0/24HRS		PGTW
13	281208	13.40	150.5E	PCN 6			KGUC
14	281208	13.40	150.5E	PCN 6		ULAC 11.7S 149.3E	PGTW
15	281208	13.40	150.5E	PCN 6		ULCC 14.2S 149.0E	KGUC
16	281208	13.40	150.5E	PCN 6	T2.5/2.5 /D1.5/24HRS		KGUC
17	281208	13.40	150.5E	PCN 6	T2.5/2.5 /D1.0/24HRS		KGUC
18	281208	13.40	150.5E	PCN 6		ULCC 13.9S 149.1E	PGTW
19	281208	13.40	150.5E	PCN 6		ULAC 13.2S 147.9E	KGUC
20	281208	13.40	150.5E	PCN 6		ULCC 13.7S 148.7E	PGTW
21	281208	13.40	150.5E	PCN 6		ULAC 13.9S 148.0E	KGUC
22	281208	13.40	150.5E	PCN 6			PGTW
23	281208	13.40	150.5E	PCN 6	T3.0/3.0 /D0.5/24HRS	ULAC 13.8S 147.7E	KGUC
24	281208	13.40	150.5E	PCN 6	T3.0/3.0 /D1.0/18HRS		PGTW
25	281208	13.40	150.5E	PCN 6			KGUC
26	281208	13.40	150.5E	PCN 6			PGTW
27	281208	13.40	150.5E	PCN 6		ULAC 13.8S 147.5E	KGUC
28	281208	13.40	150.5E	PCN 6			PGTW
29	281208	13.40	150.5E	PCN 6	T3.5/3.5 /D1.0/24HRS	ULAC 13.6S 146.9E	KGUC
30	281208	13.40	150.5E	PCN 6	T3.5/3.5 /D1.0/24HRS		PGTW
31	281208	13.40	150.5E	PCN 6			KGUC
32	281208	13.40	150.5E	PCN 6		ULAC 13.1S 146.3E	PGTW
33	281208	13.40	150.5E	PCN 6			KGUC
34	281208	13.40	150.5E	PCN 6	T3.5/3.5 /D0.5/24HRS		PGTW
35	281208	13.40	150.5E	PCN 6	T3.5/3.5 /D0.5/24HRS		KGUC
36	281208	13.40	150.5E	PCN 6		ULCC FIX	PGTW
37	281208	13.40	150.5E	PCN 6		ULCC FIX	KGUC
38	281208	13.40	150.5E	PCN 6		ULCC FIX	PGTW
39	281208	13.40	150.5E	PCN 6			KGUC
40	281208	13.40	150.5E	PCN 6			PGTW
41	281208	13.40	150.5E	PCN 6	T4.0/4.0 /D0.5/24HRS	ULAC 13.5S 150.0E	KGUC
42	281208	13.40	150.5E	PCN 6	T3.5/3.5 /S0.0/24HRS		PGTW
43	281208	13.40	150.5E	PCN 6			KGUC
44	281208	13.40	150.5E	PCN 6		ULAC 12.8S 144.8E	PGTW
45	281208	13.40	150.5E	PCN 6			KGUC
46	281208	13.40	150.5E	PCN 6			PGTW
47	281208	13.40	150.5E	PCN 6			KGUC
48	281208	13.40	150.5E	PCN 6	T3.5/3.5 /S0.0/24HRS	ULCC FIX	PGTW
49	281208	13.40	150.5E	PCN 6	T3.5/3.5 /S0.0/25HRS		KGUC
50	281208	13.40	150.5E	PCN 6		ULCC FIX	PGTW
51	281208	13.40	150.5E	PCN 6		ULAC 11.8S 143.4E	KGUC
52	281208	13.40	150.5E	PCN 6		ULCC FIX	PGTW
53	281208	13.40	150.5E	PCN 6		ULCC FIX	KGUC
54	281208	13.40	150.5E	PCN 6		ULCC FIX	PGTW
55	281208	13.40	150.5E	PCN 6			KGUC
56	281208	13.40	150.5E	PCN 6		ULCC FIX	PGTW
57	281208	13.40	150.5E	PCN 6		ULCC FIX	KGUC
58	281208	13.40	150.5E	PCN 6		ULCC FIX	PGTW
59	281208	13.40	150.5E	PCN 6		ULCC FIX	KGUC
60	281208	13.40	150.5E	PCN 6		ULCC FIX	PGTW
61	281208	13.40	150.5E	PCN 6		ULCC FIX	KGUC
62	281208	13.40	150.5E	PCN 6		ULCC FIX	PGTW
63	281208	13.40	150.5E	PCN 6			KGUC
64	281208	13.40	150.5E	PCN 6			PGTW
65	281208	13.40	150.5E	PCN 6	T2.0/2.0	SCNDRY LLCC 15.8S 142.3E	KGUC
66	281208	13.40	150.5E	PCN 6			PGTW
67	281208	13.40	150.5E	PCN 6		ULCC FIX	KGUC
68	281208	13.40	150.5E	PCN 6		ULAC 15.0S 141.5E	PGTW
69	281208	13.40	150.5E	PCN 6		INIT OBS	KGUC
70	281208	13.40	150.5E	PCN 6	T0.0/0.0		PGTW
71	281208	13.40	150.5E	PCN 6			KGUC
72	281208	13.40	150.5E	PCN 6			PGTW
73	281208	13.40	150.5E	PCN 6			KGUC
74	281208	13.40	150.5E	PCN 6			PGTW
75	281208	13.40	150.5E	PCN 6	T2.0/2.0 /S0.0/24HRS		KGUC
76	281208	13.40	150.5E	PCN 6	T1.5/1.5	INIT OBS	PGTW
77	281208	13.40	150.5E	PCN 6			KGUC
78	281208	13.40	150.5E	PCN 6			PGTW
79	281208	13.40	150.5E	PCN 6	T1.5/1.5 /D1.5/24HRS		KGUC
80	281208	13.40	150.5E	PCN 6			PGTW
81	281208	13.40	150.5E	PCN 6			KGUC
82	281208	13.40	150.5E	PCN 6			PGTW
83	281208	13.40	150.5E	PCN 6	T2.0/2.0 /S0.0/24HRS		KGUC
84	281208	13.40	150.5E	PCN 6	T1.5/1.5 /S0.0/24HRS		PGTW
85	281208	13.40	150.5E	PCN 6			KGUC
86	281208	13.40	150.5E	PCN 6		EXP LLCC	KGUC

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	011100	14.0S 142.3E	025	045	91184

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 33S BEST TRACK DATA

MO/DA/HR	BEST TRACK			WARNING			24 HOUR FORECAST			48 HOUR FORECAST			72 HOUR FORECAST		
	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND
041012Z	11.9	72.8	25	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
041100Z	11.9	72.8	25	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
041112Z	12.8	69.9	45	11.6	69.9	35	72.0	11.8	67.1	55	199.0	-20.0	12.2	64.3	65
041200Z	13.9	68.8	60	13.0	69.2	50	59.0	-10.0	14.3	66.7	70	160.0	-20.0	15.6	64.0
041212Z	15.1	67.4	75	15.0	67.4	65	29.0	-10.0	17.8	65.6	80	165.0	-10.0	19.0	63.8
041300Z	15.6	65.3	90	15.0	65.3	80	15.0	-15.0	20.0	63.6	80	110.0	30.0	24.0	63.1
041312Z	15.5	63.0	100	15.0	63.0	95	15.0	-15.0	20.0	60.5	100	195.0	0.0	23.7	59.9
041400Z	18.2	63.3	110	18.3	62.7	105	29.0	-15.0	20.3	60.6	90	243.0	0.0	23.6	60.2
041412Z	18.9	63.7	100	19.1	63.1	115	36.0	-15.0	21.4	60.5	95	239.0	0.0	22.0	60.0
041500Z	18.4	64.4	90	19.0	64.1	100	40.0	-10.0	19.0	60.7	80	319.0	0.0	20.0	60.0
041512Z	17.5	63.4	75	17.6	63.9	80	29.0	-10.0	19.0	60.3	60	307.0	0.0	20.0	60.0
041600Z	17.3	60.8	55	17.4	61.0	50	13.0	-10.0	17.4	56.6	30	78.0	0.0	0.0	0.0
041612Z	16.7	58.5	40	17.0	58.2	40	25.0	-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
041700Z	16.1	56.6	30	0.0	0.0	0.0	-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
041712Z	15.3	54.8	30	0.0	0.0	0.0	-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
041800Z	14.7	52.8	30	0.0	0.0	0.0	-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
041812Z	15.4	50.4	25	0.0	0.0	0.0	-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
041900Z	17.2	50.8	20	0.0	0.0	0.0	-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ALL FORECASTS
 URNG 24-HR 48-HR 72-HR
 32. 132. 403. 0.
 21. 110. 243. 0.
 8. 15. 24. 0.
 -3. -2. 2. 0.
 11 10 9 0

TYPHOONS WHILE OVER 35 KTS
 URNG 24-HR 48-HR 72-HR
 0. 0. 0. 0.
 0. 0. 0. 0.
 0. 0. 0. 0.
 0. 0. 0. 0.

AVG FORECAST POSIT ERROR
 AVG RIGHT ANGLE ERROR
 AVG INTENSITY MAGNITUDE ERROR
 AVG INTENSITY BIAS
 NUMBER OF FORECASTS

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1769. NM
 AVERAGE SPEED OF TROPICAL CYCLONE IS 9. KNOTS

TROPICAL CYCLONE 33S
 FIX POSITIONS FOR CYCLONE NO. 33

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	100512	11.4S 73.2E	PCN 6	T1.0/1.0	INIT OBS ULAC 11.7S 074.2E	KGWC
2	100857	11.4S 72.2E	PCN 6	T1.5/1.5	INIT OBS	FJDG
3	101753	12.1S 72.1E	PCN 6	T2.5/2.5	INIT OBS ULAC 12.0S 071.7E	KGWC
4	102151	11.6S 72.0E	PCN 6		ULAC 11.5S 071.5E	KGWC
* 5	110233	11.6S 72.2E	PCN 6			KGWC
6	110452	11.7S 70.7E	PCN 5	T2.5/2.5 /D1.5/25HRS		KGWC
7	111037	12.1S 69.9E	PCN 5			KGWC
8	111038	12.5S 69.8E	PCN 5	T3.0/3.0 /D1.5/24HRS		KGWC
9	111332	12.5S 68.9E	PCN 6			FJDG
10	111733	12.4S 69.5E	PCN 6	T3.5/3.5 /D1.0/24HRS		KGWC
11	112140	13.7S 69.1E	PCN 6			KGWC
12	120212	14.0S 68.9E	PCN 6			KGWC
13	120613	14.5S 68.4E	PCN 6	T4.0/4.0 /D1.5/25HRS	EYE FIX	KGWC
14	121026	15.1S 67.4E	PCN 6		EYE FIX	KGWC
15	121027	15.0S 67.4E	PCN 6	T3.5/3.5 /D0.5/24HRS		KGWC
16	121311	15.4S 67.1E	PCN 6		EYE FIX	FJDG
17	121712	15.6S 66.6E	PCN 6	T5.0/5.0 /D1.5/24HRS	EYE FIX	KGWC
18	122130	16.4S 66.3E	PCN 6			KGWC
19	130151	16.7S 65.2E	PCN 6			KGWC
20	130553	17.0S 64.8E	PCN 6	T5.5/5.5 /D1.5/24HRS	EYE DIA 12 NM	KGWC
21	131015	17.2S 64.1E	PCN 6		EYE DIA 12 NM	KGWC
22	131016	17.3S 63.8E	PCN 6	T5.0/5.0 /D1.5/24HRS	EYE FIX	FJDG
23	131431	17.7S 63.7E	PCN 6		EYE FIX	KGWC
24	131652	17.7S 63.4E	PCN 6	T6.0/6.0 /D1.0/24HRS	EYE FIX	KGWC
25	132119	18.1S 62.9E	PCN 6		EYE FIX	KGWC
26	140311	18.2S 63.5E	PCN 6		EYE FIX	KGWC
27	140533	18.5S 63.5E	PCN 6	T6.0/6.0 /D0.5/24HRS	EYE DIA 15 NM	KGWC
28	141004	18.9S 63.4E	PCN 6		EYE DIA 15 NM OPN SW	KGWC
29	141005	18.9S 64.0E	PCN 6	T5.5/5.5 /D1.0/24HRS		FJDG
30	141409	18.8S 63.4E	PCN 6		ULAC 18.9S 063.7E	KGWC
31	141813	18.8S 63.8E	PCN 6	T4.5/5.5 /W1.5/24HRS		KGWC
32	142108	18.8S 64.1E	PCN 6		ULAC 19.1S 064.9E	KGWC
33	150250	18.9S 64.1E	PCN 6		ULAC 18.6S 064.3E	KGWC
34	150654	17.9S 64.4E	PCN 6	T4.0/5.0 /W2.0/24HRS	ULAC 18.4S 064.7E	KGWC
35	150954	17.5S 64.0E	PCN 6		ULAC 18.1S 064.5E	KGWC
* 36	150954	18.7S 63.5E	PCN 5	T4.5/4.5 /W1.5/24HRS		FJDG
37	151348	17.5S 63.1E	PCN 6		ULAC 17.4S 064.6E	KGWC
38	151753	17.7S 62.0E	PCN 6	T2.0/3.0 /W2.5/24HRS		KGWC
39	160228	17.3S 60.5E	PCN 4		EXP LLCC	KGWC
40	160633	17.0S 58.9E	PCN 3	T2.0/3.0 /W2.0/24HRS	EXP LLCC	KGWC
41	161125	16.9S 58.7E	PCN 3		EXP LLCC	KGWC
42	161733	16.5S 59.2E	PCN 4		EXP LLCC	KGWC
43	170613	15.8S 56.1E	PCN 3	T1.0/2.0 /W1.0/23HRS	EXP LLCC	KGWC
44	171854	15.1S 54.0E	PCN 6	T2.5/2.5	INIT OBS	KGWC
45	172218	14.4S 53.9E	PCN 6		ULAC 13.9S 054.4E	KGWC
46	180327	14.6S 52.0E	PCN 6			KGWC
47	180734	14.8S 51.6E	PCN 6	T1.5/1.5 /D0.5		KGWC
48	181103	15.2S 50.4E	PCN 6			KGWC
49	181426	15.7S 50.3E	PCN 6			KGWC
50	181833	16.4S 50.2E	PCN 6			KGWC
51	190714	17.9S 51.6E	PCN 6			KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 34S
 BEST TRACK DATA

MO/DA/HR	BEST TRACK			WARNING			24 HOUR FORECAST			48 HOUR FORECAST			72 HOUR FORECAST		
	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND	POSIT	WIND	WIND
041106Z	10.5 135.8	30	0.0	10.5 133.7	35	0.0	10.5 135.8	30	0.0	10.5 135.8	30	0.0	10.5 135.8	30	0.0
041118Z	10.5 134.0	35	10.5	10.5 132.6	40	13.0	10.5 132.6	40	13.0	10.5 132.6	40	13.0	10.5 132.6	40	13.0
041206Z	11.0 132.5	45	10.8	11.0 132.6	45	13.0	11.0 132.6	45	13.0	11.0 132.6	45	13.0	11.0 132.6	45	13.0
041218Z	12.0 131.3	45	11.8	12.0 130.9	55	26.0	12.0 130.9	55	26.0	12.0 130.9	55	26.0	12.0 130.9	55	26.0
041306Z	12.8 130.4	40	13.2	12.8 130.1	45	30.0	12.8 130.1	45	30.0	12.8 130.1	45	30.0	12.8 130.1	45	30.0
041318Z	13.8 129.8	35	14.8	13.8 129.9	45	60.0	13.8 129.9	45	60.0	13.8 129.9	45	60.0	13.8 129.9	45	60.0
041406Z	14.1 129.0	30	14.0	14.1 129.5	30	30.0	14.1 129.5	30	30.0	14.1 129.5	30	30.0	14.1 129.5	30	30.0

ALL FORECASTS
 URNG 24-HR 48-HR 72-HR
 30. 102. 231. 0.
 18. 94. 0. 0.
 4. 15. 35. 0.
 4. 15. 35. 0.
 6 4 2 0

TYPHOONS WHILE OVER 35 KTS
 URNG 24-HR 48-HR 72-HR
 0. 0. 0. 0.
 0. 0. 0. 0.
 0. 0. 0. 0.
 0. 0. 0. 0.

AVG FORECAST POSIT ERROR
 AVG RIGHT ANGLE ERROR
 AVG INTENSITY MAGNITUDE ERROR
 AVG INTENSITY BIAS
 NUMBER OF FORECASTS

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 483. NM
 AVERAGE SPEED OF TROPICAL CYCLONE IS 7. KNOTS

TROPICAL CYCLONE 34S
FIX POSITIONS FOR CYCLONE NO. 34

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	090600	9.85 143.9E	PCN 6	T1.0/1.0	INIT OBS	PGTW
2	091200	11.25 143.4E	PCN 6			PGTW
3	092100	10.85 143.4E	PCN 6			PGTW
4	100600	11.15 142.0E	PCN 6	T1.0/1.0 /S0.0/24HRS		PGTW
5	101600	10.65 137.3E	PCN 6			PGTW
6	101800	10.95 137.4E	PCN 6	T1.5/1.5	INIT OBS	PGTW
7	102100	10.55 136.5E	PCN 6			PGTW
8	110000	10.15 136.1E	PCN 6			PGTW
9	110129	10.95 136.0E	PCN 6	T1.5/1.5	INIT OBS ULAC 10.6S 135.7E	KGWC
10	110300	10.65 135.6E	PCN 6	T2.0/2.0 /D1.0/21HRS		PGTW
11	110600	10.75 135.5E	PCN 6			PGTW
12	110828	10.35 135.0E	PCN 6		ULAC 10.1S 134.7E	KGWC
13	110900	10.55 135.1E	PCN 6			PGTW
14	111200	10.35 134.7E	PCN 6			PGTW
15	111228	10.35 133.7E	PCN 6	T2.5/2.5	INIT OBS	KGWC
16	111600	10.55 134.3E	PCN 6	T2.5/2.5 /D1.0/22HRS		PGTW
17	111634	10.75 133.8E	PCN 6			KGWC
18	111800	10.75 134.1E	PCN 6			PGTW
19	112100	10.65 133.8E	PCN 6			PGTW
20	112108	10.35 133.6E	PCN 6			KGWC
21	120000	10.45 133.4E	PCN 6		ULCC FIX	PGTW
22	120109	10.35 133.2E	PCN 5	T3.0/3.0 /D1.5/24HRS		KGWC
23	120300	10.85 132.9E	PCN 6	T3.0/3.0 /D1.0/24HRS		PGTW
24	120520	10.95 133.0E	PCN 5			KGWC
25	120600	11.05 132.5E	PCN 6		ULCC FIX	PGTW
26	120900	11.35 132.1E	PCN 6		ULCC FIX	PGTW
27	120948	11.65 132.8E	PCN 6			KGWC
28	121200	11.15 131.7E	PCN 6			PGTW
* 29	121349	11.65 132.8E	PCN 6			KGWC
30	121600	11.55 131.3E	PCN 6			PGTW
31	121800	12.25 130.8E	PCN 6	T3.5/3.5 /D1.0/26HRS		PGTW
32	121805	12.05 131.6E	PCN 6			KGWC
33	122100	12.65 130.7E	PCN 6			PGTW
34	122228	12.85 131.0E	PCN 6			KGWC
35	130000	12.55 130.6E	PCN 6		ULCC FIX	PGTW
36	130043	12.25 130.3E	PCN 6			KGWC
37	130300	13.35 130.3E	PCN 5		ULCC FIX	PGTW
38	130509	13.35 130.3E	PCN 5			KGWC
39	130600	13.55 130.0E	PCN 6		ULCC FIX	PGTW
40	130900	13.75 130.4E	PCN 5		ULCC FIX	PGTW
41	130927	13.75 130.2E	PCN 5			KGWC
42	131200	13.75 130.0E	PCN 6		ULCC FIX	PGTW
43	131329	14.25 130.7E	PCN 5		ULAC 14.9S 130.8E	KGWC
44	131600	14.45 129.5E	PCN 6			PGTW
* 45	131755	14.85 130.3E	PCN 5		ULCC 14.4S 129.8E	KGWC
46	131800	14.85 129.7E	PCN 6			PGTW
* 47	132100	15.05 129.8E	PCN 6			PGTW
* 48	132207	15.25 130.3E	PCN 5			KGWC
* 49	140000	15.35 129.8E	PCN 6		ULCC FIX	PGTW
* 50	140210	15.65 131.0E	PCN 5			KGWC
51	140300	14.05 129.4E	PCN 6		ULCC 15.5S 129.8E	PGTW
52	140600	14.05 129.2E	PCN 4	T0.0/0.0	INIT OBS EXP LLCC	PGTW
53	150000	14.15 127.5E	PCN 6	T0.0/0.0 /S0.0/18HRS	EXP LLCC	PGTW

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	121200	11.85 138.9E	LAND				40//0 42408		12.45 130.8E	94120
2	121400	11.65 131.7E	LAND				4//0 62087		12.45 130.8E	94120
3	122300	12.55 130.4E	LAND				45150 52613		12.45 130.8E	94120
4	130200	12.65 130.4E	LAND				5//2 52304		12.45 130.8E	94120
5	130400	12.75 130.0E	LAND				4//32 52412		12.45 130.8E	94120
6	130800	12.85 130.2E	LAND				45// 71204		12.45 130.8E	94120
7	131000	13.25 129.8E	LAND				40// 62110		12.45 130.8E	94120
8	131400	13.55 129.8E	LAND				45//2 72009		12.45 130.8E	94120

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	140000	14.05 129.5E	035	020	WMO 94111

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 35S
BEST TRACK DATA

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT
041206Z	8.5 100.3	35	0	100.6	35	21	0	10.1 96.2	55	177	5	11.7 92.5	70	517	5	0.0 0.0	0.0	0.0	0.0
041218Z	9.2 99.0	45	9	98.5	45	30	0	10.3 94.6	65	339	5	12.2 91.1	80	705	10	0.0 0.0	0.0	0.0	0.0
041306Z	10.1 99.2	50	9	99.4	55	38	5	10.0 98.5	65	211	0	11.1 86.8	80	572	20	0.0 0.0	0.0	0.0	0.0
041318Z	11.1 100.3	60	10	99.9	65	46	5	12.4 100.5	75	182	0	13.9 89.1	85	518	30	0.0 0.0	0.0	0.0	0.0
041406Z	12.0 101.3	70	11	101.3	65	24	0	14.2 103.1	75	160	15	17.3 103.7	95	314	35	0.0 0.0	0.0	0.0	0.0
041418Z	14.0 103.0	70	14	102.8	70	17	0	17.2 105.5	90	104	35	20.0 108.5	100	105	60	0.0 0.0	0.0	0.0	0.0
041506Z	15.5 105.5	60	15	105.3	70	17	10	17.7 109.8	70	75	20	19.6 113.5	75	162	45	0.0 0.0	0.0	0.0	0.0
041518Z	17.4 107.3	55	17	107.3	50	24	-5	20.1 110.2	40	60	0	23.4 112.8	30	335	0	0.0 0.0	0.0	0.0	0.0
041606Z	18.7 109.0	50	19	109.5	45	41	-5	23.5 112.8	35	309	0	0.0 0.0	0.0	0.0	0	0.0 0.0	0.0	0.0	0.0
041618Z	19.1 110.1	40	19	110.2	35	31	-5	20.7 111.9	25	167	-5	0.0 0.0	0.0	0.0	0	0.0 0.0	0.0	0.0	0.0
041706Z	18.7 110.8	30	0	0.0	0.0	0	0	0.0 0.0	0.0	0	0	0.0 0.0	0.0	0.0	0	0.0 0.0	0.0	0.0	0.0
041718Z	18.2 110.6	30	0	0.0	0.0	0	0	0.0 0.0	0.0	0	0	0.0 0.0	0.0	0.0	0	0.0 0.0	0.0	0.0	0.0
041806Z	17.8 110.3	30	0	0.0	0.0	0	0	0.0 0.0	0.0	0	0	0.0 0.0	0.0	0.0	0	0.0 0.0	0.0	0.0	0.0
041818Z	17.5 110.0	25	0	0.0	0.0	0	0	0.0 0.0	0.0	0	0	0.0 0.0	0.0	0.0	0	0.0 0.0	0.0	0.0	0.0

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	28.	178.	104.	0.	0.	0.	0.	0.
AVG RIGHT ANGLE ERROR	21.	119.	237.	0.	0.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	3.	10.	26.	0.	0.	0.	0.	0.
AVG INTENSITY BIAS	0.	9.	26.	0.	0.	0.	0.	0.
NUMBER OF FORECASTS	11	10	8	0	0	0	0	0

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1111. NM

AVERAGE SPEED OF TROPICAL CYCLONE IS 7. KNOTS

TROPICAL CYCLONE 355 FIX POSITIONS FOR CYCLONE NO. 35

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVORAK CODE	COMMENTS	SITE
1	101200	8.8S 109.3E	PCN 6	T1.0/1.0	INIT OBS	PGTW
2	101500	8.6S 107.3E	PCN 6			PGTW
3	101800	8.5S 106.0E	PCN 6			PGTW
4	102100	9.0S 105.3E	PCN 6			PGTW
5	102400	9.2S 105.7E	PCN 6	T1.5/1.5 /D0.5/30HRS		PGTW
6	102700	9.0S 104.9E	PCN 6			PGTW
7	103000	9.2S 101.2E	PCN 5	T1.5/1.5	INIT OBS ULAC 09.3S 101.9E	KGWC
8	103300	8.7S 100.9E	PCN 6	T2.5/2.5	INIT OBS ULCC FIX	PGTW
9	103600	8.8S 100.3E	PCN 6		ULCC FIX	PGTW
10	103900	8.6S 101.2E	PCN 5		ULAC 09.2S 102.1E	KGWC
11	104200	9.0S 99.9E	PCN 6		ULCC FIX	PGTW
12	104500	9.0S 99.8E	PCN 6		ULAC 09.4S 099.5E	KGWC
13	104800	9.0S 99.4E	PCN 6			PGTW
14	105100	9.0S 99.9E	PCN 6	T3.0/3.0	INIT OBS ULAC 09.2S 099.5E	KGWC
15	105400	9.0S 99.0E	PCN 6			PGTW
16	105700	9.0S 98.7E	PCN 6	T3.0/3.0 /D1.5/24HRS		PGTW
17	110000	9.2S 99.6E	PCN 6		ULAC 09.3S 099.2E	KGWC
18	110300	9.3S 99.3E	PCN 6			PGTW
19	110600	9.3S 99.3E	PCN 6			PGTW
20	110900	9.5S 99.3E	PCN 6		ULAC 09.6S 098.8E	KGWC
21	111200	9.5S 99.5E	PCN 6	T3.5/3.5 /D1.0/24HRS	ULCC FIX	PGTW
22	111500	10.2S 99.6E	PCN 6	T2.5/2.5 /D1.0/25HRS	ULAC 09.6S 099.4E	KGWC
23	111800	9.8S 99.5E	PCN 6		ULCC FIX	PGTW
24	112100	10.4S 99.7E	PCN 6		ULAC 10.2S 098.7E	KGWC
25	112400	10.2S 99.4E	PCN 6	T1.5/1.5	INIT OBS	FJDG
26	112700	10.2S 99.3E	PCN 6			PGTW
27	113000	11.0S 99.1E	PCN 6			KGWC
28	113300	10.6S 99.5E	PCN 6			PGTW
29	113600	11.1S 99.8E	PCN 6	T3.5/3.5 /D0.5/24HRS		KGWC
30	113900	11.1S 99.9E	PCN 6	T4.0/4.0 /D1.0/22HRS		PGTW
31	114200	11.1S 100.6E	PCN 6			PGTW
32	114500	11.1S 100.8E	PCN 6		ULAC 11.0S 100.4E	KGWC
33	114800	11.1S 101.3E	PCN 6			PGTW
34	115100	11.6S 100.9E	PCN 6		ULAC 11.1S 100.4E	KGWC
35	115400	11.4S 100.8E	PCN 6			PGTW
36	115700	11.6S 101.1E	PCN 6			PGTW
37	120000	11.5S 101.5E	PCN 6	T3.5/3.5 /D1.0/24HRS	ULAC 11.3S 101.3E	KGWC
38	120300	11.9S 101.4E	PCN 6	T4.0/4.0 /D0.5/27HRS		PGTW
39	120600	12.5S 101.6E	PCN 6		ULAC 13.1S 100.9E	KGWC
40	120900	12.7S 101.2E	PCN 5			FJDG
41	121200	12.6S 101.7E	PCN 6		ULAC 12.6S 101.9E	KGWC
42	121500	13.1S 101.4E	PCN 6			PGTW
43	121800	13.4S 102.3E	PCN 6	T3.0/3.5 /W0.5/24HRS	ULAC 13.4S 103.1E	KGWC
44	122100	14.2S 103.2E	PCN 4	T4.5/4.5 /D0.5/24HRS		PGTW
45	122400	14.3S 103.0E	PCN 4			PGTW
46	122700	14.3S 103.7E	PCN 6			KGWC
47	123000	14.3S 103.6E	PCN 6			PGTW
48	123300	14.8S 104.8E	PCN 6			KGWC
49	123600	14.8S 104.3E	PCN 6			PGTW
50	123900	14.7S 104.4E	PCN 6	T4.0/4.0 /S0.0/21HRS		PGTW
51	124200	15.3S 105.3E	PCN 6	T3.0/3.5 /W0.5/23HRS		KGWC
52	124500	15.7S 105.3E	PCN 6		ULCC 15.1S 105.2E	PGTW
53	124800	15.0S 105.0E	PCN 6		ULAC 16.1S 105.6E	KGWC
54	125100	16.0S 105.0E	PCN 6		ULCC FIX	PGTW
55	125400	16.4S 106.2E	PCN 6		ULCC FIX	PGTW
56	125700	16.8S 106.9E	PCN 6	T2.5/3.0 /W0.5/24HRS	EXP LLCC ULAC 17.9S 107.4E	KGWC
57	130000	17.6S 108.0E	PCN 6			KGWC
58	130300	18.4S 108.2E	PCN 6		EXP LLCC ULAC 19.1S 108.9E	KGWC
59	130600	18.6S 109.0E	PCN 3	T2.5/3.0 /W0.5/24HRS	EXP LLCC ULAC 19.4S 109.6E	KGWC
60	130900	18.7S 109.3E	PCN 6	T3.0/4.0 /W1.0/27HRS		PGTW
61	131200	19.0S 108.8E	PCN 4		EXP LLCC ULAC 20.3S 109.4E	KGWC
62	131500	18.7S 109.7E	PCN 6			PGTW
63	131800	18.8S 109.2E	PCN 4		EXP LLCC	KGWC
64	132100	19.2S 109.9E	PCN 6			PGTW
65	132400	18.6S 109.4E	PCN 4	T1.5/2.0 /W1.0/24HRS	EXP LLCC	KGWC
66	132700	19.5S 110.3E	PCN 6			PGTW
67	133000	18.8S 110.5E	PCN 4		EXP LLCC	KGWC
68	133300	18.8S 110.6E	PCN 4		EXP LLCC	PGTW
69	133600	18.7S 110.6E	PCN 4		EXP LLCC	KGWC
70	133900	18.9S 110.8E	PCN 4		EXP LLCC	PGTW
71	134200	18.8S 110.9E	PCN 3		EXP LLCC	KGWC
72	134500	18.7S 110.9E	PCN 6	T1.5/2.5 /W1.5/24HRS		PGTW
73	134800	18.4S 110.5E	PCN 3		EXP LLCC	KGWC
74	135100	18.7S 110.9E	PCN 6			PGTW
75	135400	17.0S 110.5E	PCN 4		EXP LLCC	KGWC
76	135700	17.7S 110.0E	PCN 4		EXP LLCC	PGTW
77	140000	17.7S 110.1E	PCN 4			KGWC
78	140300	17.8S 110.5E	PCN 4	T1.0/1.5 /W0.5/24HRS		PGTW
79	140600	17.8S 110.5E	PCN 4		EXP LLCC	KGWC
80	140900	17.4S 110.1E	PCN 6	T1.0/1.0	INIT OBS	PGTW
81	141200	17.5S 110.0E	PCN 6			PGTW
82	141500	17.4S 109.8E	PCN 4		EXP LLCC	KGWC
83	141800	17.4S 110.4E	PCN 4		EXP LLCC	PGTW
84	142100	17.4S 110.4E	PCN 3	T1.0/1.0 /D1.0/24HRS		KGWC
85	142400	18.1S 110.8E	PCN 4	T1.0/1.0 /S0.0/24HRS		PGTW
86	142700	17.7S 112.6E	PCN 6		ULAC 18.1S 113.8E	KGWC
87	143000	18.6S 111.6E	PCN 5	T1.0/1.0 /S0.0/24HRS	ULAC 18.4S 114.5E	KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

APPENDIX I

DEFINITIONS

BEST TRACK - A subjectively smoothed path, versus a precise and very erratic fix-to-fix path, used to represent tropical cyclone movement.

CENTER - The vertical axis or cone of a tropical cyclone. Usually determined by wind, temperature, and/or pressure distribution.

CYCLONE - A closed atmospheric circulation rotating about an area of low pressure (counterclockwise in the Northern Hemisphere).

EPHEMERIS - Position of a body (satellite) in space as a function of time; used for gridding satellite imagery. Since ephemeris gridding is based solely on the predicted position of the satellite, it is susceptible to errors from vehicle pitch, orbital eccentricity, and the oblateness of the earth.

EXPLOSIVE DEEPENING - A decrease in the minimum sea-level pressure of a tropical cyclone of 2.5 mb/hr for 12 hrs or 5.0 mb/hr for six hrs (ATR 1971).

EXTRATROPICAL - A term used in warnings and tropical summaries to indicate that a cyclone has lost its "tropical" characteristics. The term implies both poleward displacement from the tropics and the conversion of the cyclone's primary energy sources from release of latent heat of condensation to baroclinic processes. The term carries no implications as to strength or size.

EYE - A term used to describe the central area of a tropical cyclone when it is more than half surrounded by wall cloud.

FUJIWARA EFFECT - An interaction in which tropical cyclones within about 700 nm (1296 km) of each other begin to rotate about one another. When intense tropical cyclones are within about 400 nm (741 km) of each other, they may also begin to move closer to each other.

MAXIMUM SUSTAINED WIND - Highest surface wind speed averaged over a one-minute period of time. Peak gusts over water average 20 to 25 percent higher than sustained winds.

RAPID DEEPENING - A decrease in the minimum sea-level pressure of a tropical cyclone of 1.25 mb/hr for 24 hrs (ATR 1971).

RECURVATURE - The turning of a tropical cyclone from an initial path toward the west or northwest to a path toward the northeast.

RIGHT ANGLE ERROR - The distance described by a perpendicular line from the best track to a forecast position. (See Figure 4-1).

SIGNIFICANT TROPICAL CYCLONE - A tropical cyclone becomes "significant" with the issuance of the first numbered warning by the responsible warning agency.

SUPER TYPHOON/HURRICANE - A typhoon/hurricane in which the maximum sustained surface wind (one-minute mean) is 130 kt (67 m/s) or greater.

TROPICAL CYCLONE - A non-frontal low pressure system of synoptic scale developing over tropical or subtropical waters and having a definite organized circulation.

TROPICAL CYCLONE AIRCRAFT RECONNAISSANCE COORDINATOR - A USCINCPACAF representative designated to levy tropical cyclone aircraft weather reconnaissance requirements of reconnaissance units within a designated area of the PACOM and to function as coordinator between USCINCPACAF, aircraft weather reconnaissance units, and the appropriate typhoon/hurricane warning center.

TROPICAL DEPRESSION - A tropical cyclone in which the maximum sustained surface wind (one-minute mean) is 33 kt (17 m/s) or less.

TROPICAL DISTURBANCE - A discrete system of apparently organized convection - generally 100 to 300 nm (185 to 556 km) in diameter - originating in the tropics or subtropics, having a non-frontal migratory character, and having maintained its identity for 24 hours or more. It may or may not be associated with a detectable perturbation of the wind field. As such, it is the basic generic designation which, in successive stages of intensification, may be classified as a tropical depression, tropical storm or typhoon (hurricane).

TROPICAL STORM - A tropical cyclone with maximum sustained surface winds (one-minute mean) in the range of 34 to 63 kt (17 to 32 m/s) inclusive.

TROPICAL UPPER-TROPOSPHERIC TROUGH (TUTT) - A dominant climatological system (upper-level trough), and a daily synoptic feature, of the summer season over the tropical North Atlantic, North Pacific and South Pacific Oceans.

TYPHOON/HURRICANE - A tropical cyclone in which the maximum sustained surface wind (one-minute mean) is 64 kt (33 m/s) or greater. West of 180 degrees longitude they are called typhoons and east of 180 degrees they are called hurricanes. Foreign governments use these or other terms for tropical cyclones and may apply different intensity criteria.

VECTOR ERROR - The distance described by a straight line from the forecast position to the position at verification time as found on the best track. (See Figure 4-1).

WALL CLOUD - An organized band of cumuliform clouds immediately surrounding the central area of a tropical cyclone. The wall cloud may entirely enclose or only partially surround the center.

APPENDIX II

NAMES FOR TROPICAL CYCLONES

<u>Column 1</u>	<u>Column 2</u>	<u>Column 3</u>	<u>Column 4</u>
ANDY	ABBY	ALEX	AGNES
BRENDA	BEN	BETTY	BILL
CECIL	CARMEN	CARY	CLARA
DOT	DOM	DINAH	DOYLE
ELLIS	ELLEN	ED	ELSIE
FAYE	FORREST	FREDA	FABIAN
GORDON	GEORGIA	GERALD	GAY
HOPE	HERBERT	HOLLY	HAL
IRVING	IDA	IAN	IRMA
JUDY	JOE	JUNE	JEFF
KEN	KIM	KELLY	KIT
LOLA	LEX	LYNN	LEE
MAC	MARGE	MAURY	MAMIE
NANCY	NORRIS	NINA	NELSON
OWEN	ORCHID	OGDEN	ODESSA
PEGGY	PERCY	PHYLLIS	PAT
ROGER	RUTH	ROY	RUBY
SARAH	SPERRY	SUSAN	SKIP
TIP	THELMA	THAD	TESS
VERA	VERNON	VANESSA	VAL
WAYNE	WYNNE	WARREN	WINONA

NOTE:

Names are assigned in rotation, alphabetically. When the last name (WINONA) has been used, the sequence will begin again with "ANDY".

Source: CINCPACINST 3140.1 (series)

APPENDIX III

REFERENCES

- Atkinson, G. D., and C. R. Holliday, 1977: Tropical Cyclone Minimum Sea Level Pressure - Maximum Sustained Wind Relationship for the Western North Pacific. Monthly Weather Review, Vol. 105, No. 4, pp. 421-427.
- Brand, S., 1968: Interaction of Binary Tropical Cyclones in the Western North Pacific Ocean. NAVWEARSCHFAC Technical Paper No. 26-68, 25 pp.
- Brand, S., and C. P. Guard, 1978: Extratropical Storm Evolution from Tropical Cyclones in the Western North Pacific. NAVENVPREDRSCHFAC Technical Report TR 78-02, 20 pp.
- Chen, L., and W. M. Gray, 1985: Global View of the Upper Level Outflow Patterns Associated with Tropical Cyclone Intensity Change During FGGE. Atmospheric Science Paper 392, NASA NAG 5-299, Department of Atmospheric Science, Colorado State University, Fort Collins, Colorado, 146 pp.
- DeAngelis, D., 1985: Under the Bangladesh Cyclone. Mariners Weather Log, Summer 1985, Vol. 29, No. 3, pp 141-143.
- Diercks, J. M., R. C. Weir and M. K. Kopper, 1982: Forecast Verification and Reconnaissance Data for Southern Hemisphere Tropical Cyclones (July 1980 through June 1982). NAVOCEANCOMCEN/JTWC TECH NOTE 82-1, 77 pp.
- Dong, K., and C. J. Neumann, 1983: On the Relative Motion of Binary Tropical Cyclones. Monthly Weather Review, Vol. 111, pp 945-953.
- Dunnavan, G. M., 1981: Forecasting Intense Tropical Cyclones Using 700 mb Equivalent Potential Temperature and Central Sea-Level Pressure. NAVOCEANCOMCEN/JTWC TECH NOTE 81-1, 12 pp.
- Dvorak, V. F., 1984: Tropical Cyclone Intensity Analysis Using Satellite Data. NOAA Technical Report NESDIS 11, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Earth Satellite Service, Washington, D.C., 20233, 46 pp.
- Gray, W. M., 1979: Tropical Cyclone Origin, Movement and Intensity Characteristics Based on Data Compositing Techniques. NAVENVPREDRSCHFAC Contractor Report CR 79-06, 124 pp.
- Riehl, H., 1971: Intensity of Recurving Typhoons. NAVWEARSCHFAC Paper No. 3-71, 11 pp.
- Sadler, J. C., 1976: Tropical Cyclone Initiation by the Tropical Upper-Tropospheric Trough. NAVENVPREDRSCHFAC Technical Paper No. 2-76, 103 pp.
- Wirfel, W. P., and S. A. Sandgathe, 1986: Forecast Verification and Reconnaissance Data for Southern Hemisphere Tropical Cyclones (July 1982 through June 1984). NAVOCEANCOMCEN/JTWC TECH NOTE 86-1, 102 pp.

APPENDIX IV

PAST ANNUAL TROPICAL CYCLONE REPORTS

Copies of the past Annual Tropical Cyclone/Typhoon Reports
can be obtained through:

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Refer to the following acquisition numbers when ordering:

<u>YEAR</u>	<u>ACQUISITION NUMBER</u>
1959	AD 786147
1960	AD 786148
1961	AD 786149
1962	AD 786128
1963	AD 786208
1964	AD 786209
1965	AD 786210
1966	AD 785891
1967	AD 785344
1968	AD 785251
1969	AD 785178
1970	AD 785252
1971	AD 768333
1972	AD 768334
1973	AD 777093
1974	AD 010271
1975	AD A023601
1976	AD A038484
1977	AD A055512
1978	AD A070904
1979	AD A082071
1980	AD A094668
1981	AD A112002
1982	AD A124860
1983	AD A137836
1984	AD A153395

DISTRIBUTION

AFGWC (2)
 AWS TECHNICAL LIBRARY (2)
 BUR OF MET, BRISBANE (3)
 BUR OF MET, DARWIN (2)
 BUR OF MET, MELBOURNE (2)
 BUR OF MET, PERTH (1)
 BUR OF PLANNING, GUAM (2)
 CATHOLIC UNIVERSITY OF AMERICA (1)
 CENTRAL MET. OBSERVATORY, BEIJING, PRC (2)
 CENTRAL METEOROLOGICAL OFFICE, SEOUL (1)
 CENWEABUR, TAIWAN (3)
 CINCPACFLT (3)
 CIUDAD UNIV, MEXICO (1)
 CIVIL DEFENSE, GUAM (5)
 CIVIL DEFENSE, SAIPAN (1)
 CNO (OP-952), WASHINGTON DC (1)
 COLORADO STATE UNIV (3)
 COLORADO STATE UNIV (LIBRARY) (1)
 COMFAIRECONRON ONE (1)
 COMMONWEALTH OF NORTHERN M.I., SAIPAN (5)
 COMNAVAIRSYSCOM (1)
 COMNAVFAENGCOMPACDIV (1)
 COMNAVMIANAS (2)
 COMNAVOCEANCOM (2)
 COMNAVSURFGRU WESTPAC (2)
 COMNAVSURFPAC (3)
 COMPHIBGRU ONE (1)
 COMSC (1)
 COMSEVENTHFLT (1)
 COMSUBGRU SEVEN (1)
 COMTHIRDFLT (1)
 COMUSNAVPHIL (1)
 CONGRESSIONAL INFORMATION SERVICE, MD (1)
 DEFENSE COMMUNICATIONS AGENCY, GUAM (1)
 DEFENSE DOCUMENTATION CENTER (12)
 DEPT OF AIR FORCE (1)
 DEPT OF COMMERCE (2)
 DET 2, 20 WS (1)
 DET 4, 20 WS (1)
 DET 5, 20 WS (2)
 DET 8, 20 WS (2)
 DET 10, 30 WS (1)
 DET 15, 30 WS (1)
 DET 17, 20 WS (1)
 DET 18, 30 WS (1)
 ENVIR SVCS DIV, PENTAGON (1)
 FAA, GUAM (5)
 FLENUMOCEANCEN, MONTEREY (2)
 FLORIDA STATE UNIV., TALLAHASSEE (2)
 GEOLOGICAL SURVEY, GUAM (1)
 GFDL, PRINCETON, N.J. (1)
 GUAM PUBLIC LIBRARY (5)
 HUGHES AIRCRAFT COMPANY (1)
 HQ AWS/DOR (2)
 HQ AWS/DNT (1)
 HQ USAF/XOORZ (1)
 INDIA MET DEPT (3)
 INST OF PHYSICS, TAIWAN (2)
 INSTITUTO DE GEOFISICA, MEXICO (1)
 JAPAN MET AGENCY (3)
 JASDF, TOKYO (2)
 KOTSCH, W.J., RADN (RET) (2)
 LOS ANGELES PUBLIC LIBRARY (1)
 MAC/HO, IL (1)
 MARATHON OIL COMPANY, TX (2)
 MARINERS WEATHER LOG (2)
 MASS INST OF TECH (1)
 MCAS FUTENMA (2)
 MCAS IWAKUNI (3)
 MCAS KANEOHE BAY (1)
 MET DEPT BANGKOK (4)
 MET SOC OF SOUTH WALES, AUST (2)
 MET RESEARCH INST LIBRARY, TOKYO (1)
 MICRONESIAN RESEARCH CENTER UOG, GUAM (2)
 NAT CLIM DATA CENTER, NC (2)
 NATIONAL METEOROLOGICAL LIBRARY, BRACKNELL, UK (2)
 NATIONAL WEATHER ASSOCIATION (4)
 NATIONAL WEATHER SERVICE, HONOLULU (2)
 NAVAL ACADEMY (2)
 NAVAL CIVIL ENG LAB, PORT HUENEME, CA (1)
 NAVEASTOCEANCEN, NORFOLK (1)
 NAVHISTCEN (1)
 NAVOCEANCOMCEN, ROTA (1)
 NAVOCEANCOMFAC, JACKSONVILLE (1)
 NAVOCEANCOMFAC, YOKOSUKA (2)
 NAVPOLAROCEANCEN, SUTLAND (2)
 NAVWESTOCEANCEN, PEARL HARBOR (2)
 NEPRF (3)
 NOAA, NHC (2)
 NOAA/GUAM (2)
 NOAA/AOML, HRD, MIAMI FL (1)
 NOAA/HYDROMETEOROLOGY BR, SILVER SPRINGS, MD (1)
 NOAA/ACQUISITION SECTION ROCKVILLE, MD (1)
 NOAA/NESDIS, REDWOOD CITY, CA (1)
 NOAA/PMEL, SEATTLE, WA (1)
 NOCD, AGANA (3)
 NOCD, ALAMEDA (1)
 NOCD, ASHEVILLE (2)
 NOCD, ATSUGI (1)
 NOCD, BARBERS POINT (1)
 NOCD, DIEGO GARCIA (20)
 NOCD, KADENA (1)
 NOCD, MISAWA (2)
 NOCD, MONTEREY (1)
 NPGS DEPT OF MET (3)
 NPGS LIBRARY (1)
 OCEAN ROUTES INC, CA (2)
 OCEANO SERVICES INC, CA (1)
 OFFICE OF THE NAVAL DEPUTY, NOAA (1)
 OKINAWA MET OBS (1)
 OLG/HQ AWS/CARCAH, NAT HURRICANE CENTER (5)
 PACAF/DOW (2)
 PACIFIC STARS AND STRIPES (1)
 PAGASA, RP (5)
 PENNSYLVANIA STATE UNIVERSITY (1)
 ROYAL OBSERVATORY, HONG KONG (5)
 SECDEF, PENTAGON (2)
 TAIWAN UNIVERSITY (1)
 TEXAS A and M UNIVERSITY (1)
 TYPHOON COM SECR, MANILA (2)
 UNESCAP, BANGKOK (2)
 UNIVERSITY OF CHICAGO (1)
 UNIVERSITY OF HAWAII DEPT OF MET (3)
 UNIVERSITY OF HAWAII (LIBRARY) (1)
 UNIVERSITY OF PHILIPPINES (5)
 UNIVERSITY OF WASHINGTON (1)
 USCINCPAC (1)
 USS BELLEAU WOOD (1)
 USS CARL VINSON (1)
 USS CONSTELLATION (1)
 USS CORAL SEA (1)
 USS ENTERPRISE (1)
 USS KITTY HAWK (1)
 USS LONG BEACH (2)
 USS MIDWAY (1)
 USS NEW ORLEANS (1)
 USS OKINAWA (1)
 USS RANGER (1)
 USS TARAWA (1)
 USS TRIPOLI (2)
 WEATHER SERV MET OBS, AGANA (2)
 WEATHER MODIFICATION PROGRAM OFFICE (1)
 WORLD DATA CENTER A, NOAA (2)
 WORLD WEATHER BLDG, MD (1)
 1WW/DON (3)
 3AD/DO (1)
 3WW/CC (1)
 5WW/CC (1)
 17 WS/DO (1)
 30WS/CC (2)
 34 AWF, 920 WRG (1)
 41 RWRW/OL-D (2)
 43 SW/DO (1)
 54 WRS/CC (4)
 73 WEATHER GROUP, ROK AF (2)

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION/AVAILABILITY OF REPORT AS IT APPEARS IN THE REPORT/ DISTRIBUTION UNLIMITED		
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S)			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION NAVOCEANCOMCEN/JTWC		6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION NAVOCEANCOMCEN/JTWC		
6c. ADDRESS (City, State and ZIP Code) COMNAVMAR BOX 17 F.P.O. SAN FRANCISCO, CA 96630			7b. ADDRESS (City, State and ZIP Code) COMNAVMAR BOX 17 F.P.O. SAN FRANCISCO, CA 96630		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION NAVOCEANCOMCEN/JTWC		8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER		
8c. ADDRESS (City, State and ZIP Code) COMNAVMAR BOX 17 F.P.O. SAN FRANCISCO, CA 96630			10. SOURCE OF FUNDING NOS.		
			PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.
11. TITLE (Include Security Classification) 1985 ANNUAL TROPICAL CYCLONE REPORT					
12. PERSONAL AUTHOR(S)					
13a. TYPE OF REPORT ANNUAL		13b. TIME COVERED FROM JAN85 TO DEC85		14. DATE OF REPORT (Yr., Mo., Day) 1985	
15. PAGE COUNT 276 plus i-vii					
16. SUPPLEMENTARY NOTATION					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB. GR.	TROPICAL CYCLONES TROPICAL STORMS TROPICAL DEPRESSIONS TYPHOONS/SUPER TYPHOONS TROPICAL CYCLONE RESEARCH METEOROLOGICAL SATELLITE		
04	02				
19. ABSTRACT (Continue on reverse if necessary and identify by block number)					
ANNUAL PUBLICATION SUMMARIZING THE TROPICAL CYCLONE SEASON IN THE WESTERN NORTH PACIFIC, BAY OF BENGAL AND THE ARABIAN SEA, AND SOUTH PACIFIC AND SOUTH INDIAN OCEANS. A BEST TRACK IS PROVIDED FOR EACH SIGNIFICANT TROPICAL CYCLONE. A BRIEF NARRATIVE IS GIVEN FOR ALL TYPHOONS AND SELECTED TROPICAL CYCLONES IN THE WESTERN NORTH PACIFIC AND NORTH INDIAN OCEAN. ALL RECONNAISSANCE DATA USED TO CONSTRUCT THE BEST TRACKS ARE PROVIDED. FORECAST VERIFICATION DATA AND STATISTICS FOR THE JOINT TYPHOON WARNING CENTER (JTWC) ARE SUMMARIZED.					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT. ☒ DTIC USERS ☐			21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED		
22a. NAME OF RESPONSIBLE INDIVIDUAL FRANK H. WELLS			22b. TELEPHONE NUMBER (Include Area Code) 671-344-5240		22c. OFFICE SYMBOL NOCC/JTWC

BLOCK 18 (CONTINUED)
TROPICAL CYCLONE BEST TRACK DATA
TROPICAL CYCLONE FORECASTING
AIRCRAFT RECONNAISSANCE
DYNAMIC TROPICAL CYCLONE MODELS
TYPHOON ANALOG MODEL
TROPICAL CYCLONE STEERING MODEL
CLIMATOLOGY/PERSISTENCE TECHNIQUES
TROPICAL CYCLONE FIX DATA



The dense white wall cloud of Super Typhoon Dot contrasted with the thin cirrus overhead, as seen across the left wing of the 54th Weather Reconnaissance Squadron WC-130 aircraft. At 160000Z October 1985, the time of this picture, Dot had just reached super typhoon intensity. Dot became the most intense tropical cyclone of the 1985 northwest Pacific season with maximum sustained surface winds of 150 kt (77 m/s) (photo provided by the pilot and photographer Major Barry B. Besold).