TERMINAL FORECAST REFERENCE FILE

DETACHMENT 23
24TH WEATHER SQUADRON
MOODY AFB, GEORGIA

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13. ABSTRACT
This reference file discusses factors affecting the weather at Moody AFB, GA. Included are location and topography, weather controls, climatic aids, and forecasting guides.

Details of illustrations in
this document may be better
studied on microfiche

14. KEY WORDS	LINK A ROLE	LINK A WT	LINK B ROLE	LINK B WT		
Meteorology						
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Moody AFB, GA						
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SECTION I

LOCATION AND TOPOGRAPHY

Moody Air Force Base, an Air Training Command installation, is located in extreme south Georgia, approximately eleven miles northeast of the City of Valdosta. The geographic coordinates of the base are 30°58'N, 83°12'W, and the station elevation is 243 feet above mean sea level.

SIGNIFICANT TOPOGRAPHICAL FEATURES

The southernmost extension of the Appalachian Mountains lies 150 miles to the northwest of Moody. The significant moisture sources in the area are the Atlantic Ocean 100 miles to the east, the Gulf of Mexico 75 miles to the southwest, and the Okefenokee swamps to the east-southeast, with the edge of the swamp 30 miles away. This swampland is somewhat oval-shaped about 50 miles long and 30 miles wide, oriented north to south. Other significant moisture sources for Moody are the extensive swamplands which ring the base from northeast clockwise to the southwest and the extensive system of rivers and streams over the entire area.

TERRAIN

The terrain within fifty miles of the base is quite flat from northeast clockwise to the southwest. This area is composed of farmlands and extensive swampy areas. Elevations throughout these quadrants are less than 200 feet MSL. From the southwest to the northeast, clockwise, the terrain is of a low rolling nature, elevations above 200 feet MSL, reaching 400 feet about 50 miles to the northwest. This area is composed primarily of farmlands and forests. (See Charts I and II.)

POLLUTION SOURCES

The most significant sources of pollution at Moody are the heating plants on the base itself. These plants are located to the west and northwest of the runway complex. A paper mill located 20 miles to the southwest is another contributing source. Other pollution sources are the forest fires, which occur mainly in the dry fall months and during late winter or early spring when the farmers burn their fields. Any of these sources may produce a significant reduction to visibility, particularly when the station has been under a stagnant high pressure cell for a few days.

THE RUNWAY COMPLEX

The Moody airdrome has two parallel runways, oriented in a north-south direction. These runways are located at the eastern edge of the base. Both runways are 8000 feet in length and 150 feet wide. The runway designated 18R/36L is closest to the main base and is referred to as the "inside" runway. The runway designated as 18L/36R is the primary instrument runway and is referred to as the "outside" runway. (See Chart III.)

METEOROLOGICAL INSTRUMENTATION

The Base Weather Station at Moody is located in the Base Operations building, about a half mile to the west of the inside runway. The Representative Observation Site (ROS) is located in the tower immediately to the east of the old Base Operations building. This tower is approximately 55 feet high and provides an unobstructed view in all quadrants.

The AN/GMQ-13 Rotating Beam Ceilometer is located 4600 feet to the north of the center of the touchdown zone of runway 18L. This RBC utilizes a 400 foot baseline, with the detector situated about 2100 feet to the north of the runway.

The ML 221 Ceiling Light is located beside the north ramp, some 800 feet to the northeast of the old Base Operations building.

The AN/GMQ-10 Transmissometer is located about 700 feet east of the instrument runway and about 1200 feet from the north end. The projector and receiver are 11 feet above the elevation of the mid-point of the runway. The AN/GMQ-10 Receiver provides a signal input to an AN/FMN-1 Runway Visual Range Computer located in the ROS.

The AN/GMQ-11 Wind Transmitter is situated between the runways about 300 feet east of the inside runway and about 3500 feet from the north end. The instrument is 11 feet above the midpoint of the runway.

The AN/TMQ-11 Temperature-Humidity Transmitter is located about 700 feet west of the inside runway and near the mid-point of this runway.

The ML-17 Rain Gauge is located approximately 40 feet north northeast of the ROS.

Readouts for the AN/GMQ-13, GMQ-10, GMQ-11 and TMQ-11 are located in the Representative Observation Site. In addition, AN/GMQ-11 Wind Indicators are located in the Control Tower and in the FAA Radar Approach Control Facility.

The antenna assembly for the AN/FPS-77 radar is located on a 65 foot tower some 1400 feet northwest of the Base Operations building. The AN/FPS-77 console is located in the forecast section of the Base Weather Station.

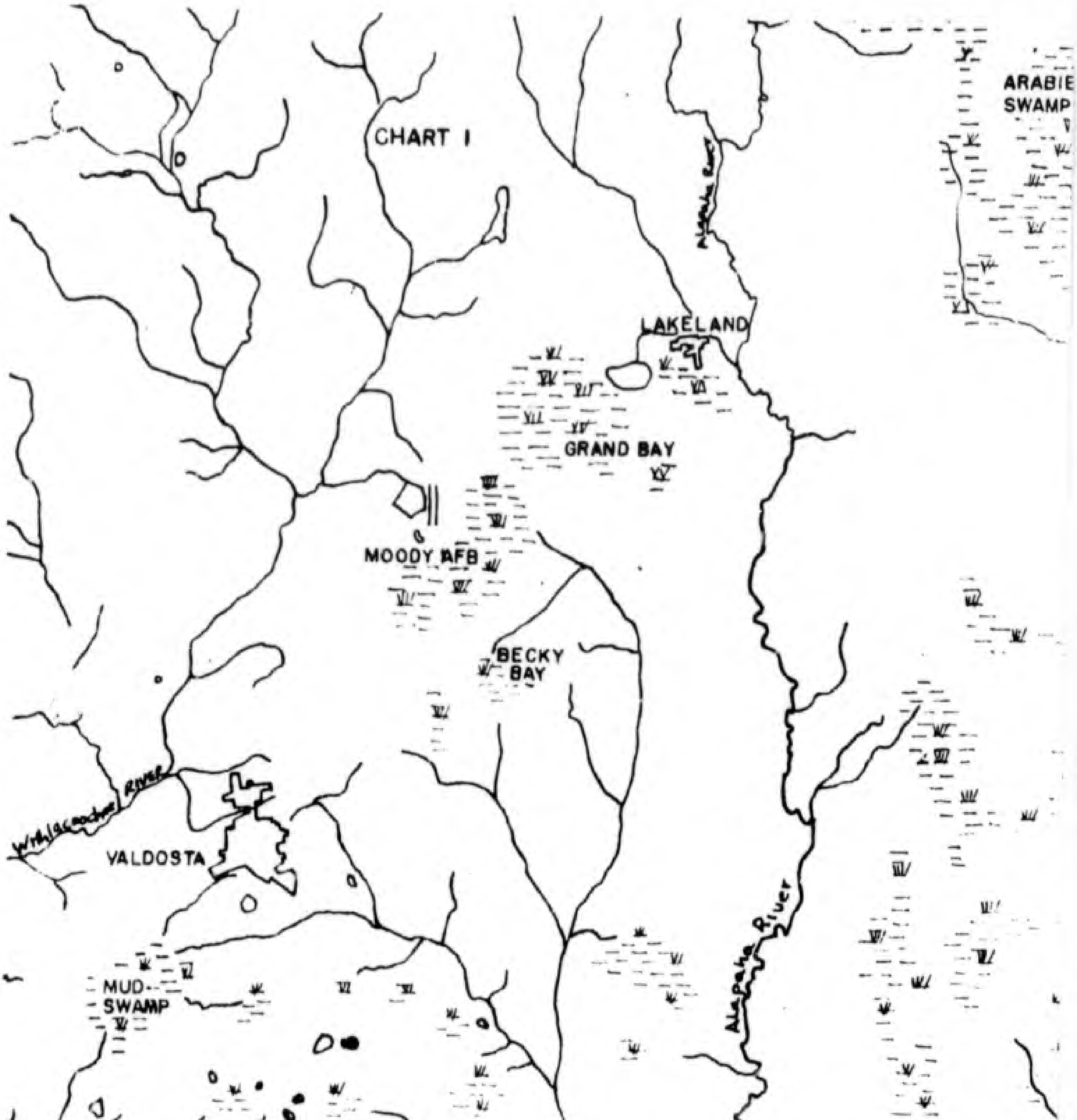
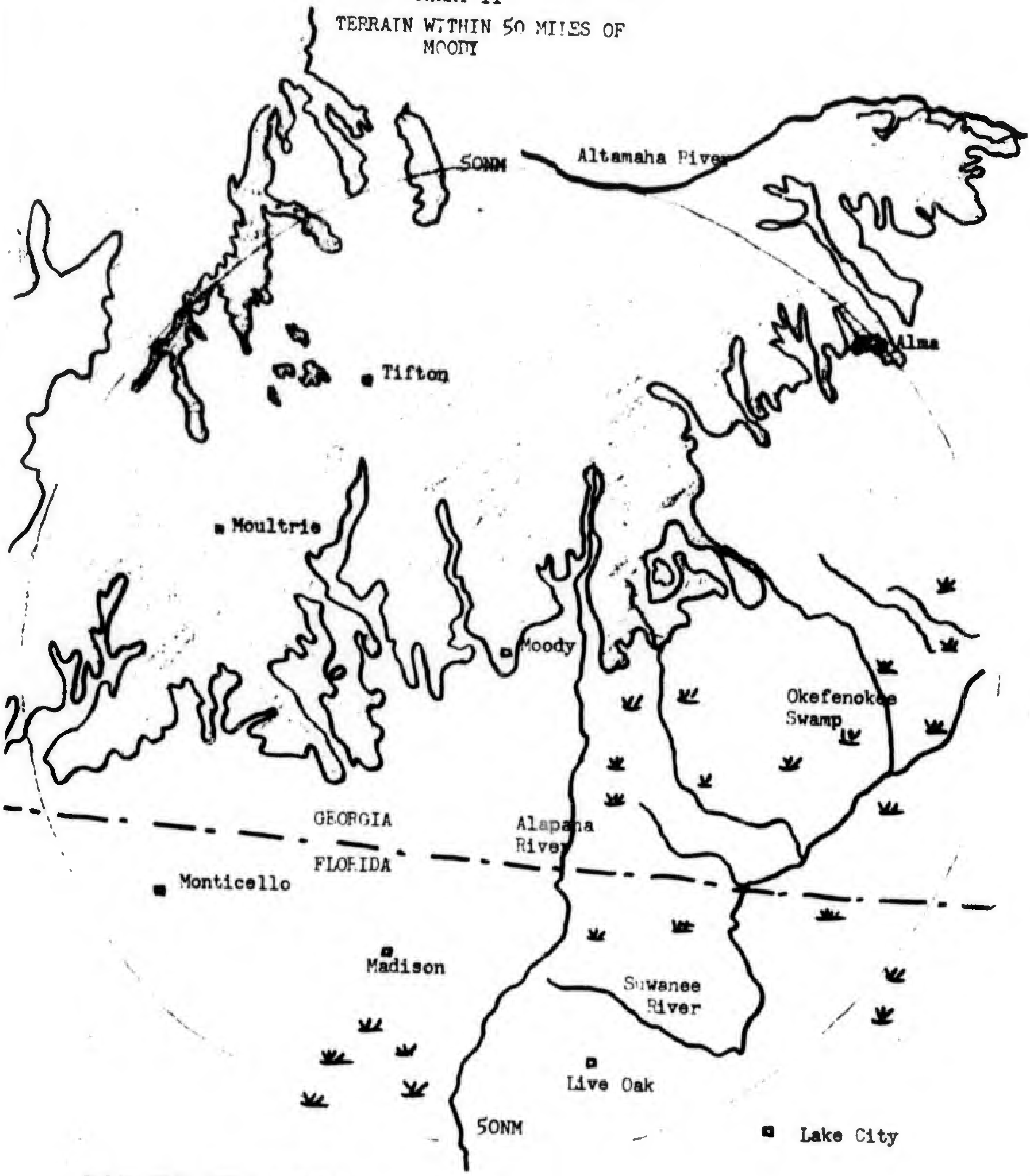


CHART I
ARABIE SWAMP
LAKELAND
GRAND BAY
MOODY AFB
BECKY BAY
Withlacoochee River
VALDOSTA
MUD-SWAMP
Alapaha River
LONGPOND
SCALE
1:250,000
5
MILES

CHART II

TERRAIN WITHIN 50 MILES OF MOODY



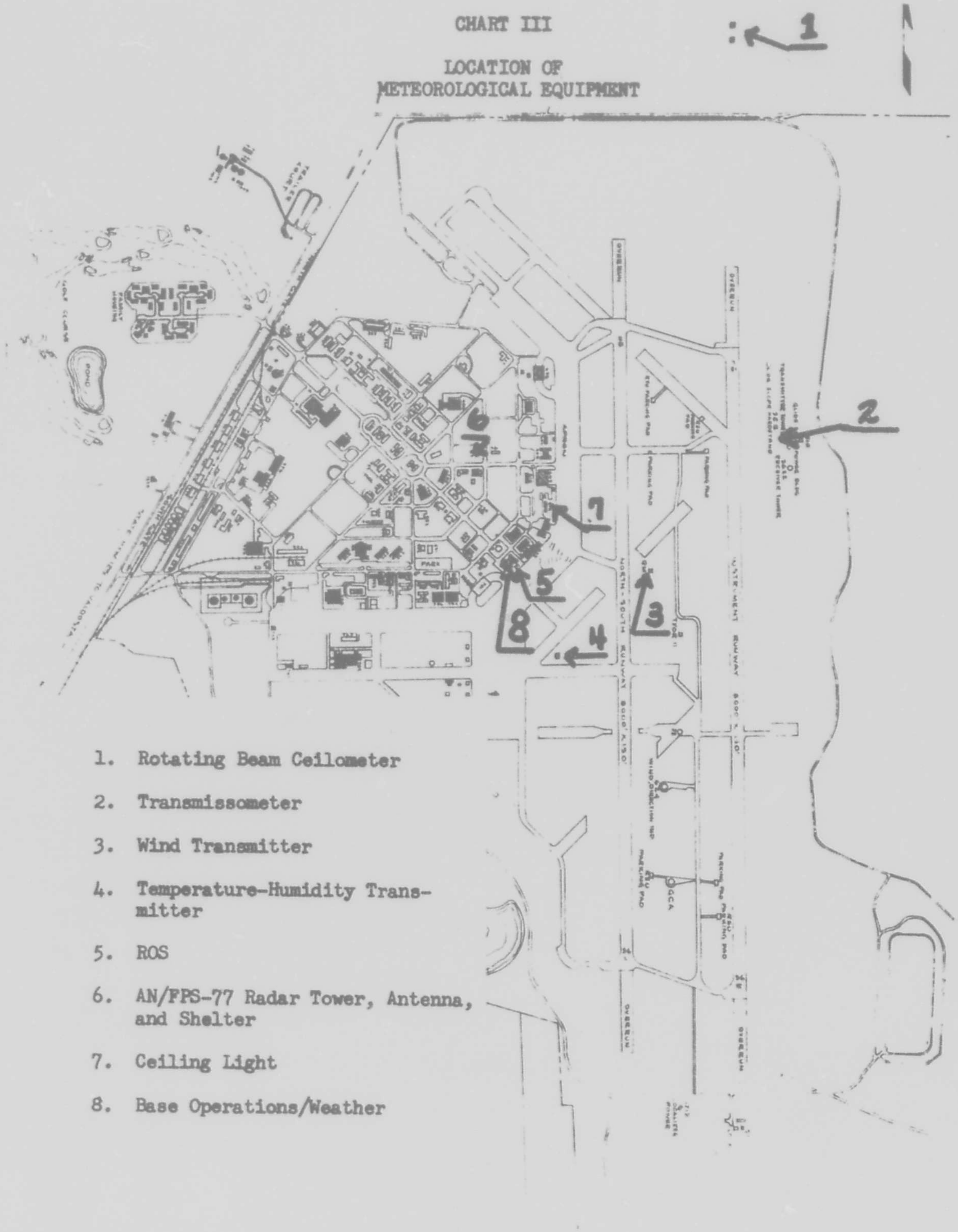
Below 200' MSL-Unshaded

200' to 400' MSL-Shaded Lightly

Above 400'-Shaded Dark

CHART III

LOCATION OF
METEOROLOGICAL EQUIPMENT



1. Rotating Beam Ceilometer

2. Transmissometer

3. Wind Transmitter

4. Temperature-Humidity Transmitter

5. ROS

6. AN/FPS-77 Radar Tower, Antenna, and Shelter

7. Ceiling Light

8. Base Operations/Weather

SECTION II

WEATHER CONTROLS

SEASONAL REGIMES

The four seasons at Moody AFB present considerable contrast in their associated weather regimes. In this section, each season is discussed separately. In each of the seasons, the most important controlling synoptic features are the location of the polar front and the Bermuda High. Peculiar phenomena that occurs in this area of the country are discussed at the end of this section.

THE WINTER REGIME (DECEMBER - MARCH)

We consider the winter season to extend from early December until the latter part of March. It is during this period that the polar front moves to its extreme southerly position, placing Moody AFB under the influence of continental polar airmasses for several days at a time. Clear and cold weather occur during these outbreaks and temperatures reach their annual minimum (freezing or near freezing and heavy nocturnal frosts). These outbreaks usually accompany rapidly moving fronts, oriented northeast to southwest, with strong northwesterly winds aloft. There is either a narrow band of weather (500 to 1000 foot ceilings and visibilities two to four miles in rain approximately 100 miles wide), or merely a clearing process depending on the stability of the air mass ahead of the front.

In this wintertime situation, the Bermuda High is in a receded position and has little or no influence in impeding the outbreak of cold air. When conditions are such that the polar front becomes stationary in the Gulf of Mexico or along the Gulf Coast Moody experiences another predominant type of weather, i.e., Gulf lows or waves along the front. When these frontal waves form, part of the front will pass to the north as a warm front, producing active warm frontal weather, followed by a pronounced cold frontal passage. Twenty-four to thirty-six hours of typical pre-warm frontal weather will occur (lowering middle clouds and precipitation beginning within 24 hours of warm frontal passage). Weather conditions will deteriorate to ceilings as low as 300 feet and visibilities of one-half mile in the frontal zone. These conditions may drop to near zero-zero conditions after sunset.

With the warm frontal passage during the late morning or early afternoon hours, the low stratus usually dissipates and visibility improves rapidly to unrestricted. If the frontal passage occurs after dark, the low ceilings and visibilities will persist until about 0900 - 1000 EST.

Within nine to fifteen hours after the warm frontal passage, a marked cold frontal passage will normally occur, usually accompanied by ceilings of 1000 to 2000 feet, rain showers or thundershowers, and gusty surface winds reaching 30 knots. In the case of a strong wave, hazardous weather often occurs in the form of family-type tornadoes or thunderstorms with strong surface winds and hail. These systems become quite important in the late winter months. Gradual clearing usually occurs with the passage of the cold front, and fair conditions remain in the area for one to three days. See page 2-10 for a further discussion on the Gulf Lows.

Fog and stratus formation is another significant and challenging winter forecast problem at Moody. Fog and stratus will normally form around midnight or shortly thereafter, whenever an mP or mT air mass is predominant in the area, and the surface wind is light from the east through the southwest. Ceilings are usually reduced to between zero and 300 feet and visibilities zero to one mile, with minimum conditions occurring between 0400 and 0800 EST. This stratus and fog may be brought about either by the advection of moisture into the area from the east or southeast coastal sections or by the effects of strong radiational cooling. The lakes and swamps in this area are extremely important moisture sources and tend to further complicate an already critical and complex forecast problem. (See Chart I for a typical winter synoptic map, and discussion on some non-classic winter systems on pages 2-14 through 2-22).

THE SPRING REGIME (APRIL - MAY)

During this season, the transition from winter to summer weather takes place. The polar front moves northward and by May the Bermuda high becomes the predominant synoptic feature in the southeastern United States. This high places south Georgia under the influence of mT or highly modified mP air. Polar outbreaks weaken rapidly during the month of April, but the associated weather with the fronts becomes more hazardous with gusty winds, heavy precipitation, squalls, thunderstorms and a significant number of tornadoes.

The latter part of the spring season brings the transition from the effects of the cP airmasses and a huge blanket of mT air covers the area as the Bermuda high builds and extends westward. As this occurs, frontal type weather disappears from the area and the hazardous types of weather are those associated with air mass thunderstorms. (See Chart II for a typical spring synoptic map.)

THE SUMMER REGIME (JUNE - SEPTEMBER)

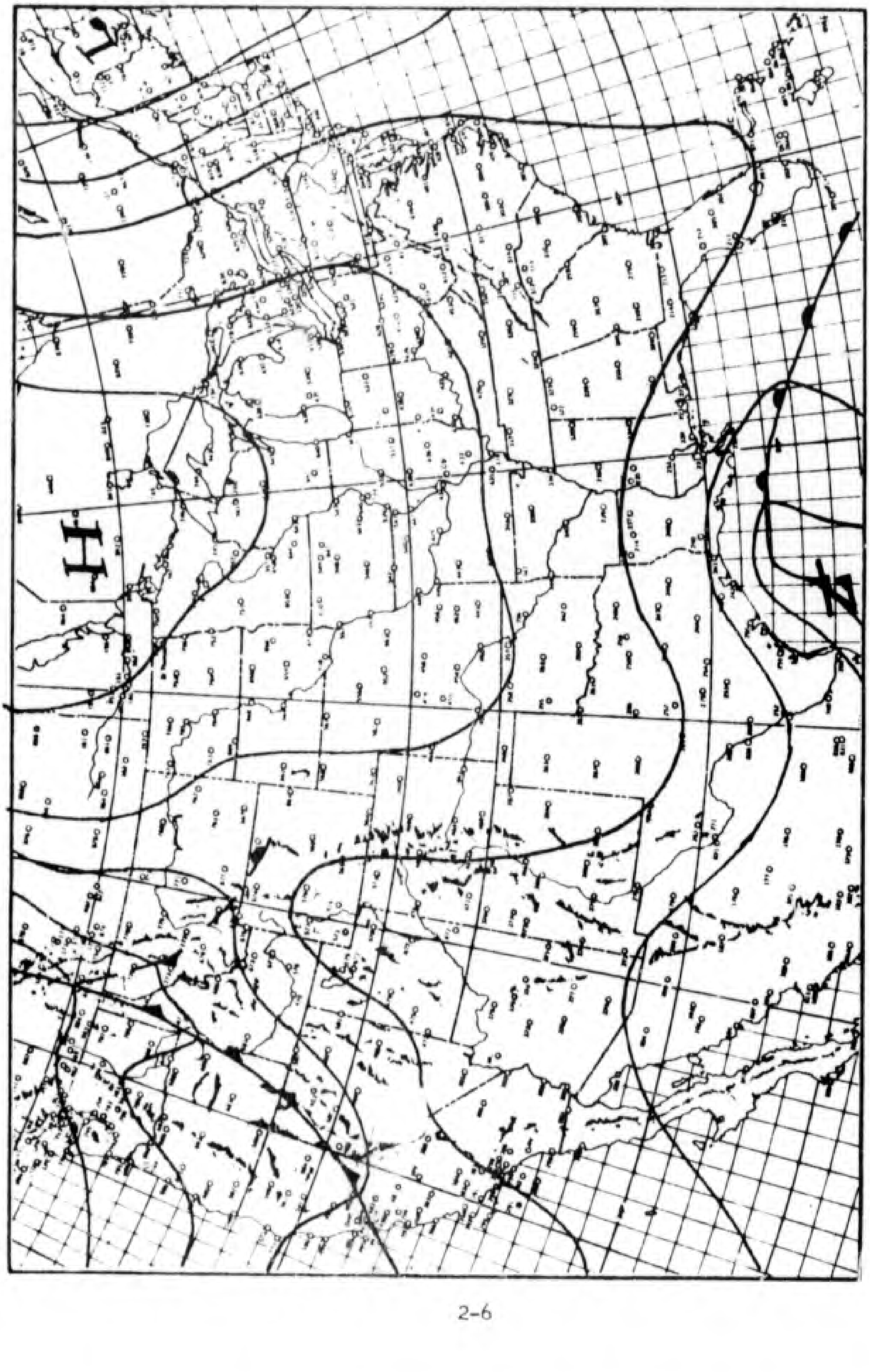
The common synoptic picture during the summer finds the Bermuda high quite well developed, and extending westward over the station. This synoptic situation is accompanied by a definite diurnal weather pattern, clear mornings, cumulus formation by noon and thunderstorms in the late afternoon or early evening. Practically no frontal passages occur, and an mT air mass prevails throughout the area. Early morning fog and stratus are rare or of short duration. One important exception to this general rule is noted when heavy rains occur during the spring months and serious visibility restrictions occur until the latter part of June. Air mass thunderstorms are a significant factor in the summer weather. The frequency of convective activity reaches a maximum during July.

Hurricanes become a concern for the Moody area during the summer months, however, only very rarely does a hurricane pass in the immediate vicinity of the station. Tropical cyclones will either pass to the south into the Gulf of Mexico, or recurve north or northeastward along the Atlantic coast. These paths will occasionally put Moody in the rain pattern, but only rarely within the radius of 35 knot winds. In those rare cases when tropical cyclones actually do pass over the station or close to it, the land areas over which the storm passes will considerably reduce their intensity. The result is that hurricane force winds are a rare phenomenon at Moody. A distinct possibility, however, is for tornadoes to form in the cumulonimbus clouds at the outer periphery of the storm.

The easterly wave is another phenomenon that can have a significant effect on the local weather during the summer season. The discussion on page 2-22 should provide the reader with a better understanding of the easterly wave. (See Chart III for a typical summer synoptic pattern.)

THE AUTUMN REGIME (OCTOBER - NOVEMBER)

Autumn is a period of transition from summer to winter; however, the period of transition is somewhat more abrupt than the spring reversal, and much less hazardous weather is produced. Frontal passages are weak and air mass thunderstorm activity is greatly diminished from the summer. Autumn is the driest season, and it is not unusual to have several days at a time of fair to clear weather. It is during this dry season that many forest fires occur in south Georgia. (See Chart IV for a typical autumn synoptic picture.)



18 JAN 56

CHART I

WINTER SYNOPTIC SURFACE CHART

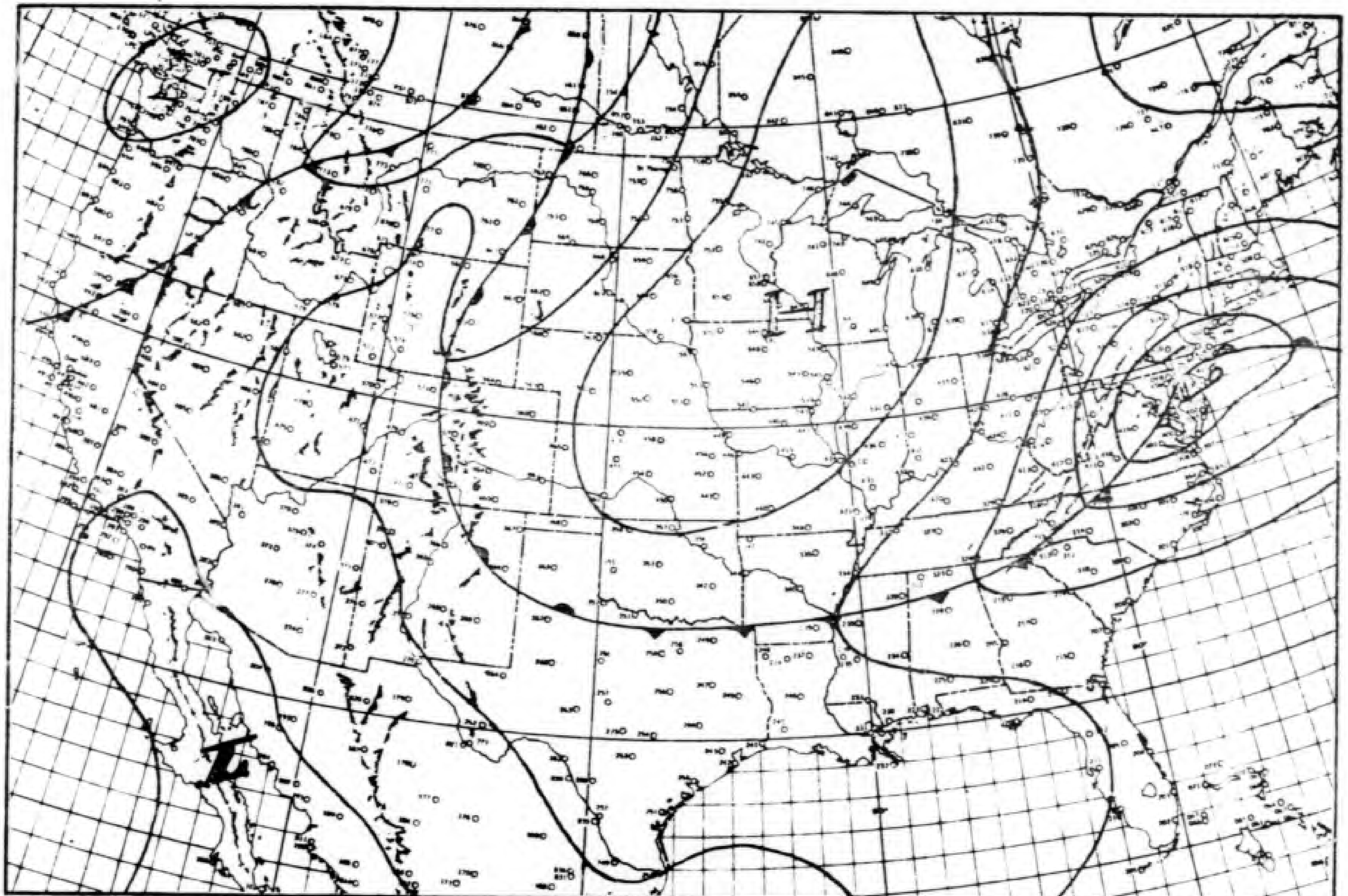


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CHART II

24 MAR 56

SPRING SYNOPTIC SURFACE CHART

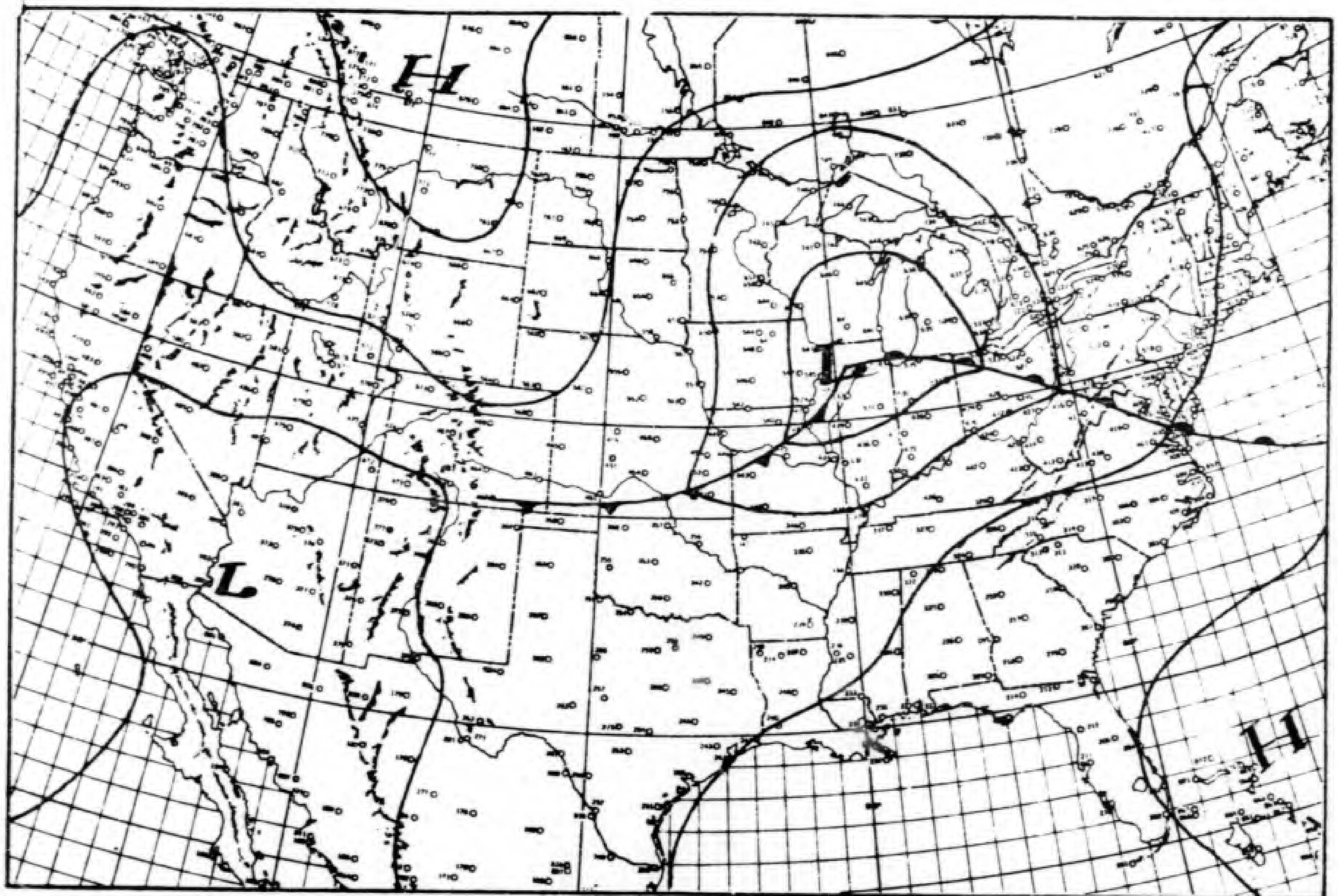

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CHART III

8 JUL 56

SUMMER SYNOPTIC SURFACE CHART

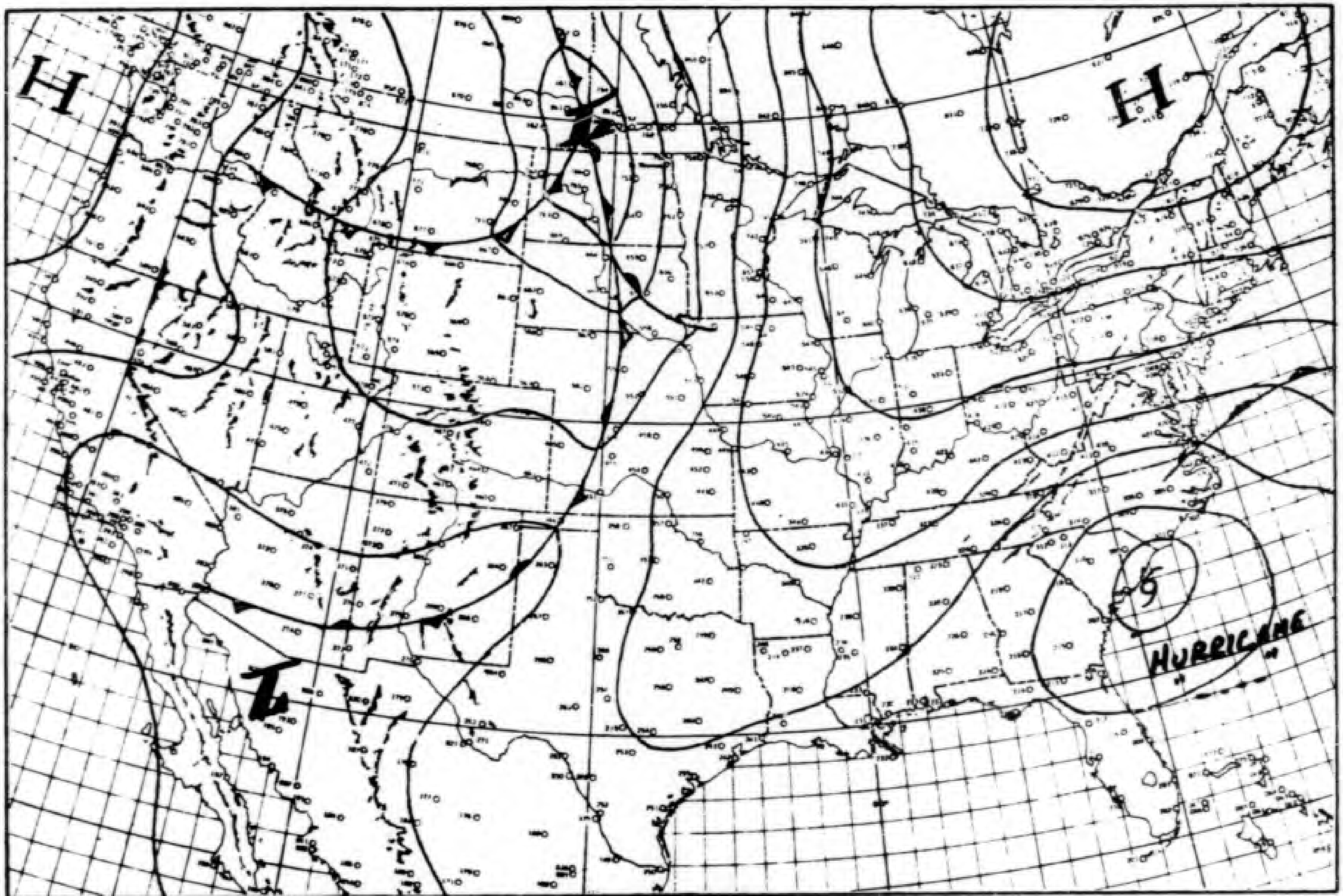


CHART IV

17 SEP 45

AUTUMN SYNOPTIC SURFACE CHART

THE GULF LOW

One of the most significant "hazardous weather" producers in the southeastern United States is the wave that occasionally develops on a quasi-stationary front along the Gulf coast. This system will produce many thunderstorms and often will generate tornadoes of the family type as it follows its typical track from the western Gulf of Mexico northeastward through the Southern states toward New England. The actual development of this type wave is a subject of considerable controversy among forecasters, but one theory holds that the possibility for this type of development exists when the major trough at 500 millibars lies to the west of Moody (generally between 85° and 100° W), and the surface flow is nearly parallel to the overlying 500 MB flow. Some keys to the development of the wave include:

(1) Presence of heavy middle cloudiness along the Gulf coast.

(2) Pressure falls on the surface in the area from Mobile, Alabama, westward to Lake Charles, Louisiana.

(3) A maximum wind band in the middle or low levels oriented from southwest to northeast and passing within 150 miles of the front.

When the low has developed, it will tend to move more northerly than the overlying wind field would suggest, at least until it has moved north of the maximum wind band. The speed of movement will be 60 to 80 percent of the 500 millibar flow over it.

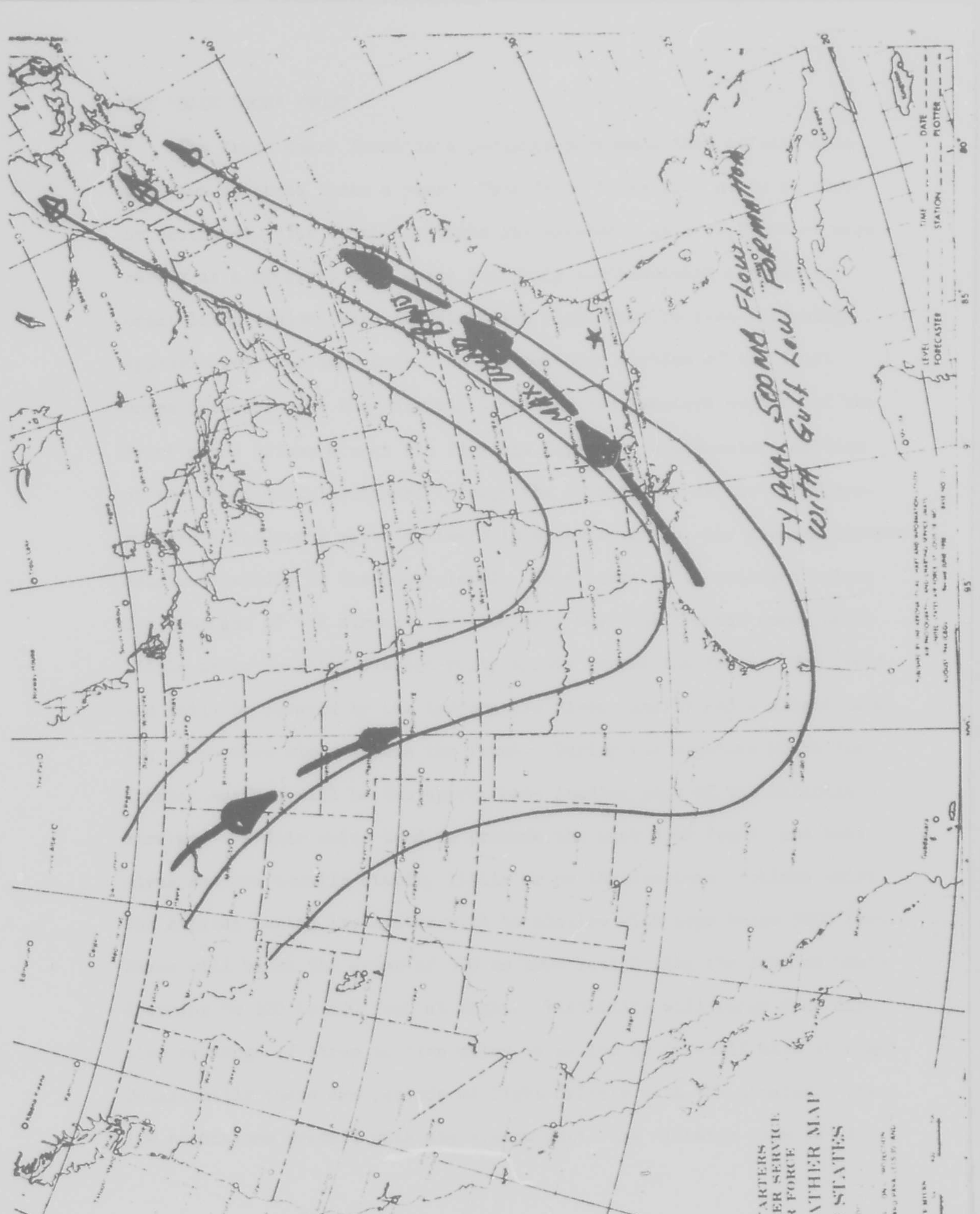
Severe thunderstorms and possible tornadoes can be expected with this system if it develops during the period from January to April. The most severe conditions are generally located near the low center and up to 120 miles south through northeast of the low. As the low drives northeast a pronounced cold front will extend southward from the low. This front will be the leading edge of fair weather conditions.

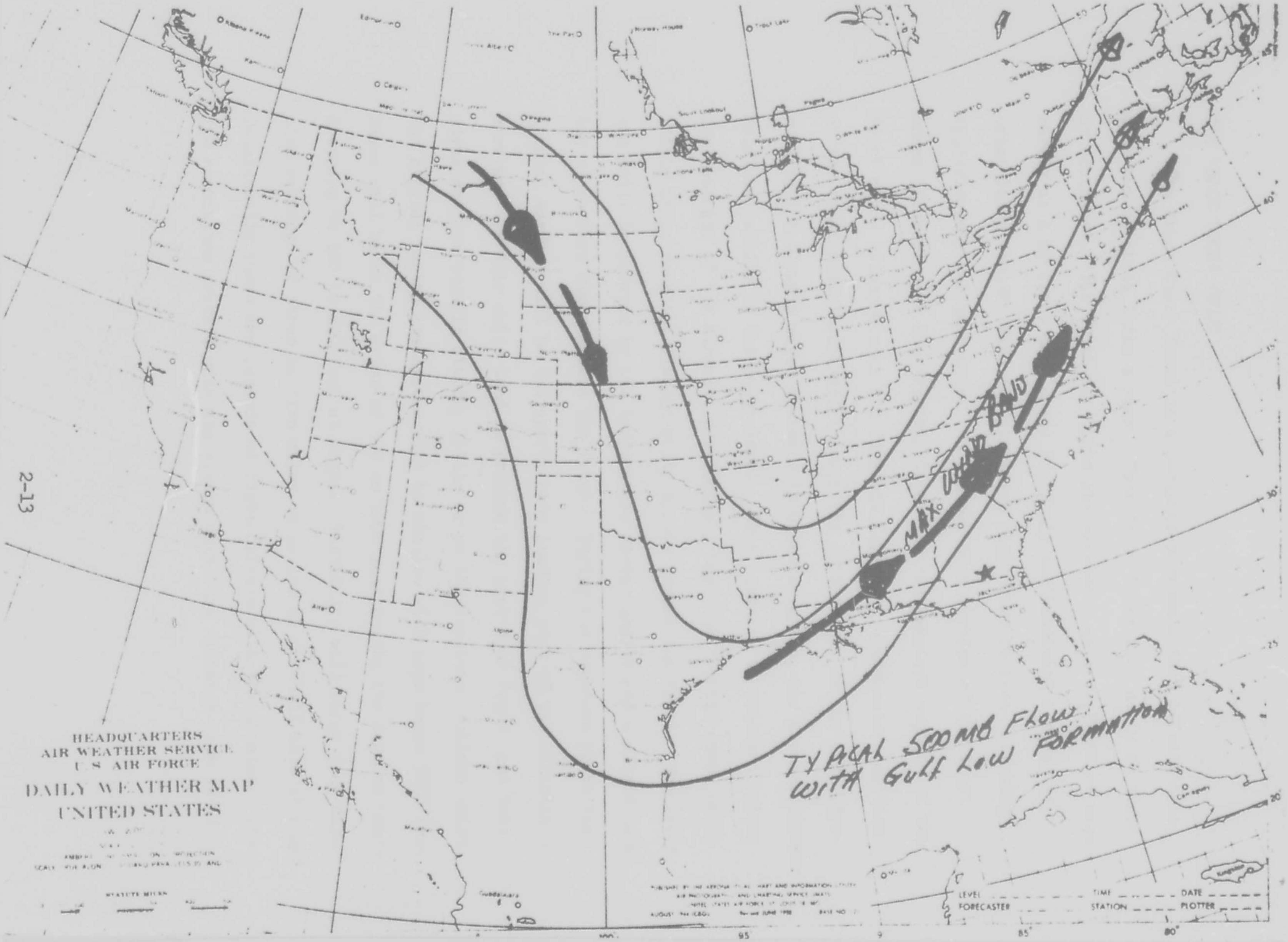
An important point to remember about this particular situation is that a series of minor waves may develop along the front before the strongest wave develops.

One upper air pattern that has been explored by J. J. George, and is discussed in his book, "Weather Forecasting for Aeronautics," seems to be a valid and valuable forecast tool in predicting wave development in the Gulf. The pattern consists of a well defined trough lying between 85° and 100° W.

One maximum wind band will lie slightly ahead of the trough and be orientated from southwest to northeast, with a second max wind band moving into the backside of the trough with a northwest to southeast orientation. When the nose of the latter max reaches a point 500 NM of the front, watch for rapid development of a wave on the front.

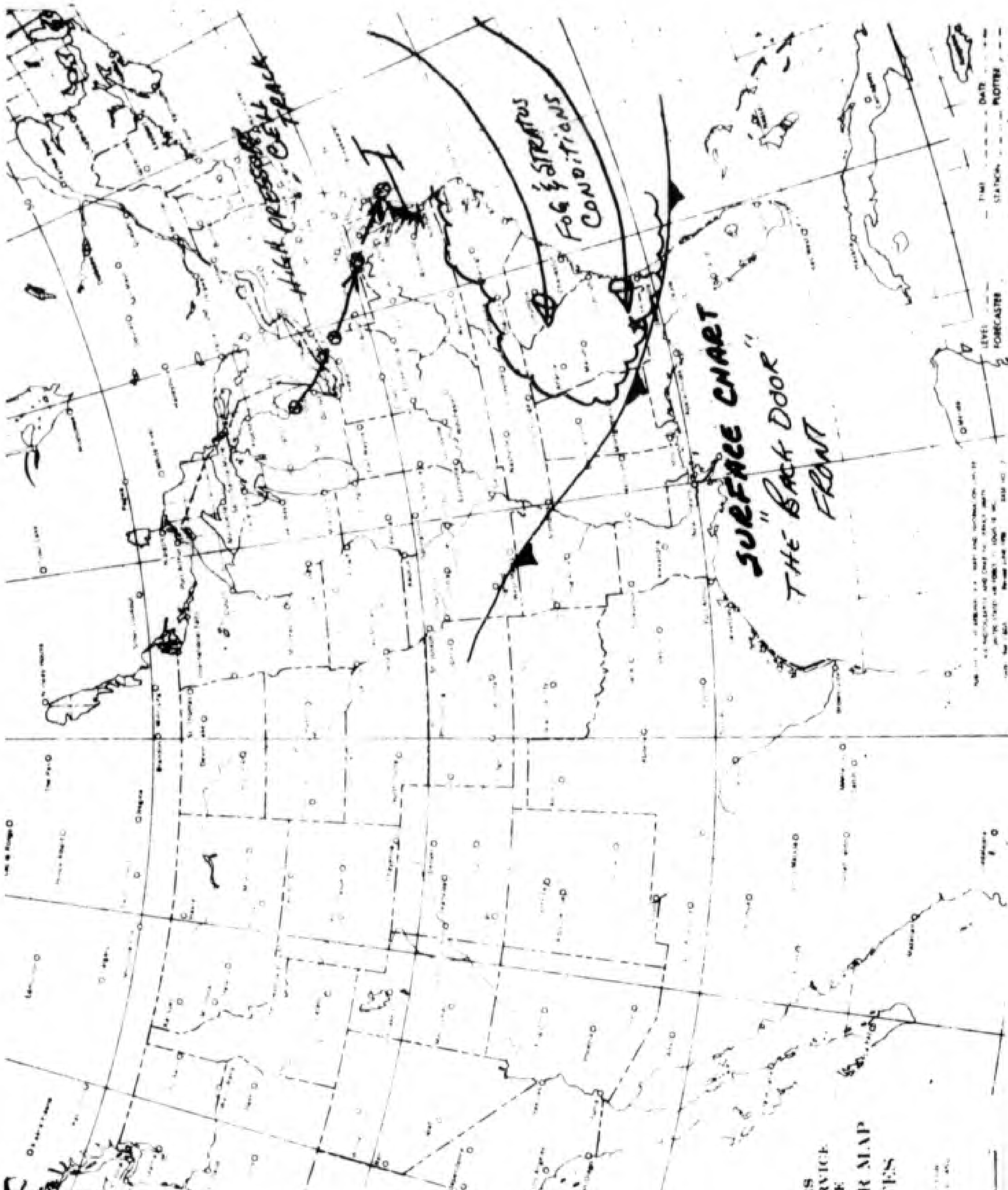

HEADQUARTERS
AIR WEATHER SERVICE
U.S. AIR FORCE
DAILY WEATHER MAP
UNITED STATES
SURFACE CHART
"THE GULF LOW"
PRESSURE FALL AREA
MID CLOUDS
LOW
TIME
DATE
STATION
LEVEL
FORECASTER
PLOTTER


TYPICAL SECOND FLOW
WITH GULF LOW FORMATION
MAX WIND BAND
HEADQUARTERS
AIR WEATHER SERVICE
U.S. AIR FORCE
DAILY WEATHER MAP
UNITED STATES


HEADQUARTERS
AIR WEATHER SERVICE
U.S. AIR FORCE
DAILY WEATHER MAP
UNITED STATES
TYPICAL 500MB FLOW
WITH GULF LOW FORMATION
MAX WIND BAND
LEVEL
FORECASTER
TIME
STATION
DATE
PLOTTER

THE "BACK DOOR" FRONT

The "back door" front is a peculiar phenomena that affects this area two or three times a year. This front moves from north to south or southwest. The front may begin its existence as a cP front or more rarely as a mP front that moves initially southeastward across the Great Lakes region, with its attendant high pressure area following approximately the same path. As the northern portion of the front moves offshore near the Virginia Capes the southwestern section of the front moves offshore near the Virginia Capes the southwestern section of the front moves southward through the Carolinas. As the high pressure cell following moves eastward into the Atlantic, the airmass absorbs moisture rapidly in the lower level. This increase in moisture raises the dewpoint of the airmass, particularly near the frontal zone, until little or no dewpoint discontinuity exists across the front. The front can still be located by the temperature discontinuity and a slight backing of surface winds across the front. During the nightime hours the frontal surface will be the approximate leading edge of the Atlantic stratus. As fair skies tend to precede the back door front, and both airmasses are usually stable, little or no thunderstorm problems exist. The stratus behind the system will be shallow with tops below 5000 feet. Bases will be on the order of 500 to 1000 feet during the daytime hours dropping to 100 to 300 feet at night. Visibility will range from daytime readings of three to five miles to as low as one-half mile at night. Occasionally there are periods of light drizzle with the stratus. These low conditions prevail with the system until the Atlantic flow is disrupted, or the front moves northeastward as a warm front.


HIGH PRESSURE CELL TRACK
FOG & STRATUS CONDITIONS
SURFACE CHART
THE "BACK DOOR" FRONT
HEADQUARTERS
AIR WEATHER SERVICE
U.S. AIR FORCE
DAILY WEATHER MAP
UNITED STATES

THE cP-mP FRONT OR DOUBLE mP FRONT

The double frontal structure in the southeastern United States is characterized in the upper air by a blocking high or ridge along or slightly east of 85° W. A cold front marking the leading edge of an mP type airmass will drift slowly across the Gulf coastal states becoming stationary in extreme southeastern Georgia or northern Florida and trailing southwestward into the Gulf of Mexico. With overrunning taking place in Alabama, Mississippi and Georgia, moisture is absorbed in the lower levels of the mP airmass producing widespread stratus and fog. A second front will move into the midwestern United States and will mark the leading edge of a cP or modified mP airmass. Little significant weather will accompany this front. Passage of this front is marked by a shift in surface winds to a more northerly direction and a sharp drop in dewpoint. As this second front moves into the Gulf Coastal States a rapid clearing of stratus and fog occurs.

A note of caution is introduced at this point in that the NMC analysis may show frontolysis at the southern end of this second system due to lack of thermal support and wind shear. Every effort should be made to locate this second system and prog it along. This second system will often merge with the leading front and move it eastward clearing the area.

General weather conditions to be expected:

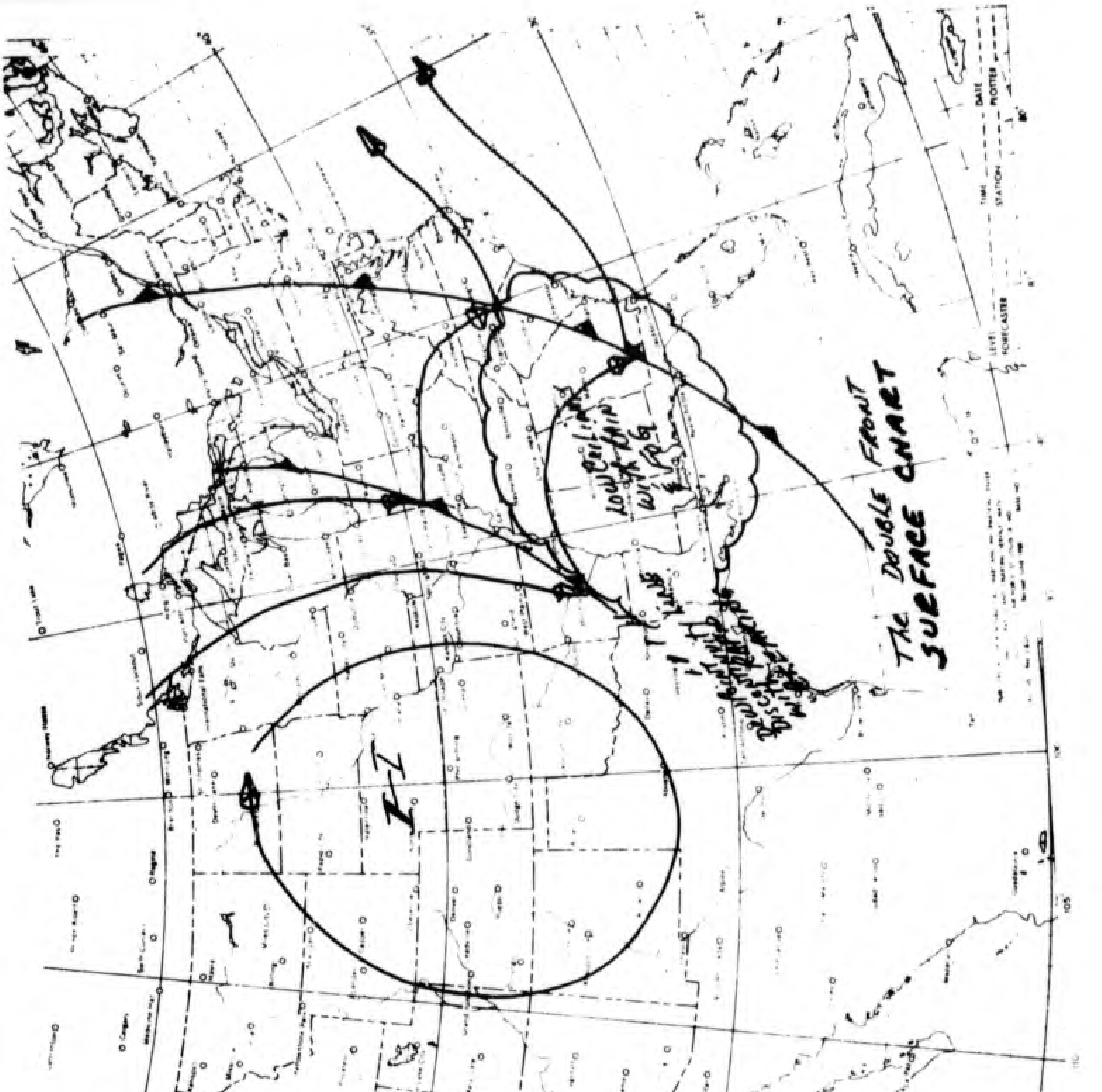
(1) If Moody is ahead of the leading system the lower cloud conditions will depend on the gradient wind flow.

Wind flow 050 to 110°	2000 ft sctd to brkn (predominately brkn)
Wind flow 110 to 170°	2000 ft sctd
Wind flow 170 to 240°	2000 ft brkn to ovcst with RW-

(2) If Moody is between the frontal systems, gradient winds are not so significant, as cloud cover is more dependent upon time of day.

Sunrise plus 2 hours	400 to 500 ft brkn to ovcst visibility 3 to 5 miles in R- and fog, with occasional periods of 500 ft sctd, 2000 ft ovcst
Sunset to Sunrise plus 2 hours	Ceilings will be 400 to 500 ft visibilities 2 to 3 miles in light drizzle and fog

As these airmasses will be generally stable, few thunderstorms will occur; however, icing may be significant in the overrunning air.


The DOUBLE FRONT
SURFACE CHART
LOW CEILING WITH RAIN WITH FOG
HEADQUARTERS
AIR WEATHER SERVICE
U.S. AIR FORCE
DAILY WEATHER MAP
UNITED STATES

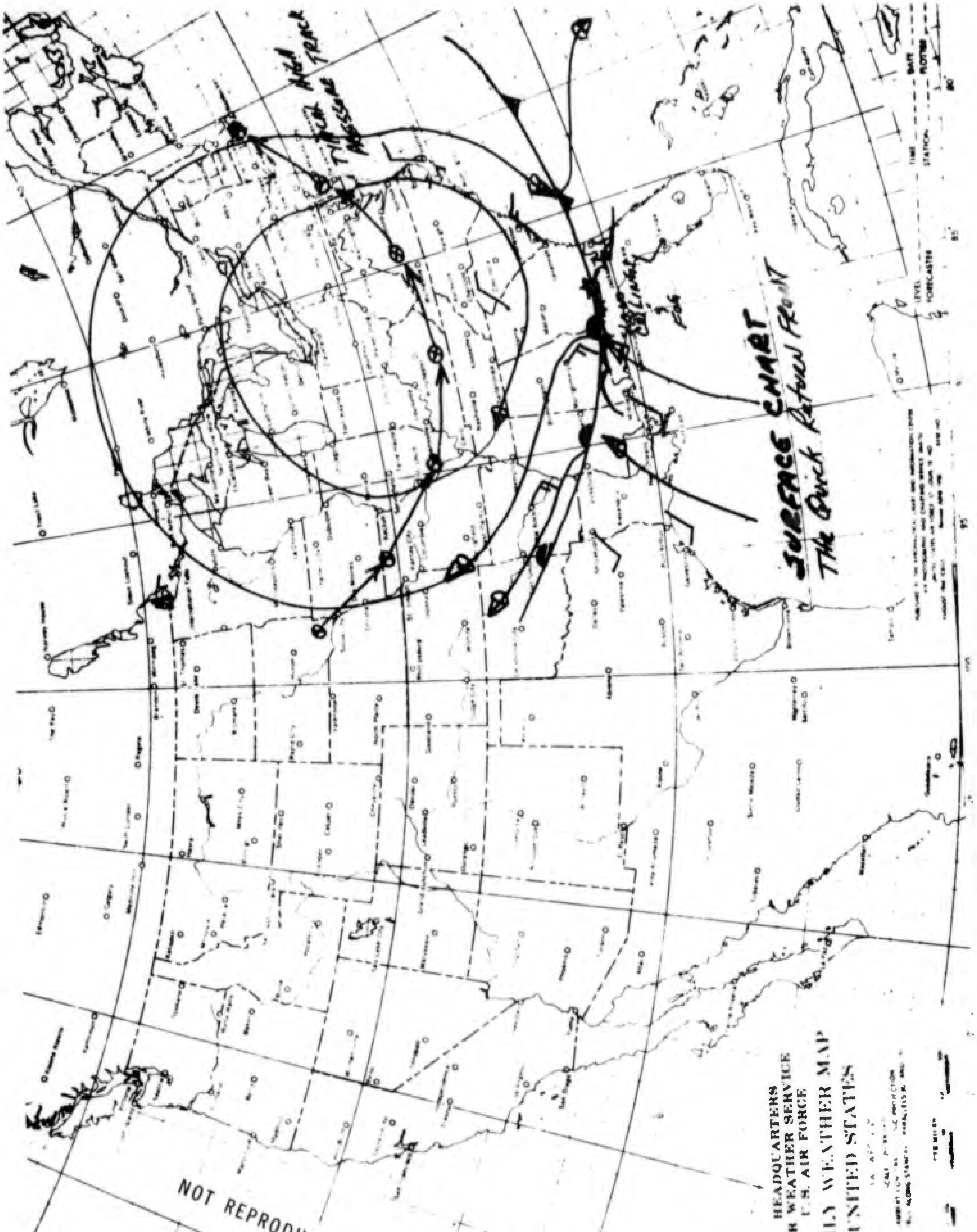
THE "QUICK RETURN" FRONT

The quick-return front is a cold front that moves south of the station, generally quite rapidly, sometimes as far south as central Florida, and returns in twelve to twenty-four hours as a warm front. The air mass following this front will cool the ground sufficiently, so that the warm moist air from the Gulf of Mexico following the warm front will condense through contact with the terrain. Precipitation along the cold front may also contribute to the terrain cooling.

The normal track for the high cell behind the front is southeastward out of Canada through the Great Plains and a recurvature to the east-northeast between 35° and 40° N. This high cell may be of polar continental origin or may move across from the Pacific Ocean. The speed of the high will be from 20 to 30 knots and it will transit the United States in thirty-six to forty-eight hours if from Canada and seventy-two to ninety-six hours if of Pacific origin.

Following the warm frontal passage, quite low ceilings and visibilities will set in, especially if the passage occurs during the nighttime hours. Ceilings will be below 200 feet and visibilities below ½ mile until about 0900 EST. Improvement will be rapid once the fog begins to burn off.

The common 500 millibar pattern shows a north-south trough along 90° W, so that southwesterly flow is over the station at that level. The 2000 foot winds will show an OMEGA pattern.


SURFACE CHART
The Quick Return Front
HEADQUARTERS
AIR WEATHER SERVICE
U.S. AIR FORCE
DAILY WEATHER MAP
UNITED STATES

THE EASTERLY WAVE

As a rule the easterly waves that pass this area will seldom extend to latitudes greater than 30° N, at the northernmost end; however, a moderate to strong easterly will affect weather conditions as far north as 33° N. The proximity of these waves to this station can produce some exceptionally heavy thunderstorms in the Moody area, much more hazardous than the normal "airmass" type thunderstorm.

The most favored synoptic pattern for these systems to influence the local weather is for the Bermuda-Azores high to have an east-west orientation with the axis north of 35° N. Generally this high will extend westward into the eastern United States as far as Tennessee. If this synoptic situation exists and either of the following conditions occur, a close examination of the surface and upper air charts through 500 millibars should be made to determine if a wave is affecting the area:

(1) The area is unstable enough to support afternoon thunderstorms but only fair weather cumulus develops (possible indicator for an approaching wave).

(2) Air mass thunderstorms develop early in the afternoon and tend to adopt a north-south orientation and move to the west (possible indicator that a wave has passed the station).

Not all easterly waves that move through the south Georgia area will have the classic configuration. Occasionally the wave may have a northeast-southwest orientation, such as depicted in Chart 1. It is possible with this configuration for thunderstorms to move rapidly southwestward slightly ahead of the northern end of the wave. These thunderstorms will be quite intense and can very easily produce wind gusts in excess of 50 knots.

Another configuration capable of producing heavy thunderstorms is the wave that makes a pronounced perturbation on the Bermuda High with a resultant increase in the gradient level winds at the wave crest. If a strong zone of convergence exists at this wave crest, thunderstorm gusts can exceed 60 knots. (See Chart 2 for a typical synoptic pattern.)

The thunderstorms that develop with a wave will generally be located from the wave position up to 150 miles east of the wave. This location will depend upon the slope of the wave. The more vertical the wave orientation, the closer to the wave the thunderstorms will be. In addition, a very strong wave may develop more than one line of thunderstorms.

CHART 1. The NE–SW orientated Wave. Thunderstorms may develops in the area outlined and move rapidly to the southwest with this configuration.

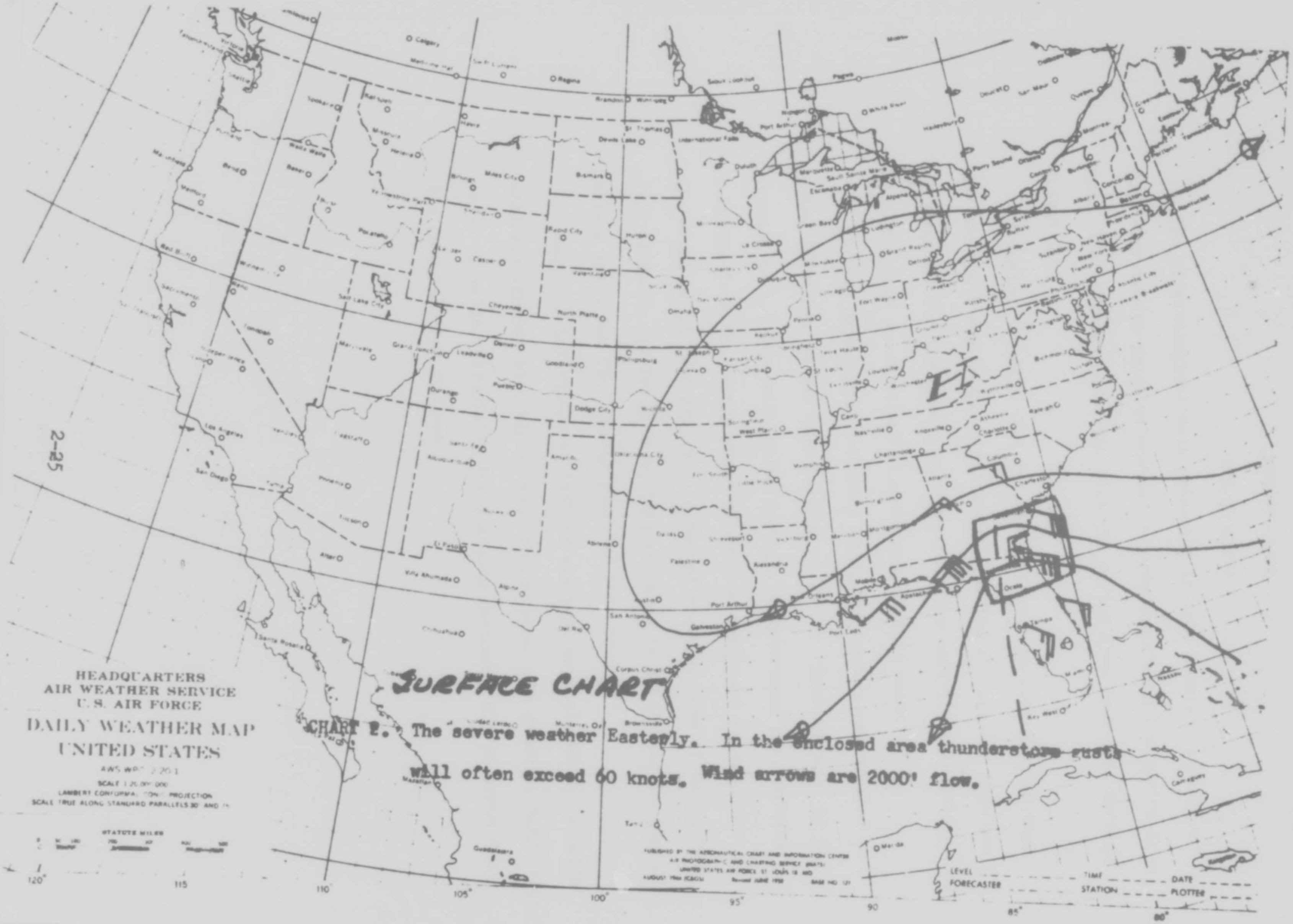


CHART 2. The severe weather Easterly. In the enclosed area thunderstorm gusts will often exceed 60 knots. Wind arrows are 2000' flow.

SECTION III

CLIMATIC AIDS

INTRODUCTION

The climatological data presented in this booklet is based on just over twenty years of weather records comprising the period from April 1942 through June 1946 plus the period from July 1951 through August 1967.

In using the data that follows it should be kept in mind that any one month may be quite different from the average for that month as computed for the twenty year period. The exceptionally cold winter of 1957-58 is an excellent illustration of this point:

Fifteen days during February 1958, the temperature dropped to below freezing, on two days falling to 19° F. This compares to an average of 1.4 days with below freezing temperatures per February computed from the twenty years of records mentioned above. Also on the night of 11 February 1958, a record breaking snow of two inches fell at Moody Air Force Base; this compares to a February average of only a trace for the twenty years of this record.

However, the winter of 1957-58 was very unusual and it is quite unlikely another such winter will follow soon. In general, many inferences of value, especially for planning purposes, may be drawn from the material that follows.

THE SEASONS

The four seasons—winter, spring, summer and fall—have, in general, distinctly different types of weather. The principal characteristics of each season are summarized below, while a more detailed breakdown, month by month, will be presented on the succeeding pages.

Winter. Extending from late November through March, winter is marked by either very good or very bad flying weather. Excellent flying weather occurs after the passage of strong cold fronts from the northwest and usually lasts for a period of several days. When the polar front becomes stationary over the southeastern United States, unstable waves may form in the Gulf of Mexico and move through Georgia with accompanying low ceilings and rain. Under these conditions, low stratus with rain and fog can persist at Moody Air Force Base for days or even weeks at a time. With the passage of strong cold fronts, snow flurries are not uncommon though only rarely does a measurable amount accumulate on the ground.

Spring. During April and May there is a fairly rapid transition from winter to summer. However, the weather associated with cold fronts, especially in April, is more hazardous than during winter; heavy precipitation, gusty surface wind, squalls and thunderstorms commonly accompany cold fronts. Tornadoes also occur in this season. During May frontal passages become less frequent.

Summer. This long season from about 1 June to 1 October is marked by afternoon and evening thunderstorms and an absence of almost all frontal activity. The mornings are mostly clear with less stratus and

and fog than in the other seasons. Thunderstorm activity is at a maximum during July with an average of thirteen days with thunderstorms for the month as compared to nine for June, ten for August and only five for September.

The hurricane season is primarily August and September. Most hurricanes recurve northward along the Atlantic coast or continue west parallel to the Gulf coast. However, a very few of these highly unpredictable storms have crossed southern Georgia, though very rarely with damaging winds as far inland as Moody Air Force Base.

Fall. This is the period of transition from summer to winter and is the driest and shortest season of the year. There is less than one thunderstorm per month and frontal passages are usually weak. Good flying weather is the rule although fog and low stratus is a common early morning problem, especially during November.

JANUARY

The coldest month of the year, January can expect several days with temperatures below freezing. Snowfall, usually only a trace in amount, can be expected on about one day during this month. Like December, January is a month of extremes, the weather being very good or very bad. After a strong polar outbreak, excellent flying weather may persist for several days at a time. On the other hand, when the polar front becomes stationary over over southern Georgia, IFR conditions can persist for days or even weeks at a time with visibility and ceiling near zero during the period from 0600E to 0900E. The paragraphs that follow present a brief summary of January weather that occurred during the twenty-year period of record.

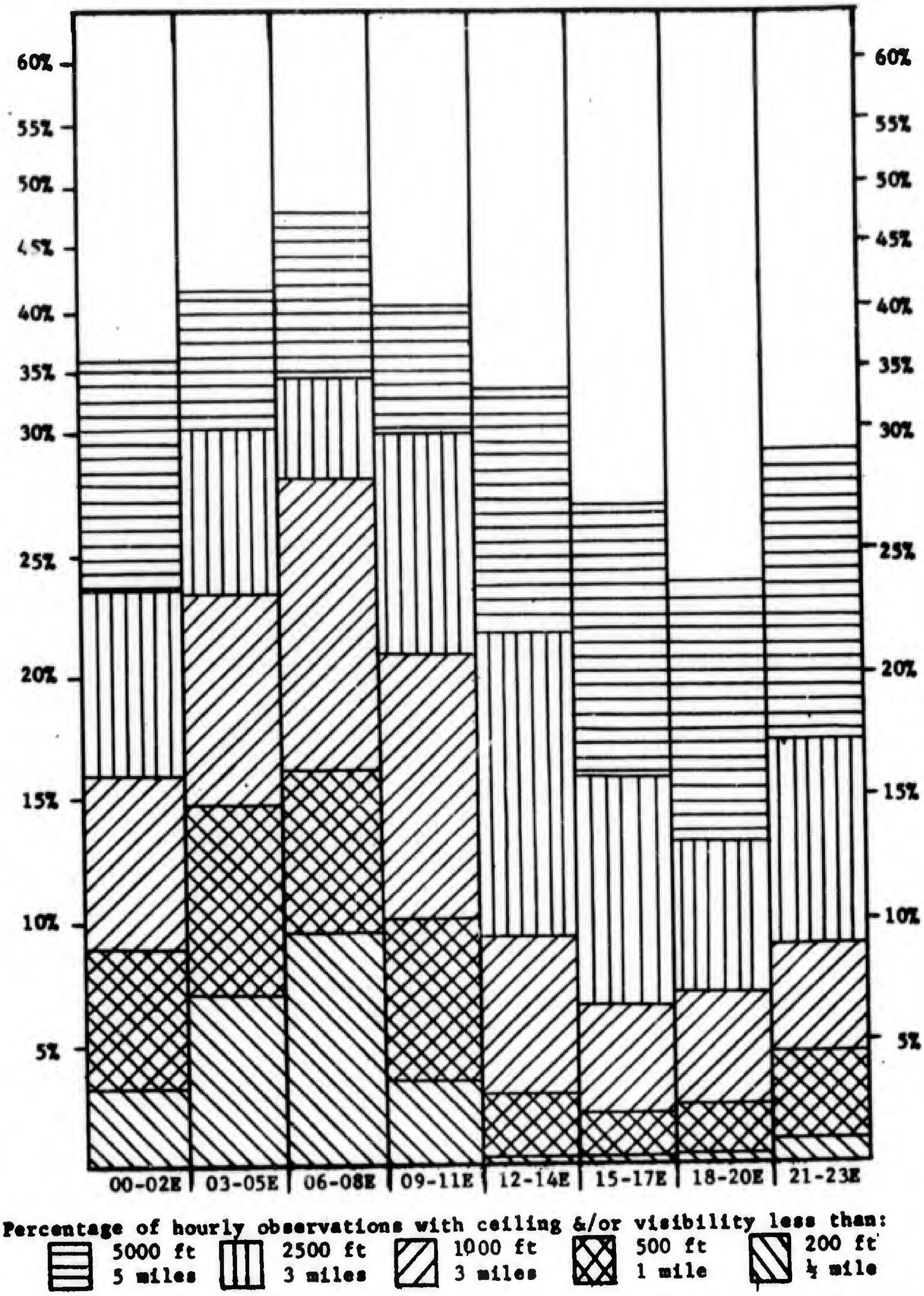
PRECIPITATION. The average precipitation for January was 2.8 inches, with most falling as rain or drizzle. On the average, only one day out of the month has thunderstorm activity. Seven days with measurable amounts of rain was the average for the month.

TEMPERATURE. The highest January temperature recorded was 82 degrees F, while the absolute minimum was 21° F. The average daily maximum was 63° F, and the average daily minimum was 42° F. An average of five days each January had freezing or below temperatures. January is the coldest month of the year, having an average mean temperature of 53° F.

FLYING WEATHER. January is the second worst month of the year for flying weather. Conditions less than a 1500 foot ceiling and/or 3 miles visibility existed some 19 percent of the time with the worst part of the day being from 0400-1000E. Three percent of the time, the field was "below minimums," with ceiling less than 200 feet and/or visibility less than ½ mile.

SURFACE WINDS. The mean January surface wind speed was 5.1 knots. 24.4 percent of the time the wind was calm; 15.7 percent from 1 to 3 knots; 50.1 percent from 4 to 10 knots; 9.8 percent from 11 to 21 knots; 0.1 percent from 22 to 27 knots; and on occasion the wind fell into the 28-33 knots category but for a total monthly time of less than one hour. The prevailing direction was WNW.

The graph on the following page shows how selected values of ceiling and/or visibility varied with the hour of the day during the average January.



JANUARY DIURNAL CEILING-VISIBILITY VARIATION

FEBRUARY

Usually the coldest part of the winter is over by February since the mean temperature for February is some 4 deg F higher than that of either December or January. Except for this distinct warming trend, February is quite similar to January and December. Good flying weather can be expected after strong cold frontal passages, while the poorest weather is caused by lows that move from the Gulf northeastward across northern Florida. As in the other winter months, fog during the morning hours is a continuing operational problem. The paragraphs that follow present a brief summary of average February weather.

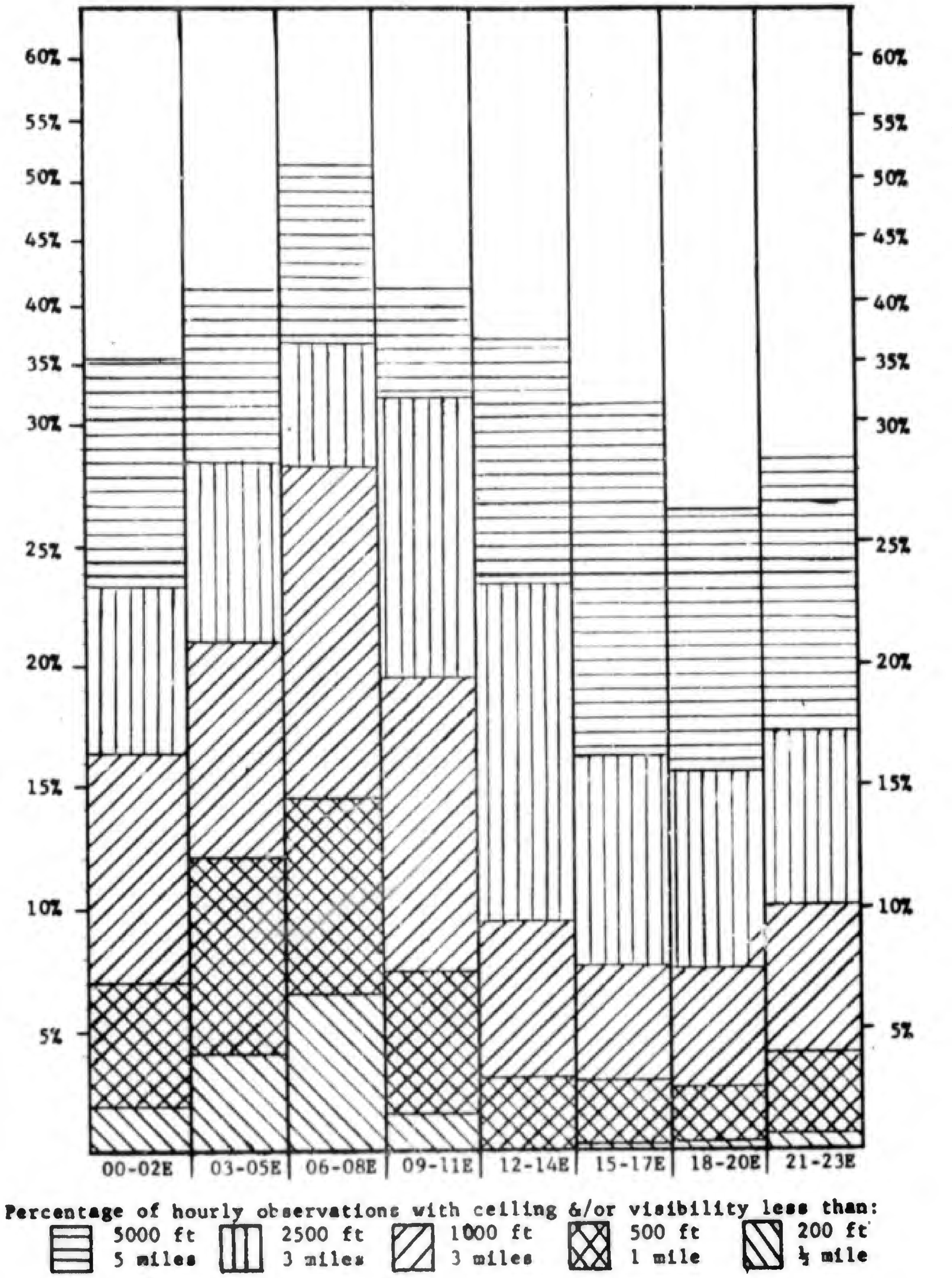
PRECIPITATION. The average precipitation for February was 4.3 inches, making February the rainiest winter month. There were eight days per month with a measurable amount of rain, almost all of which was due to rain and drizzle. A trace of snow fell on an average of one day during the month. There were two thunderstorm days.

TEMPERATURE. The highest temperature recorded during the Februarys of record was 84 deg F, while the absolute minimum was 18 deg F. The average daily maximum was 67 deg F and the average daily minimum was 46 deg F. An average of only two days each February had freezing or below temperatures.

FLYING WEATHER. Flying conditions were below 1500 and 3 19 percent of the time during February. The field was below 200 and ½ about 2 percent of the time.

SURFACE WINDS. The mean February surface wind speed was 5.8 knots. 20.3 percent of the time the wind was calm; 13 percent from 1 to 3 knots; 53.3 percent from 4 to 10 knots and 13.3 percent from 11 to 21 knots; 0.1 percent from 22 to 27 knots. On occasion the wind did reach 28 to 33 knots for a very short interval of time—totaling less than one hour per month. The prevailing wind direction was SSW.

The graph on the following page shows how selected values of ceiling and/or visibility varied with the hour of the day during the average February.



FEBRUARY DIURNAL CEILING-VISIBILITY VARIATION

MARCH

The temperature continues to rise during this last winter month, marking the approach of an early spring. Thunderstorms are more frequent than in the other winter months though still not nearly the operational problem that is the early morning fog and stratus. The latter occur nearly as frequently in March as they do during February. The paragraphs that follow present a brief summary of average March weather during the twenty year record.

PRECIPITATION. The average precipitation for March was 4.2 inches. There were eight days with measurable amounts of rain, and the average number of thunderstorm days was 2.

TEMPERATURE. The mean monthly temperature for March is 61 deg F. Freezing surface temperatures occurred only about one March day every year. The highest March temperature for the twenty years of record was 89 deg F, while the absolute minimum was 23 deg F. The average daily maximum was 72 deg F. The average daily minimum was 50 deg F.

FLYING WEATHER. March is very similar to January and February in this respect, having below VFR conditions below 1500 and/or 3 some 16 percent of the total time compared to 19 percent for February and "below minimums" (200 and/or ½) 2 percent of the time, the same as for February.

SURFACE WINDS. The mean March surface wind speed was 6.0 knots. 20 percent of the total time the wind was calm; 14 percent from 1 to 3 knots; 52.4 pe-cent from 4 to 10 knots; 15 percent from 11 to 21 knots; 0.1 percent from 22 to 27 knots. On occasion the wind did fall in the 28 to 33 knot category but, for a total time of less than one hour per month. The prevailing wind direction was SSW.

The graph on the following page shows how selected values of ceiling and/or visibility varied with the hour of the day during the average March.

MARCH DIURNAL CEILING-VISIBILITY VARIATION

APRIL

Spring is the transition period from winter to summer and is the shortest season of the year, beginning in late March or early April and ending in mid or late May. During April and early May severe weather phenomena—thunderstorms with surface hail, strong gusty surface winds and line squalls—are likely to be encountered, especially in the vicinity of cold fronts; even tornadoes are not uncommon. The paragraphs that follow present a brief summary of average April weather during the particular twenty year period of record.

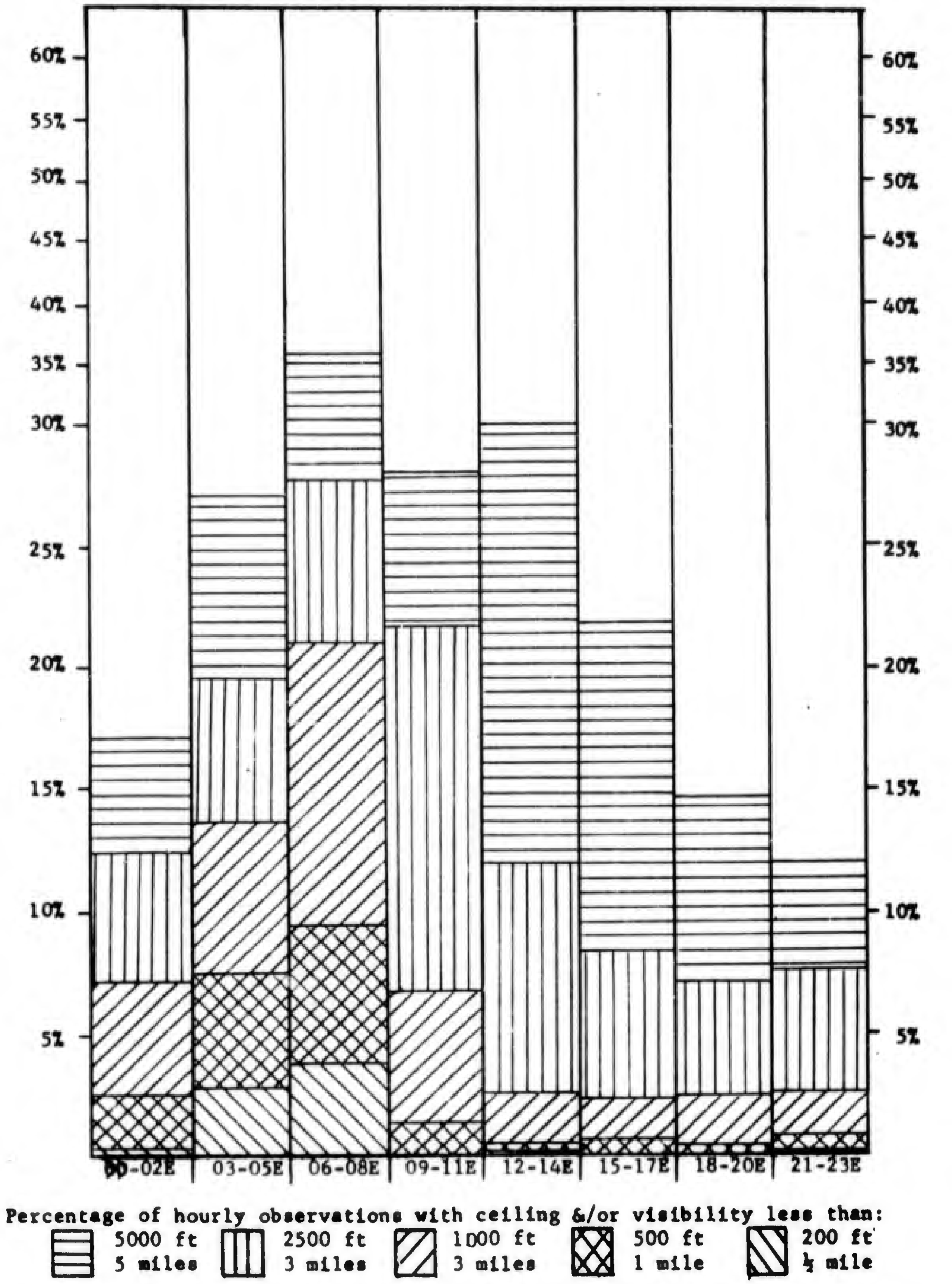
PRECIPITATION. There was an average of eight days with measurable precipitation, bringing a total of 3.9 inches, on the average, for the month. The thunderstorm days per month increases to five. There are no snow days during April.

TEMPERATURE. April, with a mean temperature of 68 deg F, is about 7 deg F warmer overall than March. The highest April temperature for the years of record was 96 deg F, while the absolute minimum was 39 Deg F. The average daily maximum was 79 deg F, and the average daily minimum was 57 deg F.

FLYING WEATHER. Below VFR conditions below 1500 and/or 3 occur 11 percent of the time with "below minimums" (200 and/or ½) occurring 1 percent. This was a marked improvement over March with 16 percent and 2 percent for these respective conditions.

SURFACE WINDS. The mean April surface wind was 6 knots. 19.9 percent of the total time the wind was calm; 16.4 percent from 1 to 3 knots; 53.0 percent from 4 to 10 knots; 10.5 percent from 11 to 21 knots; 0.1 percent from 22 to 27 knots. On occasion the wind was in the 28 to 33 knots category, but for a total time of less than one hour per month. The wind flow varied through all points of the compass with SSW and E being somewhat the more predominant.

The graph on the following page shows how selected values of ceiling and/or visibility varied with the hour of the day during the average April.



APRIL DIURNAL CEILING-VISIBILITY VARIATION

MAY

Frontal passages become less and less frequent during May, marking the approach of the long summer season. Rising daily temperatures are accompanied by a marked increase in thunderstorm activity over Georgia. The paragraphs that follow present a brief summary of May weather, extracted from the twenty-year period of record.

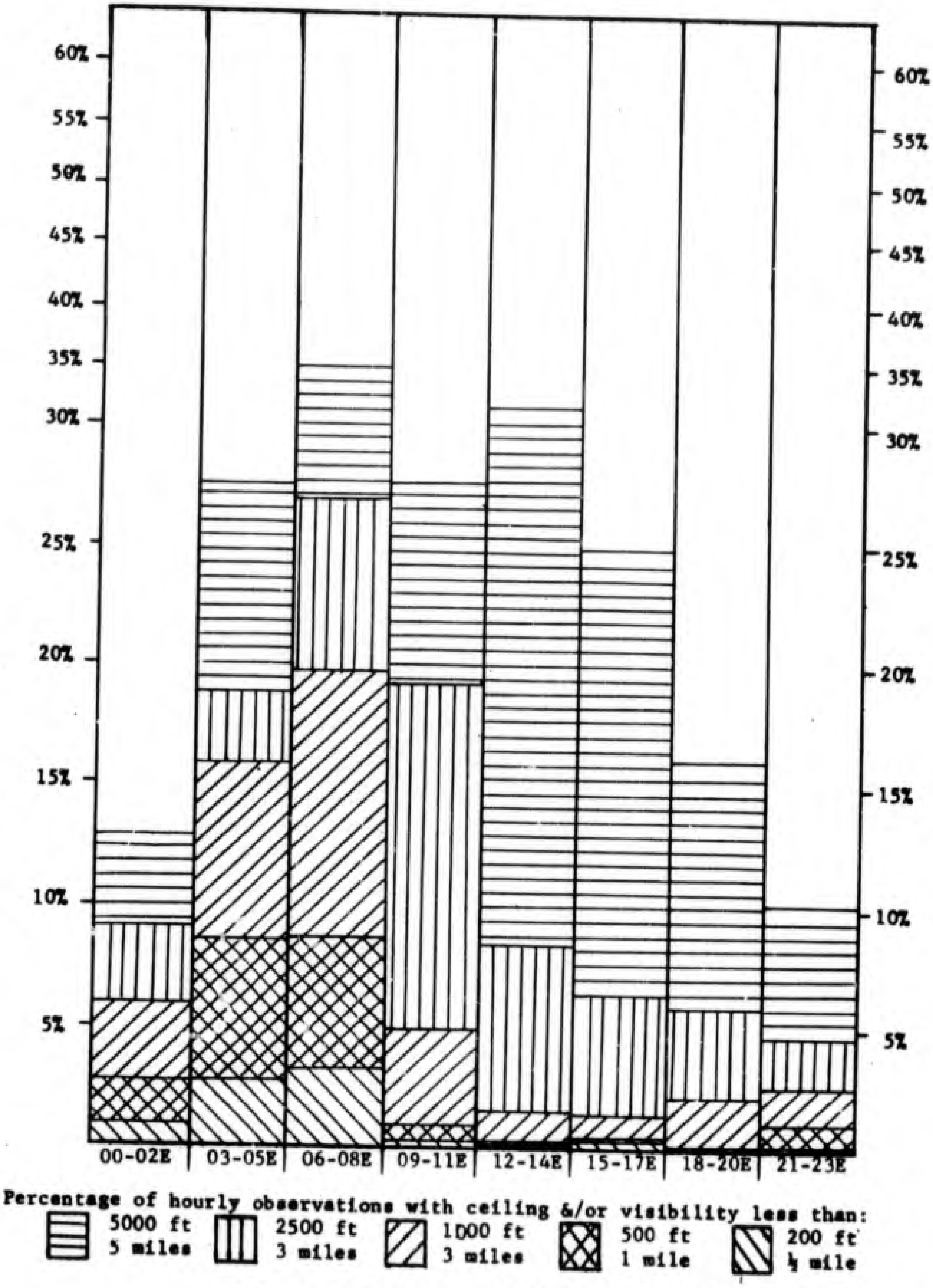
PRECIPITATION. 3.7 inches is the average May rainfall, with a measurable amount falling on an average of eight days out of the month. An average of eight thunderstorm days occur during the month.

TEMPERATURES. The rise in daily temperature continues during May, with the overall mean about 7 deg F warmer than for April. The highest temperature recorded during May for the 20 years of record was 99 deg F, while the absolute minimum was 47 deg F. The average maximum temperature is 86 deg F; the average daily minimum is 64 deg F.

FLYING WEATHER. On a percentage basis May has about the same amount of below 1500 and/or 3 conditions and "below minimums" (less than 200 and/or ½) weather as April. Nine percent of the total time during May the weather is below 1500 and/or 3 ; 1 percent of the time the field is "below minimums" (200 and/or ½).

SURFACE WIND. The mean May surface wind speed is 5 knots. 22.2 percent of the total time the wind is calm; 20.2 percent from 1 to 3 knots; 51.0 percent from 4 to 10 knots; 6.5 percent from 11 to 21 knots; on occasion the wind falls in the 22 to 27 knot category, but for a total time of less than one hour per month. The prevailing wind direction was E.

The graph on the following page shows how selected values of ceiling and/or visibility varied with the hour of the day during the average May.



MAY DIURNAL CEILING-VISIBILITY VARIATION

JUNE

June marks the beginning of the summer season. The Bermuda High extends further westward so that the predominant flow over Georgia is from the east through the southwest. There is almost no frontal activity during June, while thunderstorm activity increases markedly toward its peak in July. The temperature is near its summer maximum with little further change until late September. The paragraphs that follow present a brief summary of average June weather over a particular twenty-year period.

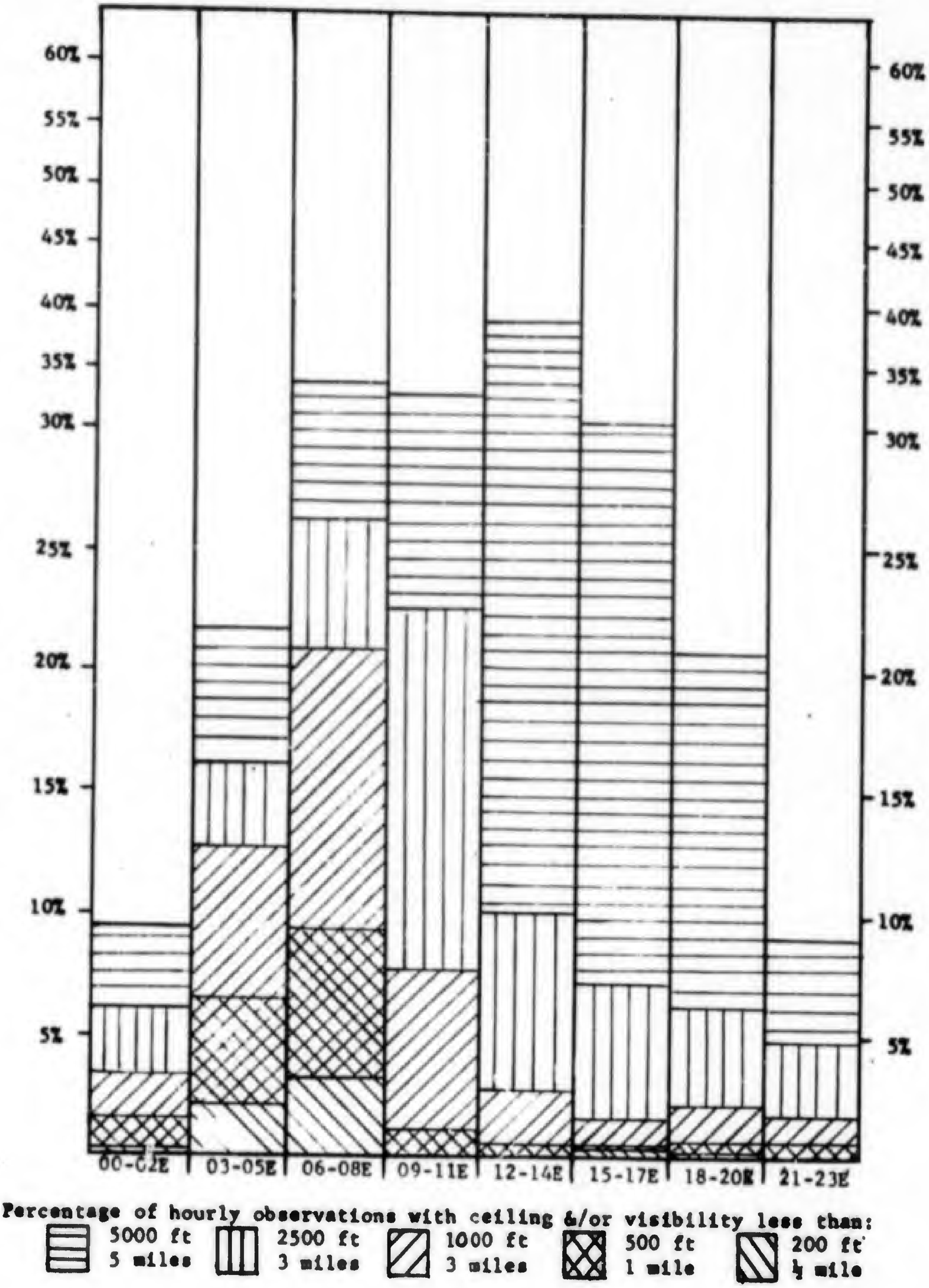
PRECIPITATION. The wettest months of the year occur during the summer in the southeast, with most of the rain being associated with the airmass thunderstorms which are so common at this time of year. June's average rainfall is 4 inches, which places it as the third wettest summer month, after July and August. During June there is an average of nine days with thunderstorms and nine days with a measurable amount of precipitation.

TEMPERATURE. June is about 5 deg F warmer, on the average, than May with an average of 81 deg F. The highest June temperature on record is 105 deg F; this was also the highest temperature recorded for the entire twenty years of record. The absolute June minimum temperature on record is 55 deg F. The average June daily maximum is 91 deg F, and the average daily minimum is 71 deg F.

FLYING WEATHER. June is the second best month for flying with only 9 percent of the total time being below conditions of 1500 and/or 3 and only 1 percent "below minimums" (less than 200 and/or ½).

SURFACE WINDS. The mean surface wind speed was 4.6 knots. Winds are calm 21.2 percent of the time; 22.0 percent from 1 to 3 knots; 51.3 percent from 4 to 10 knots; 5.6 percent from 11 to 21 knots; 0.1 percent from 22 to 27 knots; on occasion the wind fell in the 28 to 40 category but for a total monthly time of less than one hour; 0.1 percent the wind was in the "over 40 knots" category.

The graph on the following page shows how selected values of ceiling and/or visibility varied with the hour of the day during the average June.



JUNE DIURNAL CEILING-VISIBILITY VARIATION

JULY

A marked increase in frequency of thunderstorm occurrence distinguishes July from June. Because of these storms, July has the highest total rainfall of any month and the most days with measurable rainfall. However, these storms occur mostly in late afternoon and evening and are of short duration; consequently, July does not seem like an excessively rainy month. The paragraphs that follow present a brief summary of average July weather over a particular twenty year period.

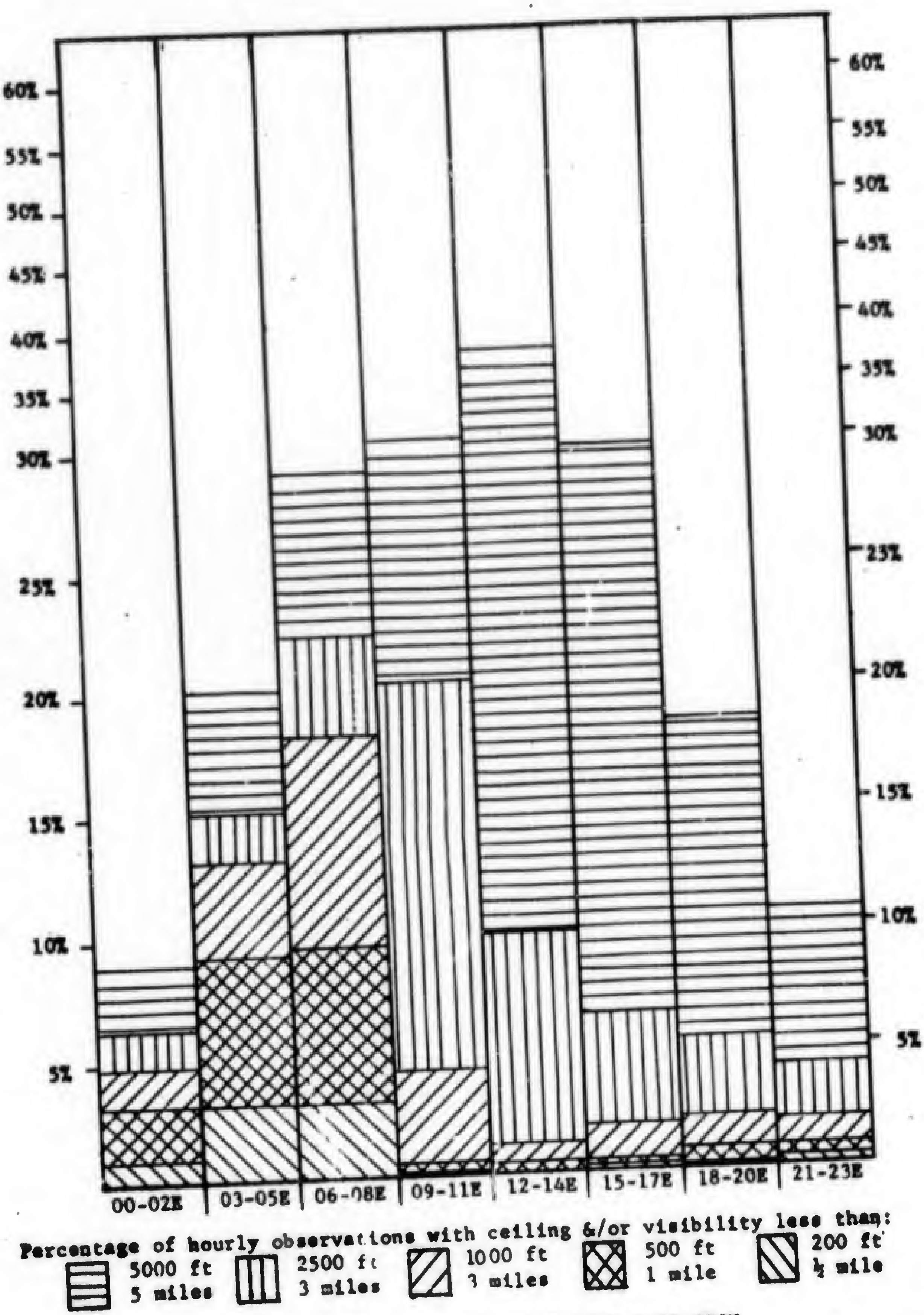
PRECIPITATION. There was an average of 13 thunderstorm days during July compared to 10 for August and 9 for June, the two months showing the next highest thunderstorm frequency. Average rainfall for July was 6.9 inches and average number of days with measurable rainfall was 14.

TEMPERATURE. The highest July temperature recorded was 103 deg F, while the absolute minimum was 66 deg F. The average daily maximum temperature was 91 deg F and the average daily minimum was 72 deg F.

FLYING WEATHER. Although July is the wettest month with 6.9 inches of rain, it also has the best flying weather. Conditions are less than 1500 and/or 3 only 8 percent of the time and less than 200 and/or ½ one percent of the time.

SURFACE WIND. The mean surface wind speed was 4.0 knots. Twenty-six and three tenths percent of the total time the wind was calm; 22.6 percent from 1 to 3 knots; 47.5 percent from 4 to 10 knots; 3.5 percent from 11 to 21 knots; 0.1 percent from 22 to 27 knots; and on occasion the wind fell in the 28 to 40 category but for a total monthly time of less than 1 hour.

The graph on the following page shows how selected values of ceiling and/or visibility varied with the hour of the day during the average July.



JULY DIURNAL CEILING-VISIBILITY VARIATION

NOV 2 1
ATC – MOODY GA

AUGUST

August is very similar to July, being characterized by hot, sticky days and afternoon or evening thundershowers. Most hurricanes that affect the SE United States occur during August and September although they are not unknown during June, July and October. The paragraphs that follow present a brief summary of average August weather over a particular twenty-year period.

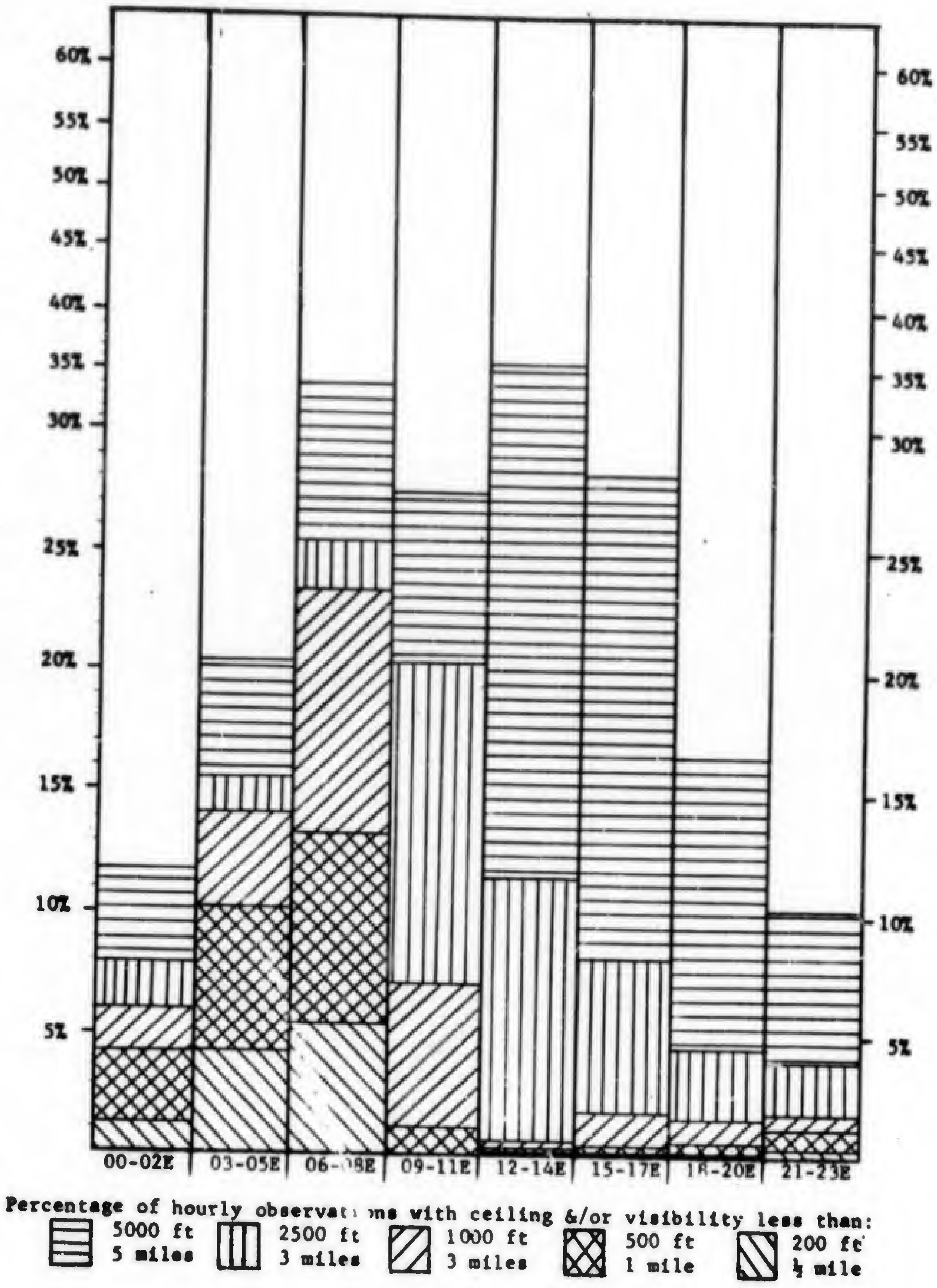
PRECIPITATION. Thunderstorm activity decreased to an average of 10 thunderstorm days. Average rainfall was down to 5.2 inches from the July peak of 6.9. Number of days with measurable rain was down to 11. However, August still easily ranked as the second rainiest month, just behind July.

TEMPERATURE. The highest August temperature recorded was 100 deg F, while the absolute minimum was 62 deg F. The average daily maximum temperature was 91 deg F and the average daily minimum was 72 deg F. The average maximum and minimum temperature for July and August was practically identical.

FLYING WEATHER. Below VFR (1500 and/or 3) conditions existed 9 percent of the time and "below minimums" (200 and/or ½) existed 1 percent of the time. These values, also, are similar to those for July.

SURFACE WINDS. The average surface wind for August and September was 4 knots, qualifying these as the calmest months of the year. For August 27.2 percent of the time the wind was calm; 23.6 percent from 1 to 3 knots; 45.7 percent from 4 to 10 knots; 3.5 percent from 11 to 21 knots; and on occasion the wind fell in the 22 to 27 category but for a total monthly time of less than one hour.

The graph on the following page shows how selected values of ceiling and/or visibility varied with the hour of the day during the average August.



AUGUST DIURNAL CEILING-VISIBILITY VARIATION

SEPTEMBER

Hurricanes commonly occur in waters adjacent to Southeastern United States with Moody Air Force Base on occasion being in the accompanying rain pattern. There is a marked decrease in thunderstorm activity during this last summer month as well as a noticeable drop in daily temperature. This change is especially noticeable during the last week or ten days in the month. The paragraphs that follow present a brief summary of average September weather over a particular twenty-year period.

PRECIPITATION. With an average monthly rainfall of 4.0 inches, September ranked as the fifth rainiest month. There were 9 days with measurable rainfall, but the number of thunderstorms per month had dropped to 5.

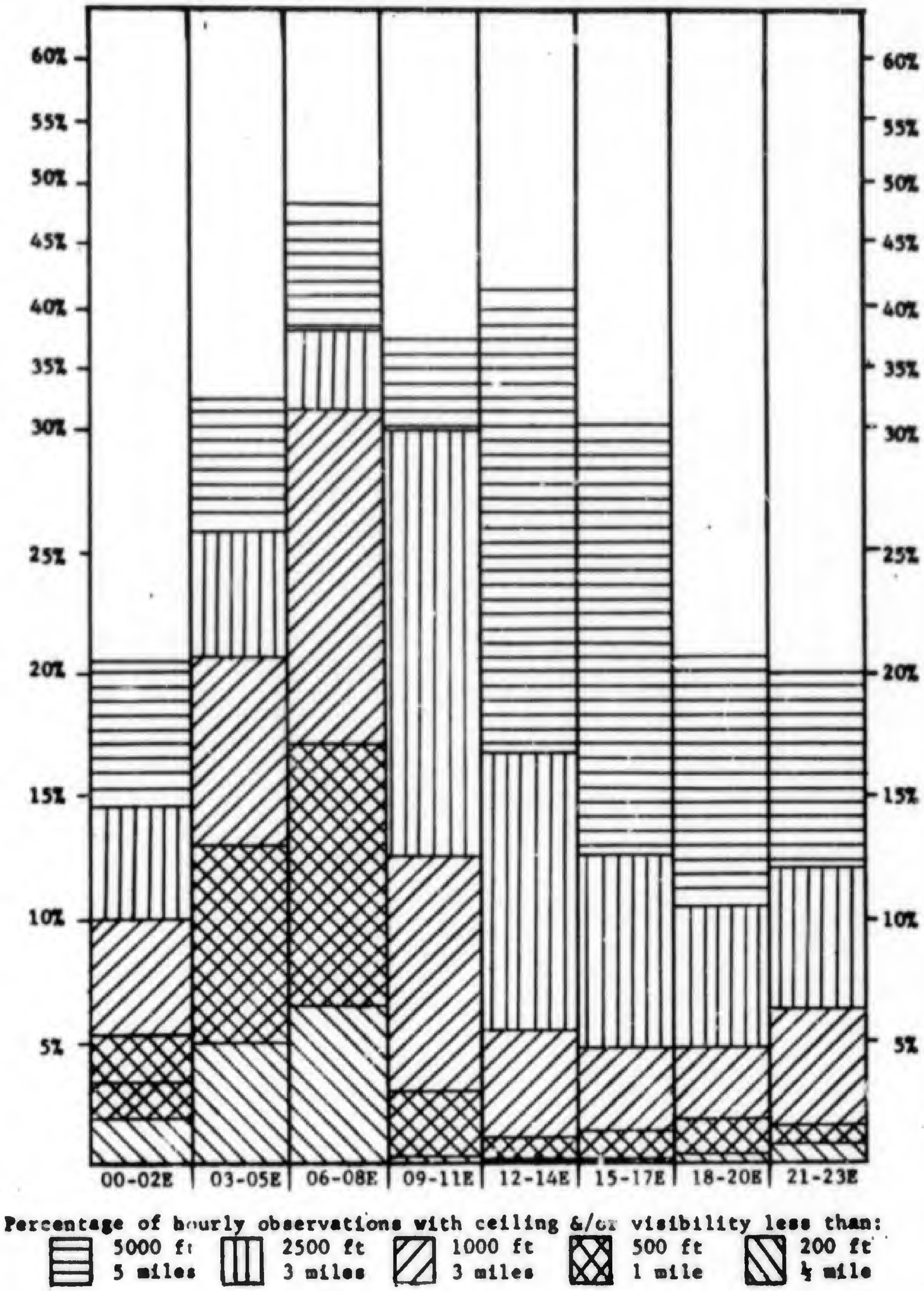
TEMPERATURE. The highest September temperature recorded during the 20 years of record was 99 deg F, while the absolute minimum was 50 deg F. The average daily maximum temperature was 87 deg F, and the average daily minimum was 69.

FLYING WEATHER. Conditions below 1500 and/or 3 existed 15 percent of the time and "Below Minimums" (200 and/or ½), 2 percent of the time; this represents a marked deterioration from the summer months.

SURFACE WINDS. Despite occasional strong winds due to hurricanes, on the average September was a calm month. 22.4 percent of the time the surface wind was calm; 20.2 percent, the wind was from 1 to 3 knots;

49.8 percent, from 4 to 10 knots, 7.5 percent, from 11 to 21 knots; and on occasion, the wind fell in the 22 to 27 and in the 28 to 40 knot categories although for a total monthly time of less than 1 hour in each category.

The graph on the following page shows how selected values of ceiling and/or visibility varied with the hour of the day during the average September.



SEPTEMBER DIURNAL CEILING-VISIBILITY VARIATION

OCTOBER

October is a very pleasant month with a mean temperature 10 deg F cooler than September. There are paractically no thunderstorms, rainfall being due primarily to infrequent lows moving out of the Gulf and across northern Florida. Frontal passages become increasingly frequent and air of polar origin lies over Georgia much of the time. The paragraphs that follow present a brief summary of average October weather over the particular twenty-year period.

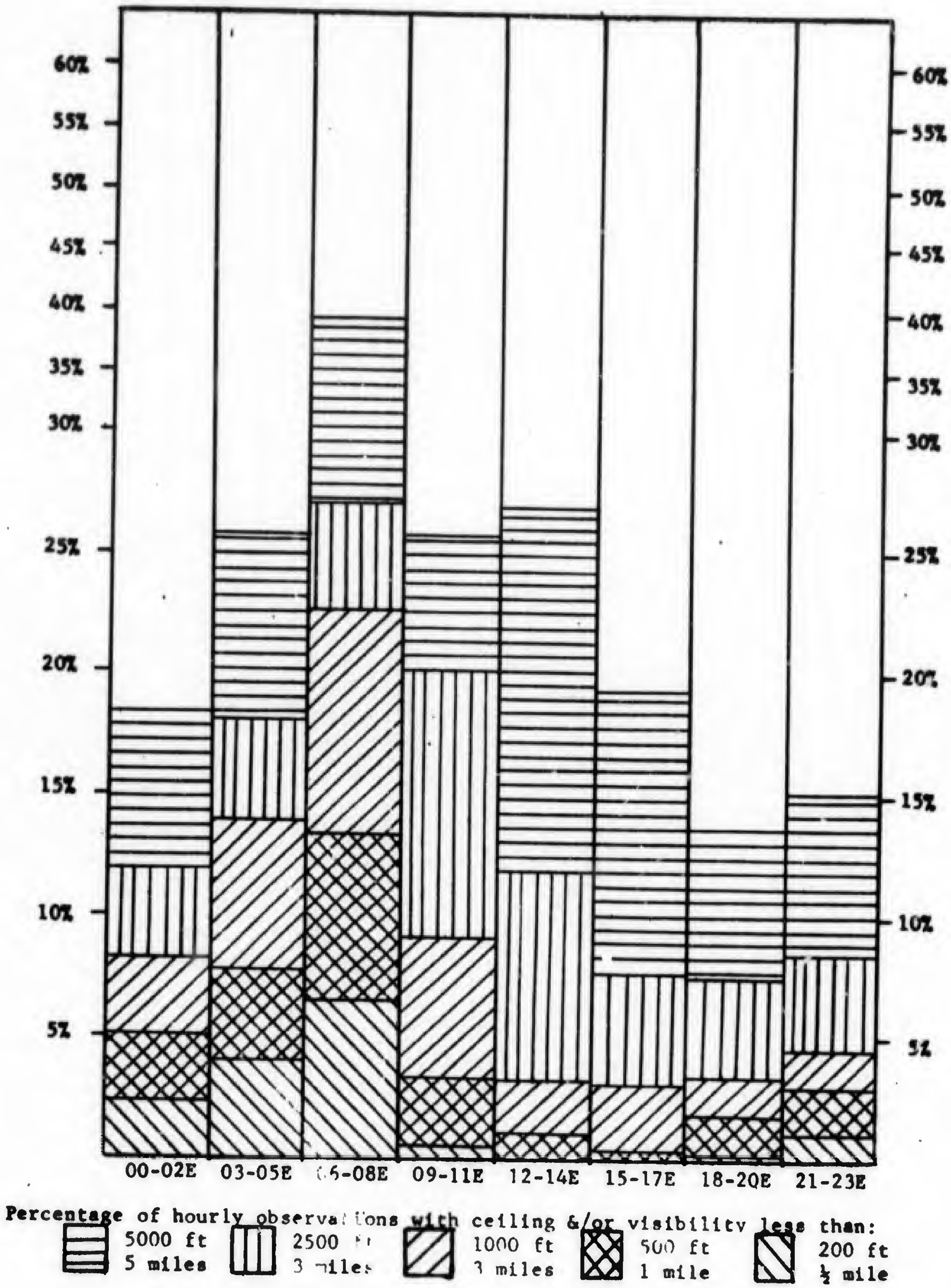
PRECIPITATION. Air mass thunderstorms rarely occur in October. This is an average of two thunderstorm days due to a low center or front crossing southern Georgia. There was an average of only four days with measurable rainfall each October. The average monthly rainfall was 1.9 inches, qualifying October as the second driest month of the year.

TEMPERATURE. The highest October temperature recorded during the 20 years of record was 94 deg F, while the absolute minimum was 34 deg F. The average daily maximum was 79 deg F, and the average daily minimum was 58 deg F. October has a mean temperature 10 deg F lower than that for September.

FLYING WEATHER. Conditions below 1500 and/or 3 existed 11 percent of the time and "Below Minimums" (200 and/or ½) 2 percent, making October, considering the absence of thunderstorms, about the best month for flying in the whole year.

SURFACE WINDS. During October, surface winds increase slightly with a mean for the month of 5 knots. 2[illegible].2 percent of the time, the wind was calm; 19.4 percent, the wind was from 1 to 3 knots; 49.3 percent, from 4 to 10 knots; 7.0 percent, from 11 to 21 knots; 0.1 percent, from 22 to 27 knots; and on occasion, the wind fell in the 28 to 40 knot category. Although the wind flow varied through all points of the compass, the occurrences from Northeast and East Northeast were considerably more predominant.

The graph on the following page shows how selected values of ceiling and/or visibility varied with the hour of the day during the average October.



OCTOBER DIURNAL CEILING-VISIBILITY VARIATION

NOVEMBER

November is very little different from October except that the mean temperature is about 10 deg F colder. November and October are the dry months of the year by a wide margin. Good flying weather is the rule although low stratus and/or fog is more common than in October. The temperature can be expected to drop below freezing on at least one night near the end of the month. The paragraphs that follow present a brief summary of average November weather over a particular twenty-year period.

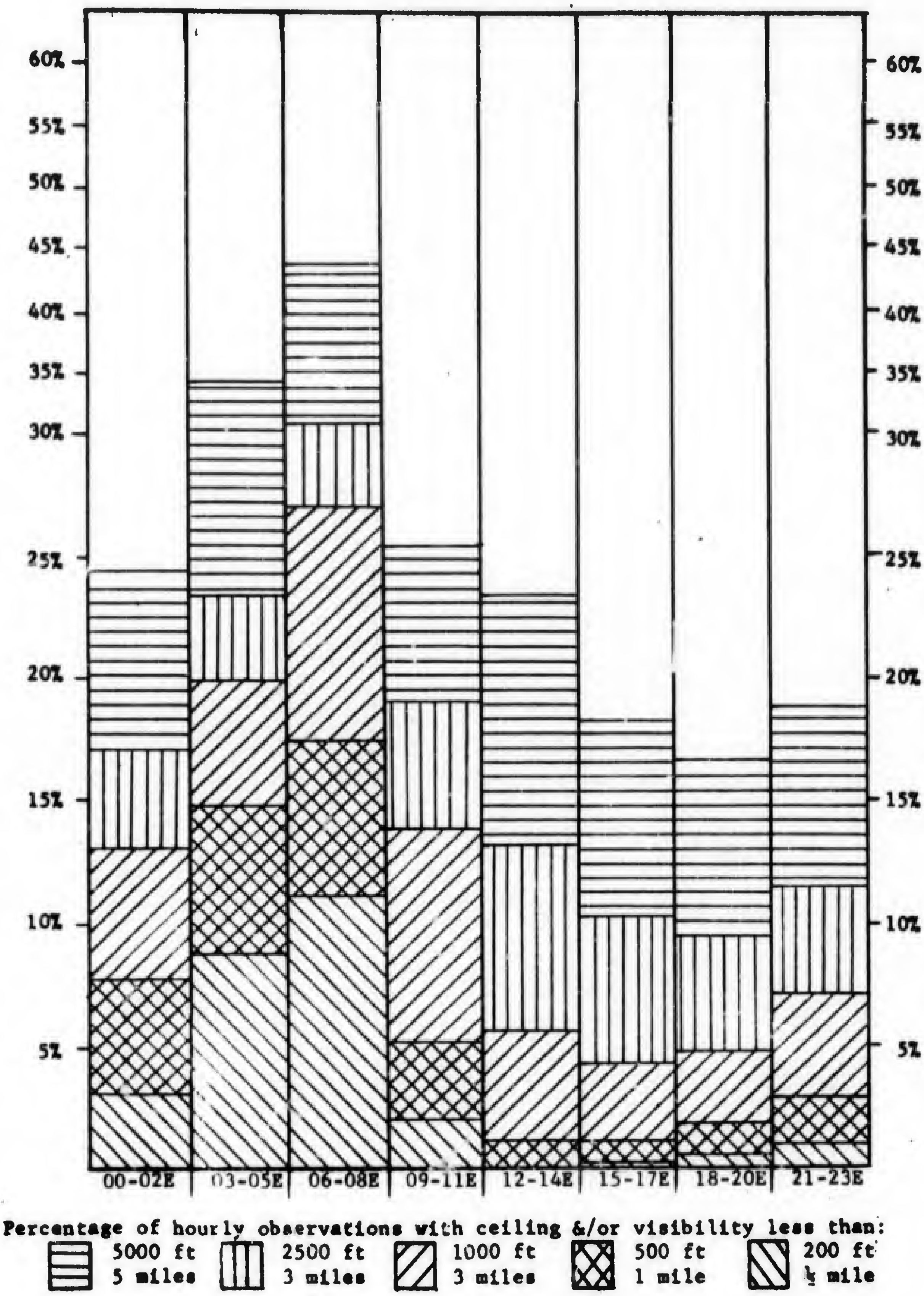
PRECIPITATION. The average November rainfall was 1.8 inches with a measurable quantity falling on six days during the month. There was an average of only one thunderstory day for the month.

TEMPERATURE. The highest November temperature was 86 deg F for the 20 years of record, while the absolute minimum was 23 deg F. The average daily maximum was 70 deg F, and the average daily minimum was 48 deg F.

FLYING WEATHER. Conditions below 1500 and/or 3 existed 14 percent of the time and "Below Minimums" (200 and/or ½) 3 percent. Fog and stratus with "Below Minimum" (200 and/or ½) conditions was on the increase, creating about the only operational weather problem for the month.

<u>SURFACE WINDS</u>. 26.8 percent of the time, the surface wind was calm; 18.0 percent, the wind was from 1 to 3 knots; 48.1 percent, from 4 to 10 knots; 7.0 percent, from 11 to 21 knots; and on occasion the wind fell in the 22 to 27 knot category but for a total monthly time of less than one hour. As in October, the wind flow varied through all points of the compass with the more predominant directions being from the Northeast and East Northeast.

The graph on the following page shows how selected values of ceiling and/or visibility varied with the hour of the day during the average November.



NOVEMBER DIURNAL CEILING-VISIBILITY VARIATION

DECEMBER

December marks the end of the short, dry, fall season. A trace of snow can be expected on at least two days and freezing temperatures on an average of five days. December is the second coldest winter month. Polar outbreaks often push through Florida giving Moody Air Force Base several consecutive days of clear, cold weather. On the other hand, when the polar front becomes stationary over south Georgia, low stratus and fog become a serious problem for prolonged periods of time. When lows form on the polar front in the Gulf and move over northern Florida or south Georgia, light to moderate rain may fall for 12 hours or longer. The paragraphs that follow present a summary of December weather over a twenty-year period.

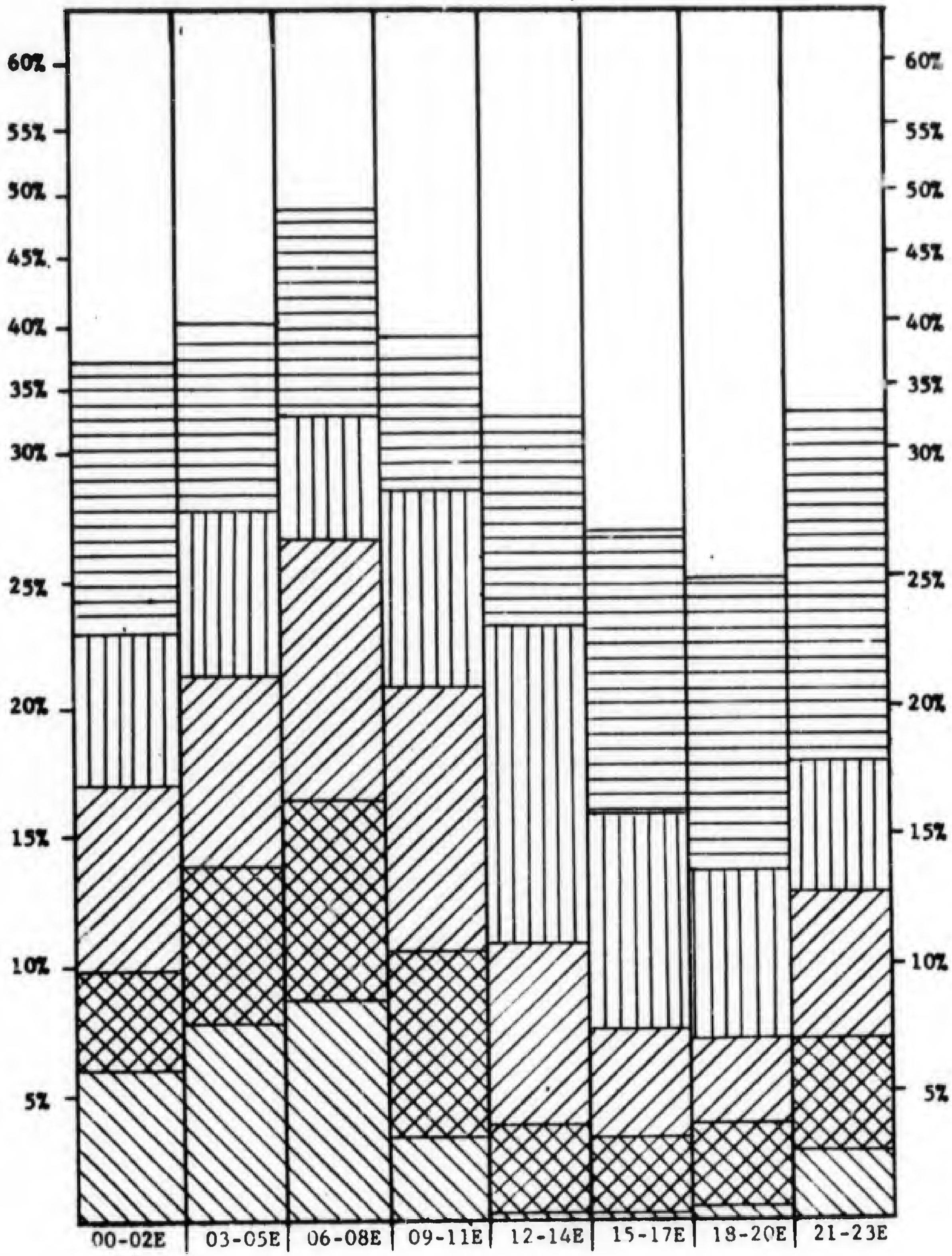
PRECIPITATION. The average December rainfall was 2.8 inches, a marked increase over October and November. A measurable quantity of rain fell on seven days of the month. There was an average of one thunderstorm day in the average December.

TEMPERATURE. The highest December temperature for the 20 years of record was 82 deg F, while the absolute minimum was 22 deg F. The average daily maximum was 63 deg F, and the average daily minimum was 43 deg F.

FLYING WEATHER. Conditions below 1500 and/or 3 existed 19 percent of the time and "Below Minimum" (200 and/or ½) conditions 4 percent of the time. In this respect, December was the worst month of the year.

SURFACE WINDS. Twenty-six and four-tenths percent of the time the surface wind was calm; 17.1 the wind was from 1 to 3 knots; 47.9 the wind was from 4 to 10 knots; 8.5 percent the wind was from 11 to 21 knots. The wind flow was from all points of the compass with West Northwest and Northeast being the slightly more predominant directions.

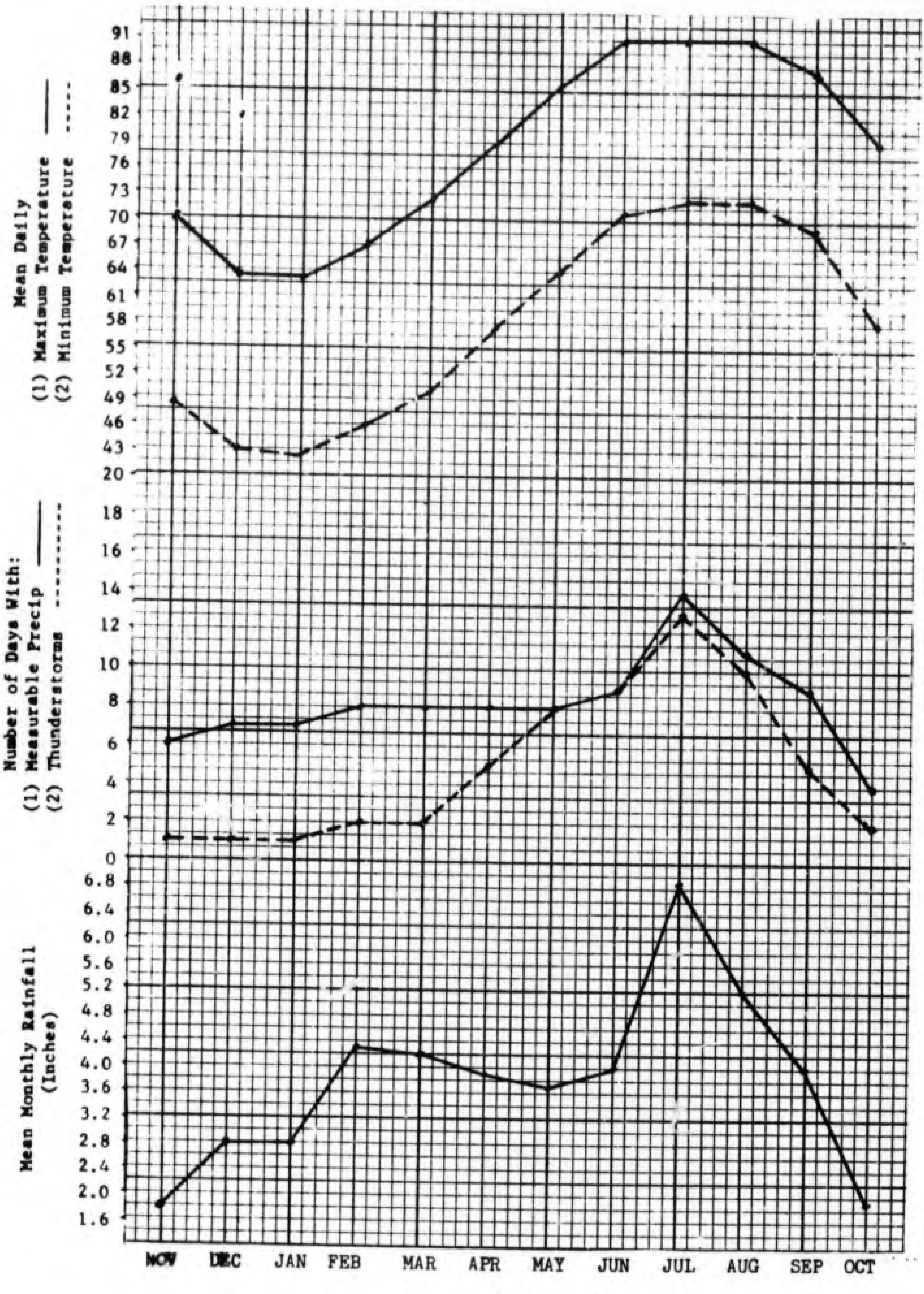
The graph on the following page shows how selected values of ceiling and/or visibility varied with the hour of the day during the average December.



Percentage of hourly observations with ceiling &/or visibility less than:

5000 ft 5 miles | 2500 ft 3 miles | 1000 ft 3 miles | 500 ft 1 mile | 200 ft ½ mile

DECEMBER DIURNAL CEILING-VISIBILITY VARIATION


Mean Daily
(1) Maximum Temperature
(2) Minimum Temperature
91
88
85
82
79
76
73
70
67
64
61
58
55
52
49
46
43
Number of Days With:
(1) Measurable Precip
(2) Thunderstorms
20
18
16
14
12
10
8
6
4
2
0
Mean Monthly Rainfall
(Inches)
6.8
6.4
6.0
5.6
5.2
4.8
4.4
4.0
3.6
3.2
2.8
2.4
2.0
1.6
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT

SUNRISE AND SUNSET AT VALDOSTA, GEORGIA

EASTERN STANDARD TIME

NO. 1062

DAY	JAN. Rise A.M.	JAN. Set P.M.	FEB. Rise A.M.	FEB. Set P.M.	MAR. Rise A.M.	MAR. Set P.M.	APR. Rise A.M.	APR. Set P.M.	MAY Rise A.M.	MAY Set P.M.	JUNE Rise A.M.	JUNE Set P.M.
1	7 31	5 43	7 25	6 09	7 00	6 32	6 23	6 52	5 49	7 11	5 31	7 31
2	7 31	5 43	7 24	6 10	6 59	6 32	6 21	6 53	5 48	7 12	5 30	7 32
3	7 31	5 44	7 24	6 11	6 58	6 33	6 20	6 53	5 48	7 13	5 30	7 32
4	7 32	5 45	7 23	6 12	6 57	6 34	6 19	6 54	5 47	7 13	5 30	7 33
5	7 32	5 46	7 22	6 12	6 55	6 34	6 18	6 55	5 46	7 14	5 30	7 33
6	7 32	5 46	7 22	6 13	6 54	6 35	6 16	6 55	5 45	7 15	5 30	7 34
7	7 32	5 47	7 21	6 14	6 53	6 36	6 15	6 56	5 44	7 16	5 30	7 34
8	7 32	5 48	7 20	6 15	6 52	6 36	6 14	6 56	5 43	7 16	5 30	7 35
9	7 32	5 49	7 19	6 16	6 51	6 37	6 13	6 57	5 43	7 17	5 29	7 35
10	7 32	5 50	7 19	6 17	6 50	6 38	6 12	6 58	5 42	7 18	5 29	7 36
11	7 32	5 50	7 18	6 18	6 48	6 39	6 11	6 58	5 41	7 18	5 29	7 36
12	7 32	5 51	7 17	6 18	6 47	6 39	6 09	6 59	5 40	7 19	5 29	7 36
13	7 32	5 52	7 16	6 19	6 46	6 40	6 08	7 00	5 40	7 20	5 29	7 37
14	7 32	5 53	7 15	6 20	6 45	6 41	6 07	7 00	5 39	7 20	5 29	7 37
15	7 32	5 54	7 14	6 21	6 44	6 41	6 06	7 01	5 38	7 21	5 30	7 37
16	7 31	5 55	7 13	6 22	6 42	6 42	6 05	7 02	5 38	7 21	5 30	7 38
17	7 31	5 56	7 12	6 22	6 41	6 43	6 04	7 02	5 37	7 22	5 30	7 38
18	7 31	5 57	7 11	6 23	6 40	6 43	6 03	7 03	5 37	7 23	5 30	7 38
19	7 31	5 57	7 10	6 24	6 39	6 44	6 01	7 04	5 36	7 23	5 30	7 39
20	7 30	5 58	7 09	6 25	6 37	6 44	6 00	7 04	5 35	7 24	5 30	7 39
21	7 30	5 59	7 08	6 26	6 36	6 45	5 59	7 05	5 35	7 25	5 30	7 39
22	7 30	6 00	7 07	6 26	6 35	6 46	5 58	7 06	5 34	7 25	5 31	7 39
23	7 29	6 01	7 06	6 27	6 34	6 46	5 57	7 06	5 34	7 26	5 31	7 39
24	7 29	6 02	7 05	6 28	6 32	6 47	5 56	7 07	5 33	7 27	5 31	7 40
25	7 29	6 03	7 04	6 29	6 31	6 48	5 55	7 07	5 33	7 27	5 31	7 40
26	7 28	6 04	7 03	6 29	6 30	6 48	5 54	7 08	5 33	7 28	5 32	7 40
27	7 28	6 05	7 02	6 30	6 29	6 49	5 53	7 09	5 32	7 28	5 32	7 40
28	7 27	6 05	7 01	6 31	6 27	6 50	5 52	7 09	5 32	7 29	5 32	7 40
29	7 27	6 06	7 01	6 32	6 26	6 50	5 51	7 10	5 32	7 30	5 33	7 40
30	7 26	6 07			6 25	6 51	5 50	7 11	5 31	7 30	5 33	7 40
31	7 26	6 08			6 24	6 51			5 31	7 31		

DAY	JULY Rise A.M.	JULY Set P.M.	AUG. Rise A.M.	AUG. Set P.M.	SEPT. Rise A.M.	SEPT. Set P.M.	OCT. Rise A.M.	OCT. Set P.M.	NOV. Rise A.M.	NOV. Set P.M.	DEC. Rise A.M.	DEC. Set P.M.
1	5 33	7 40	5 50	7 28	6 09	6 57	6 26	6 19	6 48	5 45	7 13	5 31
2	5 34	7 40	5 51	7 27	6 10	6 55	6 27	6 17	6 49	5 44	7 14	5 31
3	5 34	7 40	5 52	7 26	6 10	6 54	6 28	6 16	6 49	5 44	7 15	5 31
4	5 35	7 40	5 52	7 26	6 11	6 53	6 28	6 15	6 50	5 43	7 15	5 31
5	5 35	7 40	5 53	7 25	6 12	6 52	6 29	6 14	6 51	5 42	7 16	5 31
6	5 36	7 40	5 54	7 24	6 12	6 50	6 30	6 13	6 52	5 41	7 17	5 31
7	5 36	7 40	5 54	7 23	6 13	6 49	6 30	6 11	6 53	5 41	7 18	5 31
8	5 37	7 39	5 55	7 22	6 13	6 48	6 31	6 10	6 54	5 40	7 18	5 32
9	5 37	7 39	5 55	7 21	6 14	6 47	6 31	6 09	6 54	5 39	7 19	5 32
10	5 38	7 39	5 56	7 20	6 14	6 45	6 32	6 08	6 55	5 39	7 20	5 32
11	5 38	7 39	5 57	7 19	6 15	6 44	6 33	6 07	6 56	5 38	7 21	5 32
12	5 39	7 38	5 57	7 19	6 15	6 43	6 [illegible]	6 05	6 57	5 37	7 21	5 32
13	5 39	7 38	5 58	7 18	6 16	6 42	6 34	6 04	6 58	5 37	7 22	5 33
14	5 40	7 38	5 58	7 17	6 17	6 40	6 35	6 03	6 59	5 36	7 23	5 33
15	5 40	7 38	5 59	7 16	6 17	6 39	6 35	6 02	6 59	5 36	7 23	5 33
16	5 41	7 37	6 00	7 15	6 18	6 38	6 36	6 01	7 00	5 35	7 24	5 34
17	5 41	7 37	6 00	7 14	6 18	6 37	6 37	6 00	7 01	5 35	7 24	5 34
18	5 42	7 36	6 01	7 12	6 19	6 35	6 37	5 59	7 02	5 34	7 25	5 34
19	5 42	7 36	6 02	7 11	6 19	6 34	6 38	5 58	7 03	5 34	7 26	5 35
20	5 43	7 35	6 02	7 10	6 20	6 33	6 39	5 57	7 04	5 34	7 26	5 35
21	5 44	7 35	6 03	7 09	6 21	6 31	6 40	5 56	7 05	5 33	7 27	5 36
22	5 44	7 34	6 03	7 08	6 21	6 30	6 40	5 55	7 05	5 33	7 27	5 36
23	5 45	7 34	6 04	7 07	6 22	6 29	6 41	5 54	7 06	5 33	7 28	5 37
24	5 45	7 33	6 05	7 06	6 22	6 28	6 42	5 53	7 07	5 32	7 28	5 37
25	5 46	7 33	6 05	7 05	6 23	6 26	6 43	5 52	7 08	5 32	7 29	5 38
26	5 47	7 32	6 06	7 04	6 24	6 25	6 43	5 51	7 09	5 32	7 29	5 39
27	5 47	7 31	6 06	7 02	6 24	6 24	6 44	5 50	7 10	5 32	7 29	5 39
28	5 48	7 31	6 07	7 01	6 25	6 22	6 45	5 49	7 10	5 32	7 30	5 40
29	5 49	7 30	6 07	7 00	6 25	6 21	6 46	5 48	7 11	5 31	7 30	5 40
30	5 49	7 29	6 08	6 59	6 26	6 20	6 46	5 47	7 12	5 31	7 30	5 41
31	5 50	7 29	6 09	6 58			6 47	5 46			7 31	5 42

Add one hour for Daylight Saving Time if and when in use.

I certify that the above data are the result of an accurate and true computation by the Nautical Almanac Office, United States Naval Observatory, an agency charged by Federal Statute (9 Stat. L 374, 375) with the duty of making such computations and publishing the results.

E W Woolard

E. W. WOOLARD
Director Nautical Almanac
U. S. Naval Observatory

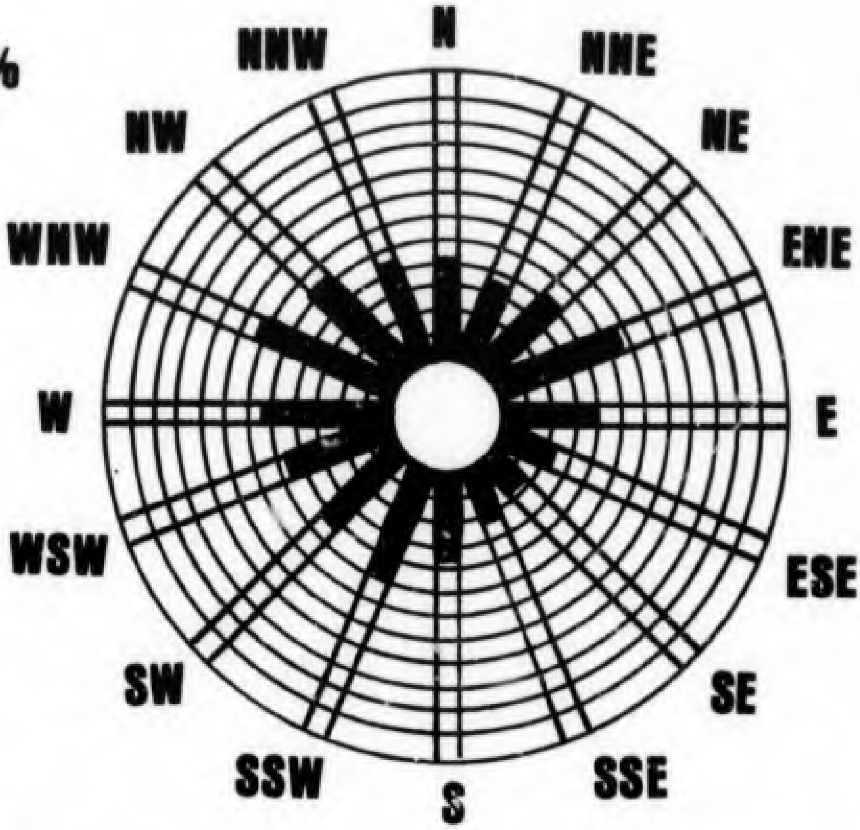
C. G. Christie

C. G. CHRISTIE
Captain, USN
Superintendent
U. S. Naval Observatory

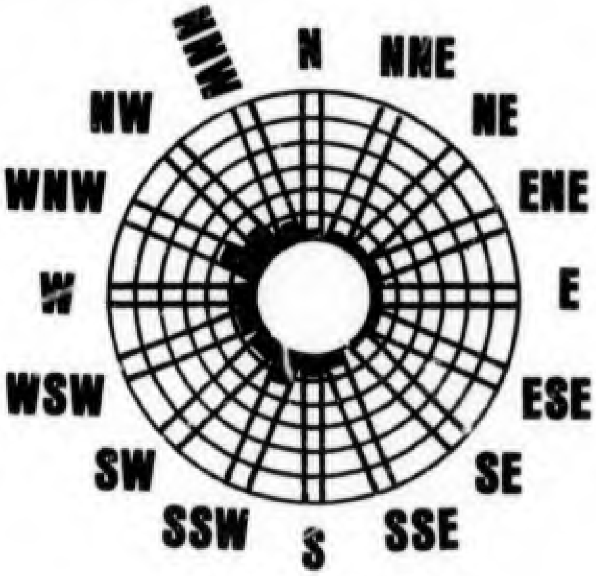
SURFACE WIND ROSE **MONTH** JAN

I. CALM 24.4 **%**

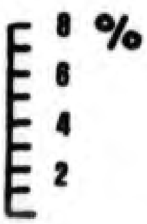
II. 1-10 KTS 65.7 **%**



III. GREATER THAN 10 KNOTS 9.9 **%**



II. & III. SCALE :

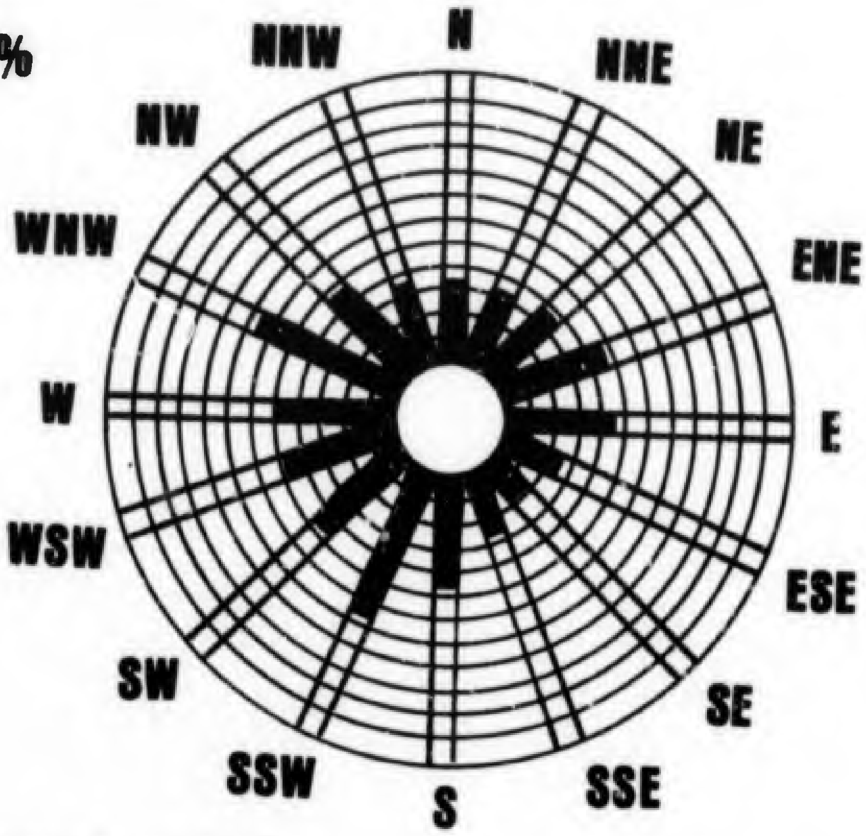


SURFACE WIND ROSE

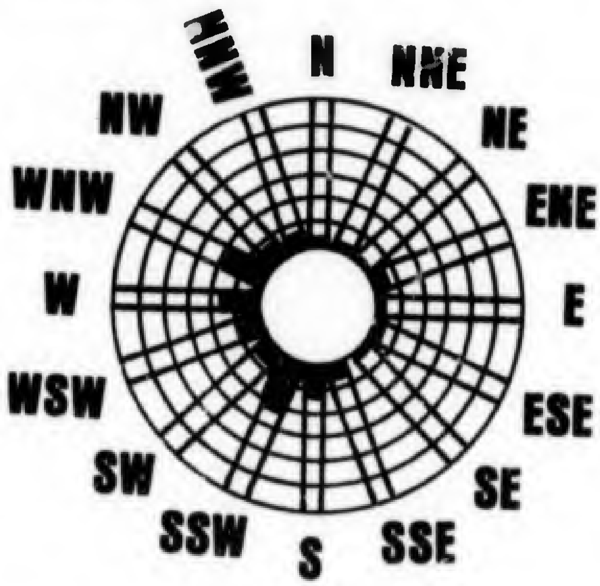
MONTH *FEB*

I. CALM *20.3* %

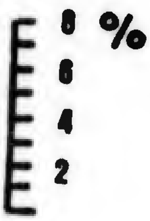
II. 1-10 KTS *66.3* %



III. GREATER THAN 10 KNOTS *13.4* %



II. & III. SCALE :

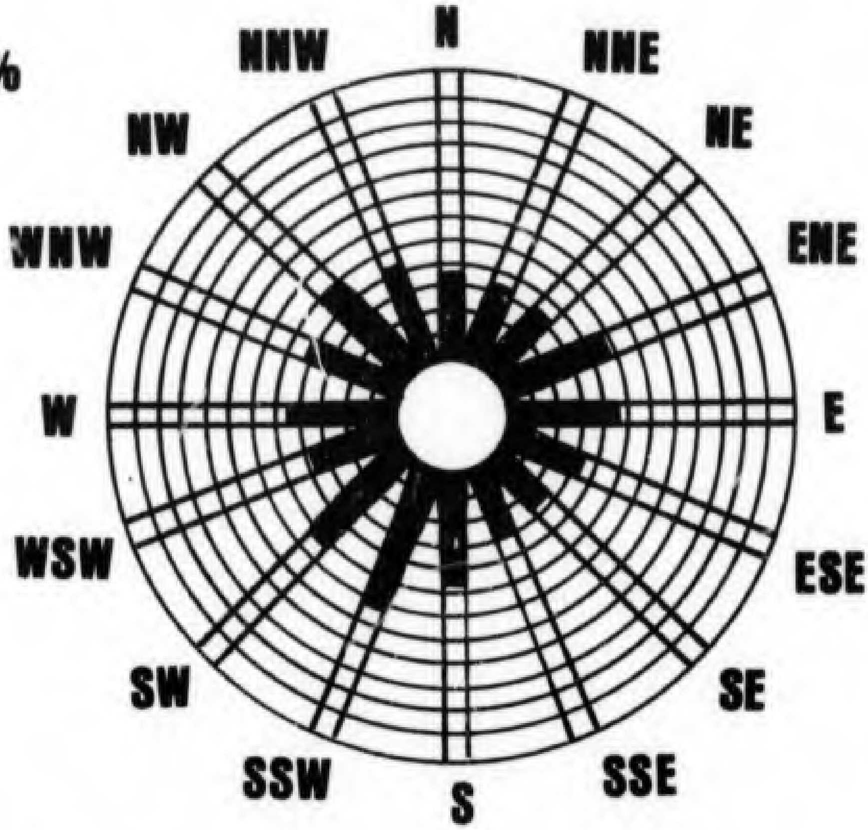


SURFACE WIND ROSE

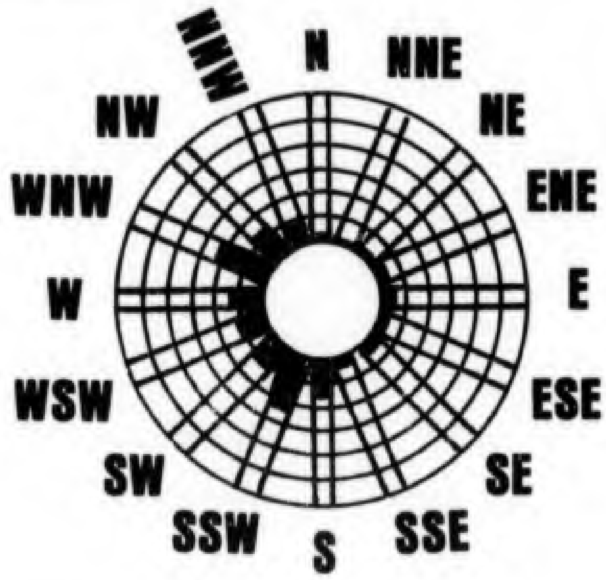
MONTH *MAR*

I. CALM *19.5* %

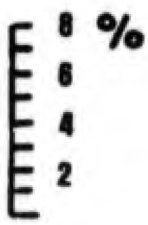
II. 1-10 KTS *65.8* %



III. GREATER THAN 10 KNOTS *14.7* %



II. & III. SCALE :

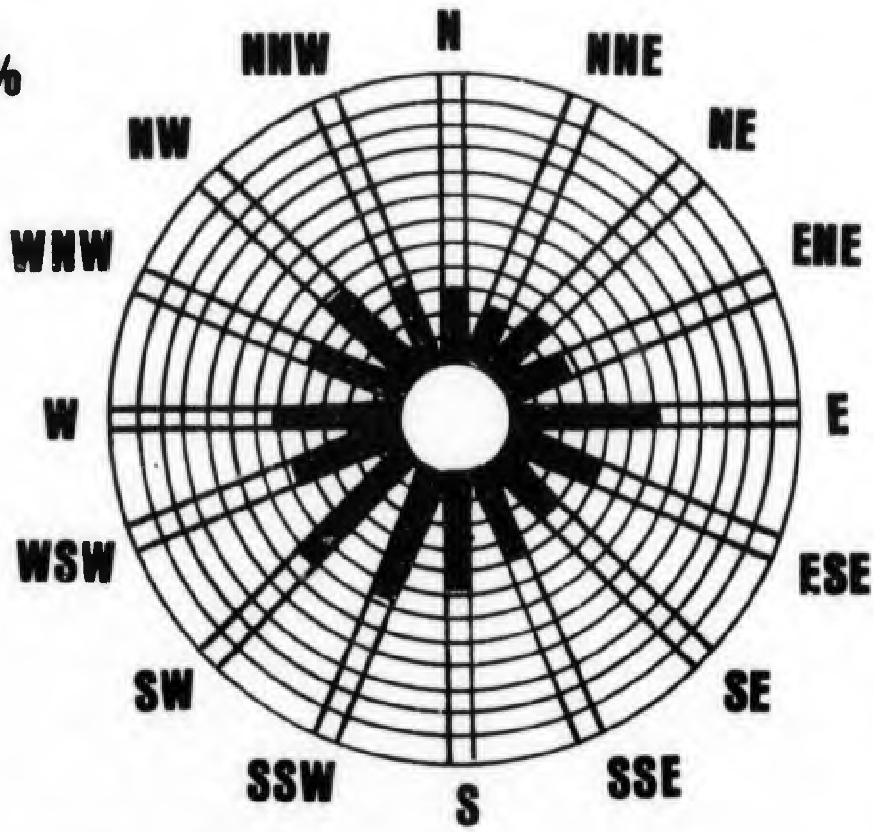


SURFACE WIND ROSE

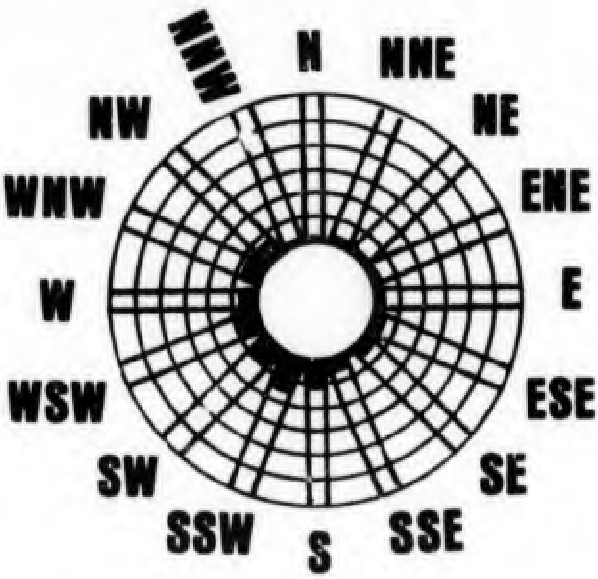
MONTH APR

I. CALM 19.9 %

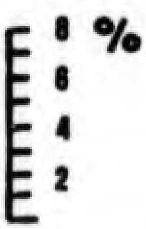
II. 1-10 KTS 69.5 %



III. GREATER THAN 10 KNOTS 10.6 %



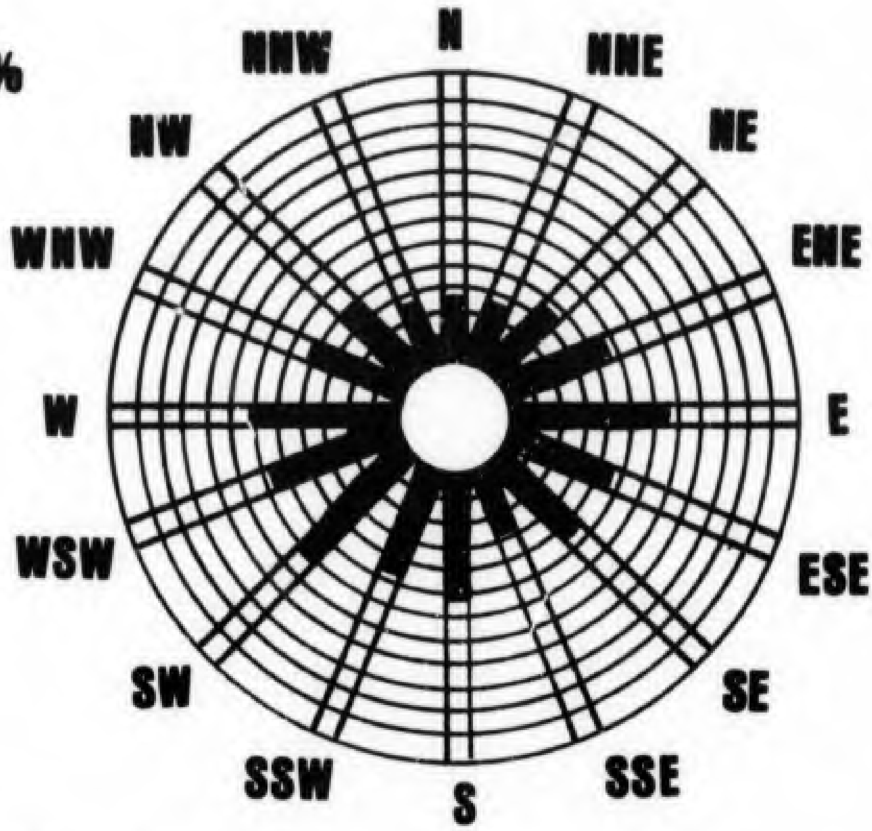
II. & III. SCALE :



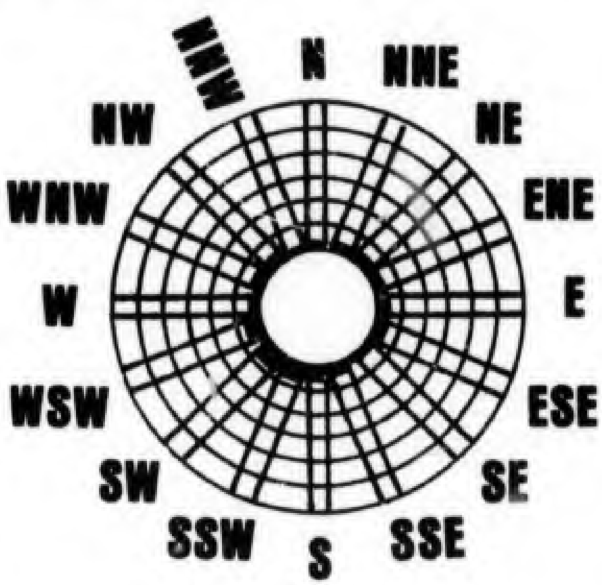
SURFACE WIND ROSE **MONTH** *MAY*

I. CALM *22.2* %

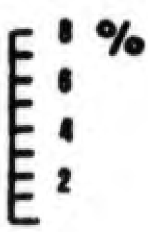
II. 1-10 KTS *71.3* %



III. GREATER THAN 10 KNOTS *6.5* %



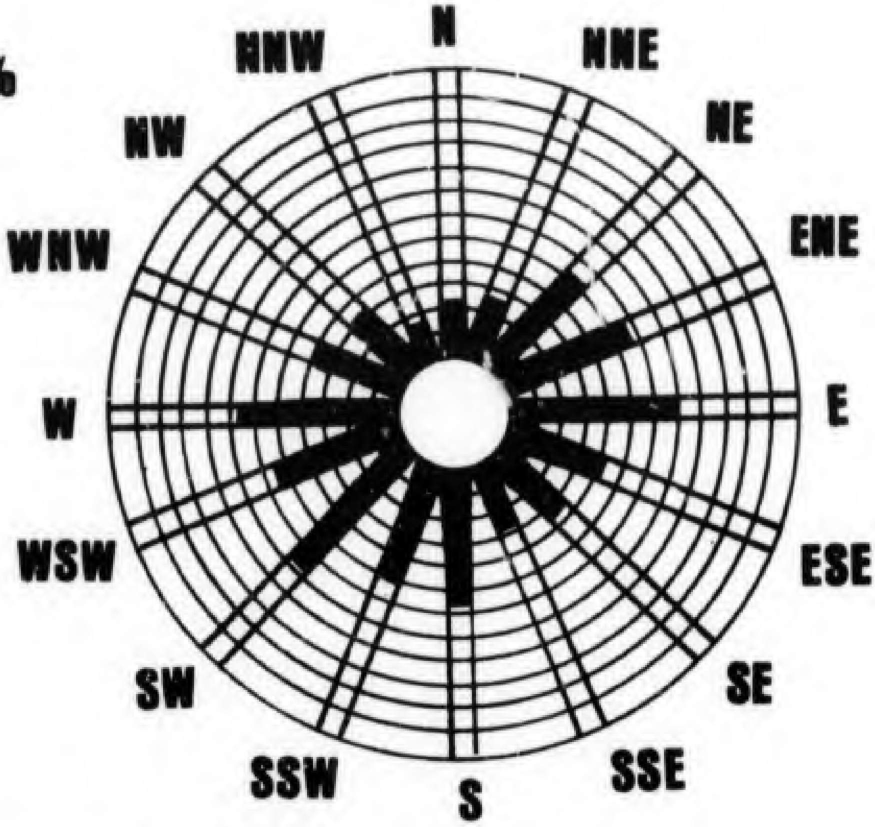
II. & III. SCALE :



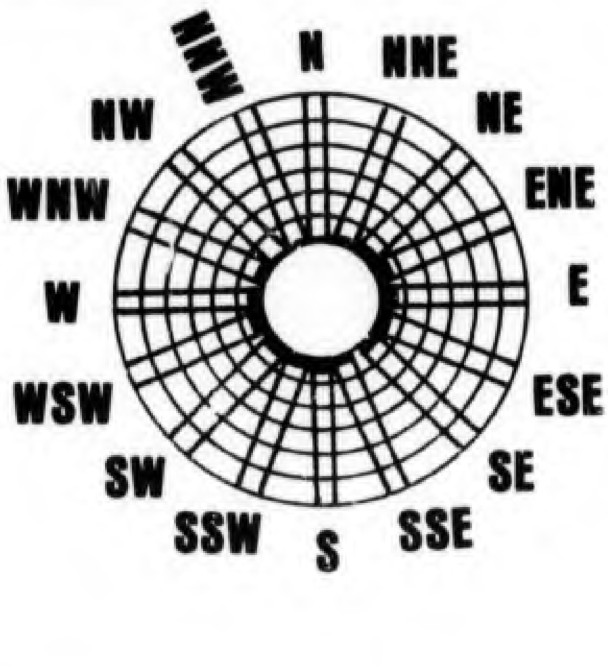
SURFACE WIND ROSE MONTH JUN

I. CALM 21.2 %

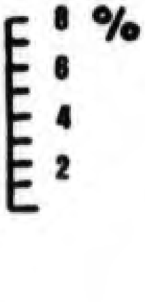
II. 1-10 KTS 73.2 %



III. GREATER THAN 10 KNOTS 5.6 %



II. & III. SCALE :

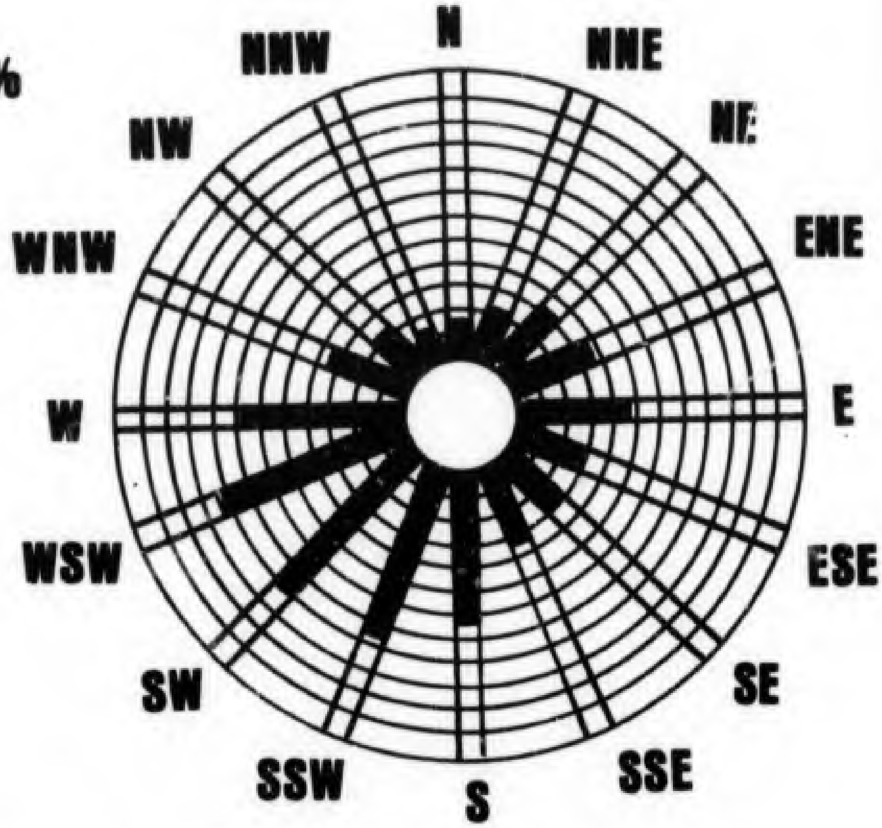


SURFACE WIND ROSE

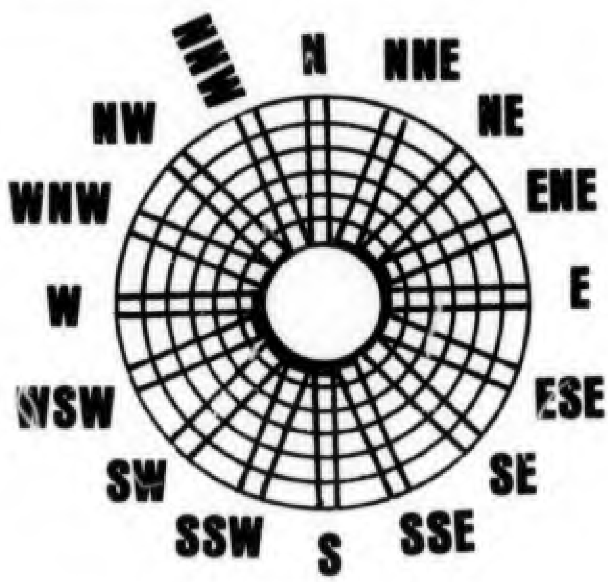
MONTH JUL

I. CALM 26.3 %

II. 1-10 KTS 70.1 %



III. GREATER THAN 10 KNOTS 3.6 %



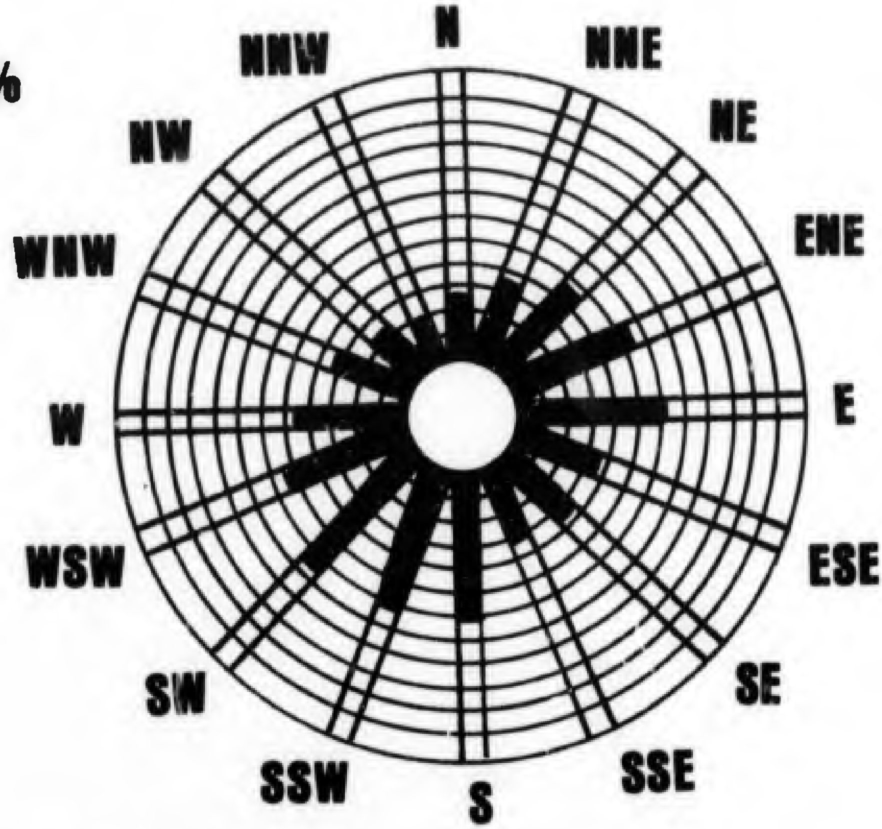
II. & III. SCALE :

SURFACE WIND ROSE

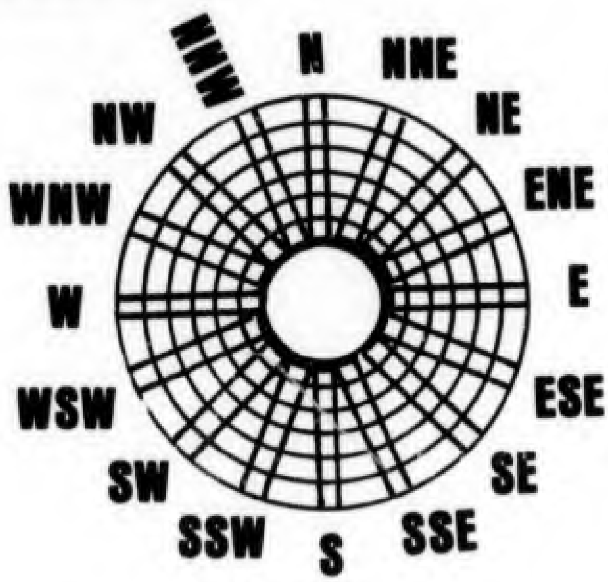
MONTH *AUG*

I. CALM *27.2* %

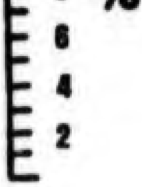
II. 1-10 KTS *69.3* %



III. GREATER THAN 10 KNOTS *3.5* %



II. & III. SCALE :

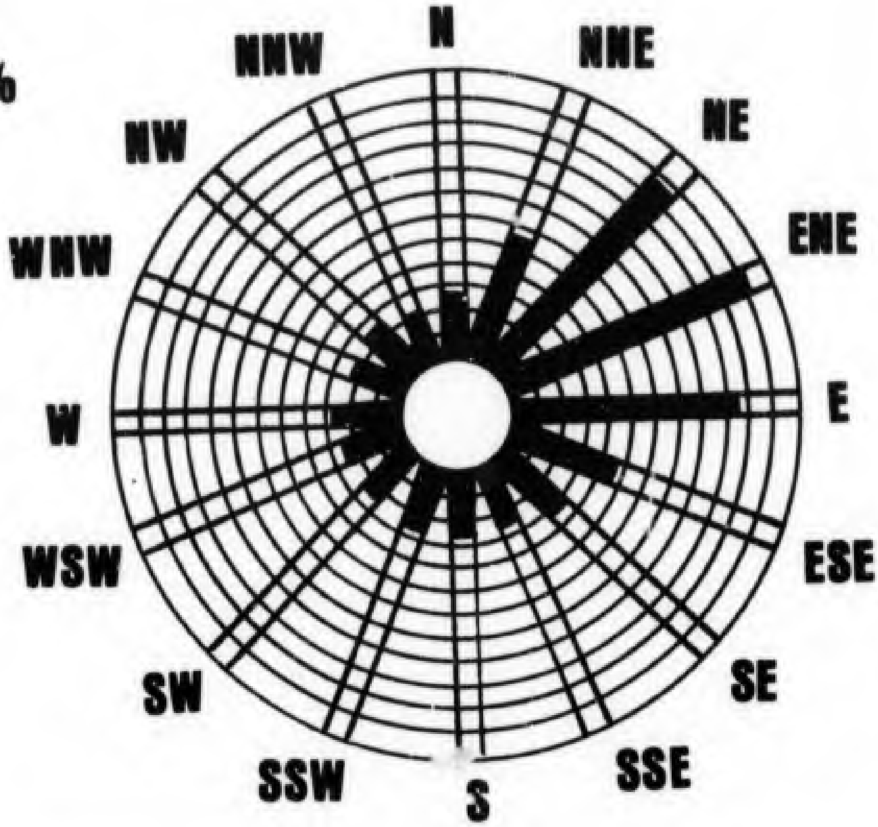


SURFACE WIND ROSE

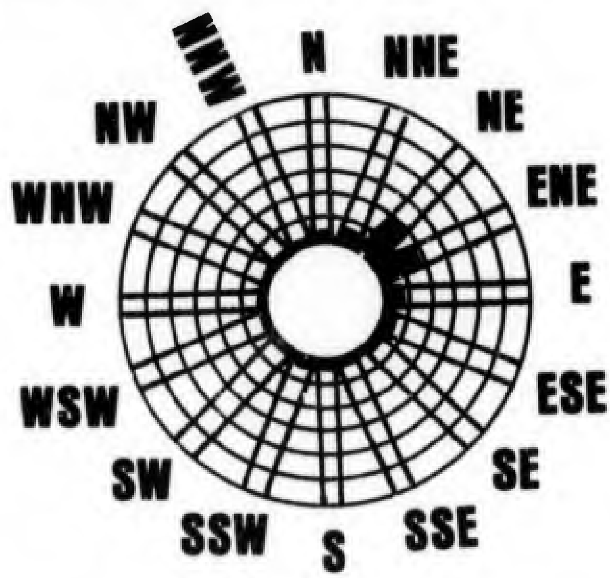
MONTH *SEP*

I. CALM *22.4* %

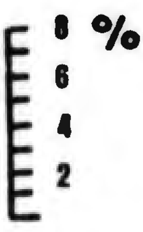
II. 1-10 KTS *70.0* %



III. GREATER THAN 10 KNOTS *7.6* %



II. & III. SCALE :

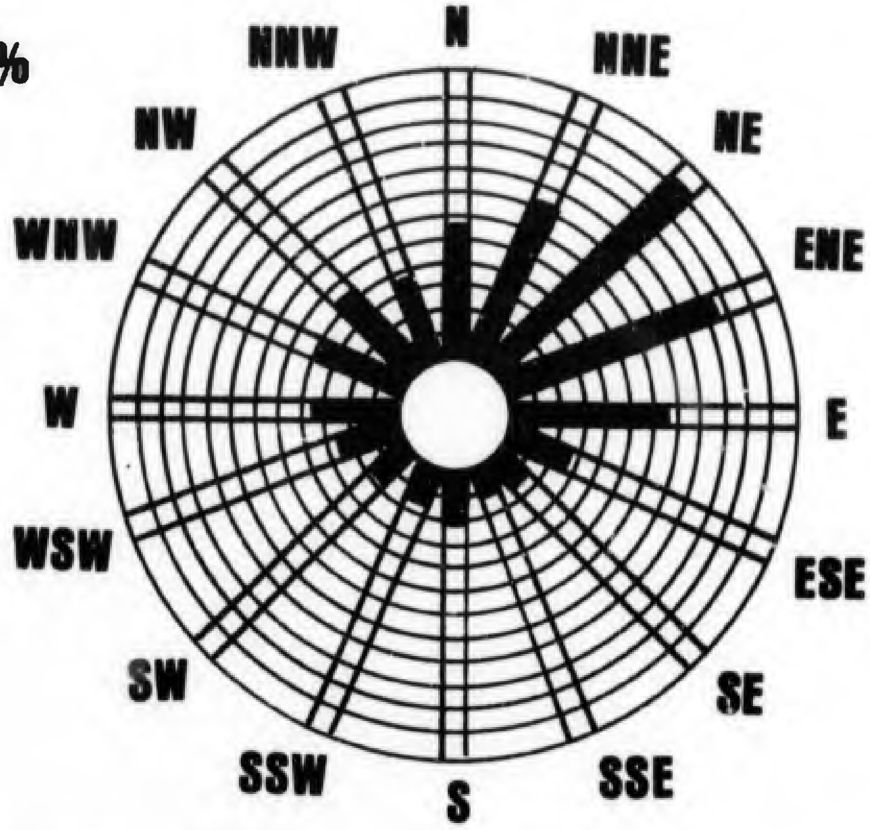


SURFACE WIND ROSE

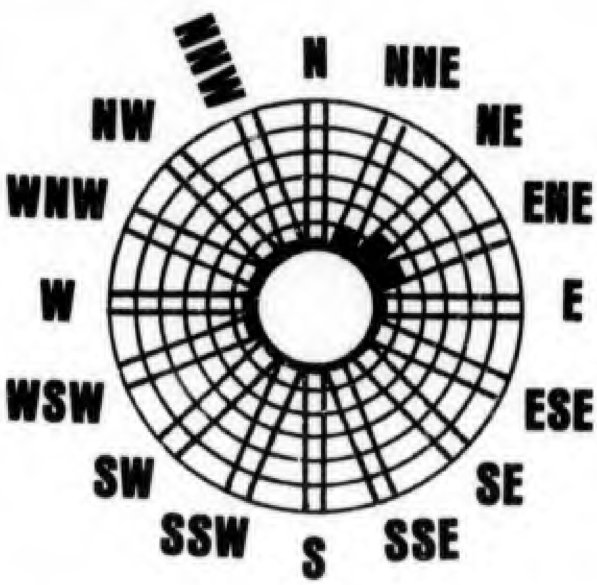
MONTH OCT

I. CALM 24.2 %

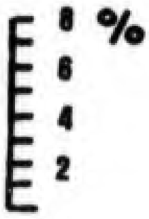
II. 1-10 KTS 68.7 %



III. GREATER THAN 10 KNOTS 7.1 %



II. & III. SCALE :

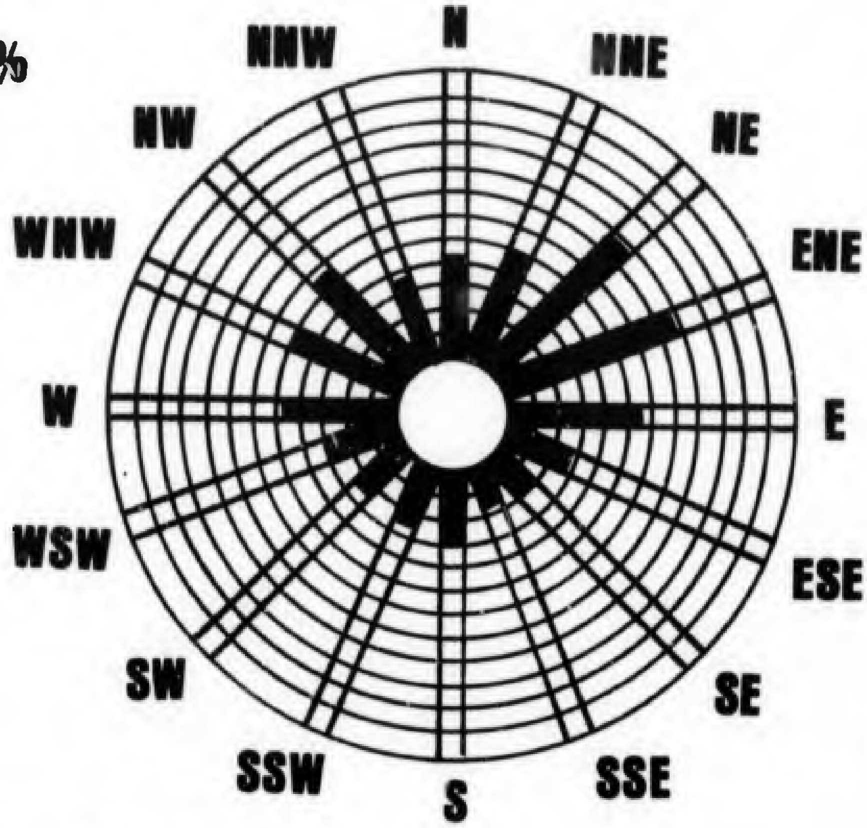


SURFACE WIND ROSE

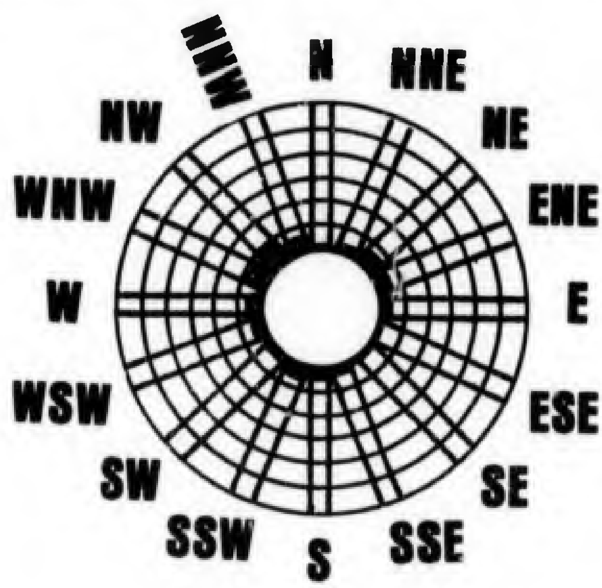
MONTH *Nov*

I. CALM *26.8* %

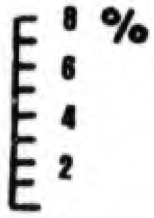
II. 1-10 KTS *66.2* %



III. GREATER THAN 10 KNOTS *7.0* %



II. & III. SCALE :

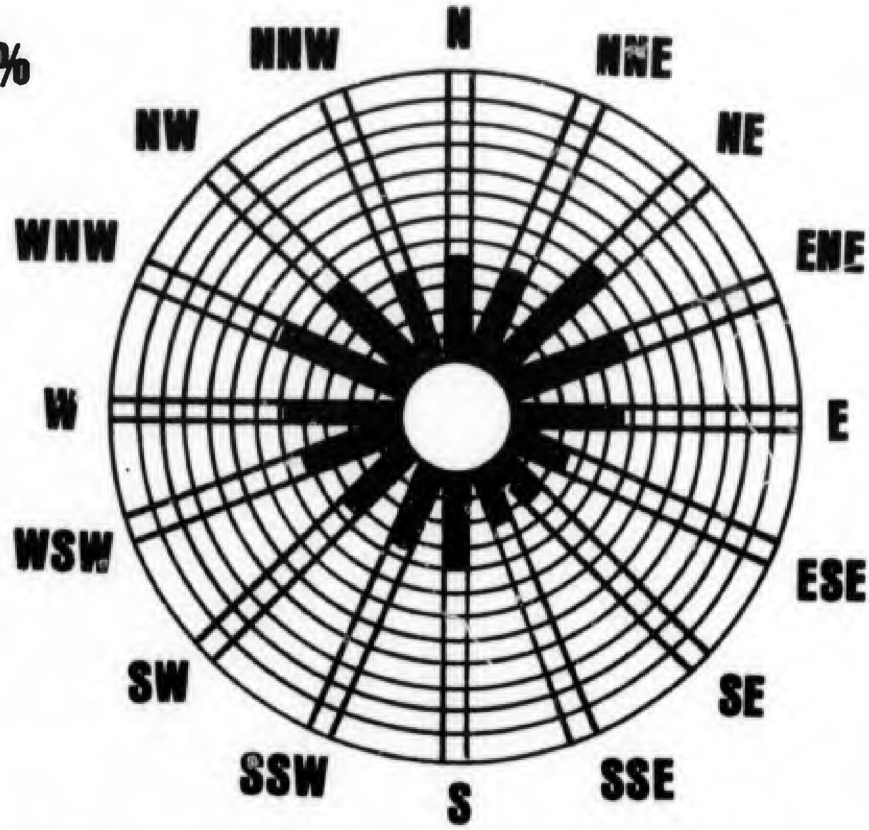


SURFACE WIND ROSE

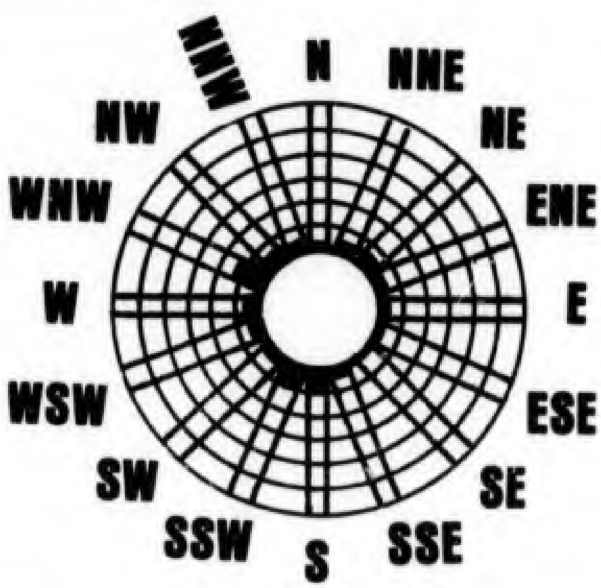
MONTH DEC

I. CALM 26.4 %

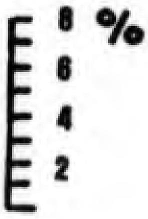
II. 1-10 KTS 65.1 %



III. GREATER THAN 10 KNOTS 8.5 %



II. & III. SCALE :



Average Hurricane Tracks

Hurricane tracks may be divided into three main groups:

1. Those moving in the easterlies all the time.
2. Those recurving from the easterlies to the westerlies.
3. Those moving in the westerlies all the time.

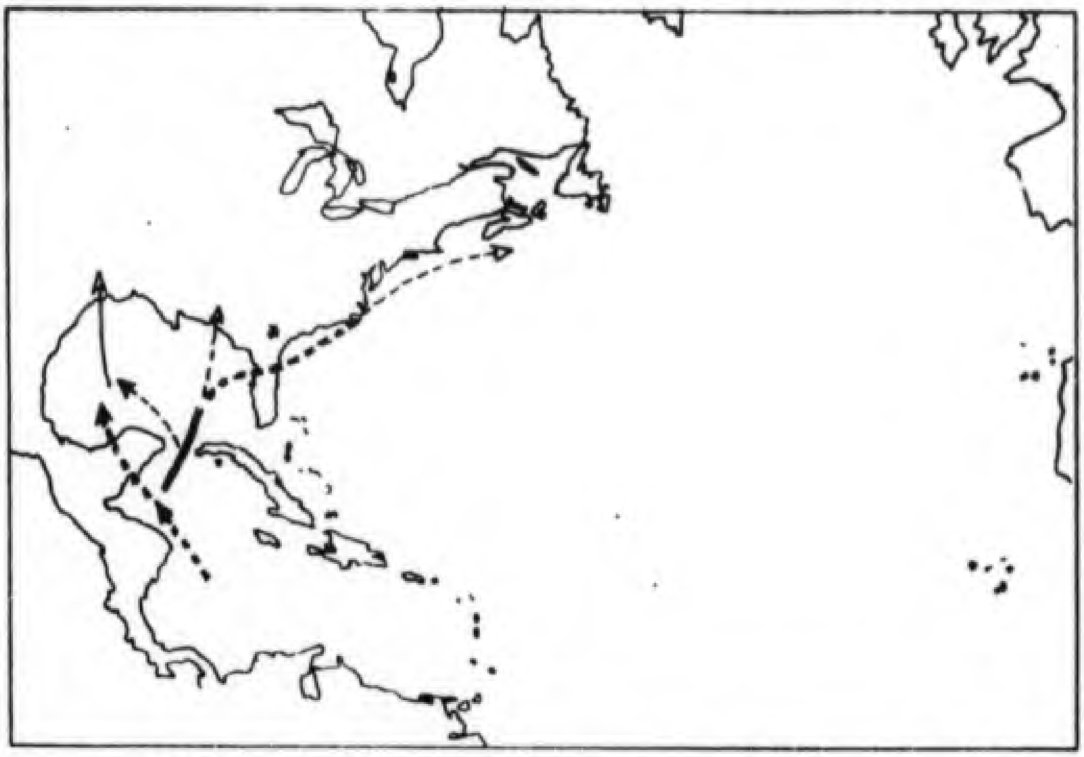
Percentages of tropical storms in the three categories over the last 70 years are as follows:

Category 1: 30%

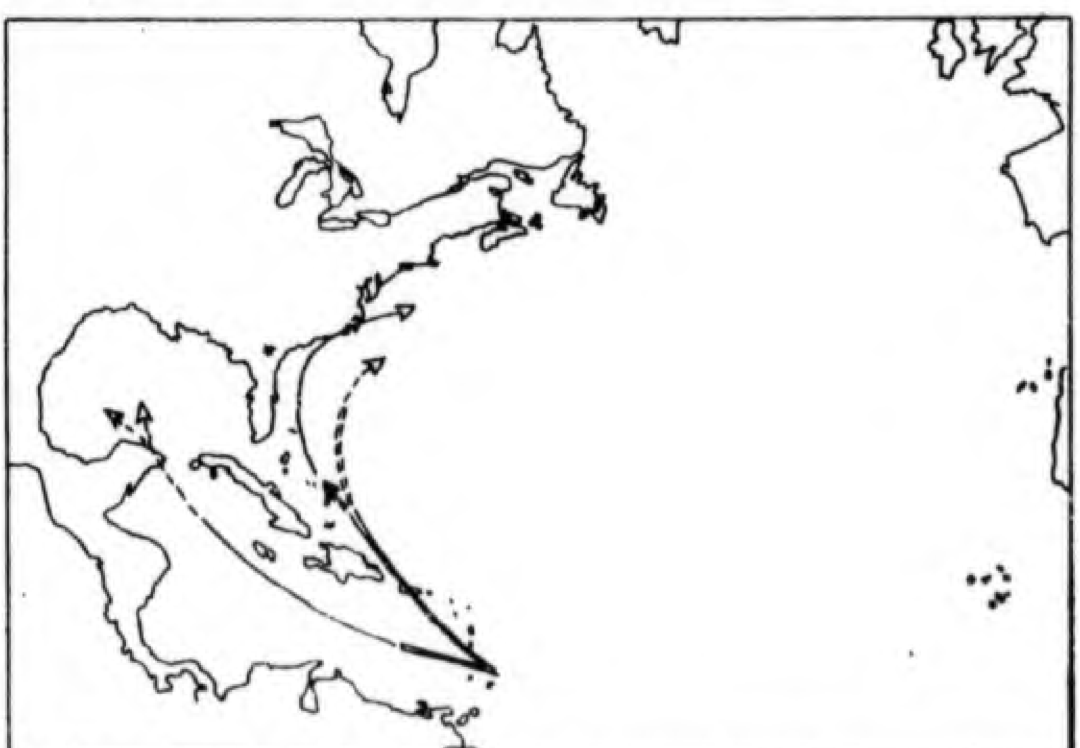
Category 2: 60%

Category 3: 10%

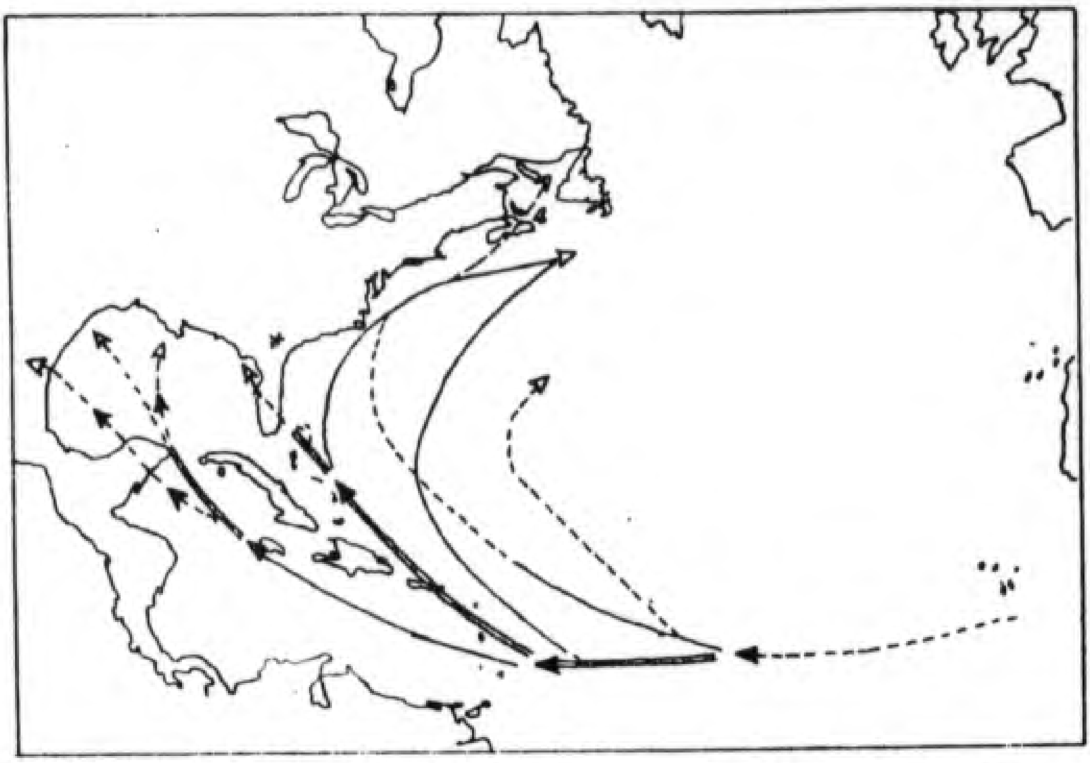
The following charts illustrate the prevailing tracks of tropical cyclones in the months June through November in the North Atlantic Area. Solid lines represent primary tracks where a considerable number of storms have traveled, while dashed lines are secondary tracks where the number of storms involved is relatively few. The more well-defined tracks, which are indicated by double lines, are representative of travel of storms in the general direction and within about two degrees of latitude either side of the indicated paths. The less-well-defined tracks, shown by single lines, are only broadly representative of storm motion in their vicinity. The solid arrow on a track or a track origin is representative of a region of storm genesis, while an open arrow indicates either a rapid decrease in storm frequency or a wide scatter of tracks of storms in that region.



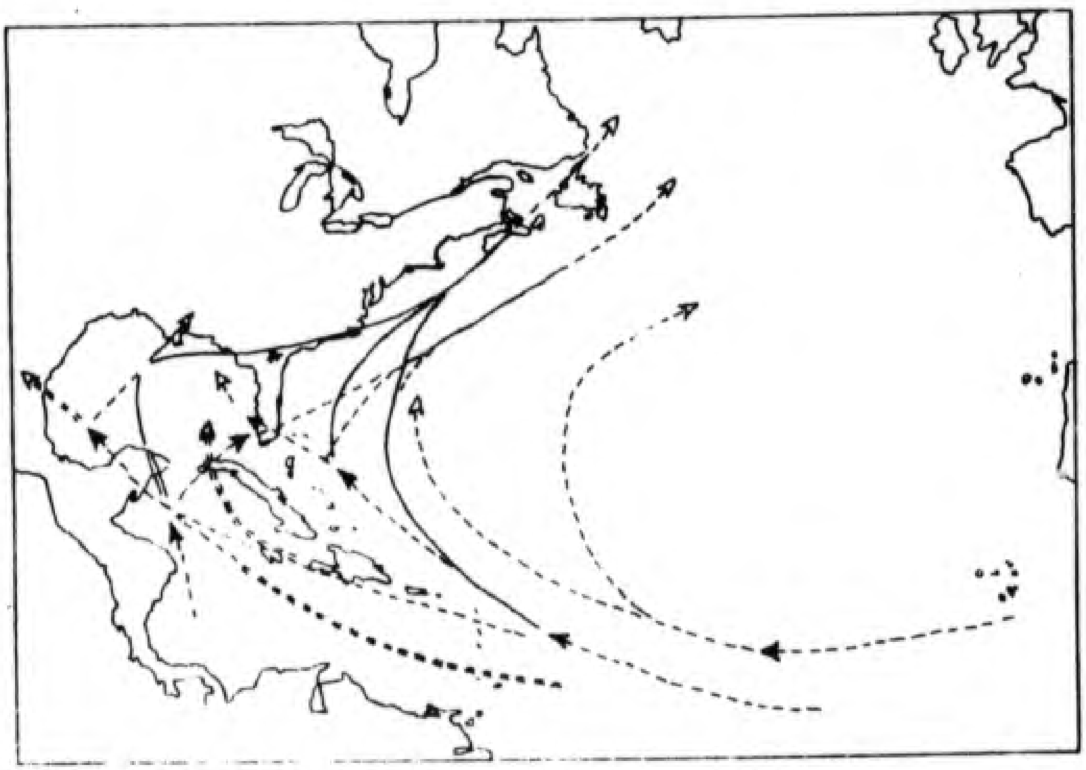
Prevailing tracks of tropical storms in North Atlantic area in June.



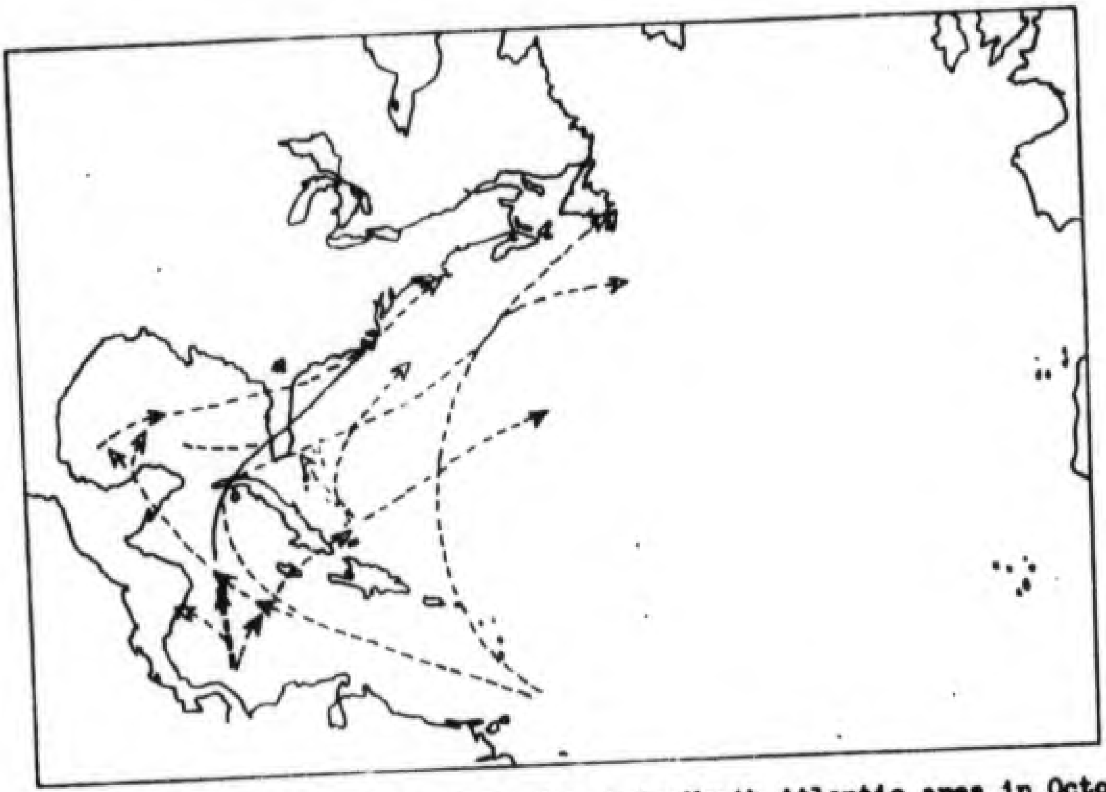
Prevailing tracks of tropical storms in North Atlantic area in July.



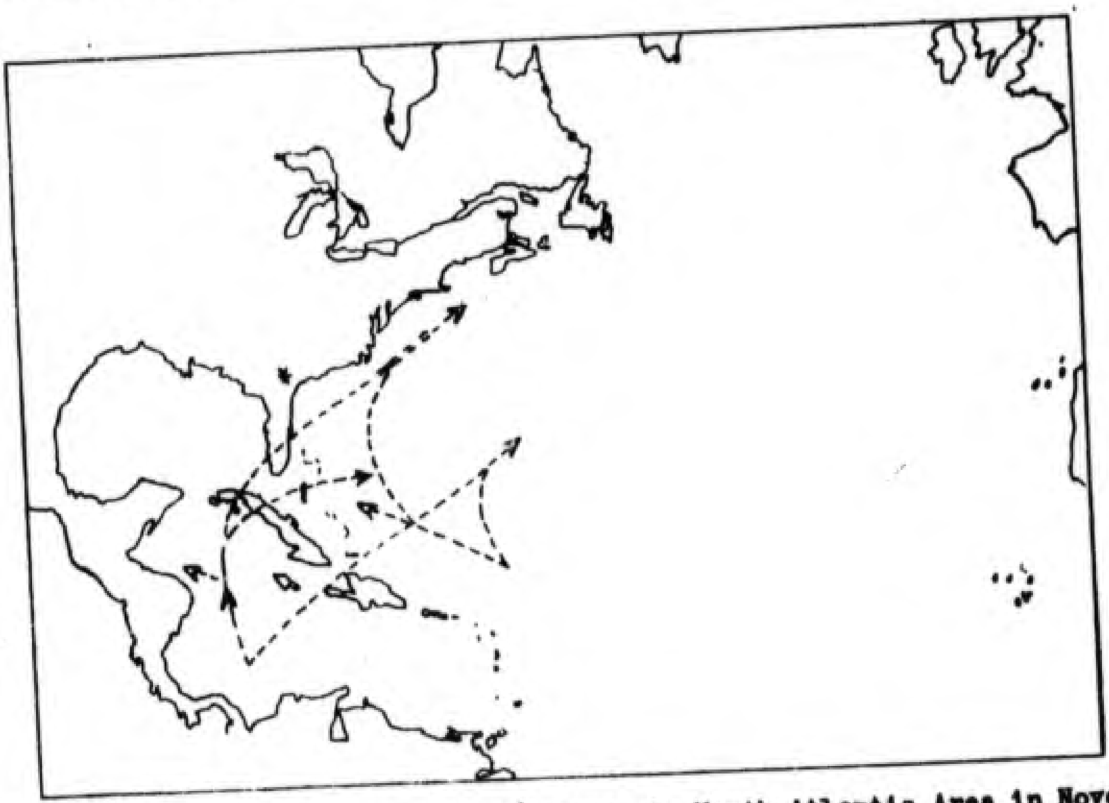
Prevailing tracks of tropical storms in North Atlantic area in August.



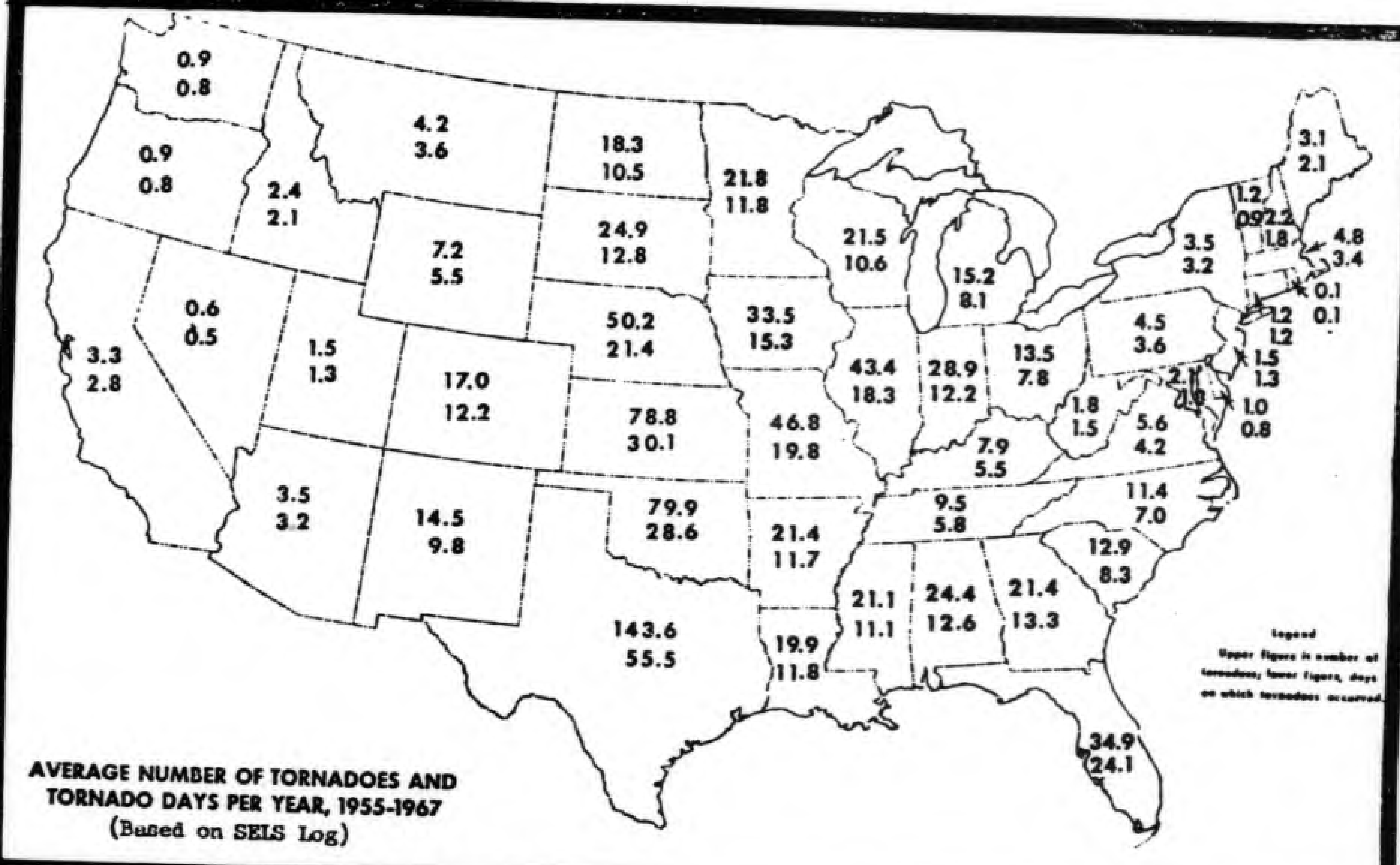
Prevailing tracks of tropical storms in North Atlantic area in September.



Prevailing tracks of tropical storms in North Atlantic area in October.

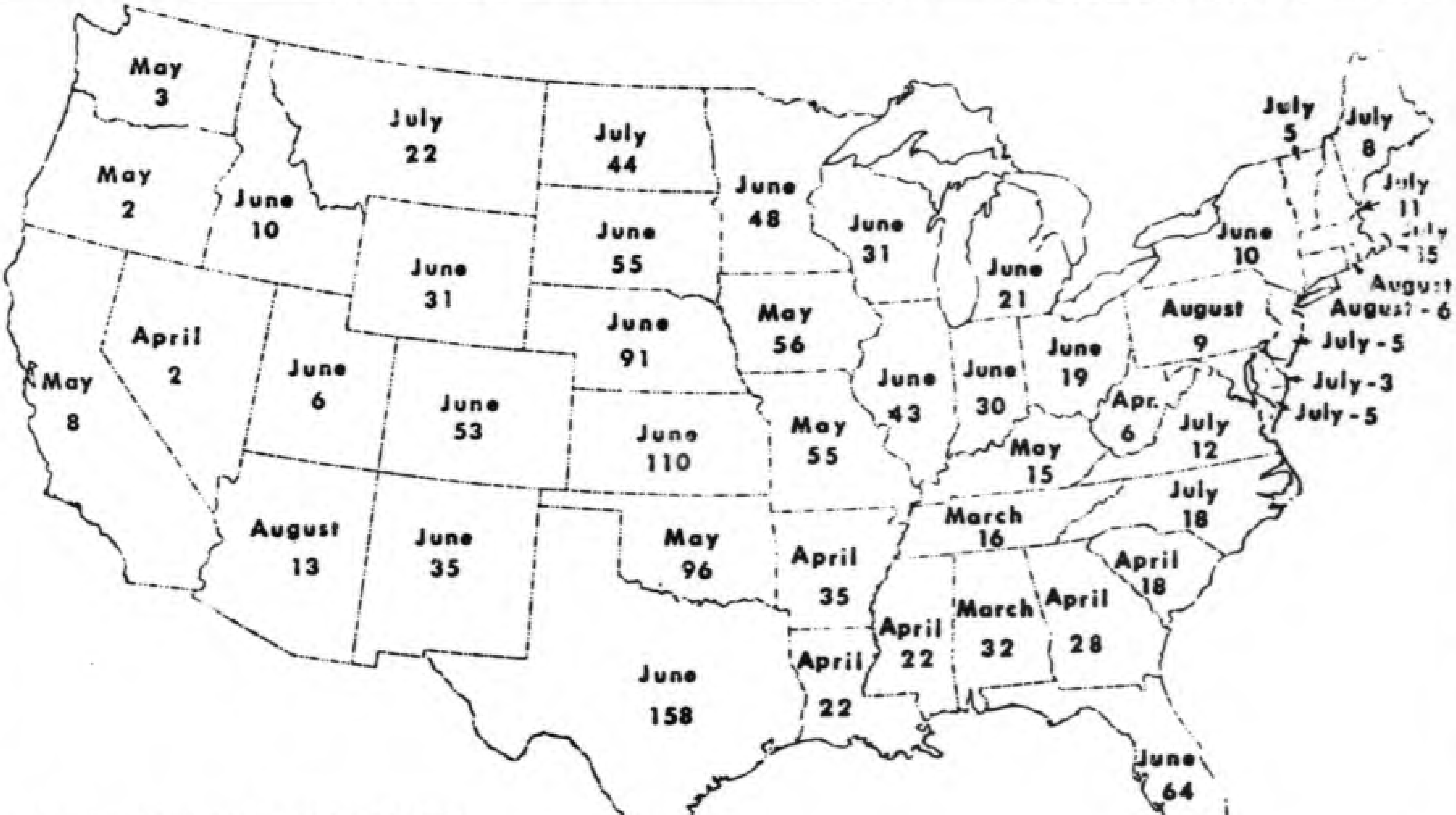


Prevailing tracks of tropical storms in North Atlantic Area in November.



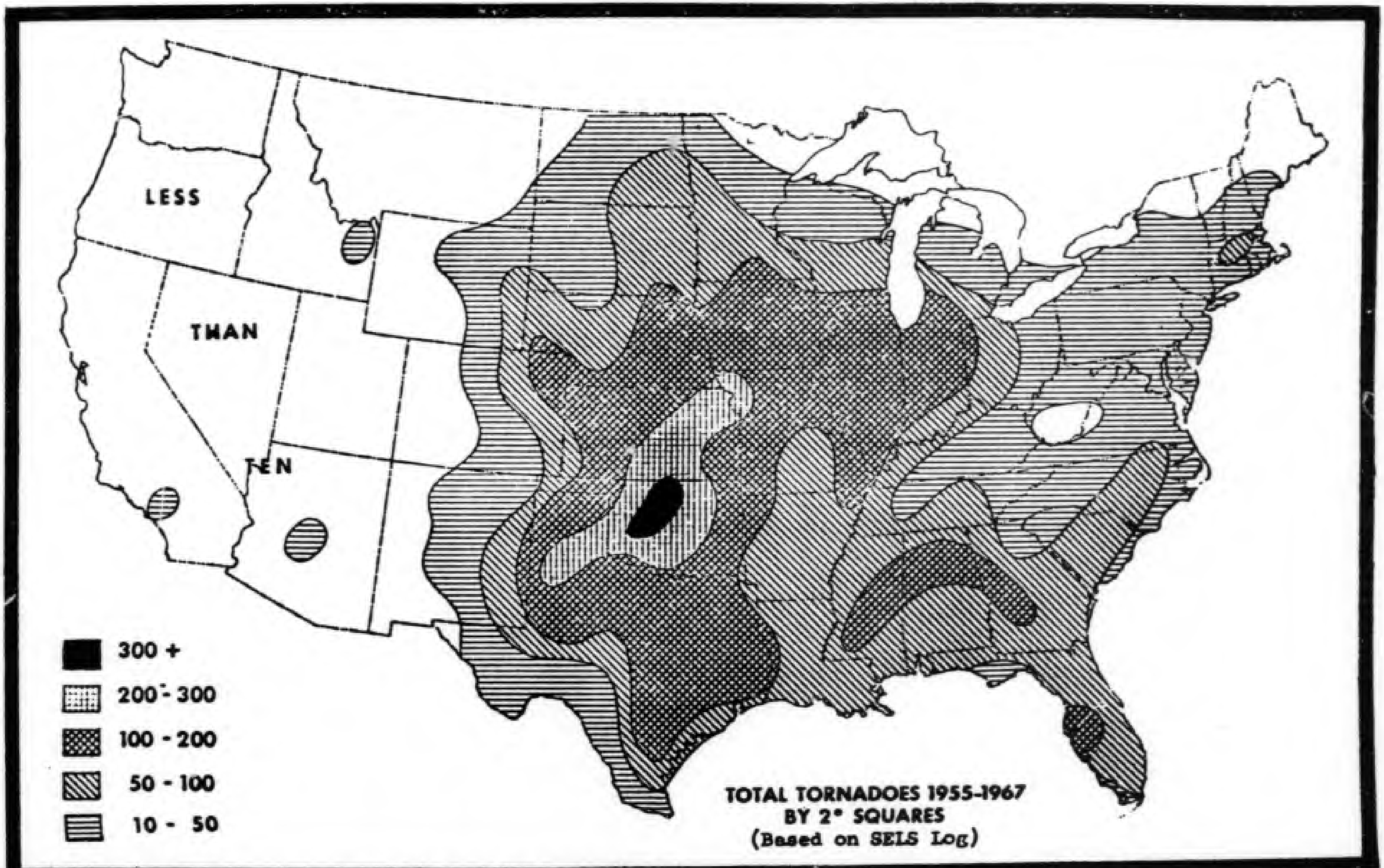
AVERAGE NUMBER OF TORNADOES AND TORNADO DAYS PER YEAR, 1955-1967
(Based on SELS Log)

(from ESSA Technical Memorandum WBTM FCST 12, Sep 1969)



MAXIMUM NUMBER OF TORNADO DAYS
BY MONTH DURING 1955-1967 PERIOD
(Based on SEIS Log)

(from ESSA Technical Memorandum WBTM FCST 12, Sep 69)



TOTAL TORNADOES 1955-1967
BY 2° SQUARES
(Based on SELS Log)

(from ESSA Technical Memorandum WBTM FCST 12, Sep 1969)

Section IV

LOCAL FORECAST STUDIES, METHODS AND AIDS

INTRODUCTION

Moody AFB is an undergraduate pilot training (UPT) base, providing basic instruction in T-41, T-37 and T-38 aircraft to USAF pilot candidates.

Because the students are not yet fully qualified pilots, special student minimum, student VFR, and student flying status weather conditions have been established at Moody AFB. These special conditions, taken together with regulation field minimum and standard VFR limits, constitute the operational weather requirements of the base. A complete listing of these requirements includes the following:

1. T-37 Student Flying.

a. For traffic pattern management purposes, a ceiling of 1500 ft and visibility of 3 miles.

b. Student VFR requires:

(1) Daytime - Ceilings not less than 2000 ft, and ground visibilities not less than 3 miles or air-to-air visibilities not less than 5 miles.

(2) Nighttime - Ceilings not less than 3000 ft and visibilities of any kind not less than 5 miles.

c. Minimum conditions:

(1) A restricted pilot must have ceilings of 500 feet or better and visibilities of 1 mile or better at the terminal.

(2) An unrestricted pilot must have ceilings of 400 feet or better and visibilities of 1 mile or better at the terminal.

d. Crosswind components of 10 knots and 18 knots at the terminal alter the flying status.

2. T-38 Student Flying.

a. Student VFR requires:

(1) Daytime - Ceilings not less than 2500 ft and ground visibilities not less than 3 miles, or air-to-air visibilities not less than 5 miles.

(2) Nighttime - Ceilings not less than 2500 feet and visibilities of any kind not less than 5 miles.

b. Minimum conditions:

(1) A restricted pilot must have ceilings of 300 feet or better and visibilities of 1 mile or better on takeoff.

(2) An unrestricted pilot must have ceilings of 200 feet or better and visibilities of ½ mile or better.

c. Landing conditions:

(1) Ordinarily, landing requires ceilings of at least 300 ft and visibilities of at least 1 mile.

(2) For GCA or ILS landings, ceilings of 200 feet or better and visibilities of ½ mile or better are required.

d. Icing conditions of any type are critical to T-38 flying.

e. Crosswind components of 15 knots and 25 knots at the terminal alter the flying status.

3. Non-Student Flying.

a. VFR requires ceilings of 1000 feet or better and visibilities of 3 miles or better.

b. Alternates are required if the field has ceilings below 3000 ft or visibilities less than 3 miles.

c. Field minimums at Moody AFB are 200 foot ceiling and ½ mile visibility.

4. Summary of Operationally Critical Values of Ceiling and Visibility.

Ceiling (ft)	Visibility (mi)
200	½
500	1
1000	2
3000	3

5. Summary of Operationally Critical Runway Crosswind Components.

10 kts 15 kts 18 kts 25 kts

OBJECTIVE FORECASTING METHODS AND AIDS

Detachment 23 once had an approved objective forecast study entitled, "Moody Ceiling and Visibility Study" dated October 1960.

Intended to apply only for the period November through March, this study was constructed from a meager ten months of data and was originally tested on dependent data. Due to these initial limitations and the excessive number of graphs, charts and diagrams required, rapid application of the method is impossible. This particular study has found little favor among duty forecasters at Moody, has been retired, and is now filed with Research Materials for Retention. All attempts at developing a workable fog and/or stratus study for Moody AFB have been unsuccessful. All previous attempts of associating the standard fog/stratus phenomena (temperature-dew point spread, surface wind velocity, gradient wind speed and direction, cloud cover, previous days precipitation, etc.) have resulted in disappointingly weak correlations. At present, there is no formalized objective forecast study in progress.

It is felt that a more realistic approach to the problems of forecasting stratus, fog, and thunderstorm development at Moody is the use of rules of thumb and synoptic reminders which can be subjectively integrated into the forecast. A test program has been established for the past year and results are very promising. Hopefully, a combination of two or more of these workable rules of thumb will give an insight as to which parameters cause the particular phenomena.

FORECASTING GUIDES

1. RULES OF THUMB

a. All Seasons. Stratus. Under airmass conditions and gradient winds of 080 to 160 degrees and 15 knots or greater, expect broken stratocumulus over Moody from about noon until 1600 local time. Bases of clouds will be 2000 to 4000 feet.

b. All seasons, more prevalent in winter and late fall and early spring. Stratus and Fog. With a small temperature-dewpoint spread near daybreak, and a gradient wind from northeast clockwise through southwest, watch for low stratus to move into the area around 0800 local time, especially if the stations upstream have reported stratus.

2. GENERAL SYNOPTIC REMINDERS

a. All Seasons. Fronts. The passage of a cold low over south Georgia is very likely to be accompanied by several hours (6 to 12) of heavy showers or thunderstorms. It is not uncommon during the spring or early summer, and sometimes these lows can be traced all the way from off the California coast. These lows may not always show up on the surface analysis.

b. All Seasons. Fronts. When the 700 or 500 mb flow is parallel to a surface front watch for the possibility of wave development on the front.

c. All Seasons. Fronts. An approaching front will decelerate in this area if there is a ridge at 500 mb just to the east of Moody (between 75 and 60 degrees West). Conversely, a front will tend to accelerate if there is a trough in that area.

d. All Seasons. Fog. When visibility begins to improve in morning fog, it will improve rapidly.

e. All Seasons. Fog and Stratus. Fog and stratus conditions rarely occur with gradient winds from the west clockwise to the northeast.

f. All Seasons. Fog and Stratus. Fog and stratus caused by frontal activity in the area, particularly with overrunning type precipitation occurring, can vary considerably during the day and minimum conditions can occur even in the early afternoon hours.

g. Summer. Thunderstorms. Showers or thunderstorms will generally move with the 10,000 foot winds.

h. Summer. Thunderstorms. If there is no marked change in stability index over the past 24 hours, persistence is a reliable tool for forecasting thunderstorms.

i. Summer. Thunderstorms. Almost all convective thunderstorms occur between the hours of 1600 and 2100 E.

j. Vorticity Considerations.

(1) Vorticity maxima are associated with troughs, lows or cyclonic wind shear.

(2) Vorticity minima are associated with ridges, highs and anti-cyclonic wind shear.

(3) Minor waves in the upper air are often not shown by the contour curvature but will show up in many cases as a vorticity maximum.

(4) When vorticity lines are in phase with contours, little change will occur over the next forecast period, 24-36 hours.

(5) When vorticity lines are out of phase with contours, significant changes will occur over the next 24-36 hours.

(6) When there is a good cross isopleth pattern of contour and vorticity lines, the vorticity field can be advected with 70-80% of the 500 mb flow.

(7) Height falls and surface pressure falls are associated with positive vorticity advection.

(Note: Positive vorticity advection occurs where vorticity values decrease downstream. Negative vorticity advection occurs where vorticity values increase downstream. Positive vorticity advection at 500 mb is associated with horizontal divergence of wind velocities at this level. This implies associated horizontal convergence of wind velocities in the lower levels. With this regime upward vertical motion would prevail in the lower and midtroposphere. The converse is true for negative vorticity advection.)

(8) Systems move rapidly when vorticity lines and contours are out of phase, and slowly or not at all when in phase.

(9) When the maximum vorticity value associated with a 500 mb trough assumes a value of 15 (times 10 to the -5th per second) or greater and moves with a southward component, the associated trough will deepen and close off in most cases. Surface cyclogenesis may be forecast in conjunction with situations of this type.

(10) If an area of upper level divergence (positive vorticity advection) overtakes a slow moving or stationary front, a wave will generate on the front.

(11) If an area of upper level divergence moves faster and away from a front, the front will dissipate.

(12) Warm air advection in lower layers increases the effect of upper level divergence.

(13) Cold air advection in lower layers decreases the effect of upper level divergence.

(14) Overcast skies and precipitation are associated with areas of Positive Vorticity Advection (PVA), clear skies with Negative Vorticity Advection (NVA).

k. All Seasons. Fog and Stratus. A north to south pressure gradient is one of the primary ingredients for fog or stratus formation.

l. All Seasons. Fog and Stratus. Winds becoming southeasterly from the surface to 5000 feet, with a frontal surface overhead, will indicate the onset of poor weather conditions.

3. THEORIES TO BE TESTED:

a. All Seasons. Fog. If the 1600E previous day dew point is less than 30° F, visibilities next morning will be 5 miles or greater.

b. All Seasons. Fog. When the 0400E dew point is less than 40° F, visibilities will be 3 miles or greater.

c. All Seasons. Fog and Stratus. If the 850 mb dewpoint is 10° C or less, there will be little or no early morning stratus. Forecast moisture to increase at this level if convergence is taking place.

d. Late Spring, Summer, Early Fall. Thunderstorms. If cumulus forms by 1000E, there will be showers or thunderstorms in the vicinity of the station by 1630E.

e. Spring, Summer and Fall. Showers. In the absence of clouds in the morning and no invesion above 10,000 feet:

(1) With a dew point equal to or greater than 0° C at 700 mb, and a stability index equal to or less than 0, there is an excellent possibility of airmass showers, and almost a sure thing for activity with an instability line or frontal lifting.

(2) With a dew point temperature greater than plus 2 at 700 mb and a stability index less than -2, it's almost a sure thing that airmass showers will occur, and a certainty if an instability line or frontal system is passing through the area.

(3) With a dew point less than 0° C at 700 mb and a stability index greater than 0, forecast no showers.

(4) Chances for shower activity are greatly diminished if there is warm air advection aloft.