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EASTERN—WESTERN ARCTIC SEA ICE ANALYSIS

1987

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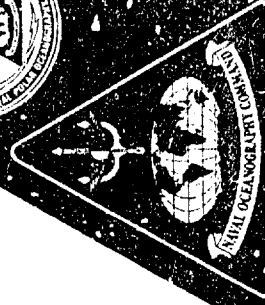
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PREPARED BY
NAVAL POLAR OCEANOGRAPHY CENTER
SUITLAND, MD

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FOREWORD

Since 1976, the U.S. Navy and the National Oceanic and Atmospheric Administration (NOAA) have sponsored the Navy/NOAA Joint Ice Center (JIC) in Suitland, Maryland. The JIC has built upon the long experience of the Navy in observing and recording sea ice information, and NOAA's expertise in satellite data collection and interpretation. By combining resources, the Navy and NOAA have kept pace with the increasing requirements for Arctic and Antarctic information from all sectors of society.

This publication is the fourteenth annual compilation of satellite photographic products, limited aerial reconnaissance and other conventional observations. The JIC would like to thank the Atmospheric Environment Service, Canada, for their support in aerial reconnaissance of the Canadian Archipelago, Beaufort Sea, and the Great Lakes; and the observers of the stations bordering the Baltic Sea for their timely data. Thanks are also extended to those observers who endeavored to send JIC their ice observations from ships, planes, and shore stations. The Great Lakes analyses were aided by National Weather Service data collection and analyses performed at the Ann Arbor, Michigan, Forecast Office; and, beginning in December 1987, the Cleveland, Ohio, Forecast Office. All these data were incorporated into the weekly analyses and significantly improved the quality of the final products.

Table I, inside back cover, summarizes the satellite data available during 1987.

The ice charts contained in this atlas were derived from a manual synthesis of sea ice data received by the JIC.

Analyses were performed by trained Navy and NOAA personnel, but limitations in the data, primarily resolution and wavelength (implying cloud limitations), strongly influenced the analysis methodology and accuracy of the product. The following analysis procedure was used:

- a. Conventional shore station, ship, and aerial reconnaissance data were evaluated and plotted on base charts.
- b. NOAA polar orbiter, NASA Nimbus 7 SMMR, GEOSAT altimeter, DMSP visual, and SSM/I data were gridded and manually interpreted for sea ice conditions.
- c. A final product was produced from a. and b. wherever sufficient data existed; otherwise, meteorological data and ice drift data (derived from forecast meteorological fields) were incorporated to estimate the ice edge.

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Naval Polar Oceanography Center
4301 Suitland Road
Washington, DC 20390-5180

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1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) EASTERN-WESTERN ARCTIC SEA ICE ANALYSIS 1987		5. TYPE OF REPORT & PERIOD COVERED Reference Report 1987
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) NAVAL POLAR OCEANOGRAPHY CENTER, SUITLAND, MD		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Naval Oceanography Command Detachment Federal Building Asheville, NC 28801-2696		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Commanding Officer Fleet Numerical Oceanography Center Monterey, CA 93943-5005		12. REPORT DATE
		13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report)
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approval for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Sea ice; polar ice fields; satellite imagery; concentration; stage of development; fast ice; concentration of thickness; theoretical thickness, Arctic		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) These are approximately 7-days analysis of sea ice prepared by the Naval Polar Oceanography Center, Suitland, MD. Included are ice concentration and ice thickness (age). Area covered:		

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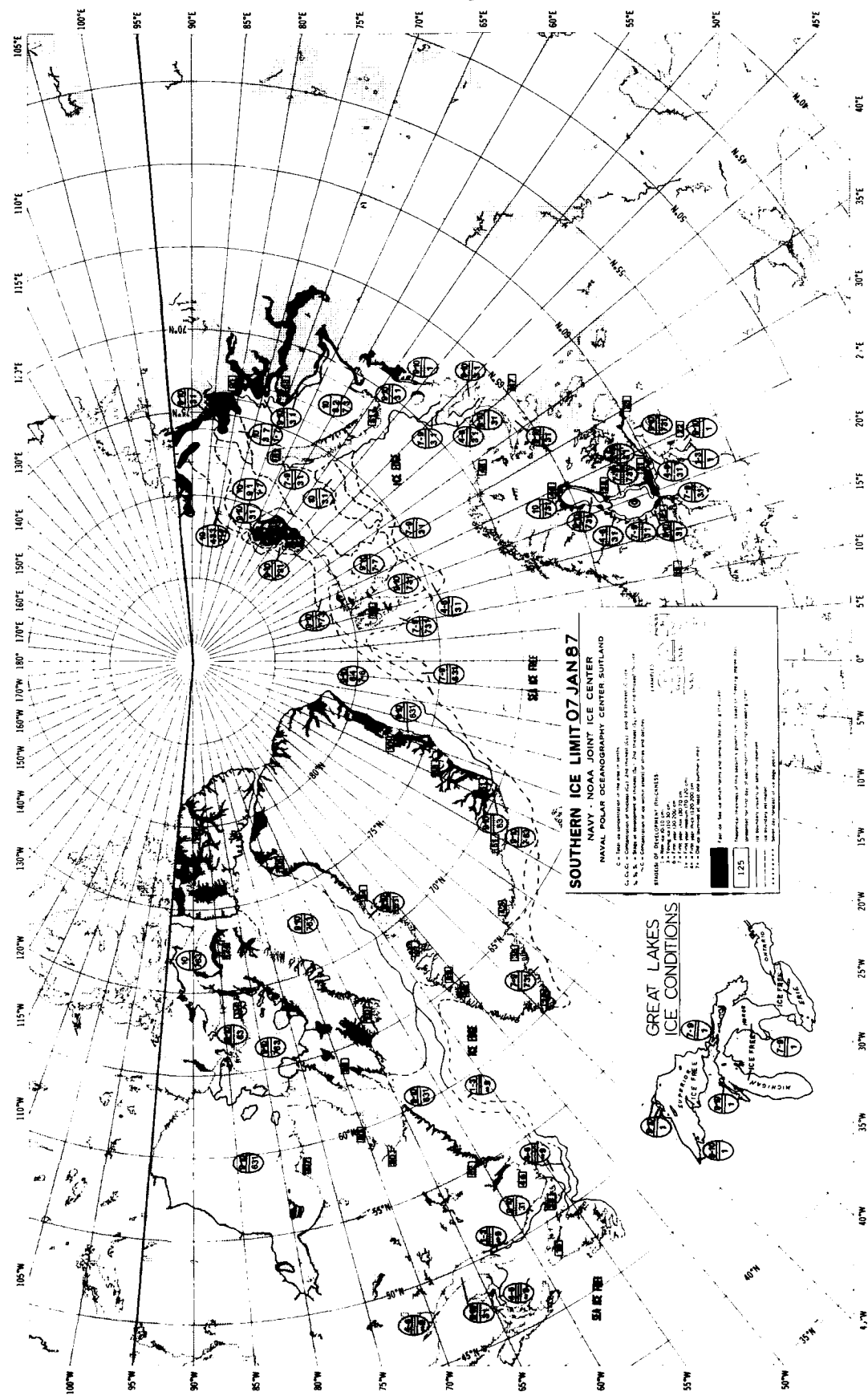
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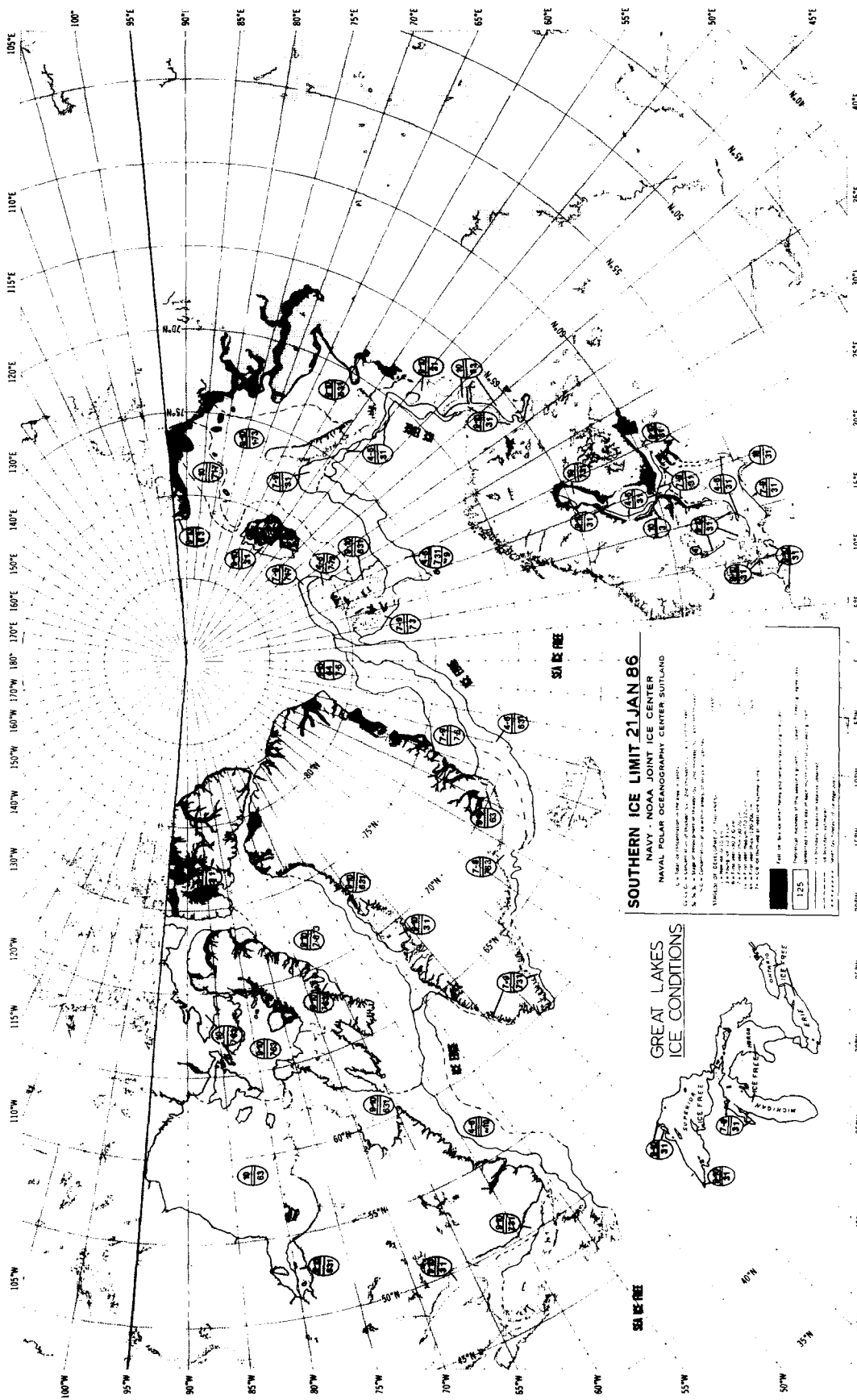
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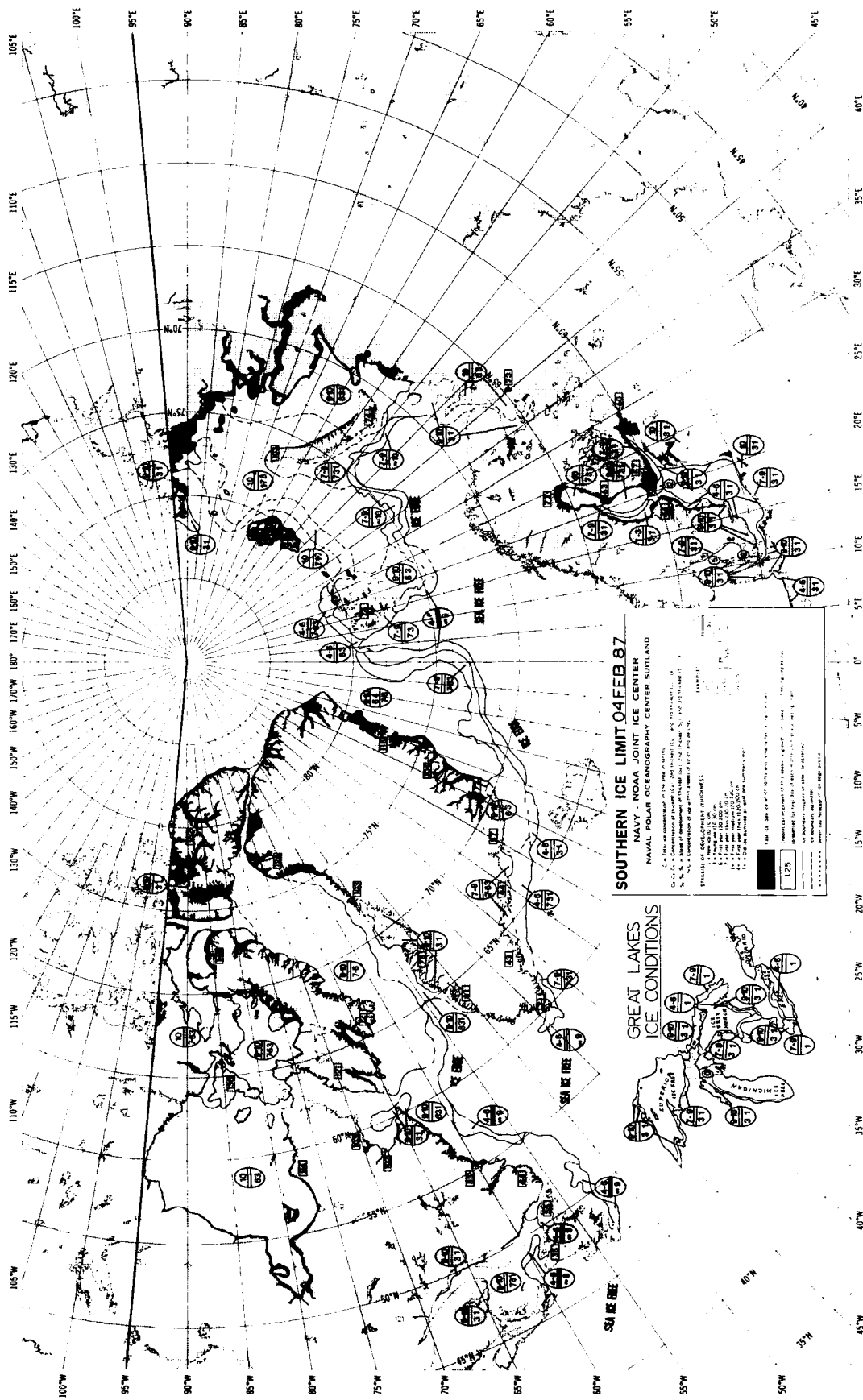
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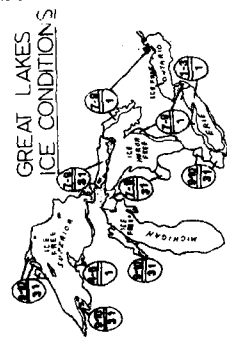
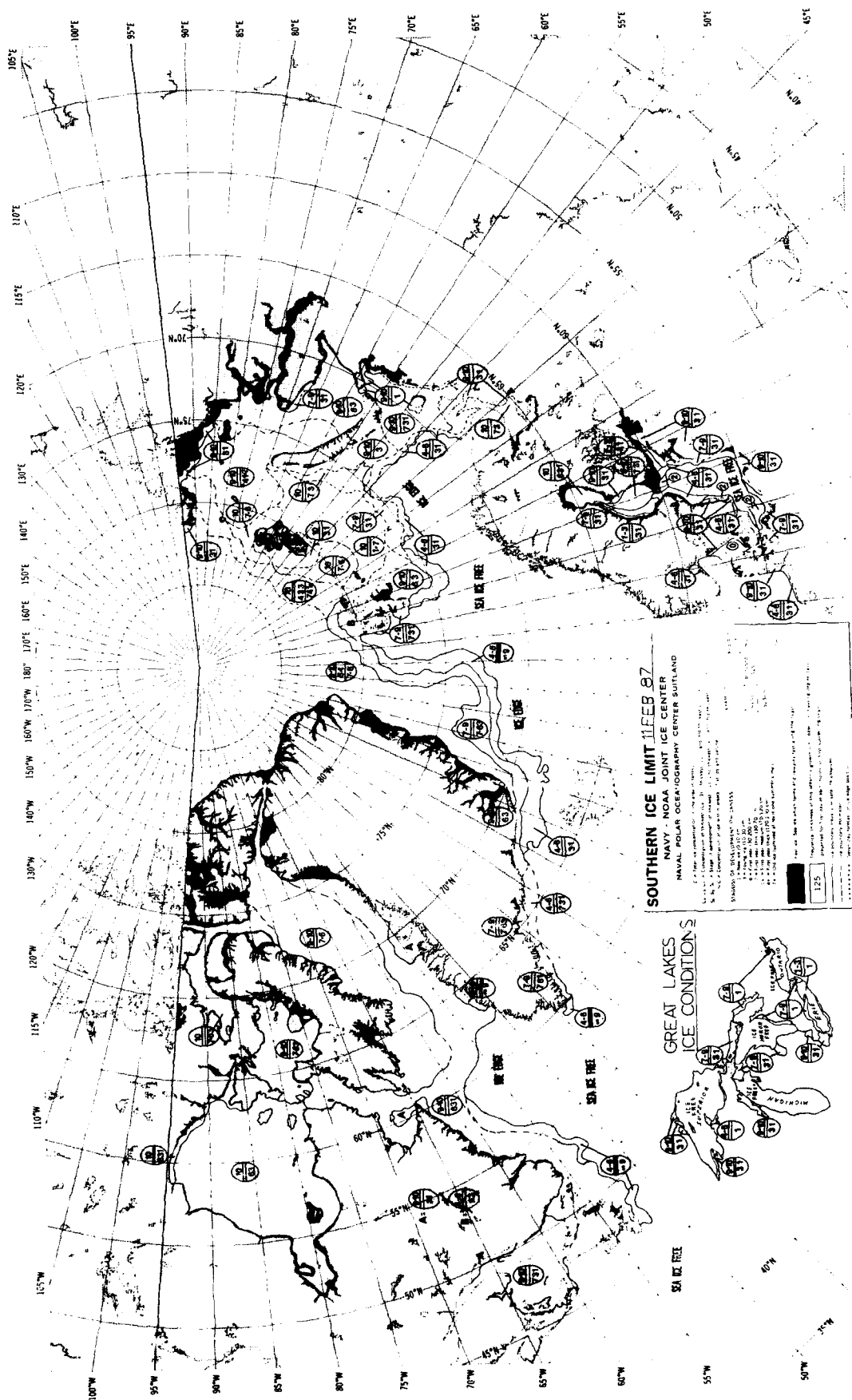
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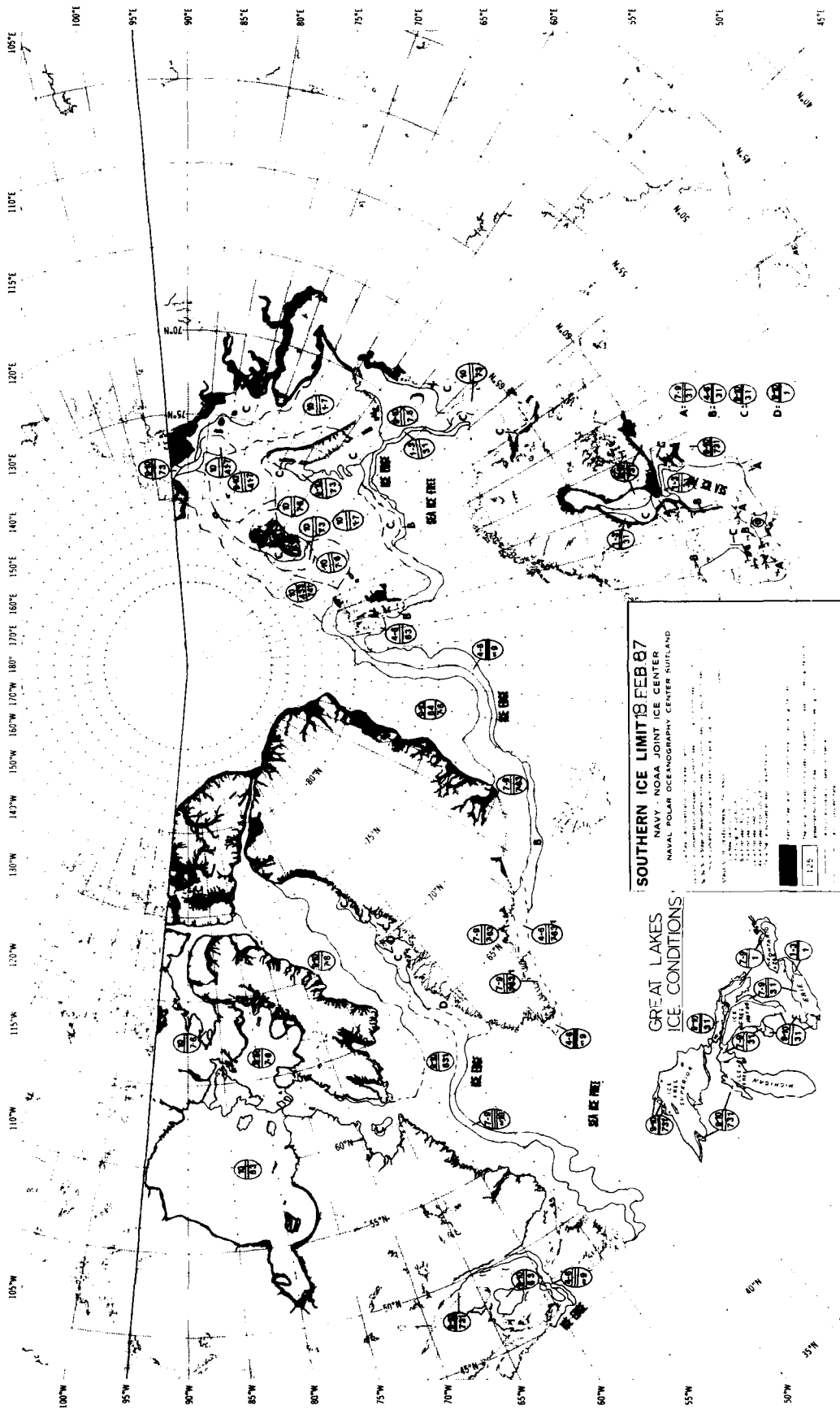
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ICE CONDITIONS**

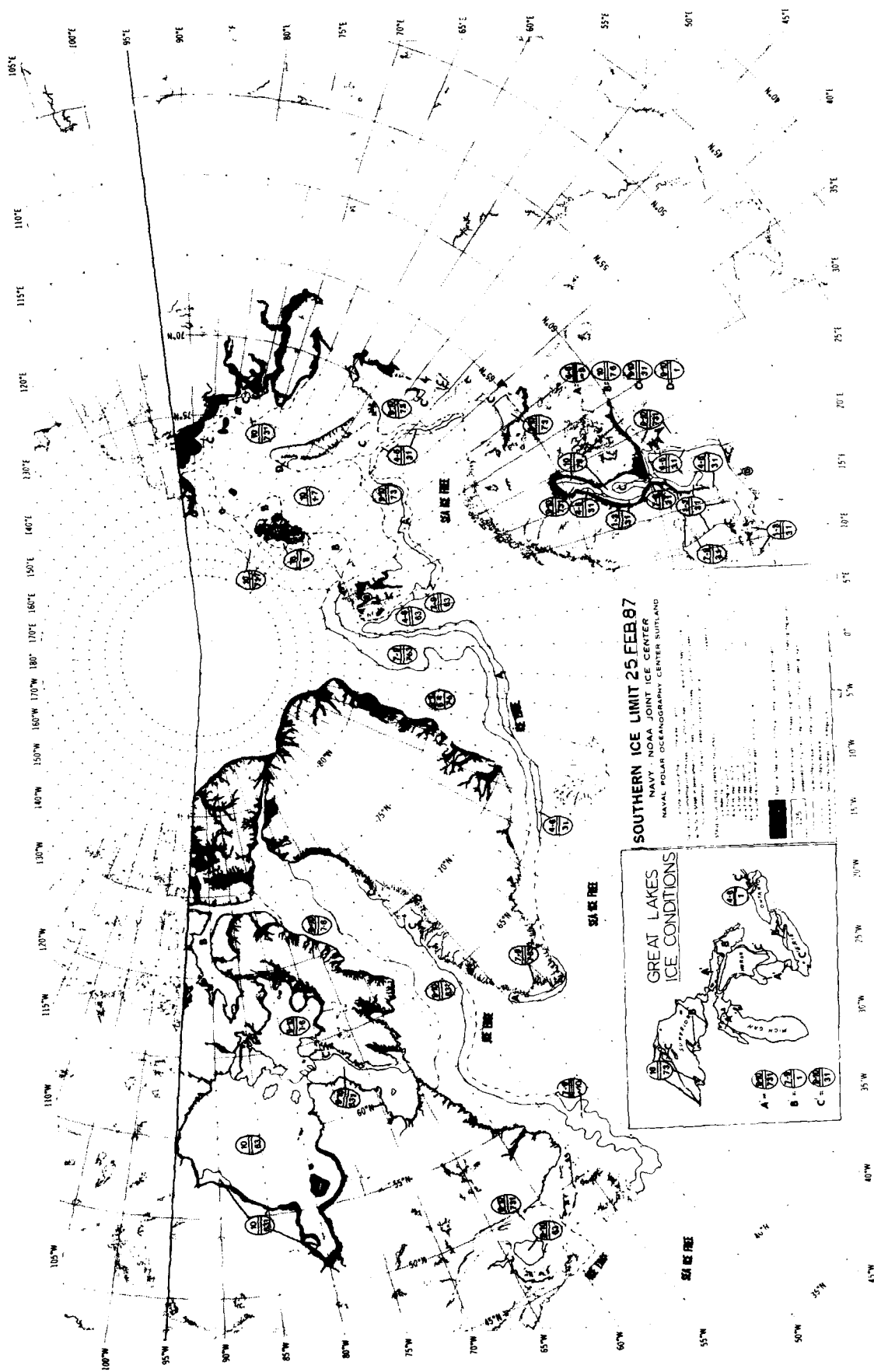


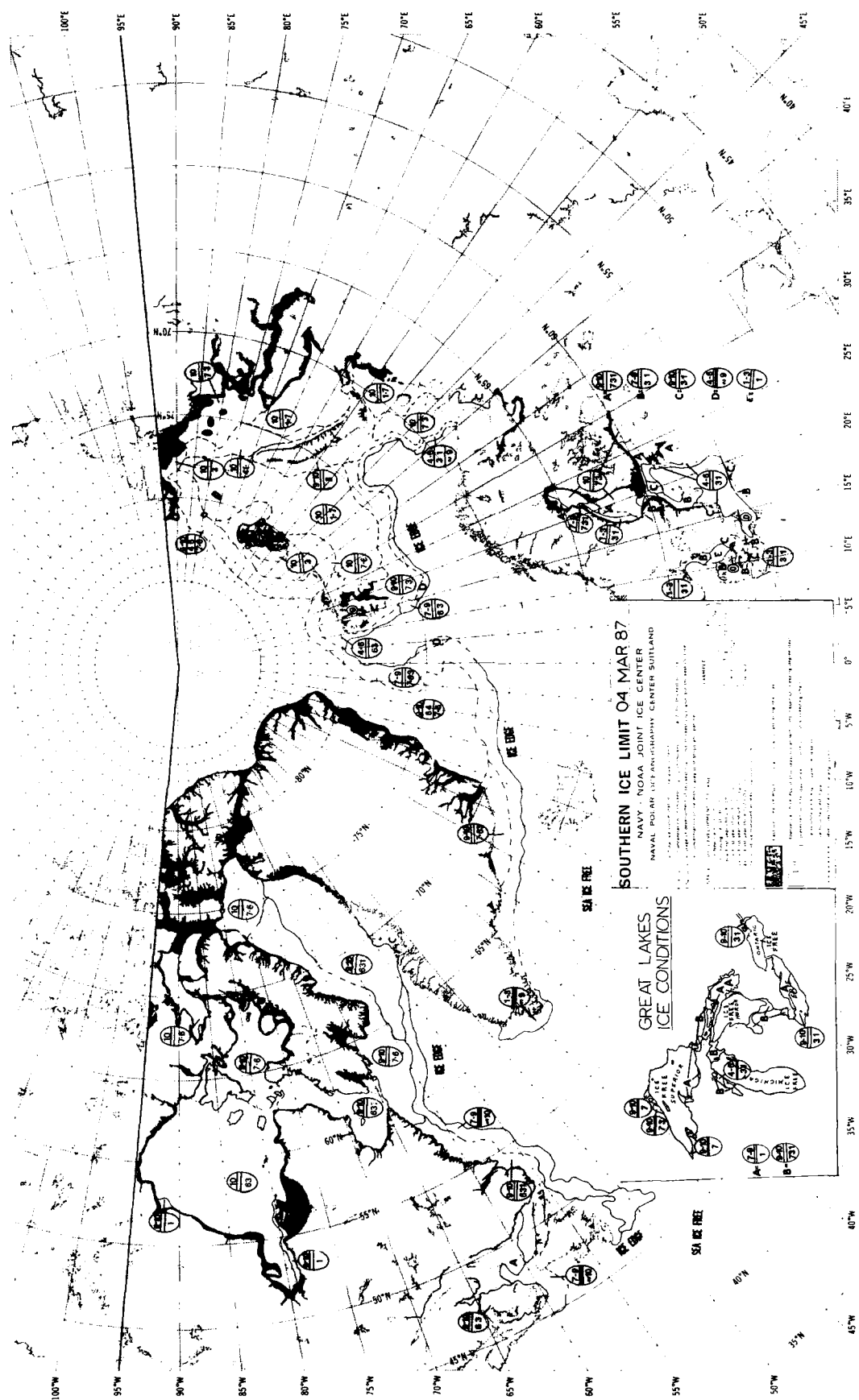








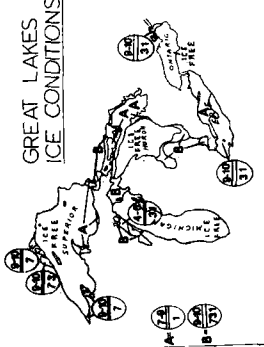


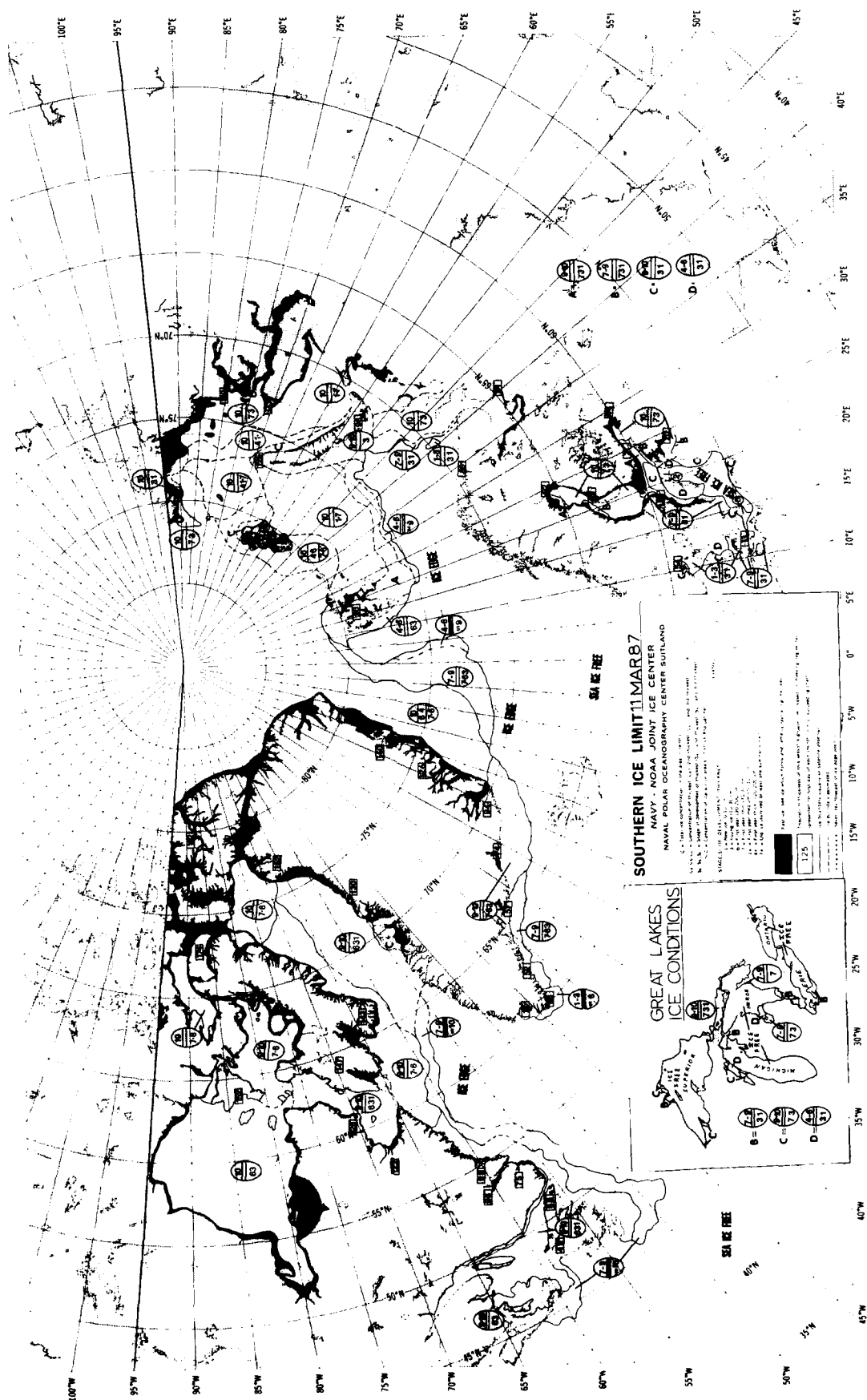


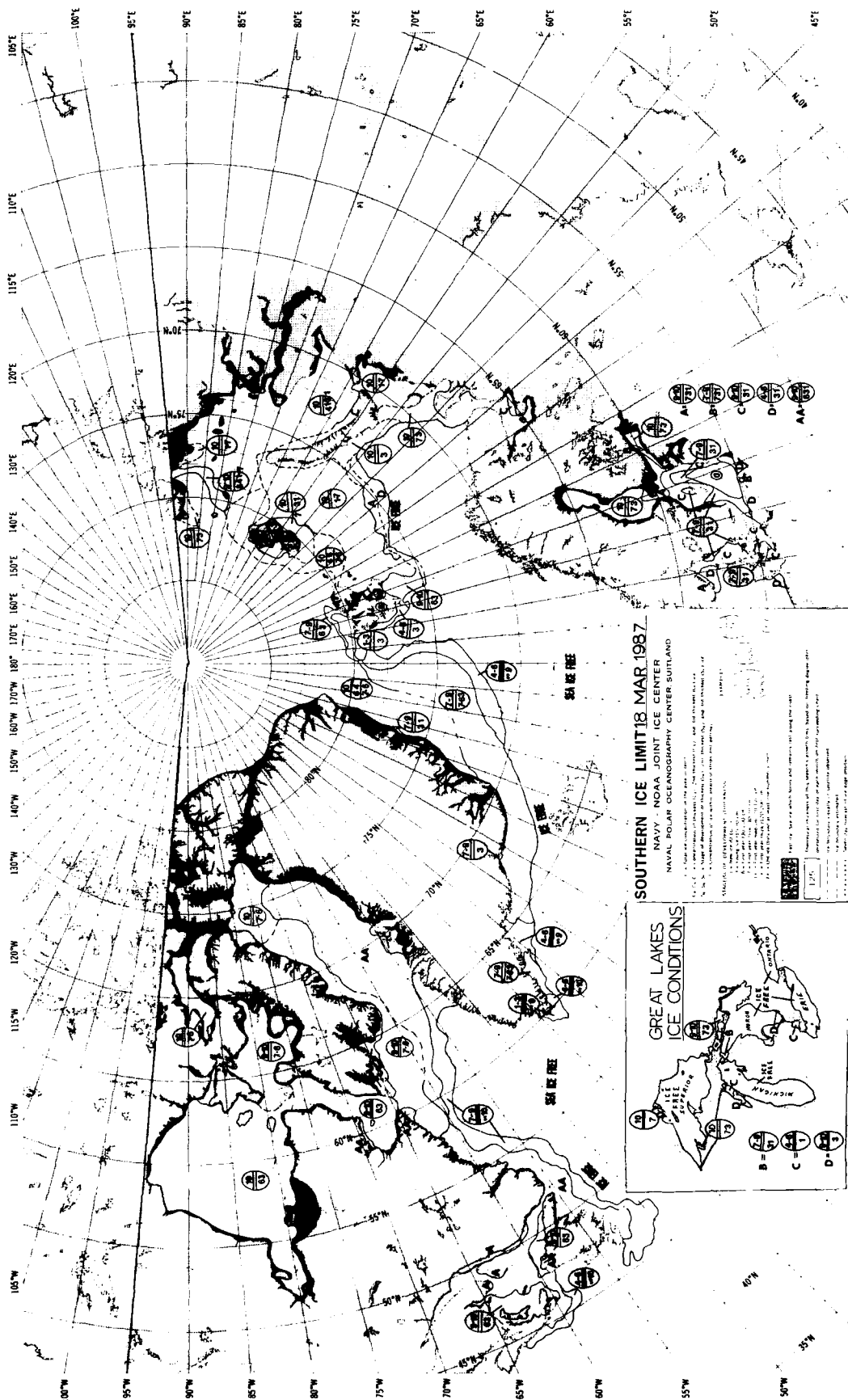
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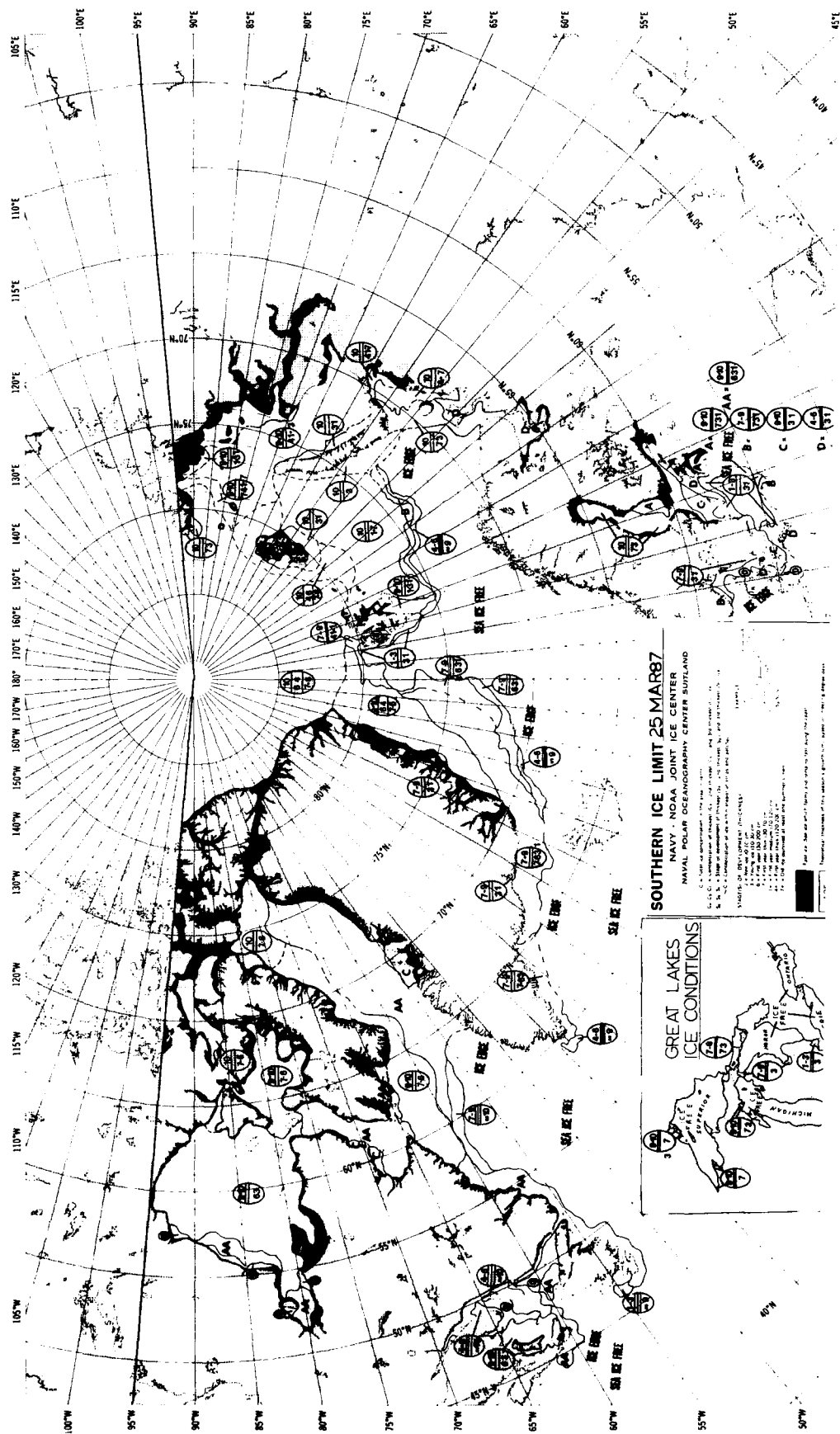
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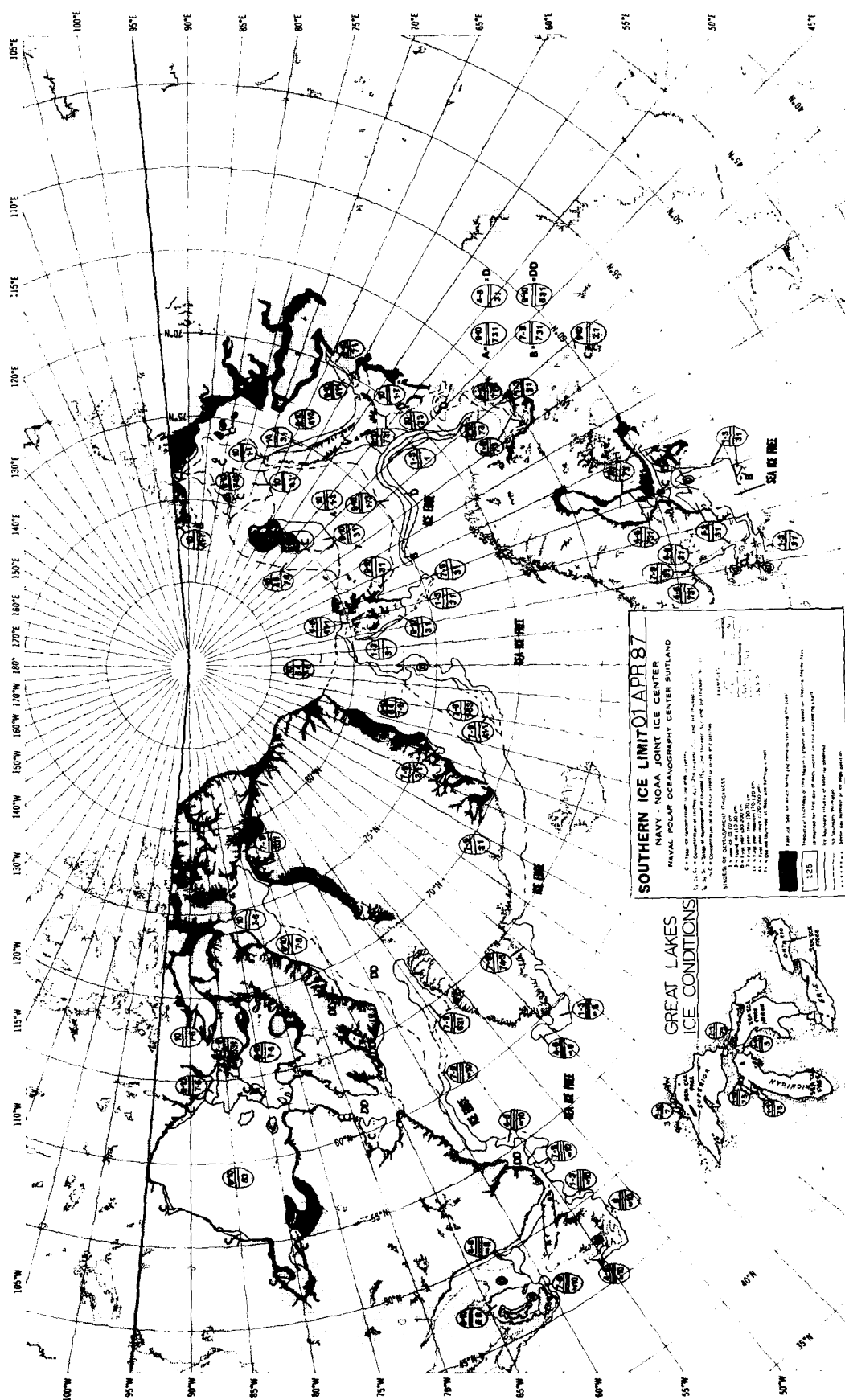
GREAT LAKES
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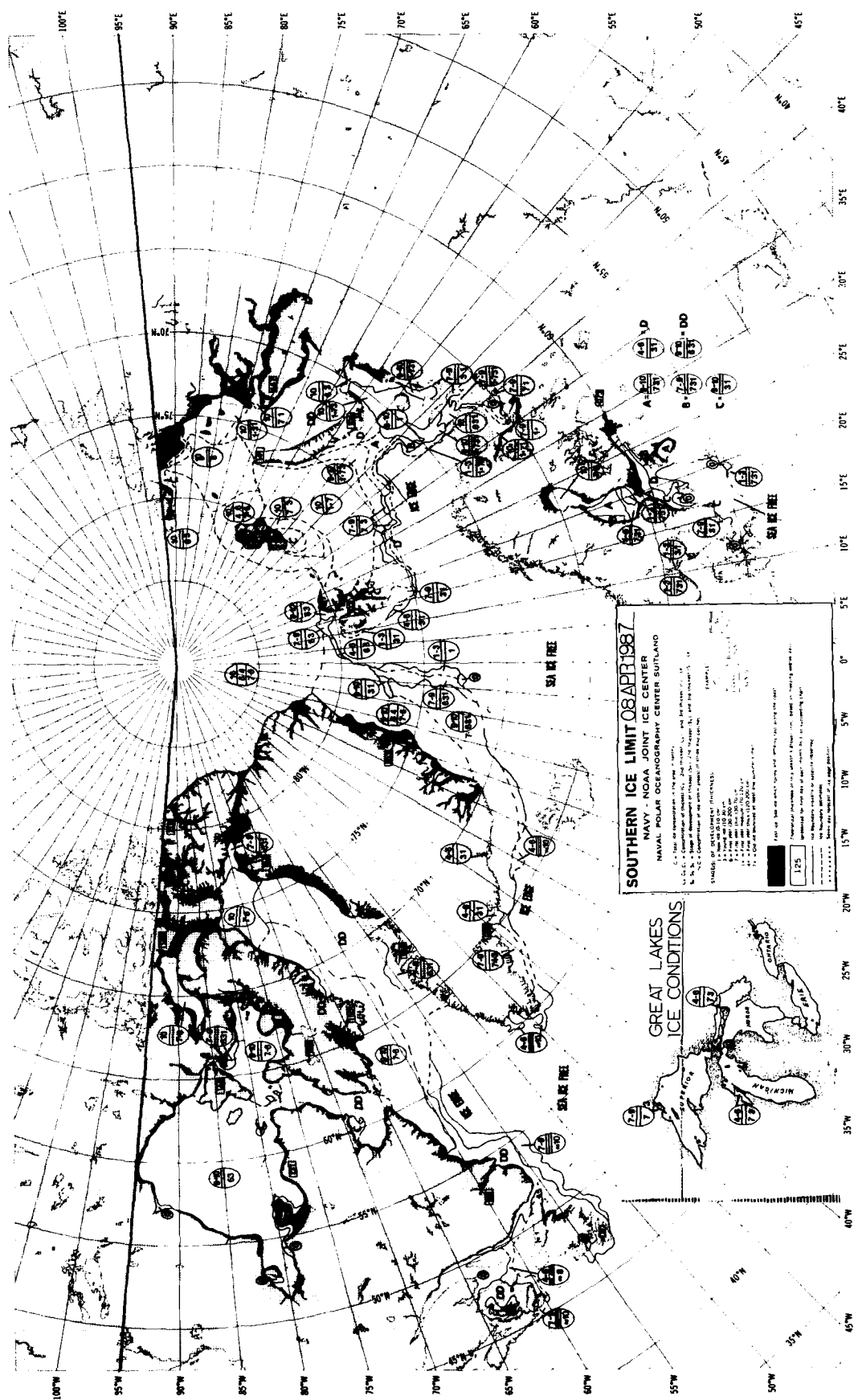


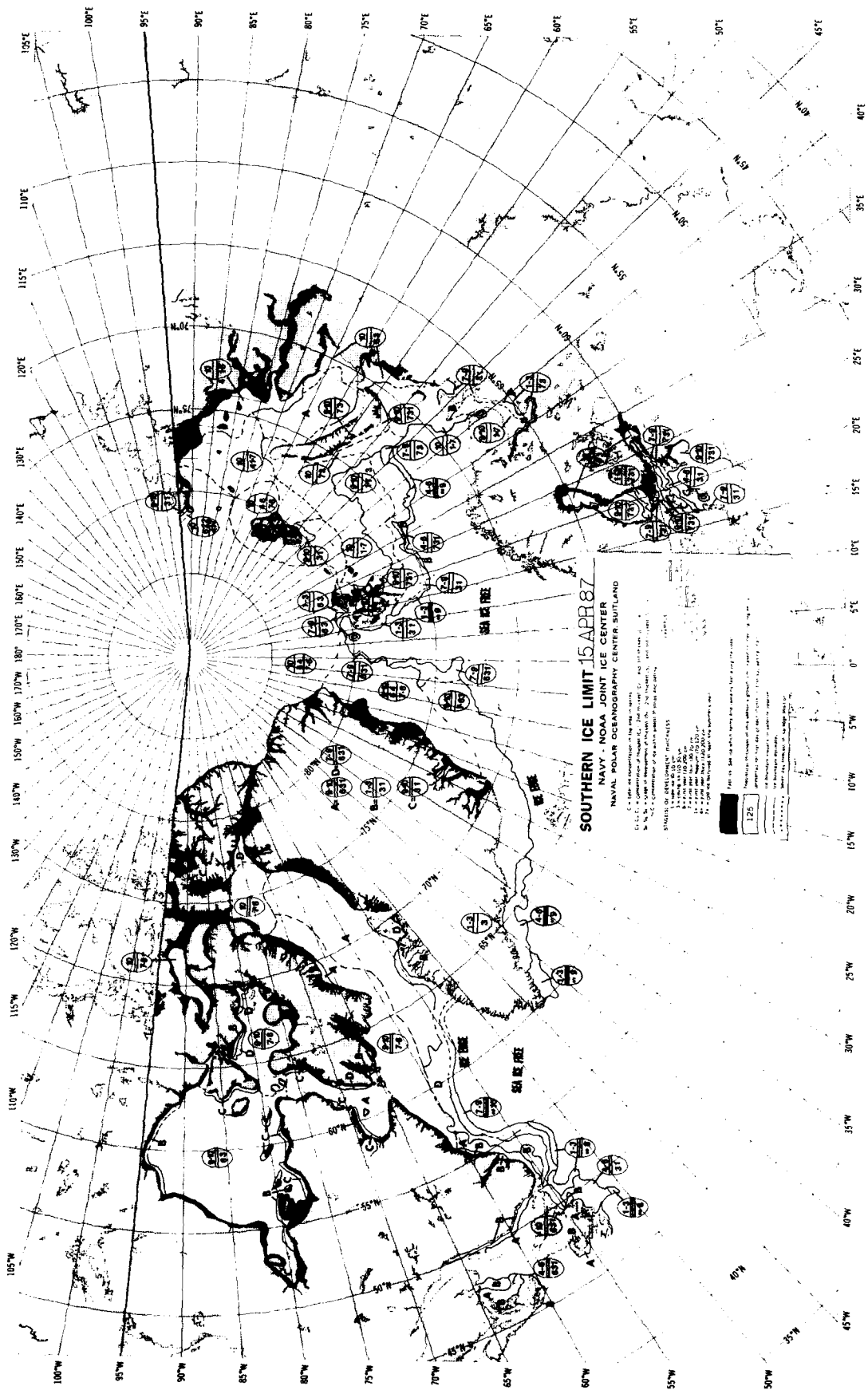


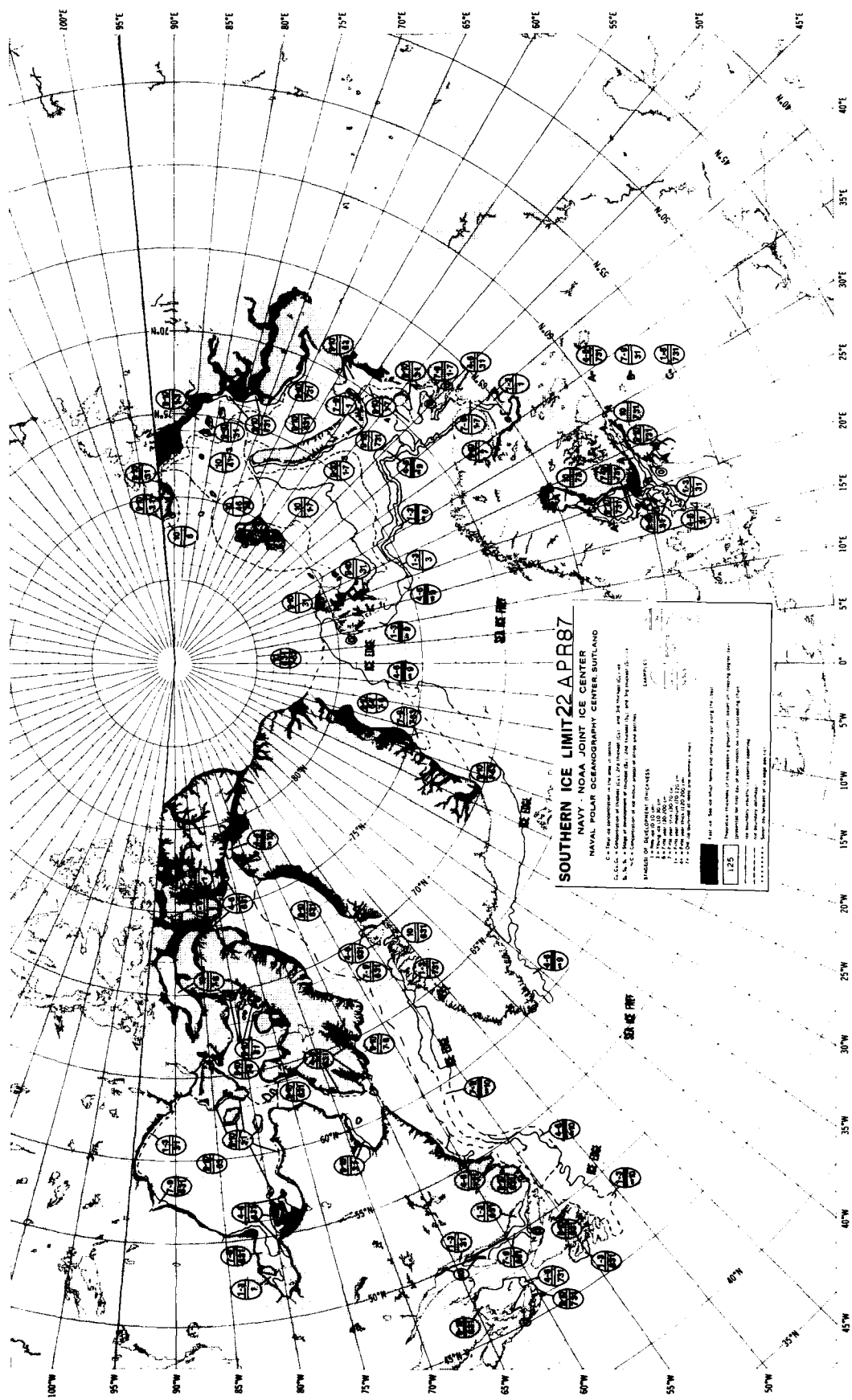


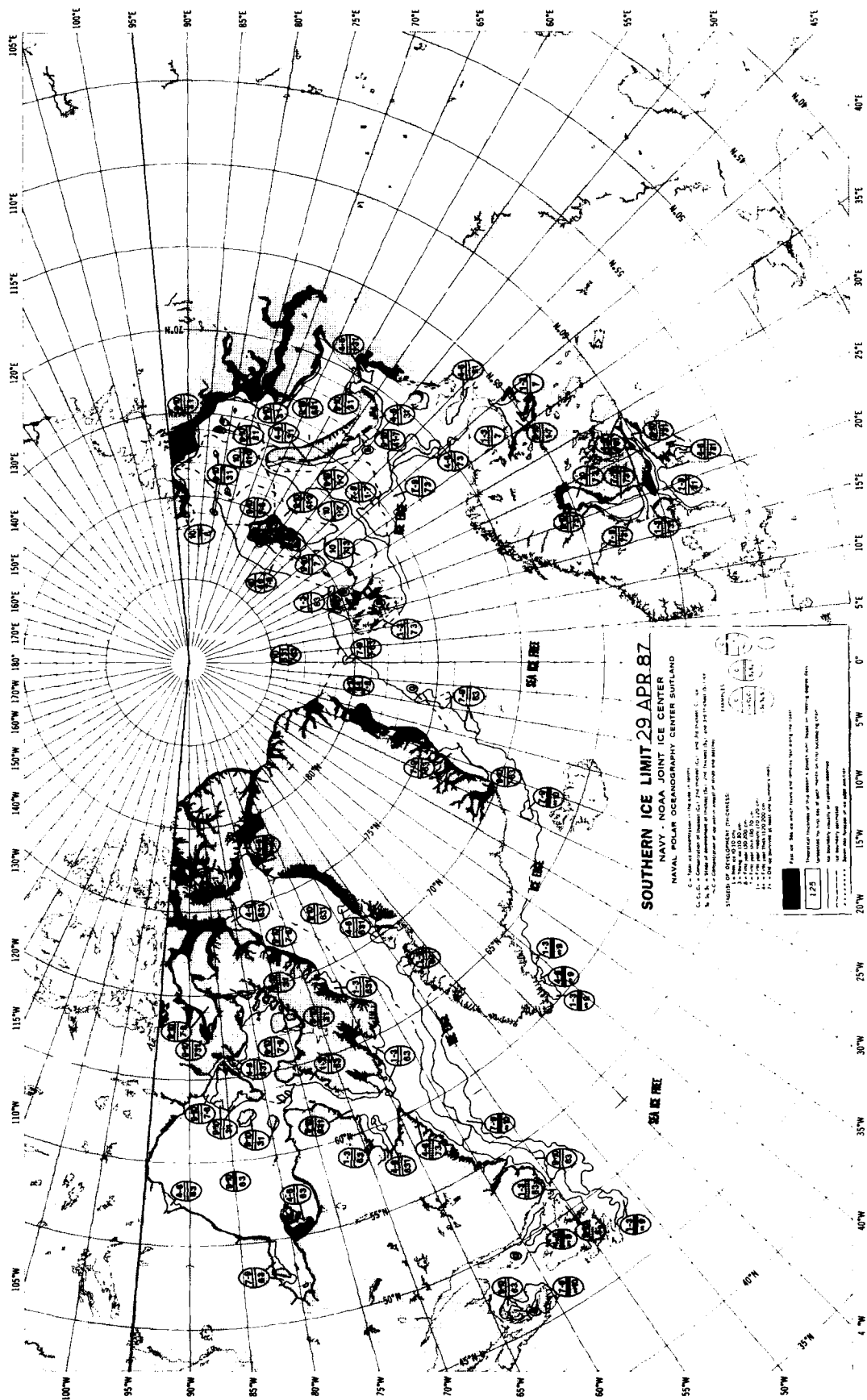


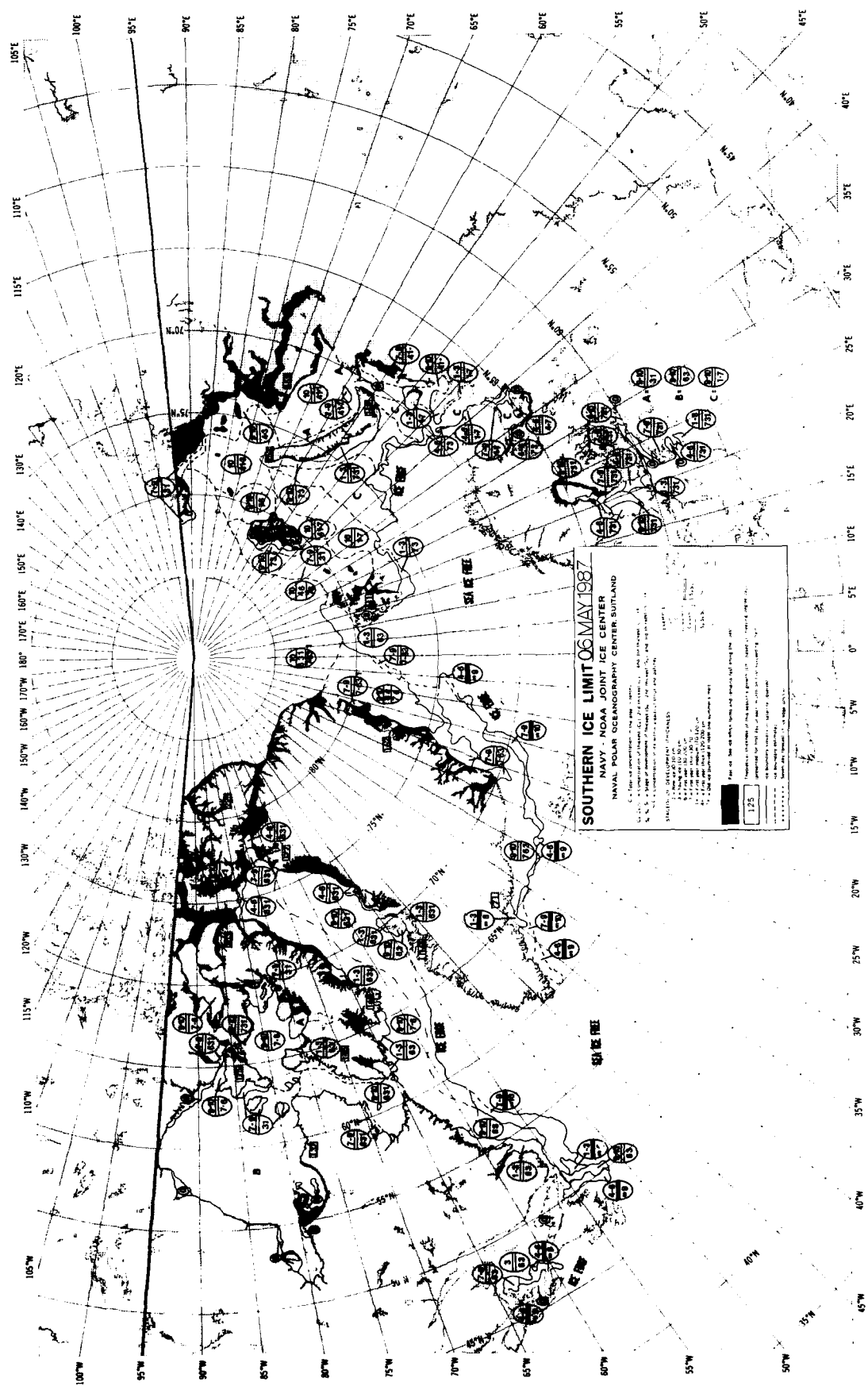


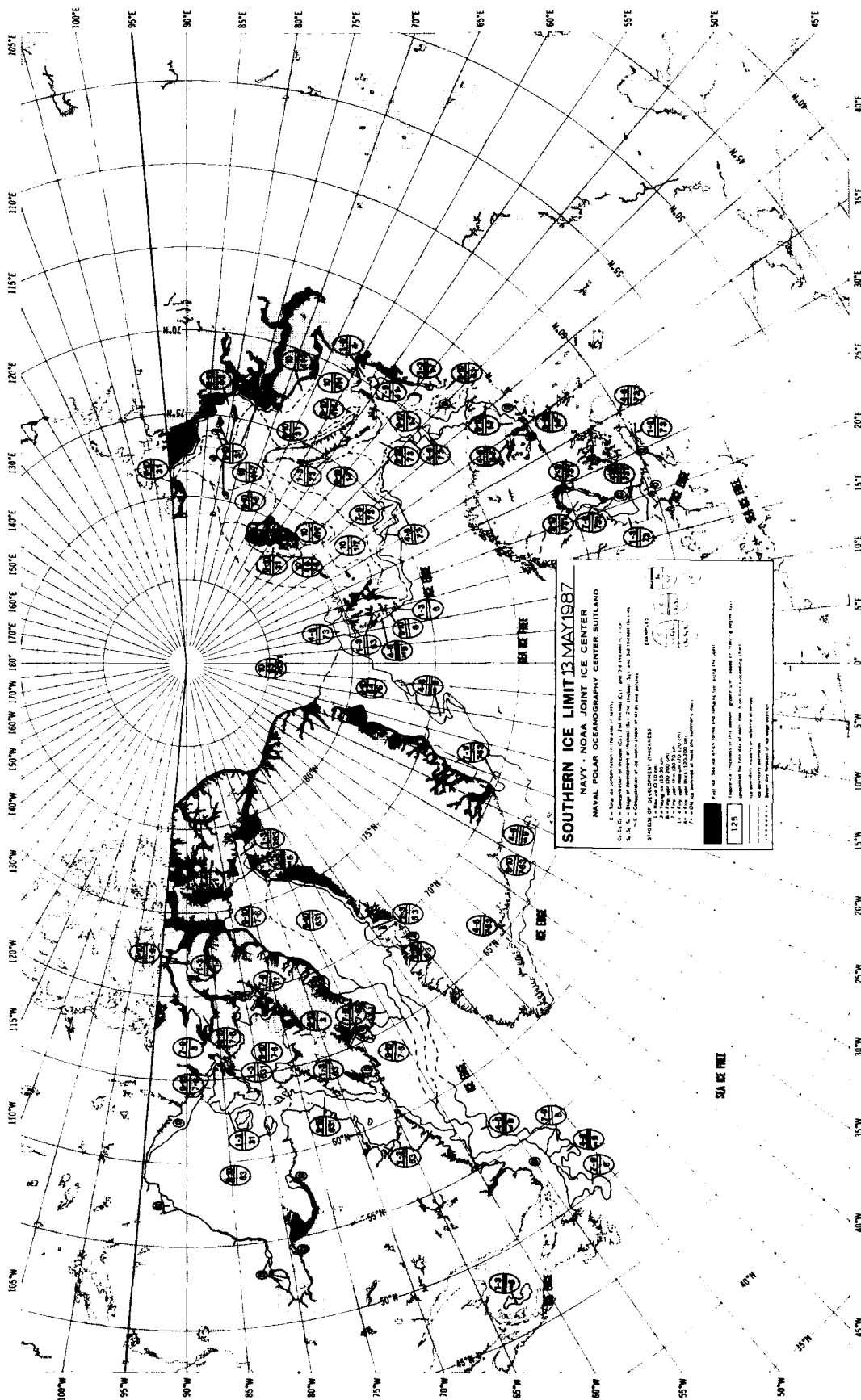








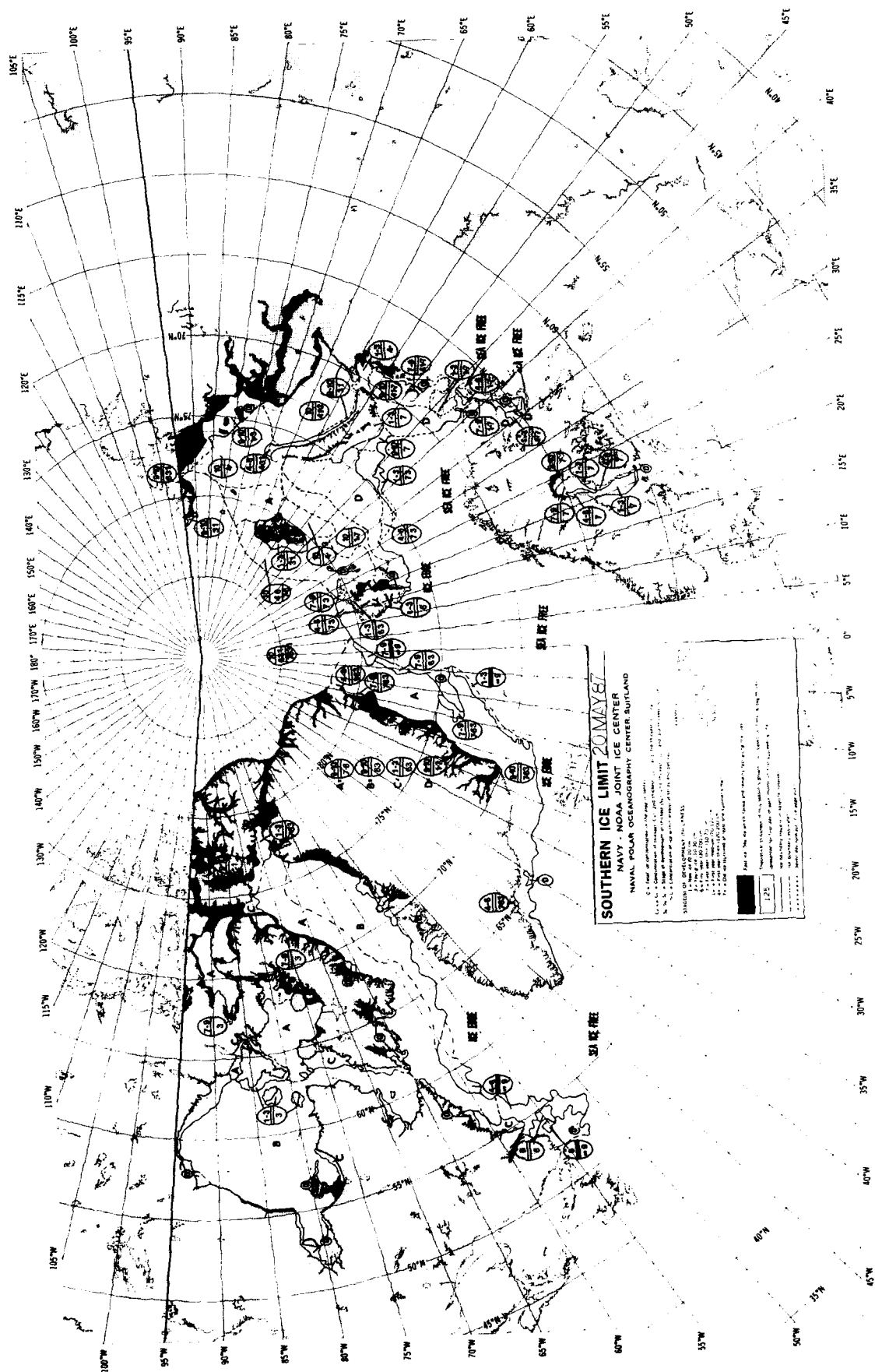


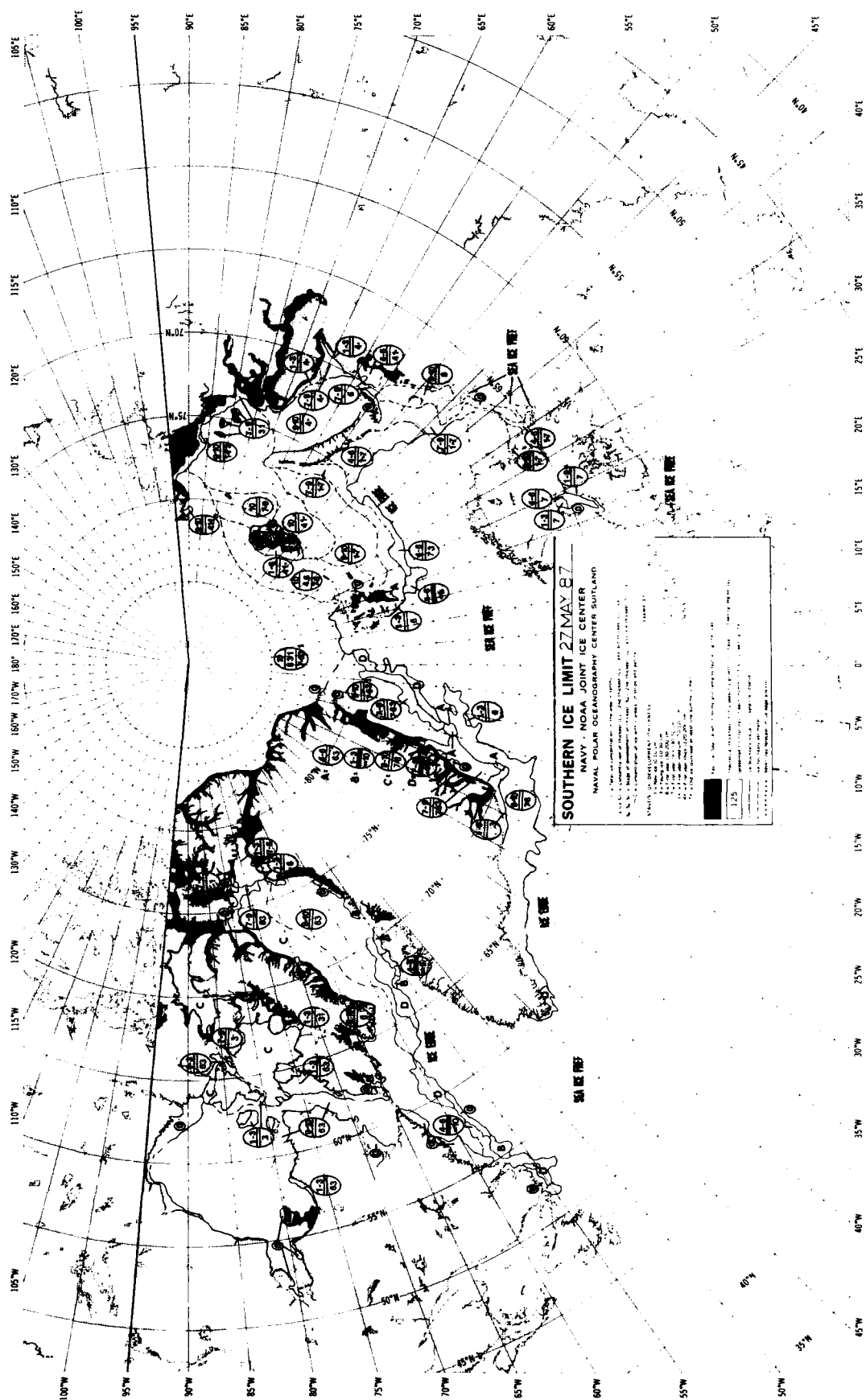


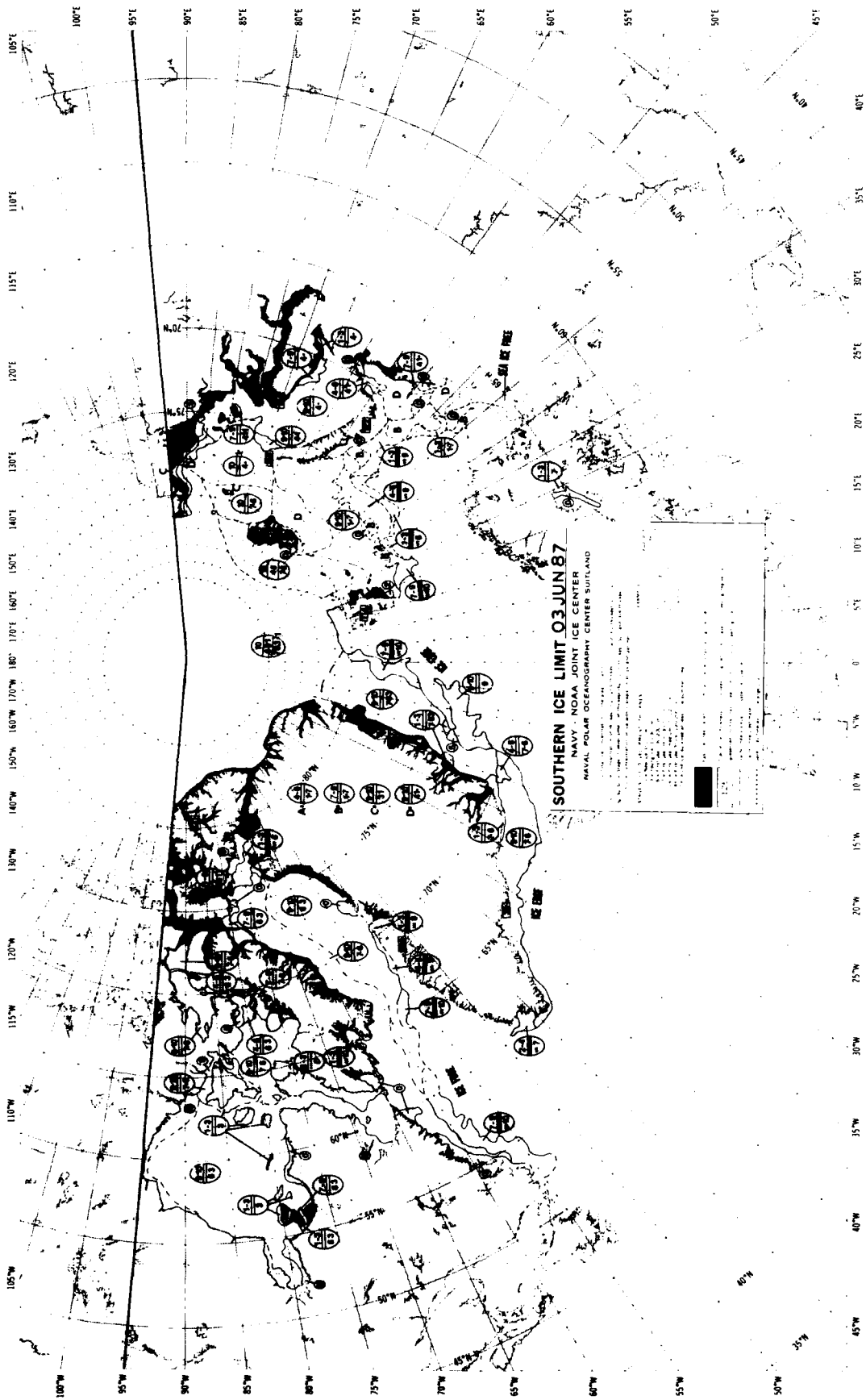
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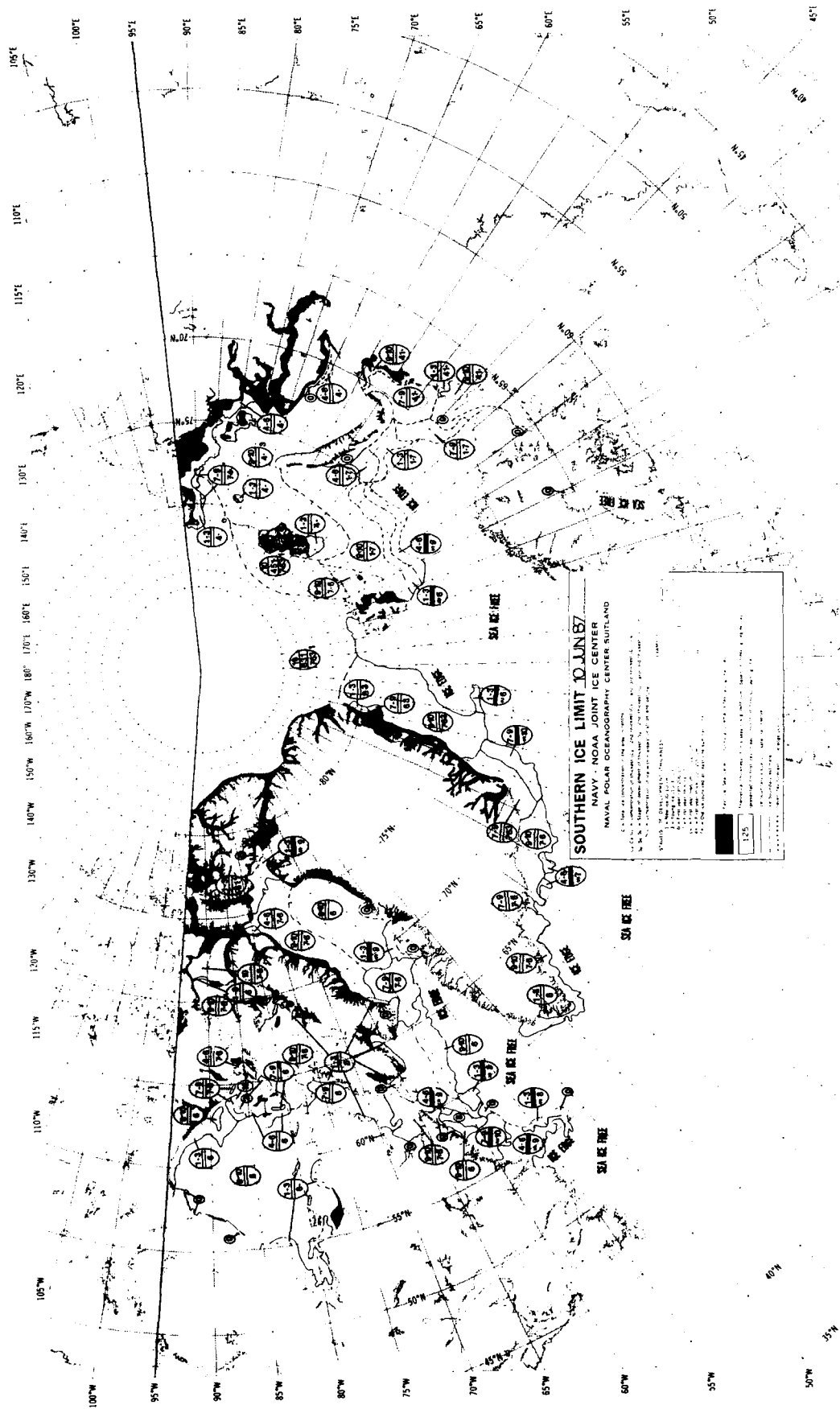
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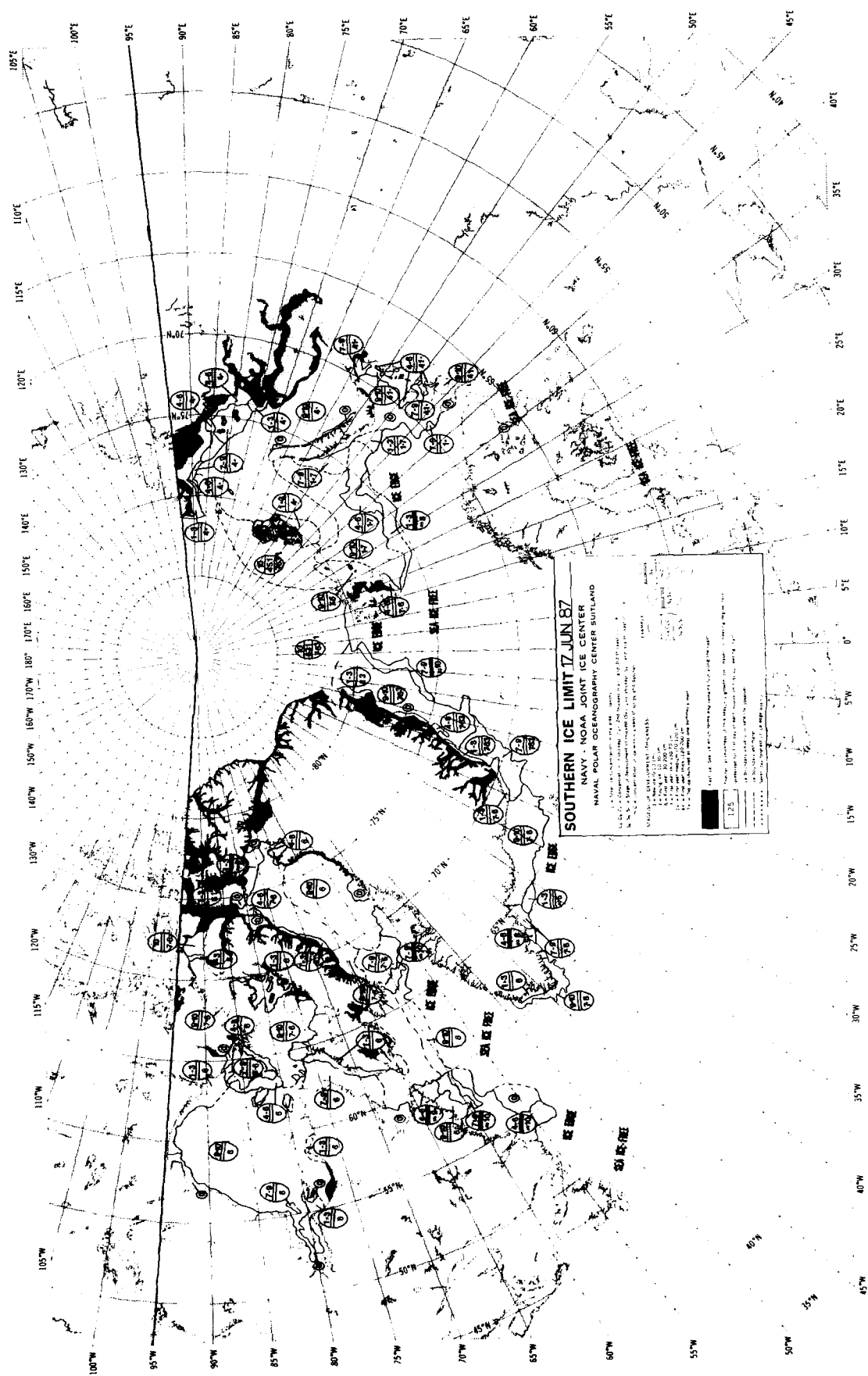
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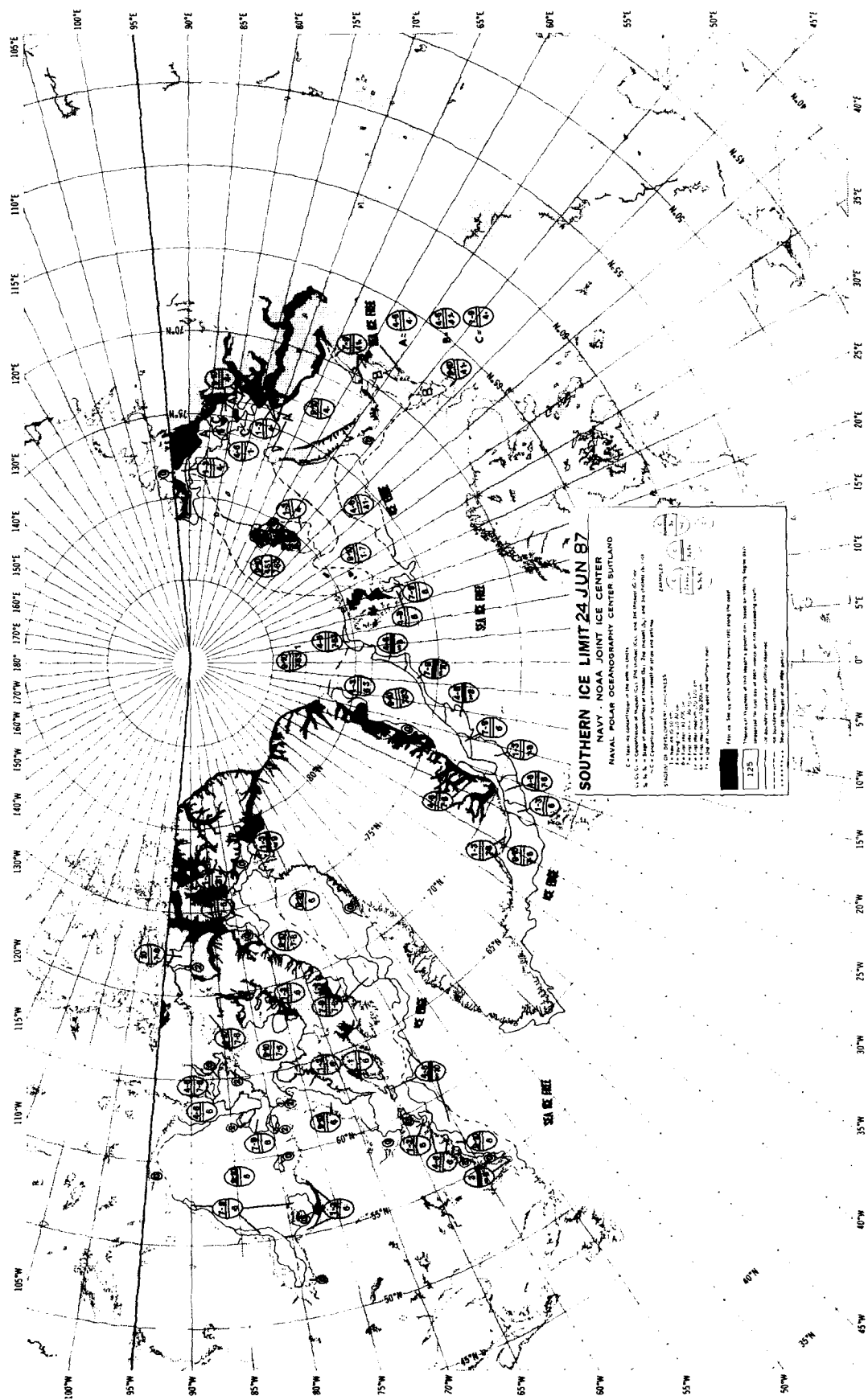


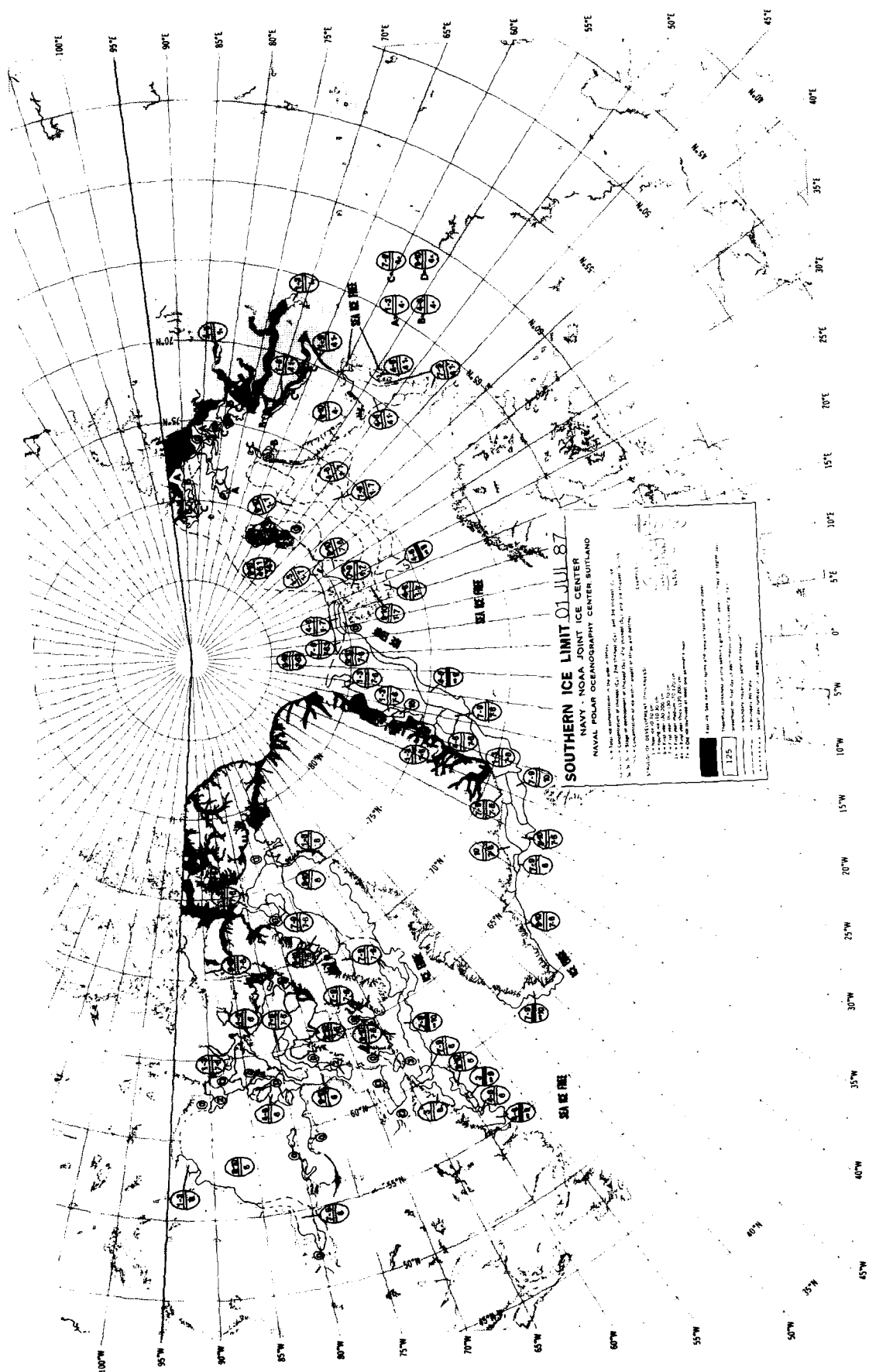


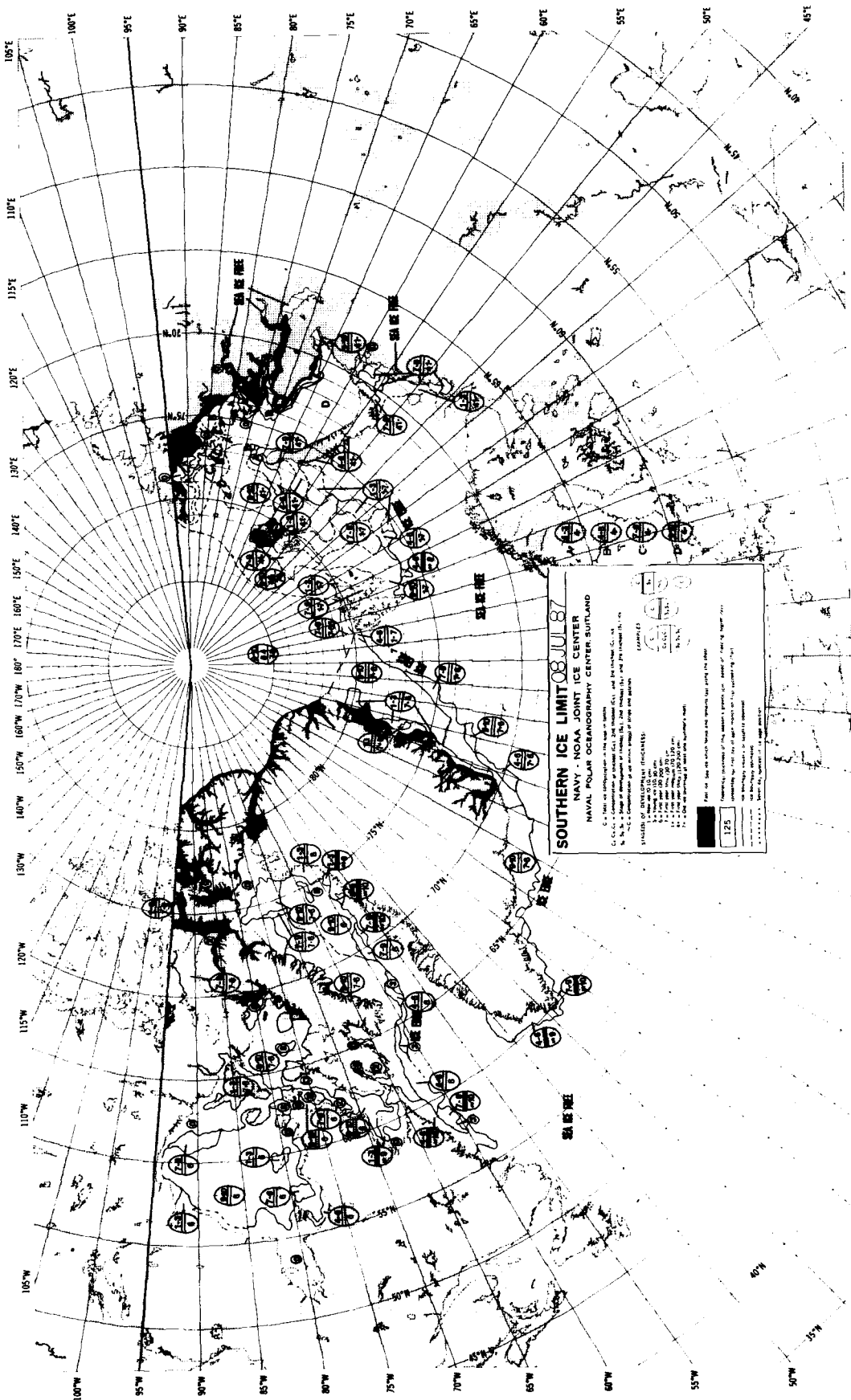








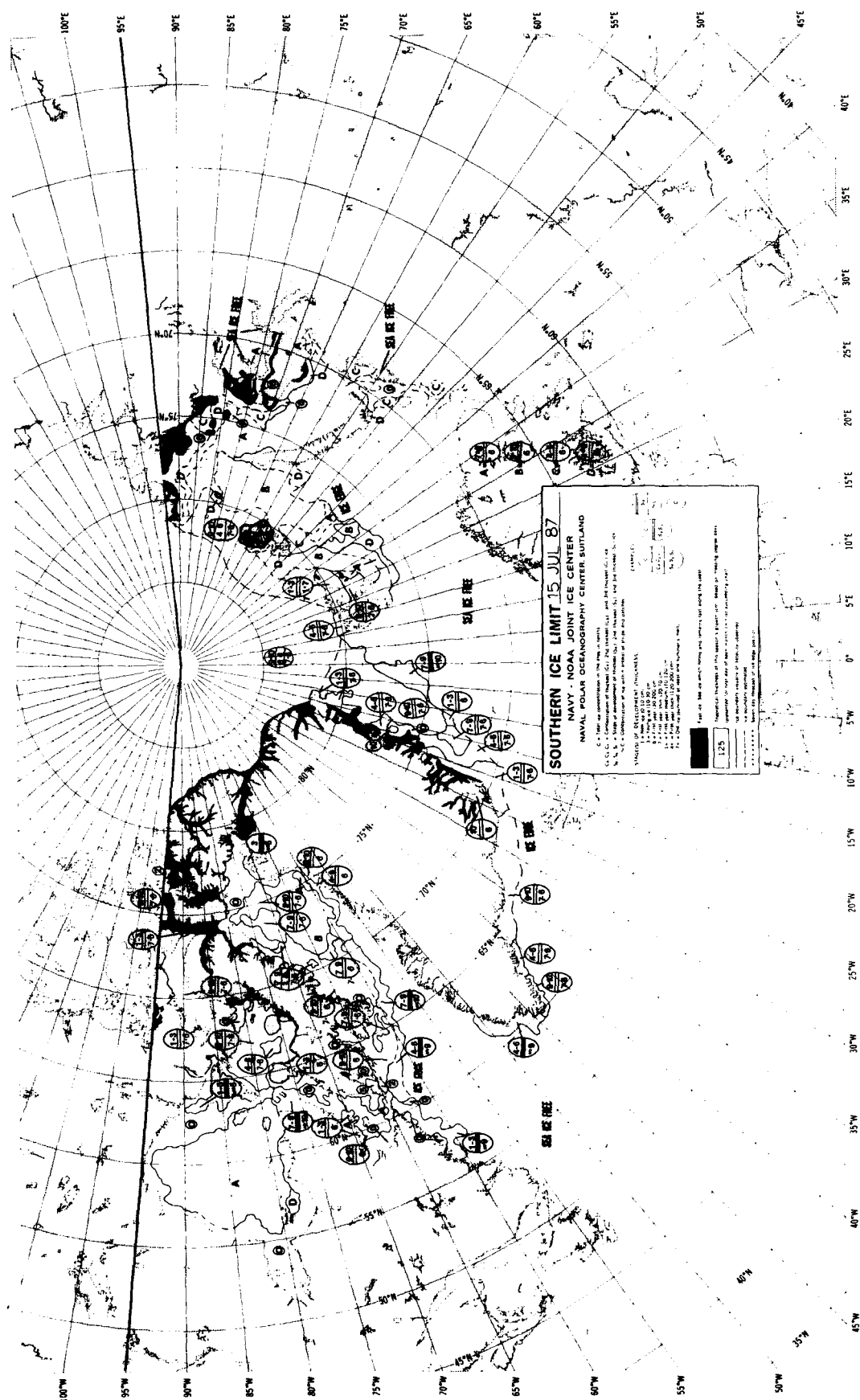


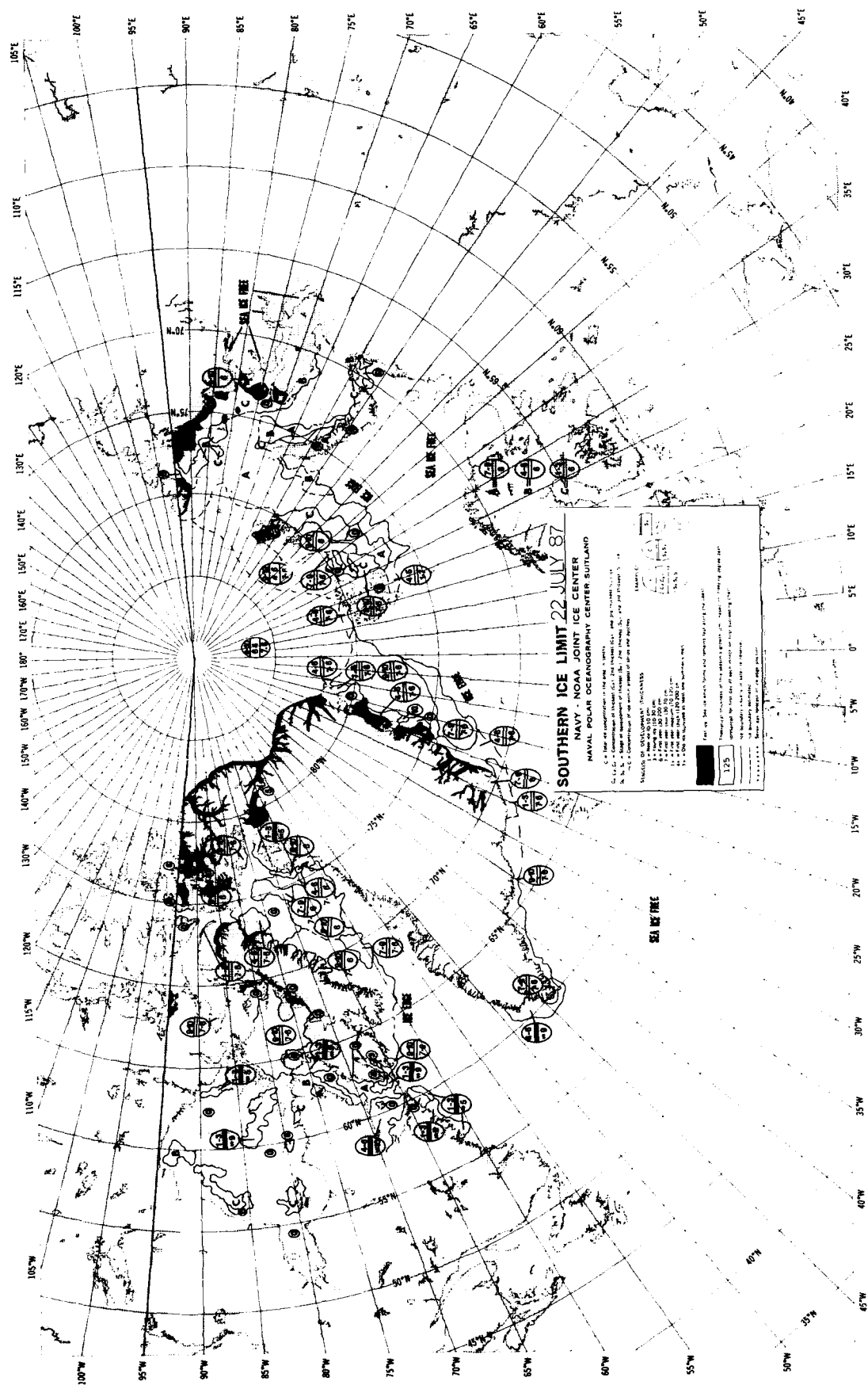


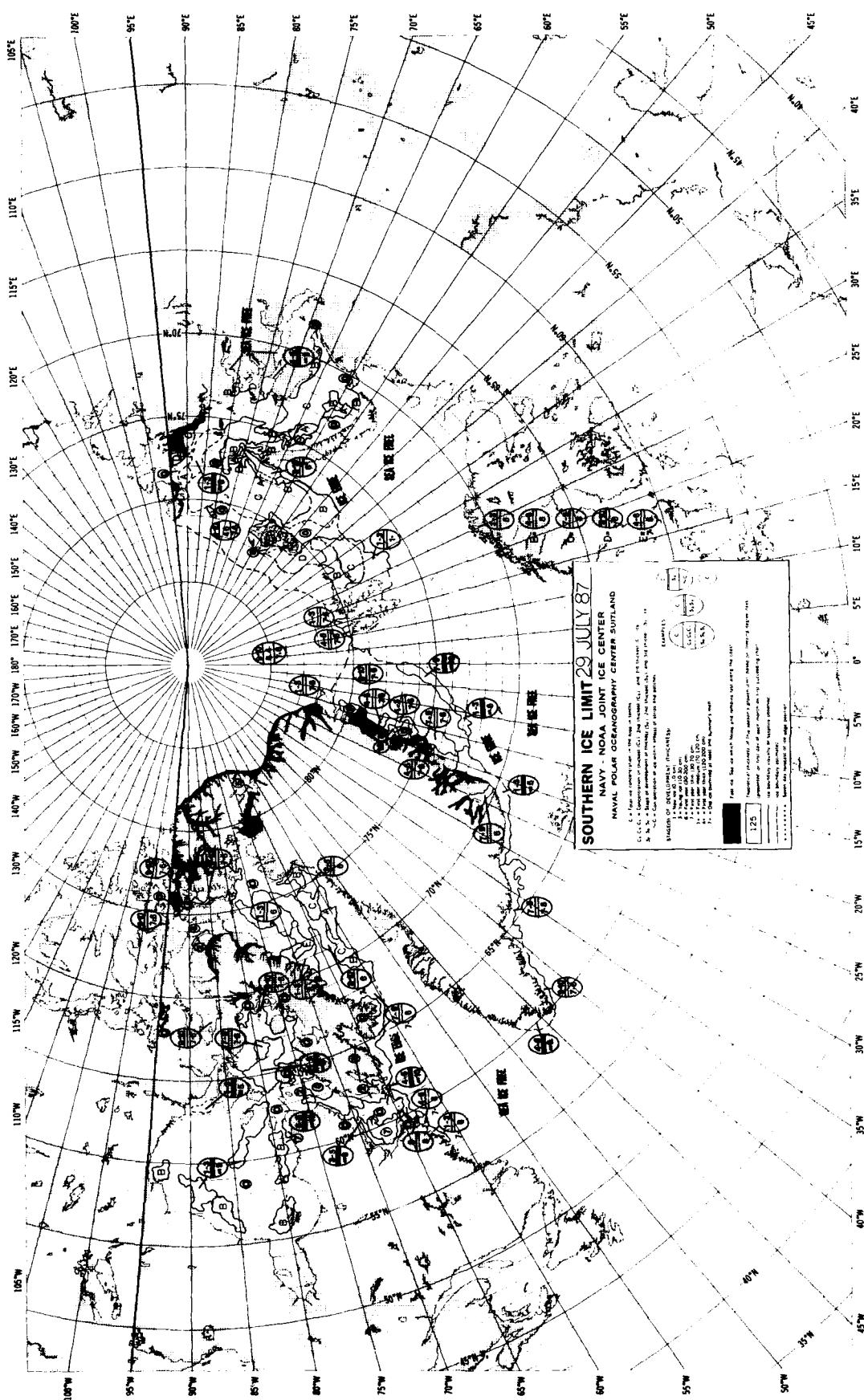
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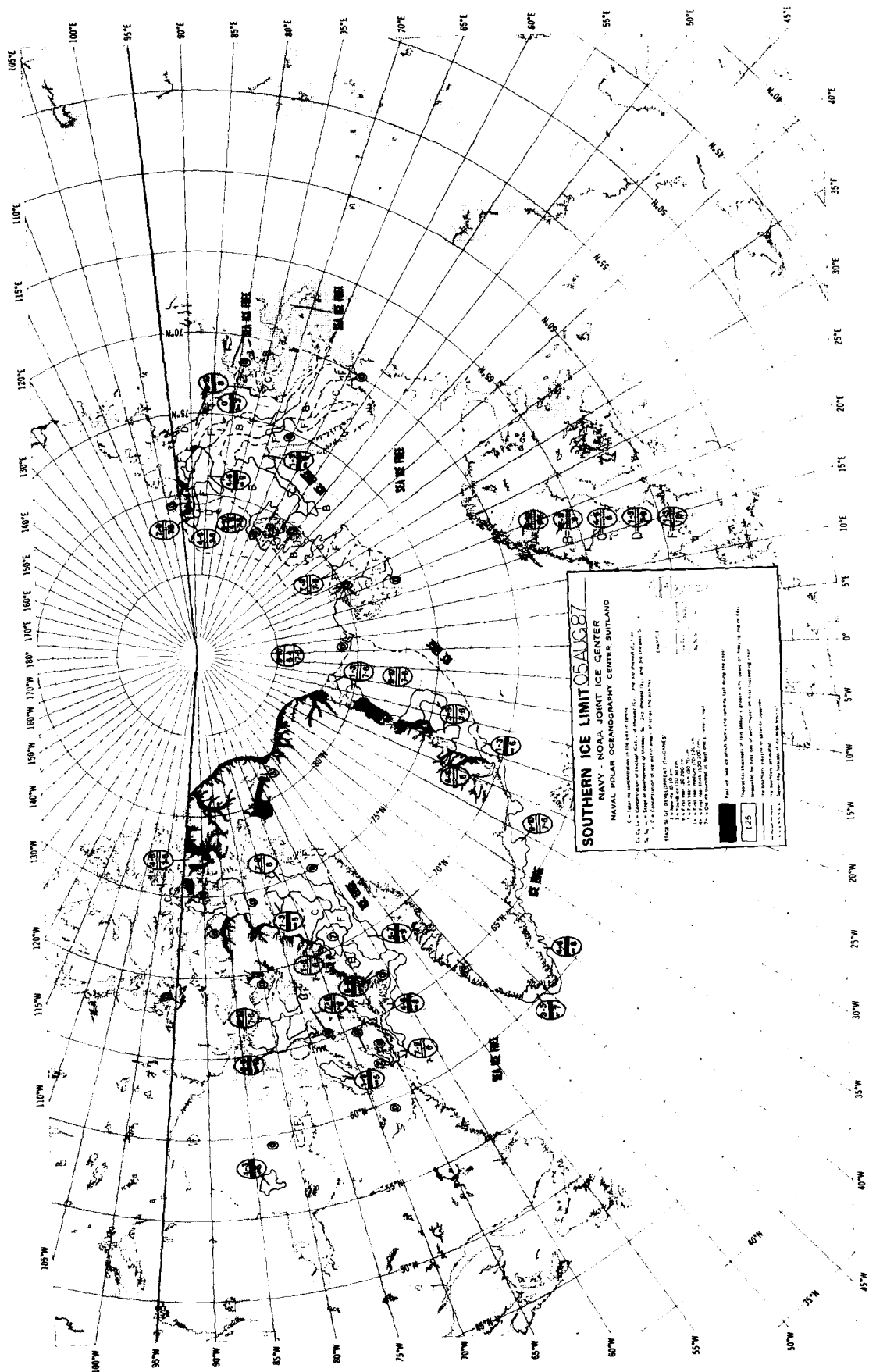
CLIC - Composite of Latitude, Longitude, and Ice Thickness Data
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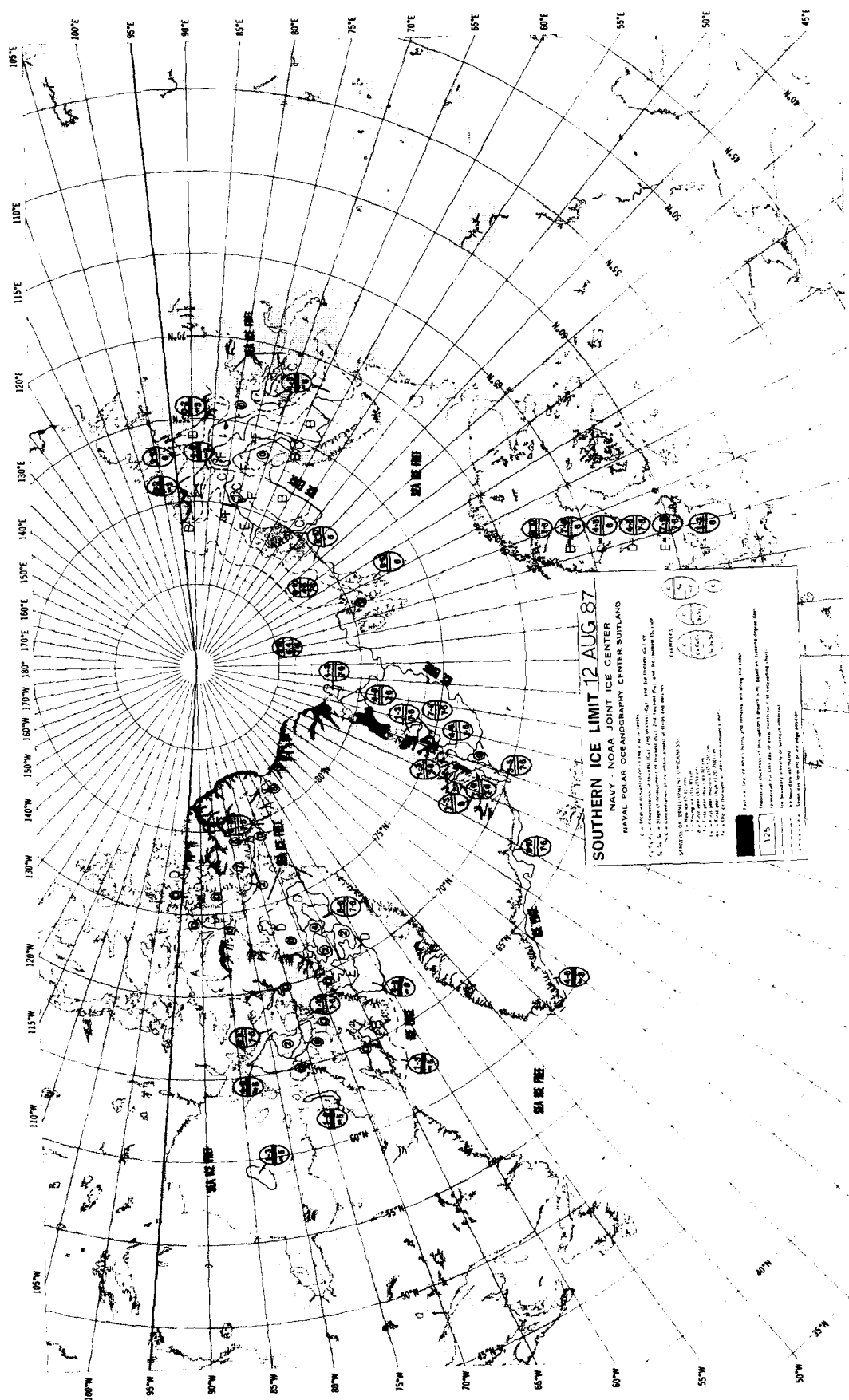
VALUES OF DEVELOPMENT (THICKNESS):
 1. 100 to 150 cm
 2. 150 to 200 cm
 3. 200 to 250 cm
 4. 250 to 300 cm
 5. 300 to 350 cm
 6. 350 to 400 cm
 7. 400 to 450 cm
 8. 450 to 500 cm
 9. 500 to 550 cm
 10. 550 to 600 cm
 11. 600 to 650 cm
 12. 650 to 700 cm
 13. 700 to 750 cm
 14. 750 to 800 cm
 15. 800 to 850 cm
 16. 850 to 900 cm
 17. 900 to 950 cm
 18. 950 to 1000 cm
 19. 1000 to 1050 cm
 20. 1050 to 1100 cm
 21. 1100 to 1150 cm
 22. 1150 to 1200 cm
 23. 1200 to 1250 cm
 24. 1250 to 1300 cm
 25. 1300 to 1350 cm
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 33. 1700 to 1750 cm
 34. 1750 to 1800 cm
 35. 1800 to 1850 cm
 36. 1850 to 1900 cm
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 38. 1950 to 2000 cm
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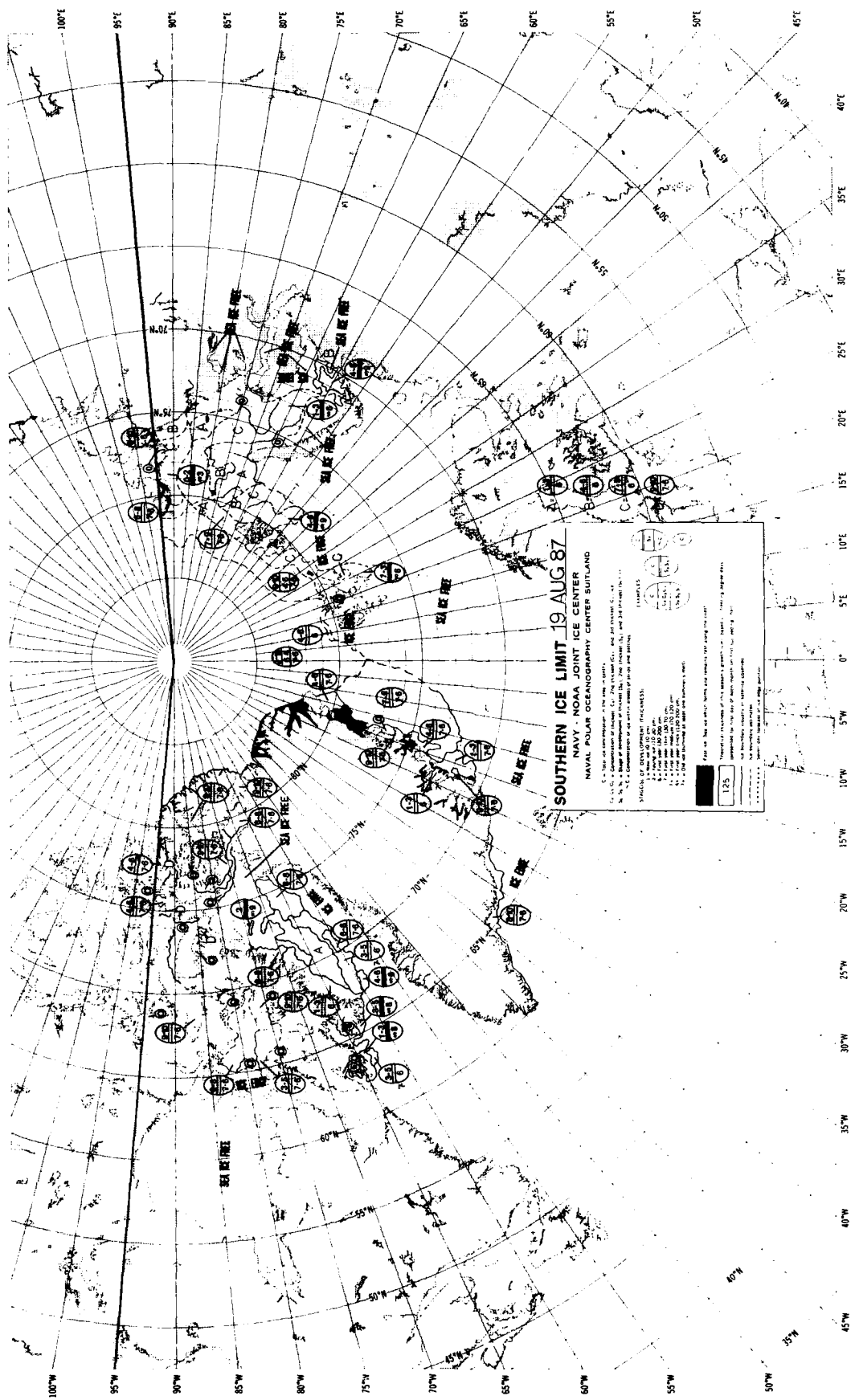


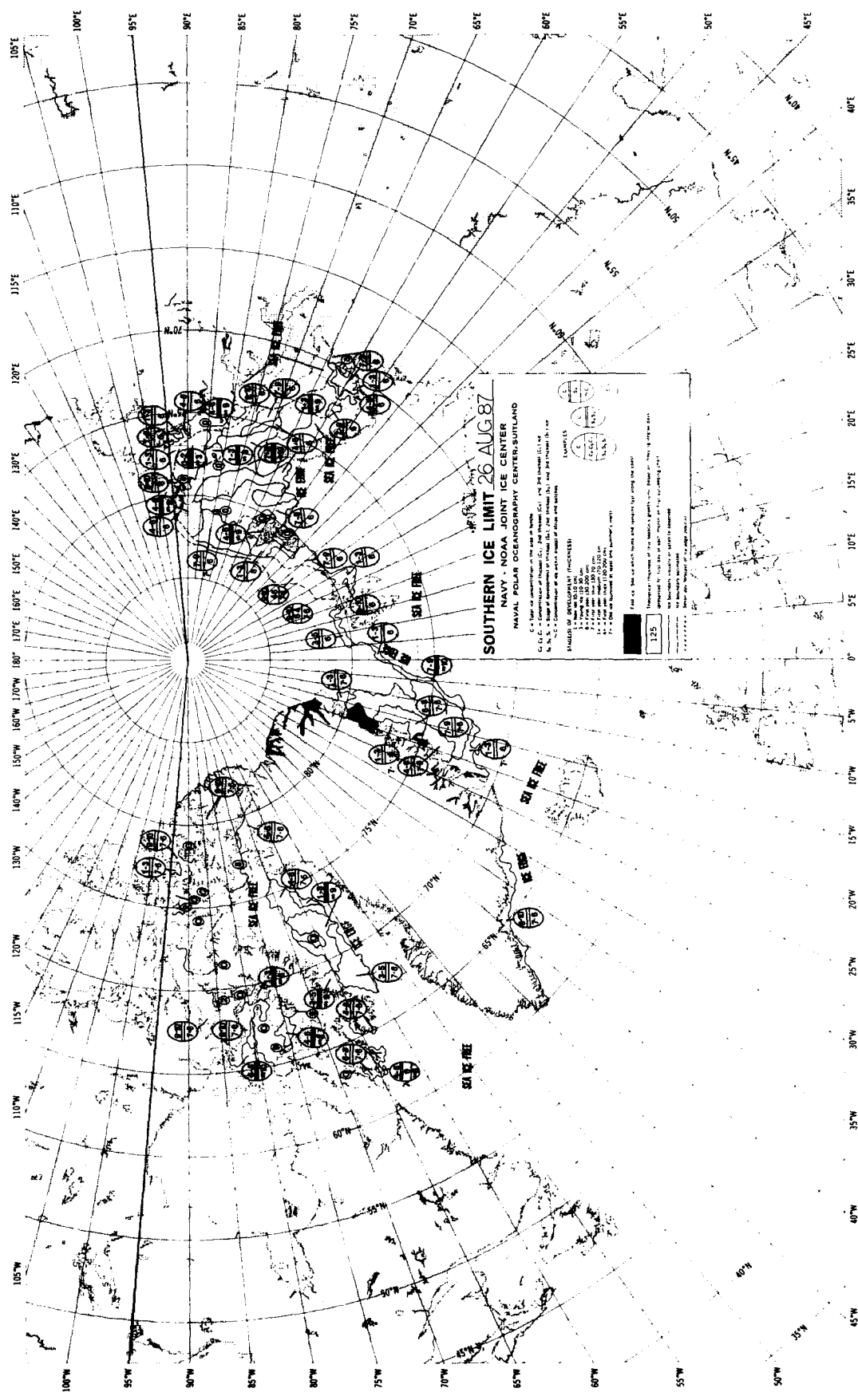












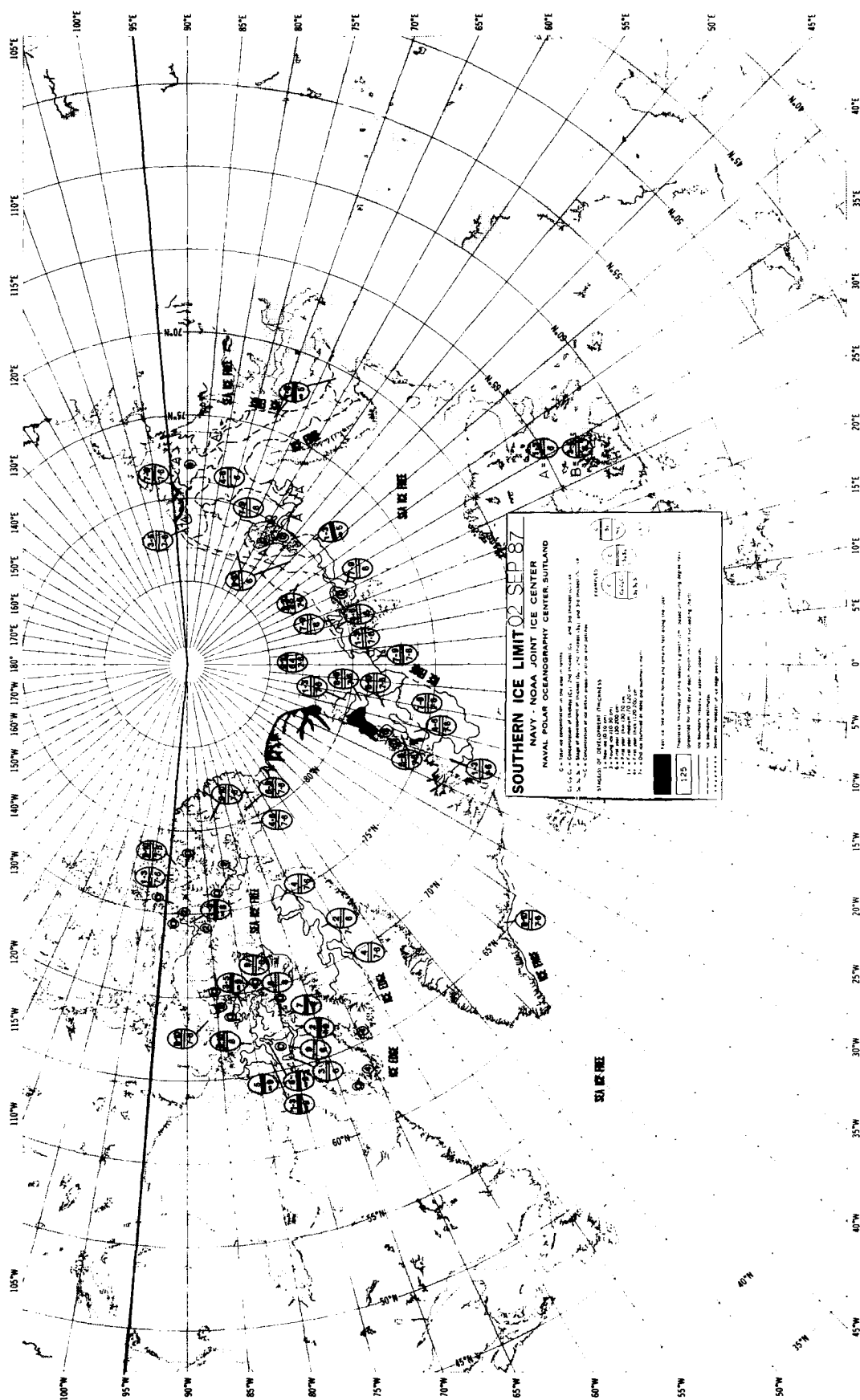
SOUTHERN ICE LIMIT 26 AUG 87
 NAVY - NOAA JOINT ICE CENTER
 NAVAL POLAR OCEANOGRAPHY CENTER-SUITLAND

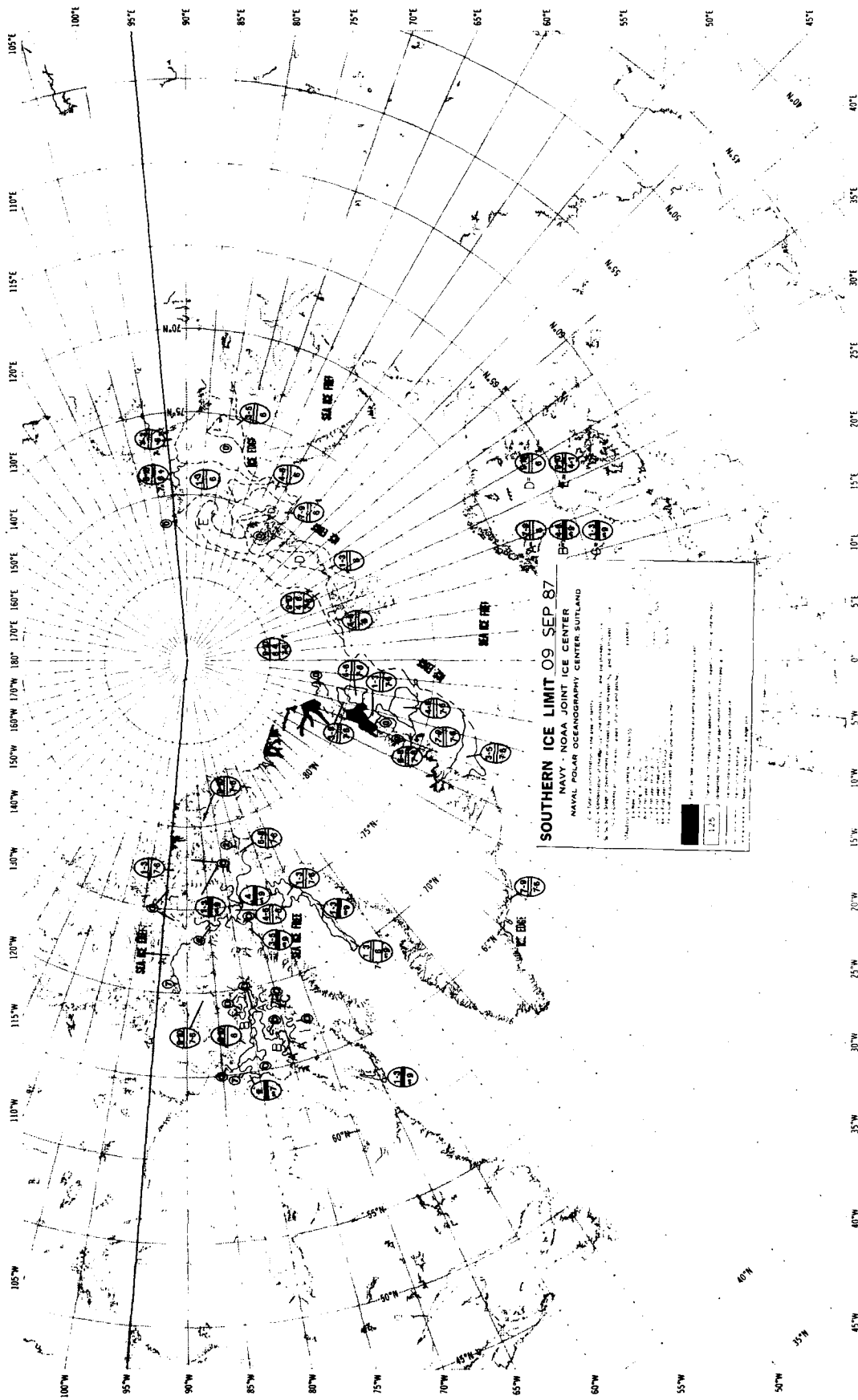
C = Total ice concentration in the area in %
 C₁ C₂ C₃ = Concentration of ice in %
 W₁ W₂ W₃ = Concentration of ice in %
 W₁ W₂ W₃ = Concentration of ice in %

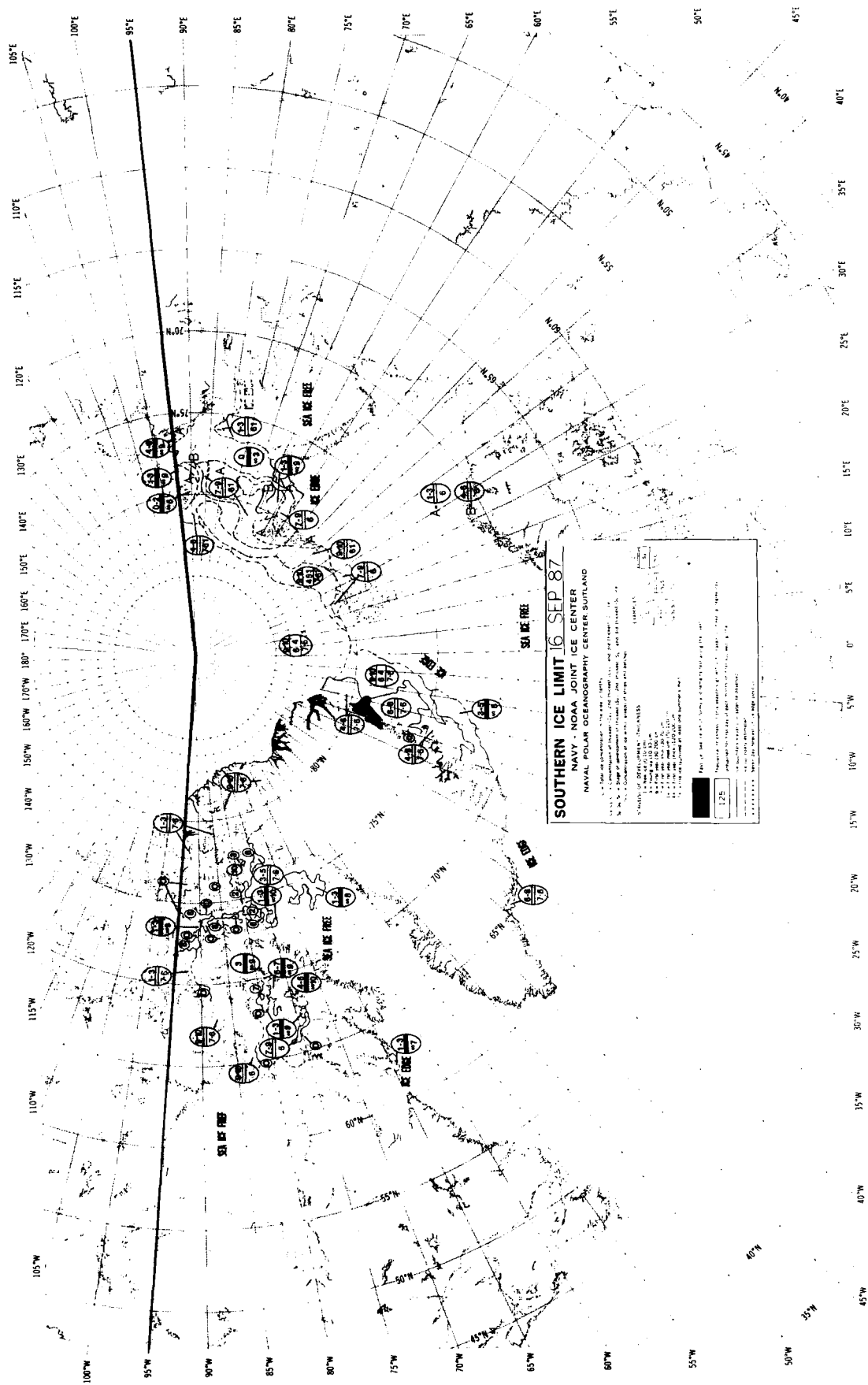
VALUES OF DEVELOPMENT (THICKNESS)

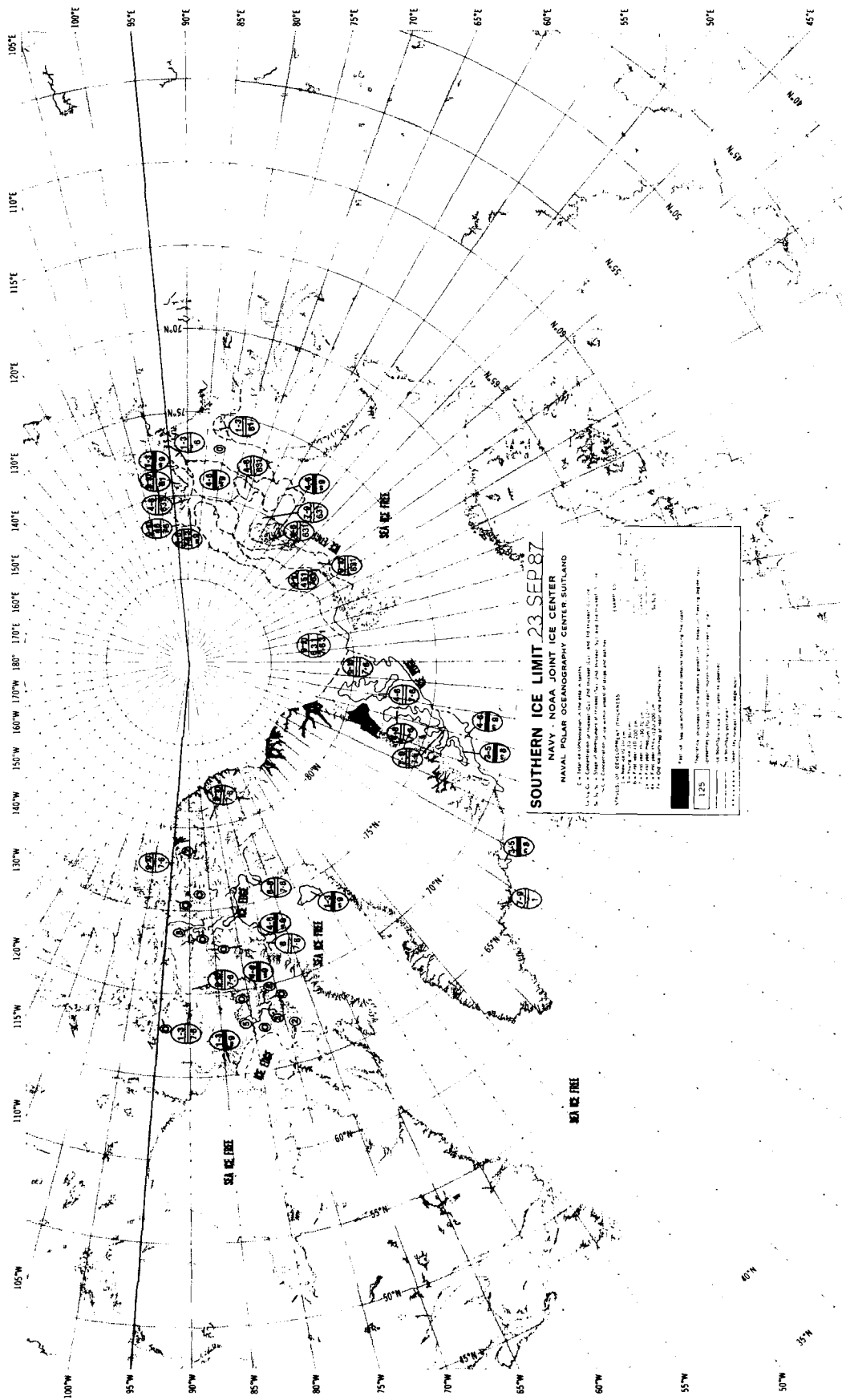
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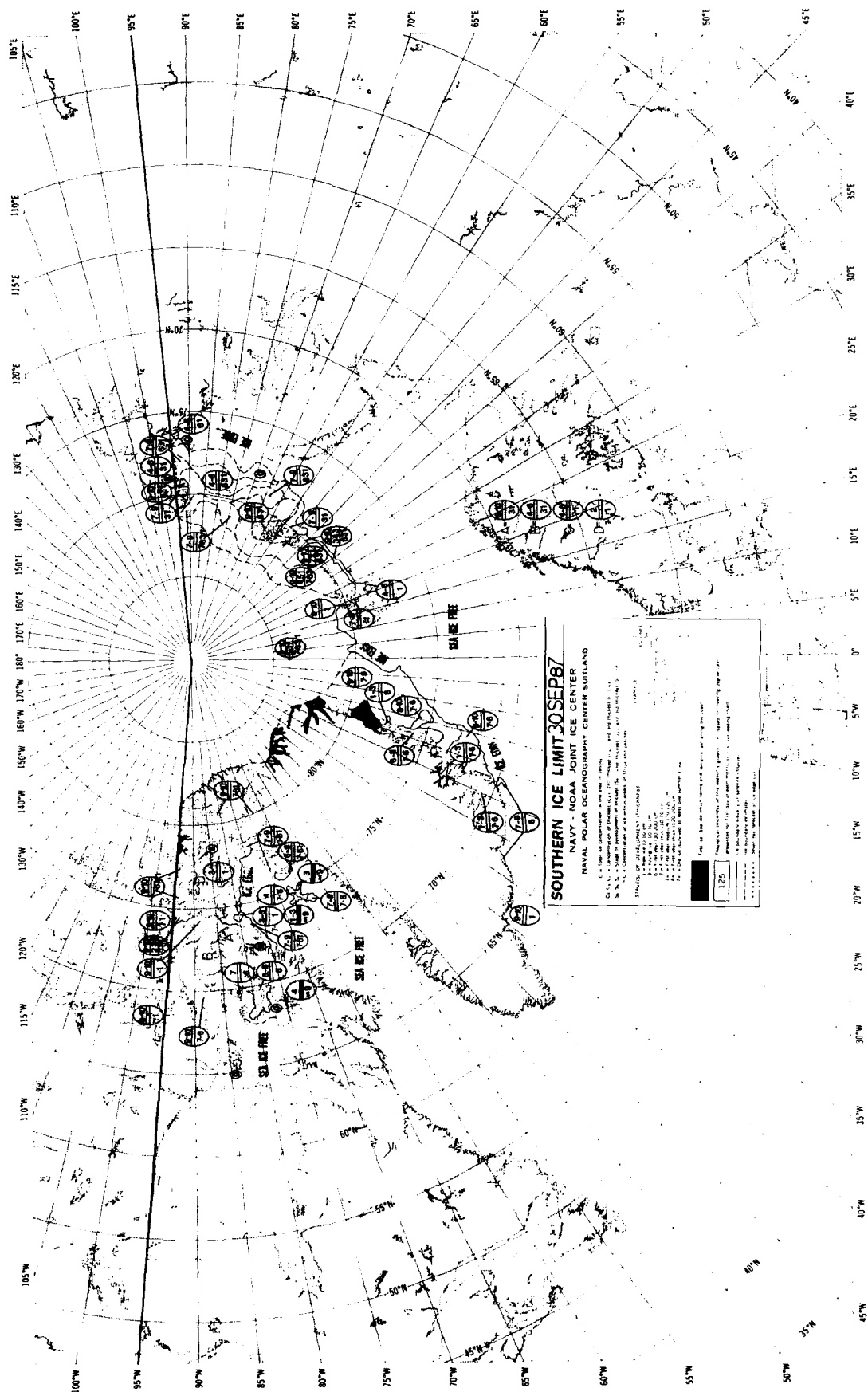
125

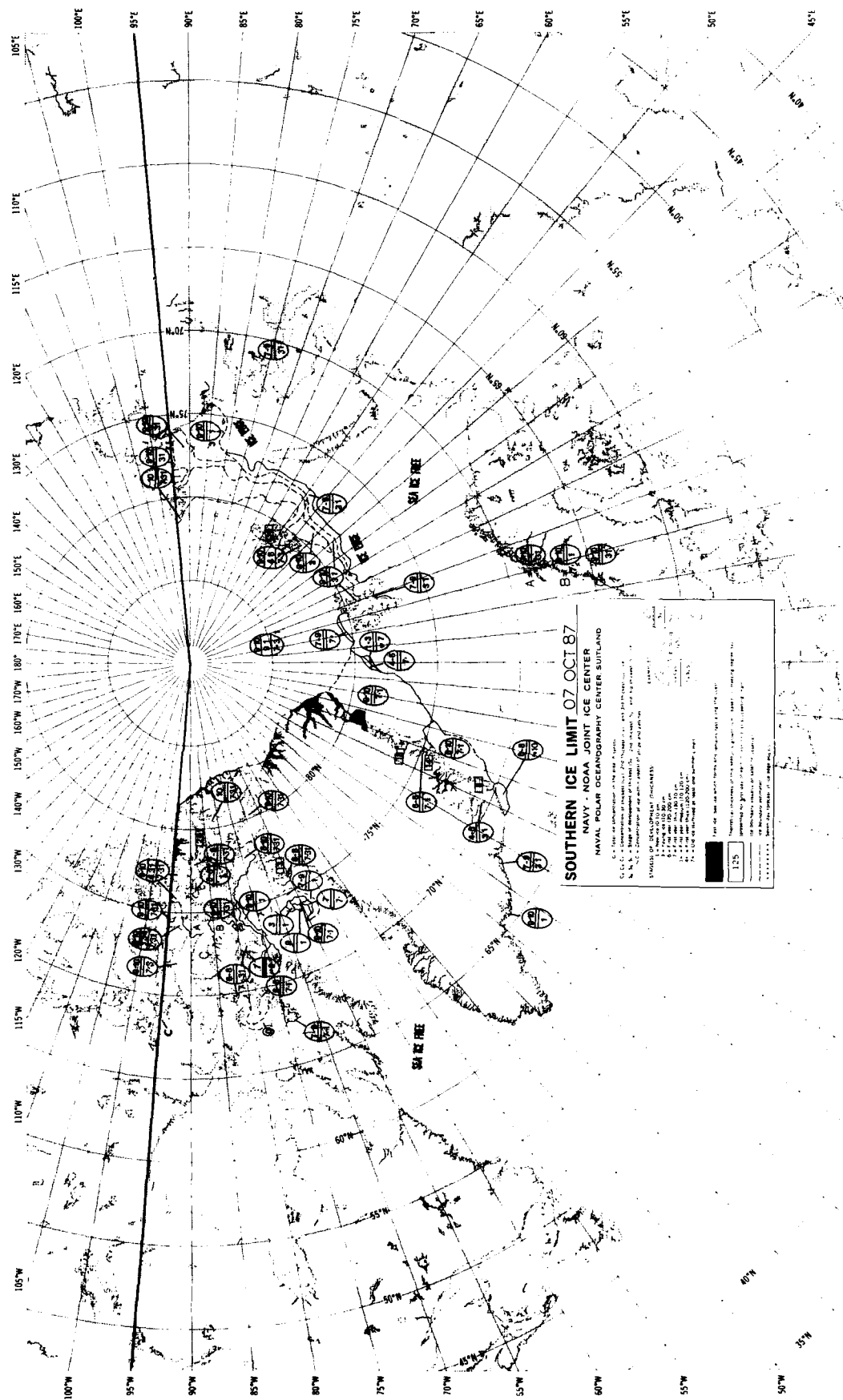


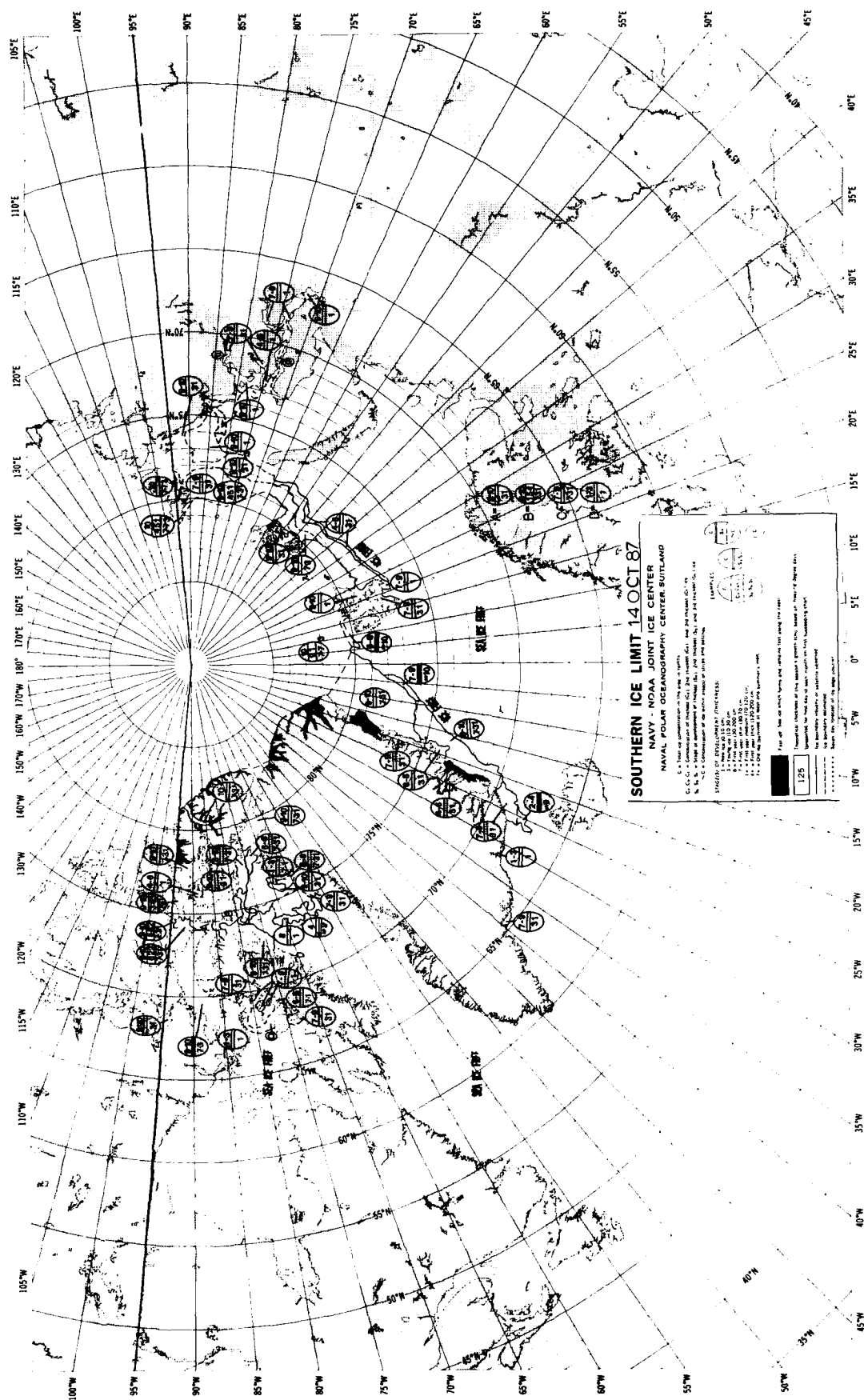


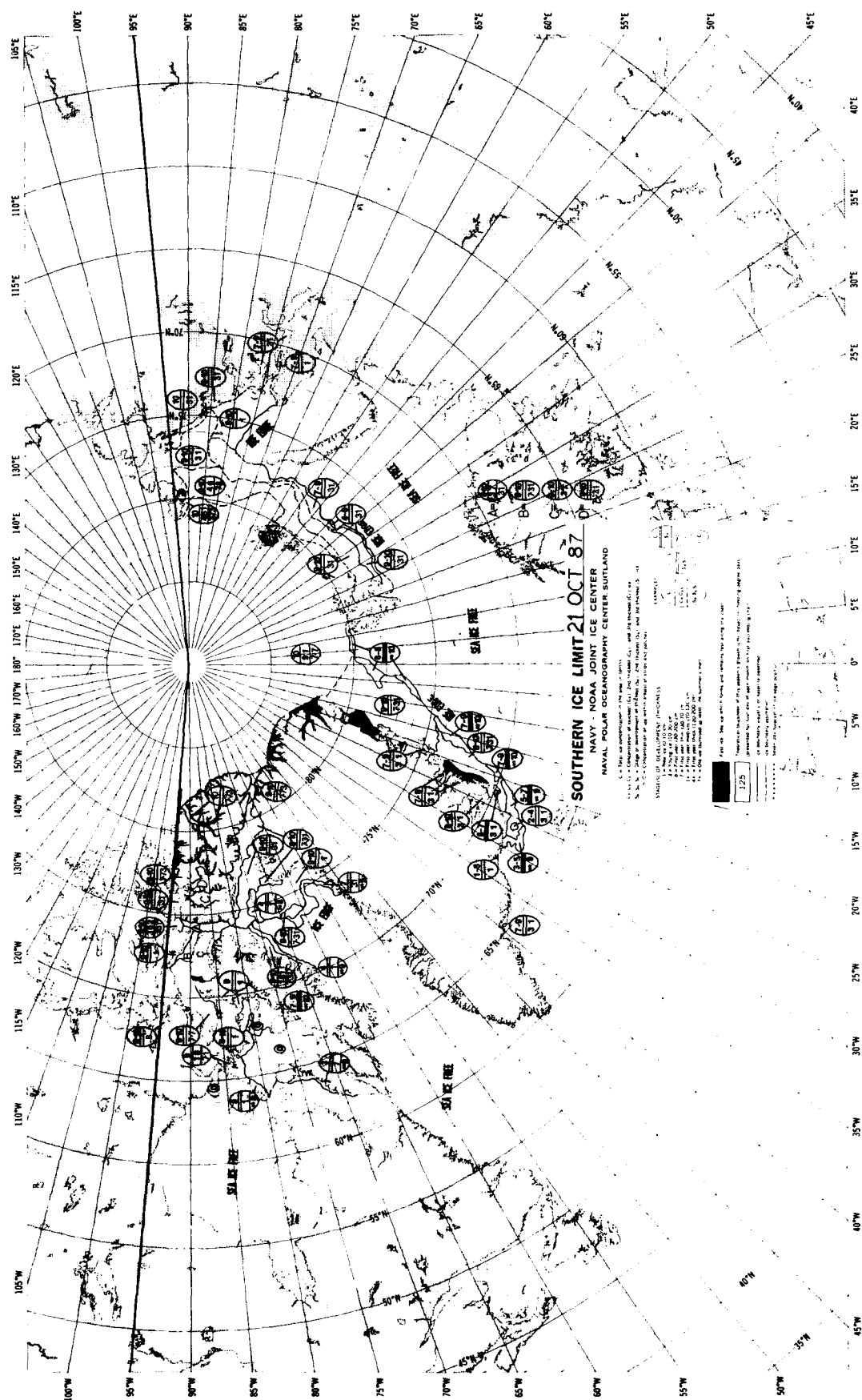


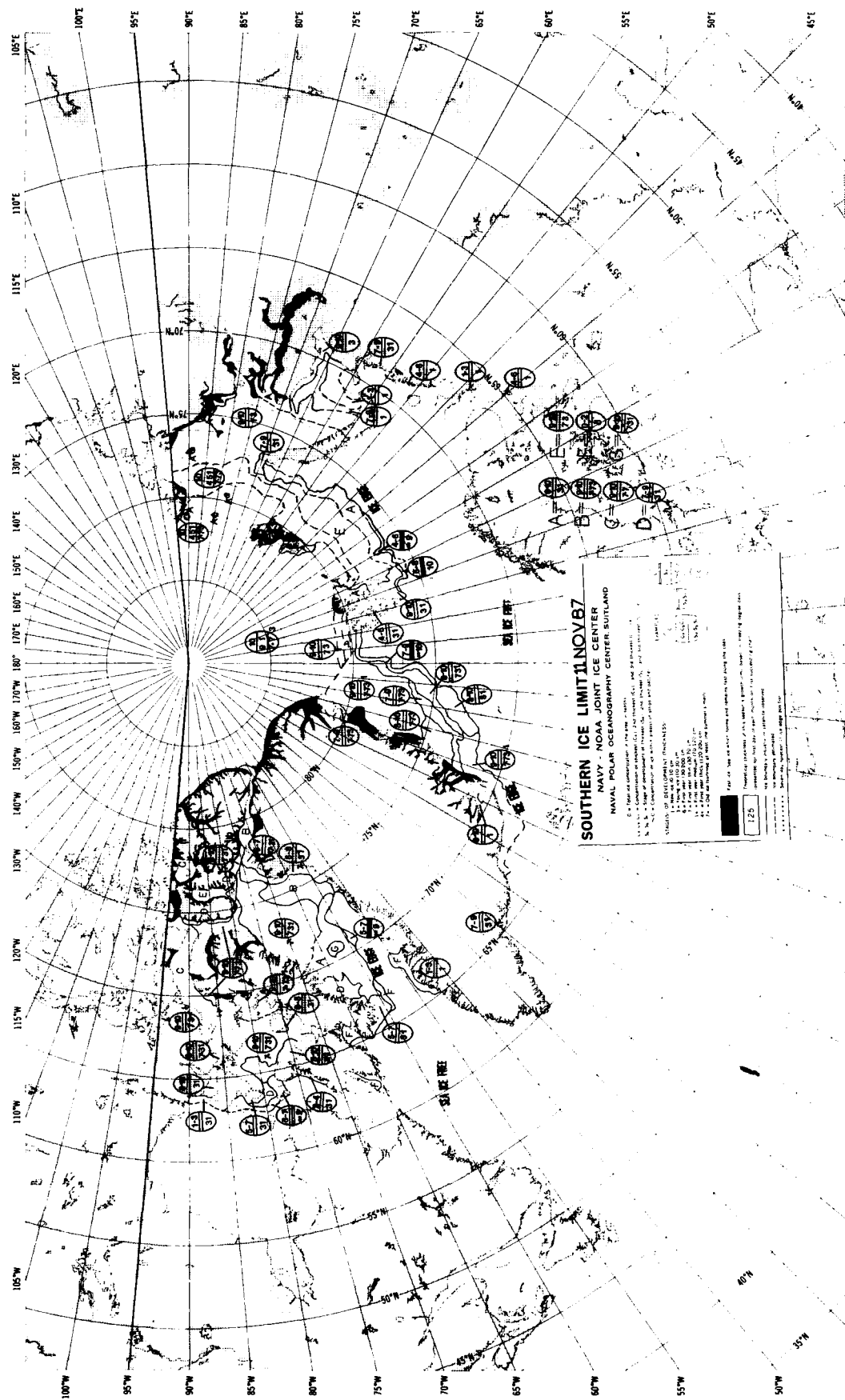


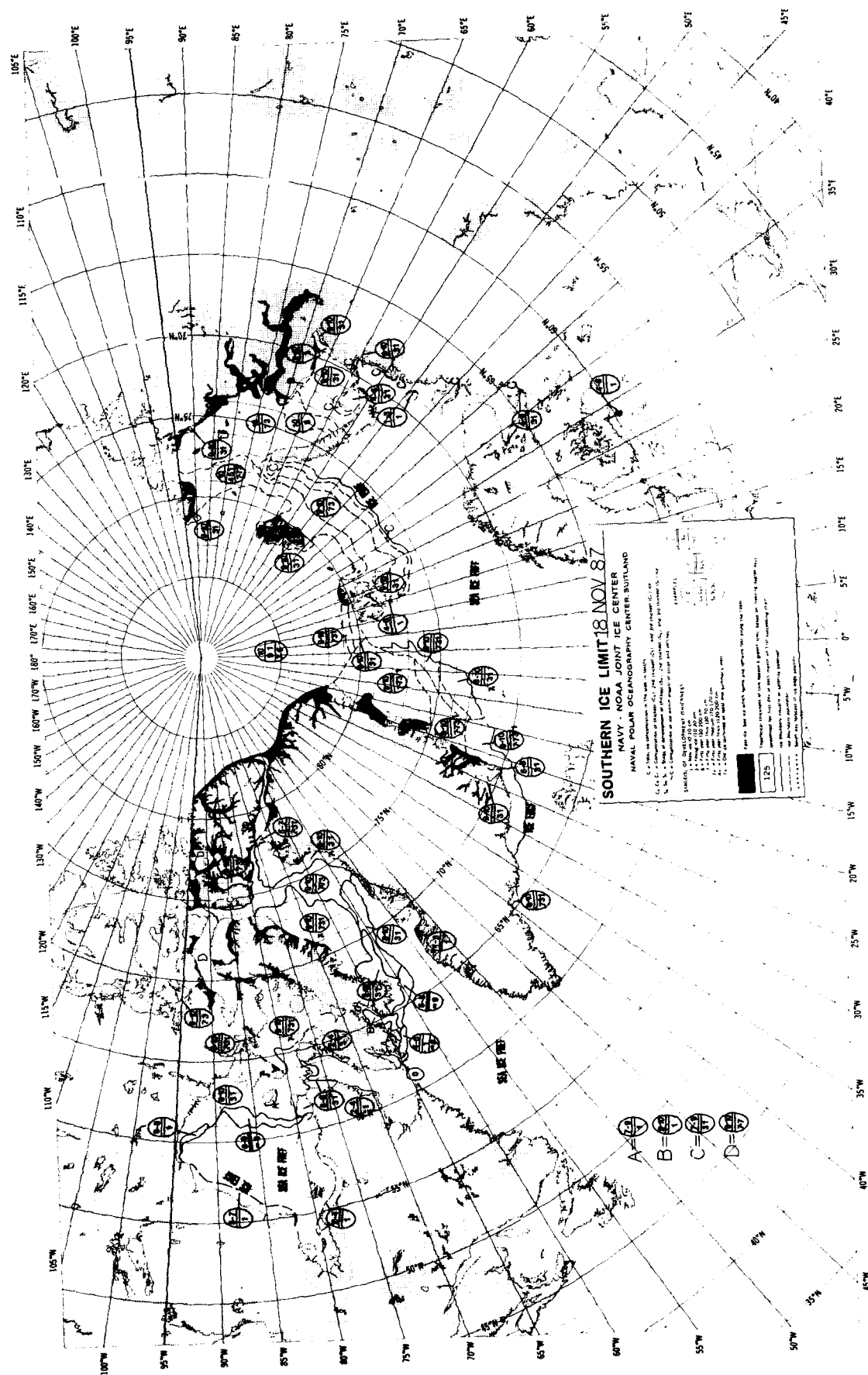


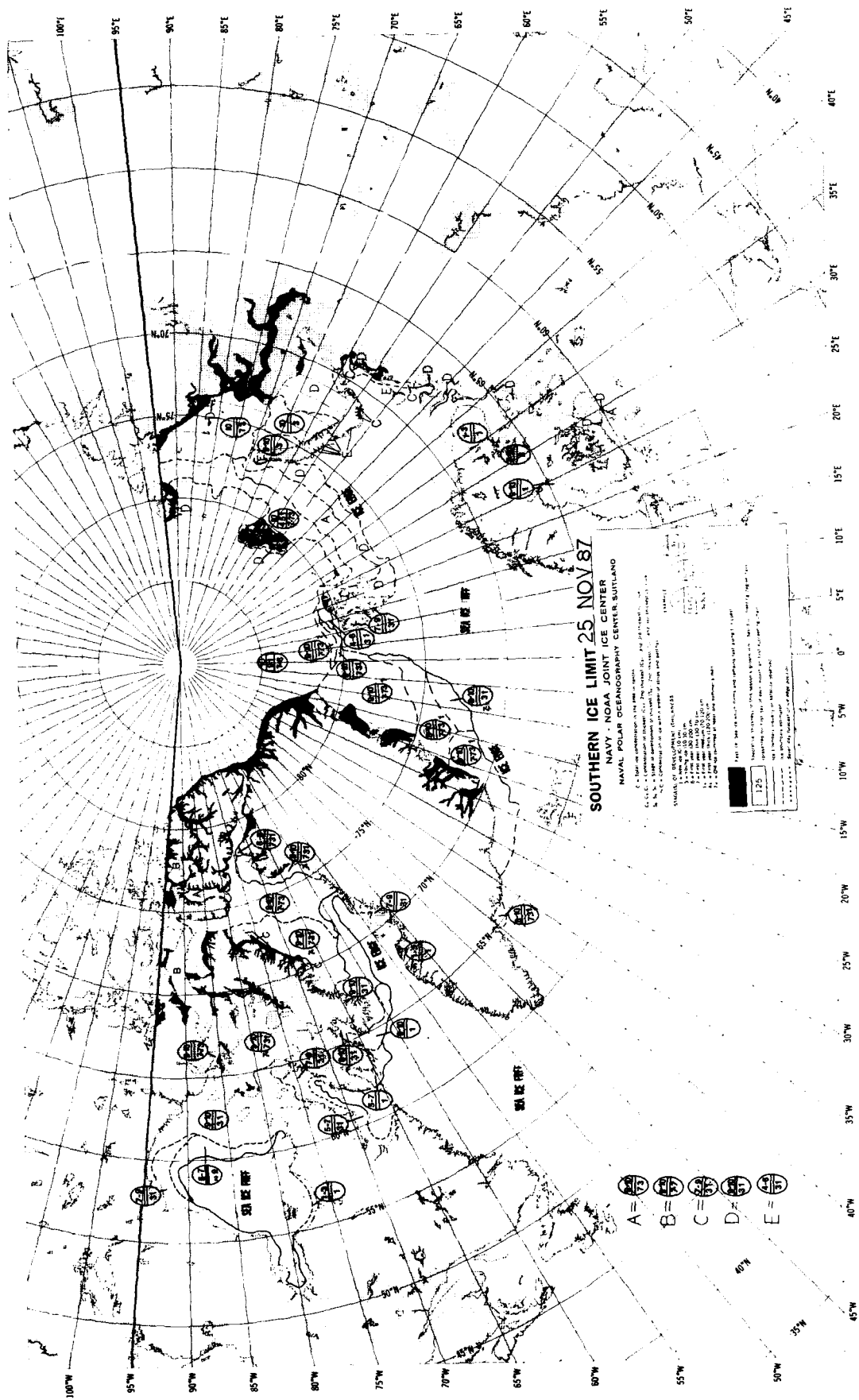


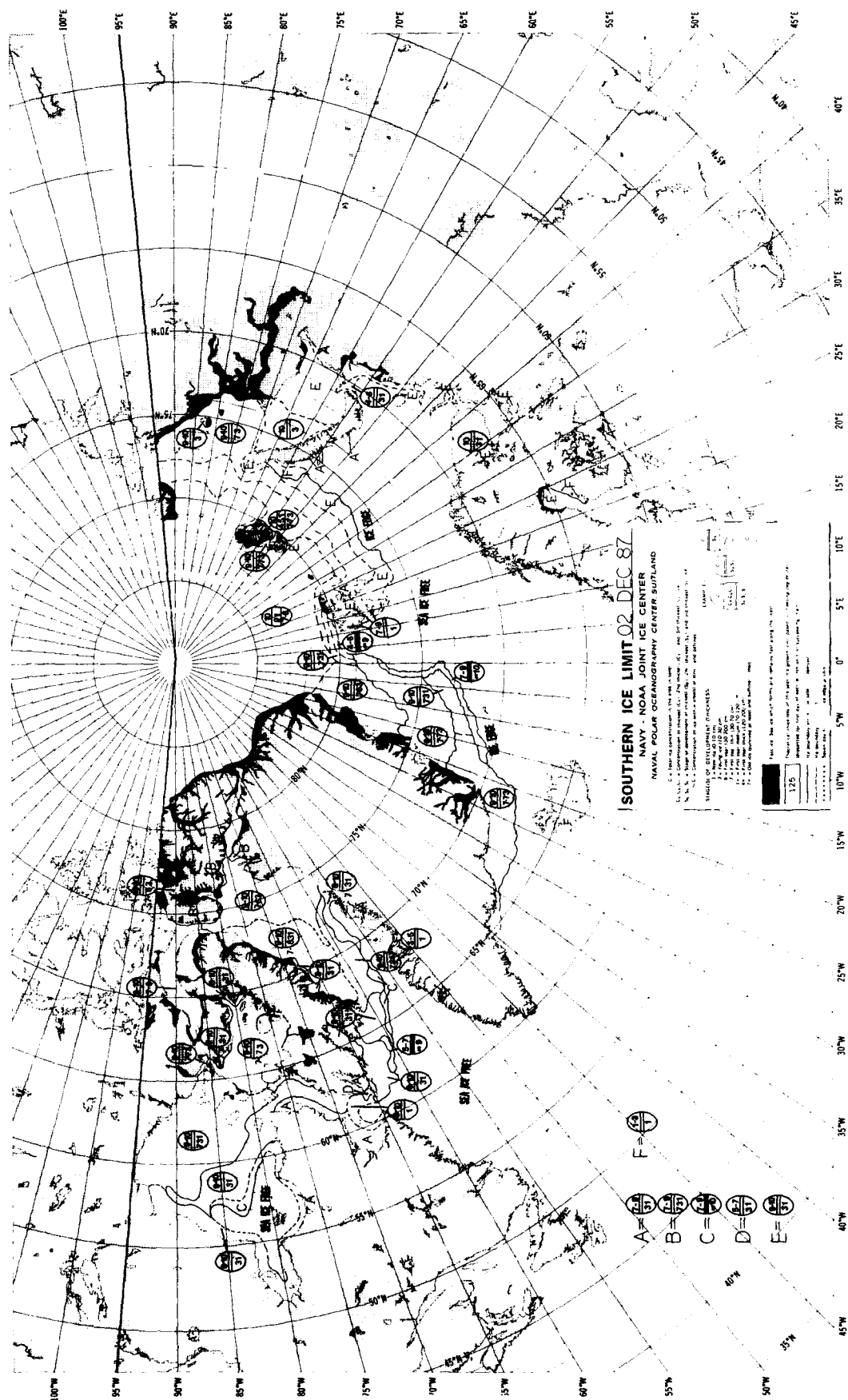


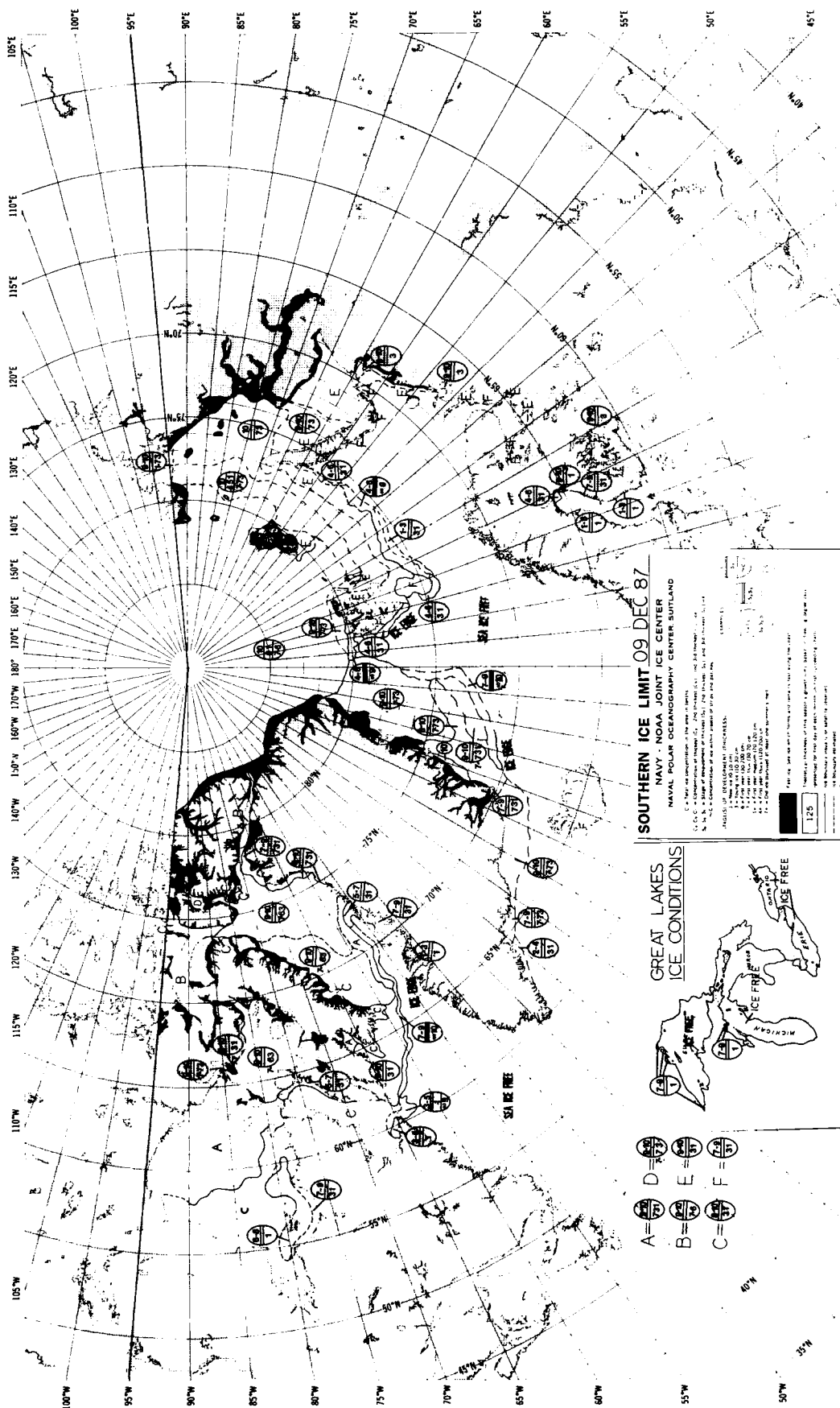












SOUTHERN ICE LIMIT 09 DEC 87

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NAVAL POLAR OCEANOGRAPHY CENTER SUITLAND

1. Data is from the 09 DEC 87 survey.

2. Data is from the 09 DEC 87 survey.

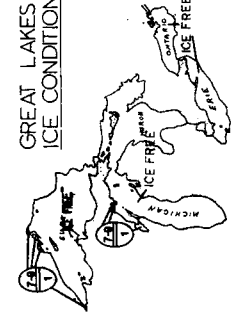
3. Data is from the 09 DEC 87 survey.

4. Data is from the 09 DEC 87 survey.

5. Data is from the 09 DEC 87 survey.

6. Data is from the 09 DEC 87 survey.

GREAT LAKES ICE CONDITIONS



- A =
- B =
- C =
- D =
- E =
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1. Data is from the 09 DEC 87 survey.

2. Data is from the 09 DEC 87 survey.

3. Data is from the 09 DEC 87 survey.

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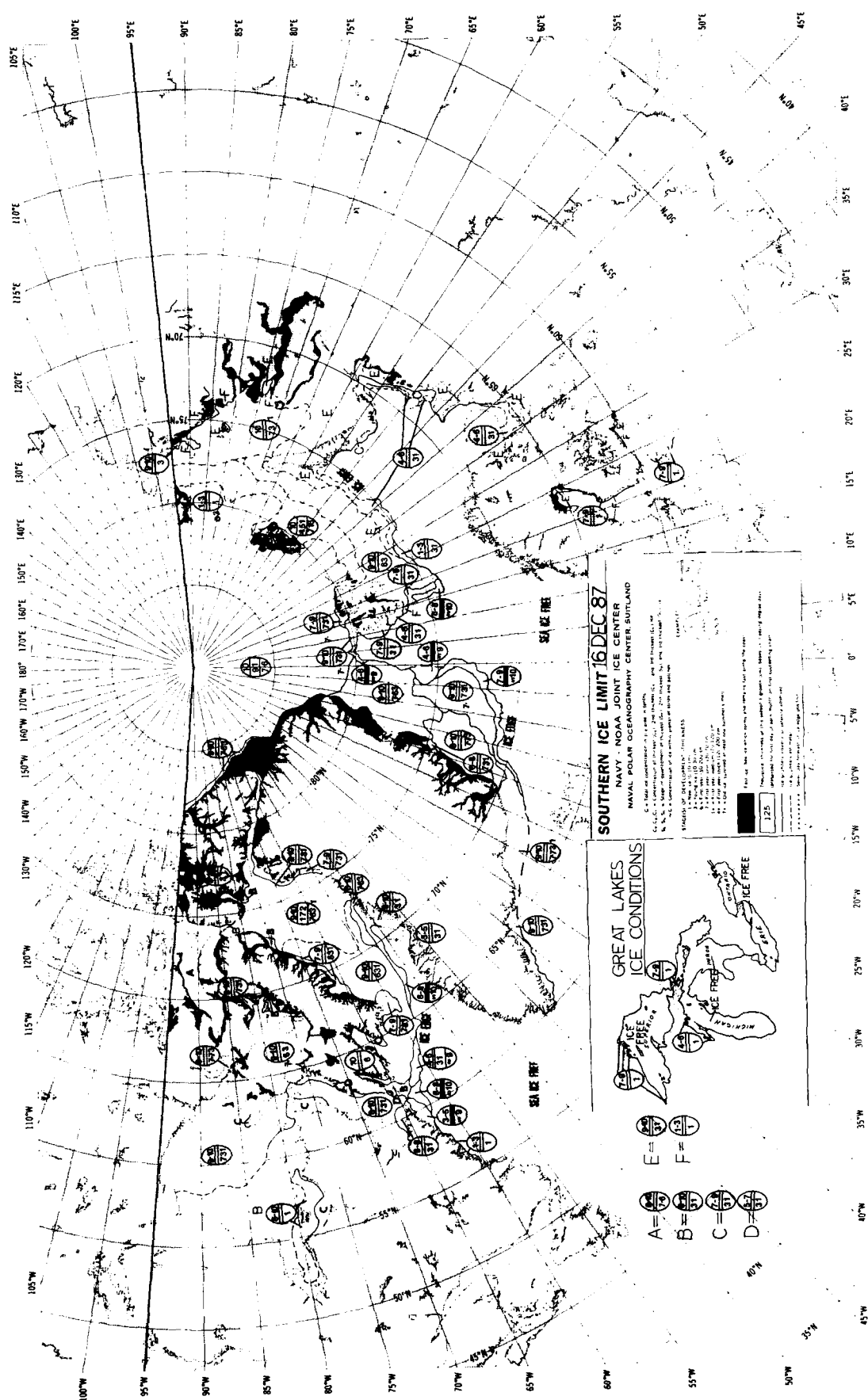
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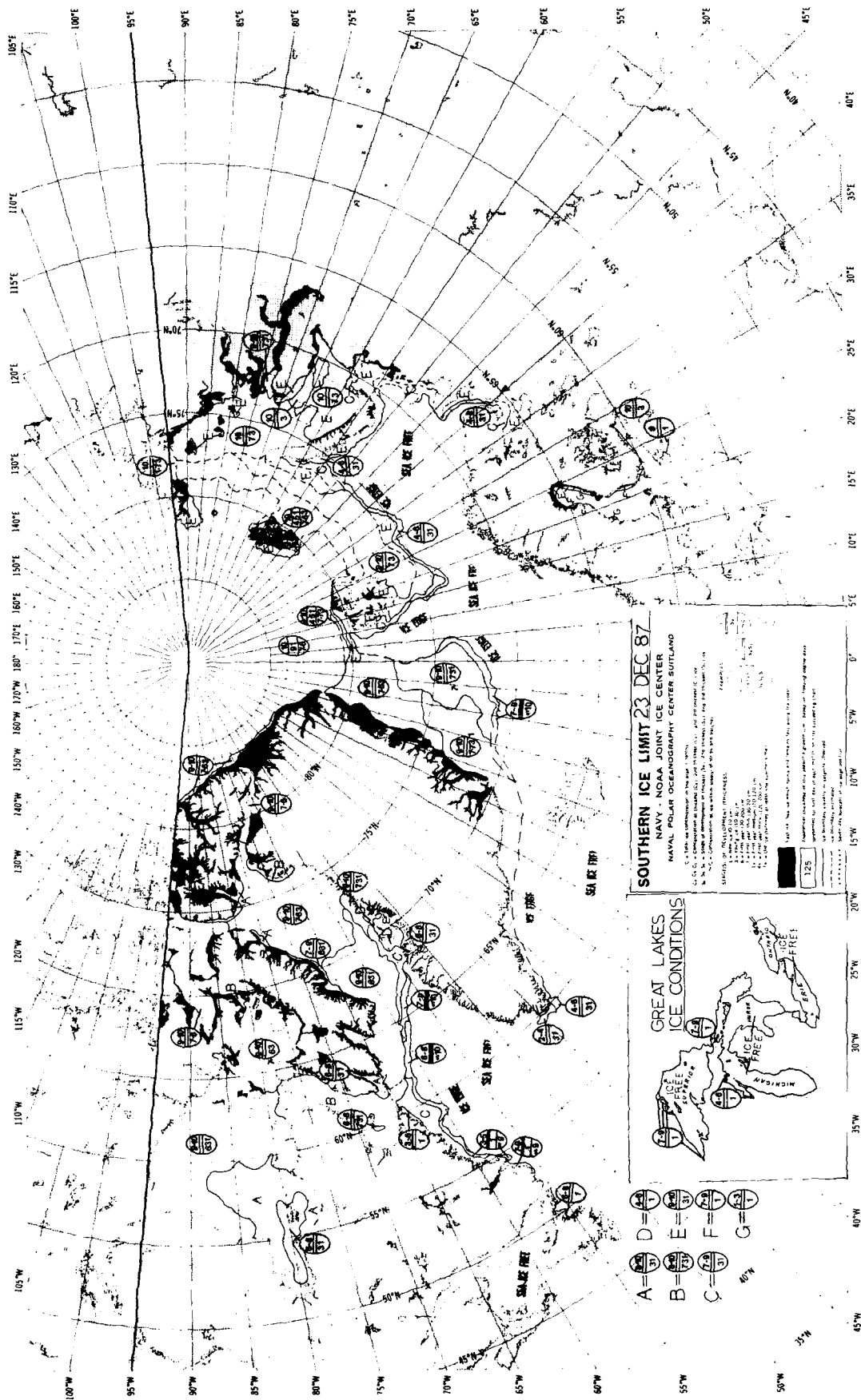
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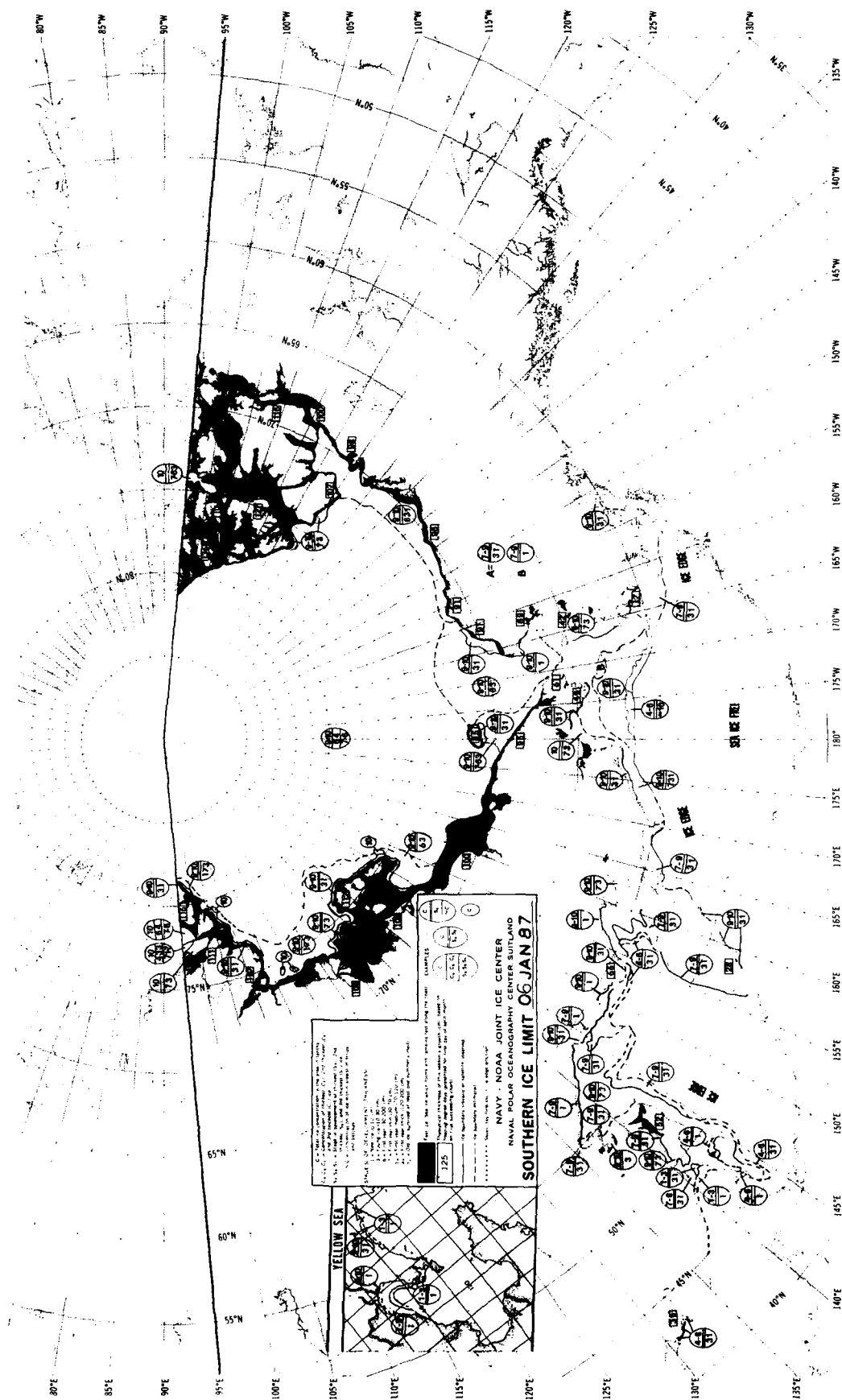
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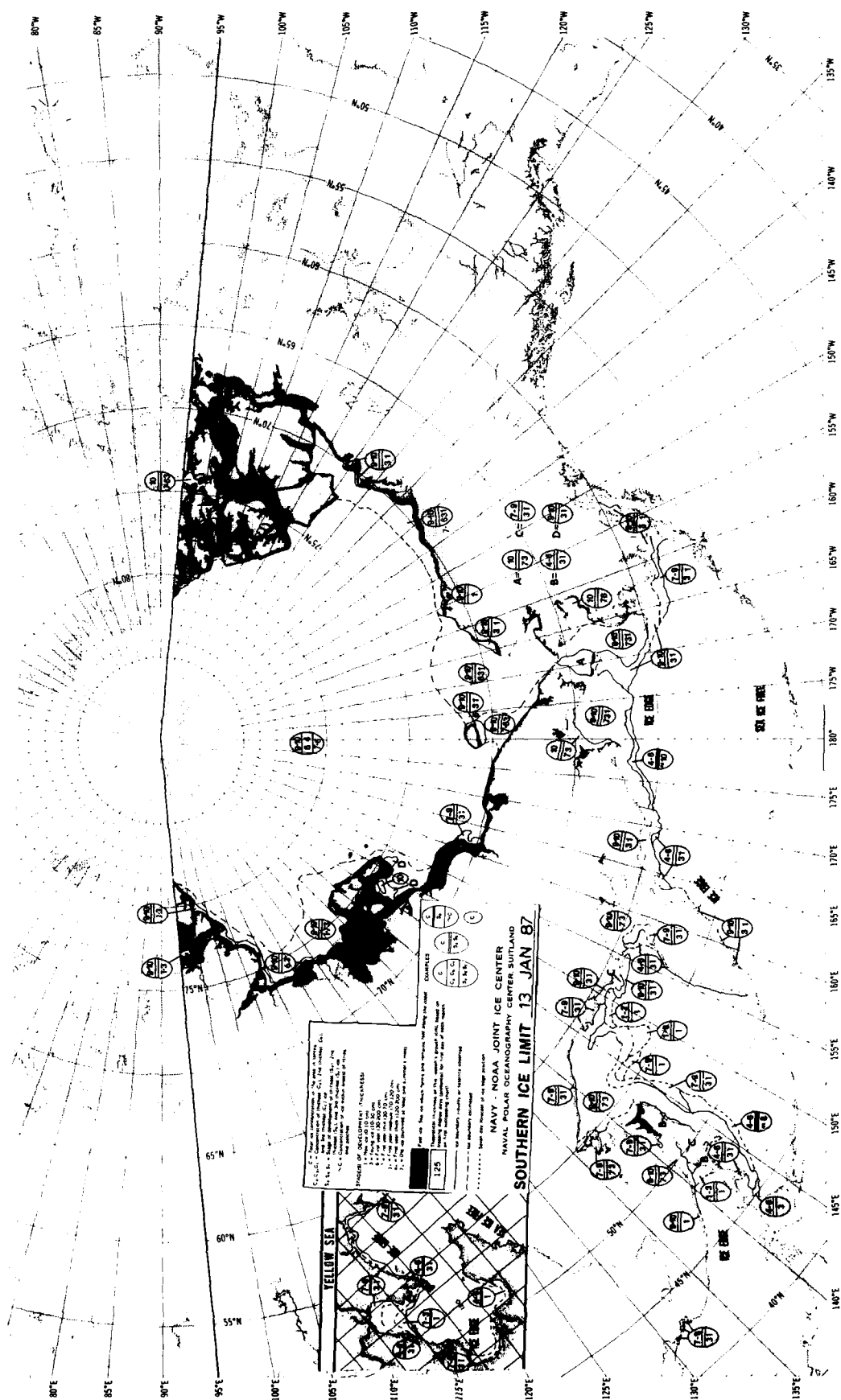
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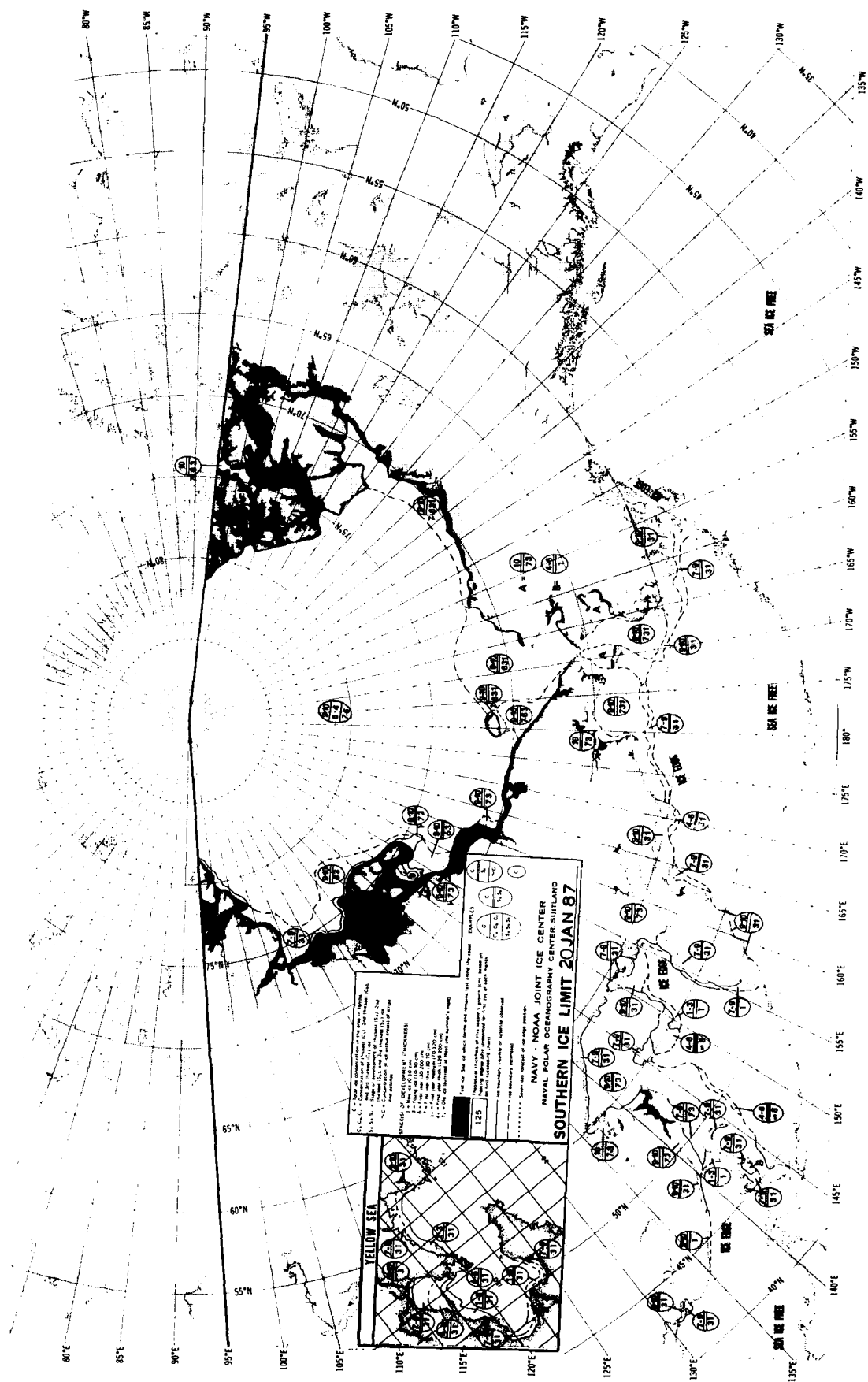
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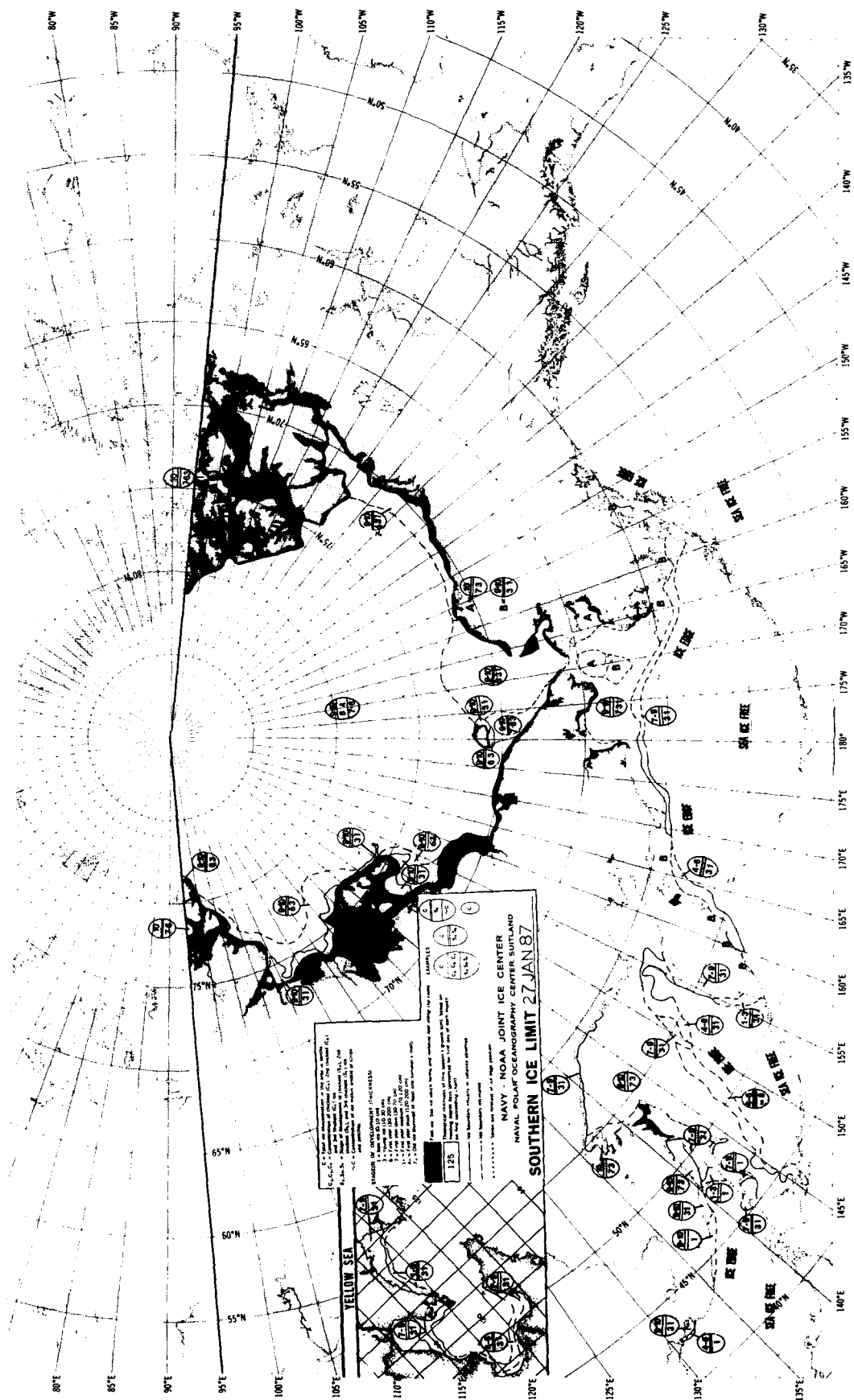


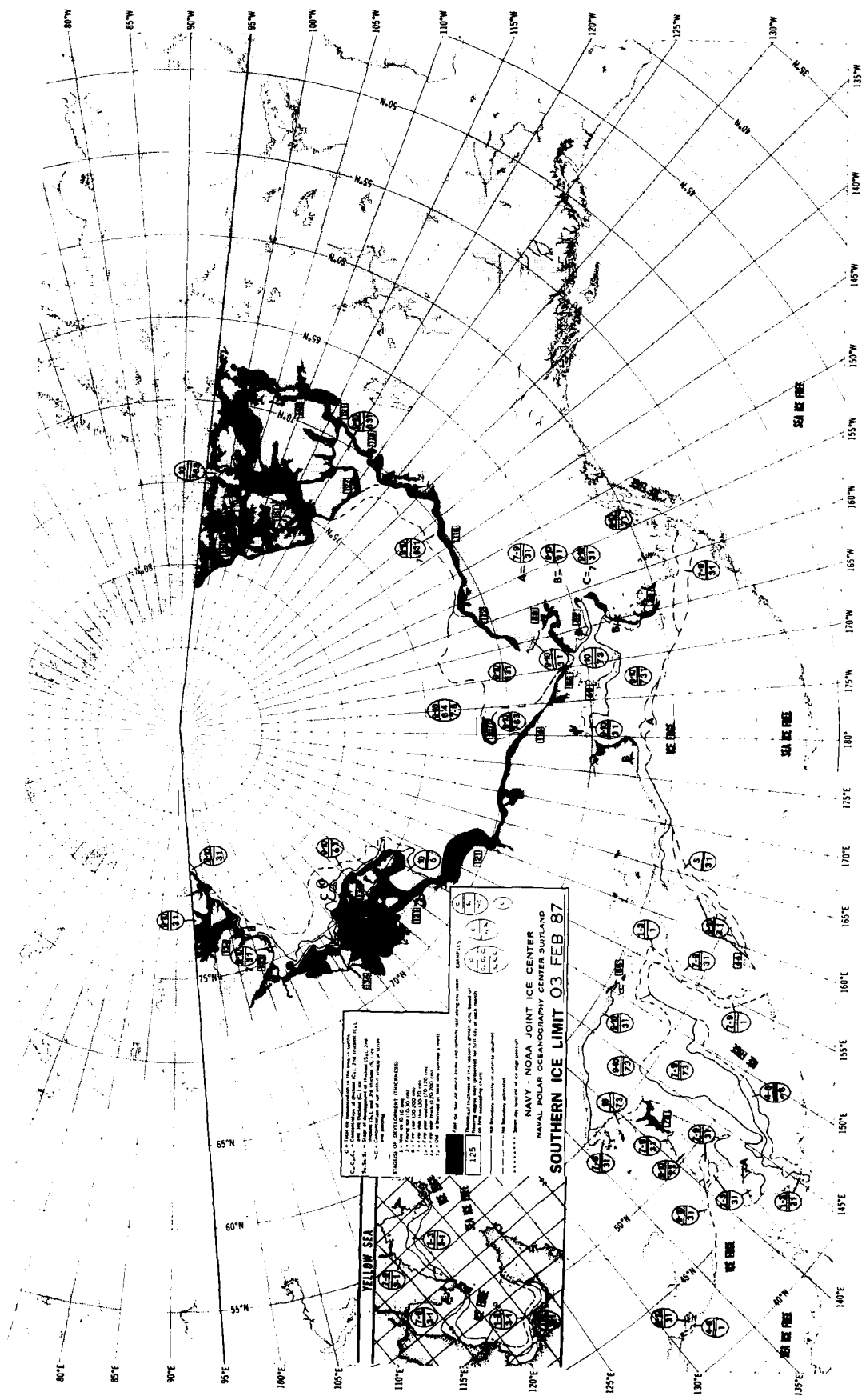


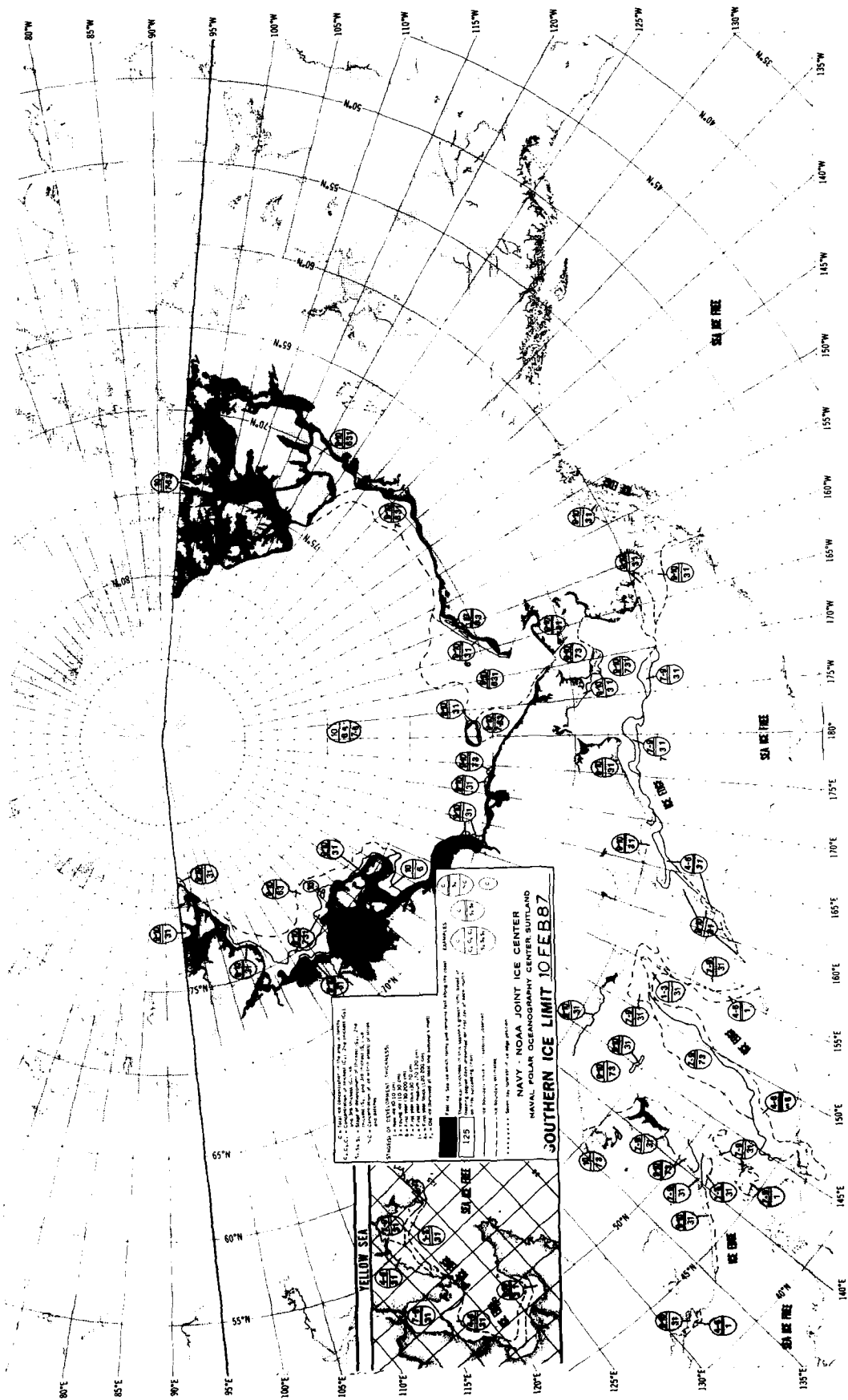


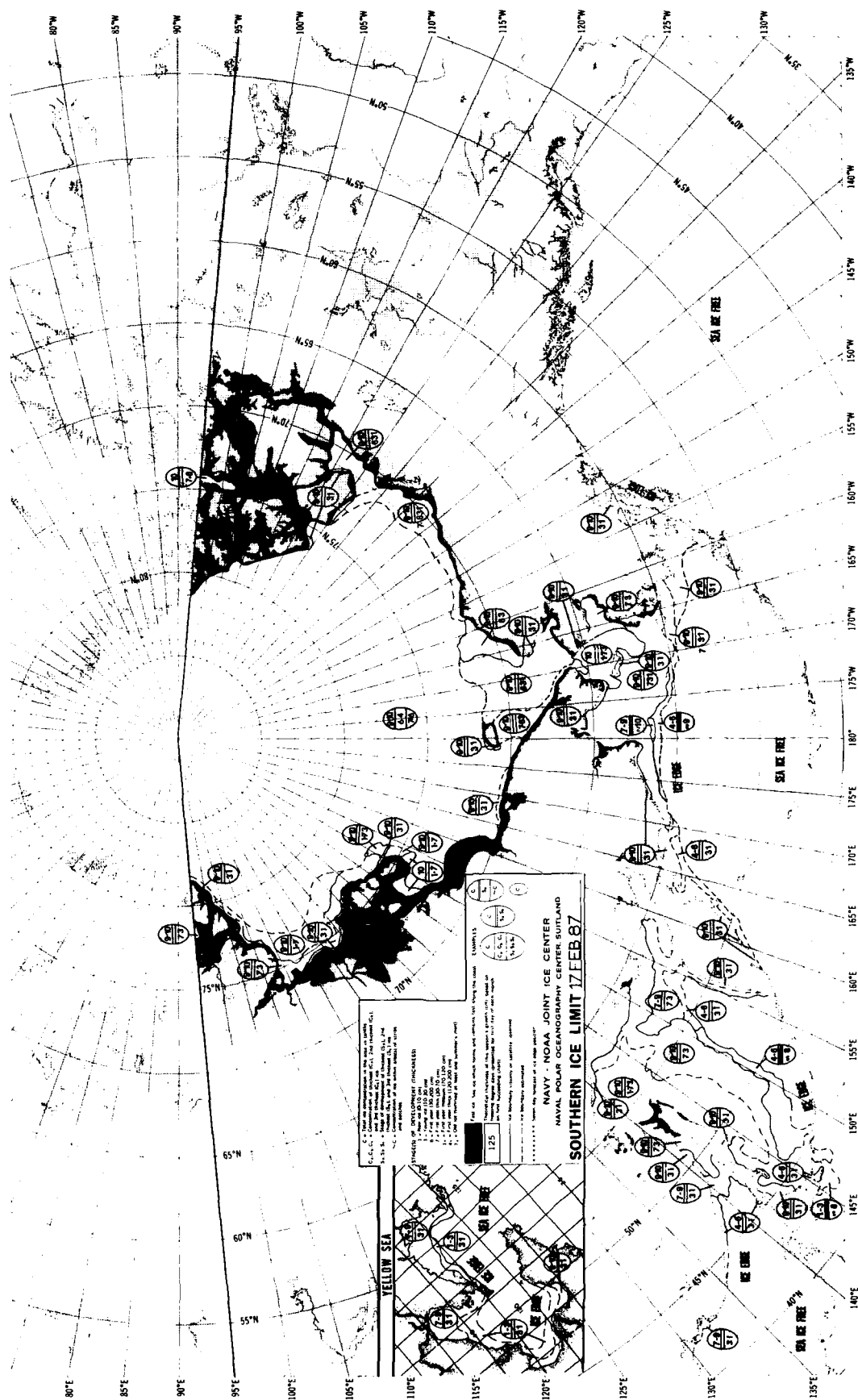


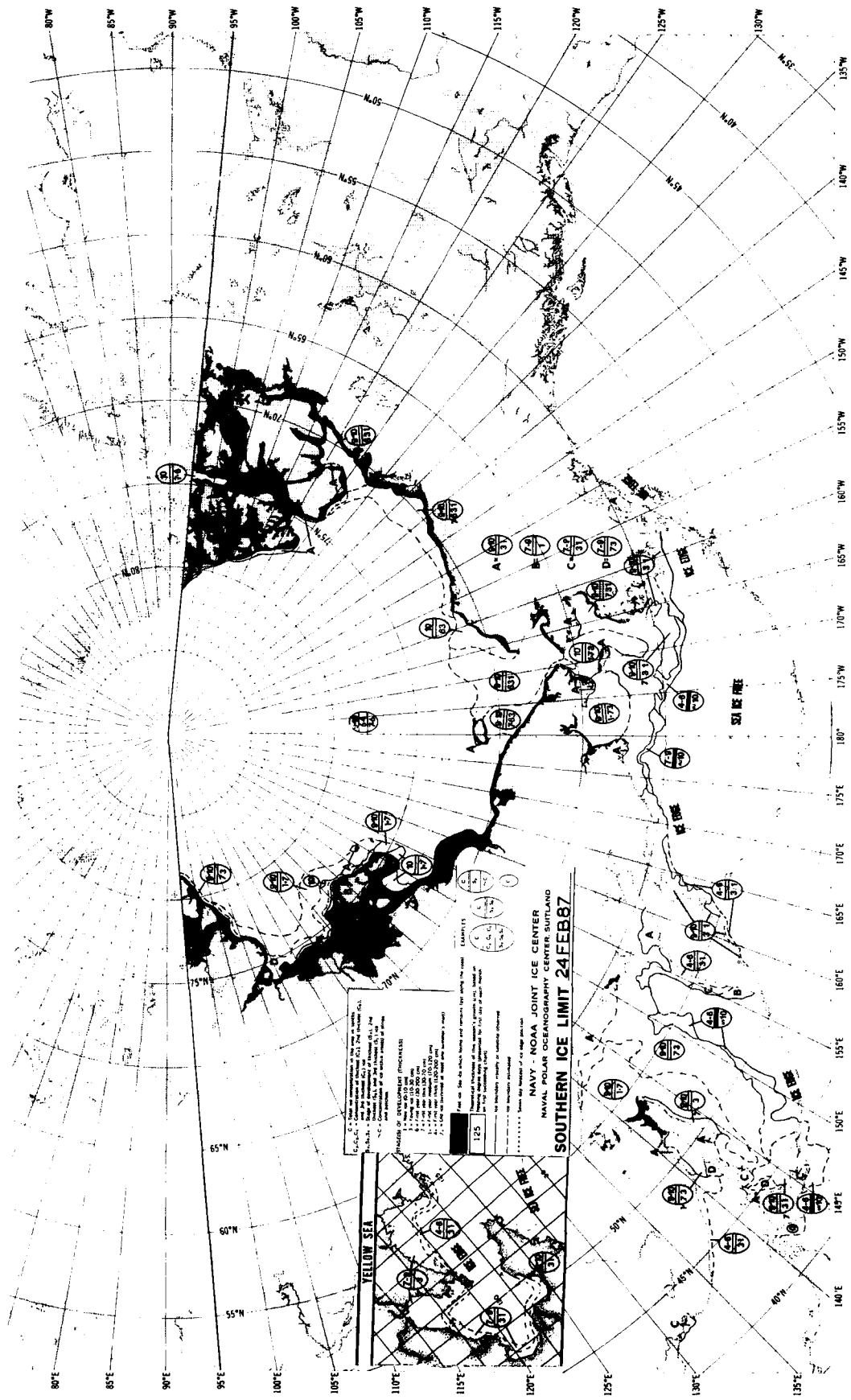


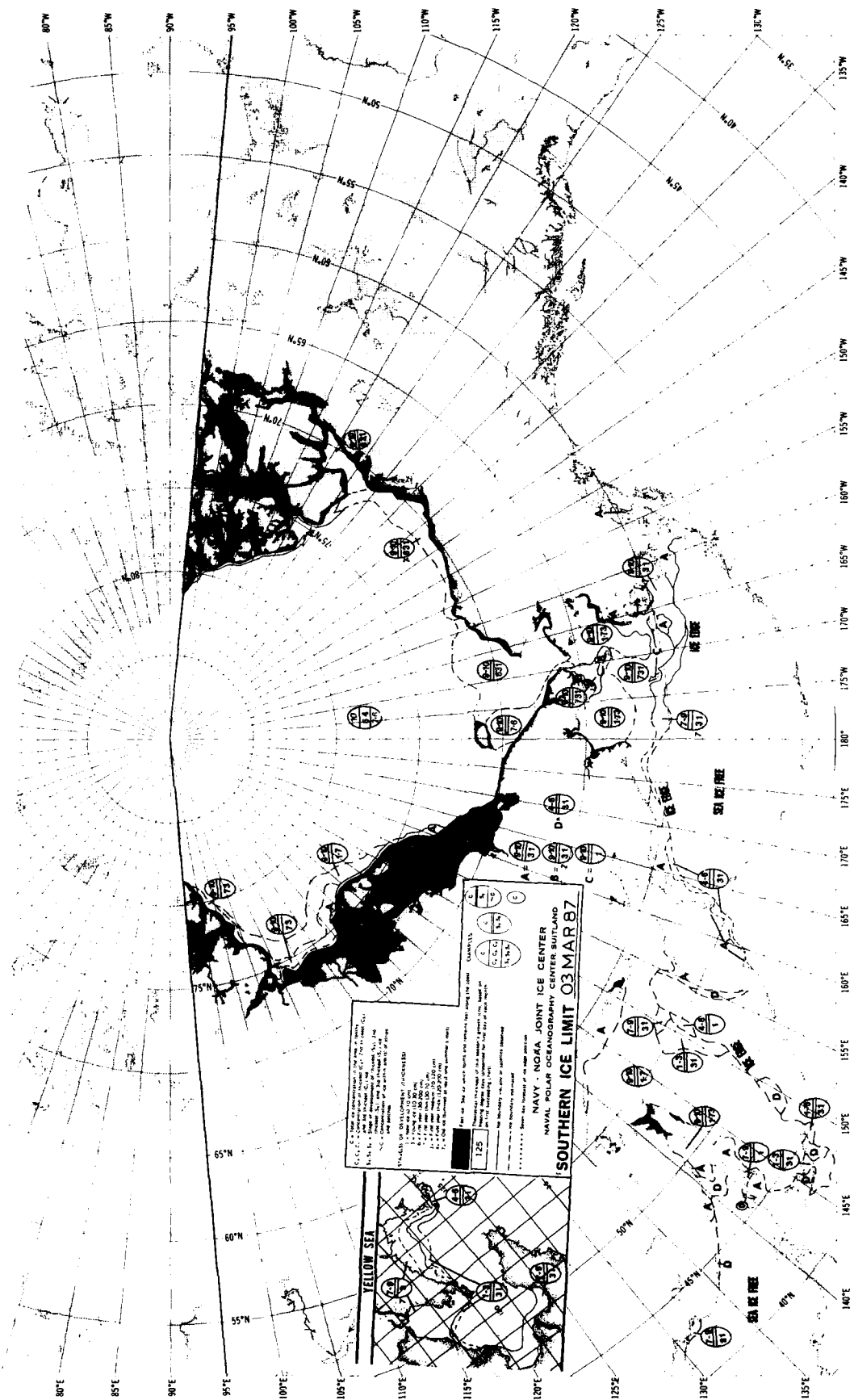


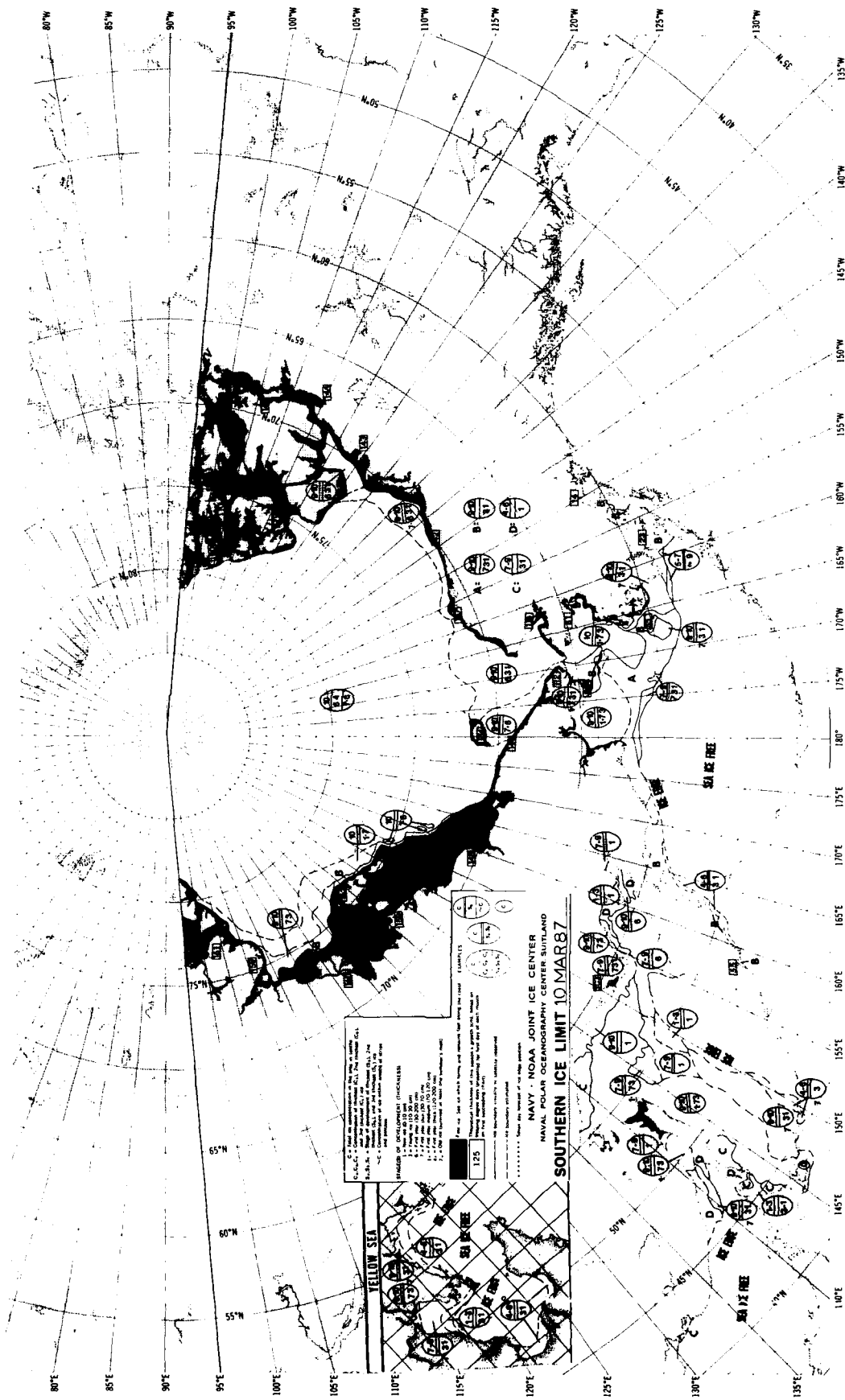


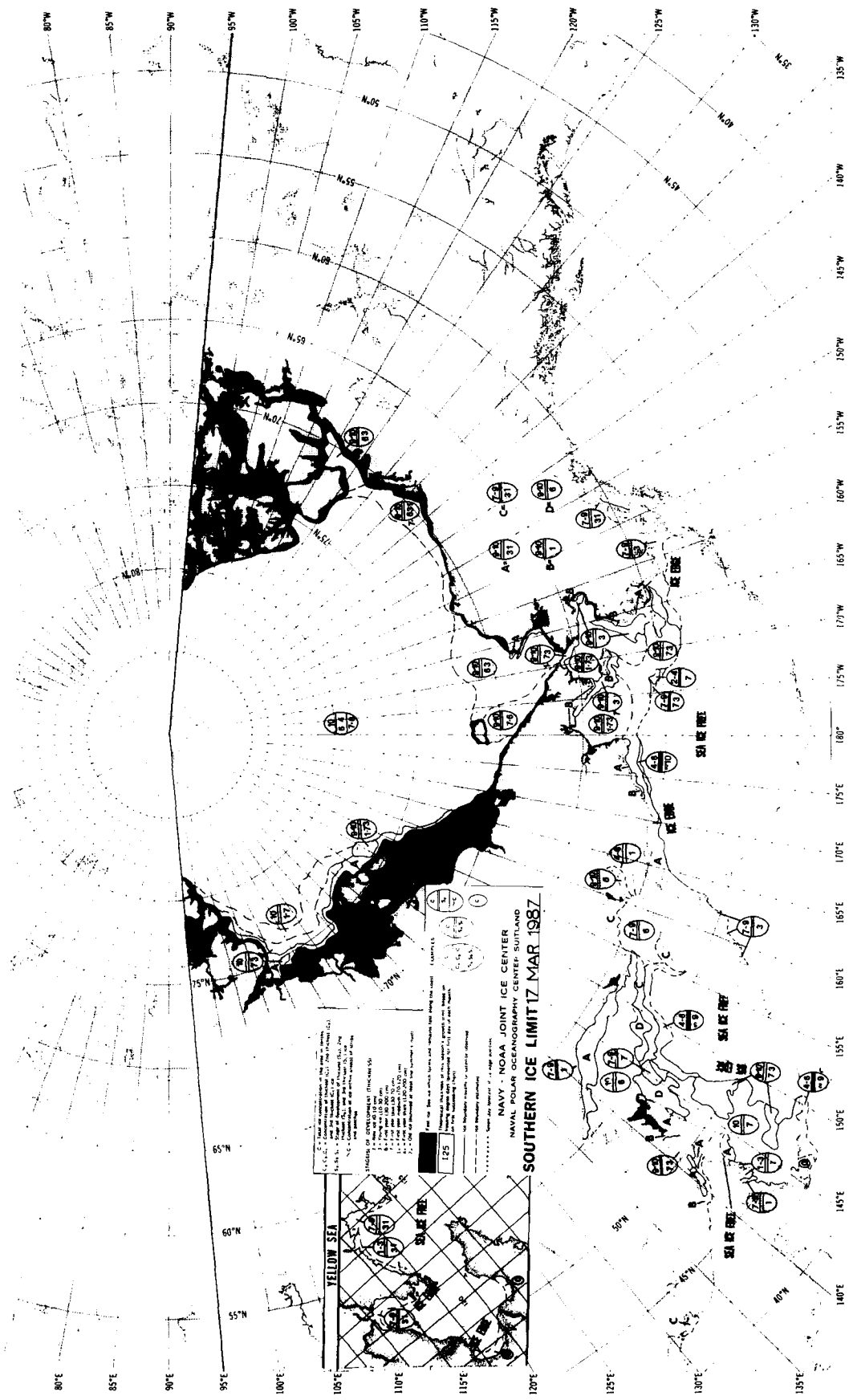


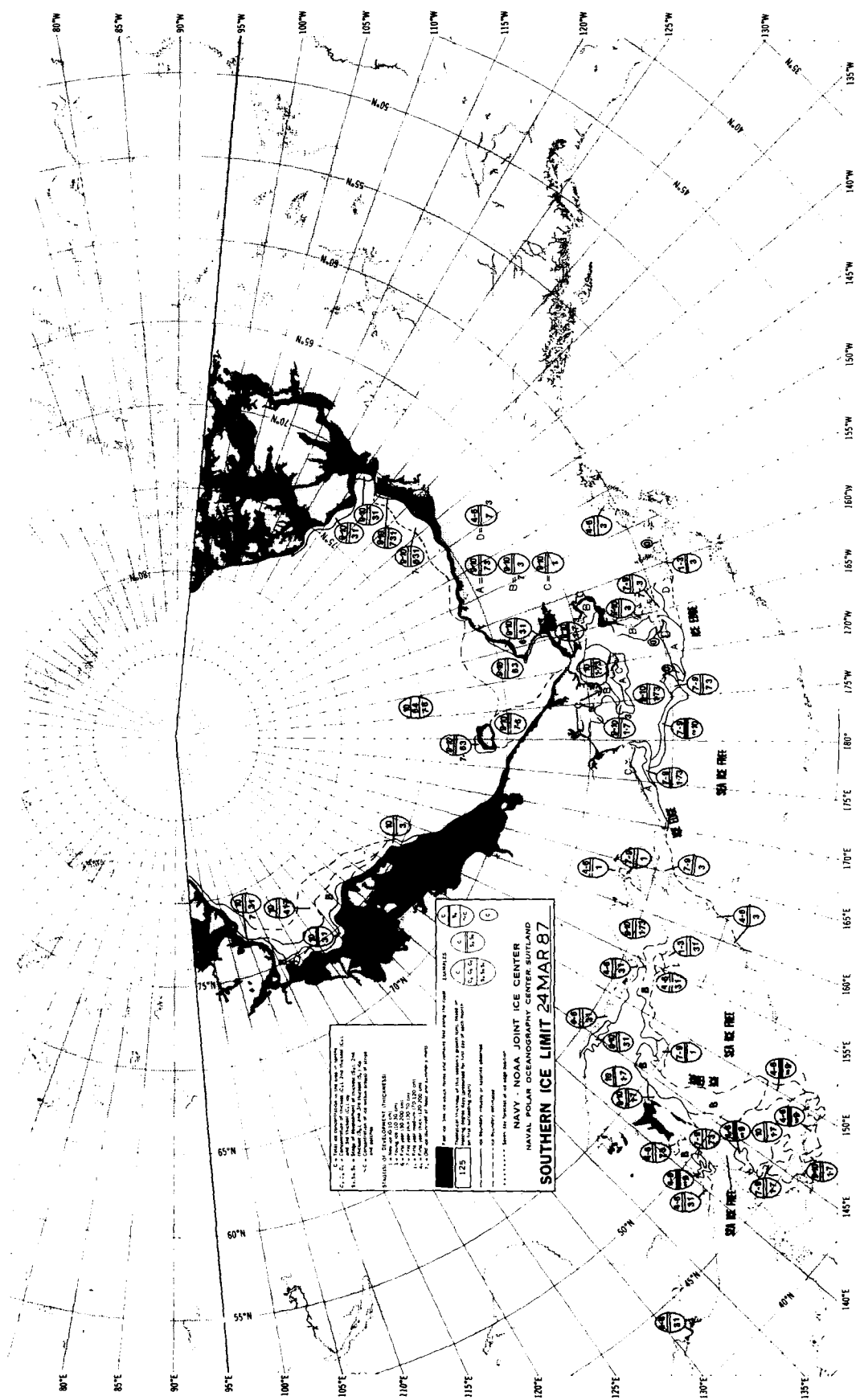


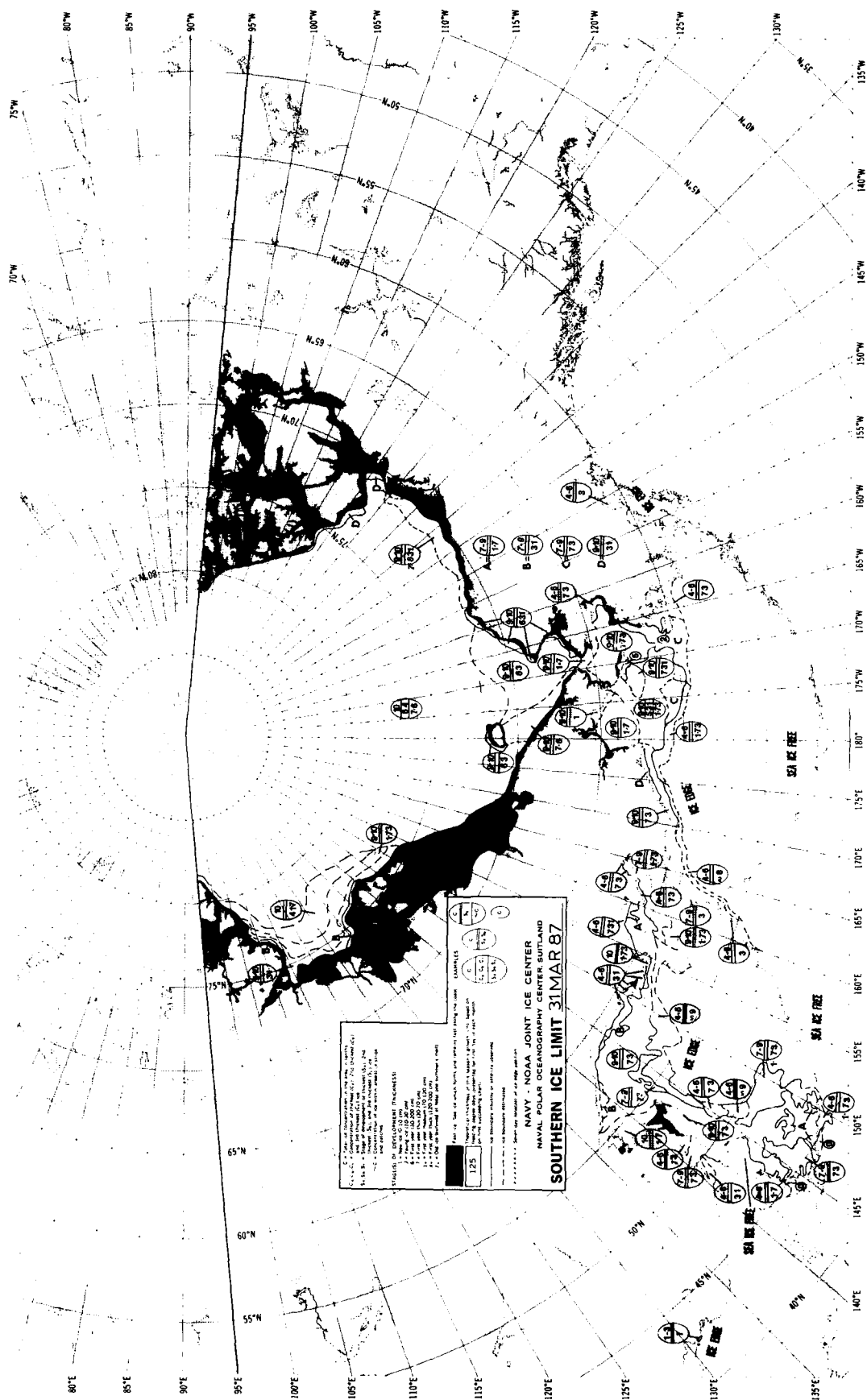


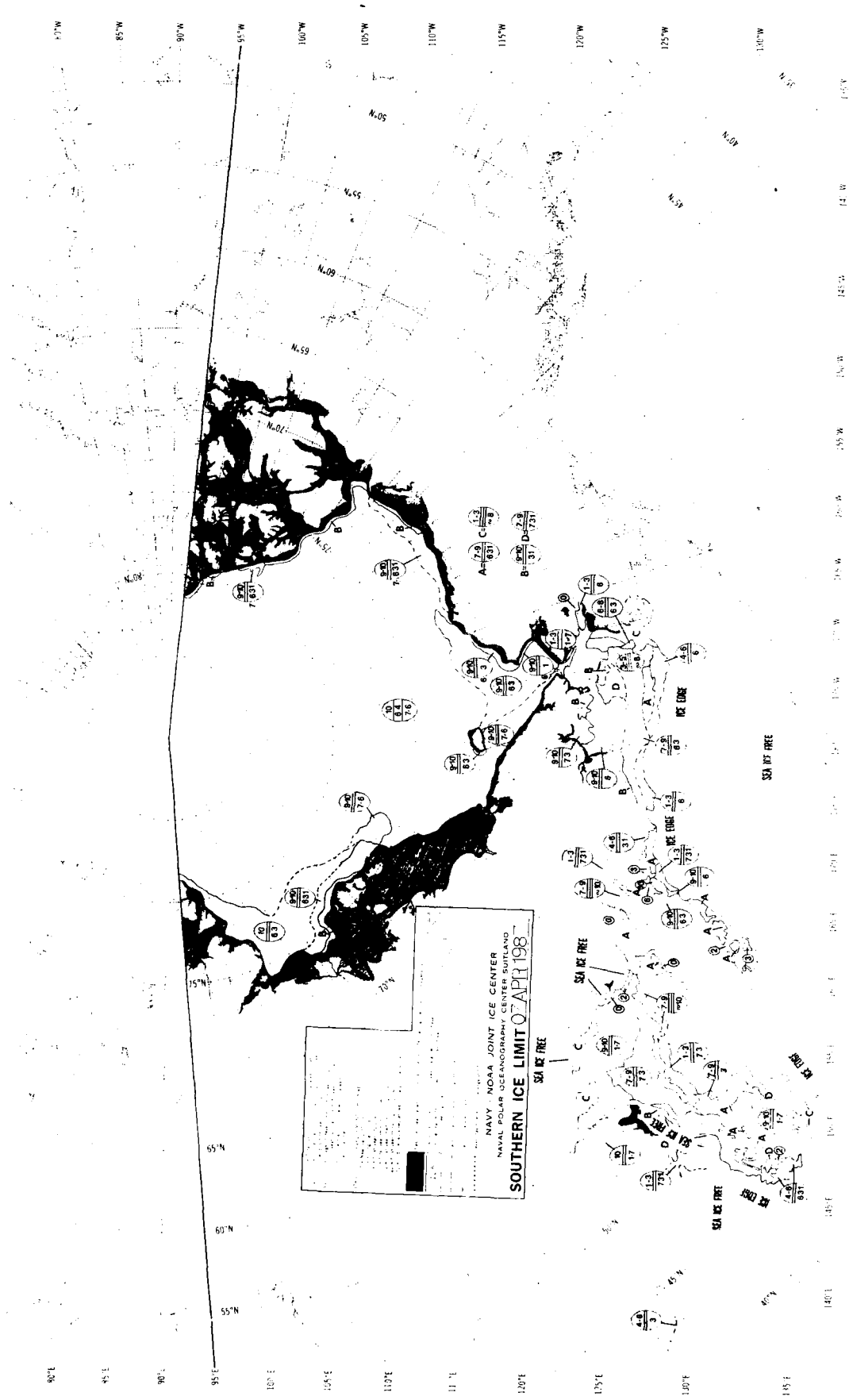




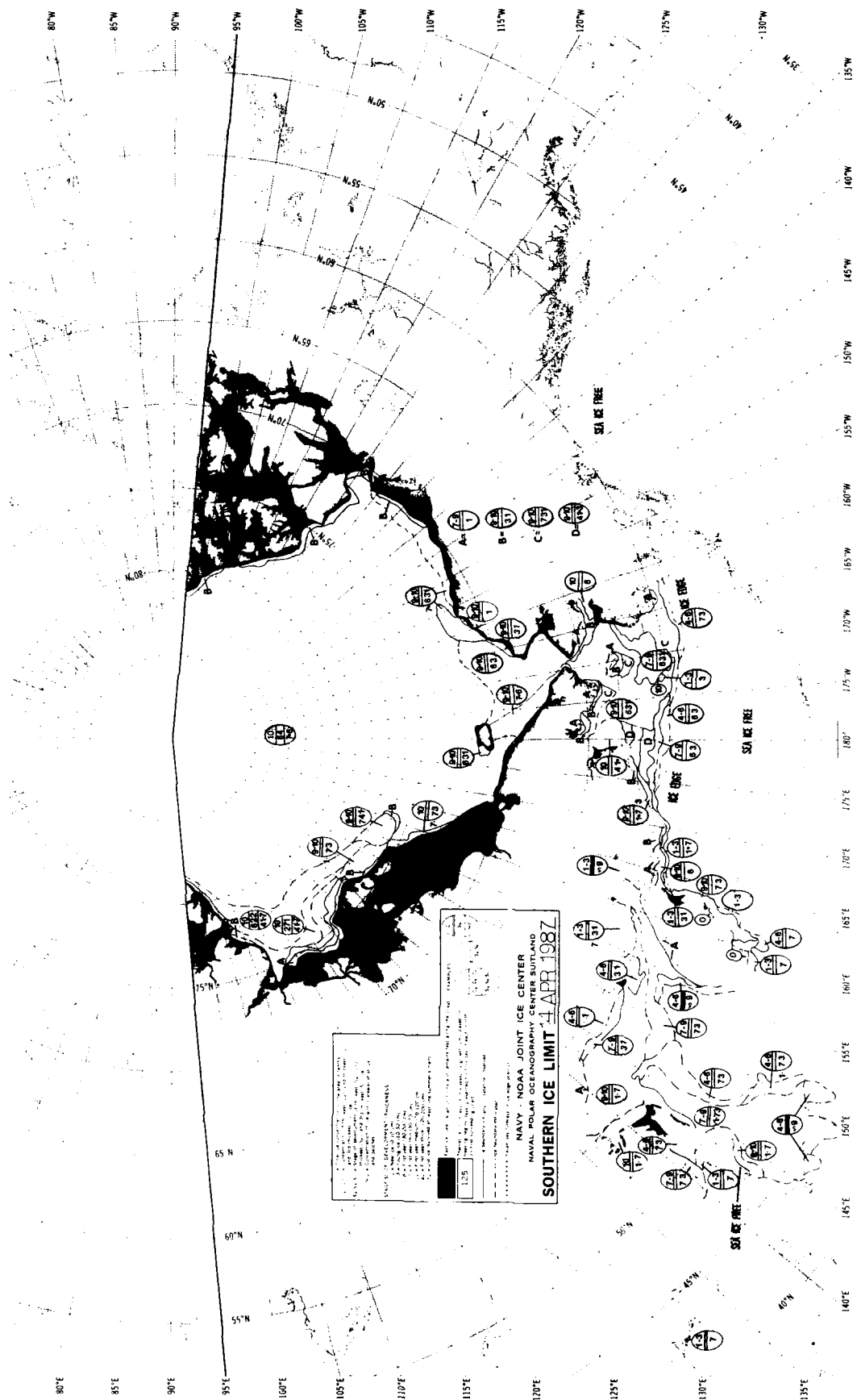


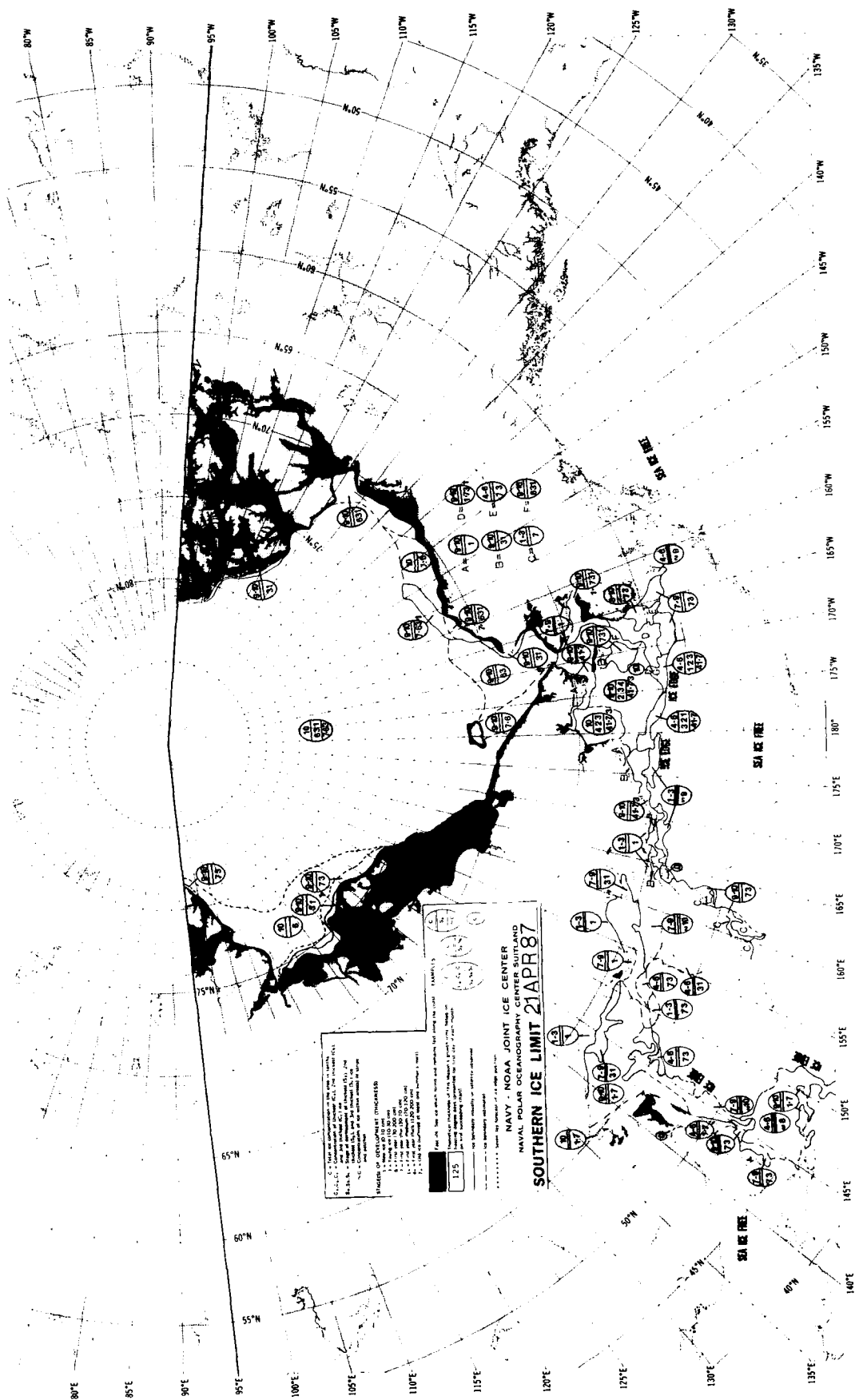


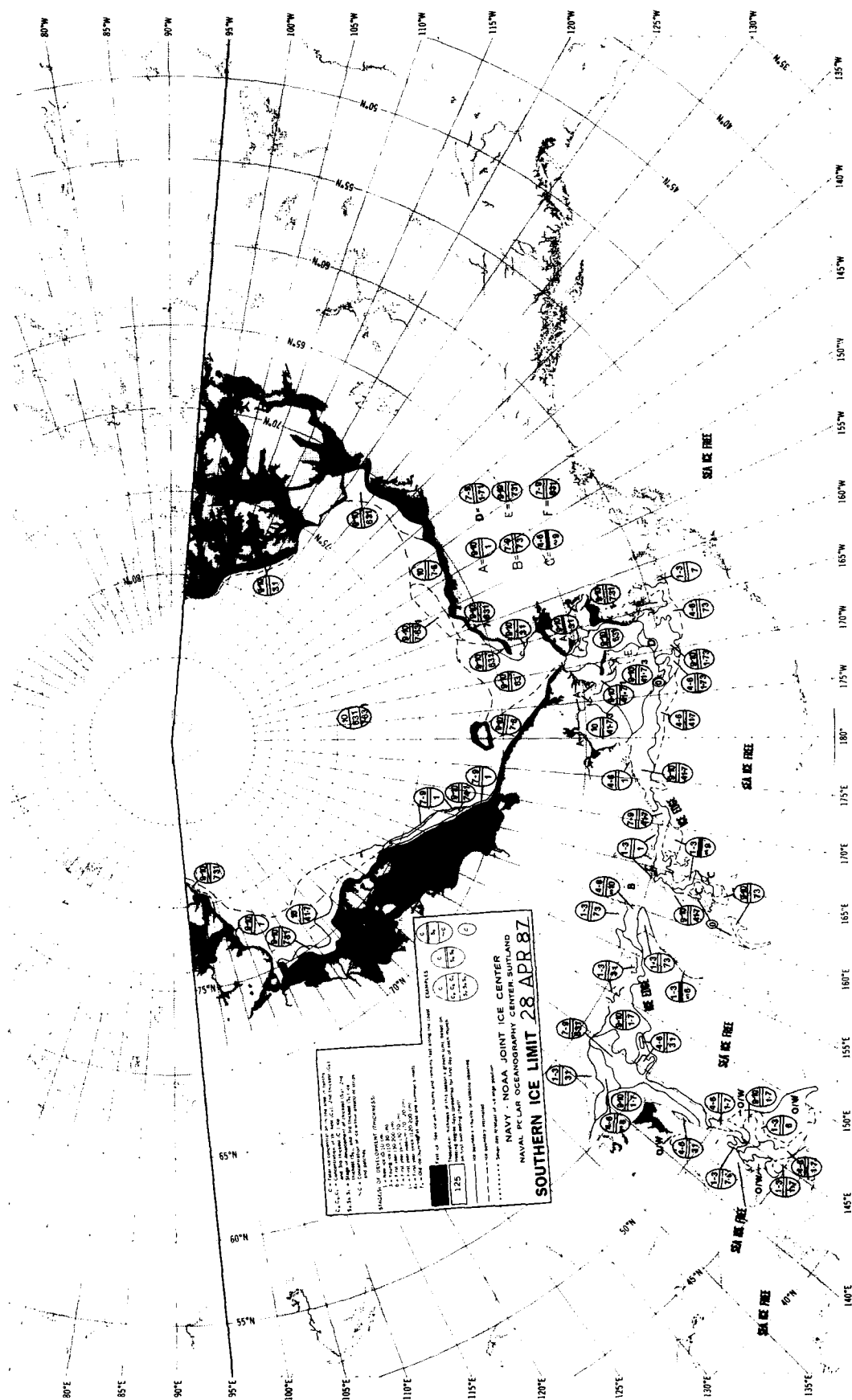


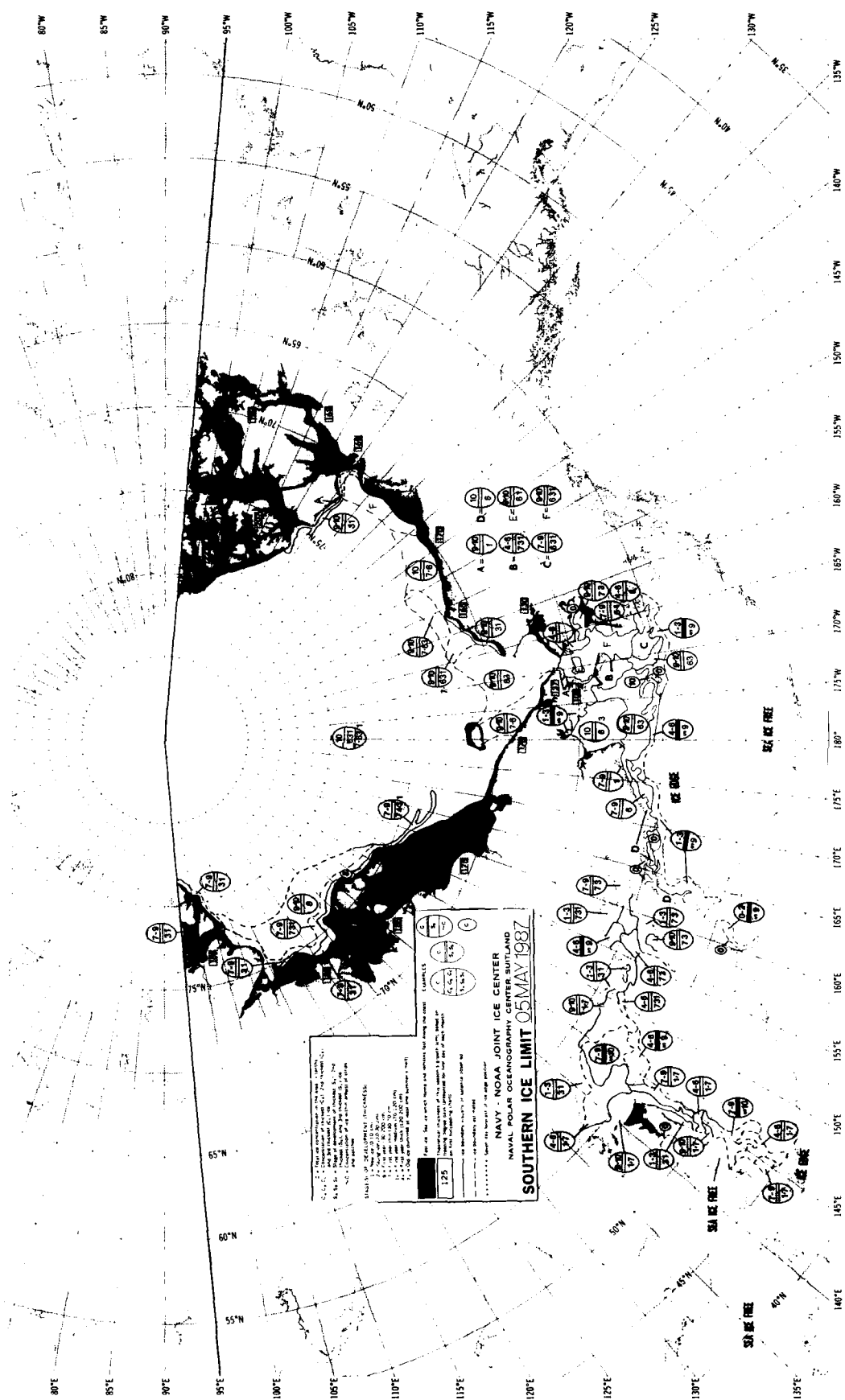


NAVY - NOAA JOINT ICE CENTER
NAVAL POLAR OCEANOGRAPHY CENTER SUITLAND
SOUTHERN ICE LIMIT Q7APR198









NAVY, NOAA JOINT ICE CENTER
NAVAL POLAR OCEANOGRAPHY CENTER SUTLAND
SOUTHERN ICE LIMIT 05 MAY 1987

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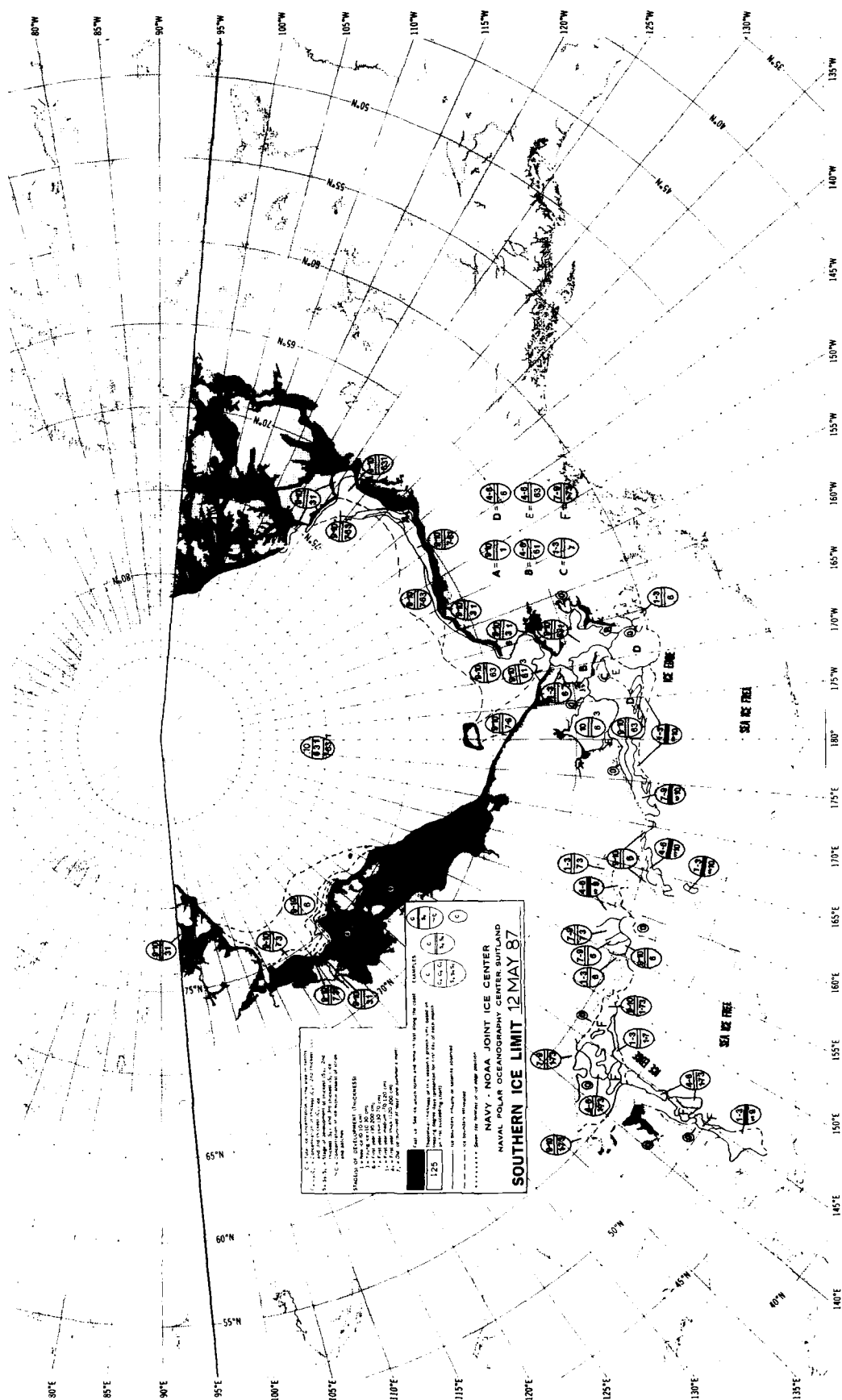
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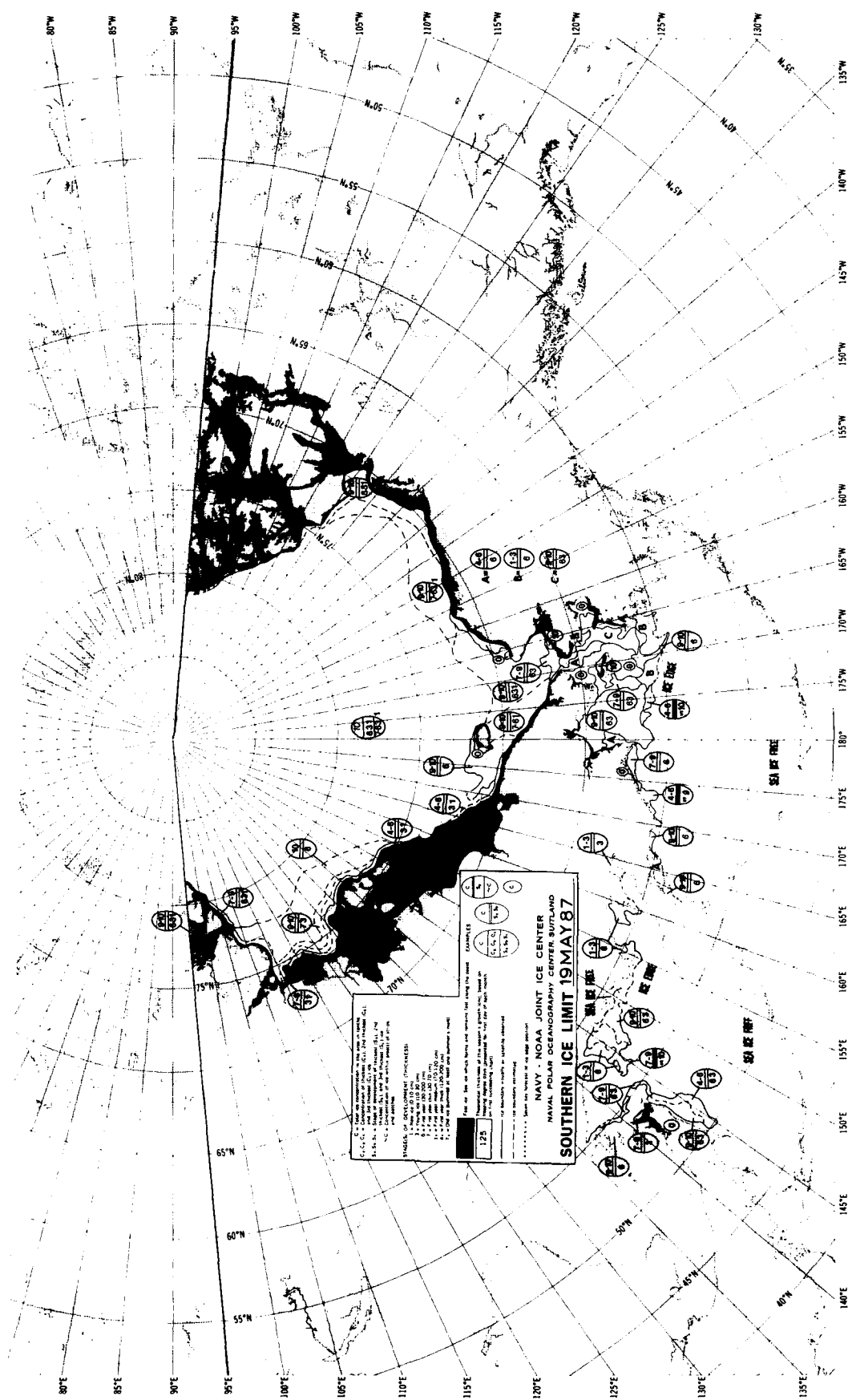
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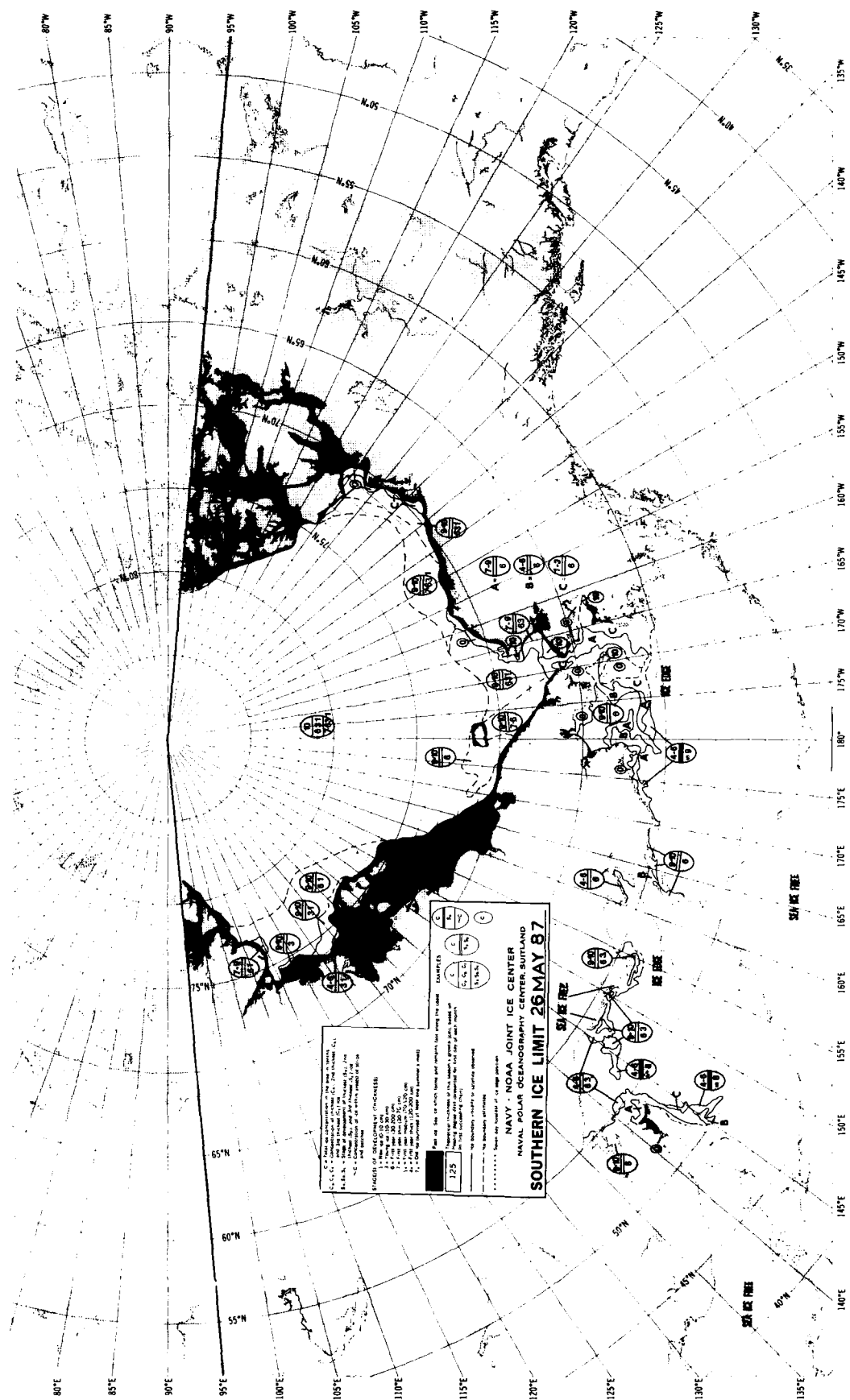
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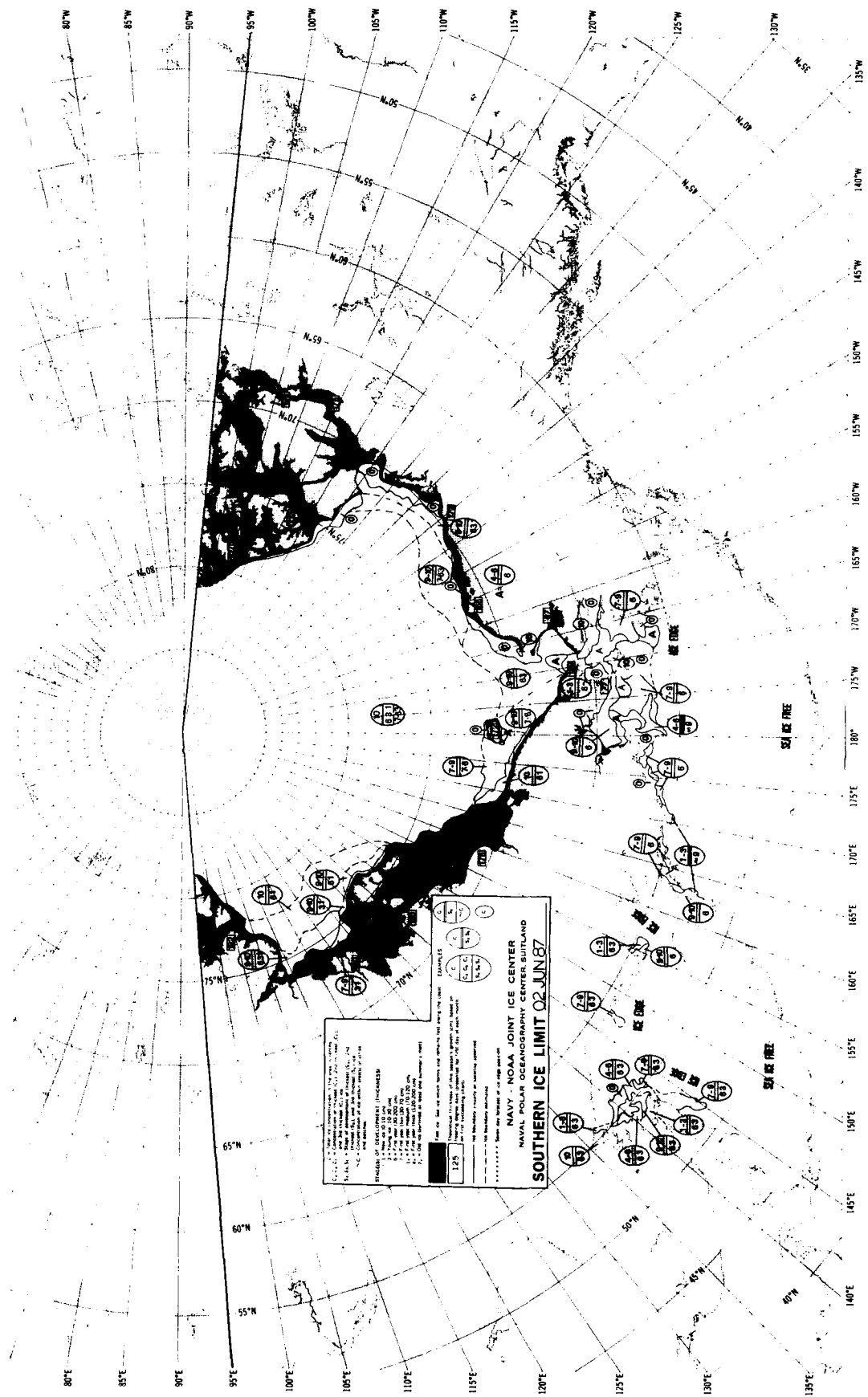
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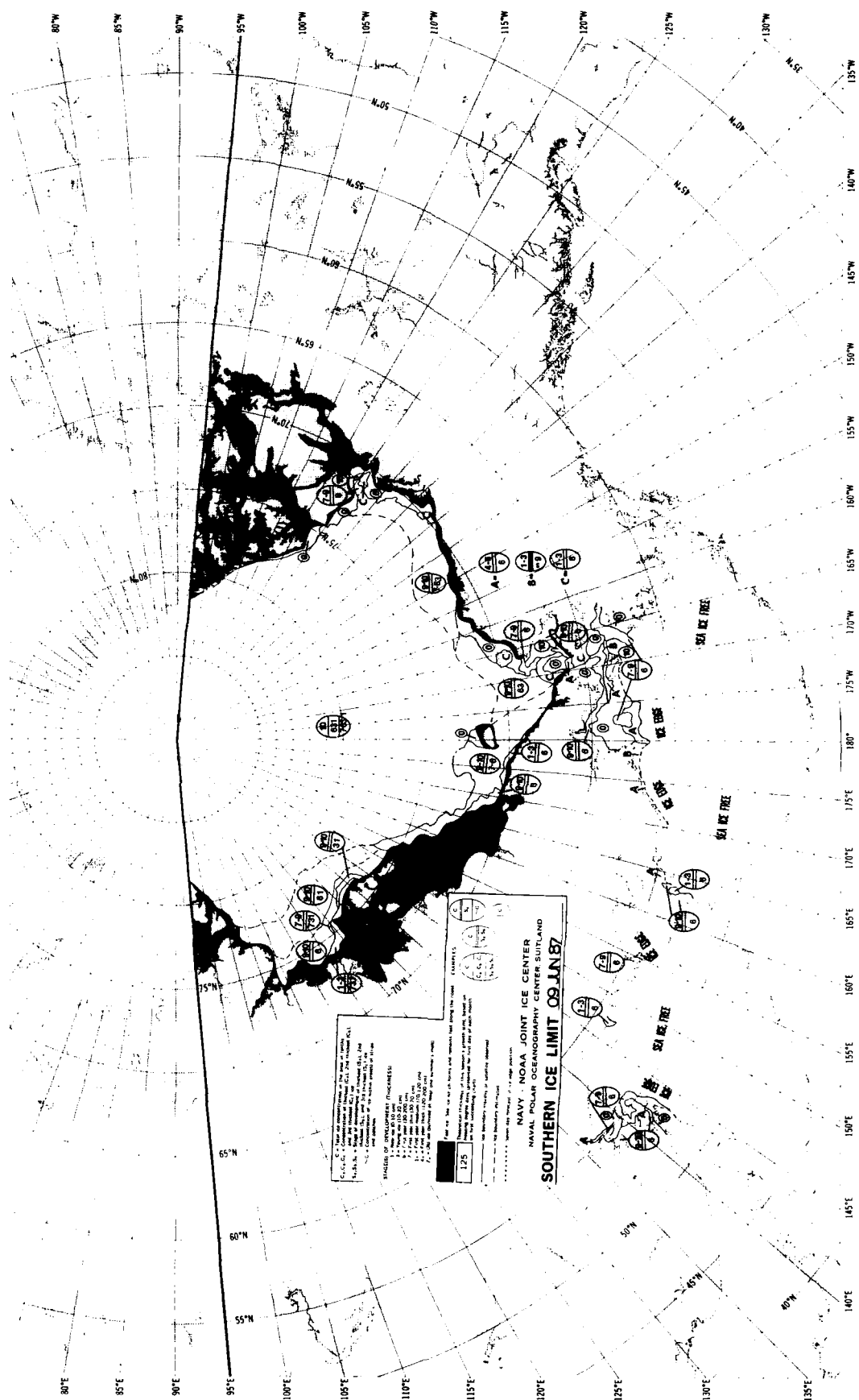
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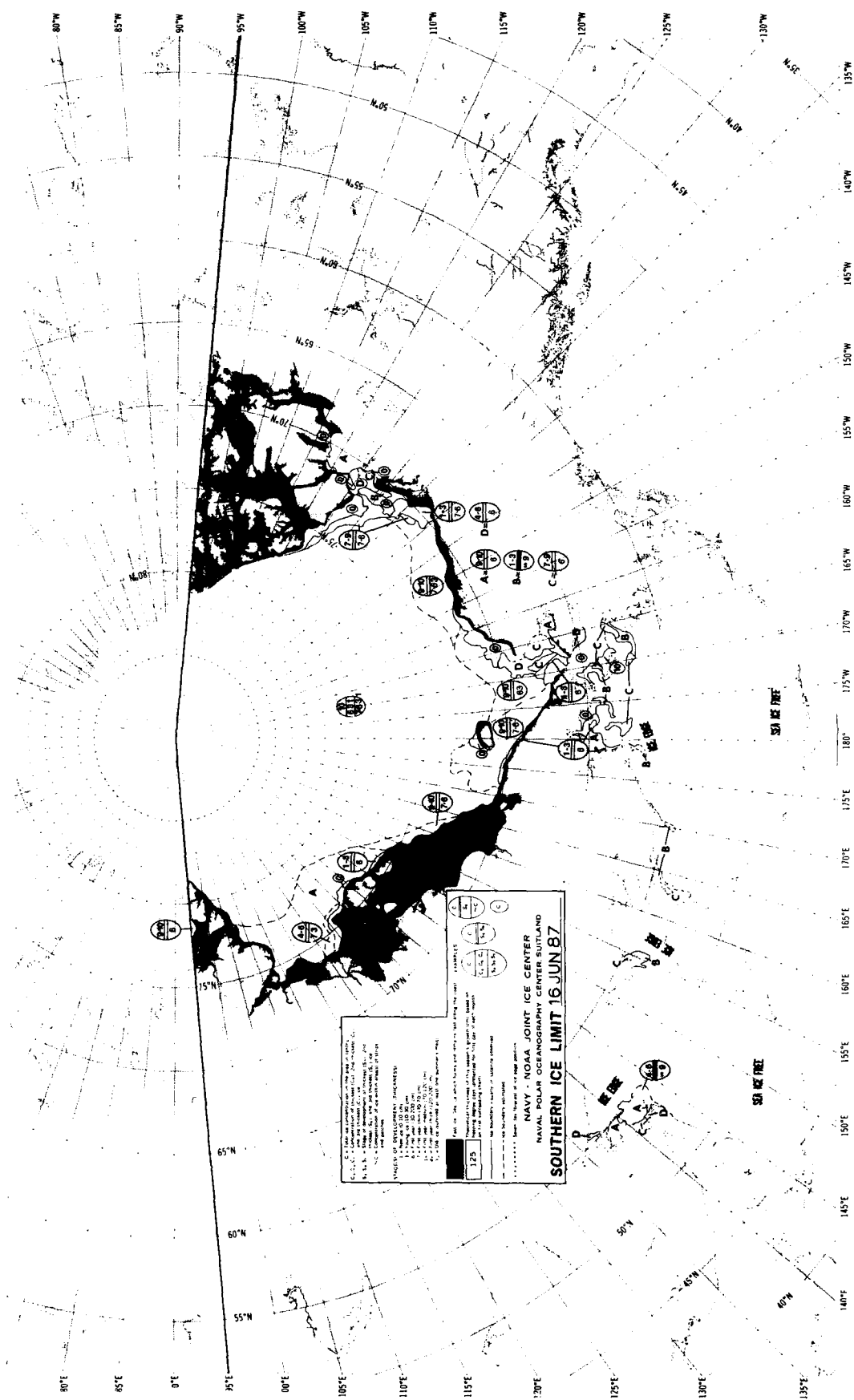


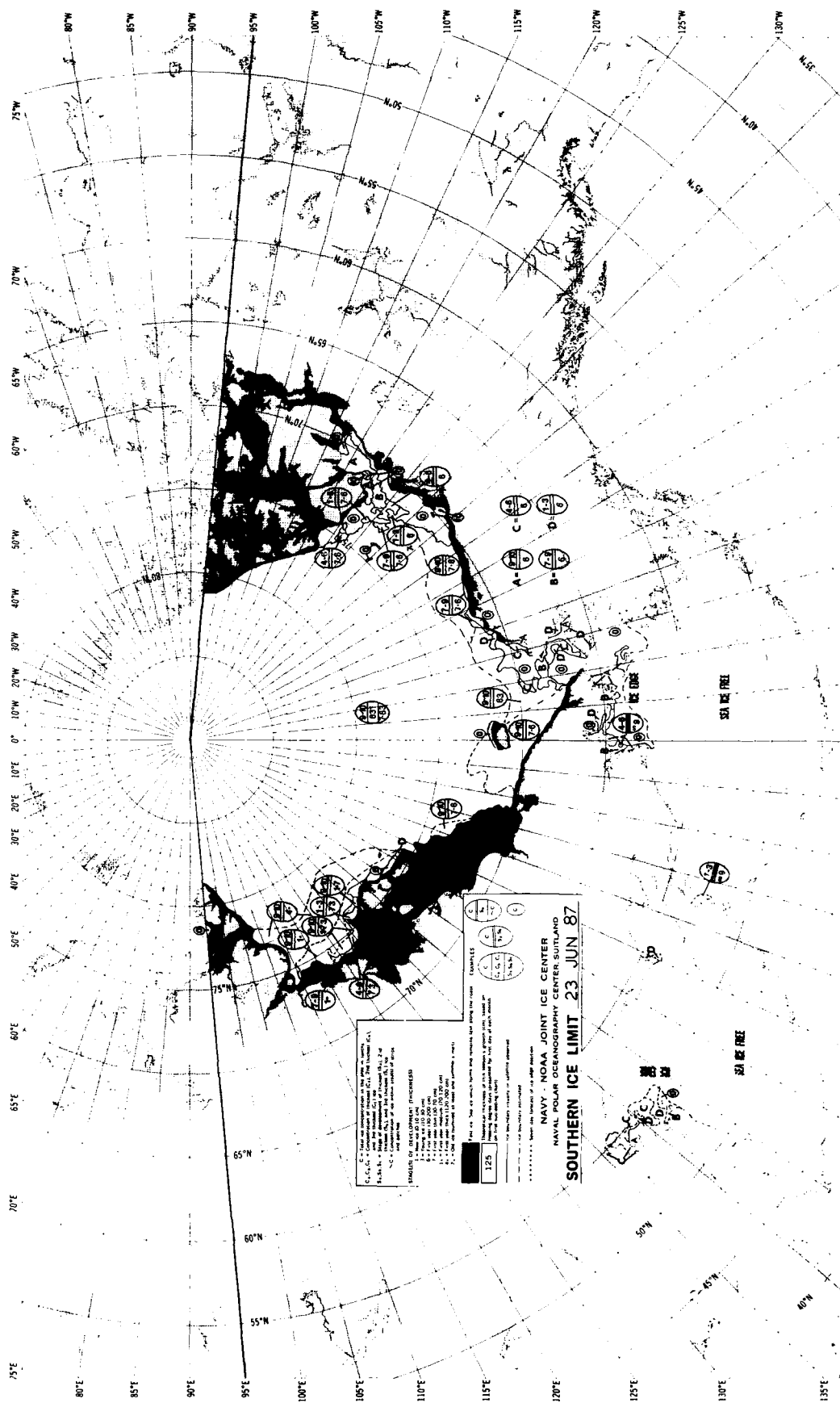


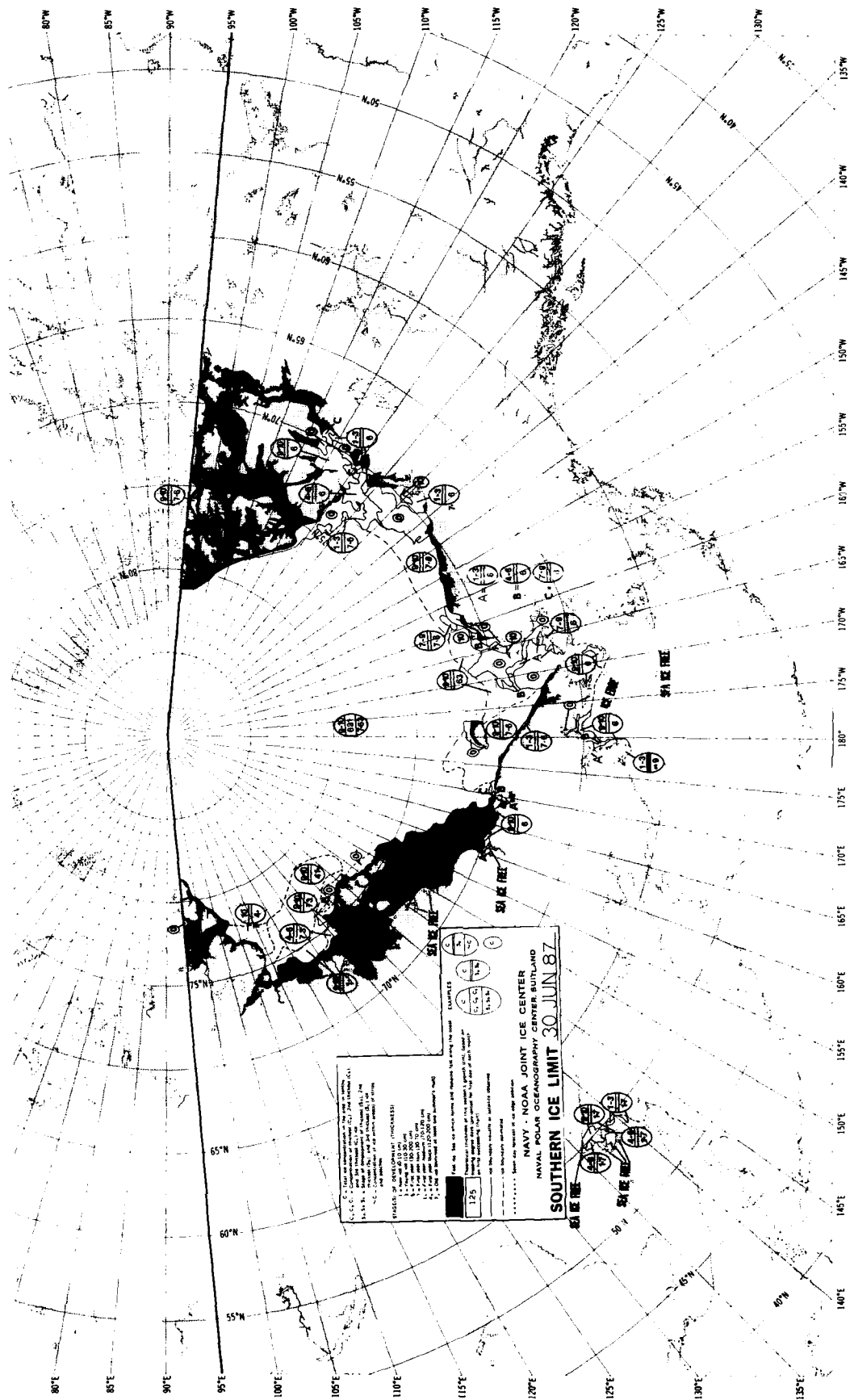


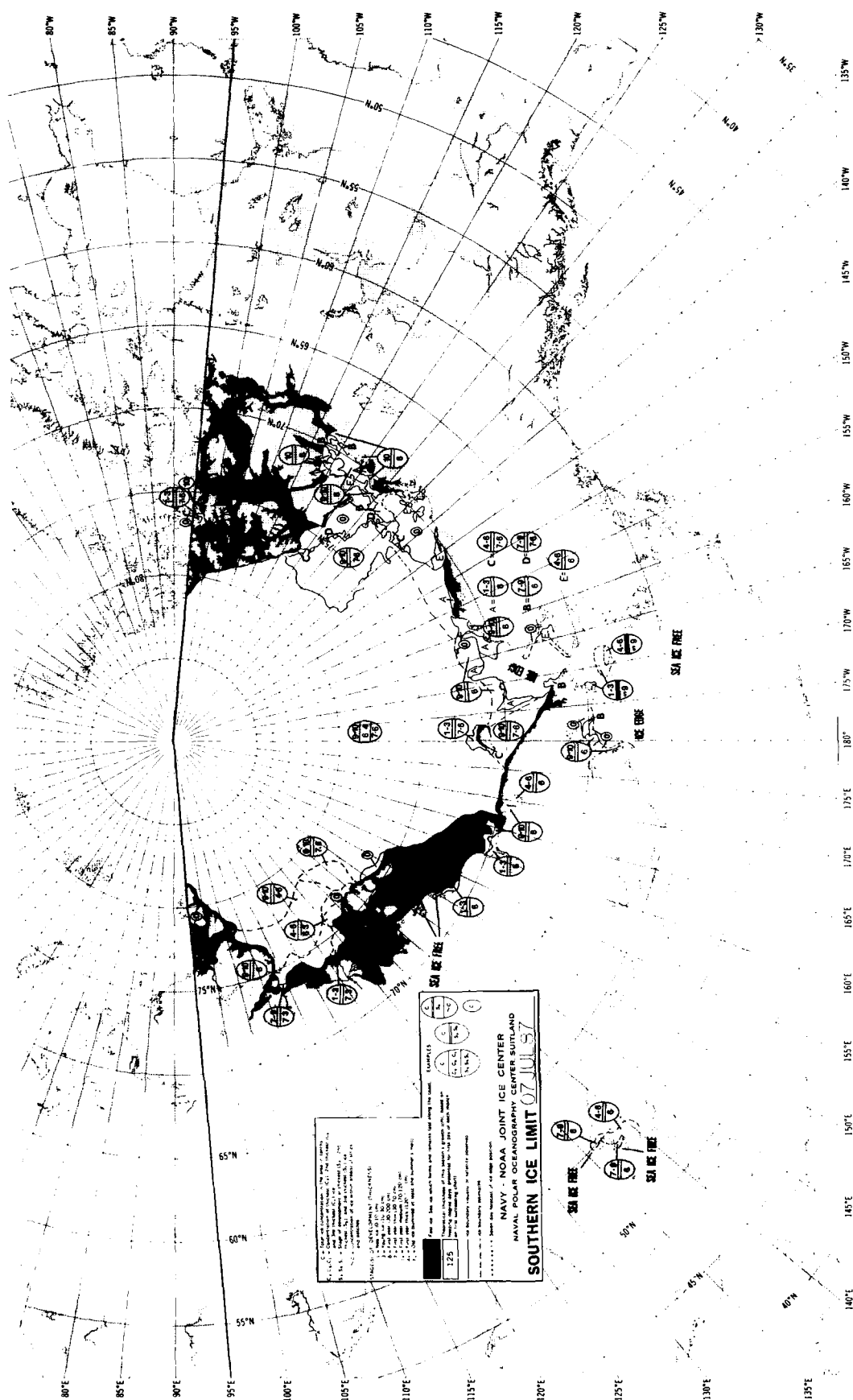


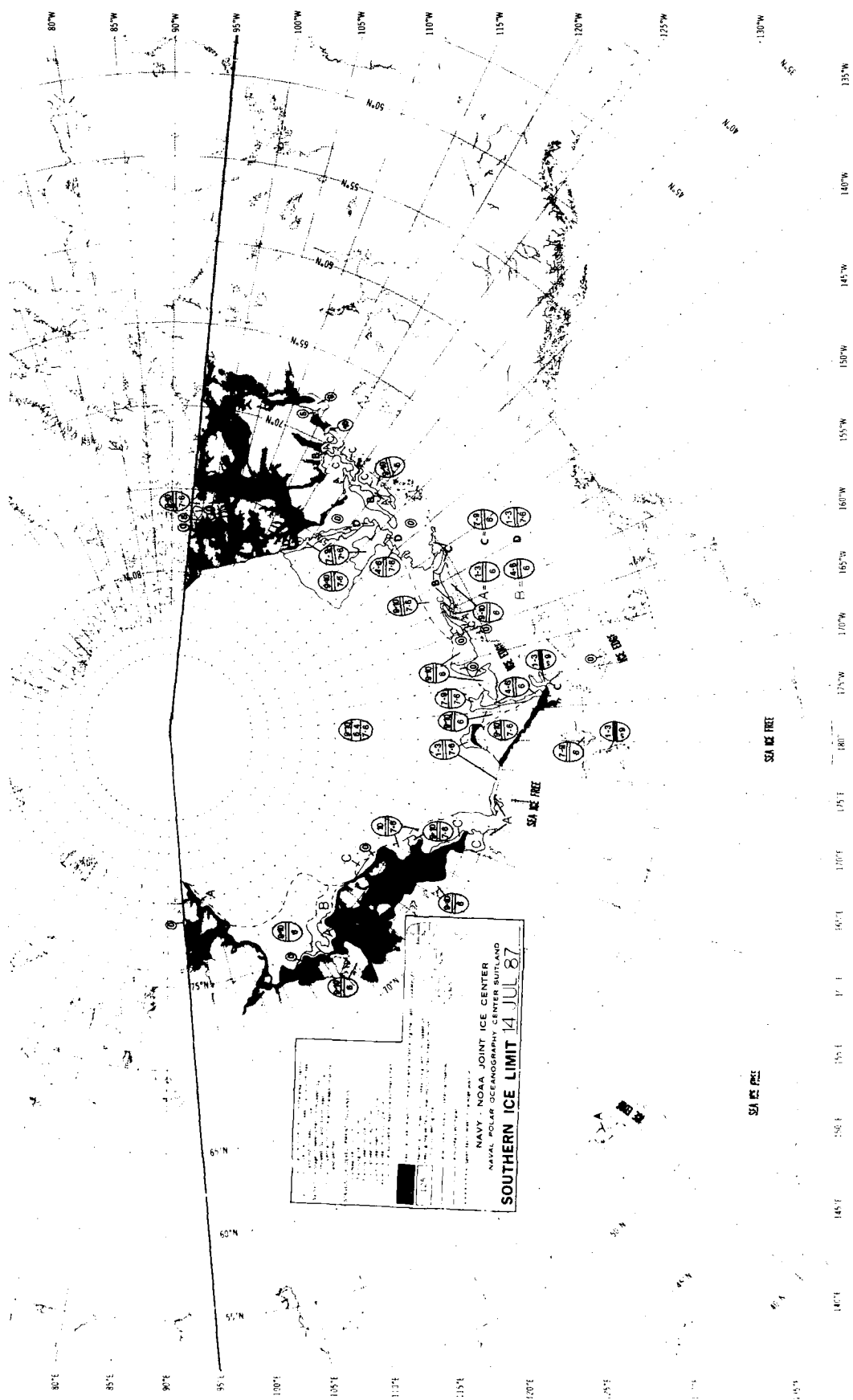


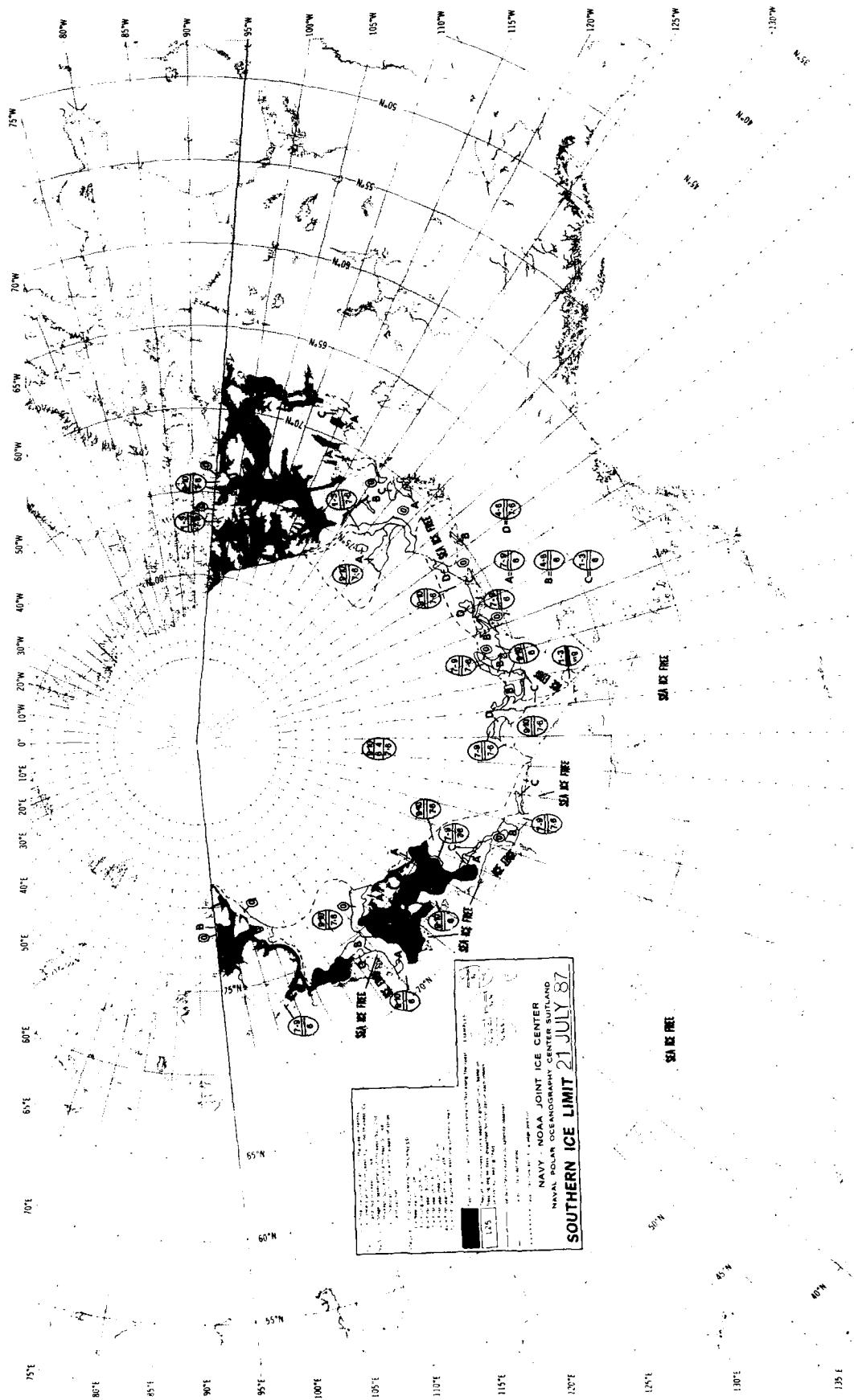


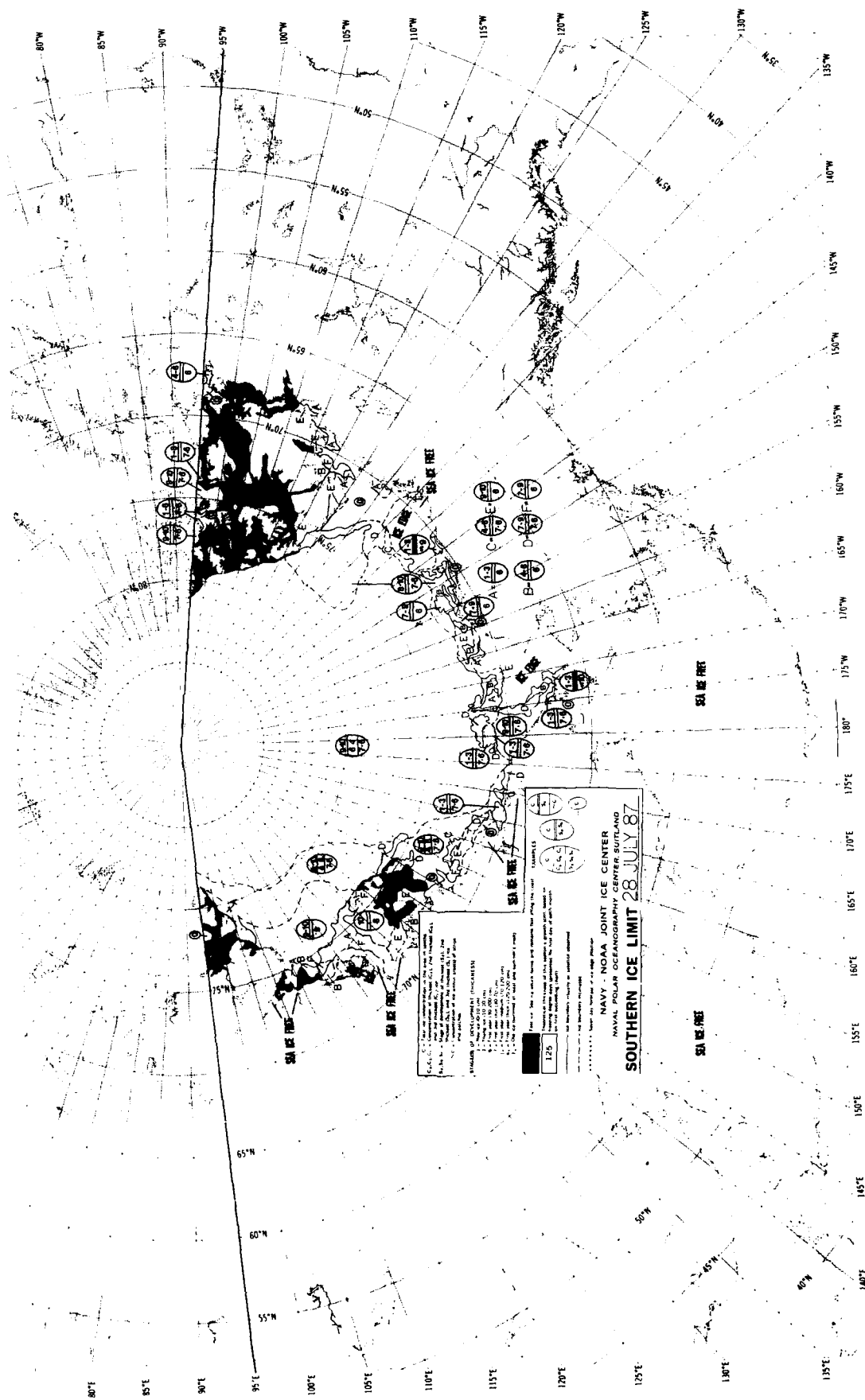


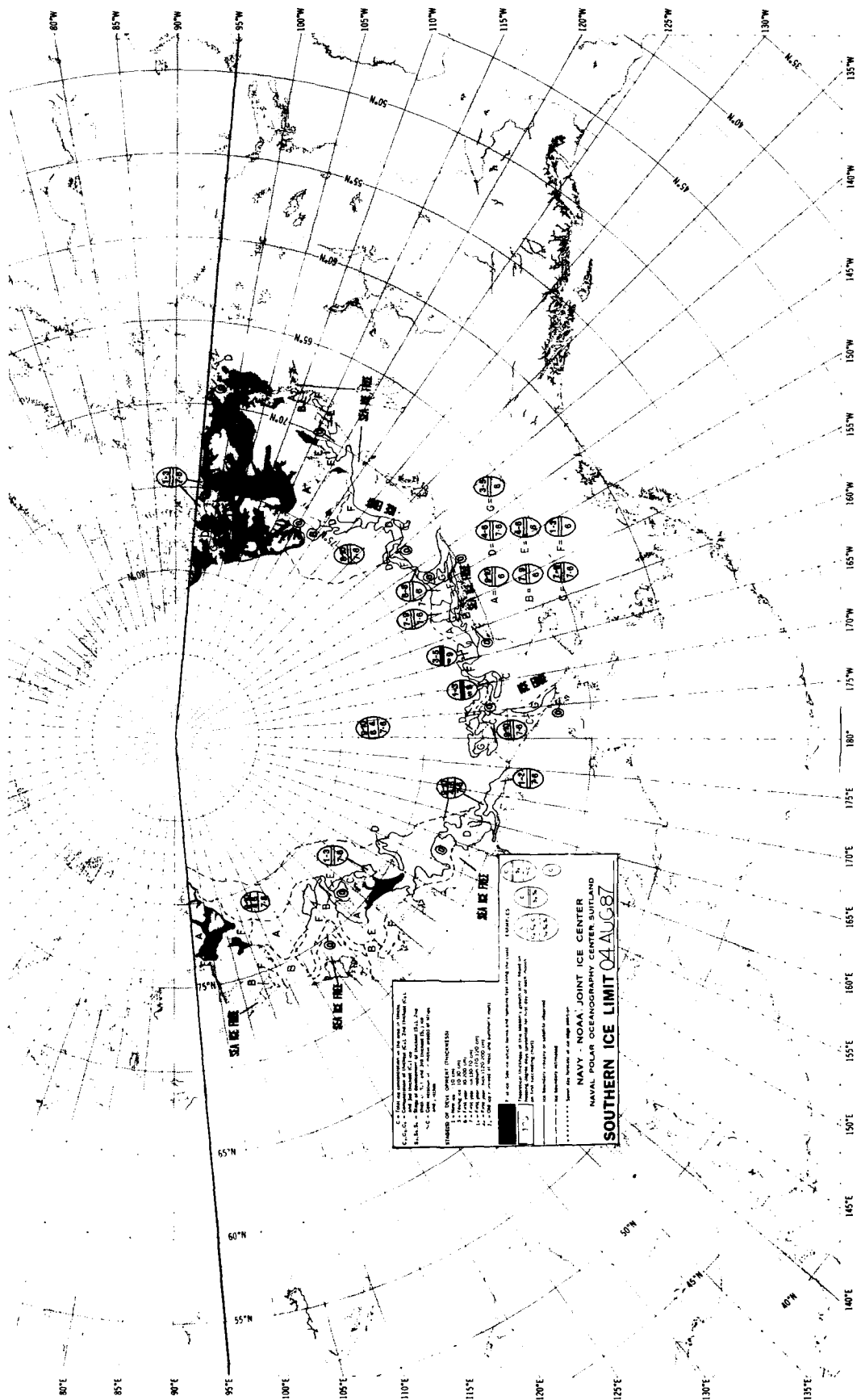












SOUTHERN ICE LIMIT 04 AUG 87

NAVY - NOAA JOINT ICE CENTER
NAVAL POLAR OCEANOGRAPHY CENTER SUTLAND

LEGEND

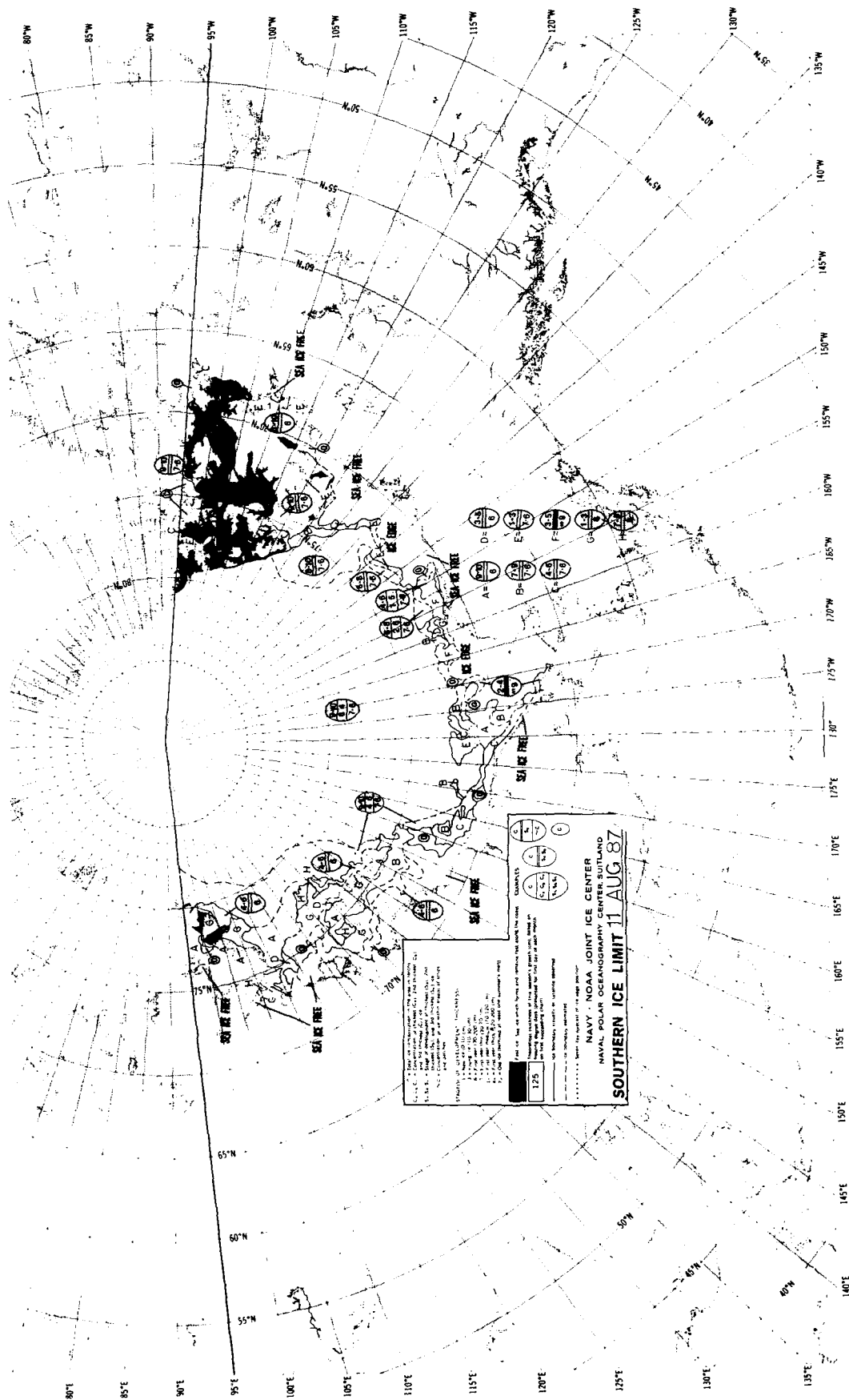
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2. Ice Limit (Thin Black Line)
3. Ice Limit (Dashed Line)
4. Ice Limit (Dotted Line)
5. Ice Limit (Dash-dot Line)
6. Ice Limit (Long-dash Line)
7. Ice Limit (Short-dash Line)
8. Ice Limit (Dash-dot-dot Line)
9. Ice Limit (Dash-dot-dot-dot Line)
10. Ice Limit (Dash-dot-dot-dot-dot Line)

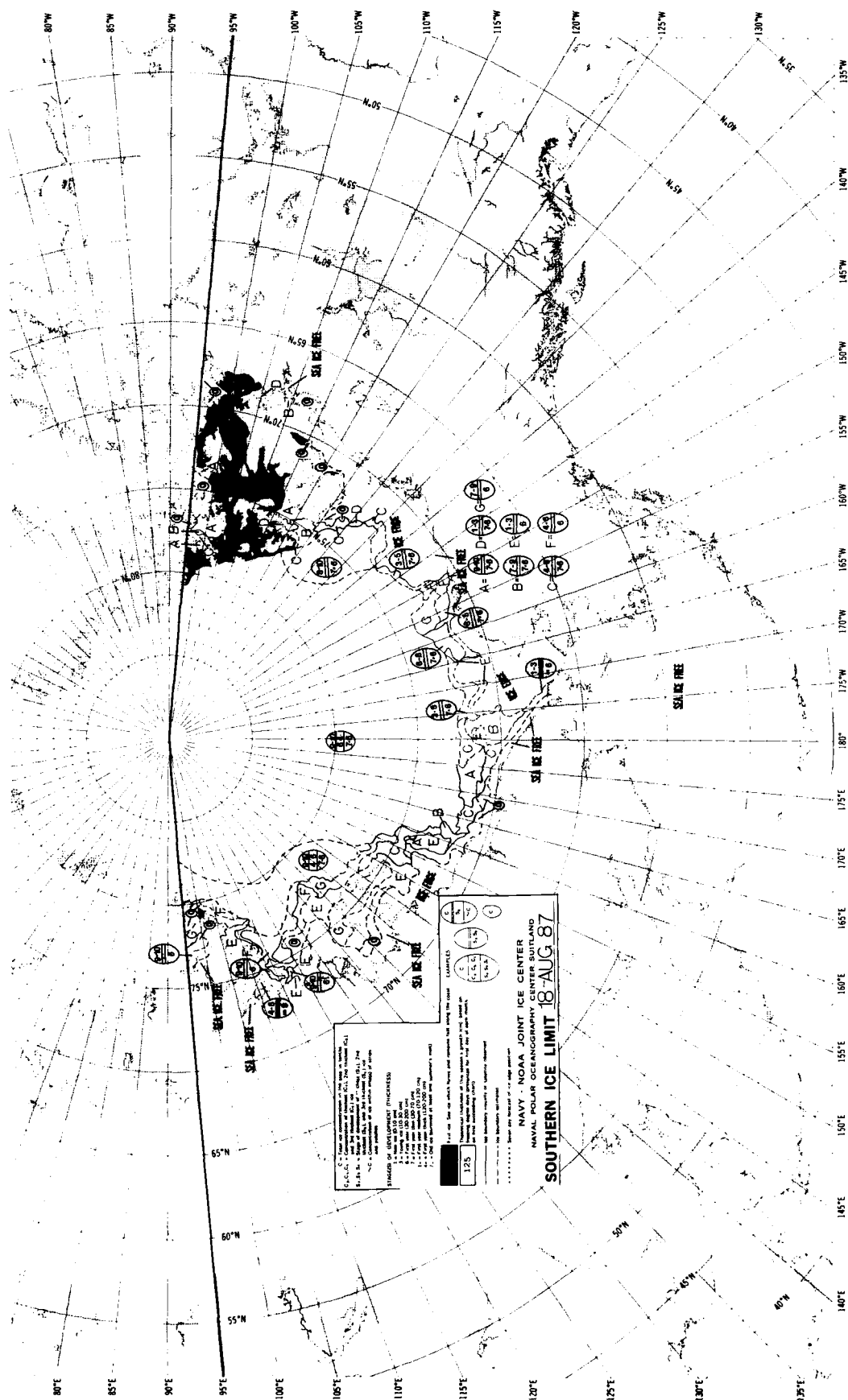
SYMBOLS

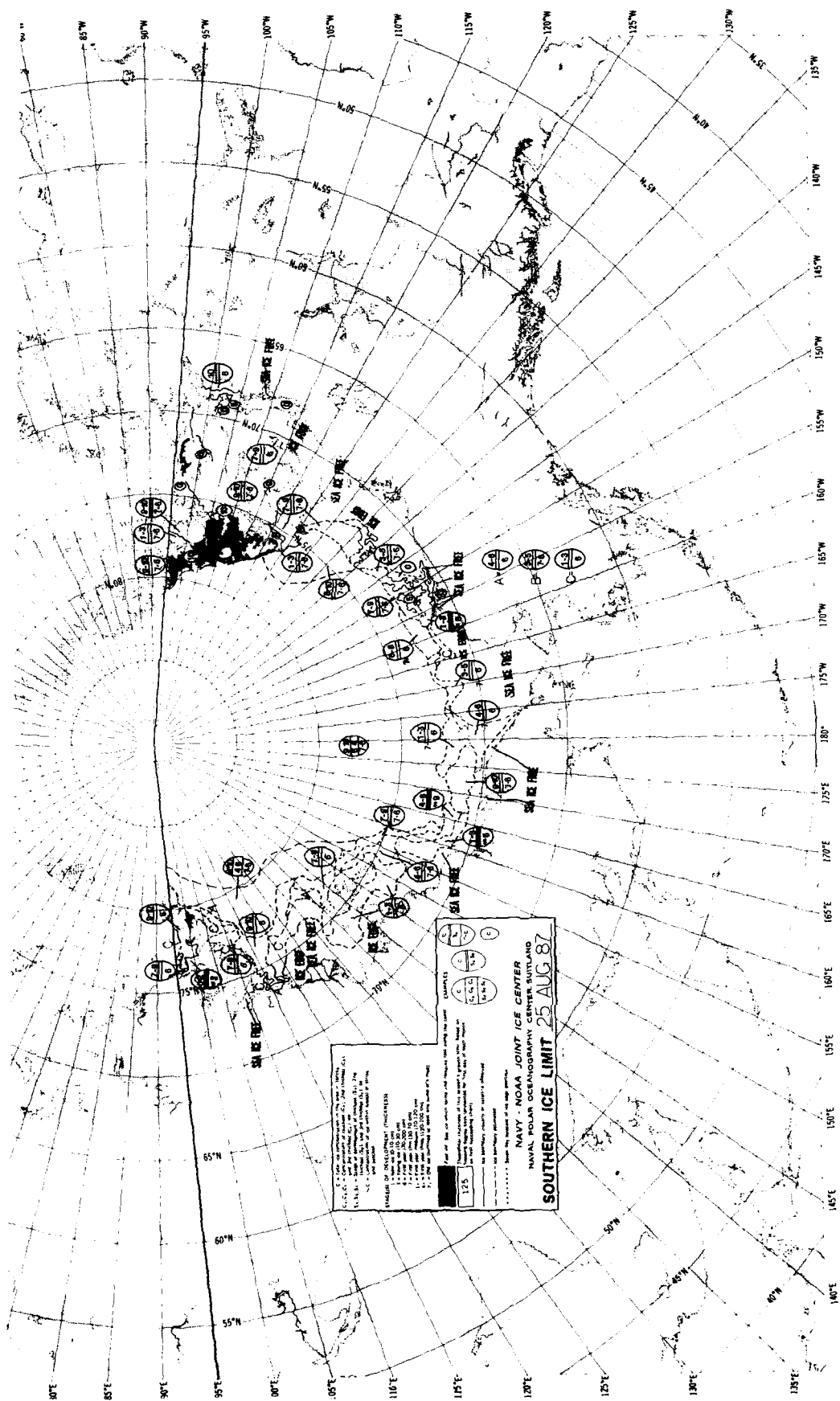
A - Ice Limit (Thick Black Line)
B - Ice Limit (Thin Black Line)
C - Ice Limit (Dashed Line)
D - Ice Limit (Dotted Line)
E - Ice Limit (Dash-dot Line)
F - Ice Limit (Long-dash Line)
G - Ice Limit (Short-dash Line)

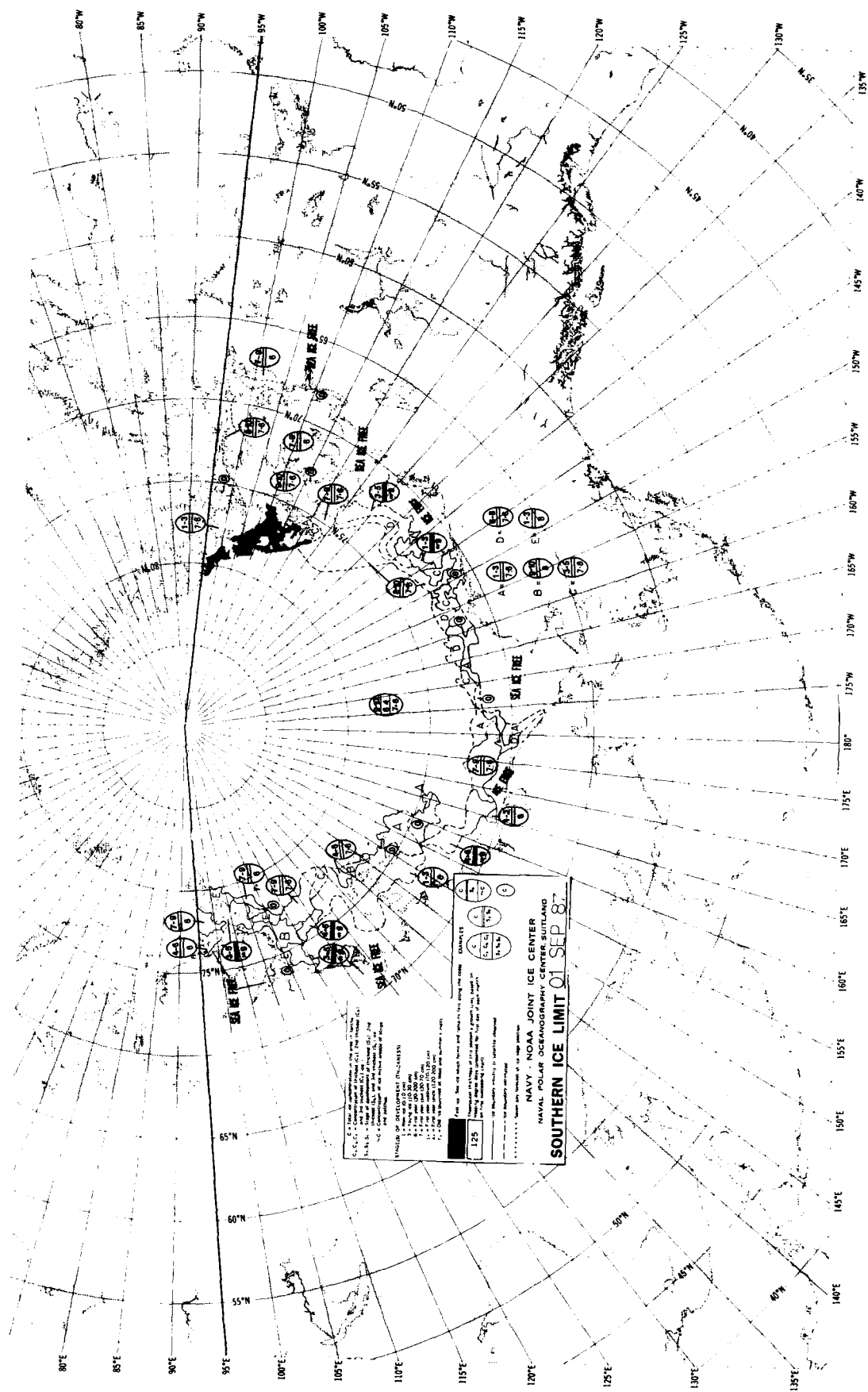
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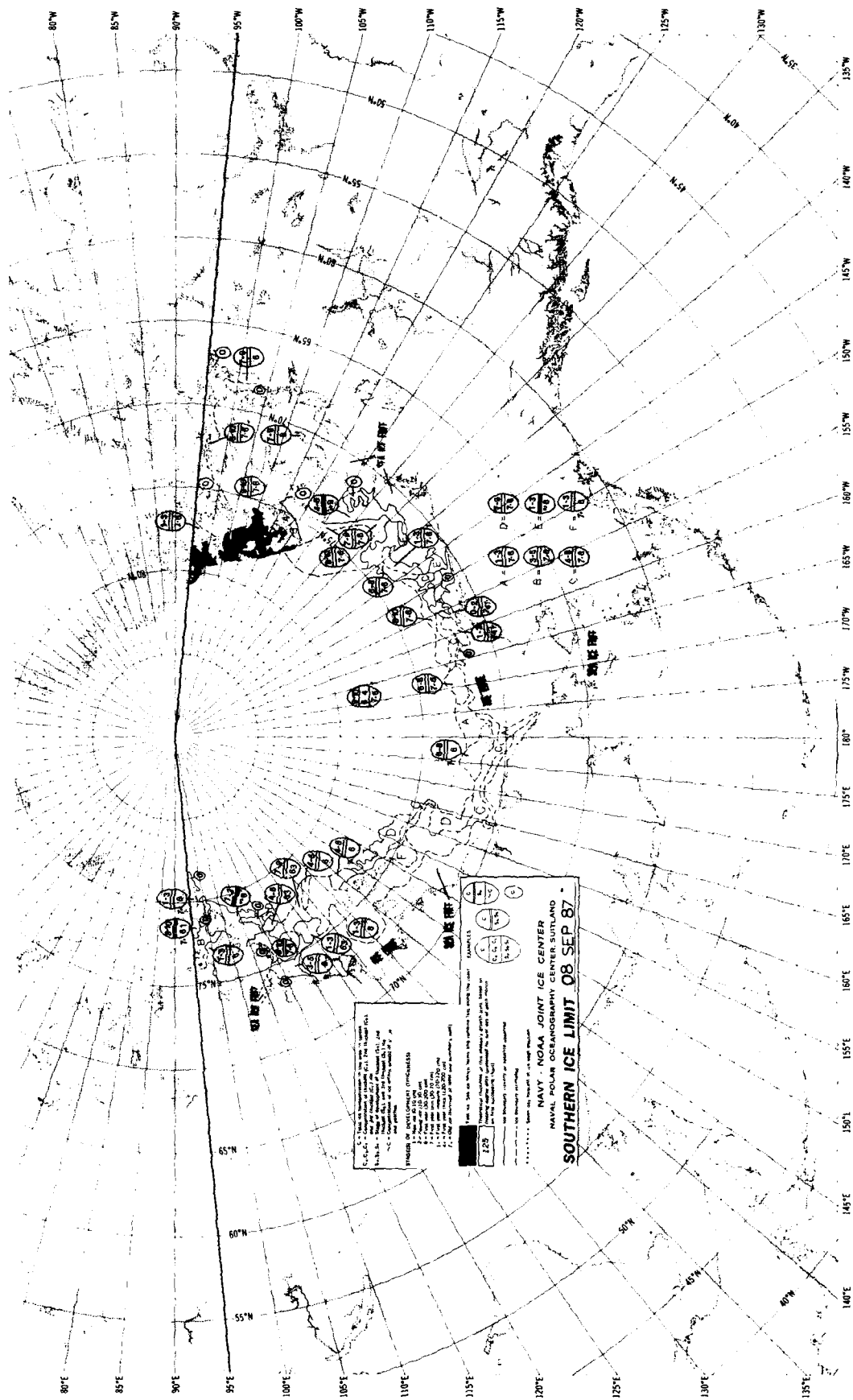
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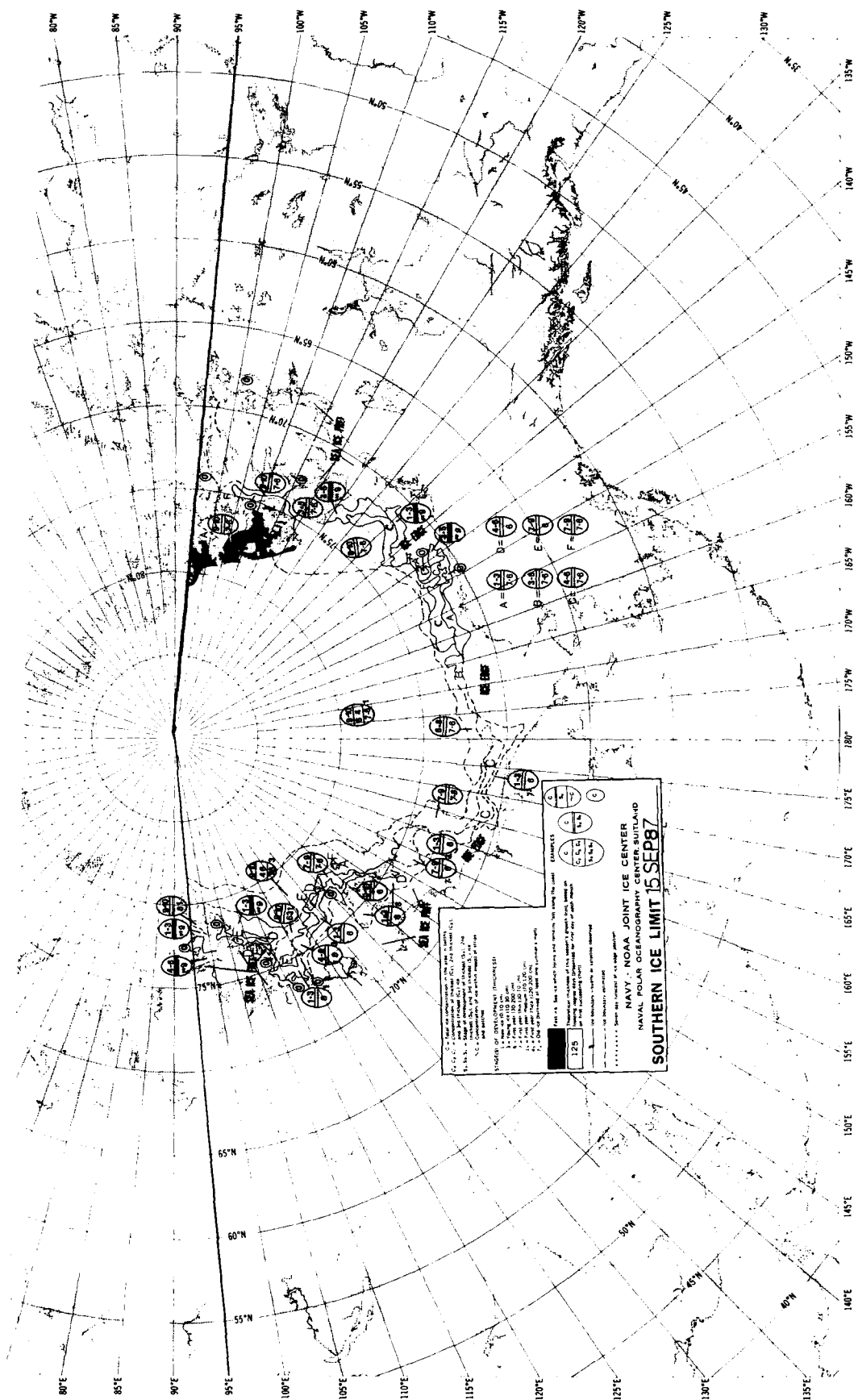


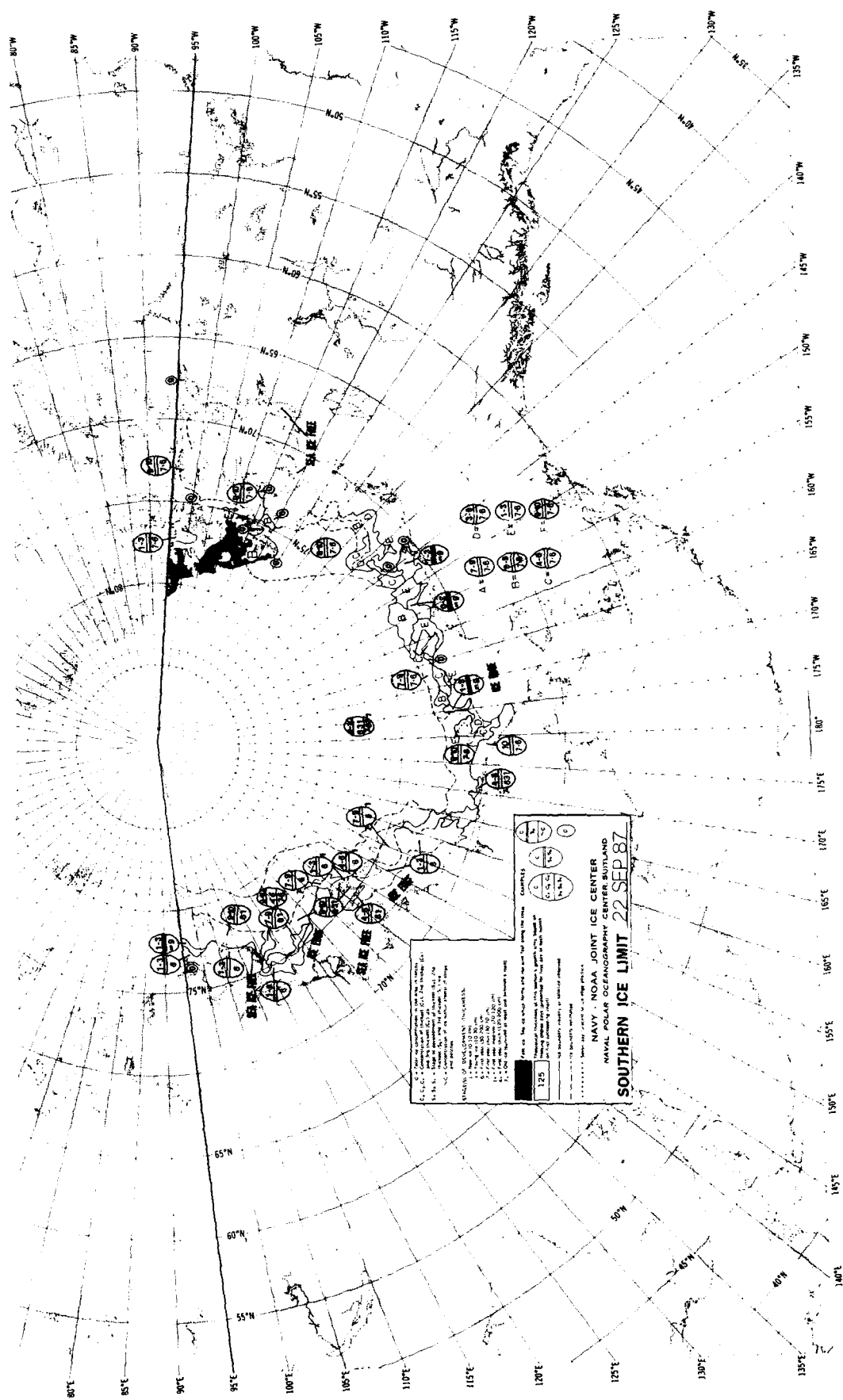


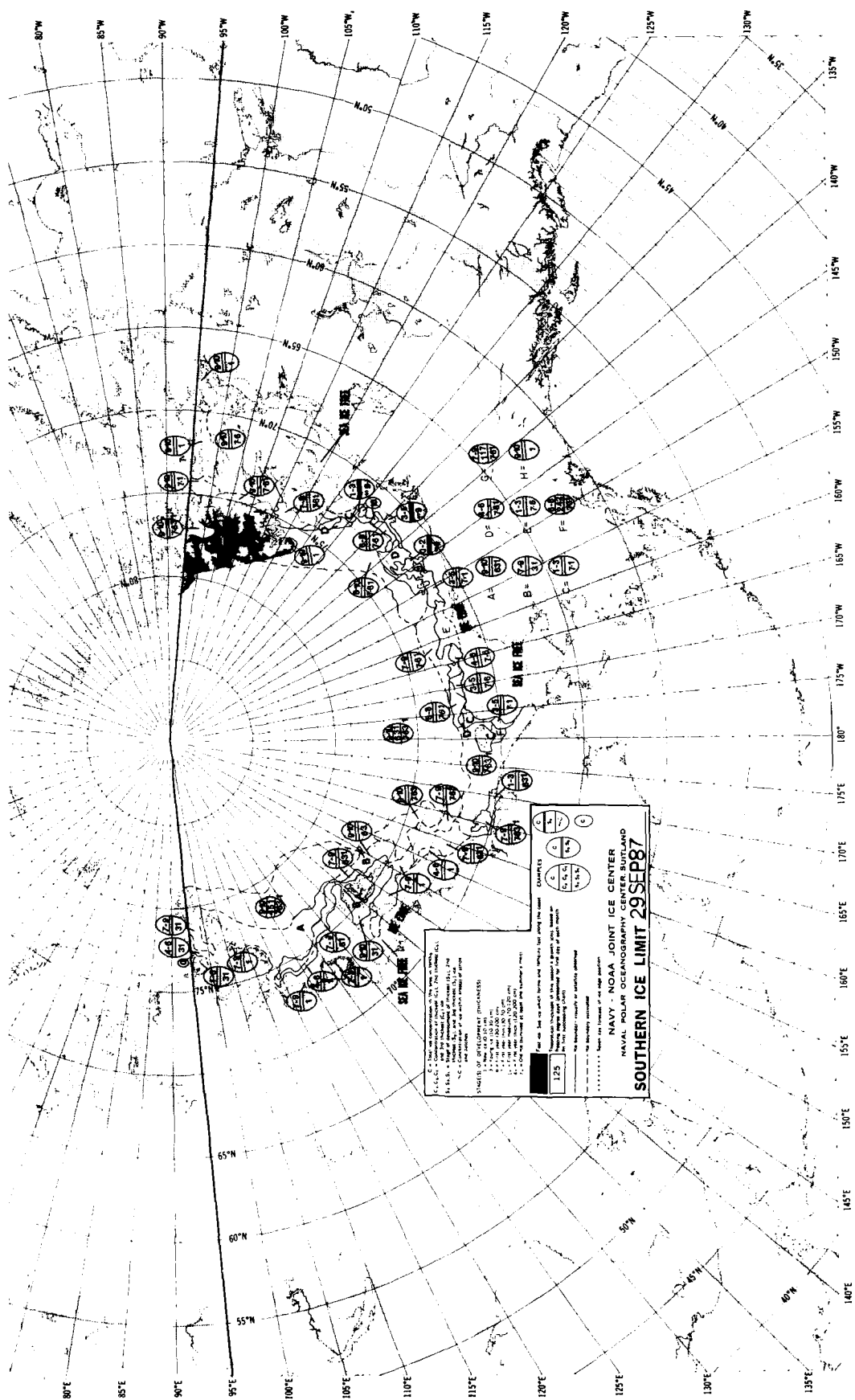


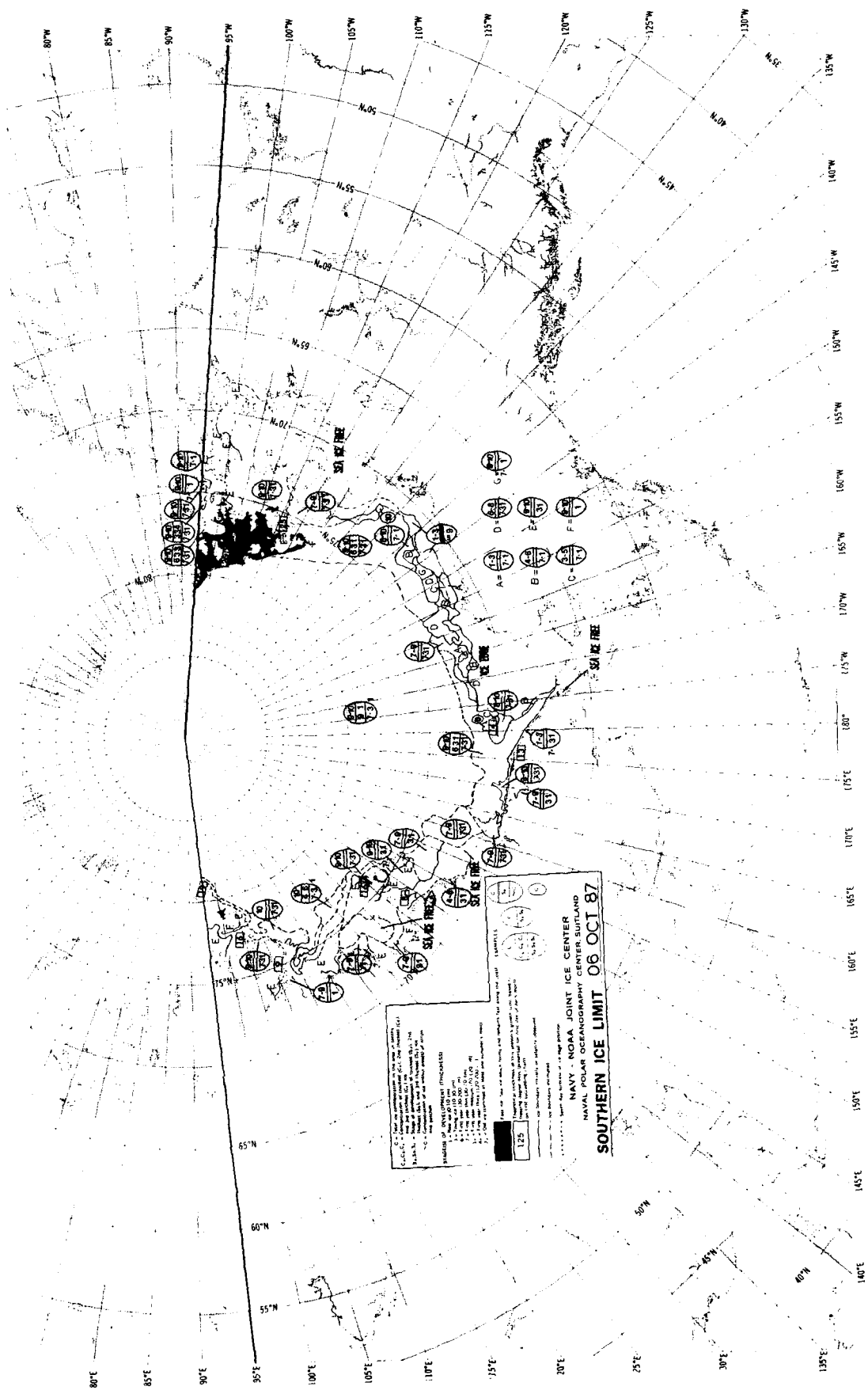


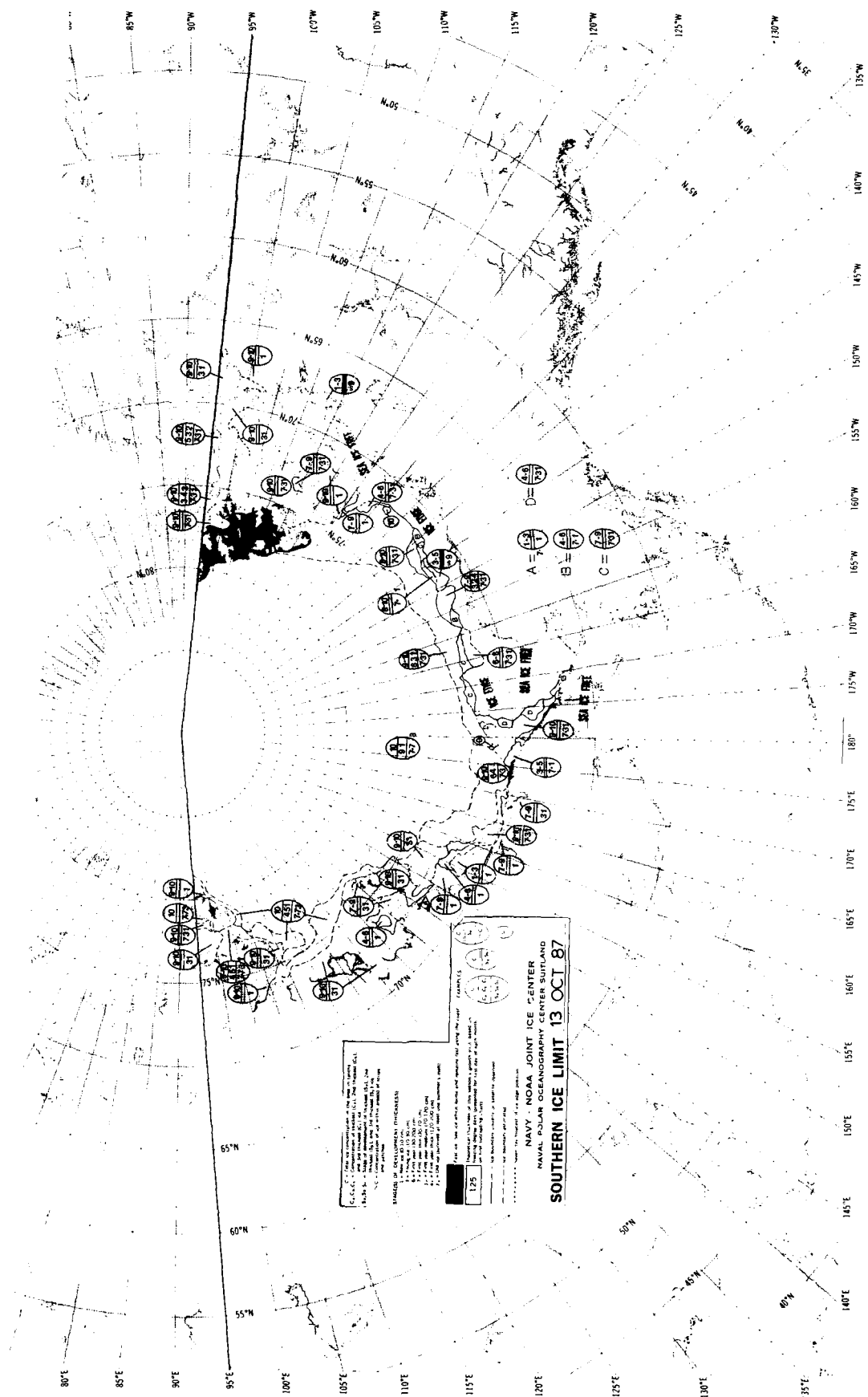


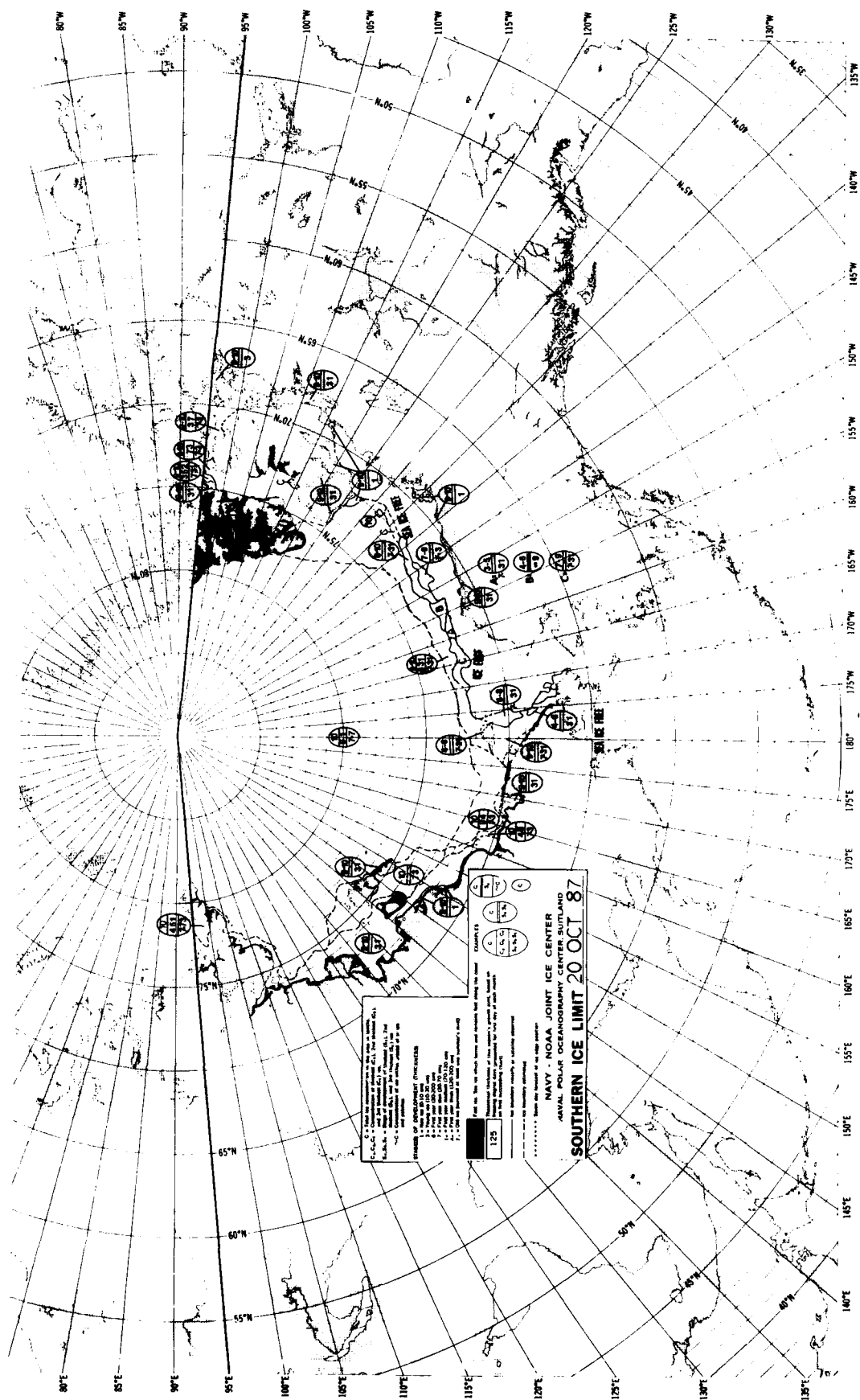


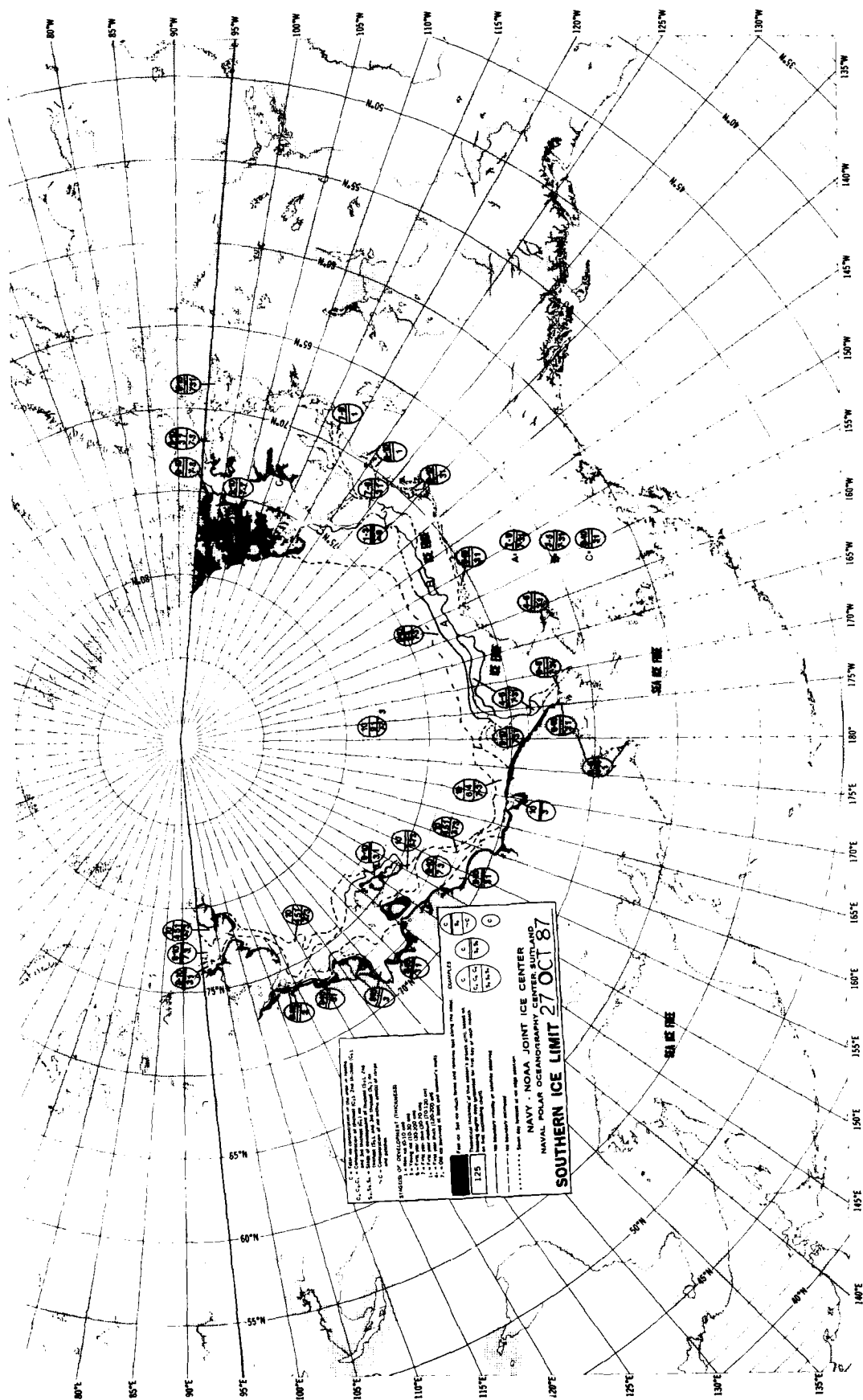


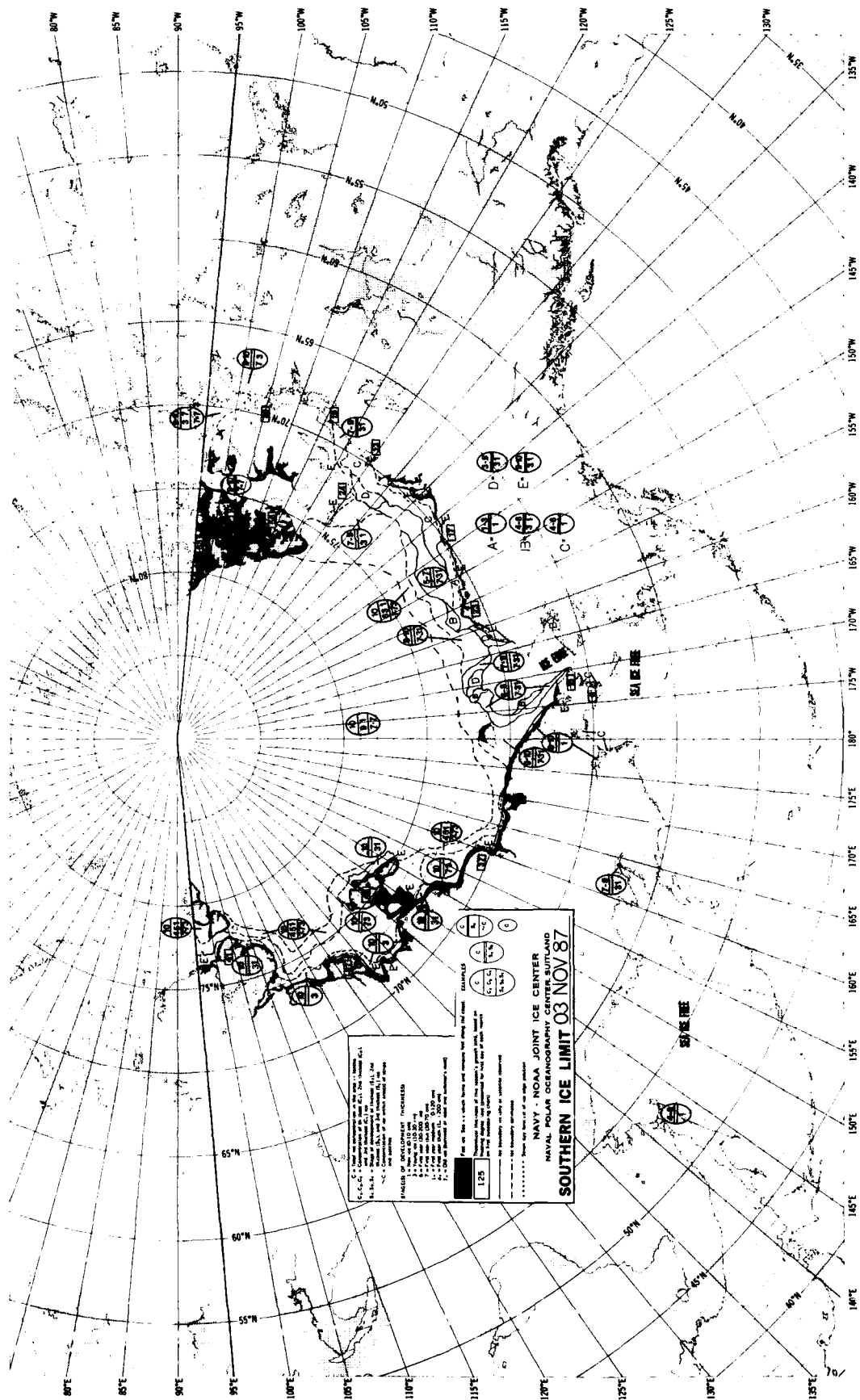


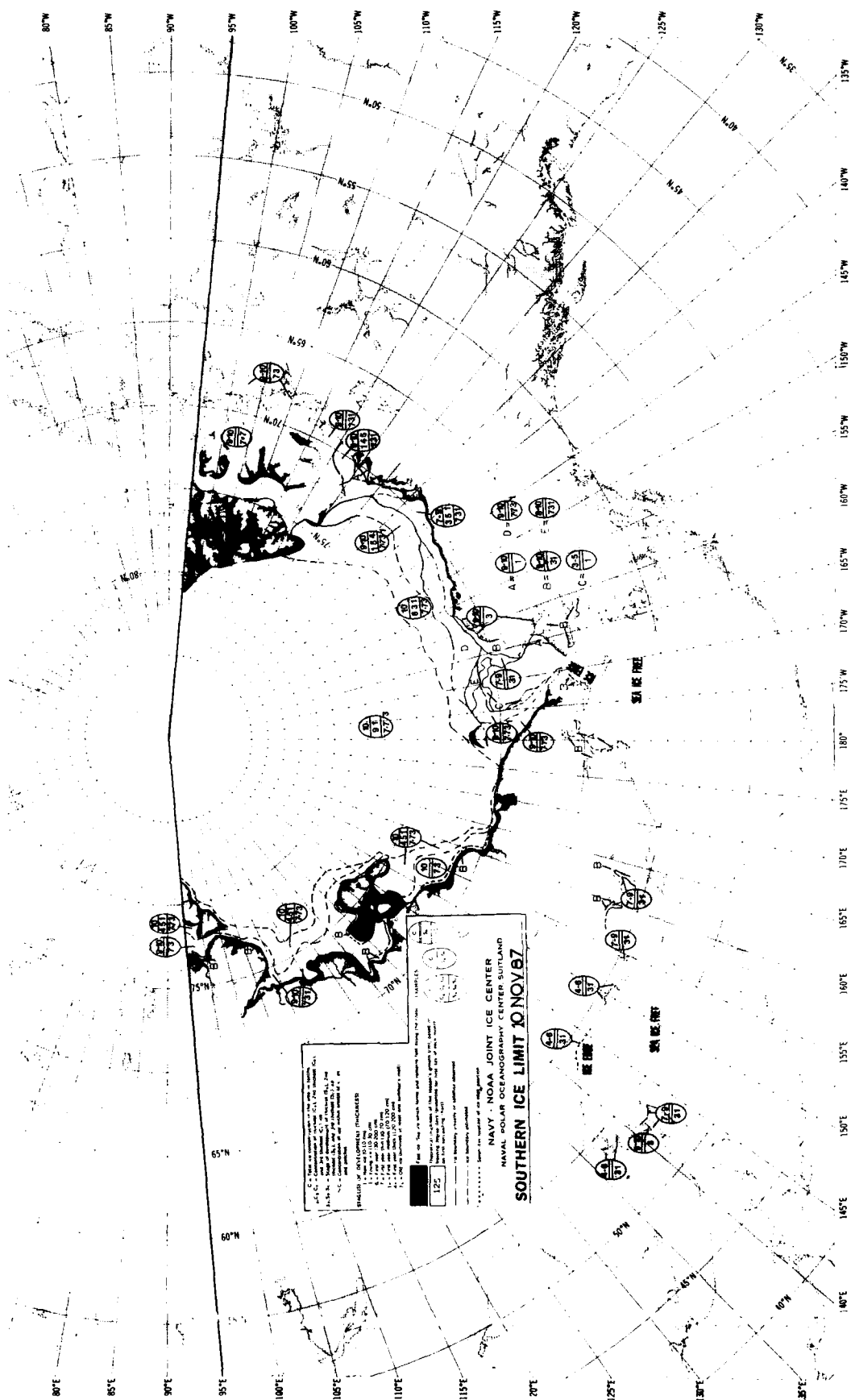


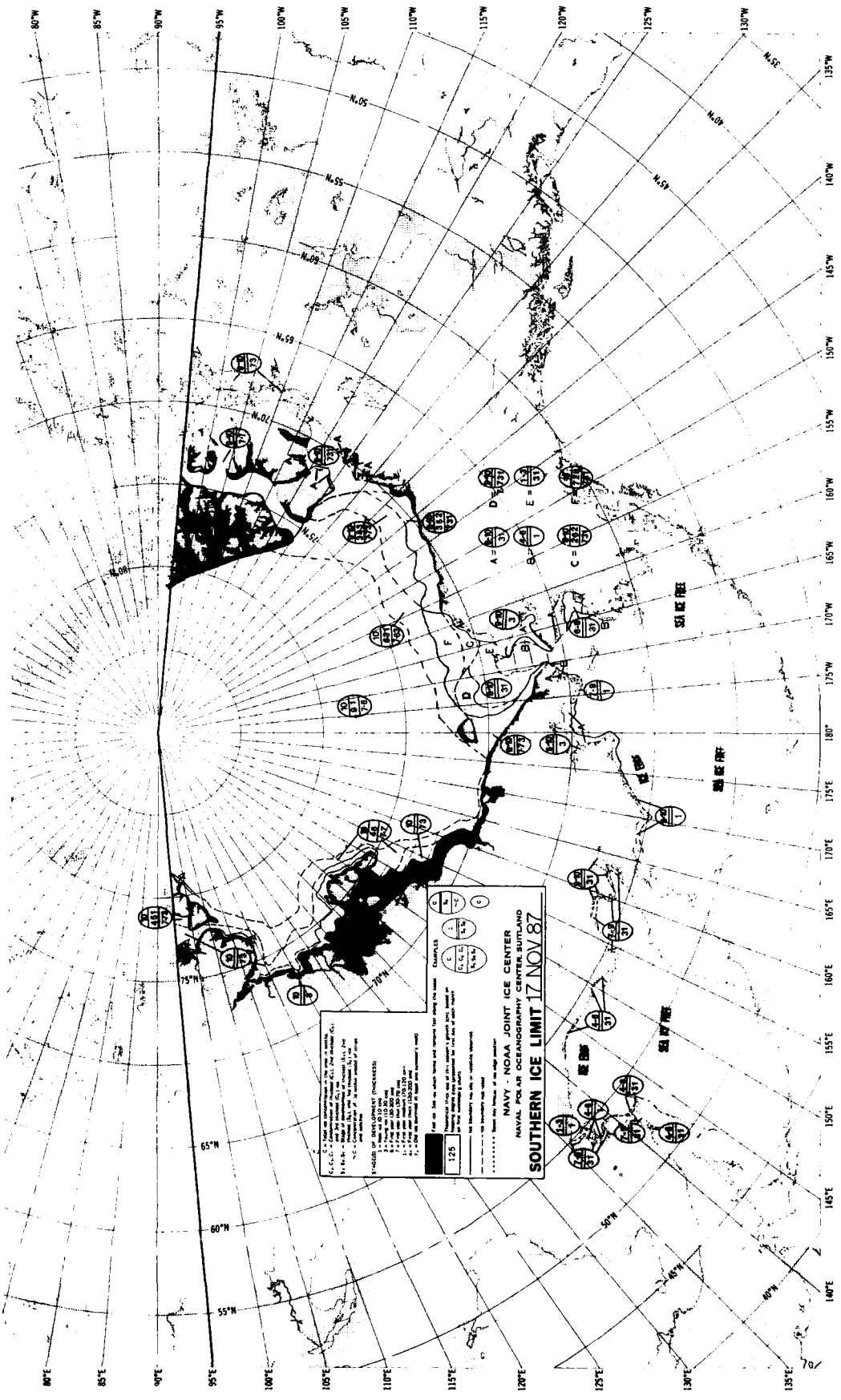


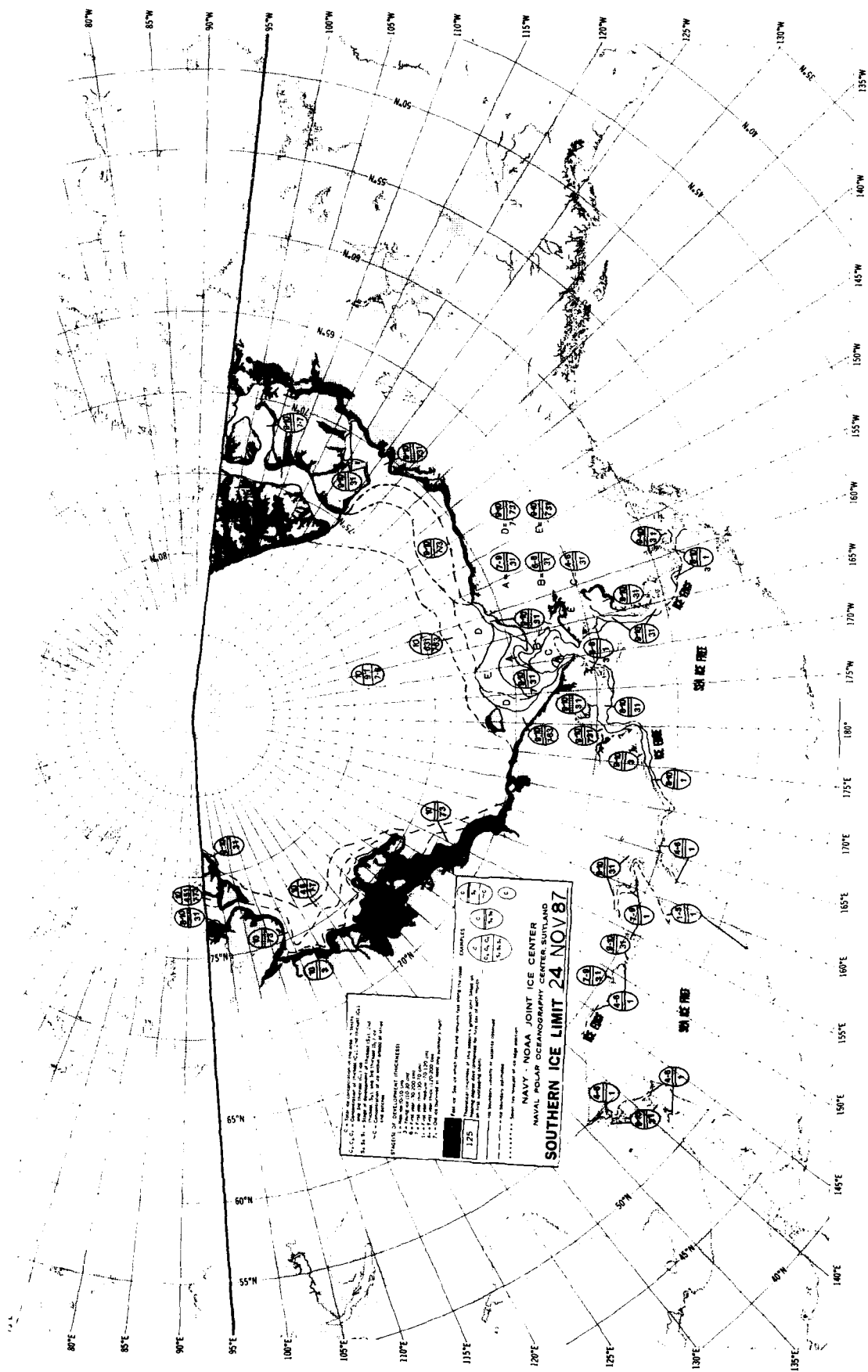


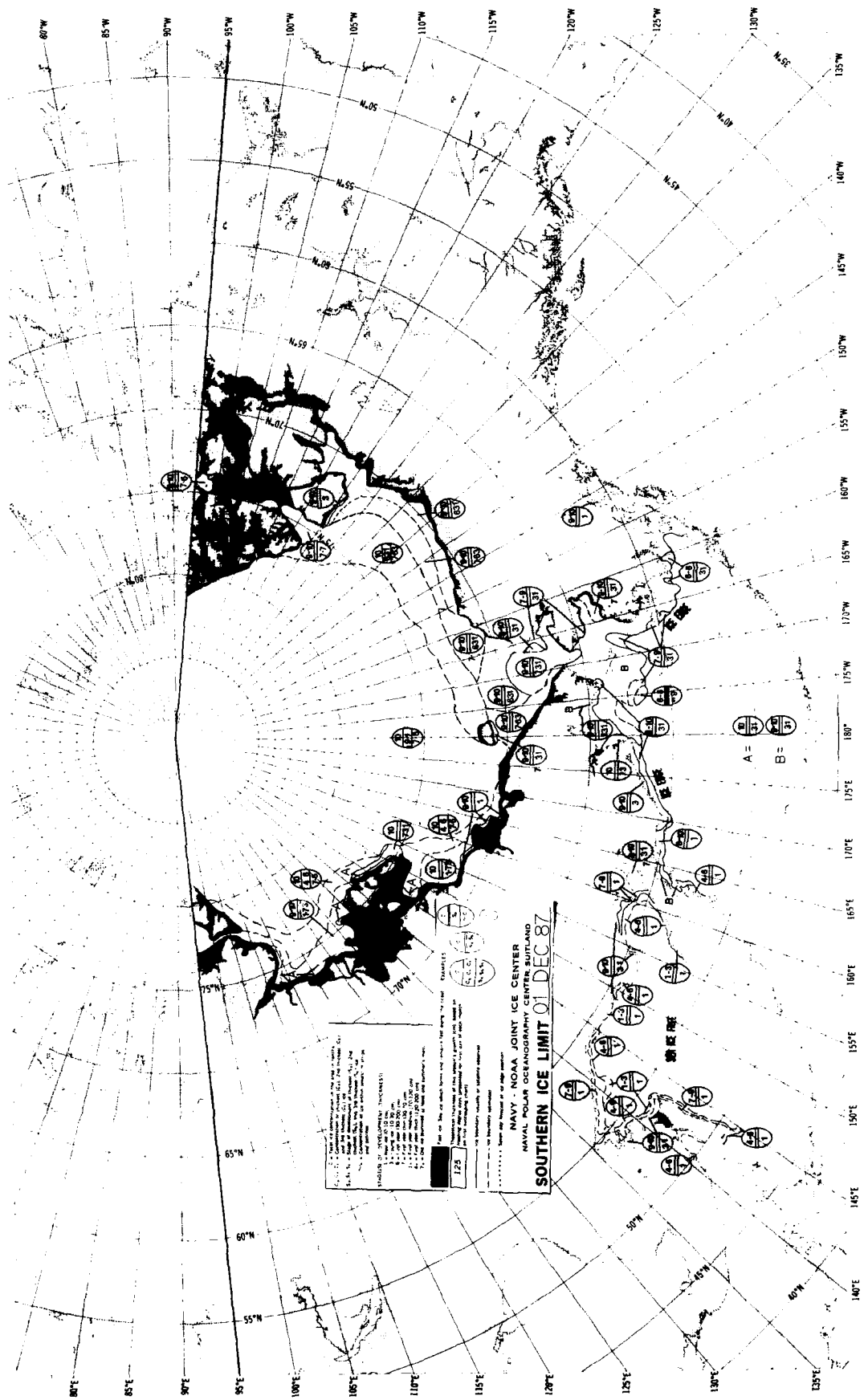


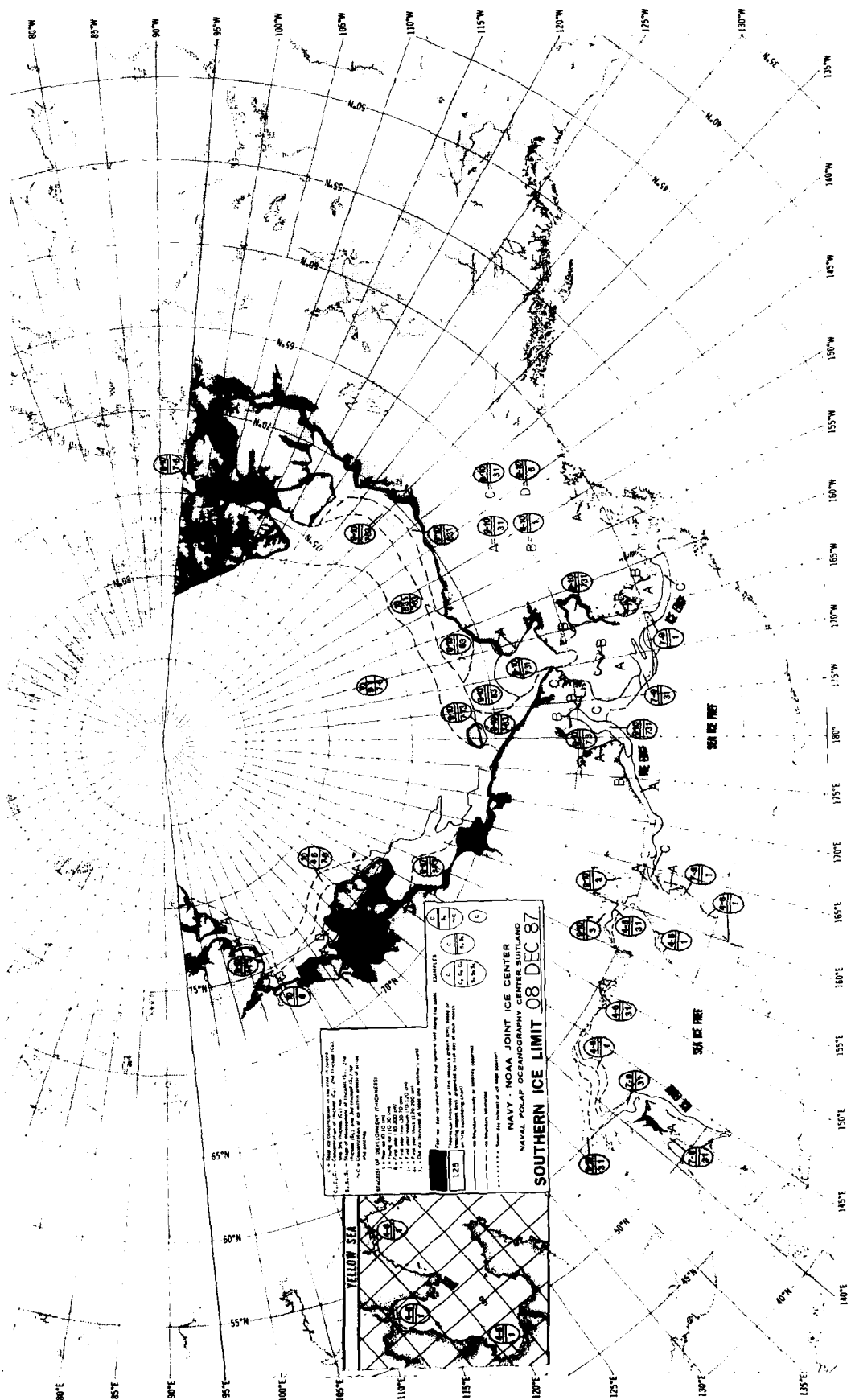


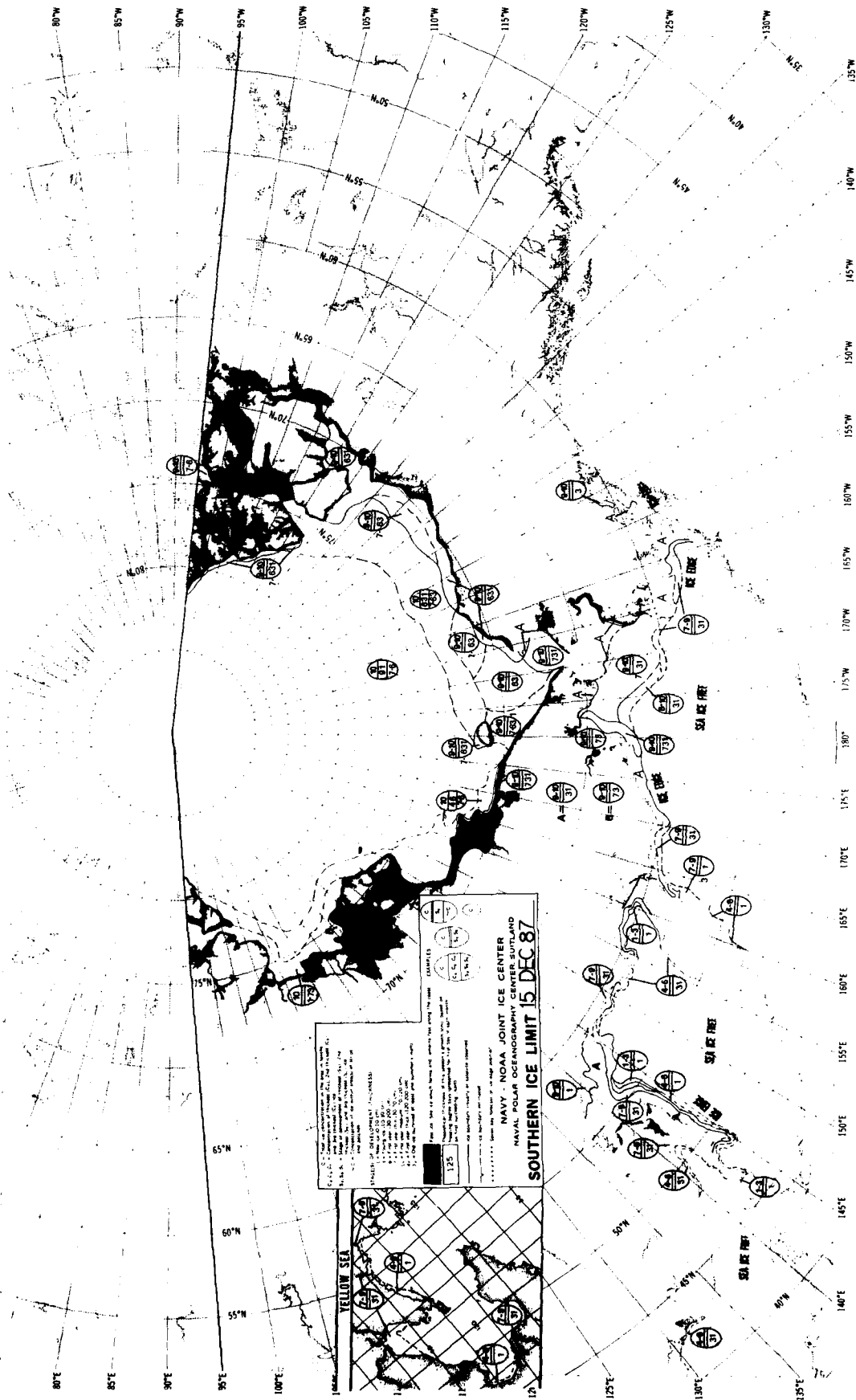












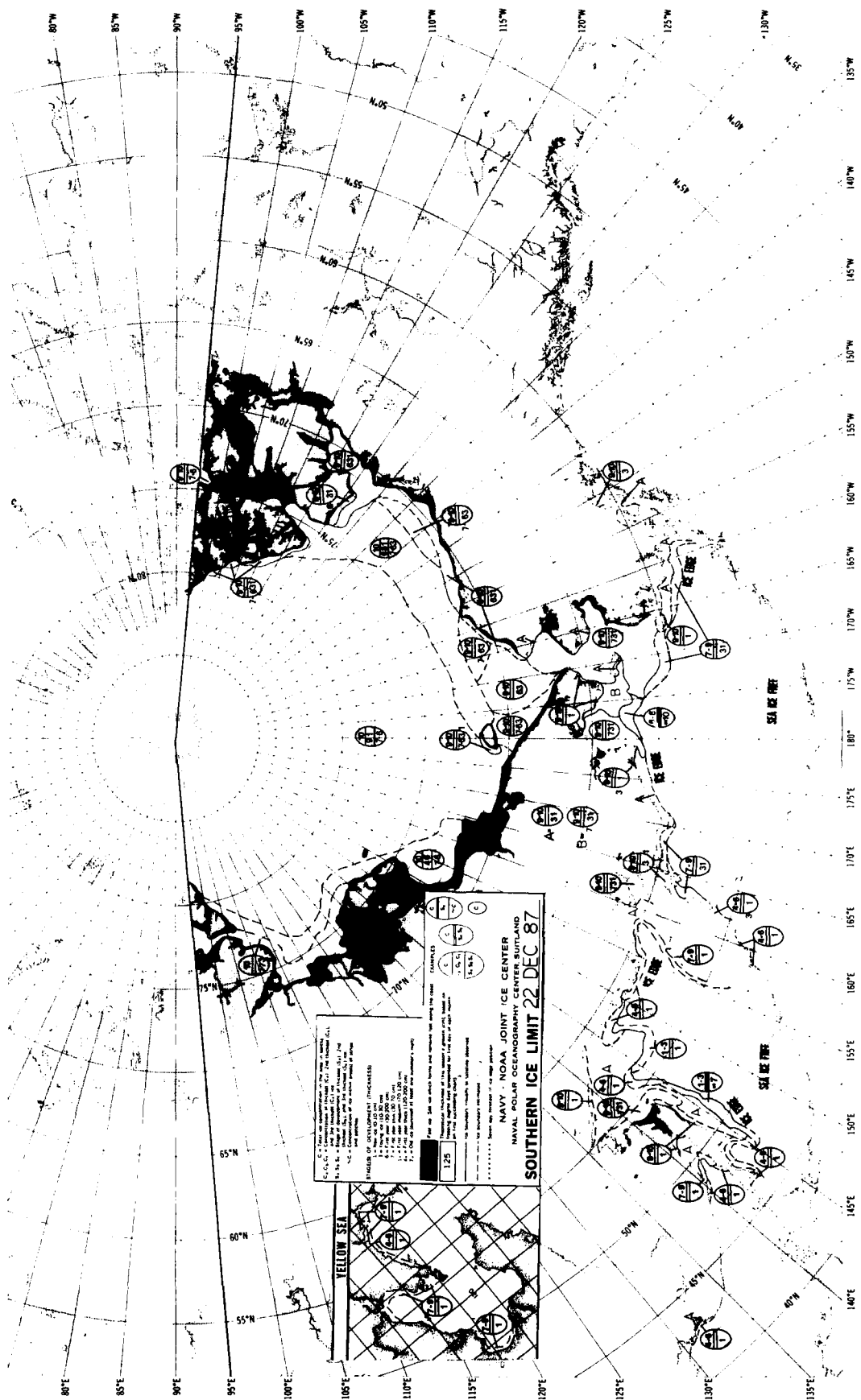


TABLE I. SATELLITE DATA UTILIZED DURING 1987

Time Period		Satellite Remote Sensing			Resolution	Coverage
From	To	Sensor Platform	Sensor Type	Spectral Region		
1-87	12-87	NOAA-9	AVHRR HRPT/LAC VIS NIR IR	0.58-0.68 um 0.73-1.10 um 10.5-11.5 um	1 km	Regional
			GAC VIS IR	0.58-0.68 um 10.5-11.5 um	4 km	Global
1-87	12-87	NOAA-10	AVHRR HRPT/LAC VIS NIR IR	0.58-0.68 um 0.73-1.10 um 10.5-11.5 um	1 km	Regional
			GAC VIS IR	0.58-0.68 um 10.5-11.5 um	4 km	Global
1-87	12-87	NIMBUS-7	SMMR	0.81 cm 1.66 cm	50 km	Global
1-87	12-87	GEOSAT	RADAR ALTIMETER	N/A	7 km	Regional
1-87	7-87	DMSP-F(6)	VIS IR	0.4-1.1 um 10.2-12.8 um	3.7 km	Global
1-87	12-87	DMSP-F(7)	VIS IR	0.4-1.1 um 10.2-12.8 um	3.7 km 4.4 km	Global
8-87	12-87	DMSP-F(8)	VIS SSM/I	0.4-1.1 um 18-87 GHz	0.5 km 50 km	Global Global

Abbreviations and Acronyms:

AVHRR - Advanced Very High Resolution Radiometer
 cm - Centimeter
 GAC - Global Area Coverage
 GHz - Gigahertz
 HRPT - High Resolution Picture Transmission
 IR - Infrared
 km - Kilometer
 LAC - Local Area Coverage
 NIR - Near Infrared
 SMM/I - Special Sensor Microwave Imager
 SMMR - Scanning Multifrequency Microwave Radiometer
 um - Micrometer
 VIS - Visible



EASTERN—WESTERN
ARCTIC SEA ICE ANALYSIS
1987