



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MARINE CLIMATIC GUIDE

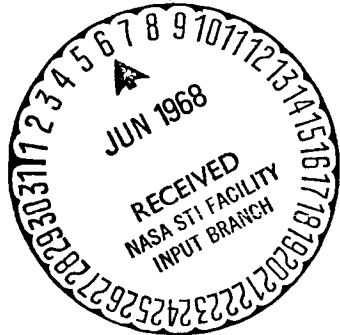
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Oceanographic Atlas of the Polar Seas, H. O. Pub. No. 705, U. S. Navy Hydrographic Office, Part II, 1958

Oceanographic Atlas of the North Atlantic Ocean, Section IV, Pub. No. 700, U. S. Naval Oceanographic Office, 1963.

In addition, certain other unpublished summaries were used. This includes material being used in the preparation of new oceanographic climatologies by the U. S. Naval Oceanographic Office.

CHART INDEX

<u>SUBJECT</u>	<u>CHART NUMBERS</u>
Monthly Air Temperature	1-36
Monthly Sea Surface Temperature	37-48
Monthly Surface Wind Speed	49-84
Seasonal Seas	85-96
Monthly Visibility	97-108
Seasonal Superstructure Icing	109-111
Monthly Polar Ice Field	All Charts

The charts presented in this guide have a legend in the lower right hand corner. For the most part, interpretation of these charts is straightforward; but in order to avoid any confusion, an example for a specific point is given. Ordinarily this material will be used to interpret climatic conditions within an area. The example that follows is intended only to clarify terms, or nomenclature, that appear in the legend.

Example:

Month January

Location 20° N Lat., 160° W Long.

Fifth percentile of air temperature (Chart 1)

Fifty percentile of air temperature (Chart 2)

Ninety-fifth percentile of air temperature (Chart 3)

Mean sea surface temperature (Chart 37)

Percentage frequency of occurrence of surface wind speed equal to or greater than 18 knots (Chart 49)

Percentage frequency of occurrence of surface wind speed equal to or greater than 27 knots (Chart 50)

Ninety-fifth percentile of surface wind speed (Chart 5I) 28 knots

Percentage frequency of occurrence of seas equal to or greater than 8 feet (Chart 85)

Percentage frequency of occurrence of seas equal to or greater than 12 feet (Chart 86)

Ninety-fifth percentile of seas

7 feet

much less than 5%

Percentage frequency of occurrence of visibility less than 5 nautical miles (Chart 97)

less than 5%

Probability of superstructure icing (Chart 109)

0

ACKNOWLEDGMENTS

The Marine Climatic Guide was prepared by the Houston Section of the Spaceflight Meteorology Group, Weather Bureau, ESSA. The Houston Section is indebted to the members of the Suitland Section of the Spaceflight Meteorology Group for their contribution in the preparation of this Guide. The Houston Section also thanks the U. S. Naval Oceanographic Office, Suitland, Maryland, for their cooperation and for the use of recently summarized data.

DATA SOURCE

U.S. Navy Marine Climatic Atlas of the World, NAVWEPS 50-IC-528, Vol. 1

[illegible]

" " " " " "

NAVWEP50-1C-530, Vol. III

[illegible][illegible]

" " " " " " NAVWEPS 50-IC-533, Vol. VI

[illegible]

Climatological and Oceanographic Atlas for Mariners, U. S. Department of the Navy, Volume I, August 1959.

" " " " " "

World Atlas of Sea Surface Temperatures, H. O. Pub. No. 225, Second Edition 1944.

INTRODUCTION

In support of NASA manned space flight programs, the Spaceflight Meteorology Group, ESSA, Weather Bureau, prepared a rather detailed and complete statistical analysis of recorded wind and sea conditions for those water-covered areas of the world lying between 40° North and 40° South latitudes. This study was useful in several ways, but primarily it was used by the Landing and Recovery Division, NASA, Manned Spacecraft Center, Houston, Texas, in connection with the selection of spacecraft landing areas. The information was also used in the development of recovery systems and procedures. Because launch azimuth angles and other constraints were such that landing would not occur poleward of 40 degrees latitude, this early study met the requirements of the Landing and Recovery Division (LRD) up to and including the Apollo Program.

It is anticipated that programs subsequent to Apollo may necessitate landings of manned spacecraft at more poleward latitudes. It is the purpose of the Marine Climatic Guide to furnish LRD with a broad-scale view of those weather elements pertinent to their planning and operation over all the water-covered areas of the world. Once the more likely landing areas have been defined, the Spaceflight Meteorology Group should be contacted for a more detailed study of those areas.

The charts presented in this guide have been constructed using the most recent information available in the U. S. Navy Atlases. For the purposes of this study, no attempt was made to update these analyses by processing additional data. Depending upon the availability of data, the charts have been analyzed on a monthly or a seasonal basis. The values of the various parameters have been selected to meet the requirements of the Landing and Recovery Division.

DISCUSSION

It is not the intent to discuss the charts as they relate to the problem, but rather to briefly discuss the limitations, the arrangement, and the

interpretation of the charts.

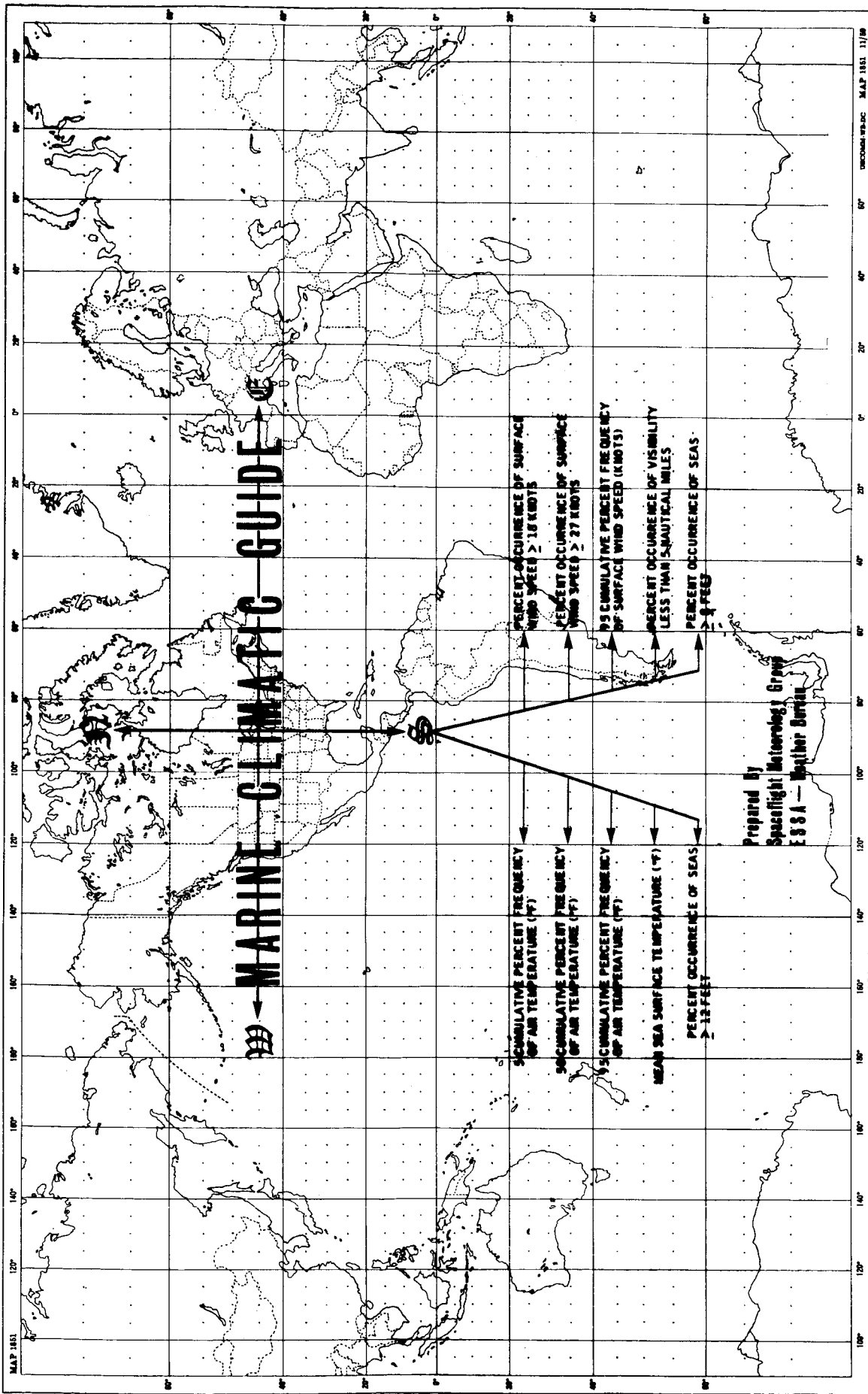
It should be reemphasized that these charts can be most effectively used to obtain "first approximations." For finer detail, other studies, or more likely new studies, will be required.

The reader should also be reminded that the data upon which these analyses are based were obtained from ships at sea. In those areas outside the normal shipping routes, data are scarce and confidence in the analyses in these areas is not high. This is particularly true in the Southern Hemisphere and in the vicinity of the polar ice in both hemispheres. It should be noted that smoothed isopleths do not include the effects of islands and coastlines. These effects may be considerable.

These charts are arranged so that all charts depicting air temperature are in one group and follow in chronological sequence, i.e., January, February, March,.....etc. The charts showing sea temperature, surface wind speed, and visibility are in groups that follow and they too are shown on a monthly basis. Sea state (waves generated on the ocean by local winds blowing over the water) is shown for periods of three months so that February is said to be representative of January, February, and March; and May is representative of April, May, and June, etc.

Because those areas in which floating ice may be found are of particular significance, the ice limit is shown on each chart and is represented by a broken line. The ice limit line in the Northern Hemisphere is interpreted to mean that 90 percent of all reported ice was found poleward of that line. Because of the way in which the data were tabulated, this line in the Southern Hemisphere indicates that 50 percent of all reported ice was poleward of that line.

A limited amount of information pertaining to superstructure icing is available. Charts pertaining to this condition are presented only for the fall, winter, and spring seasons. Superstructure icing during the summer months occurs rarely, if ever.



MARINE CLIMATIC GUIDE

90 CUMULATIVE PERCENT FREQUENCY
OF AIR TEMPERATURE (°F)

90 CUMULATIVE PERCENT FREQUENCY
OF SURFACE WIND SPEED (KNOTS)

90 CUMULATIVE PERCENT FREQUENCY
OF SURFACE WIND SPEED (KNOTS)
LESS THAN 5 NAUTICAL MILES

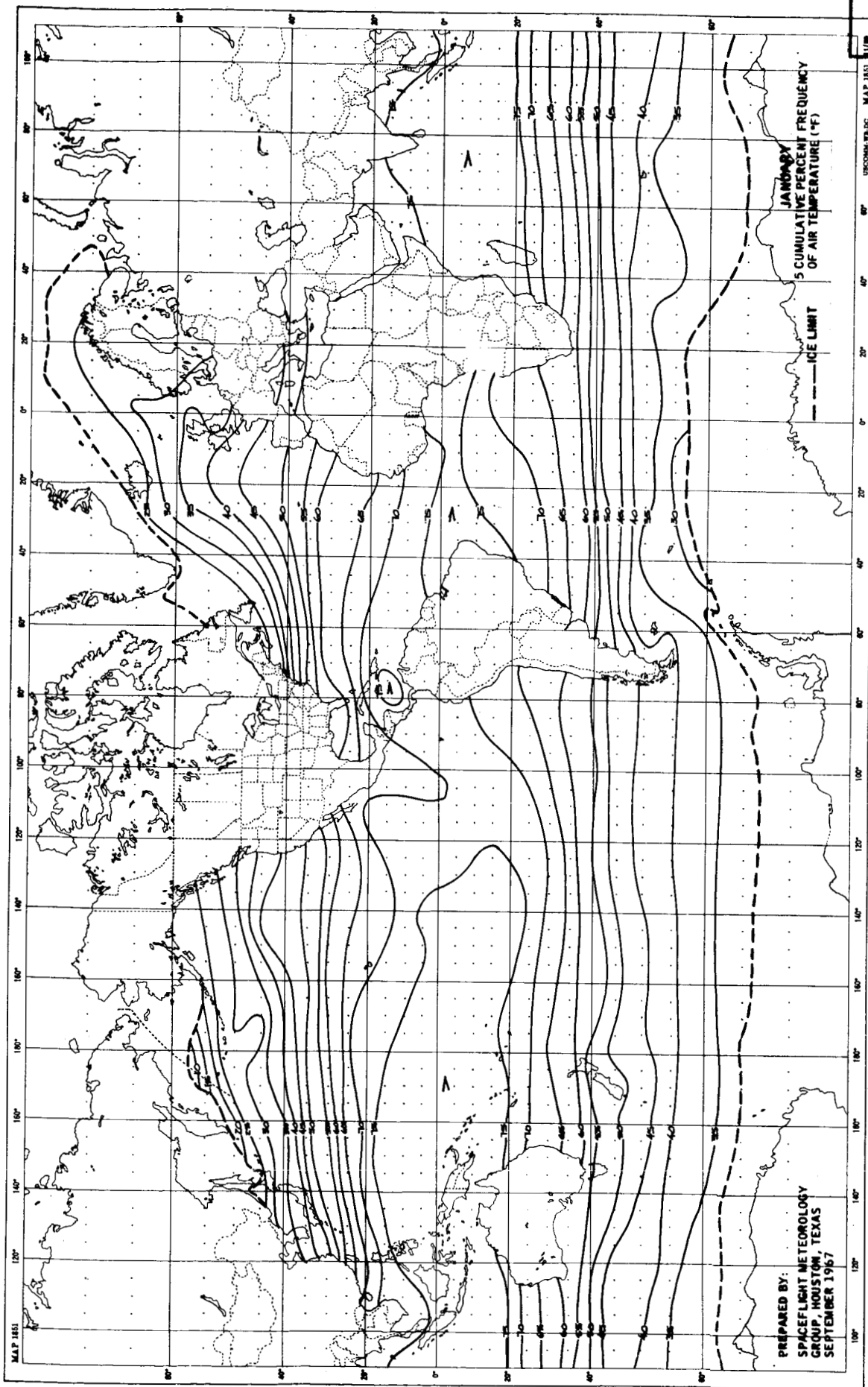
90 CUMULATIVE PERCENT FREQUENCY
OF SURFACE WIND SPEED (KNOTS)
> 16 KNOTS

90 CUMULATIVE PERCENT FREQUENCY
OF SURFACE WIND SPEED (KNOTS)
> 27 KNOTS

MEAN SEA SURFACE TEMPERATURE (°F)

PERCENT OCCURRENCE OF SEAS
> 12 FEET

Prepared by
Spaceflight Meteorology Group
ESSA - Washington

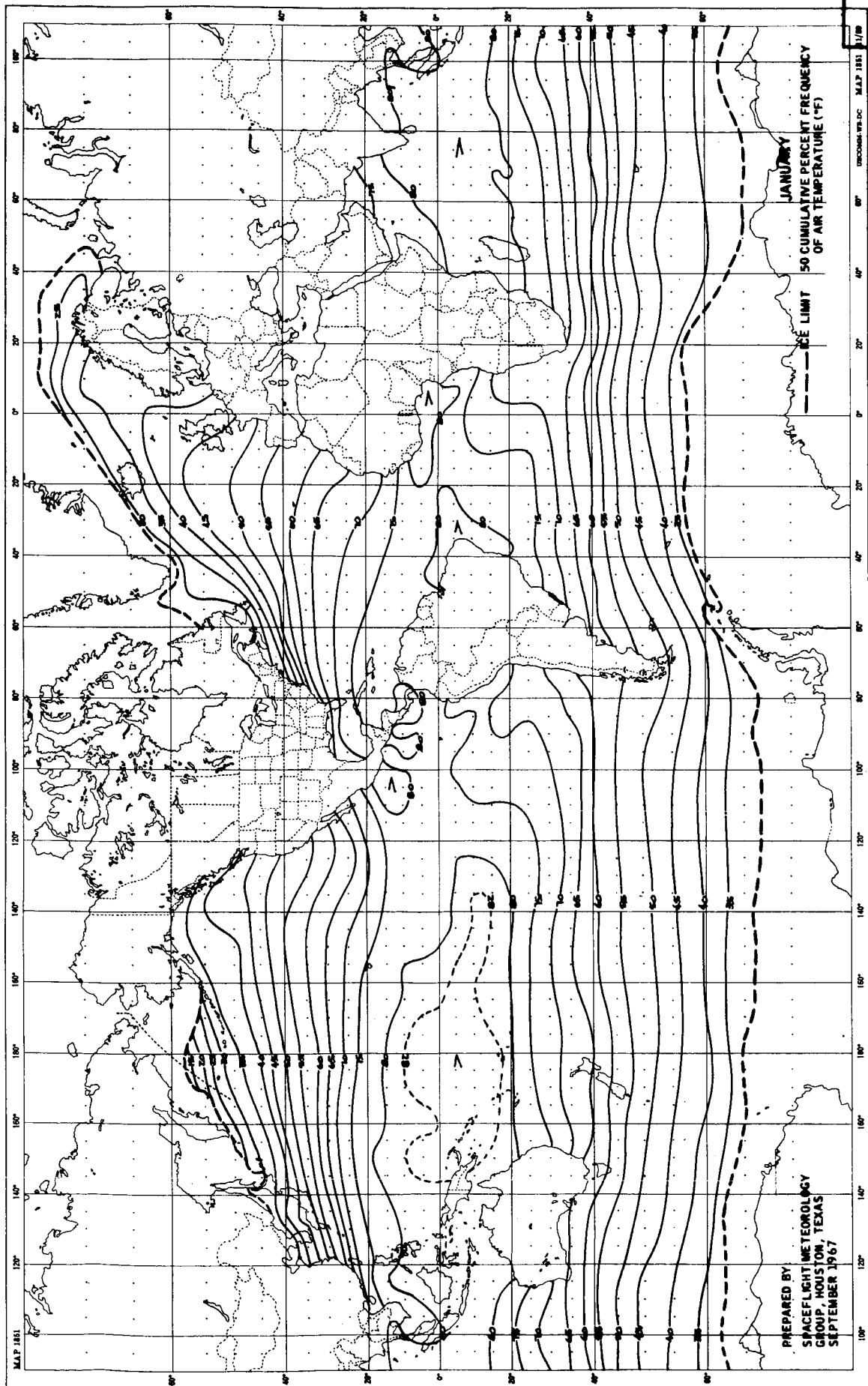


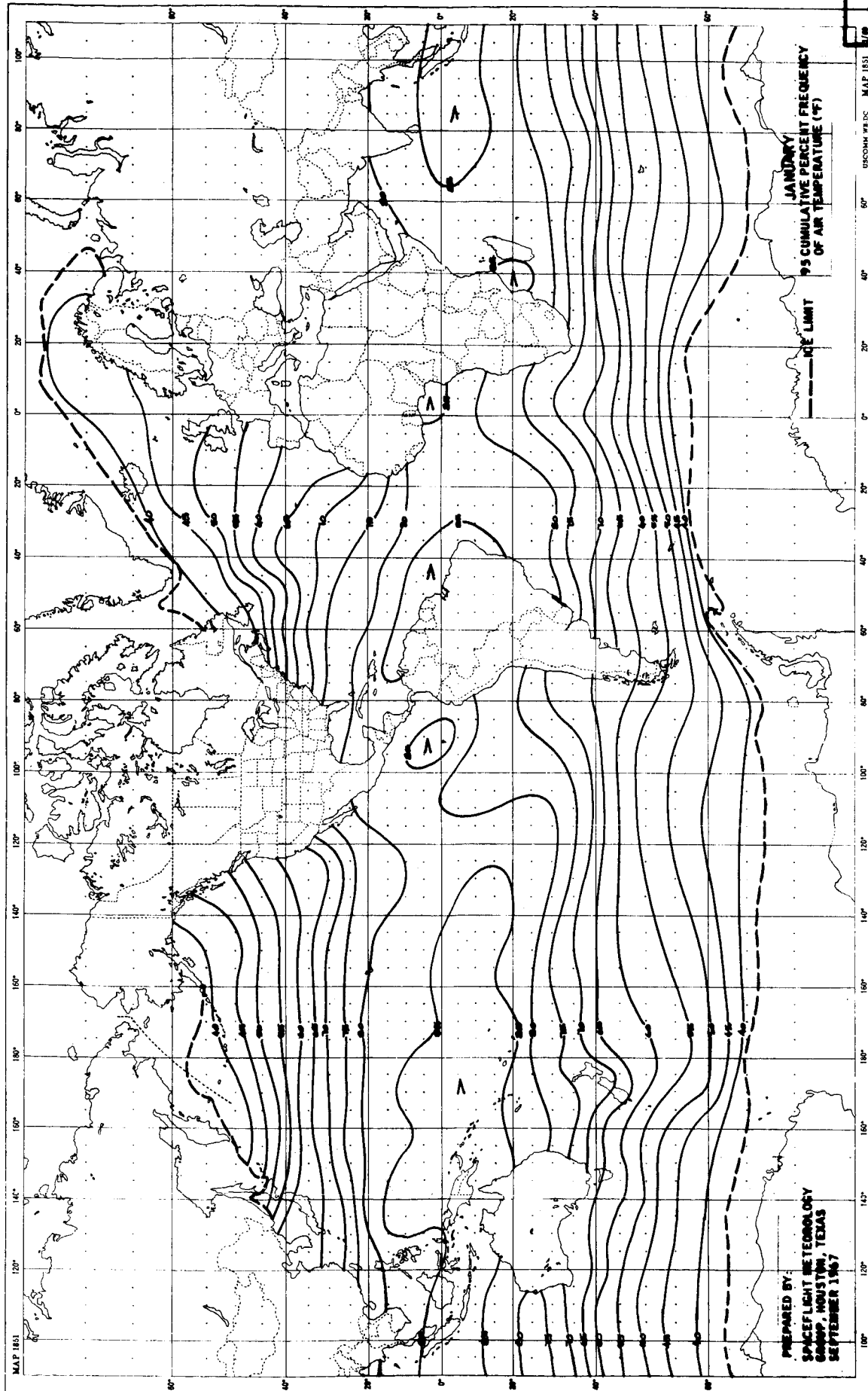
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SEPTEMBER 1967

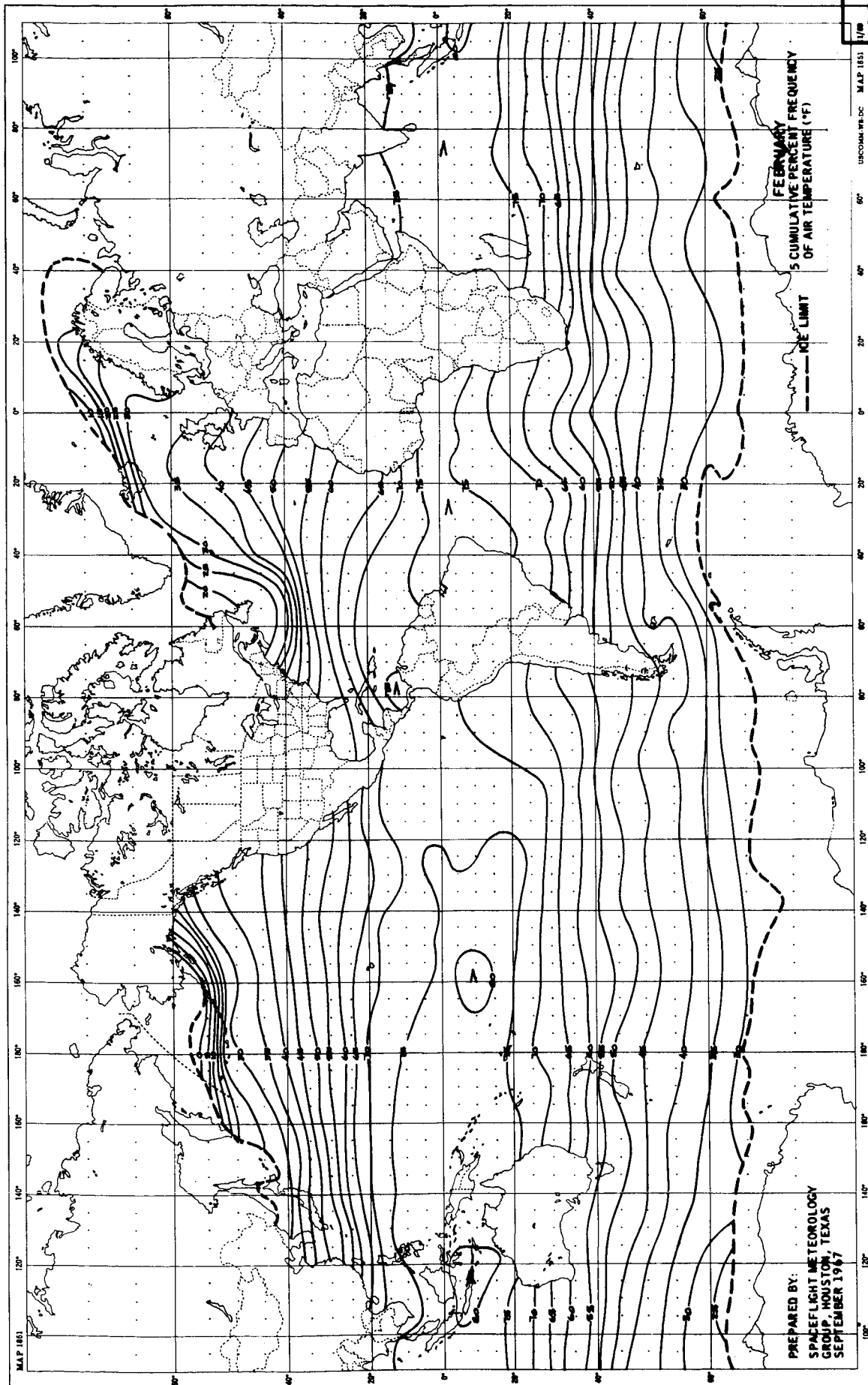
JANUARY
5 CUMULATIVE PERCENT FREQUENCY
OF AIR TEMPERATURE (°F)

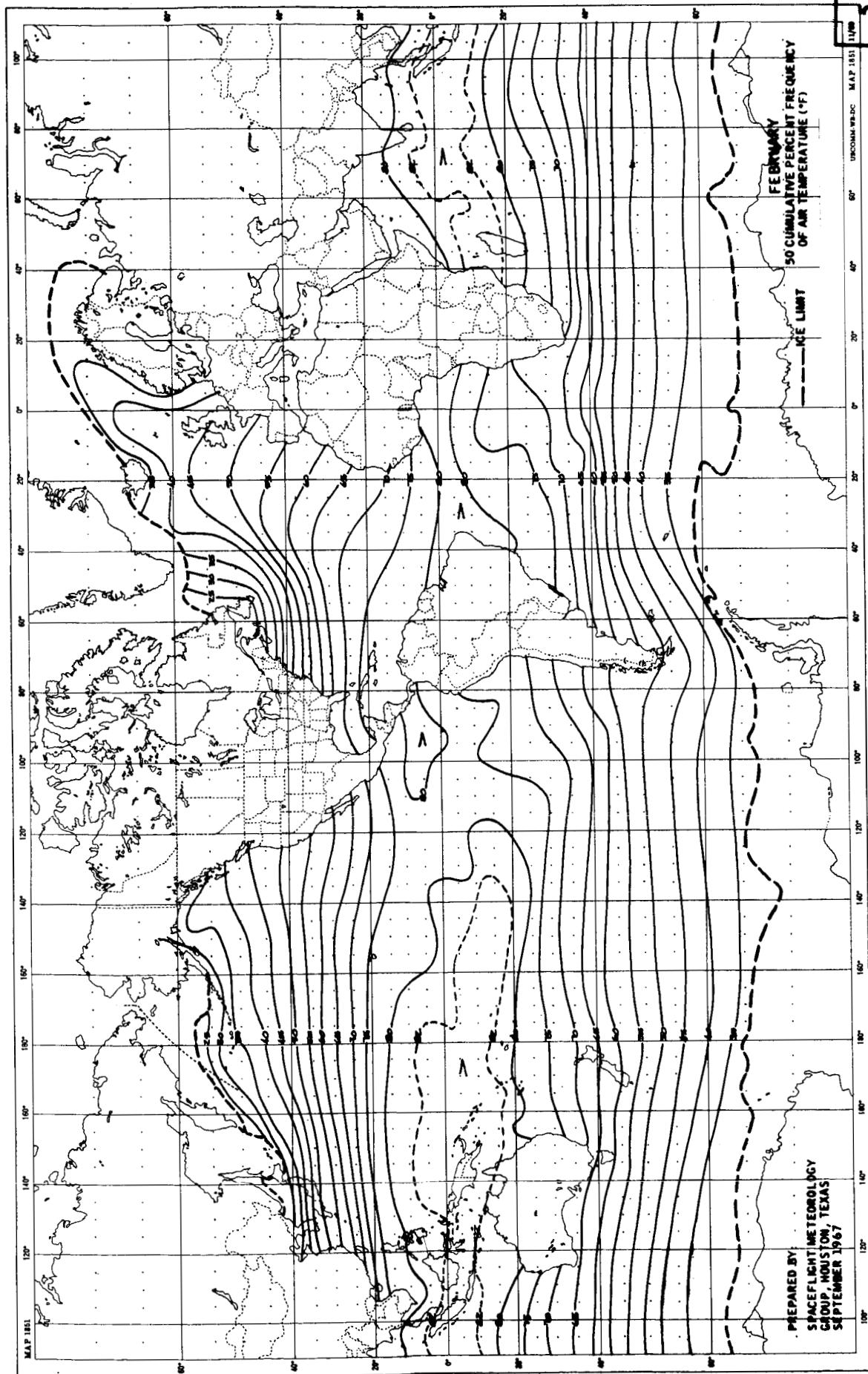
--- ICE LIMIT

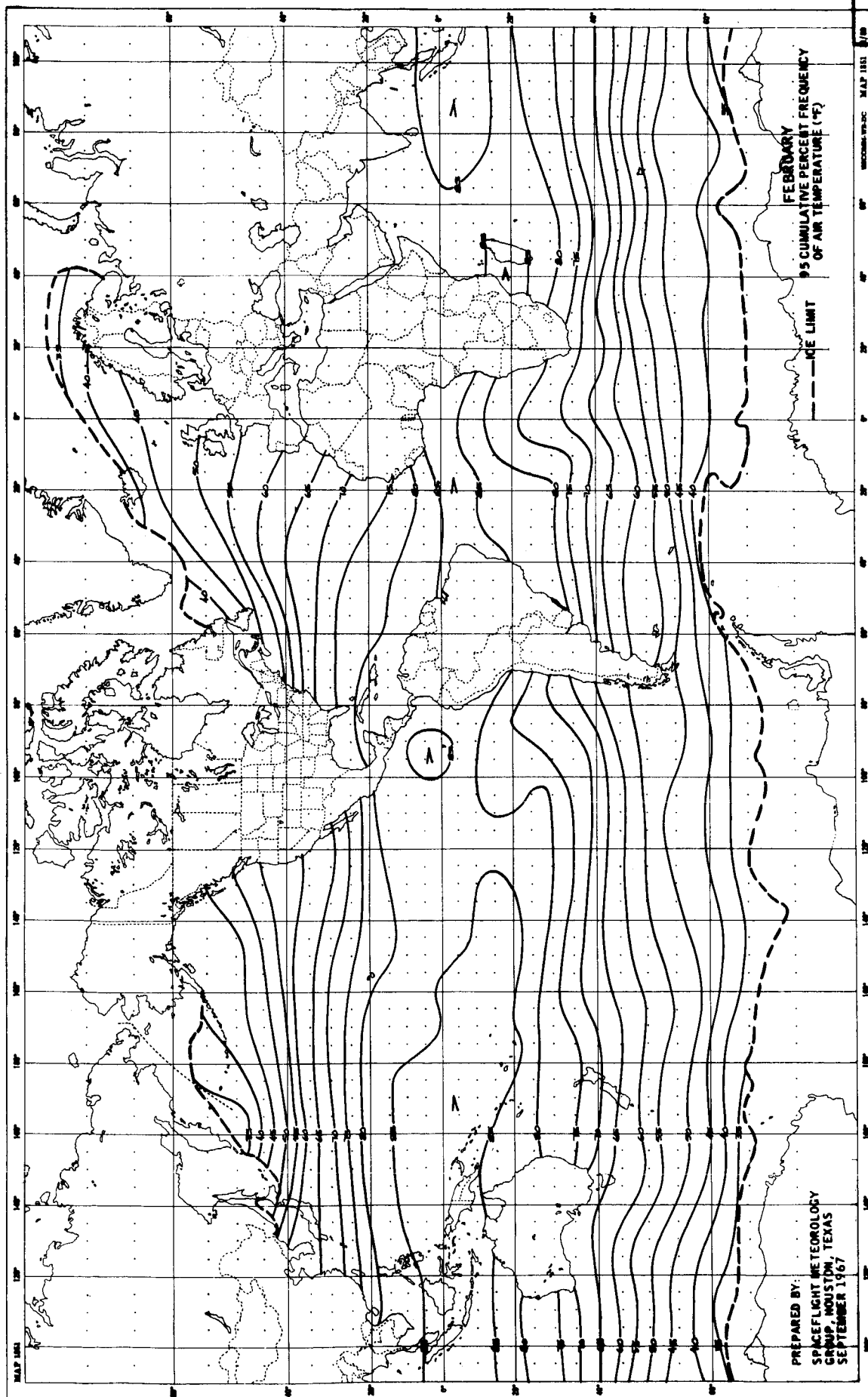
UNCOMMANED MAP 1851

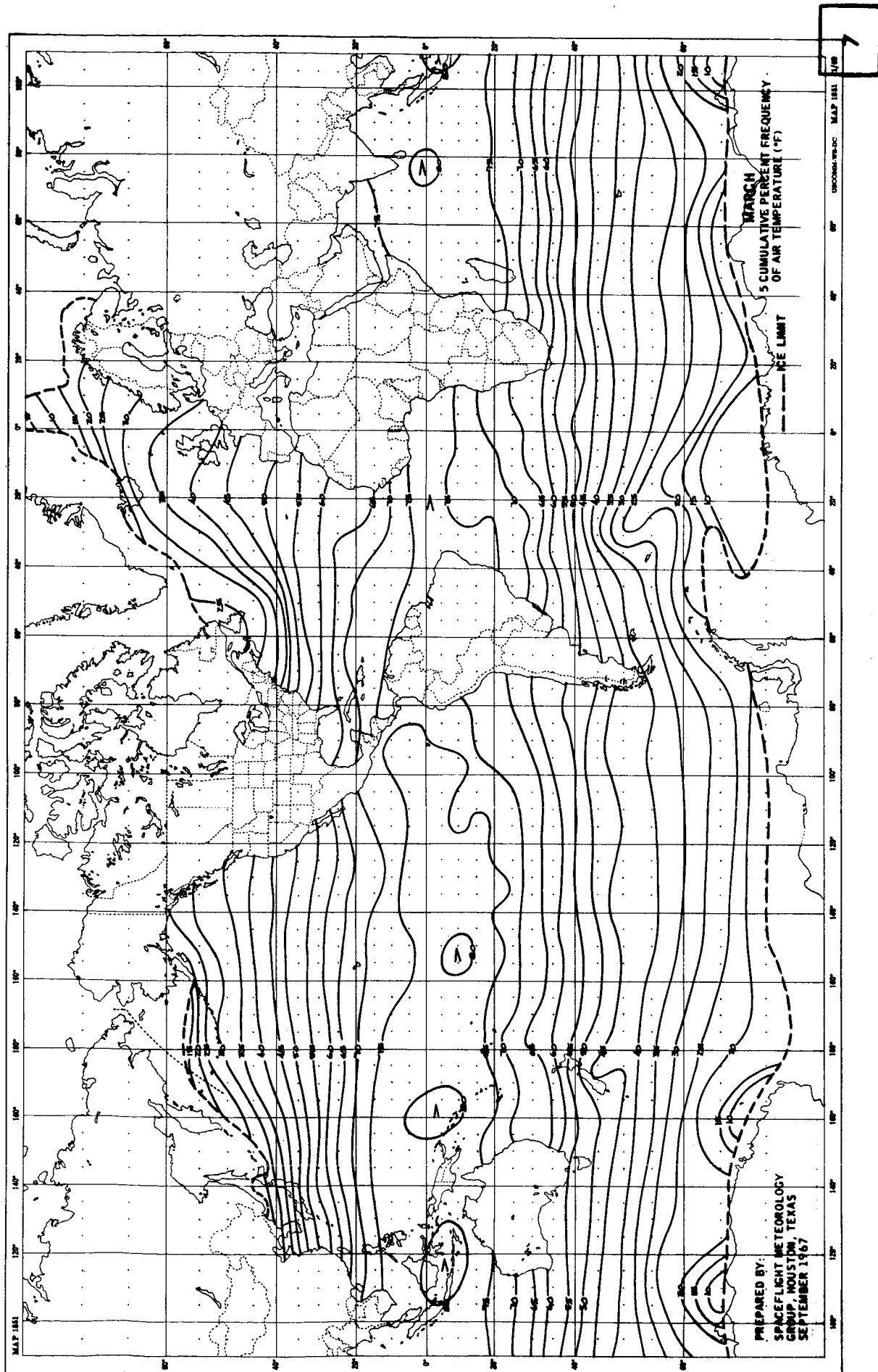


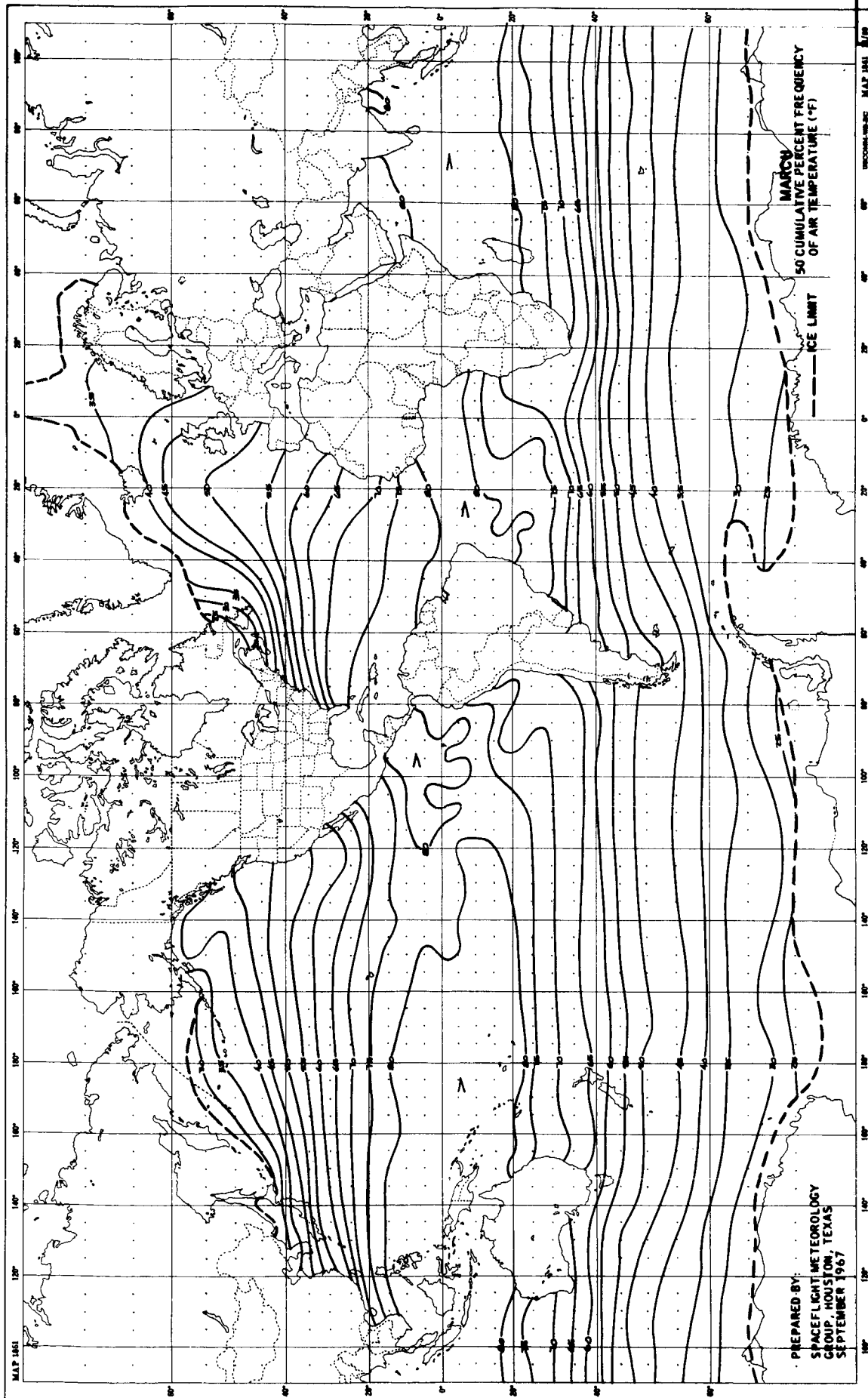


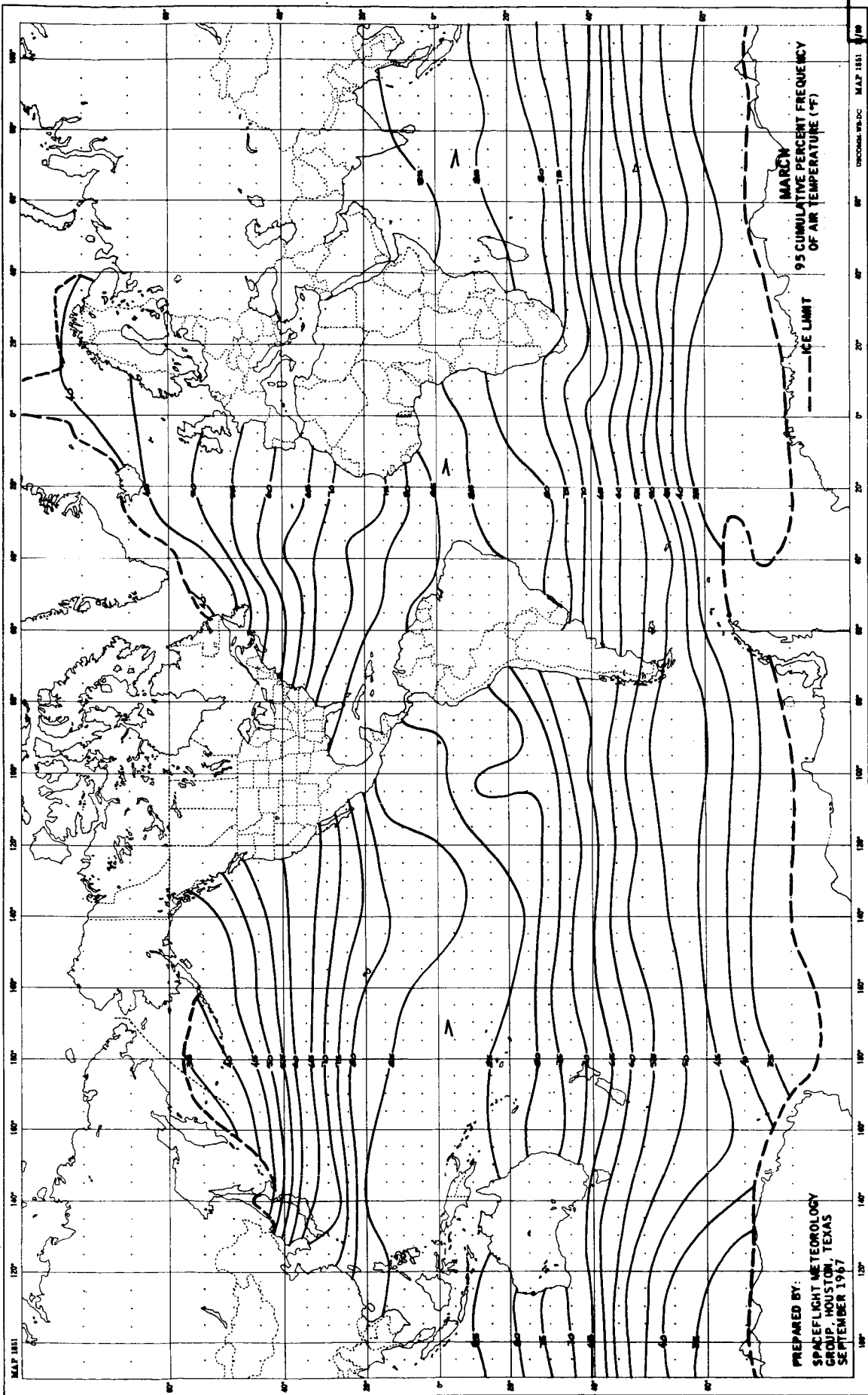


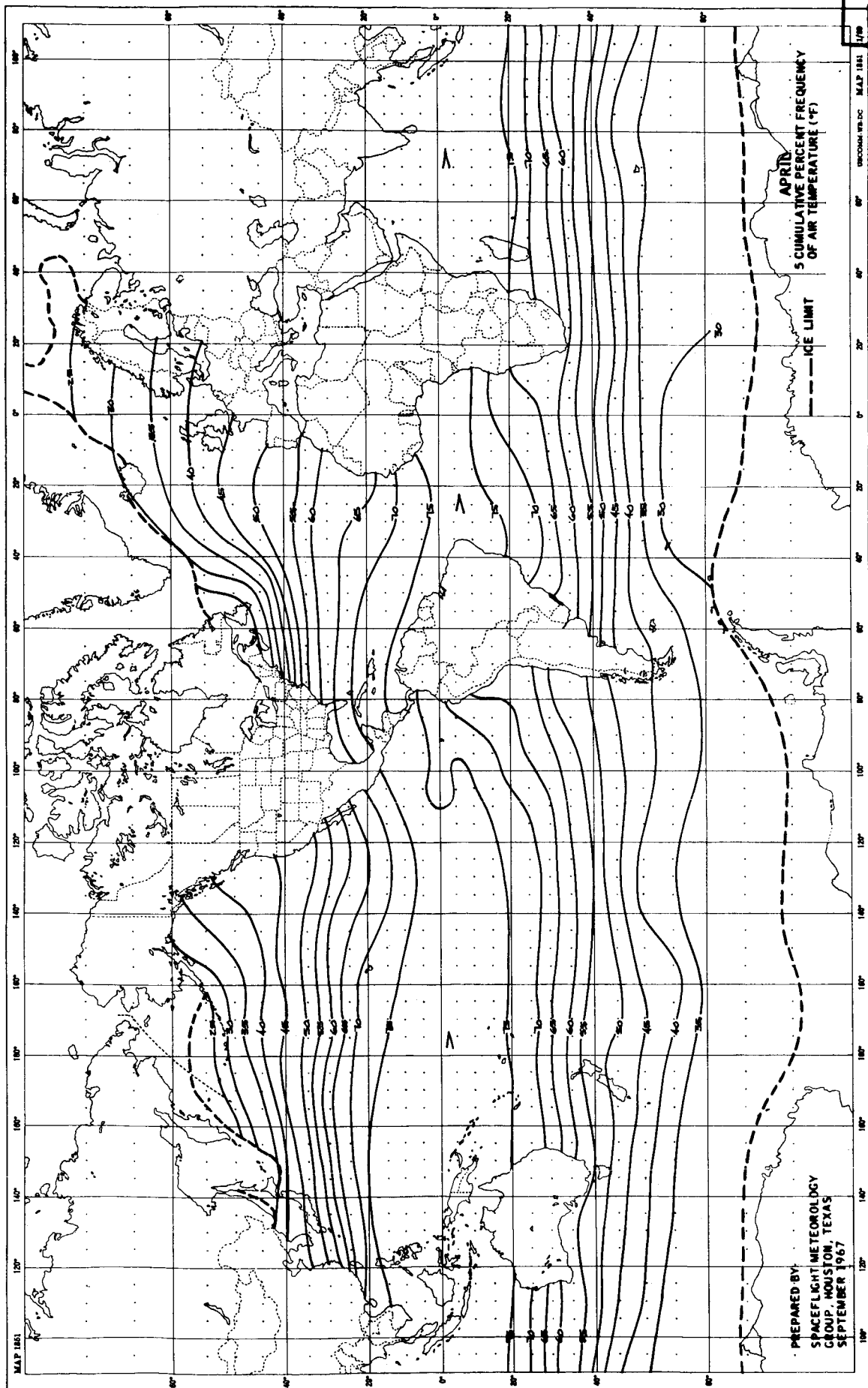


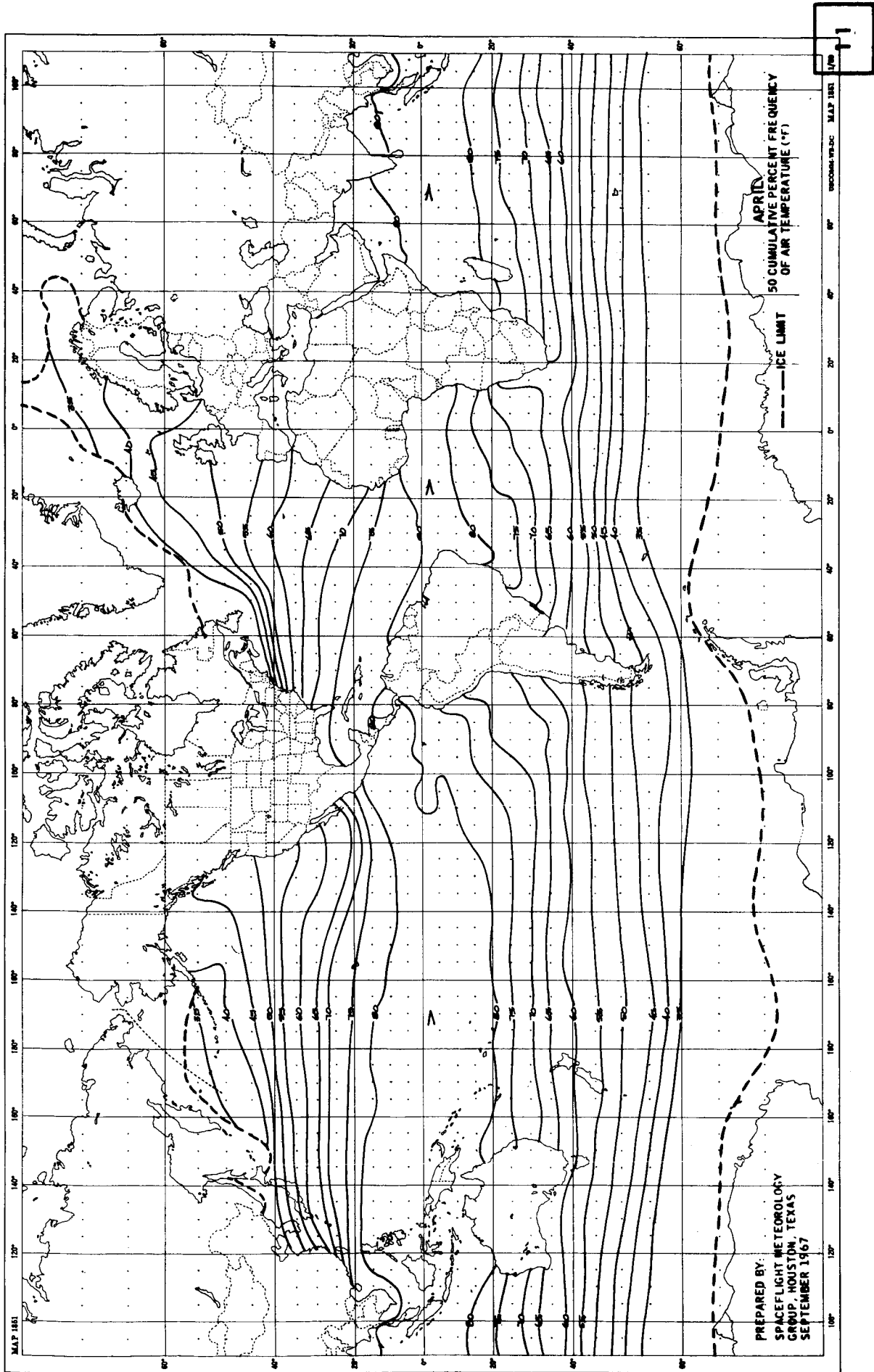


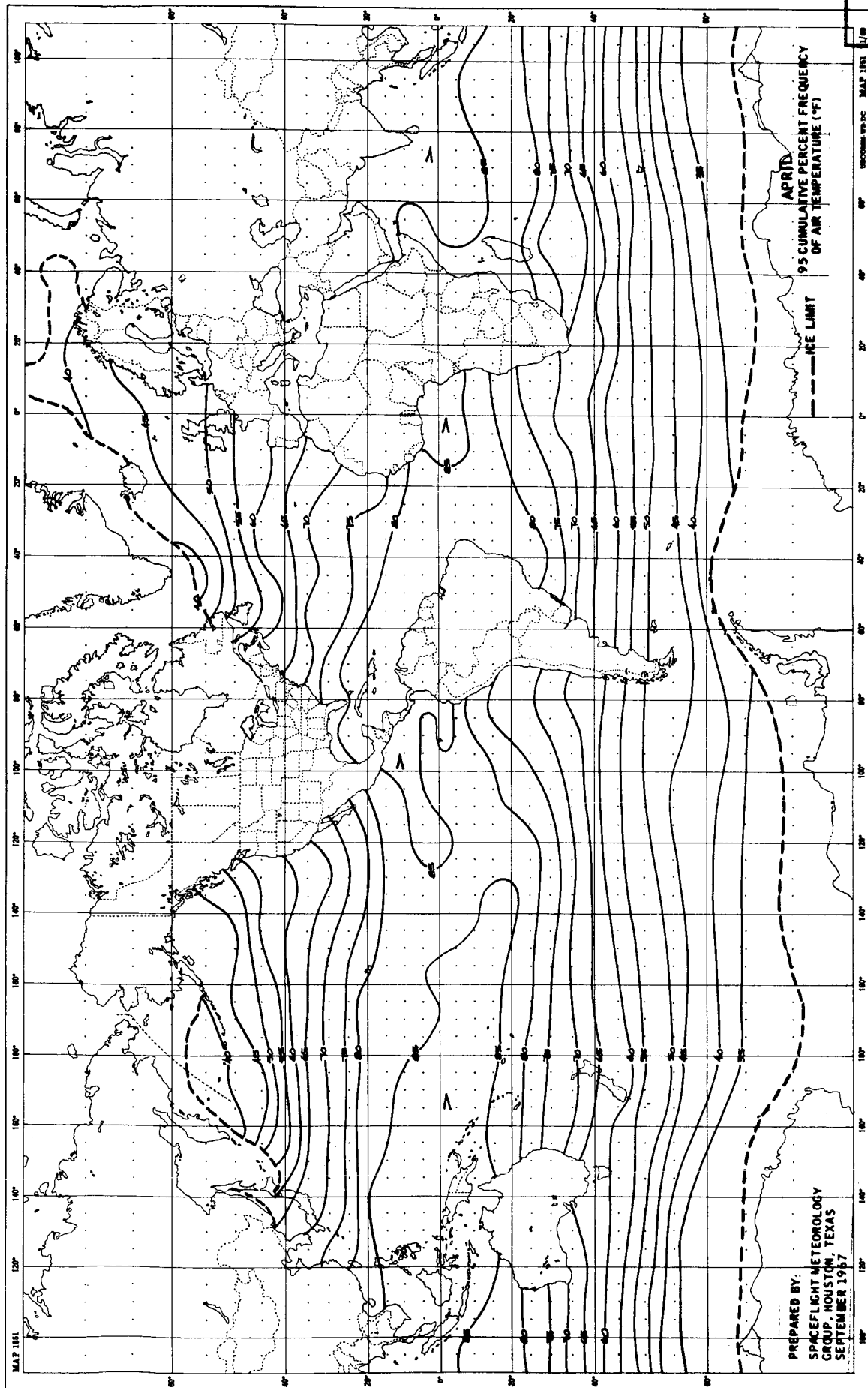


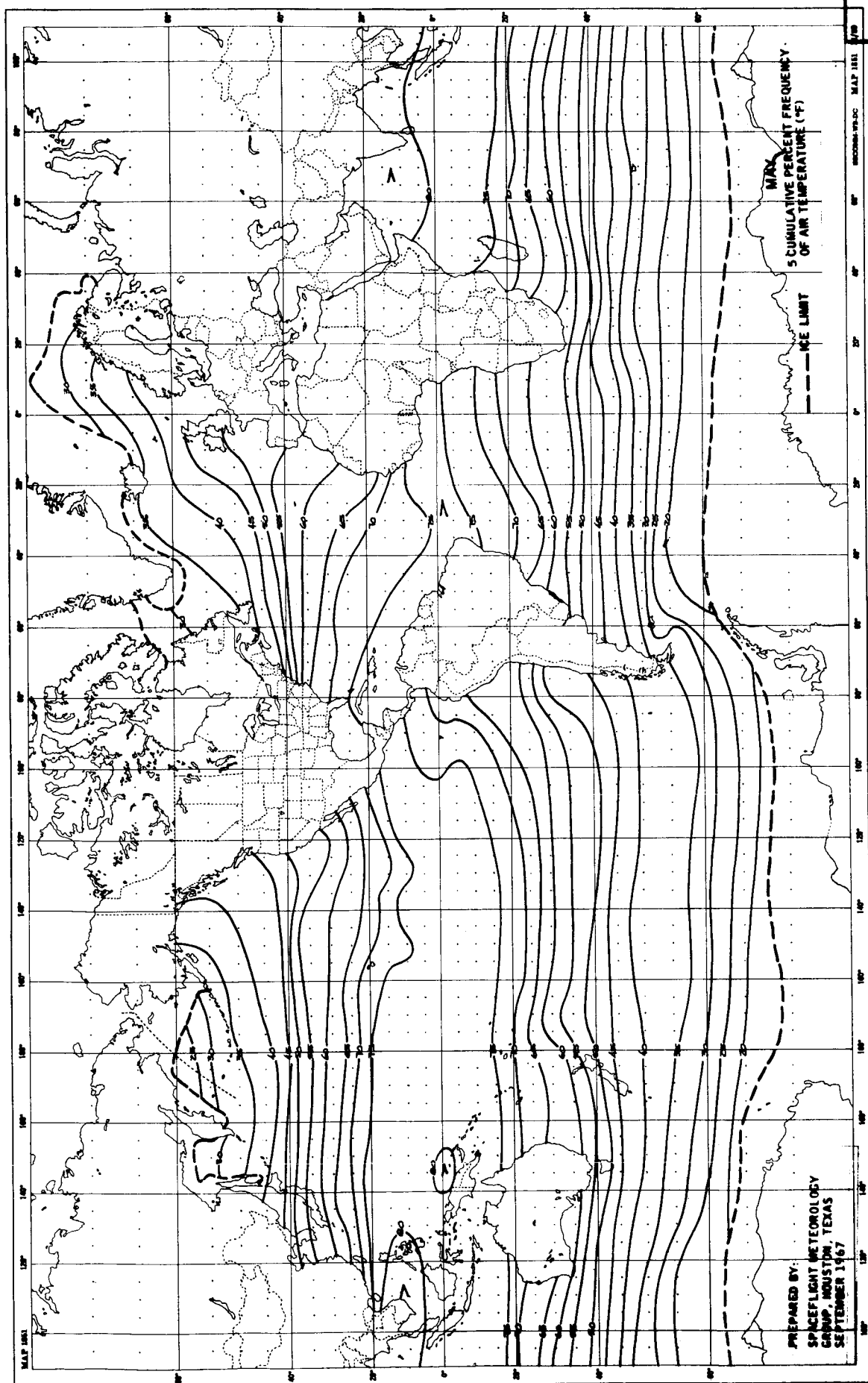


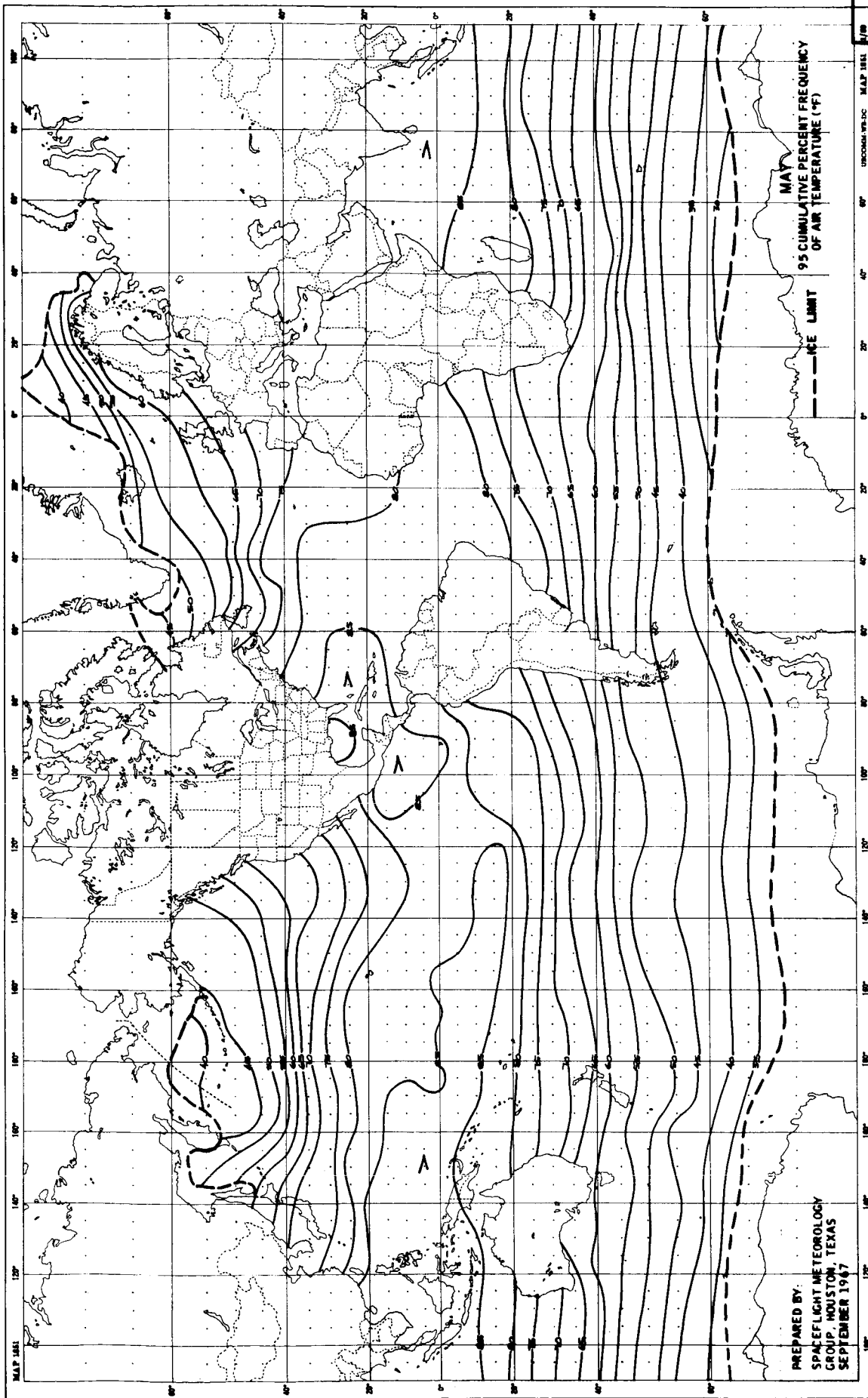


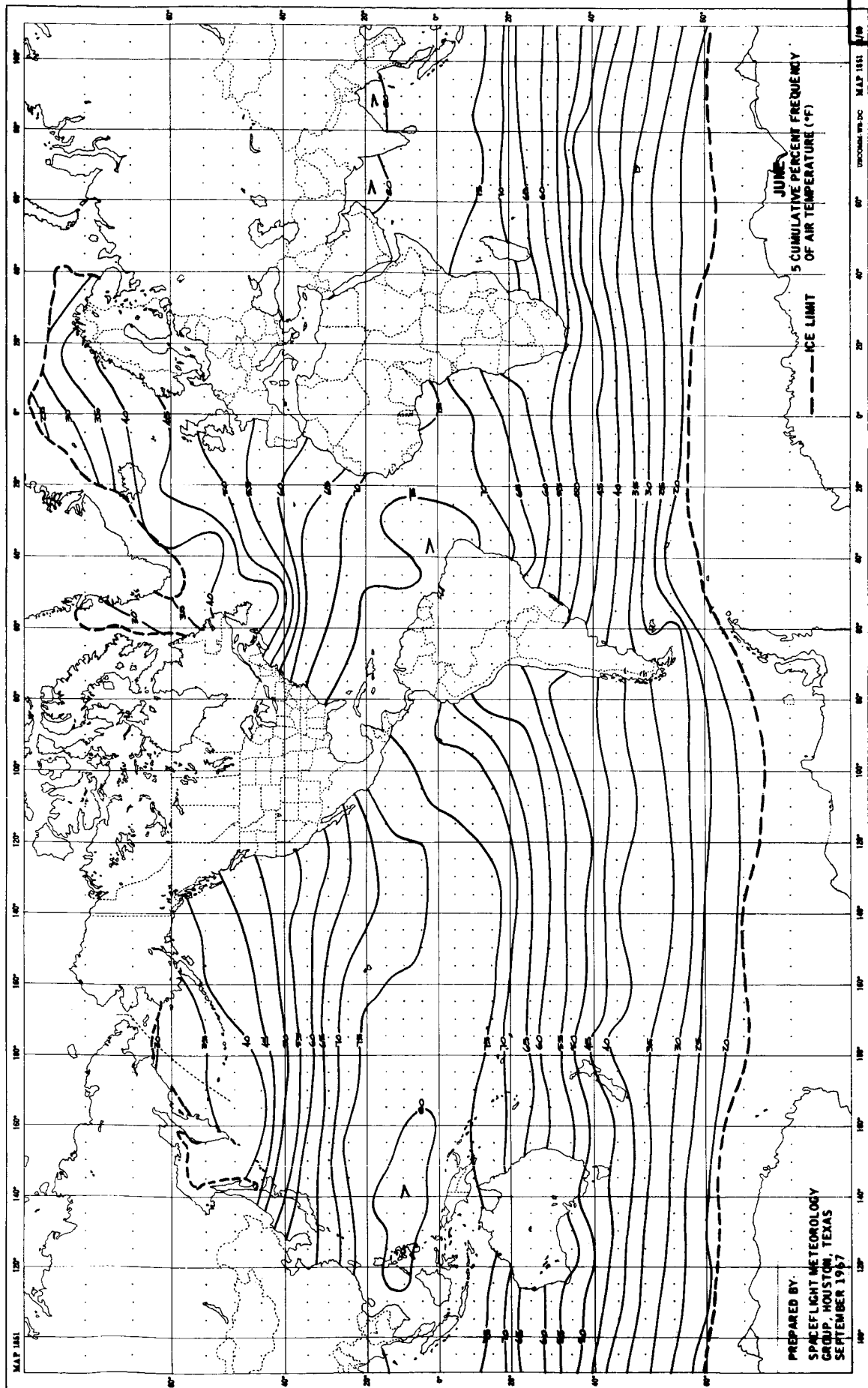


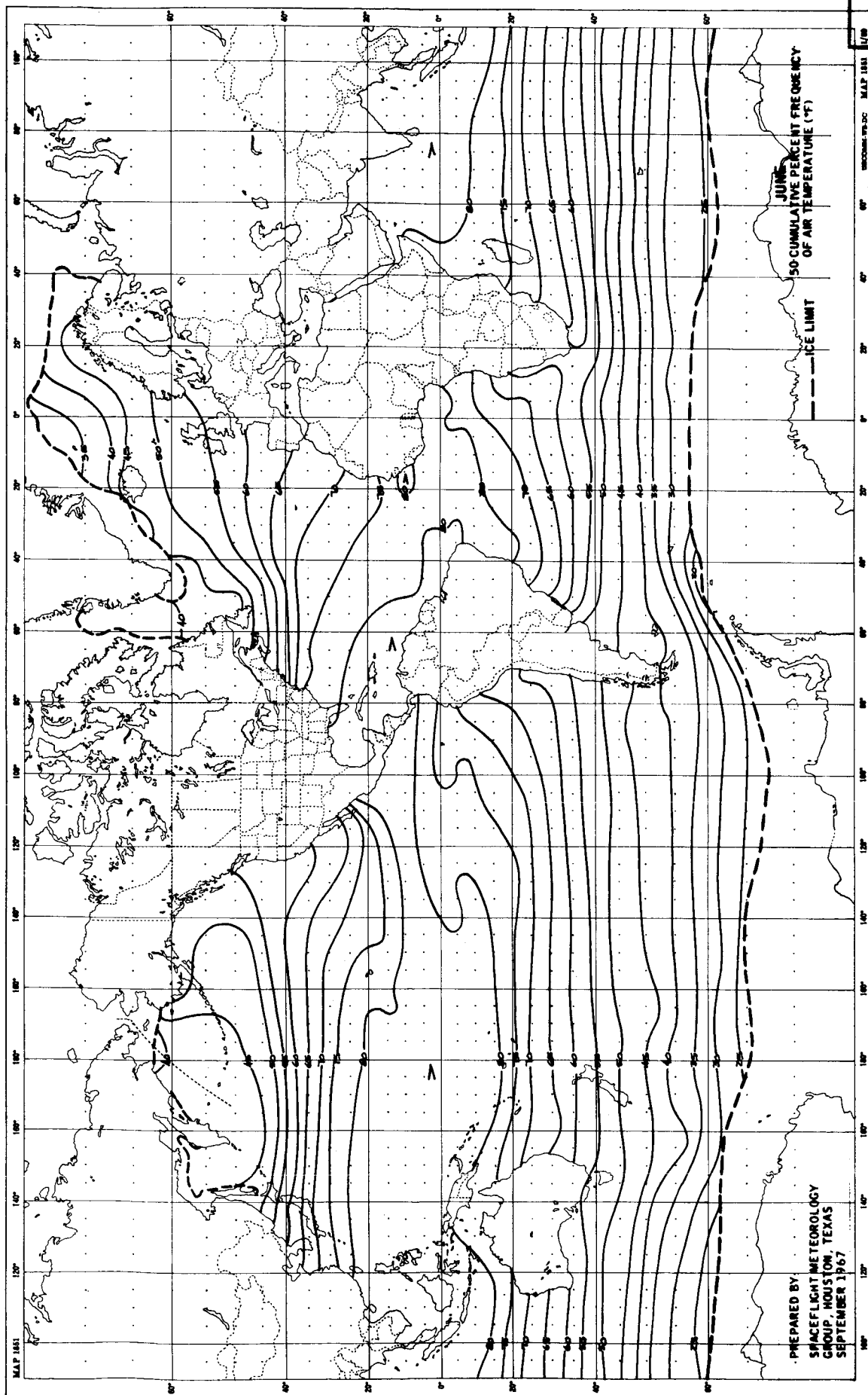


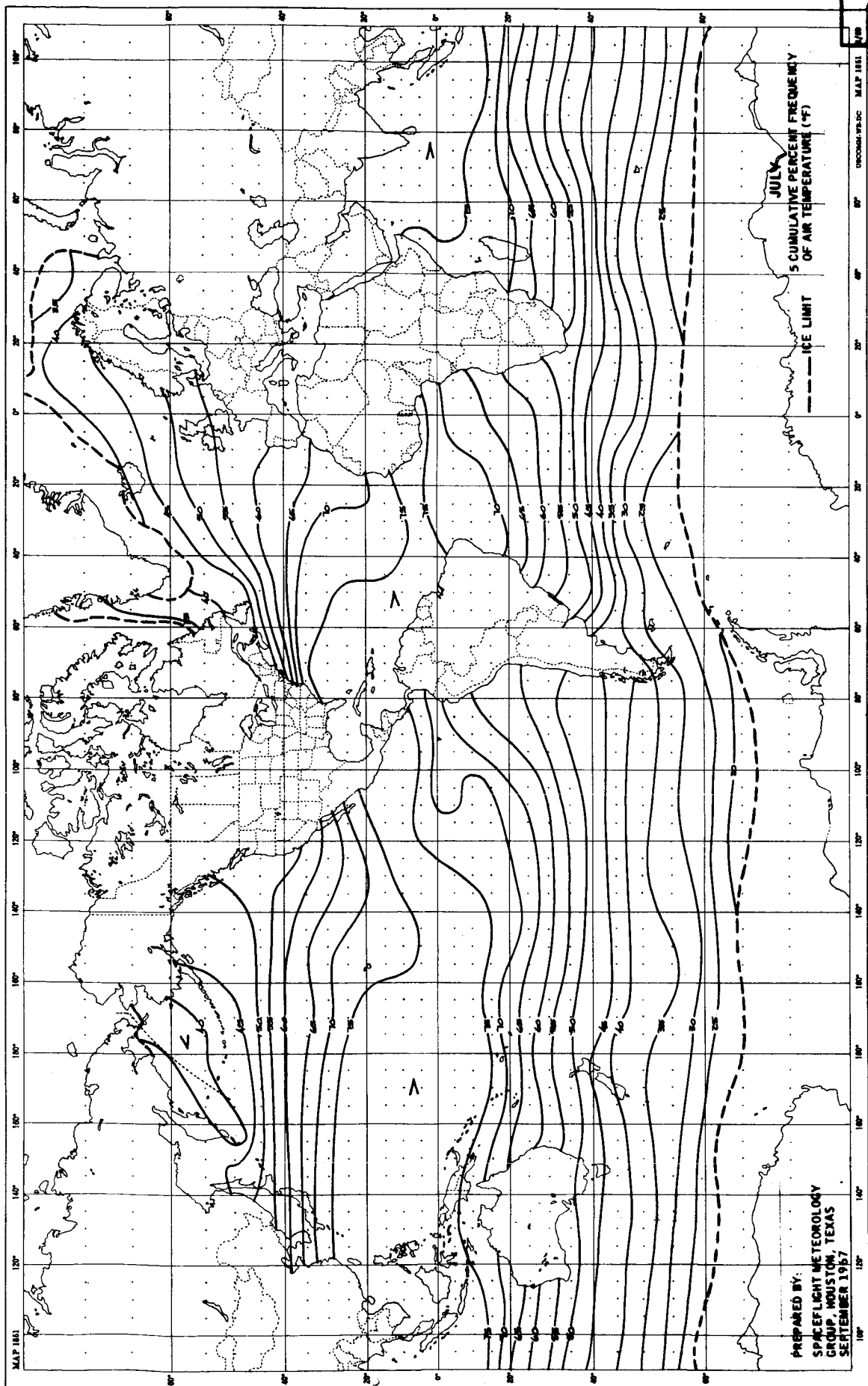


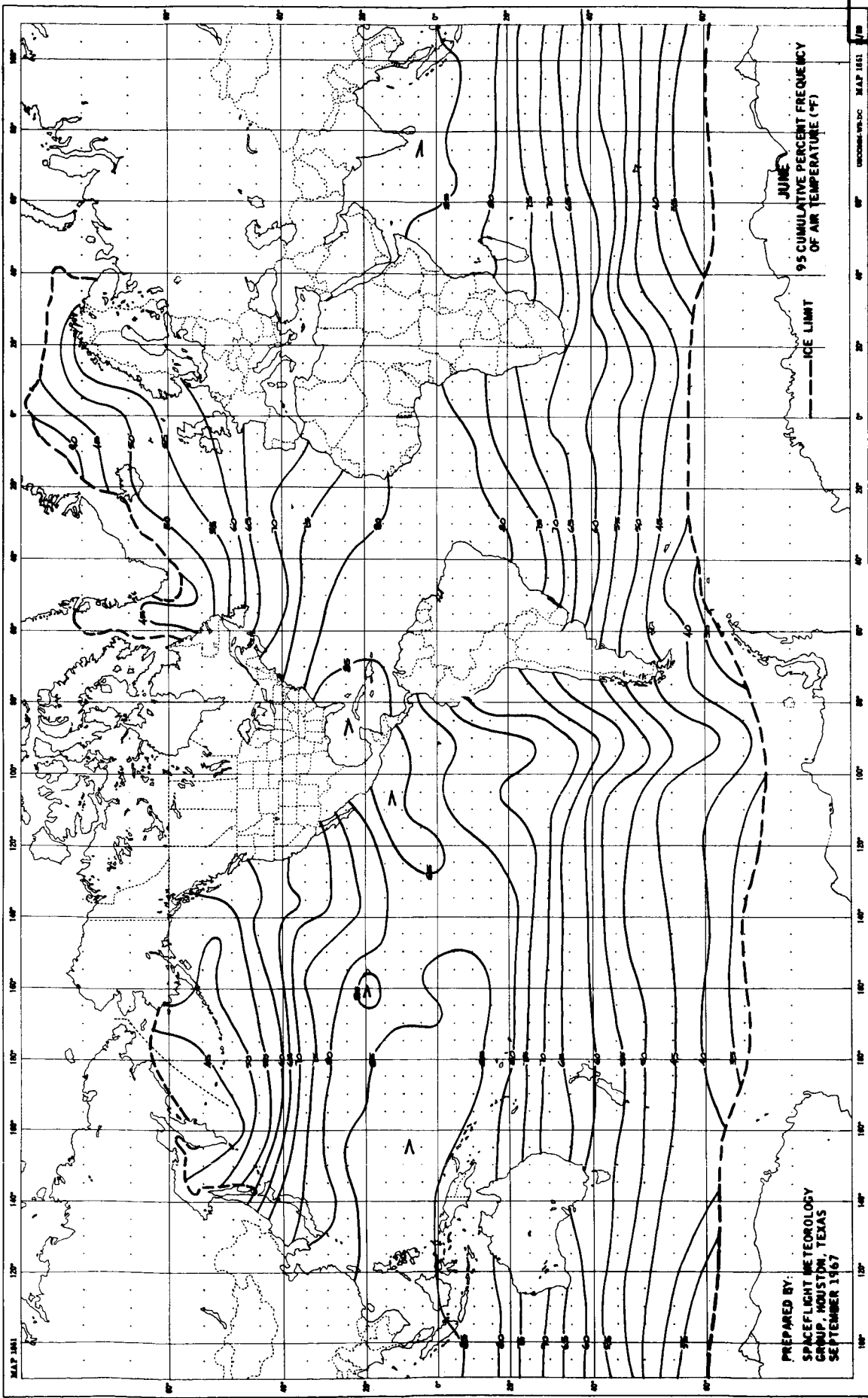


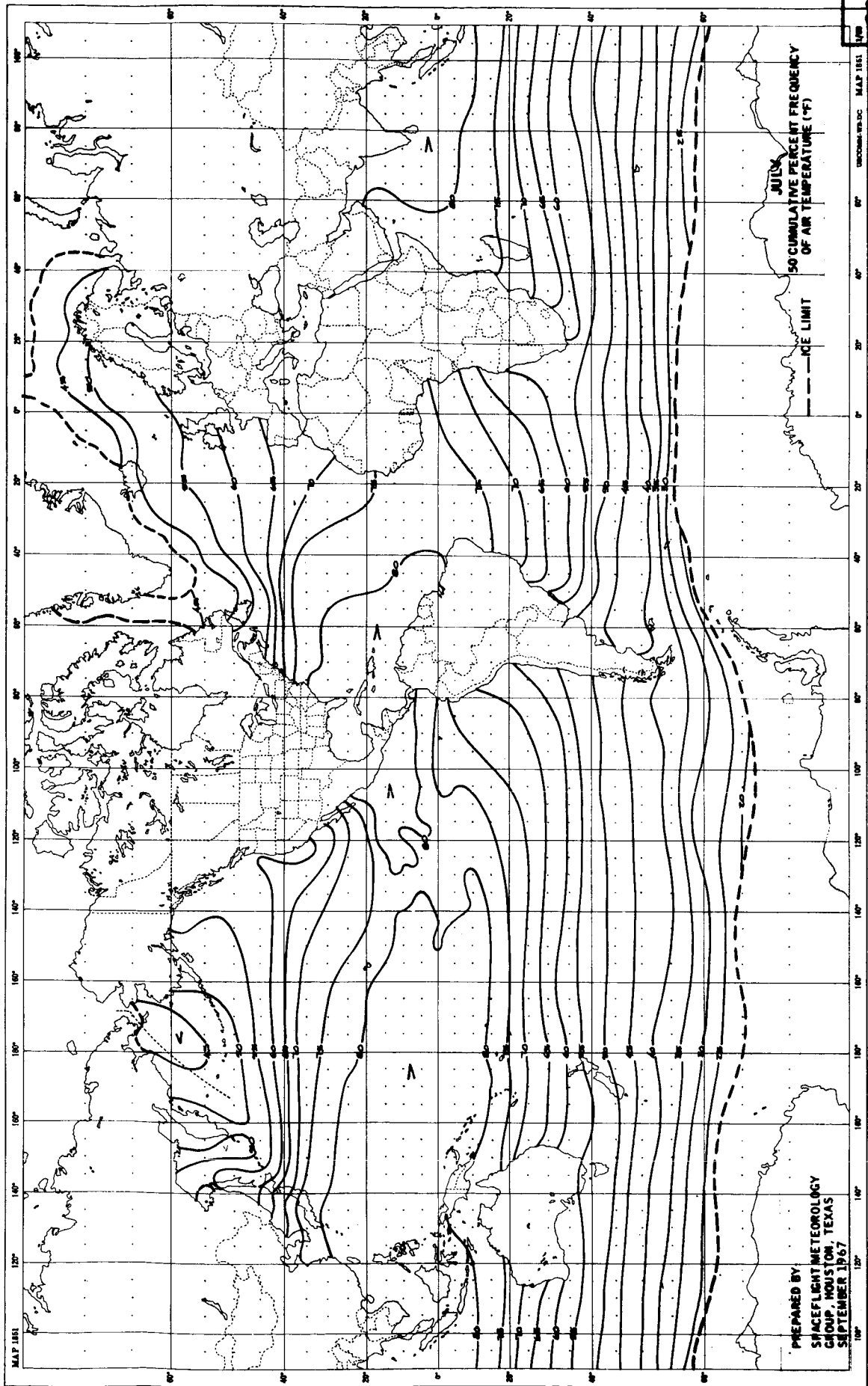


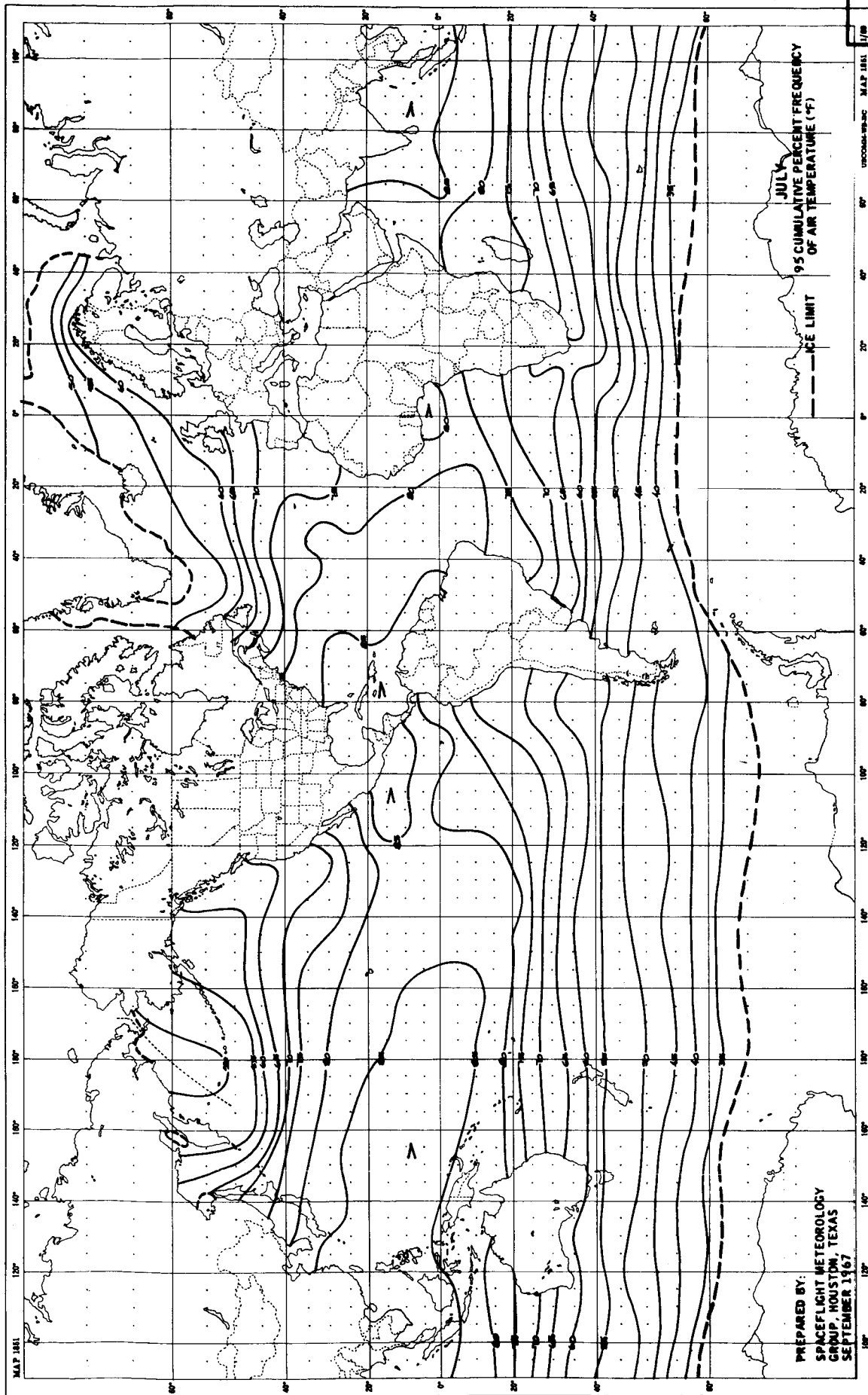




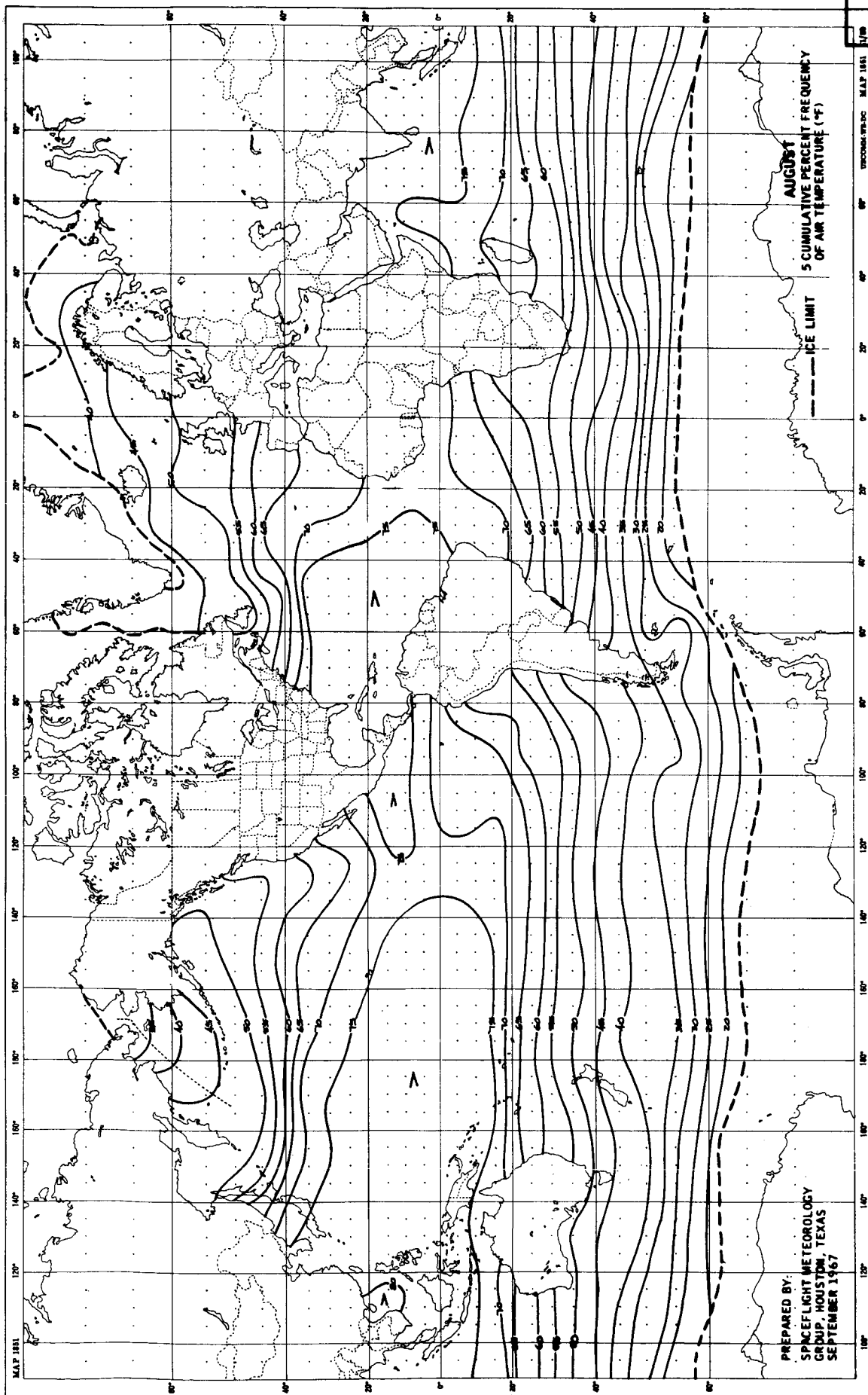








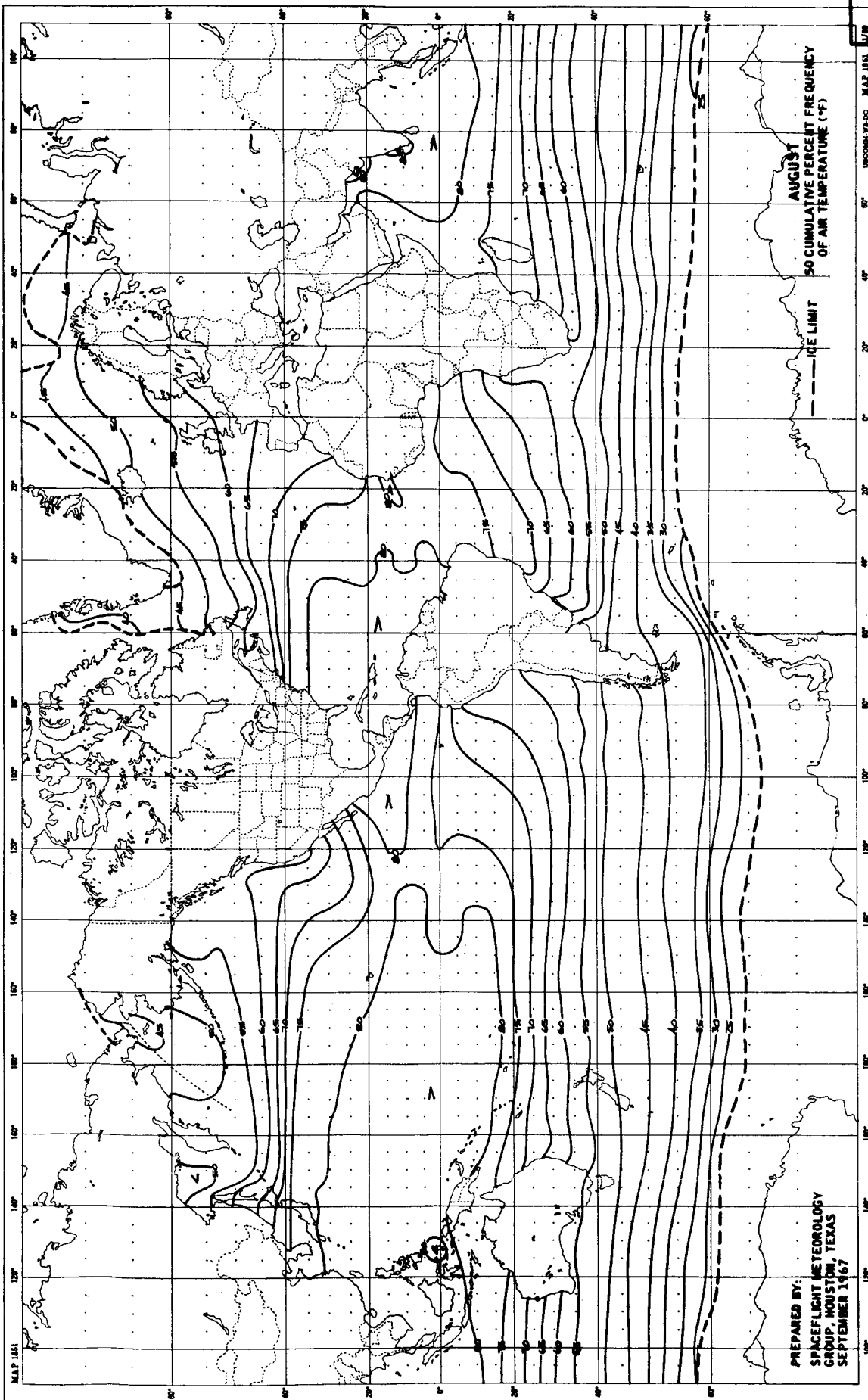
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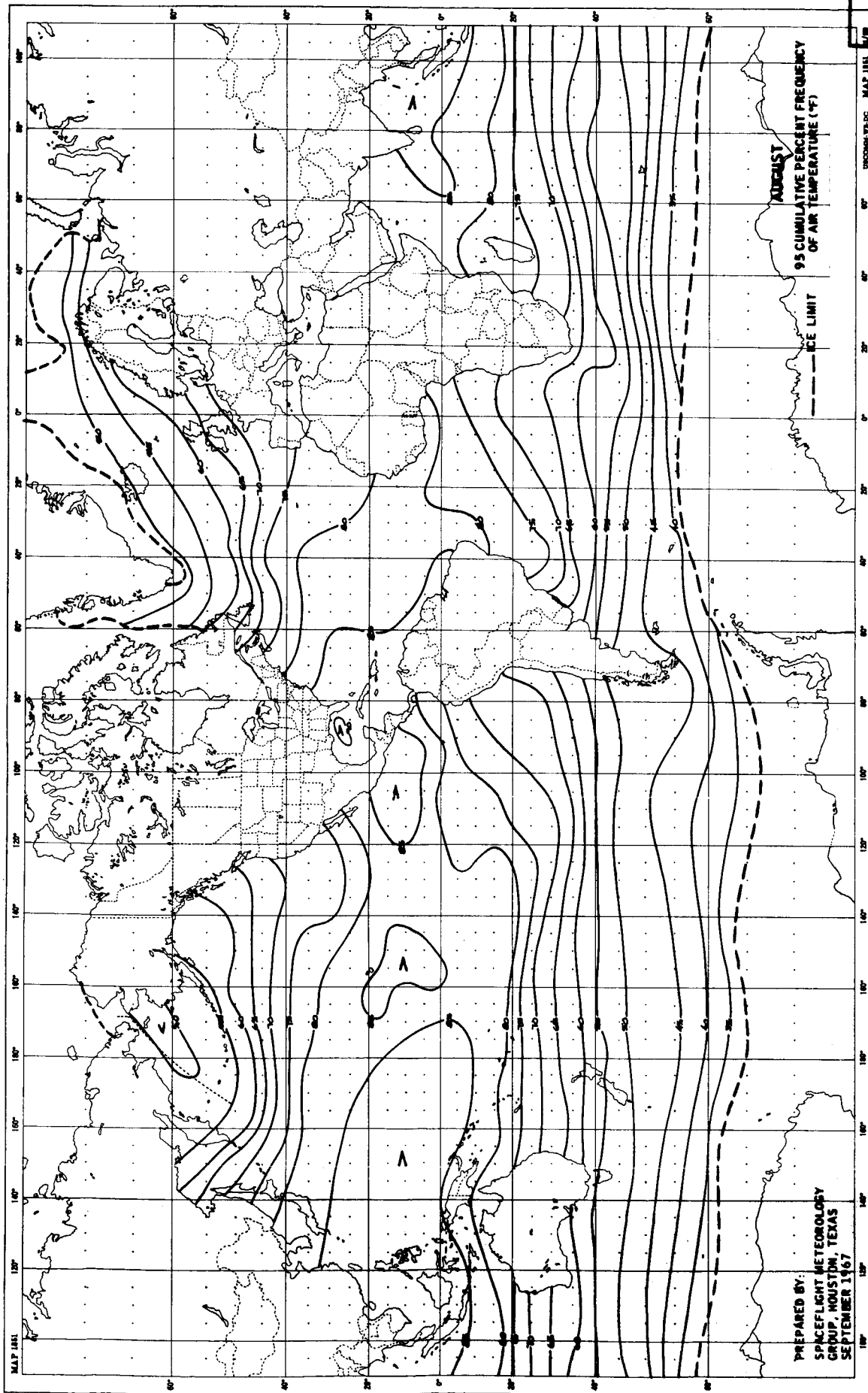


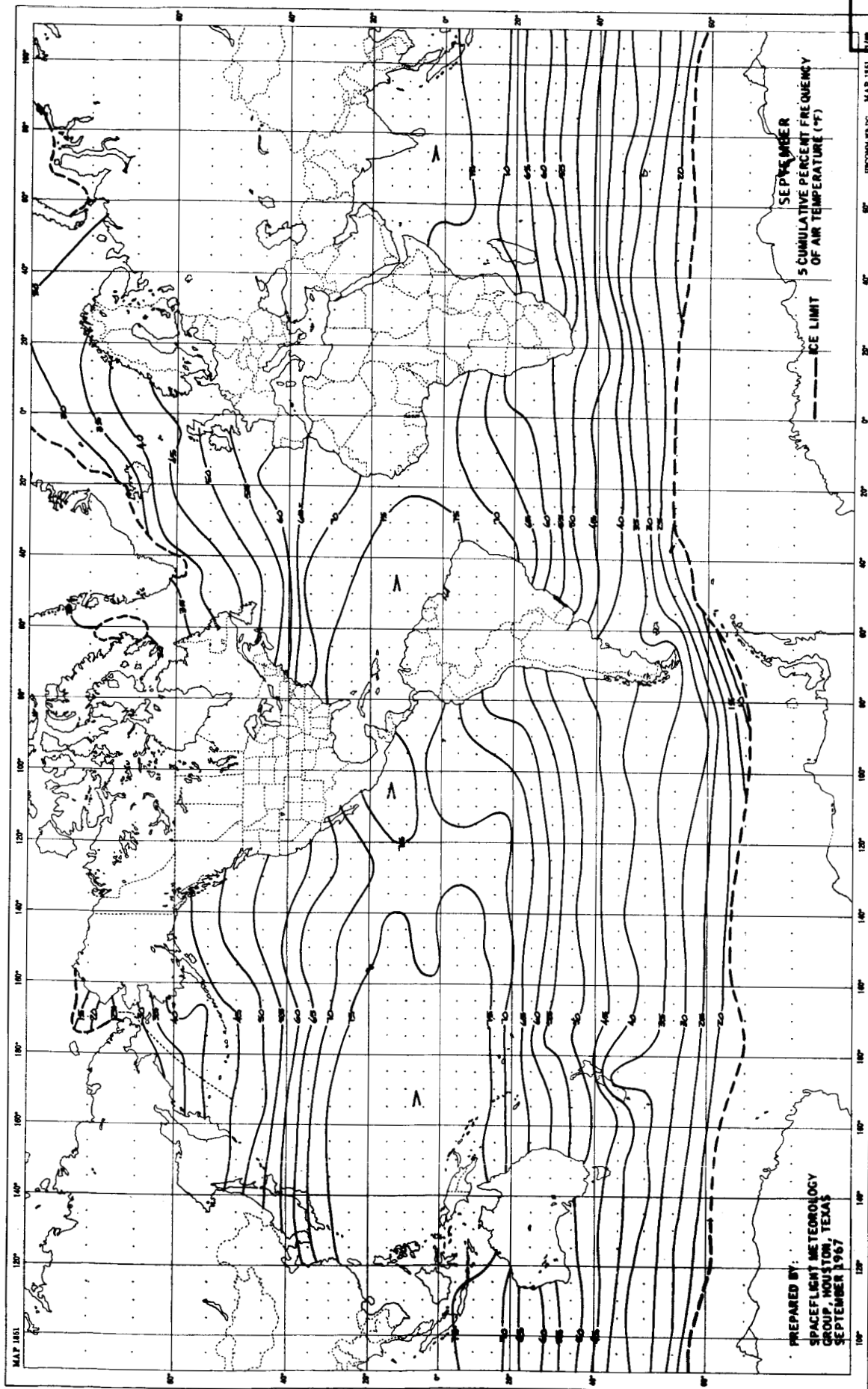
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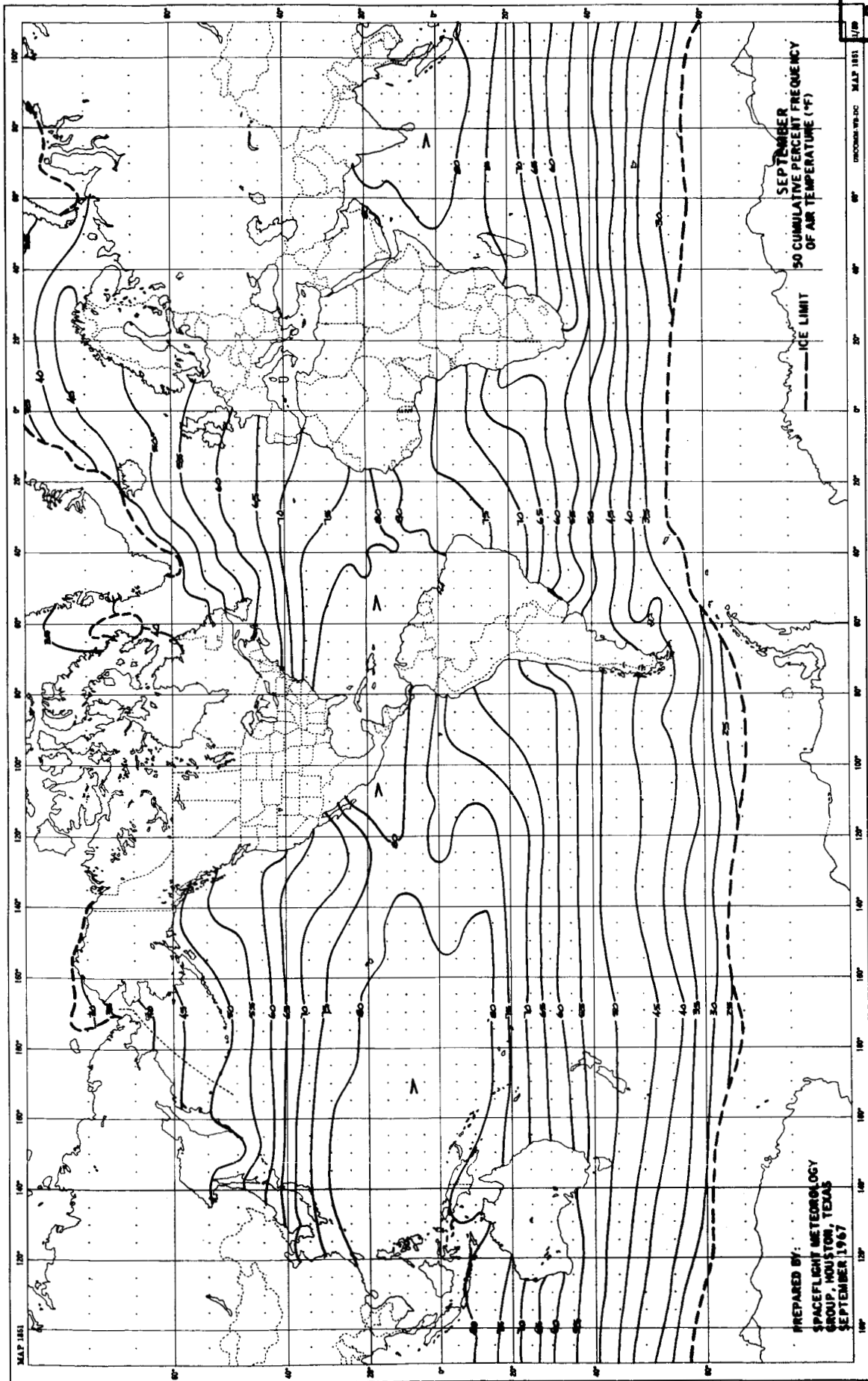
AUGUST
5 CUMULATIVE PERCENT FREQUENCY
OF AIR TEMPERATURE (°F)

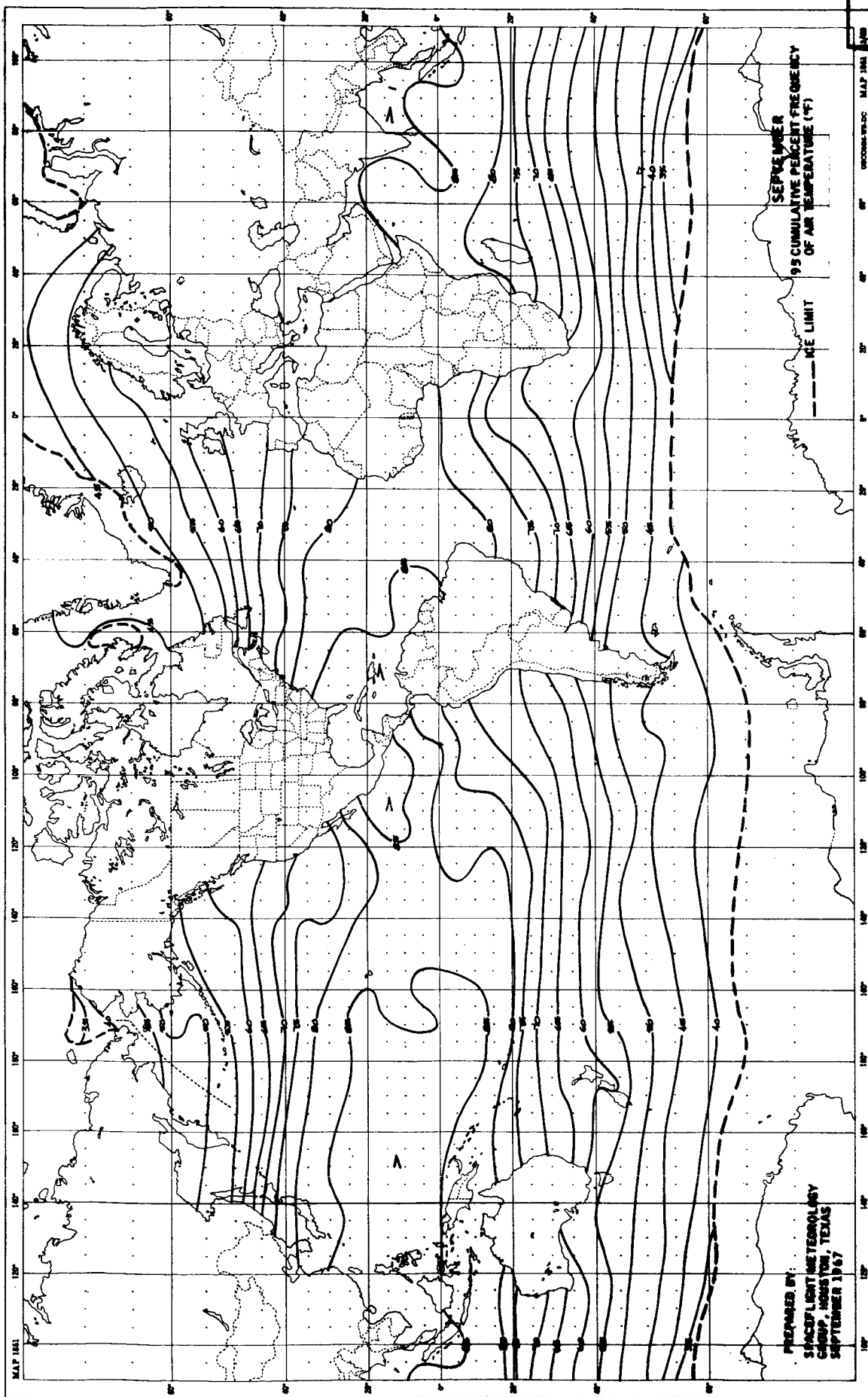
--- ICE LIMIT

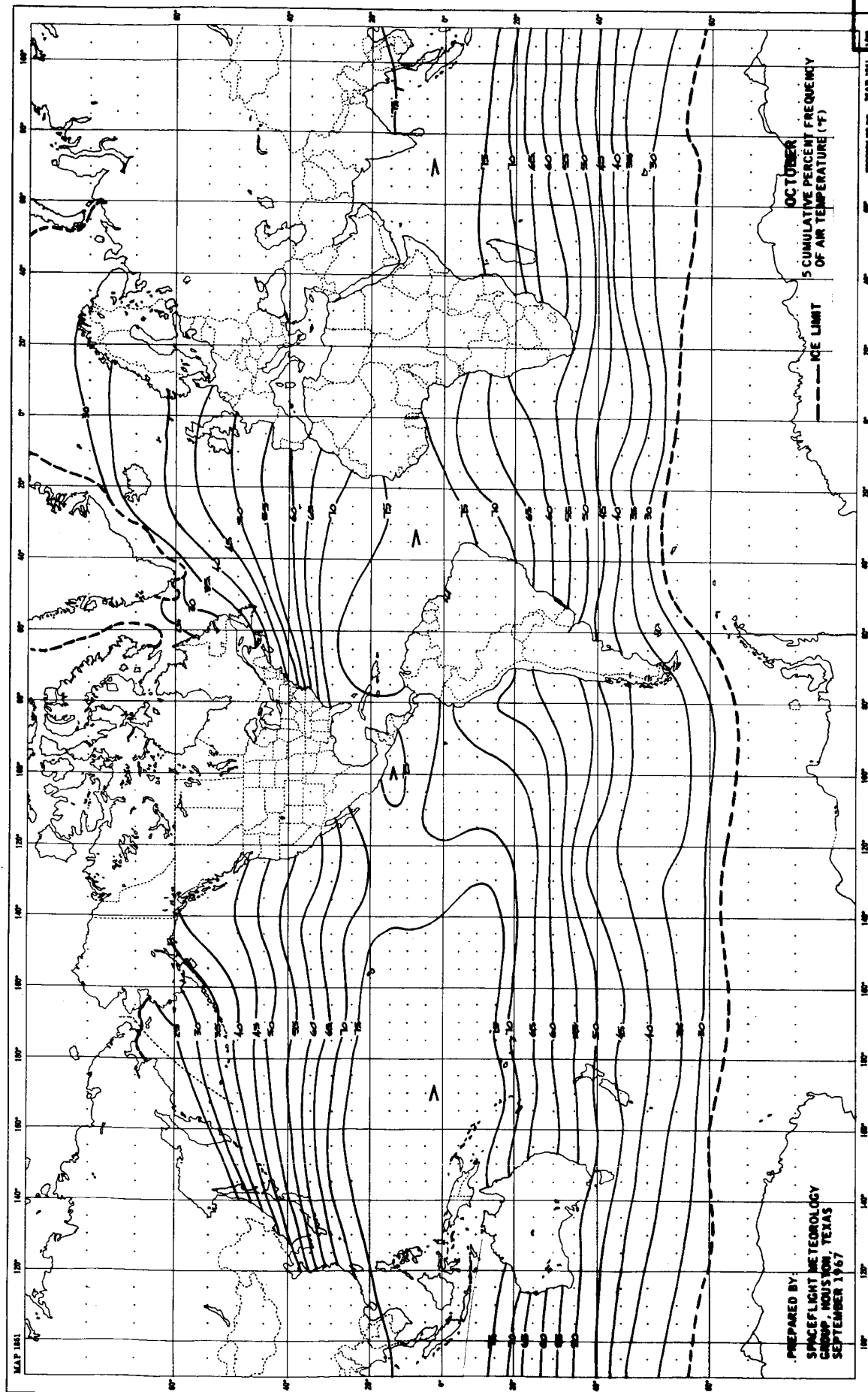


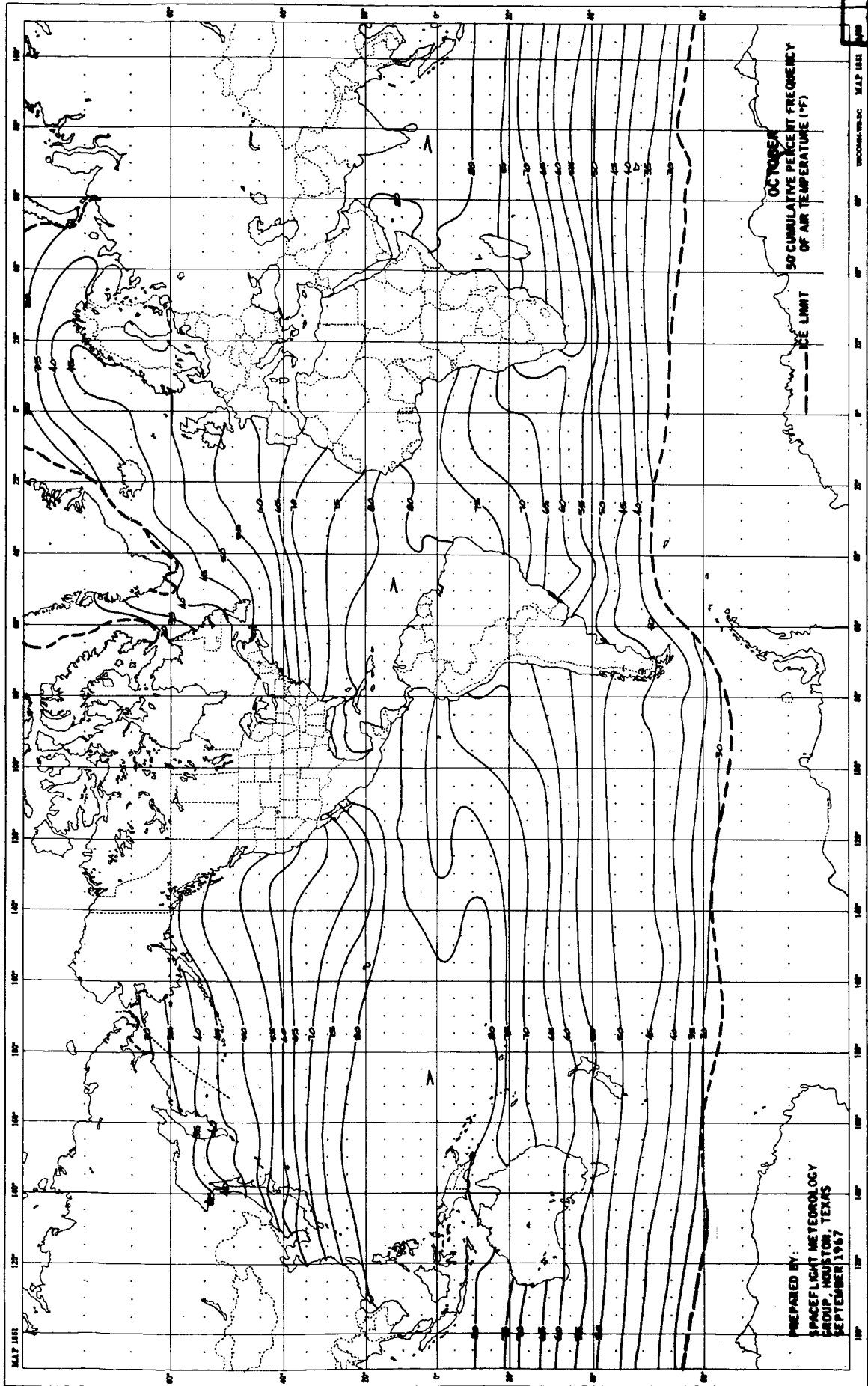












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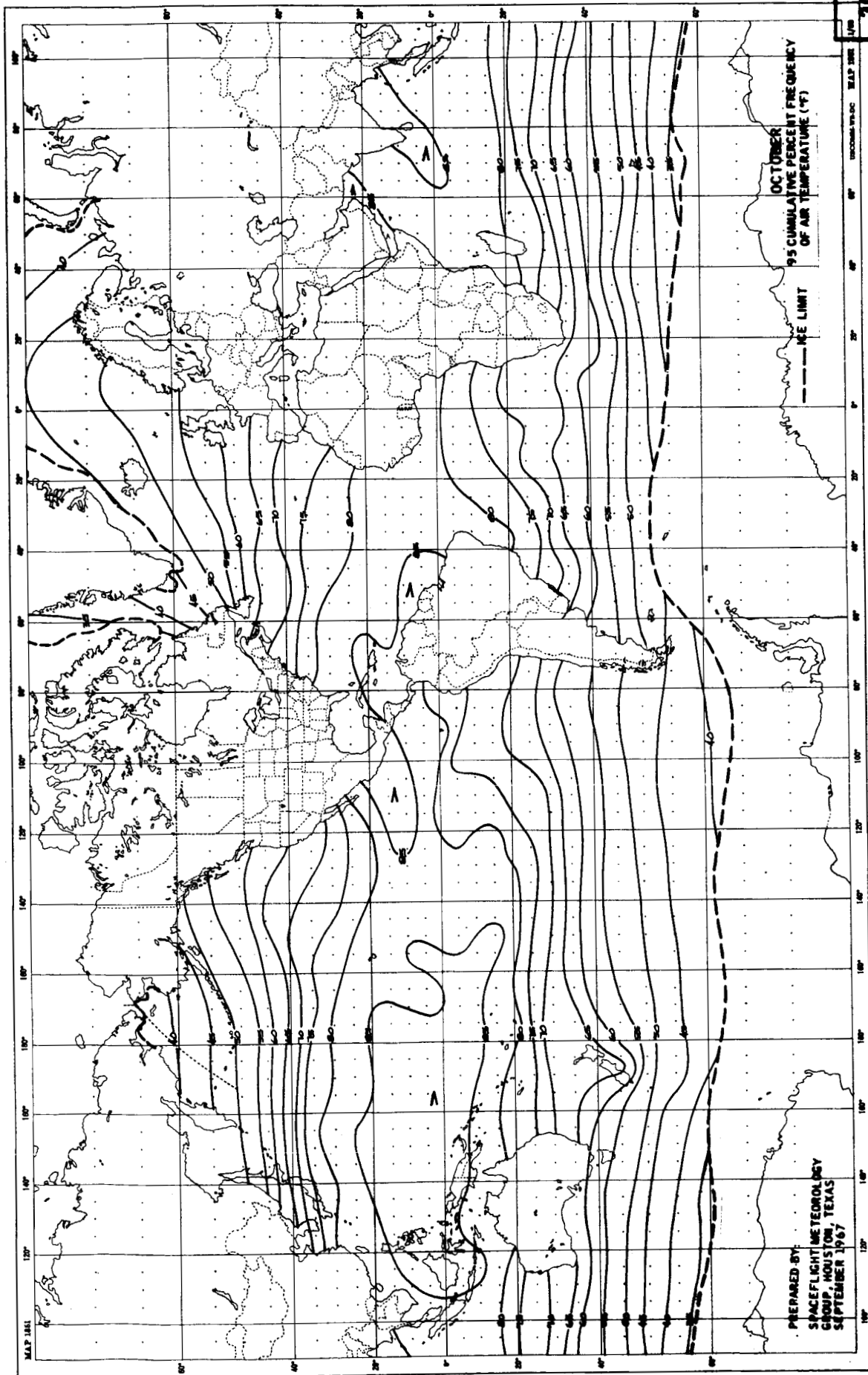
OCTOBER
50 CUMULATIVE PERCENT FREQUENCY
OF AIR TEMPERATURE (°F)

--- ICE LIMIT

MAP 1881

UNCLASSIFIED

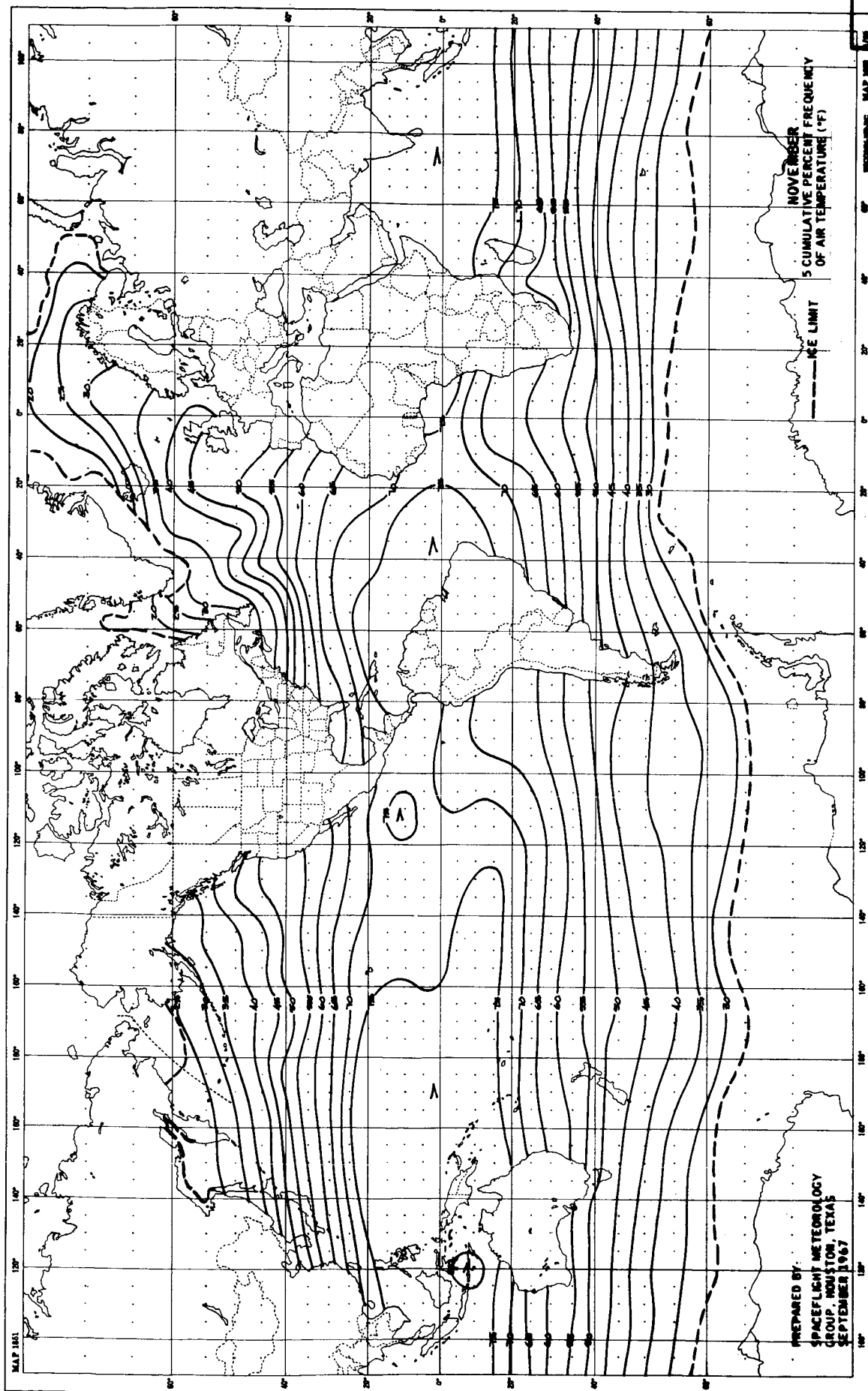
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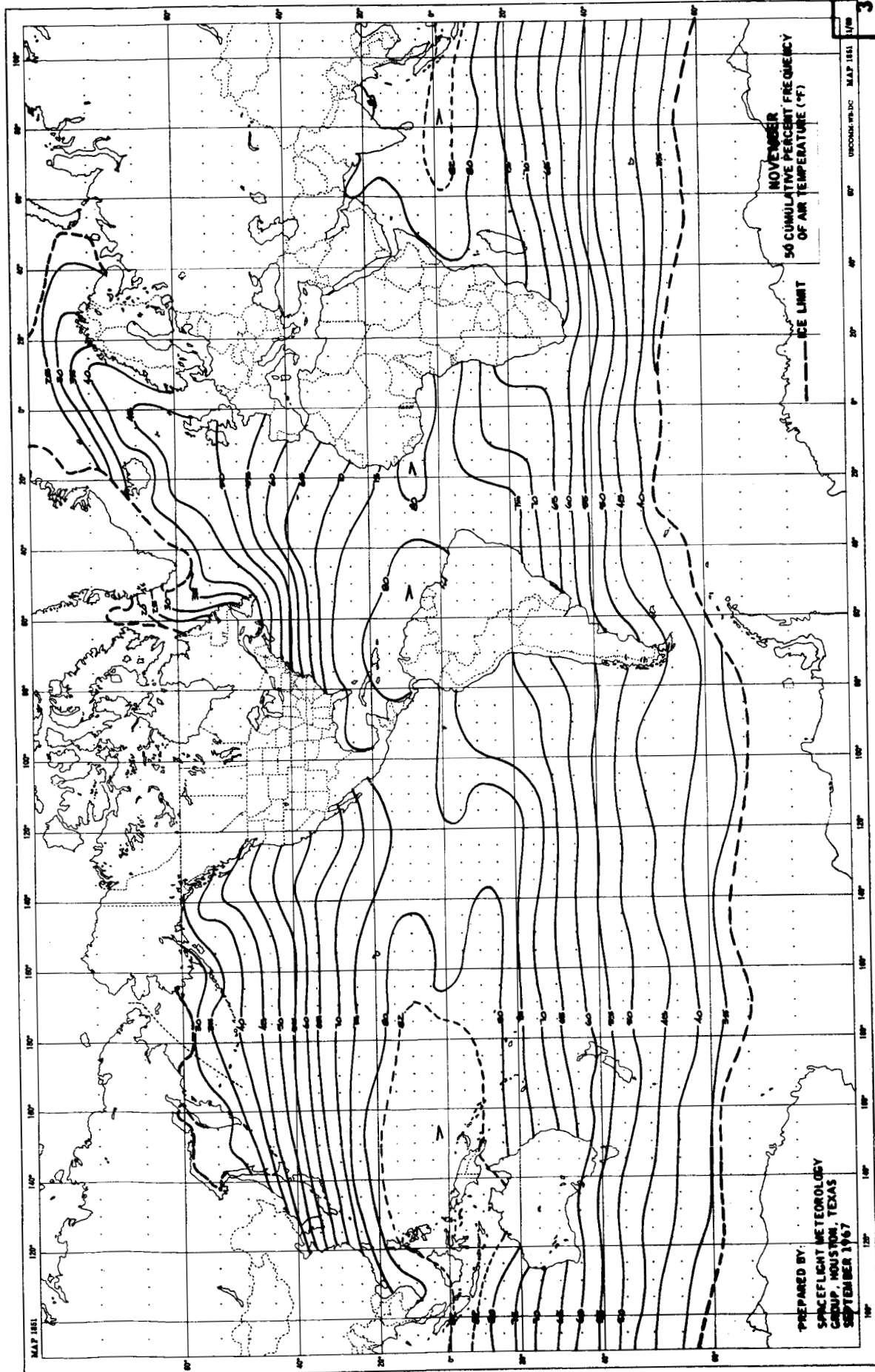


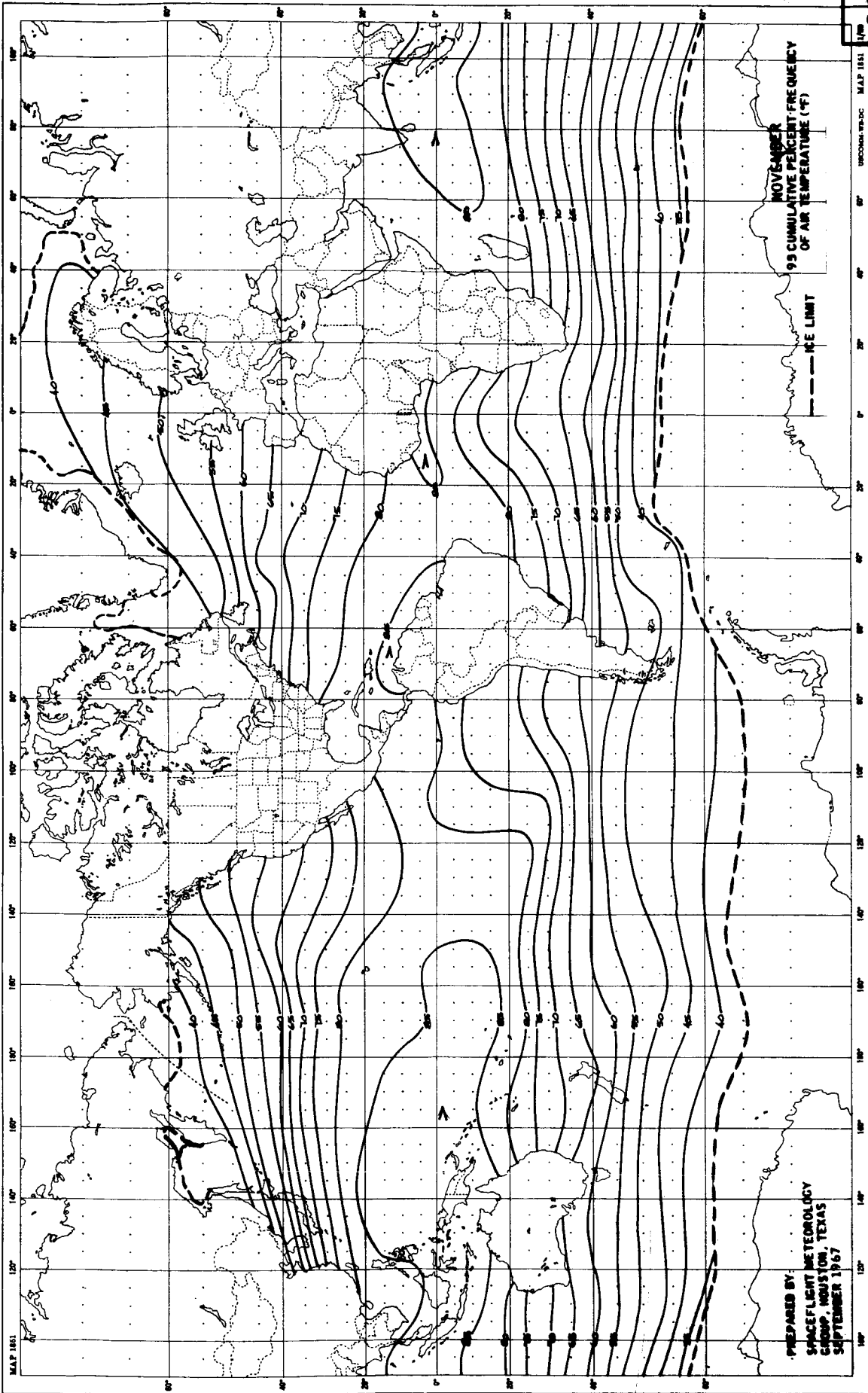
OCTOBER
95 CUMULATIVE PERCENT FREQUENCY
OF AIR TEMPERATURE (°F)

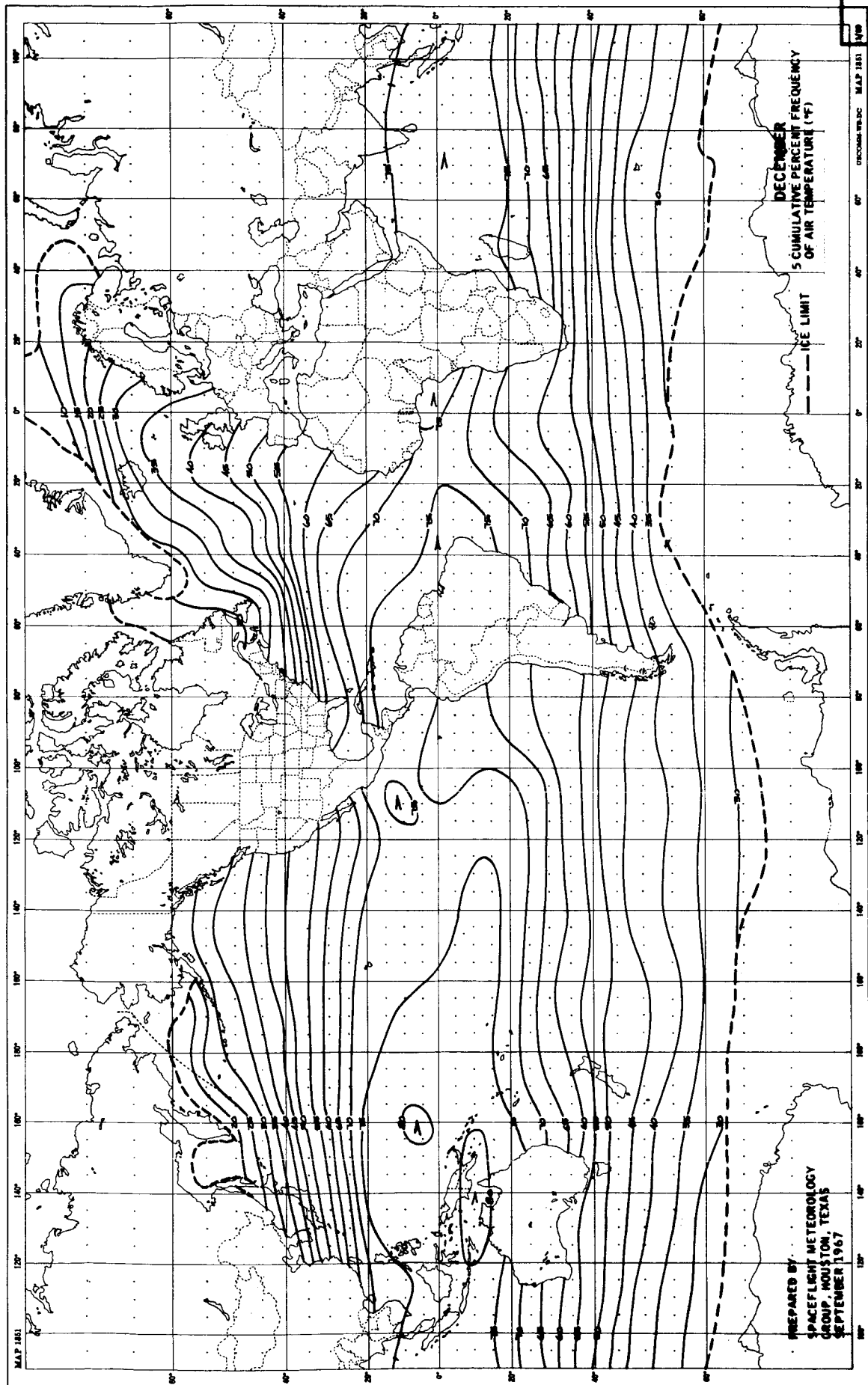
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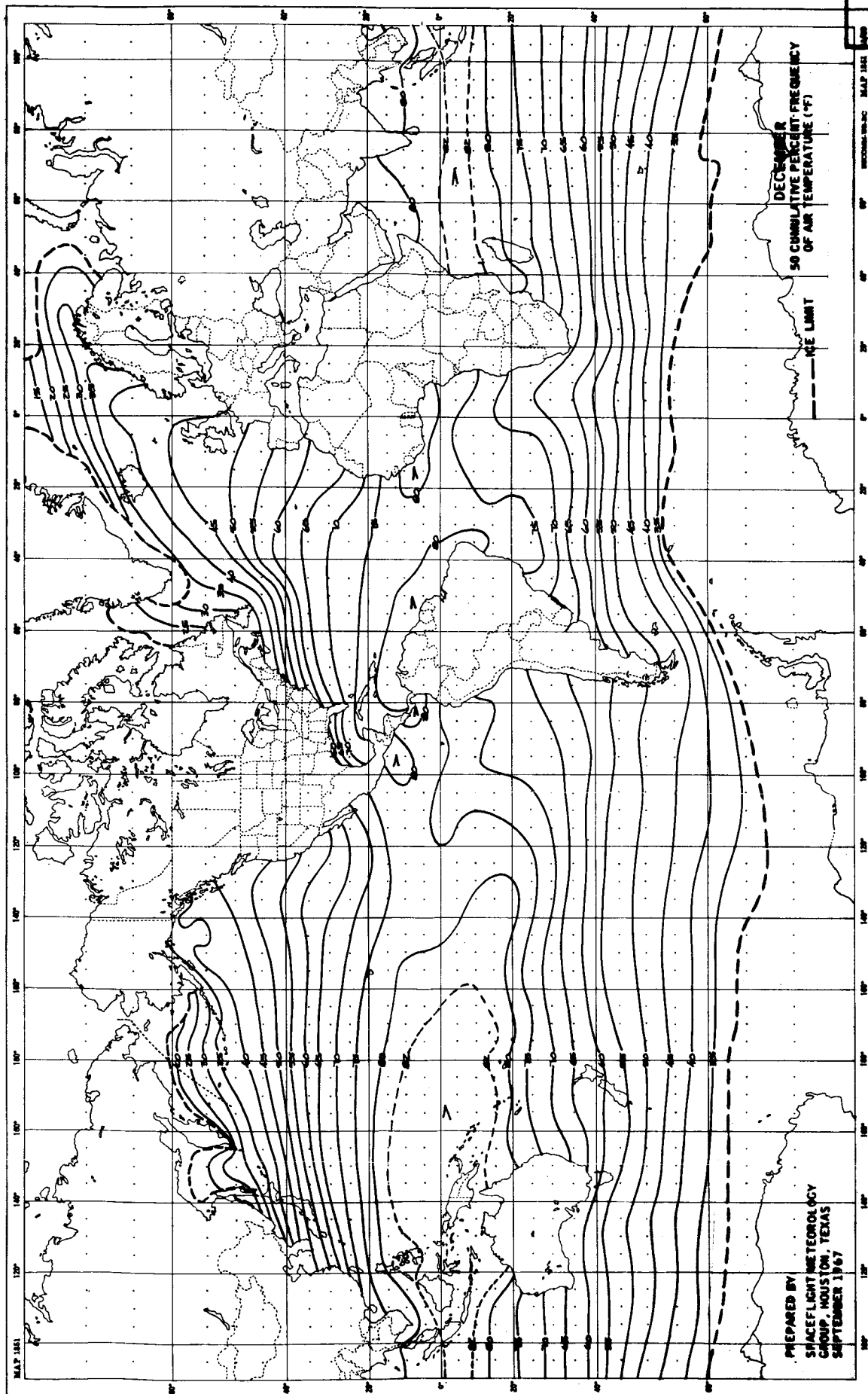
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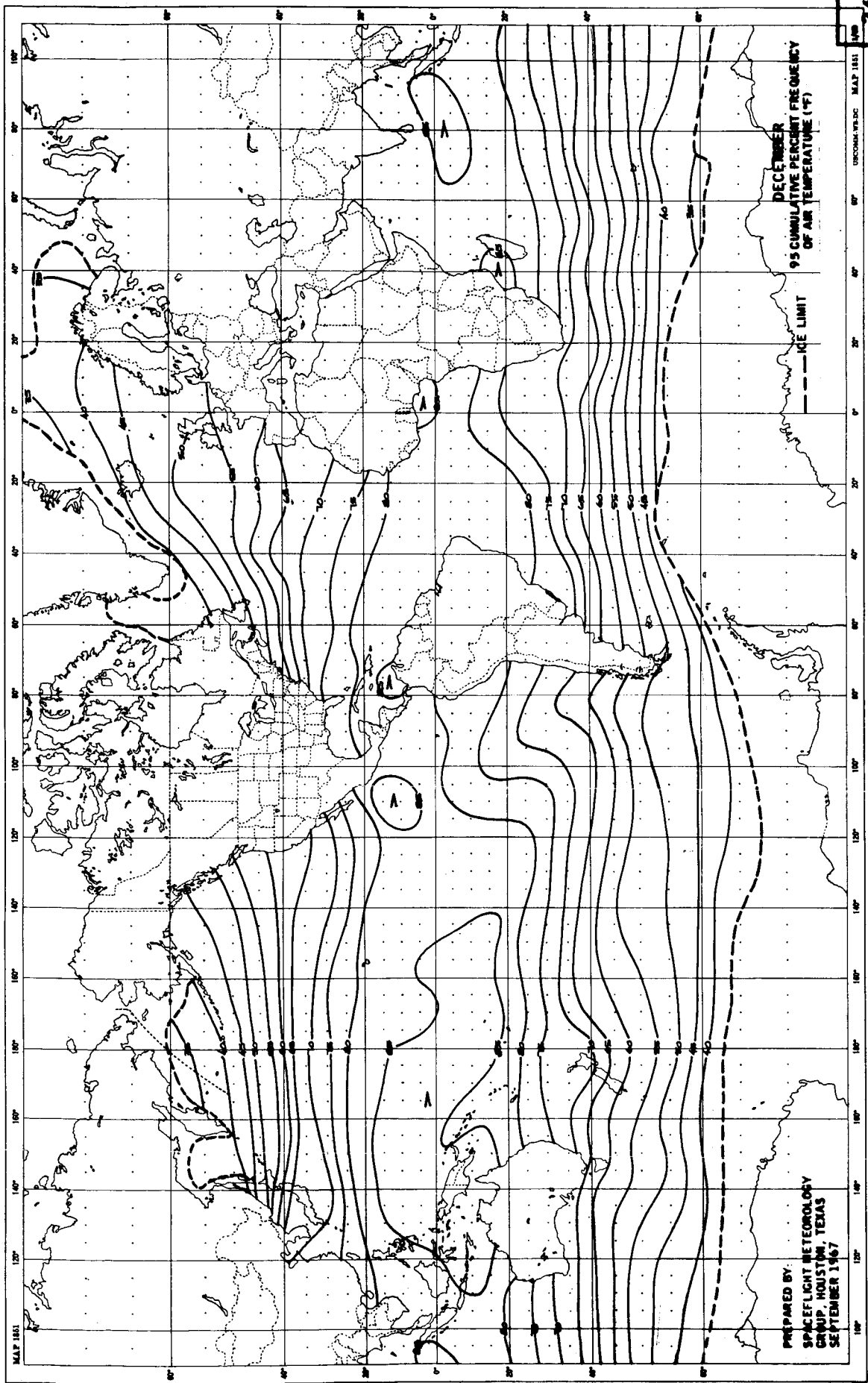


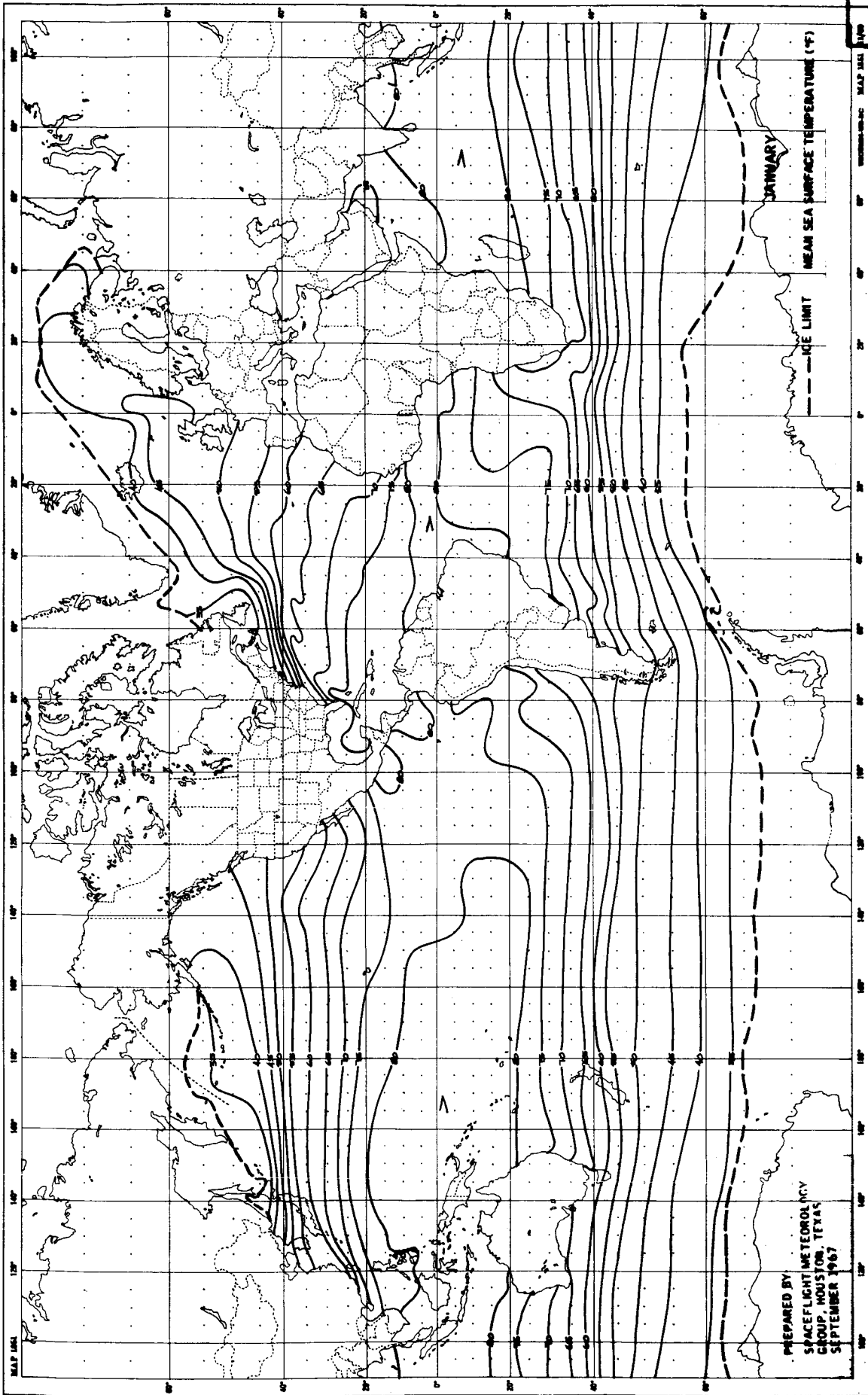


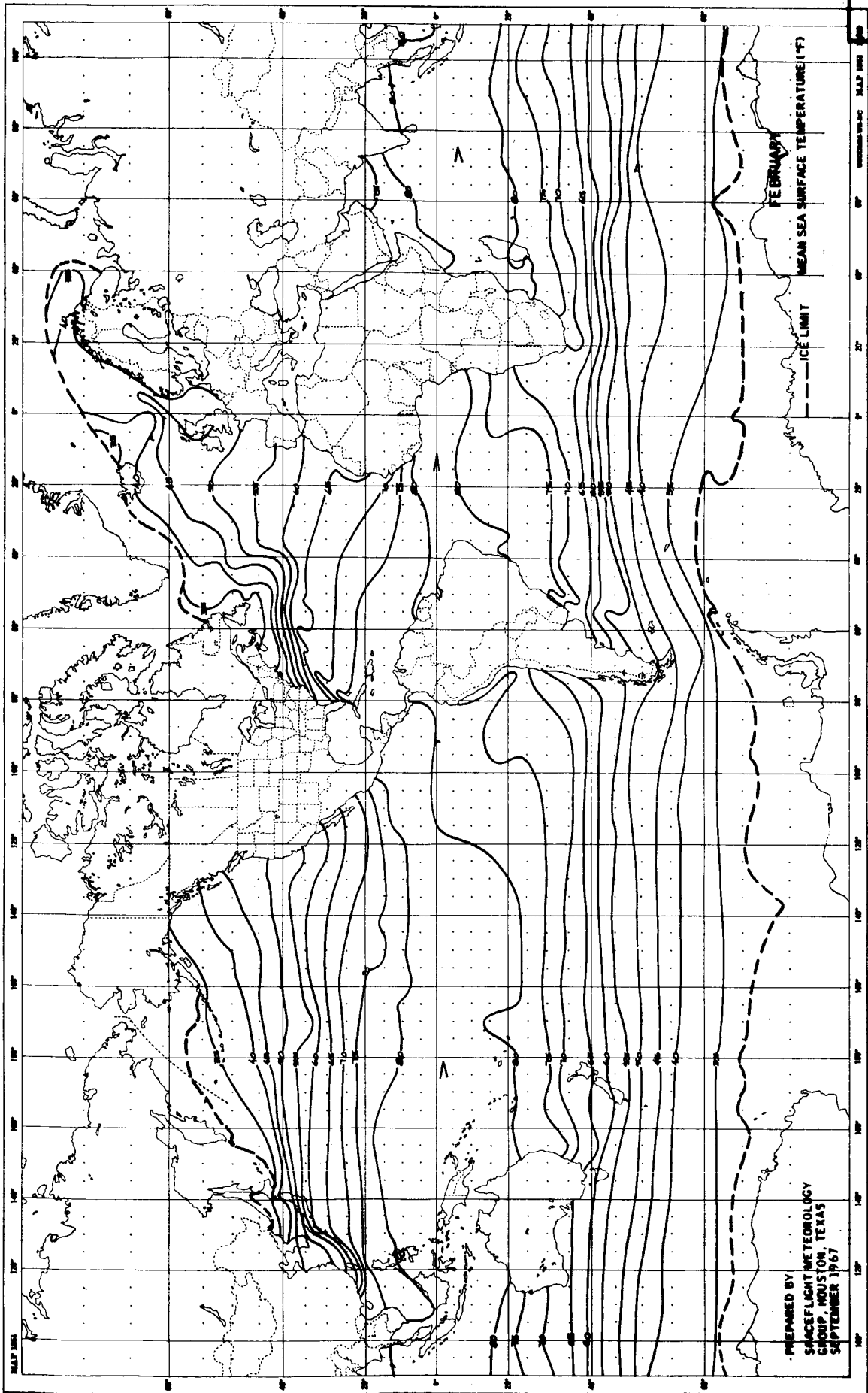


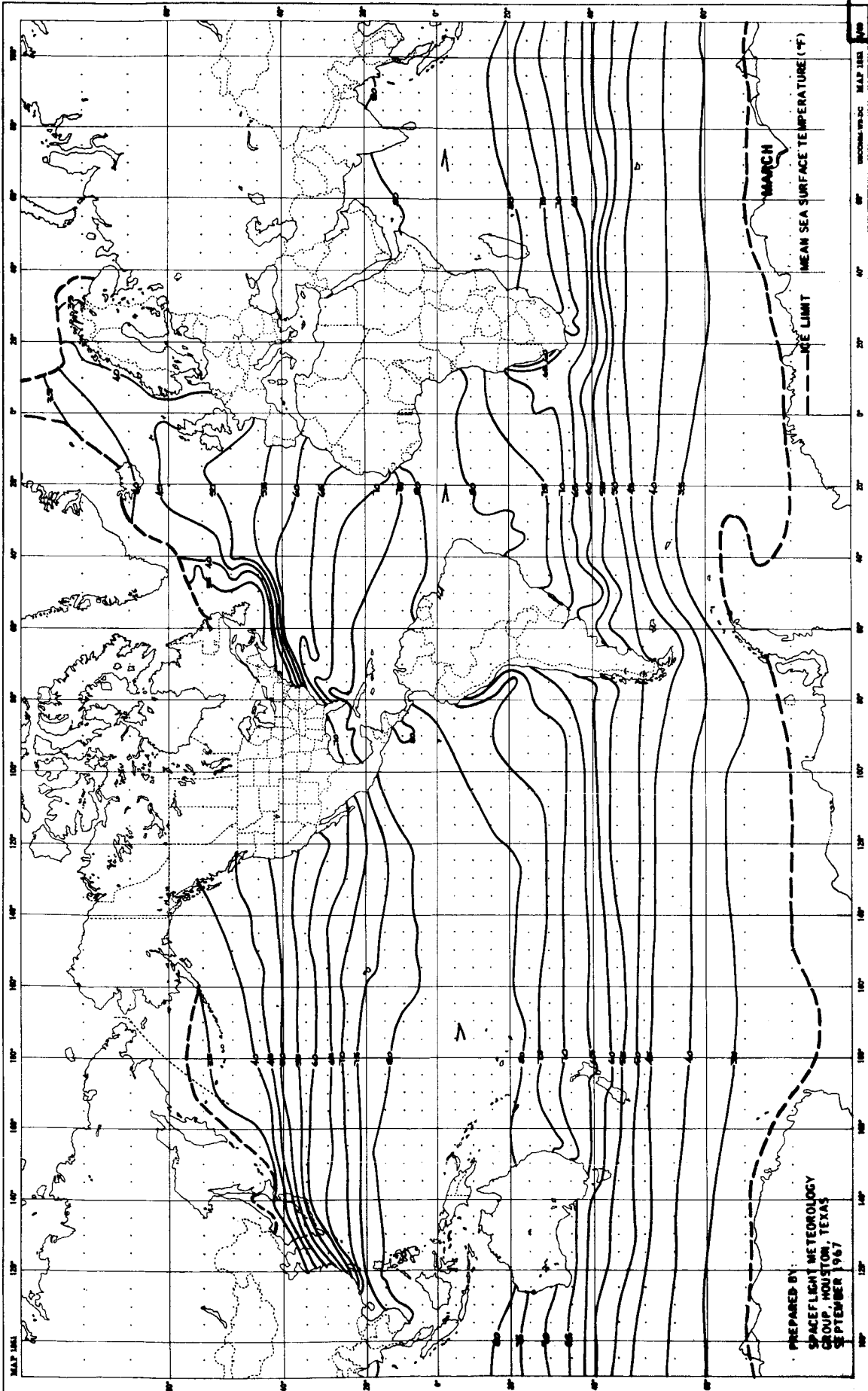




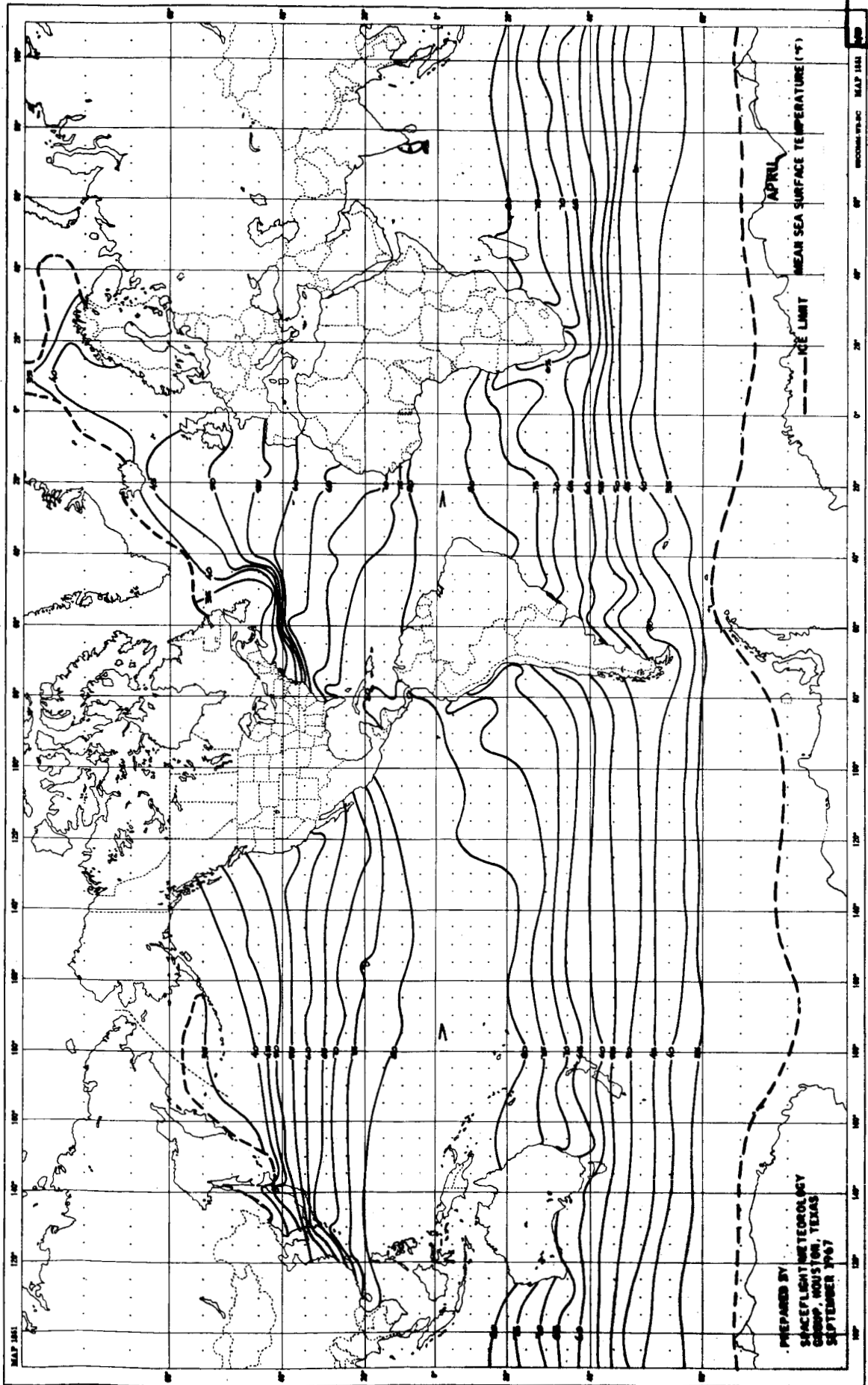


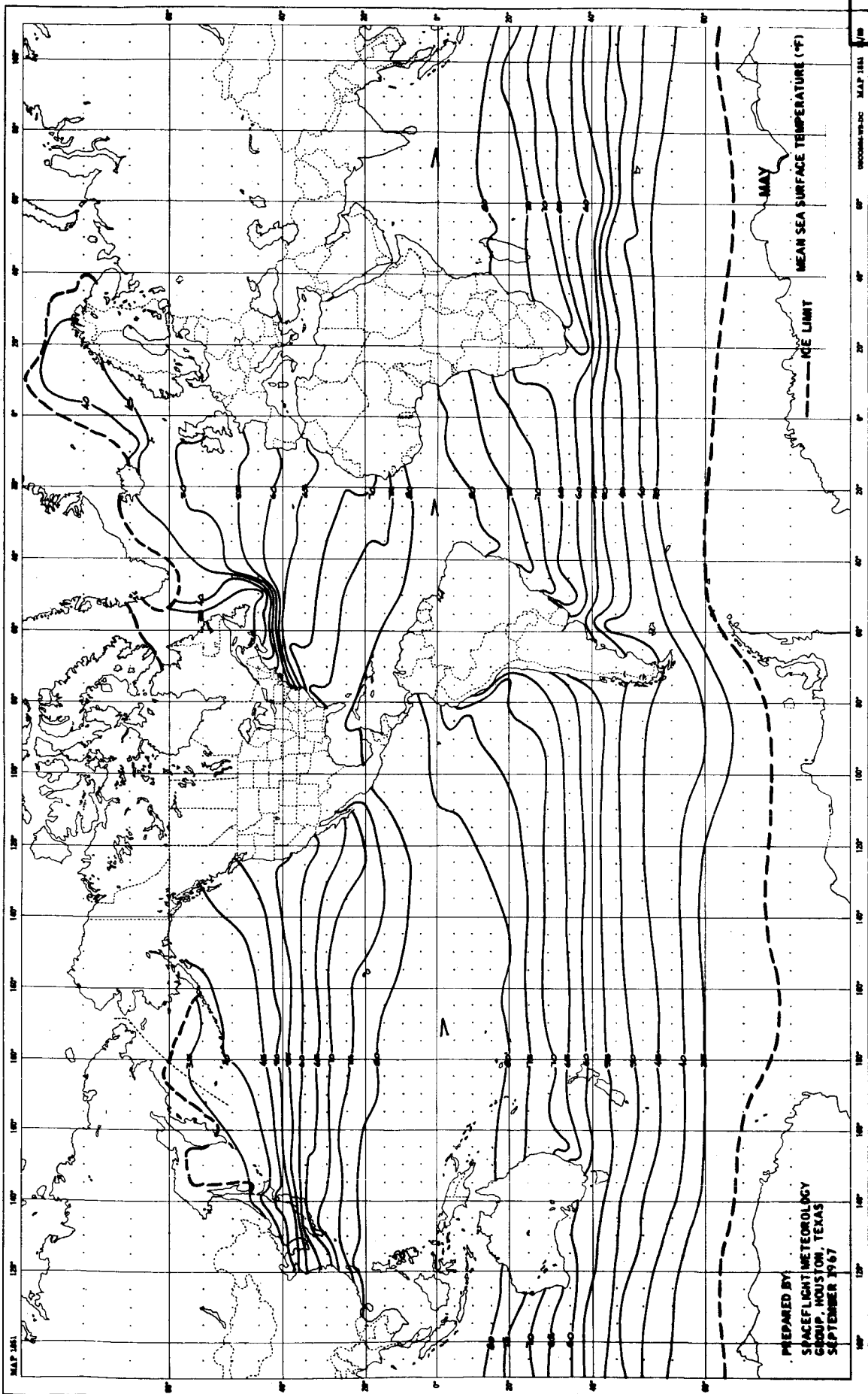


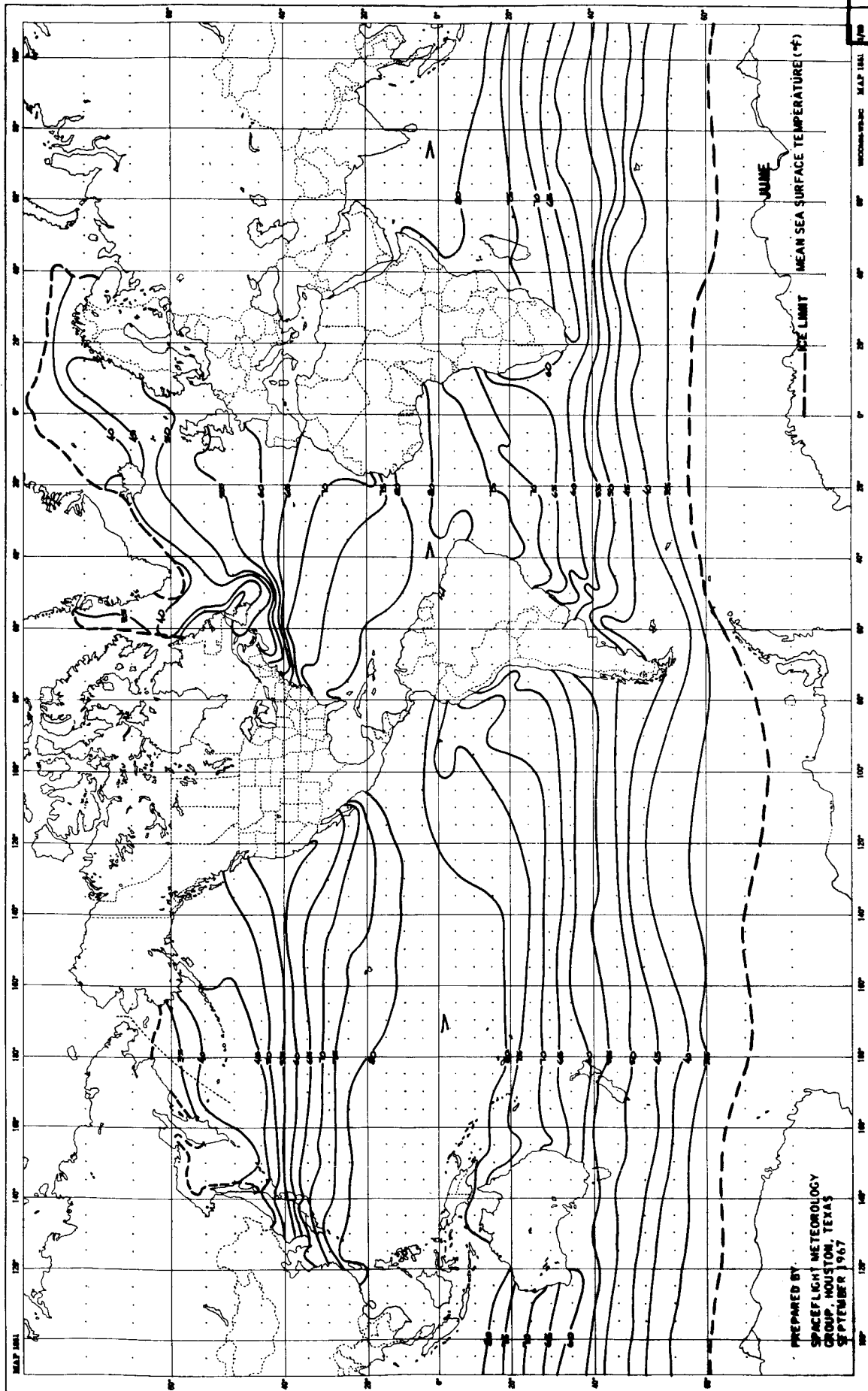


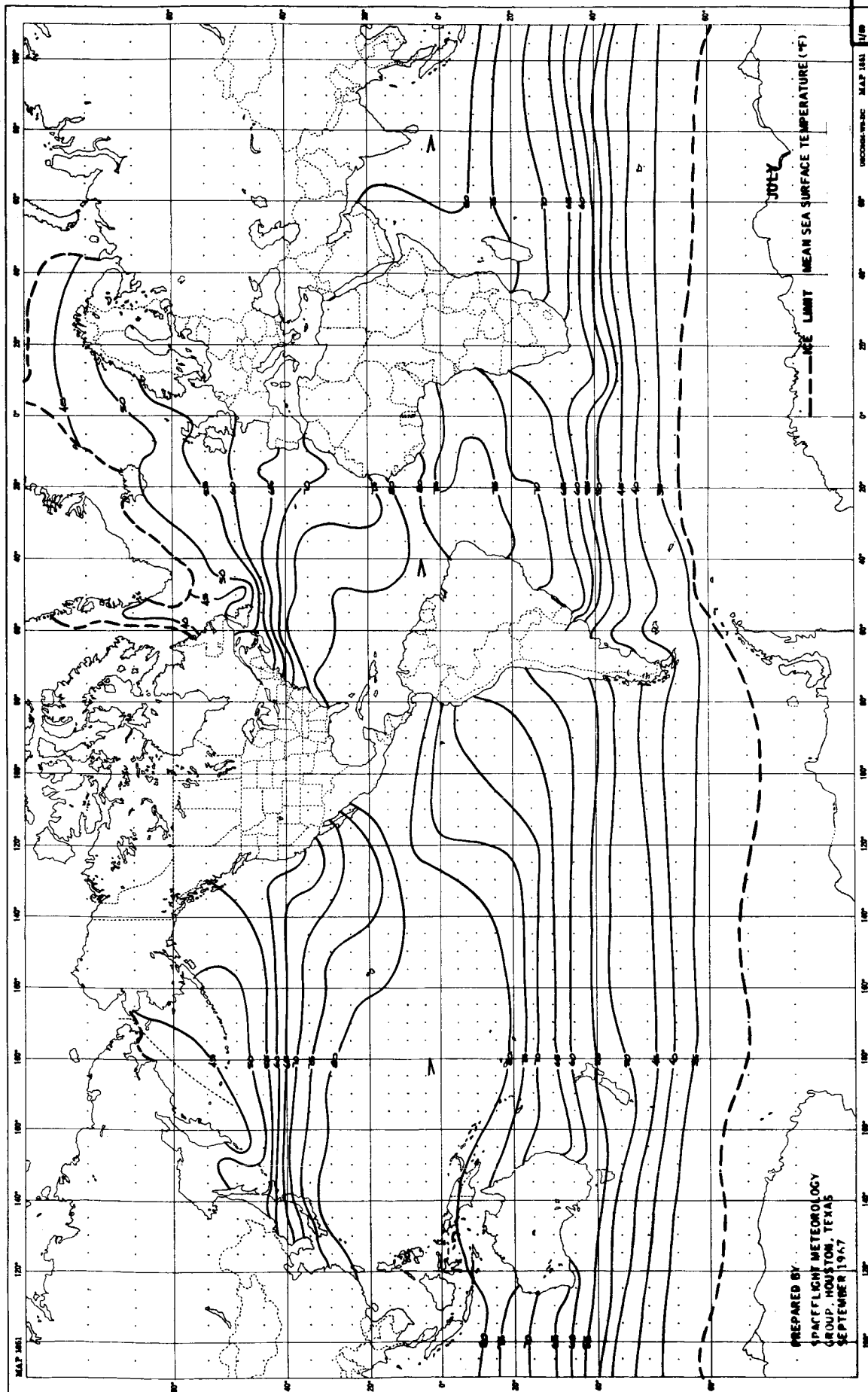


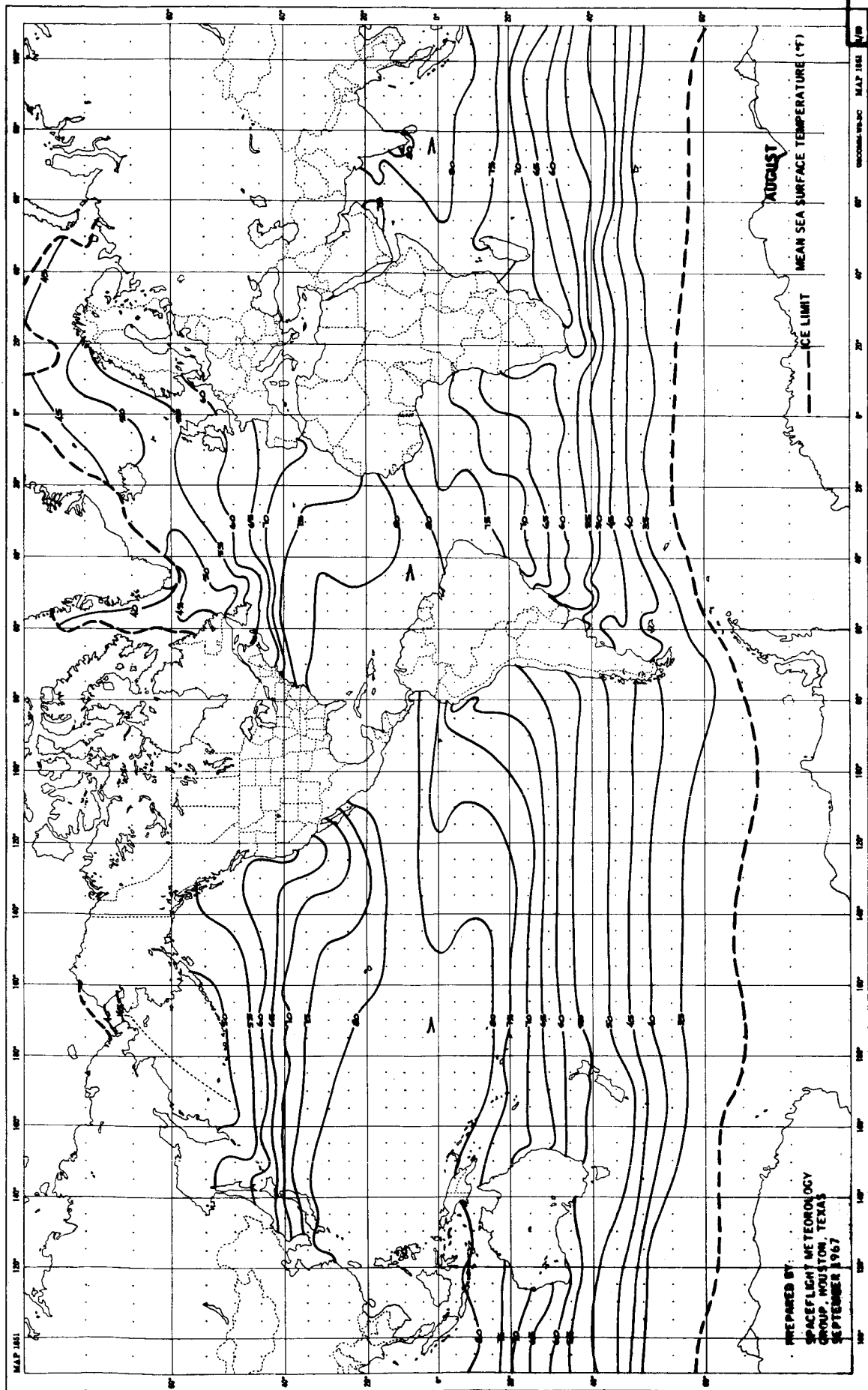
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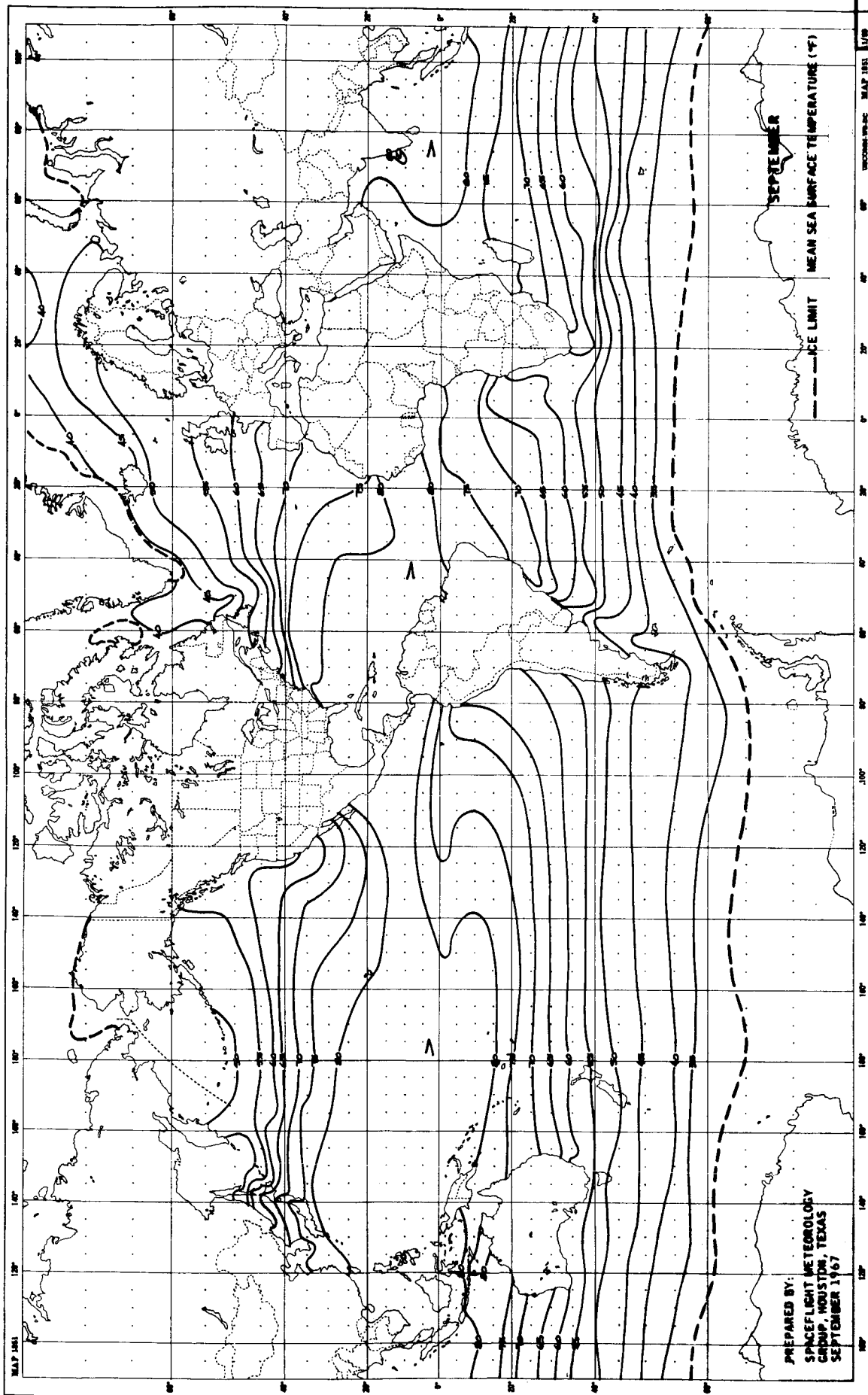


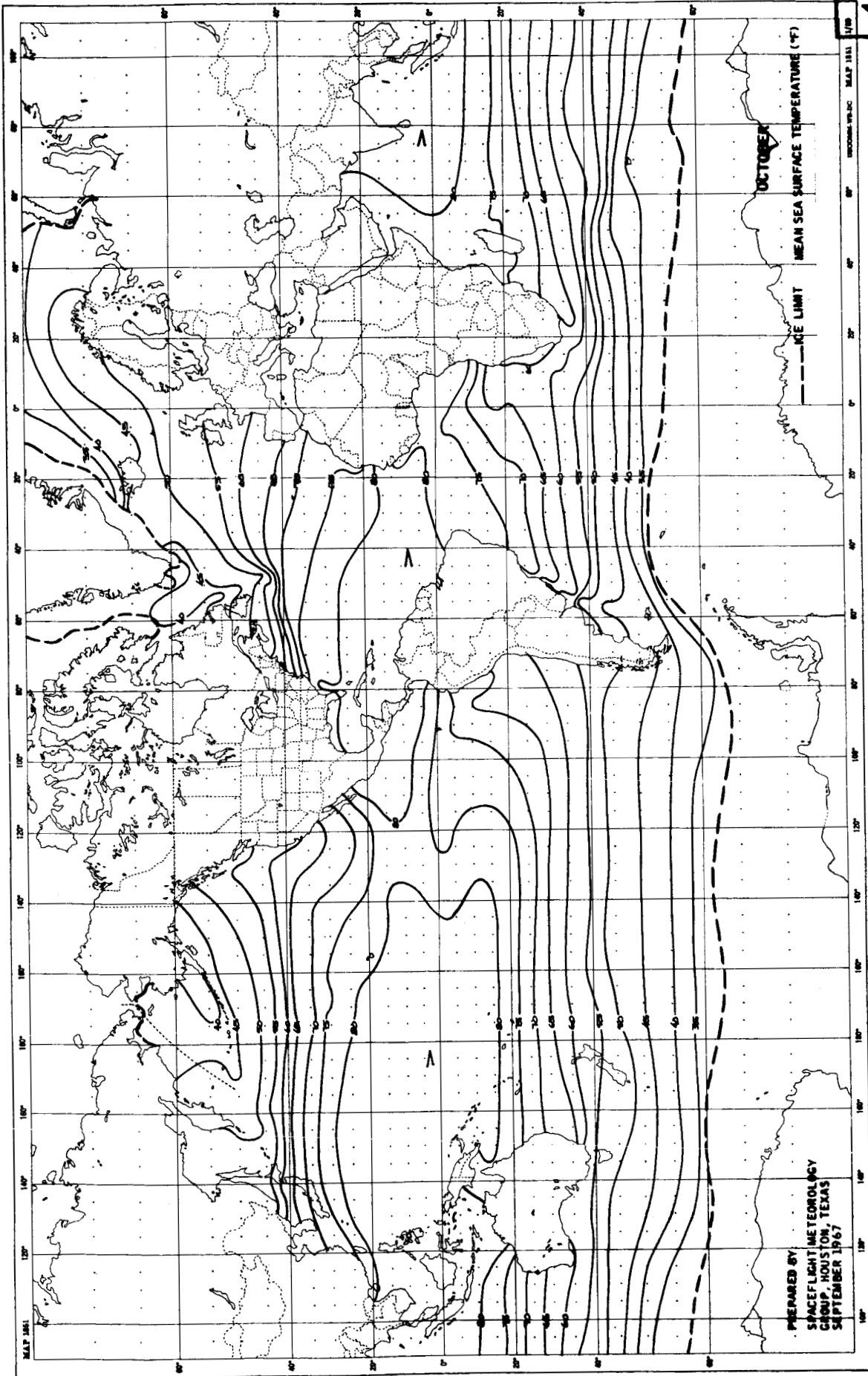


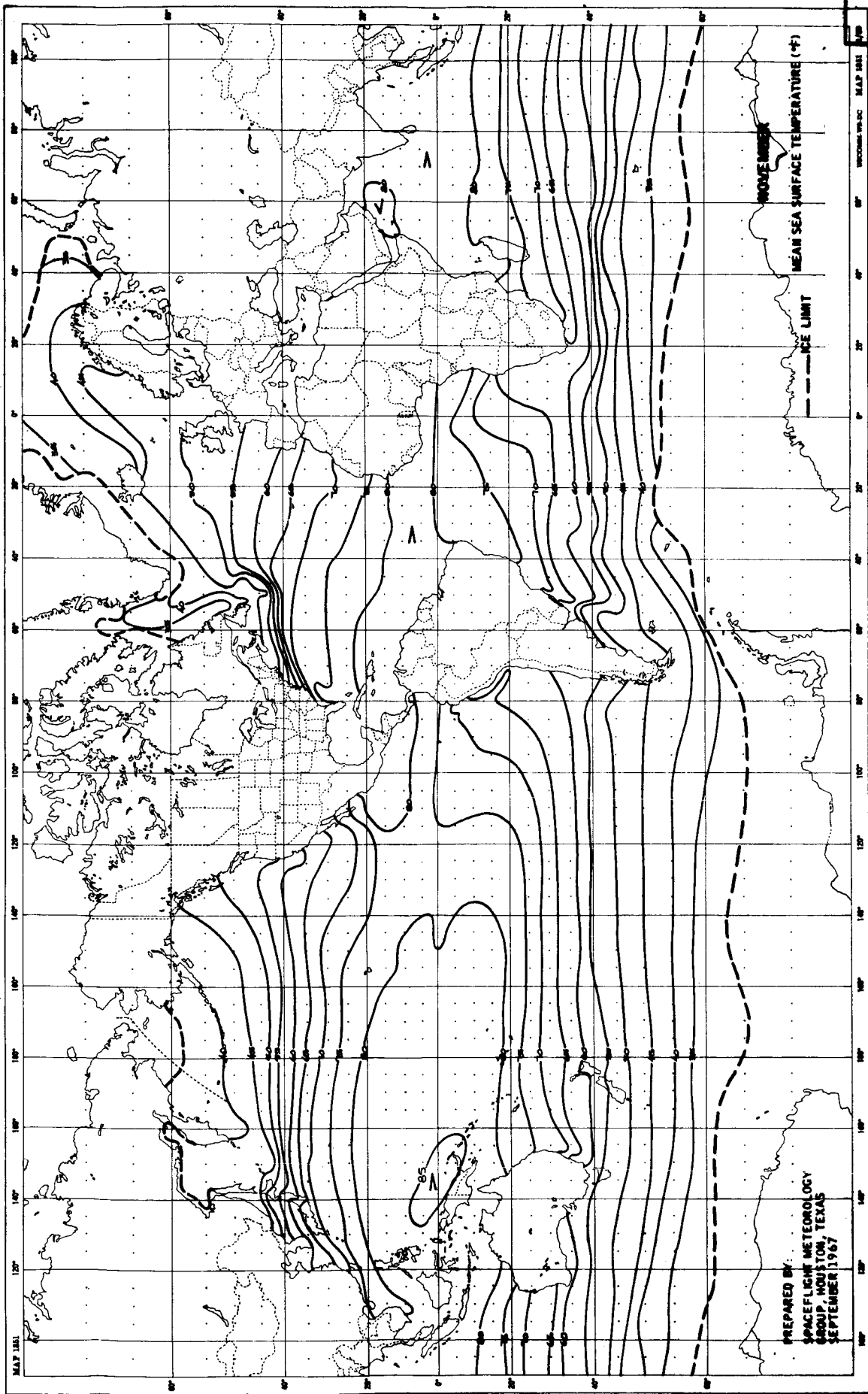


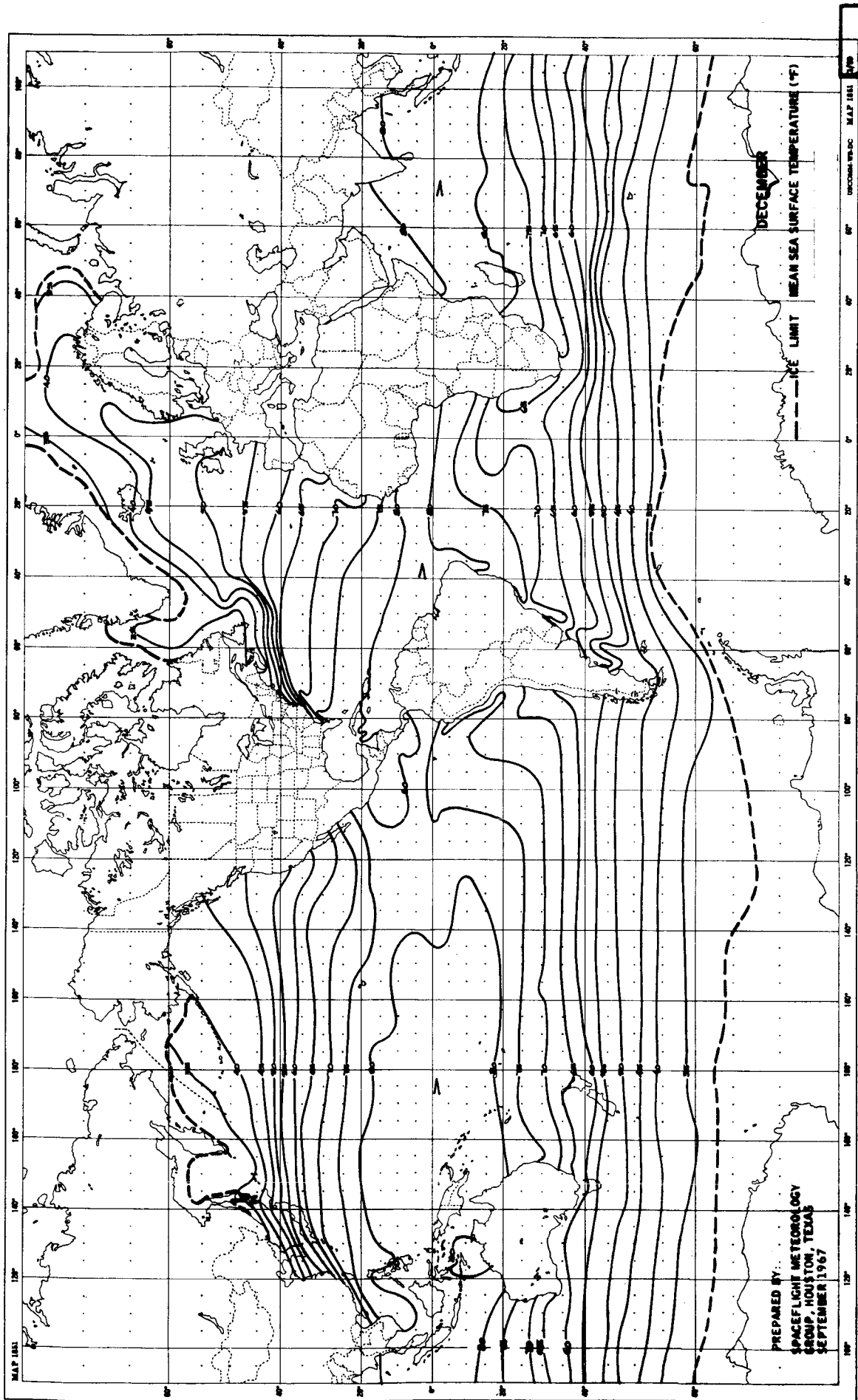


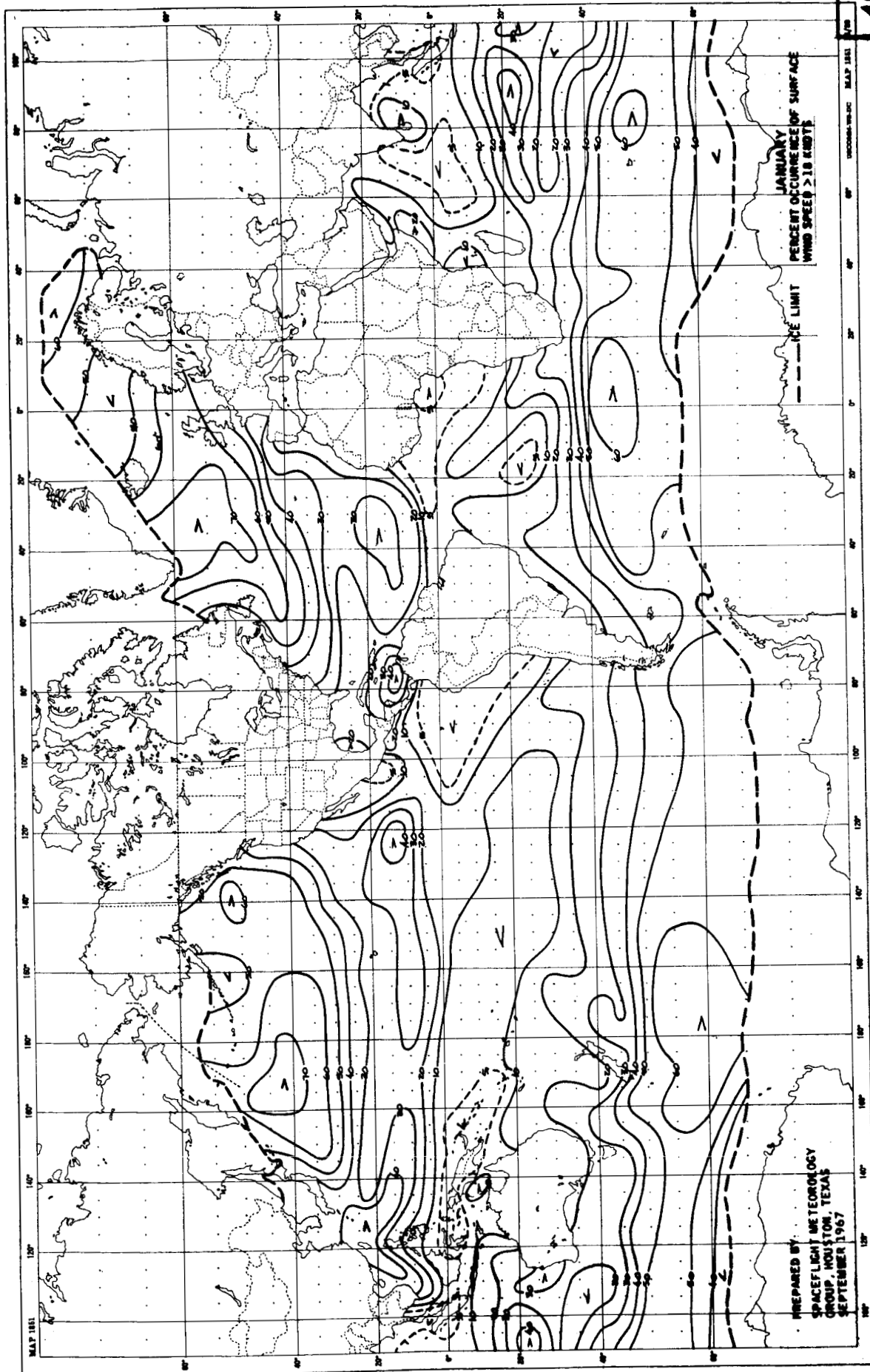


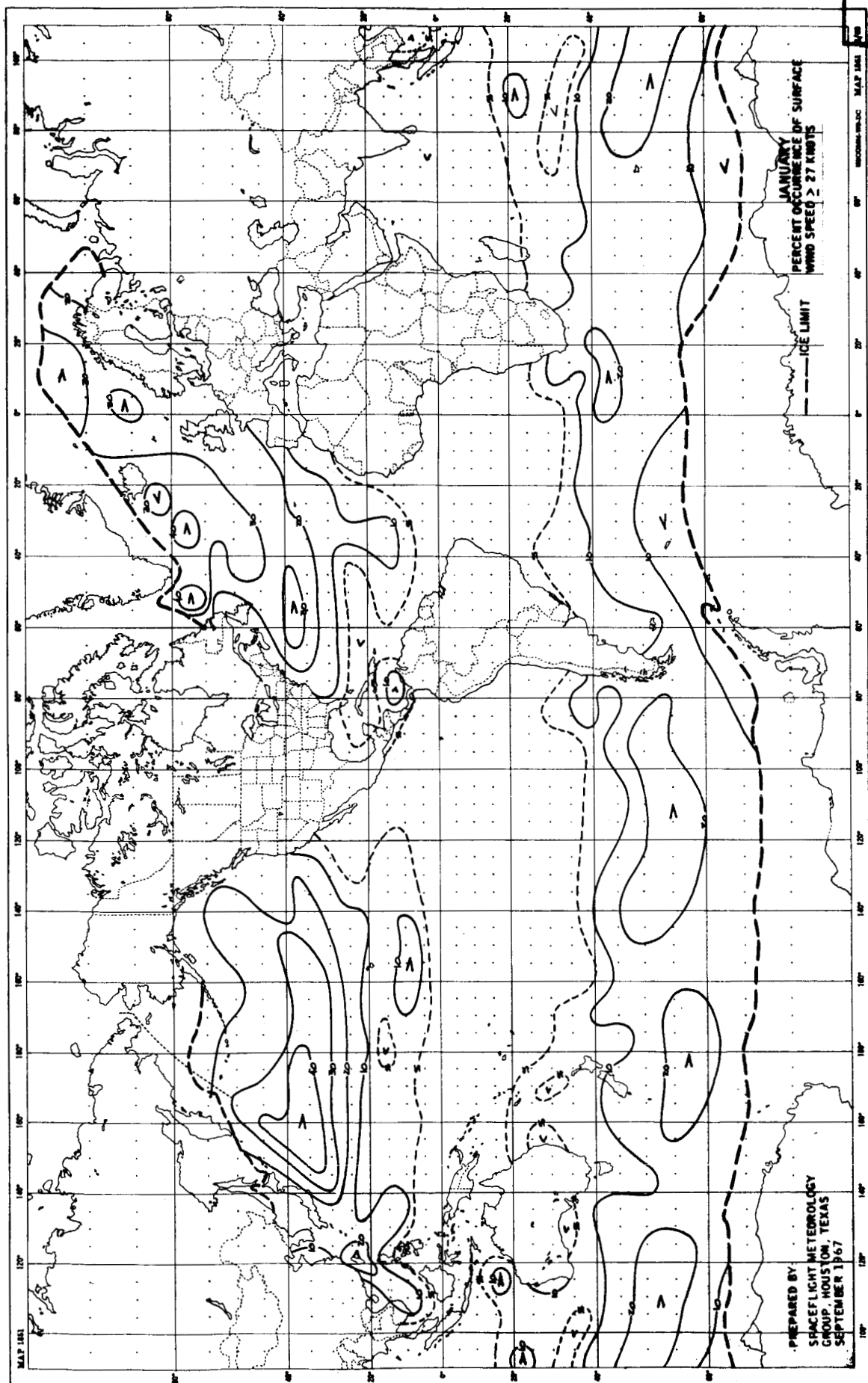


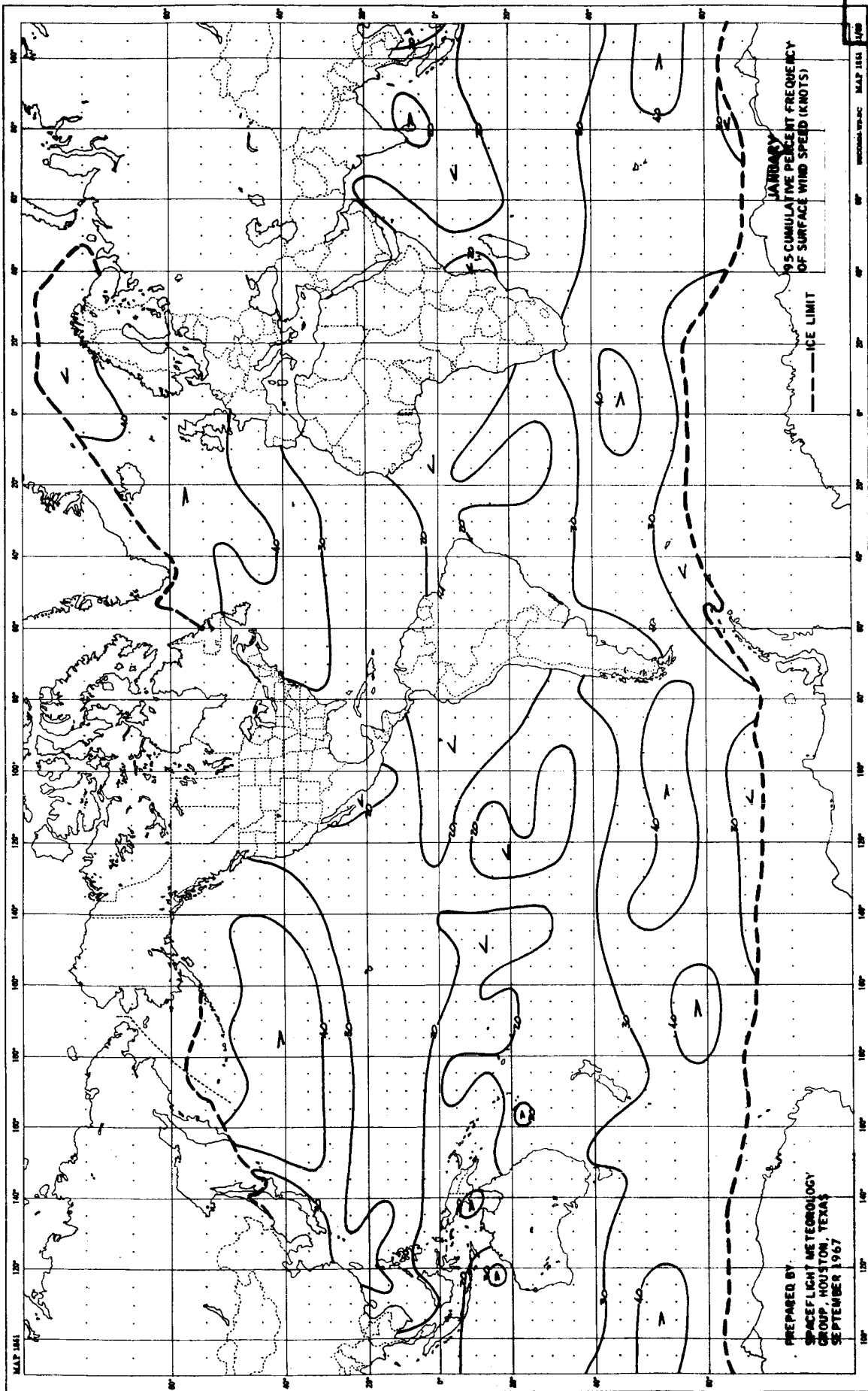


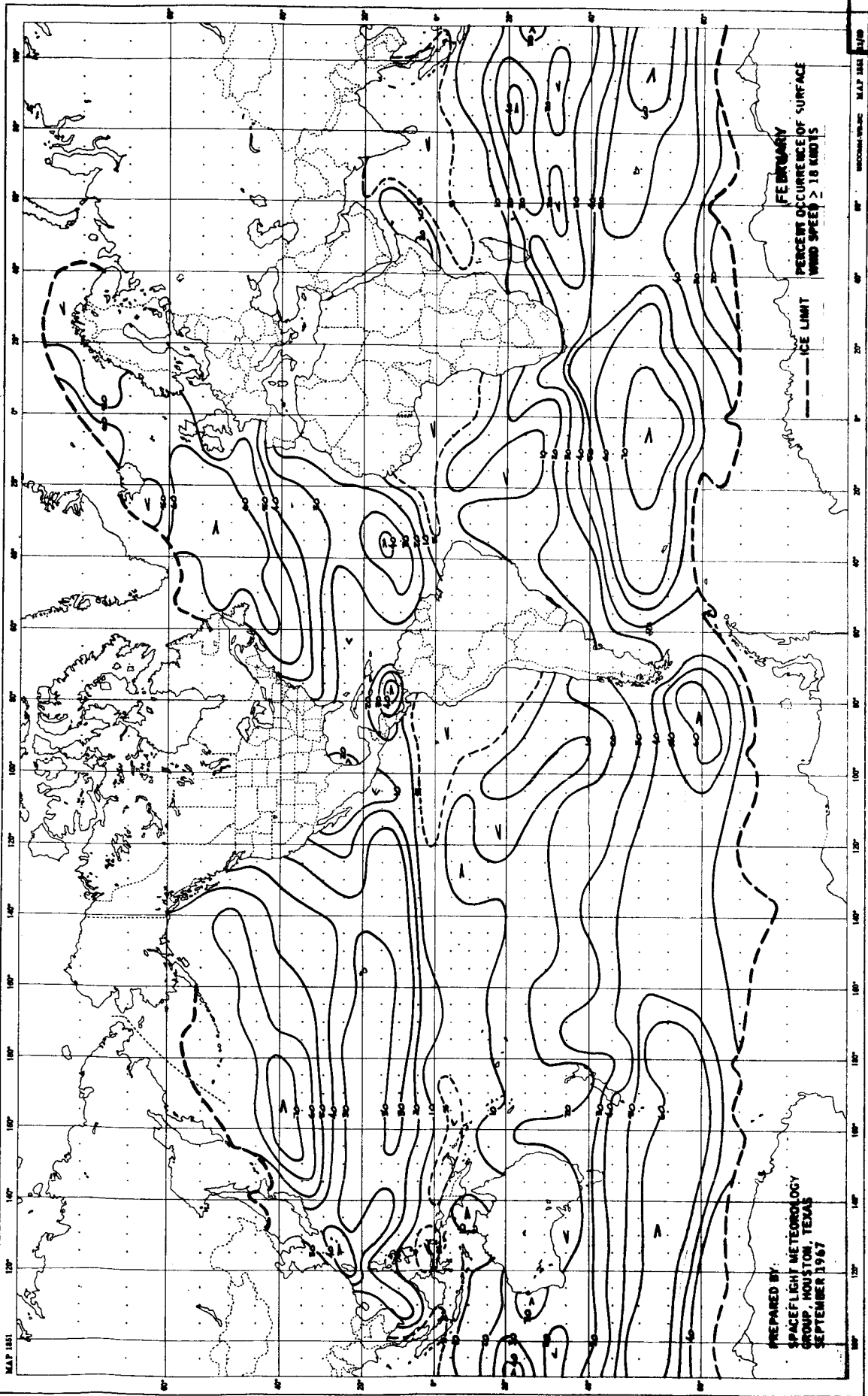


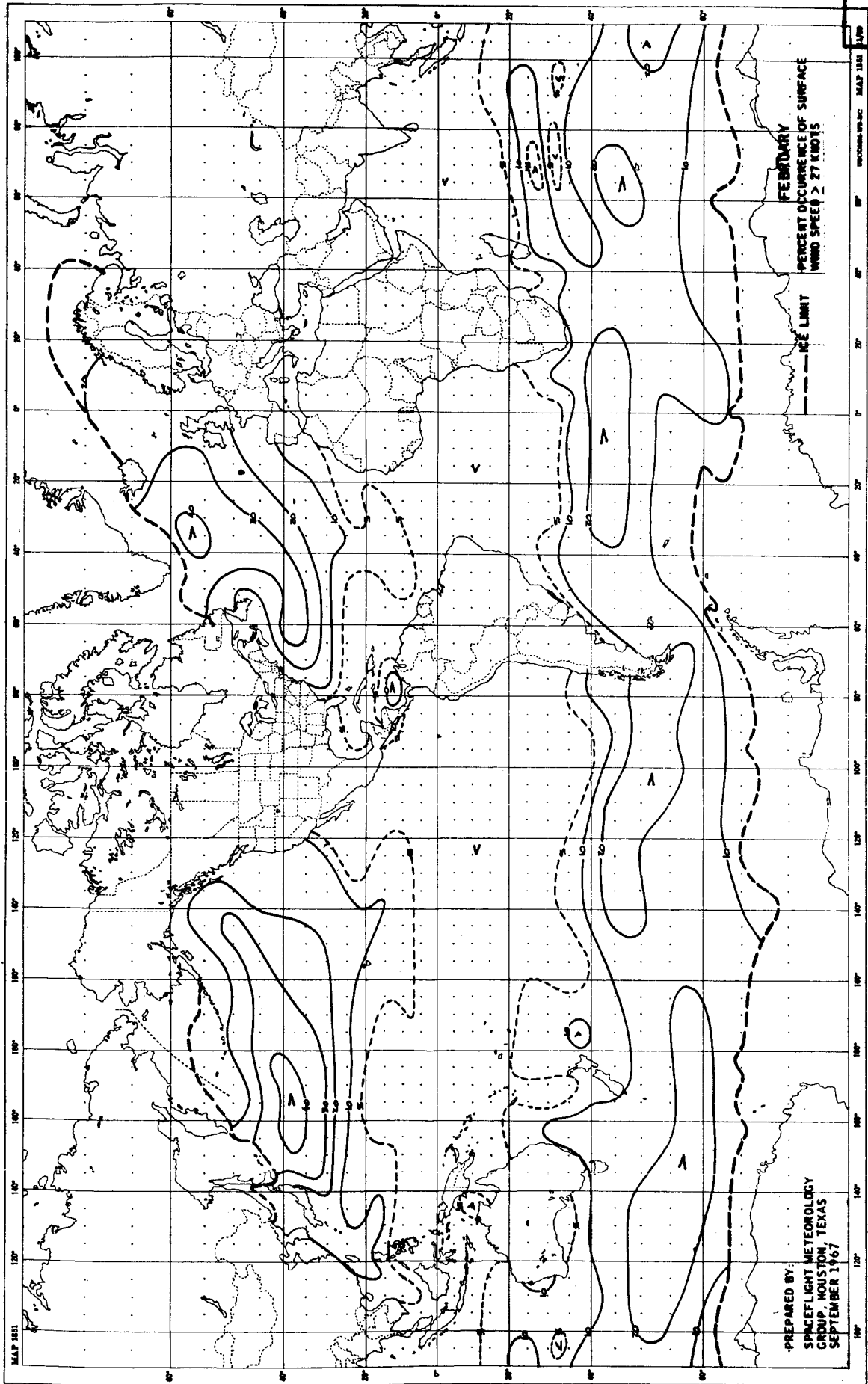


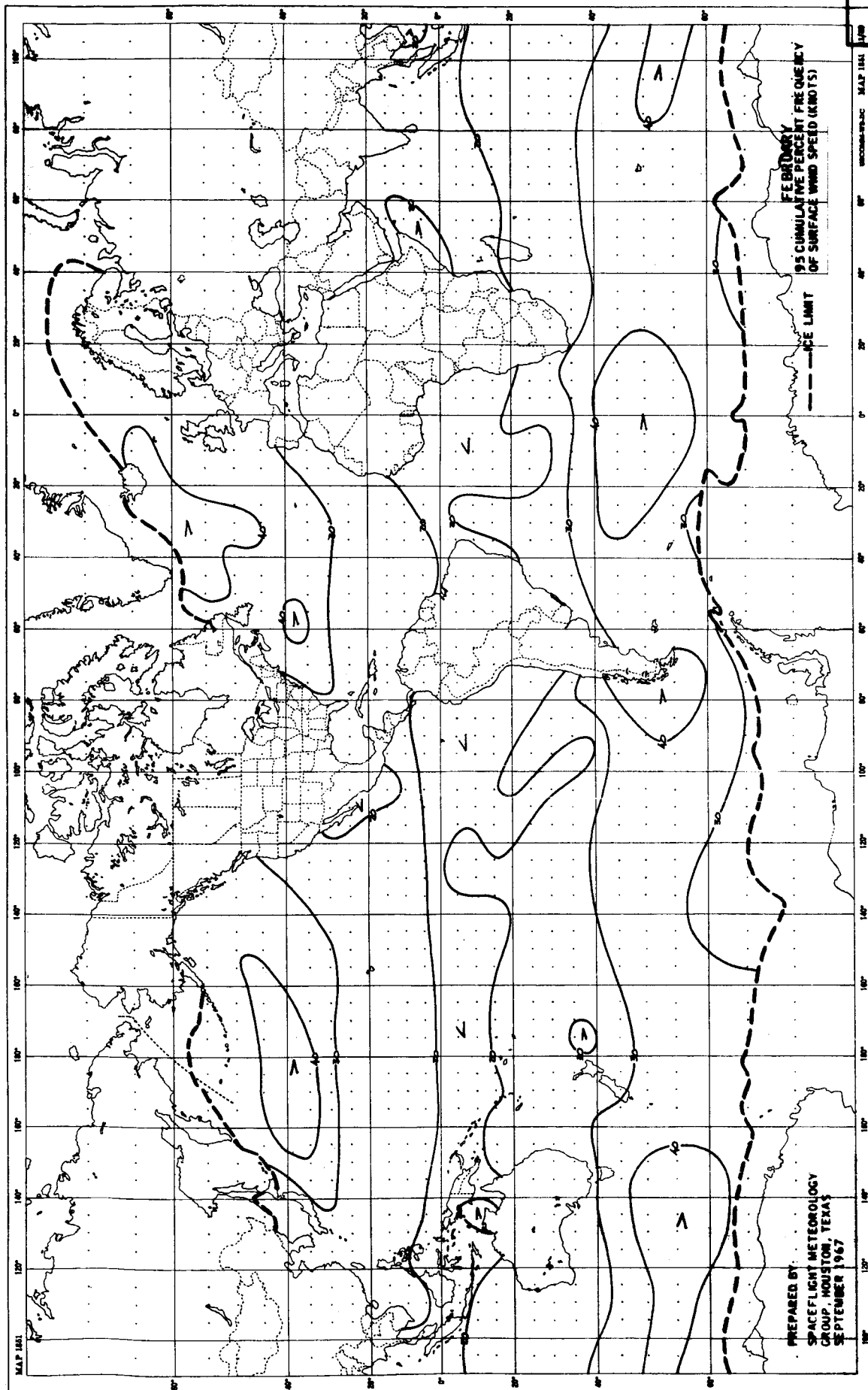


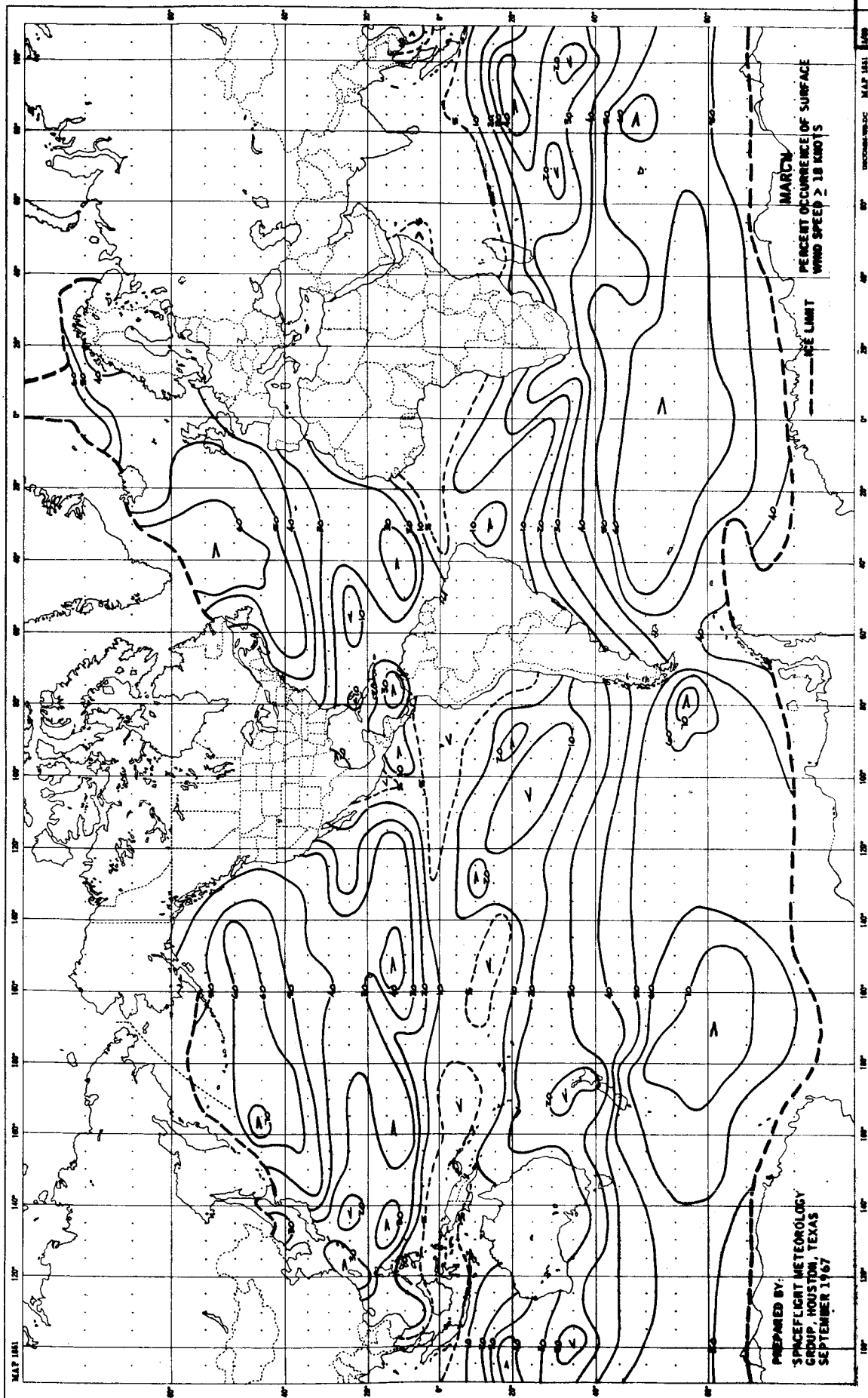


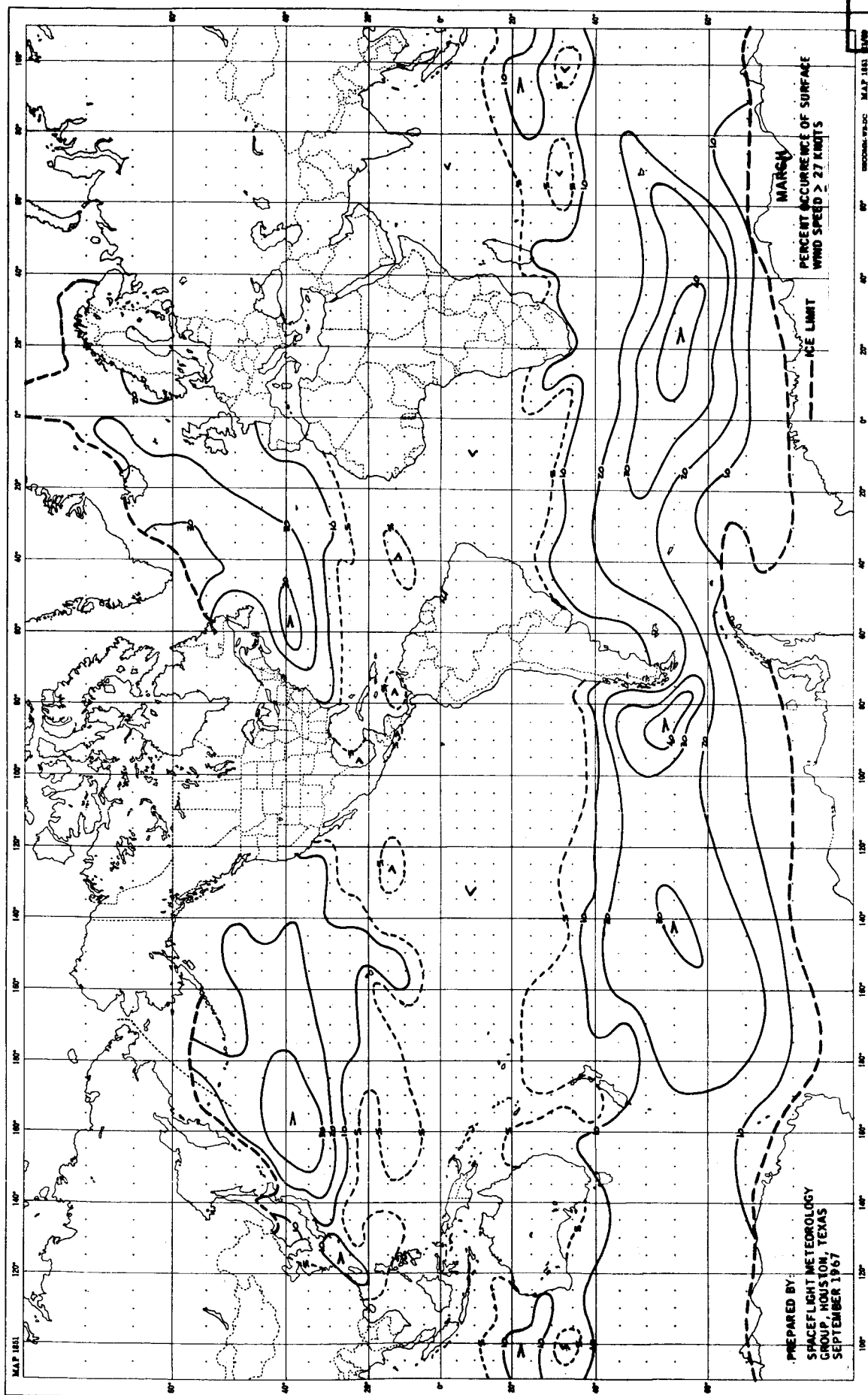


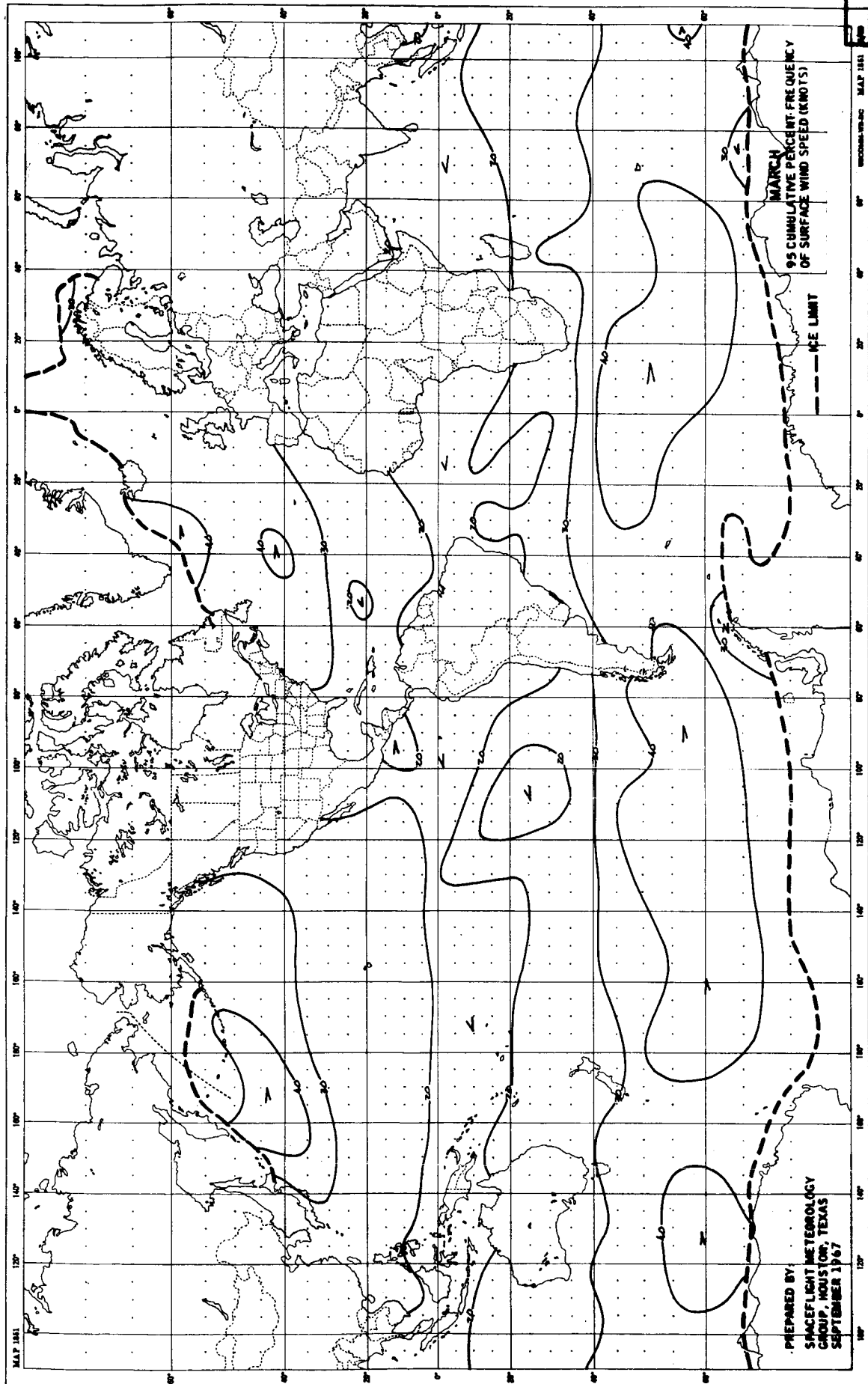


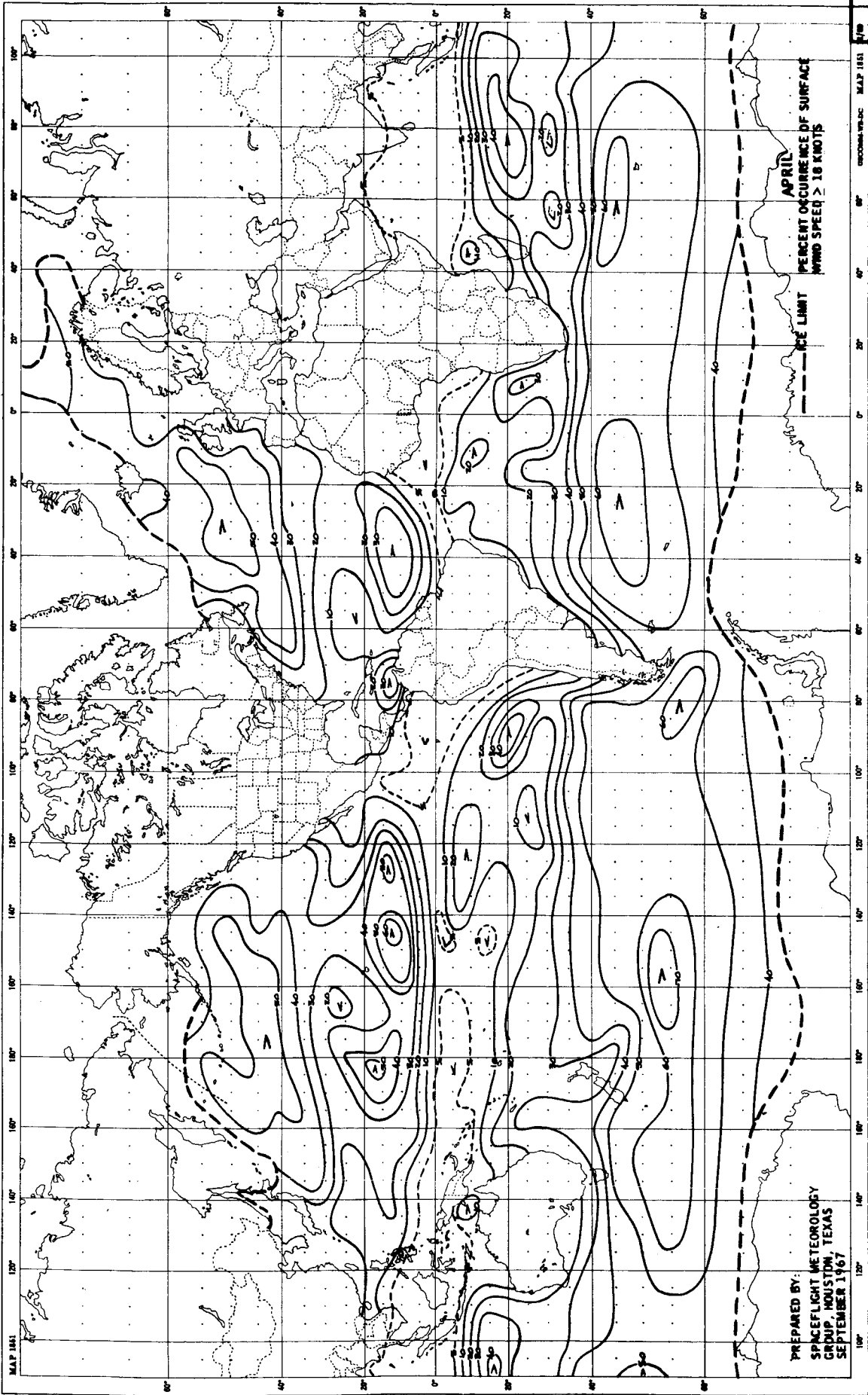


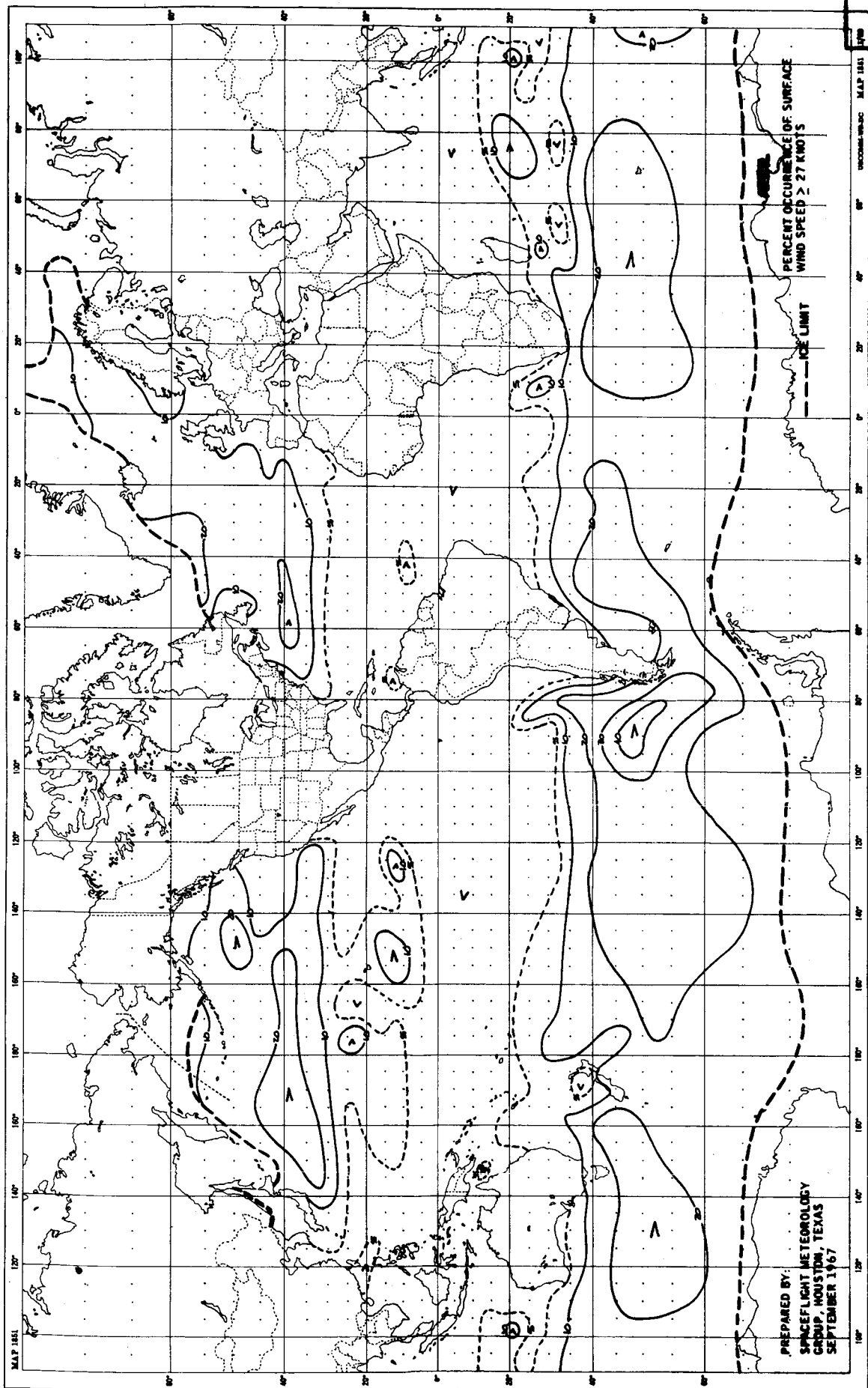




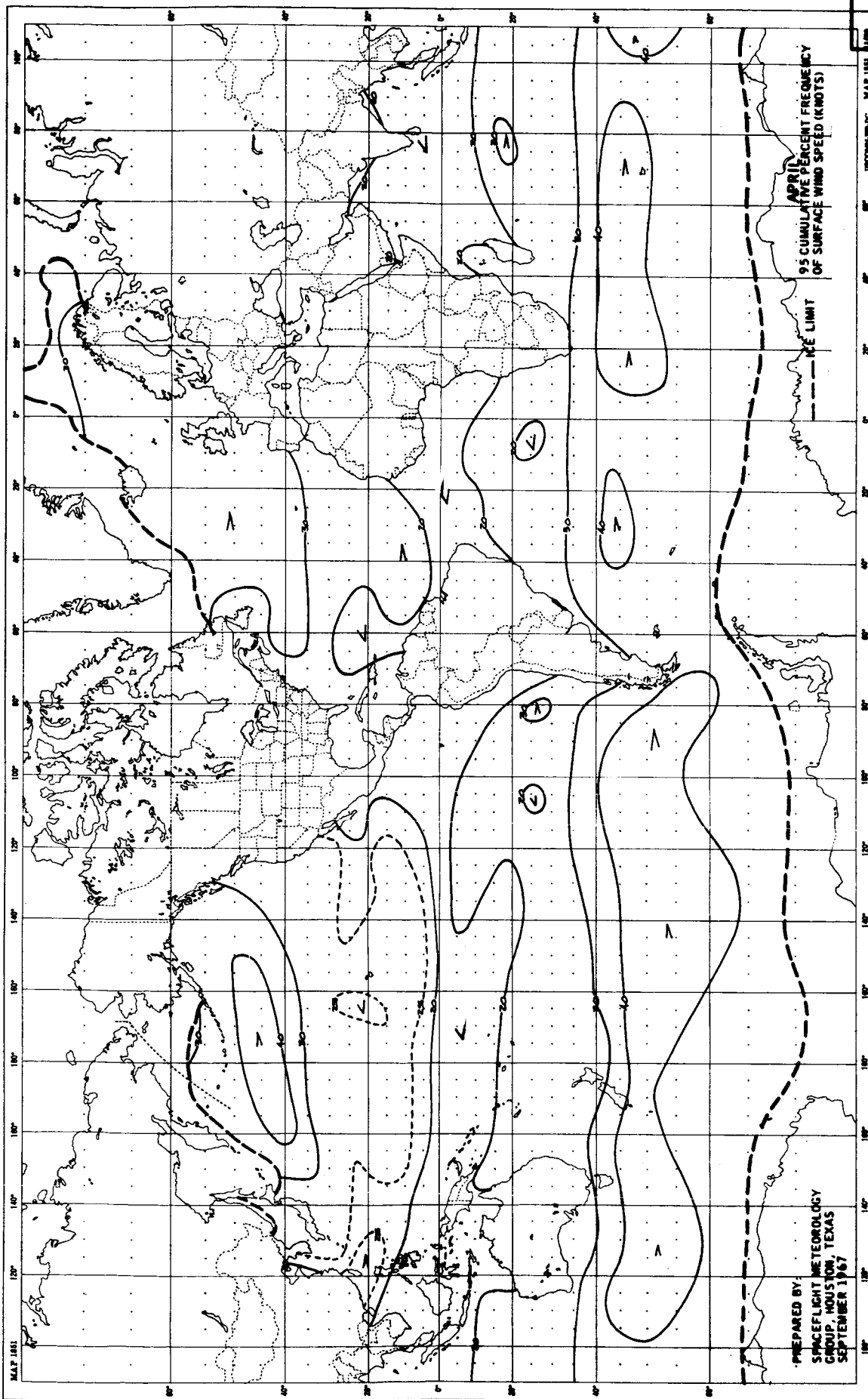


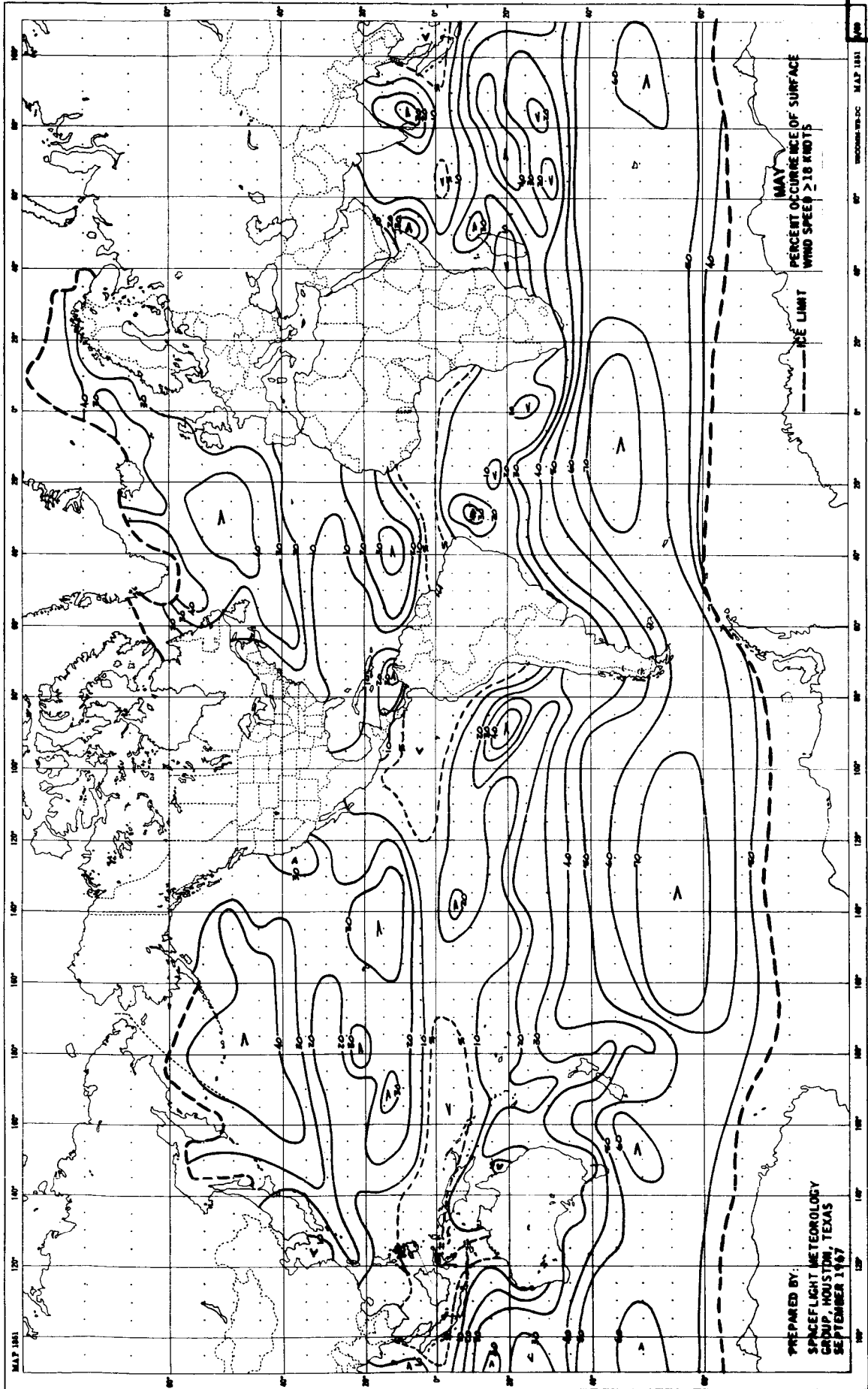


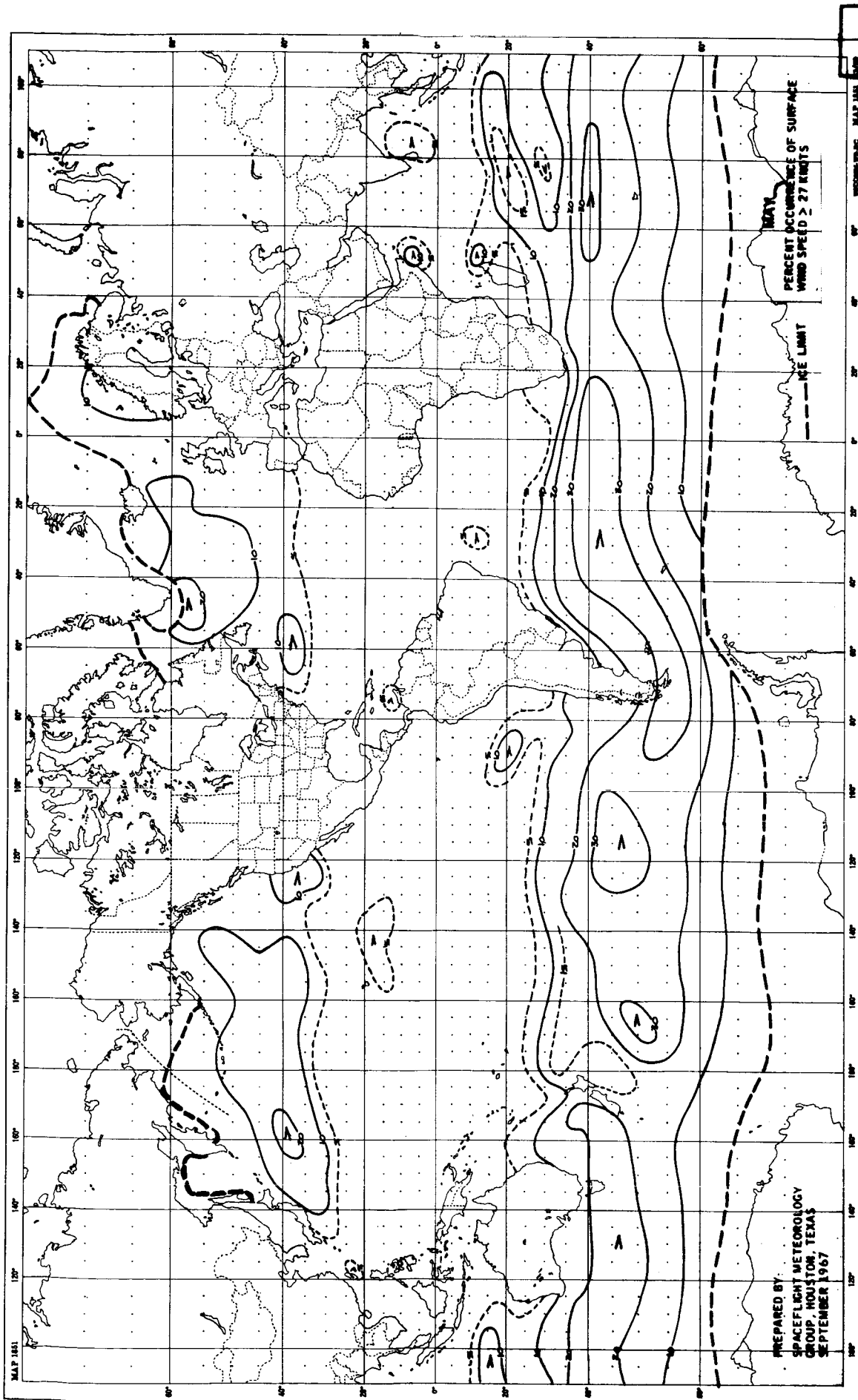


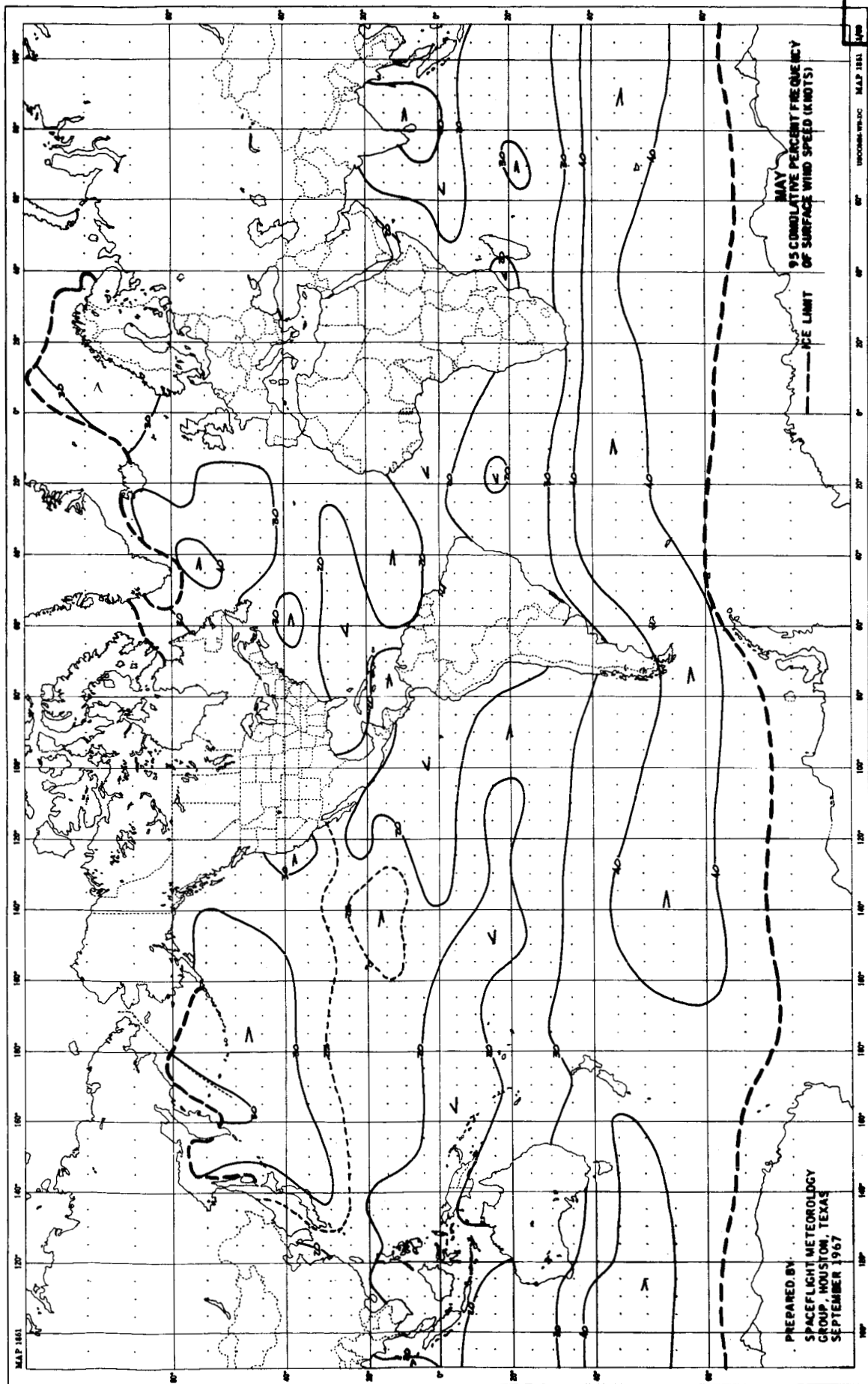


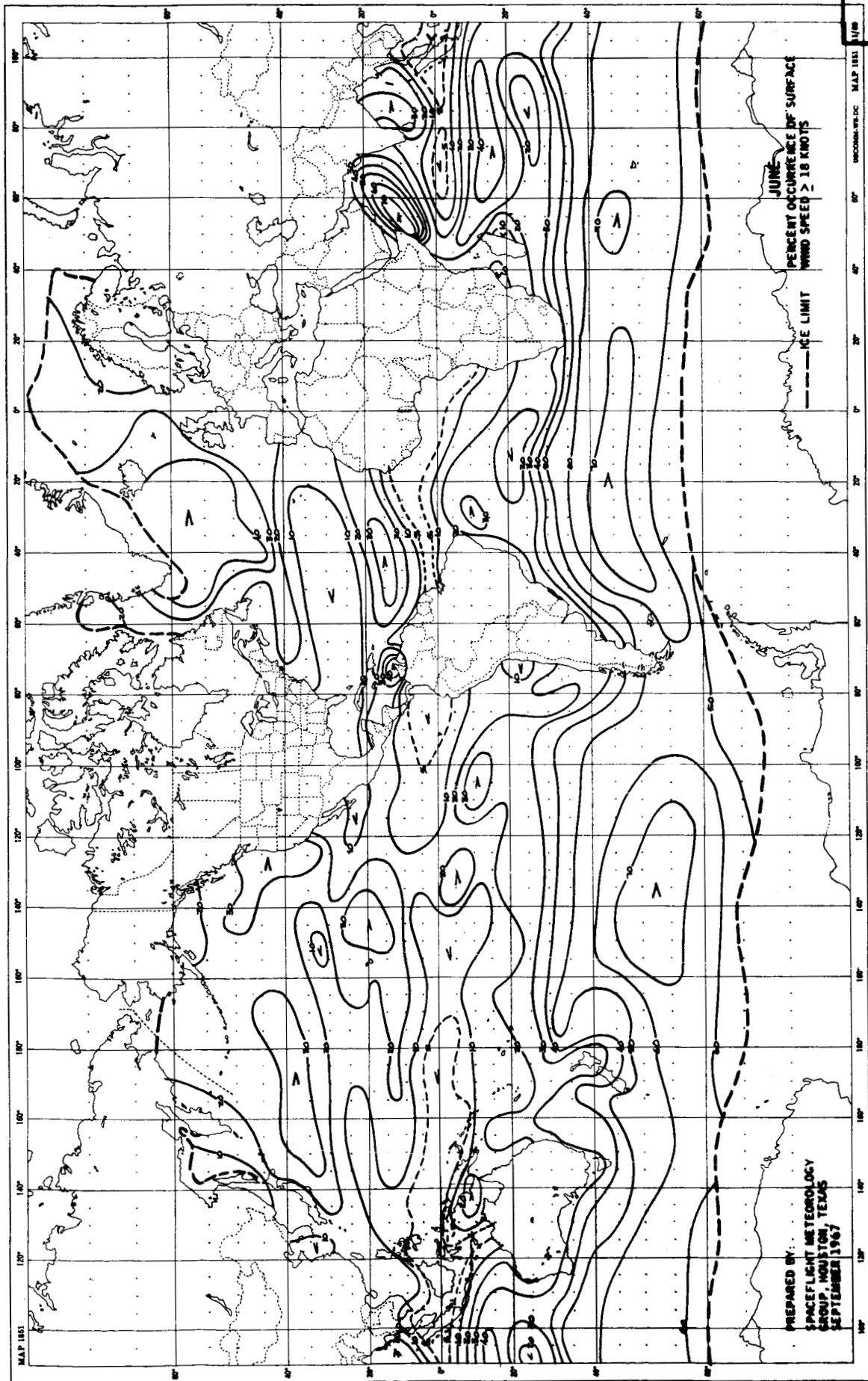
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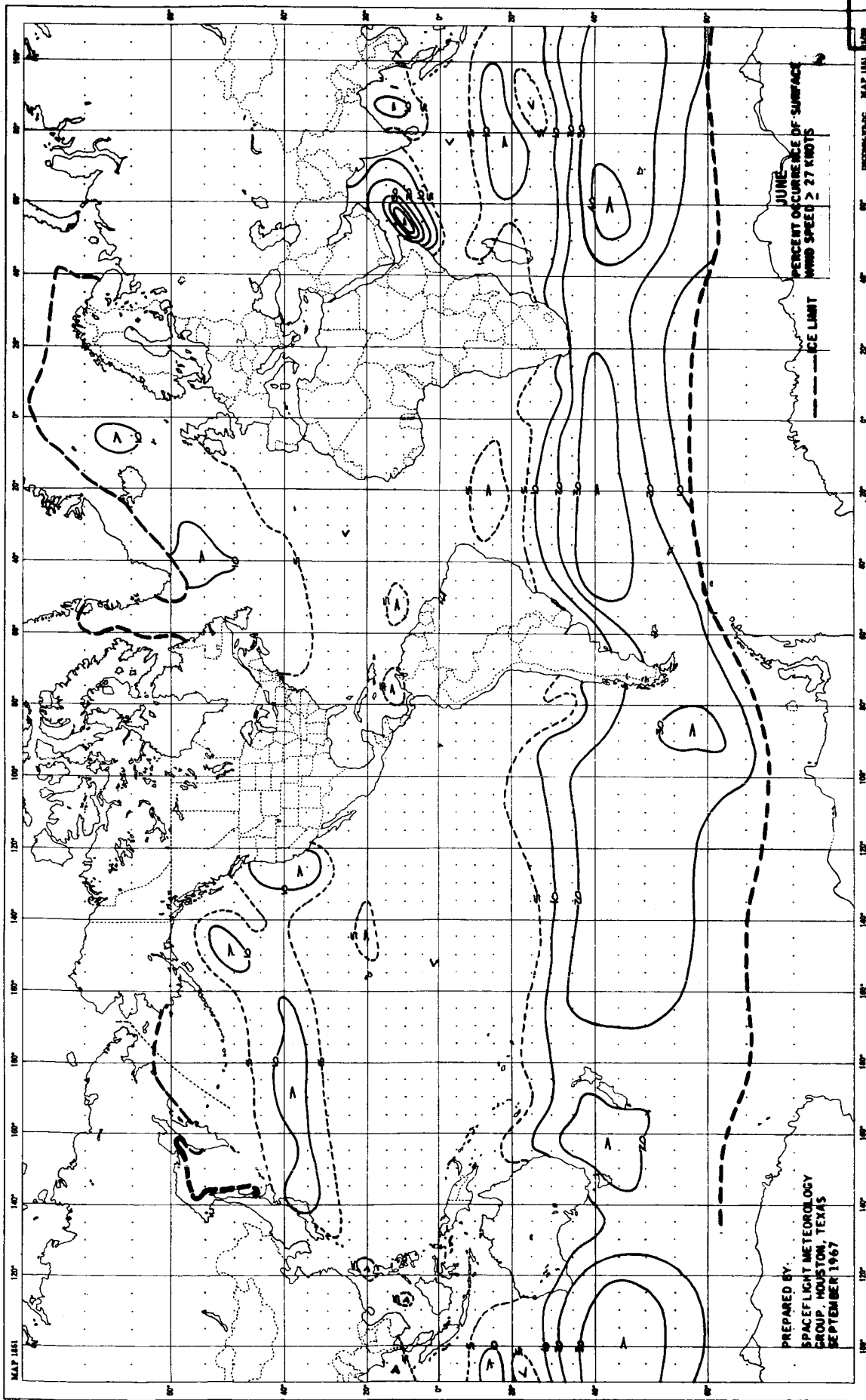




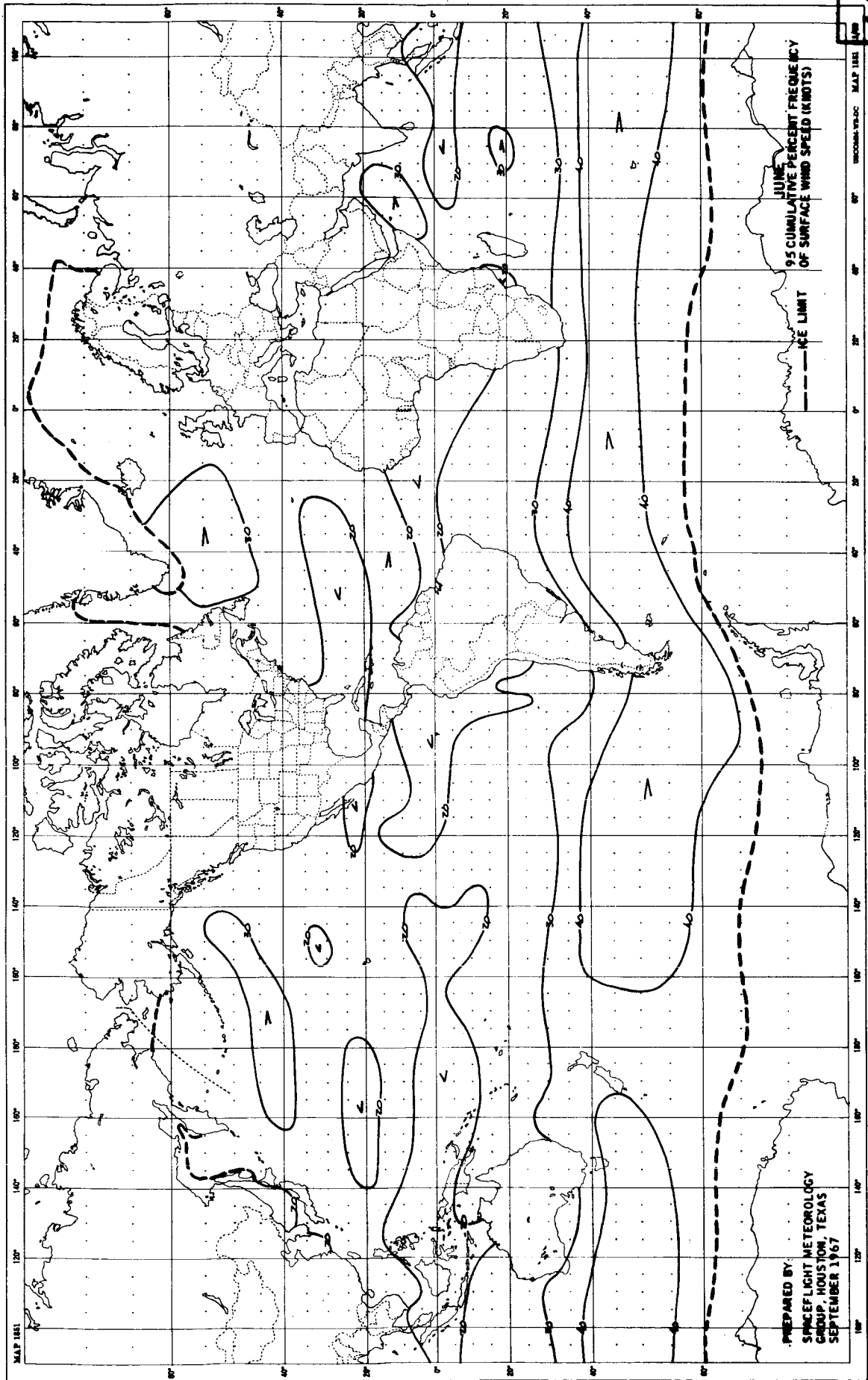


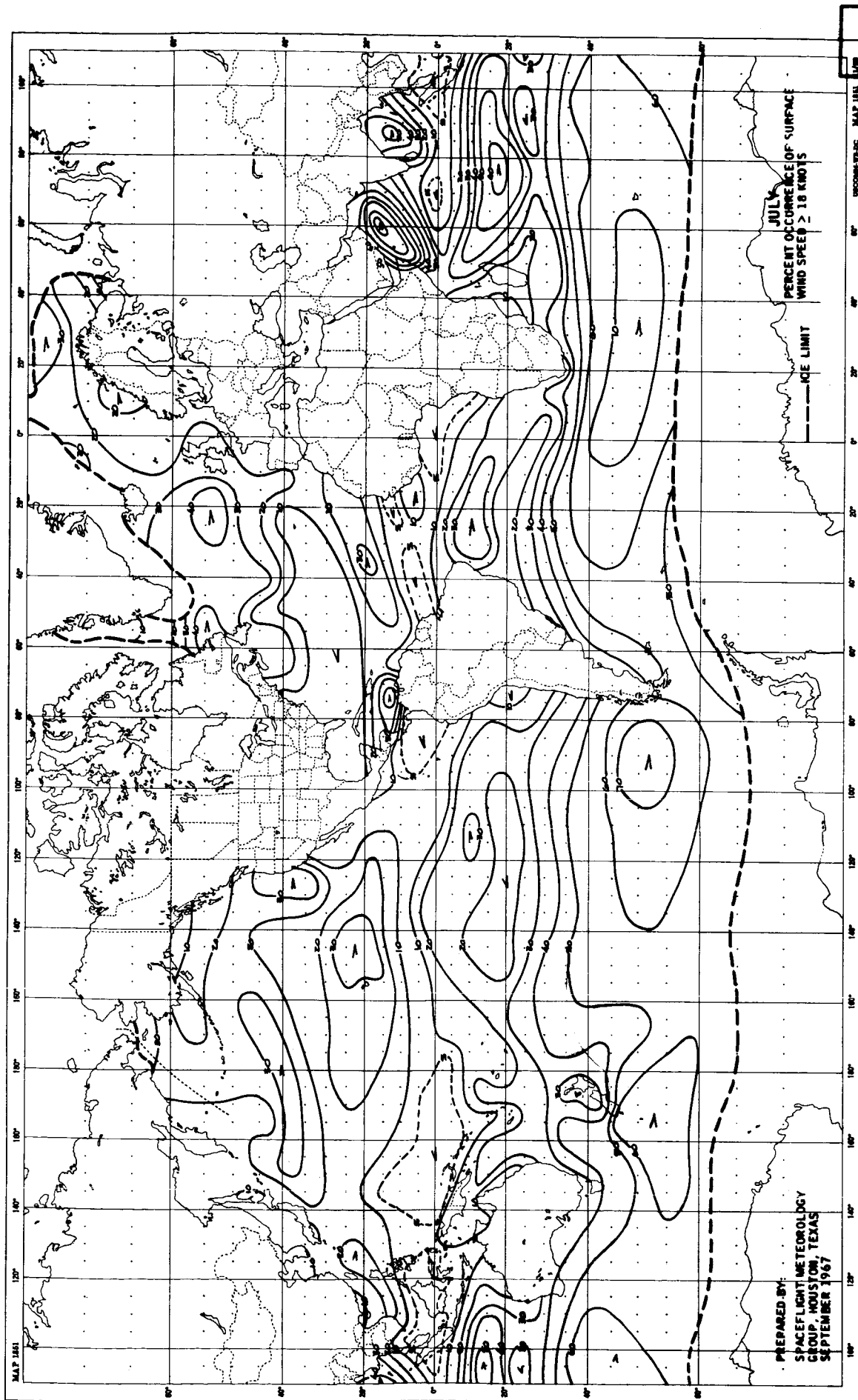


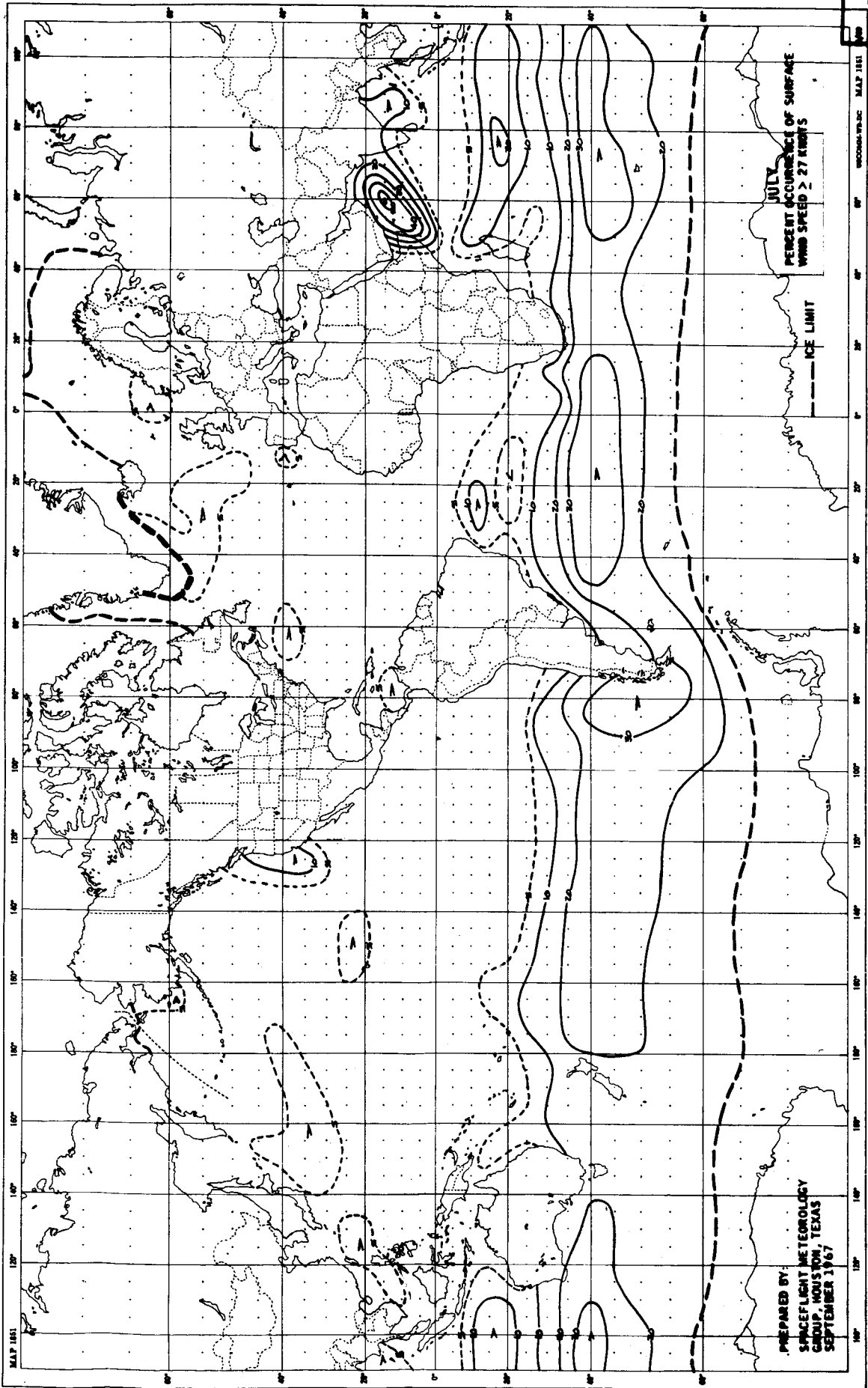


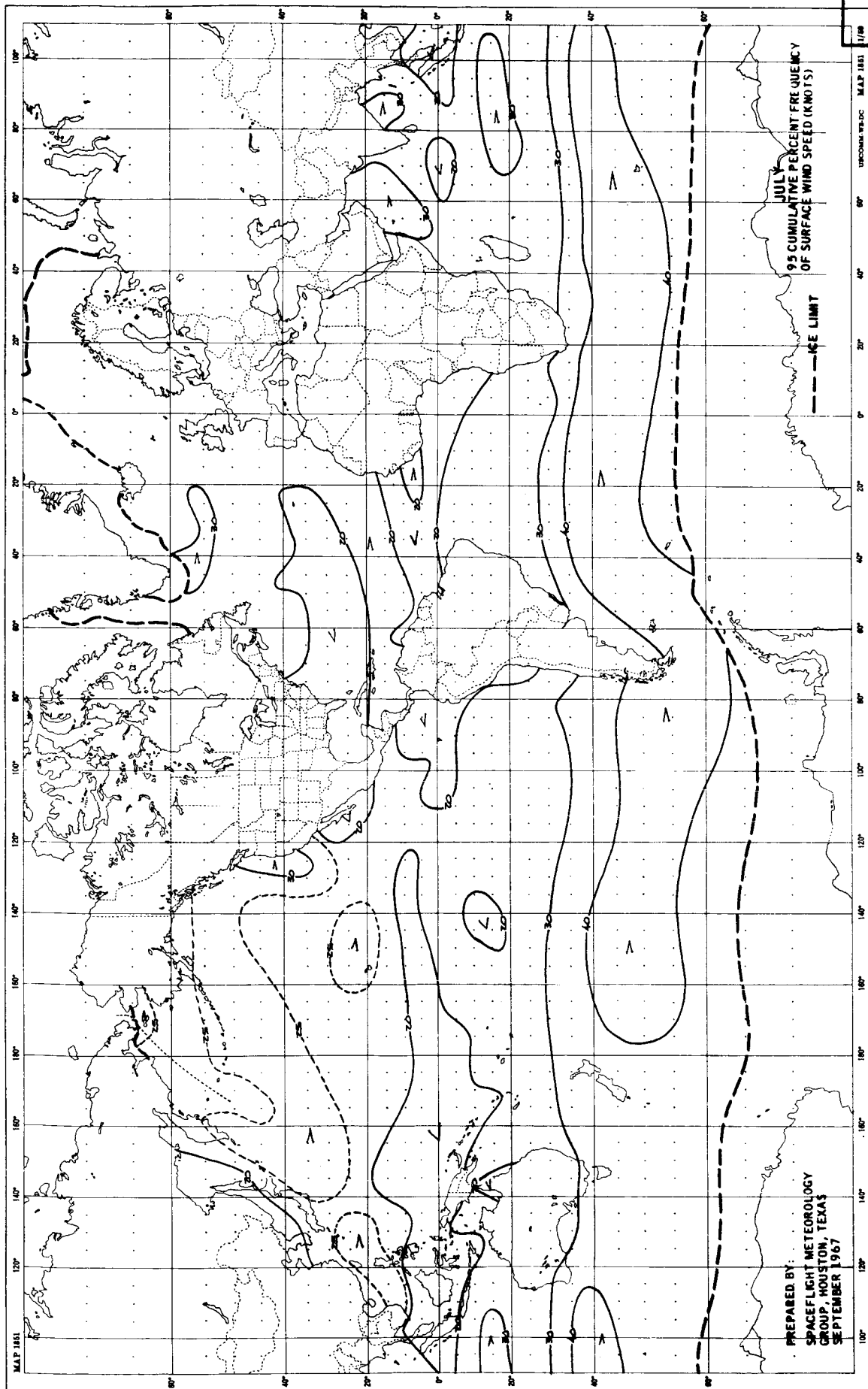


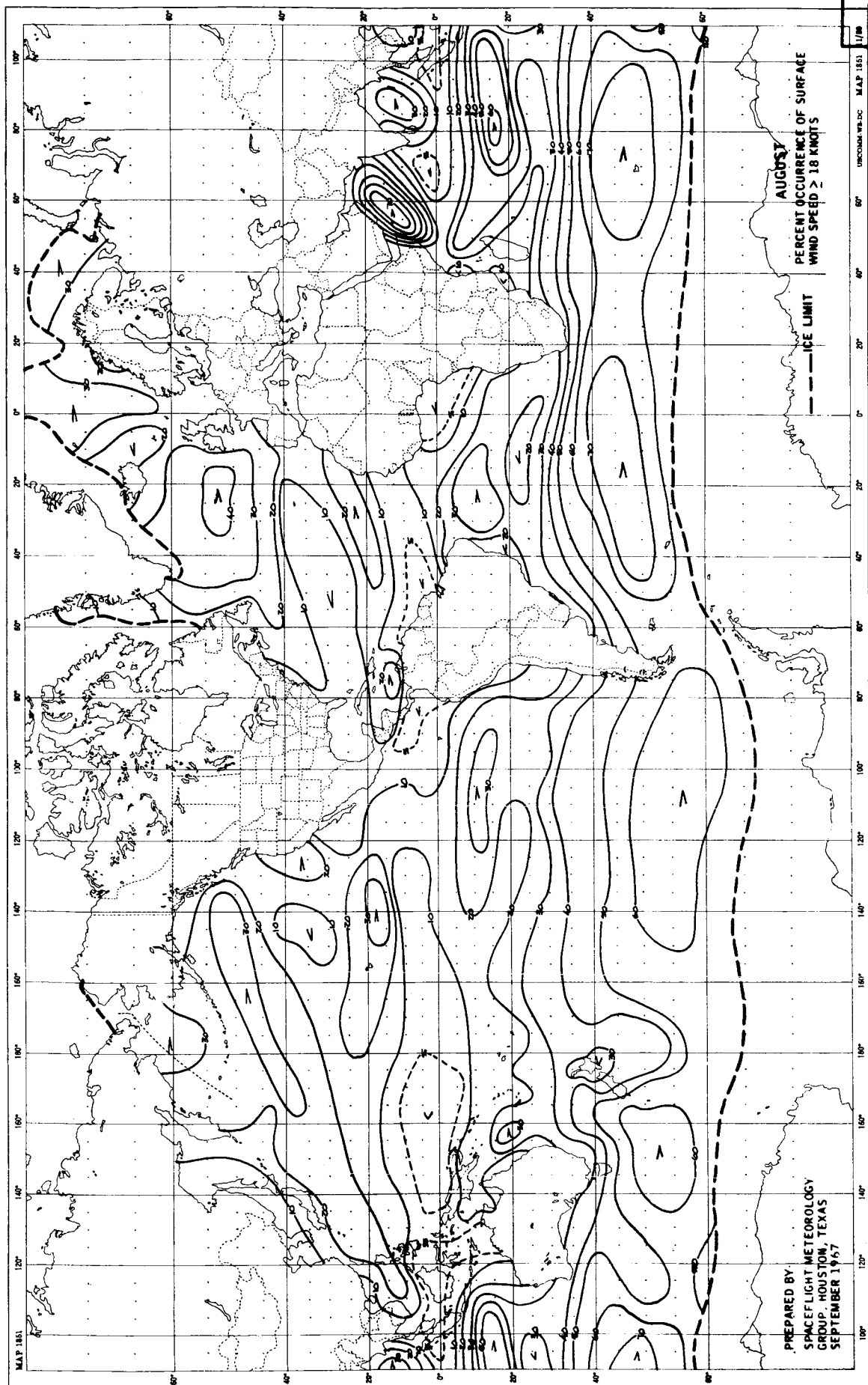
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SEPTEMBER 1967

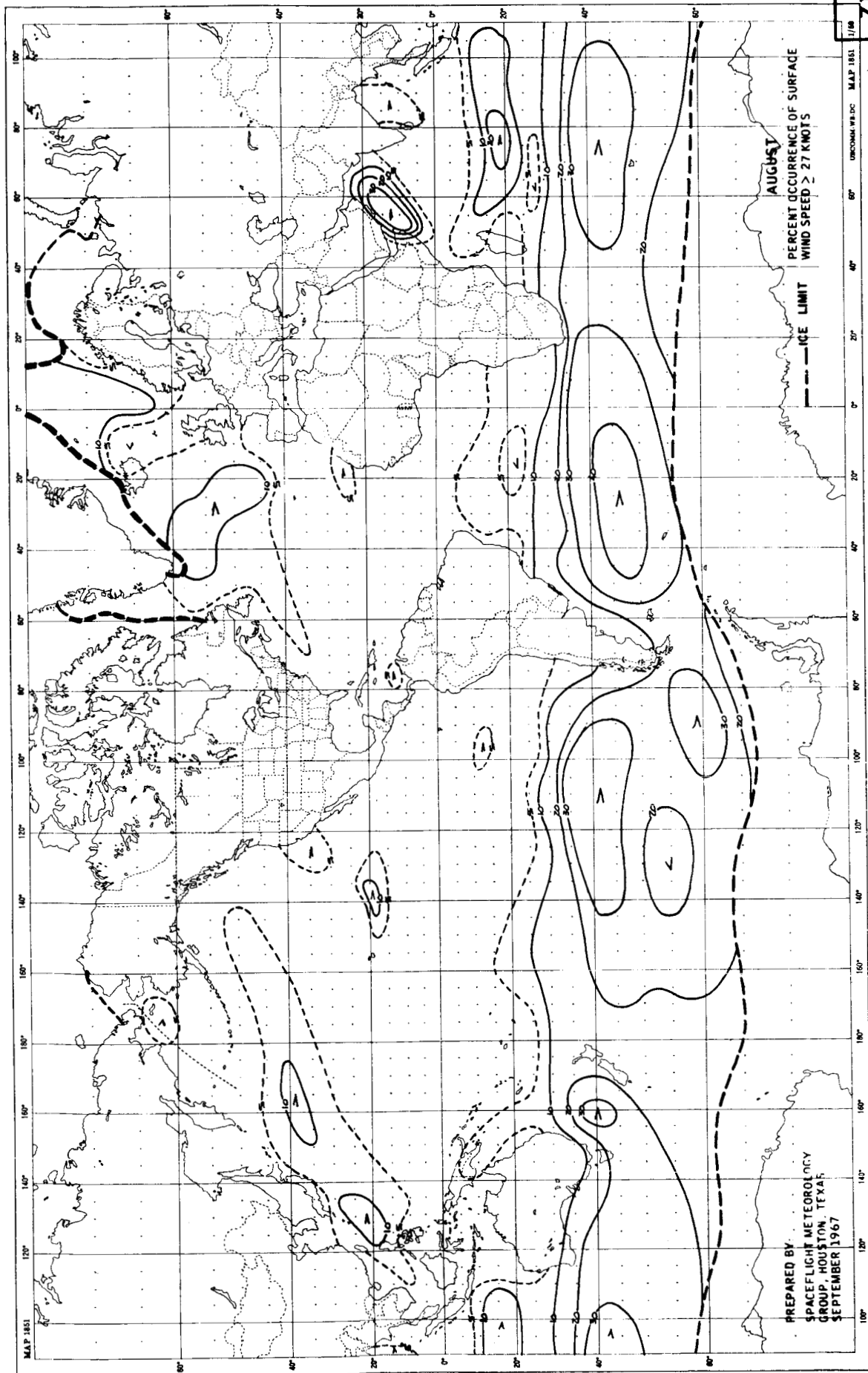


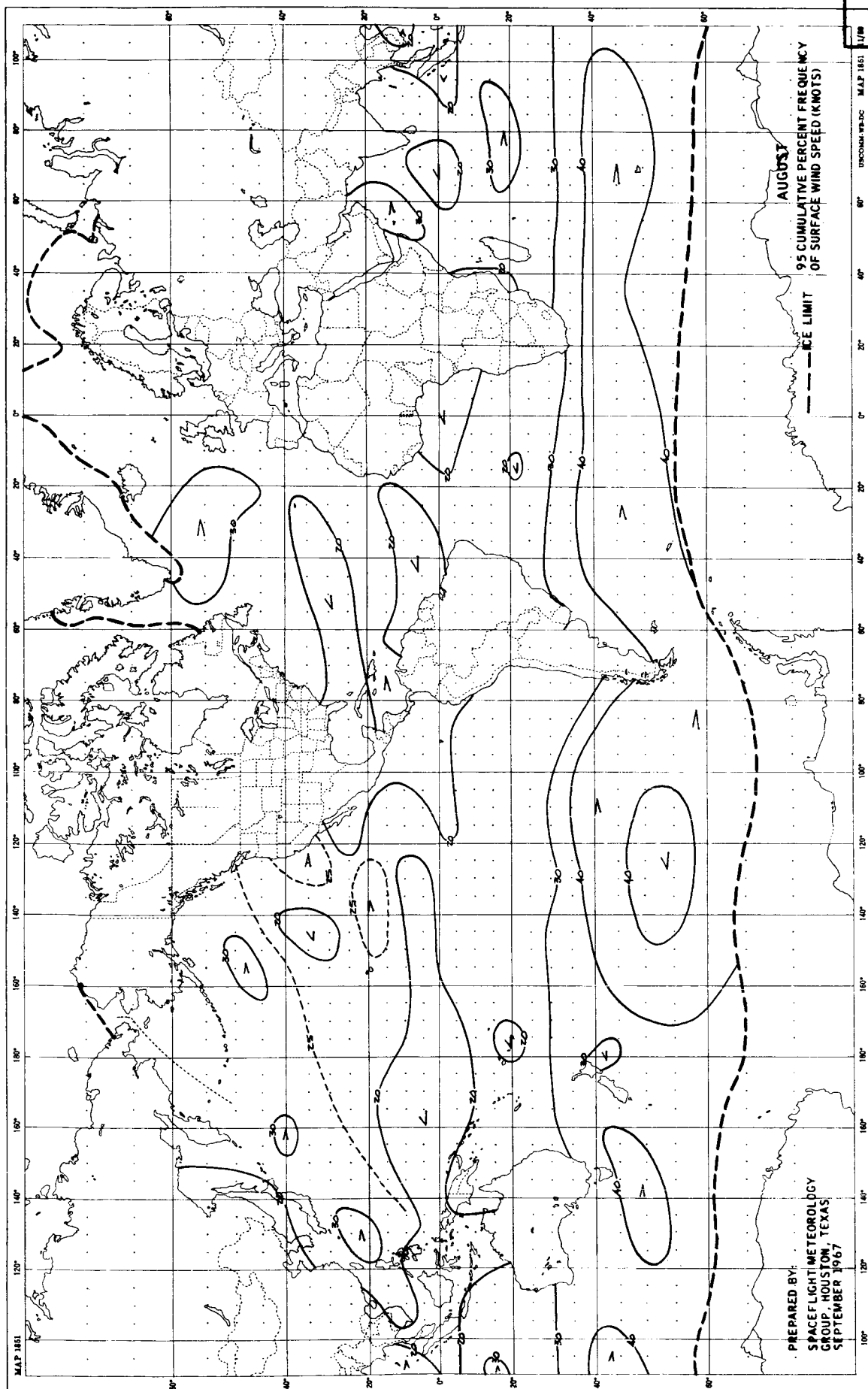


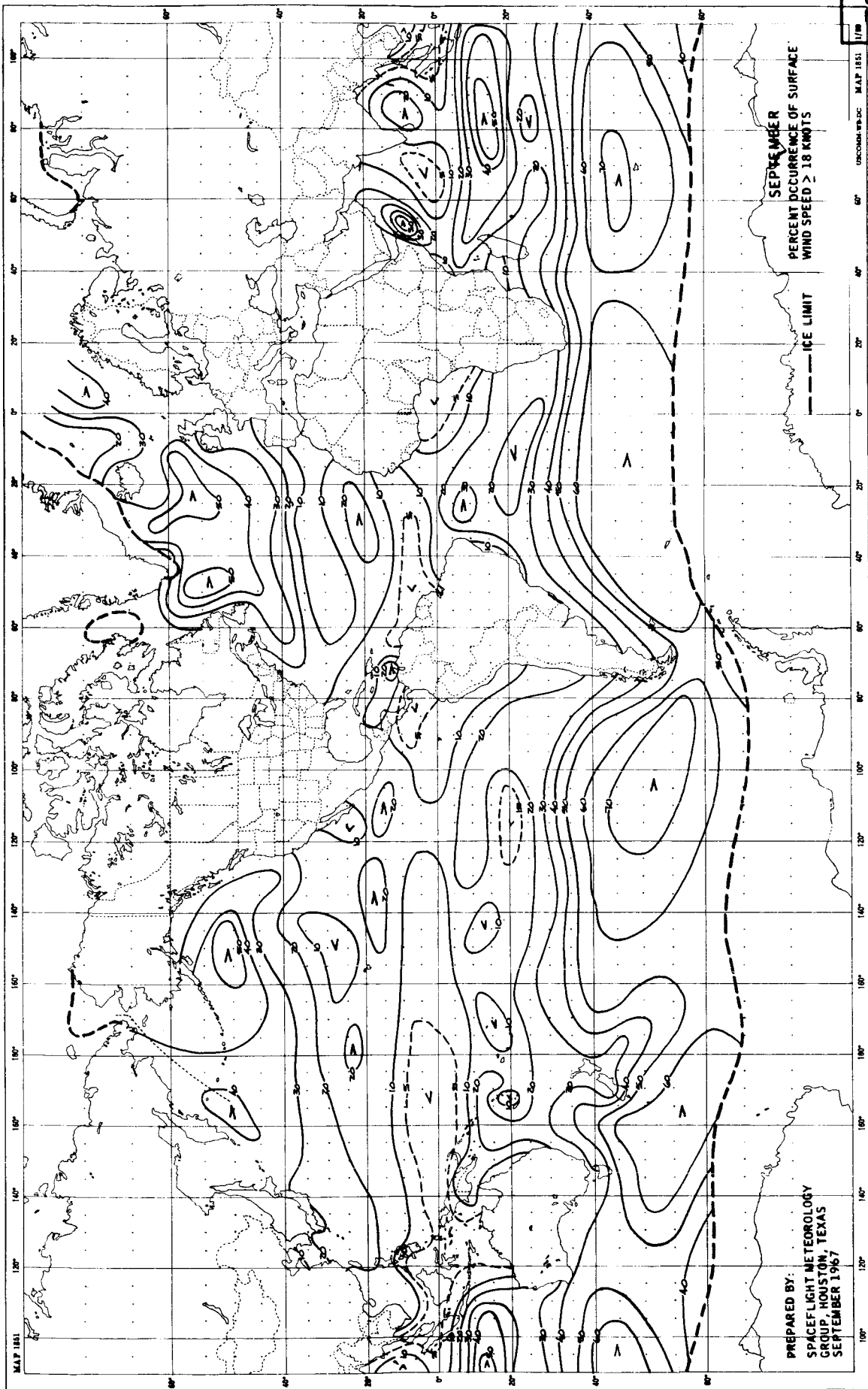


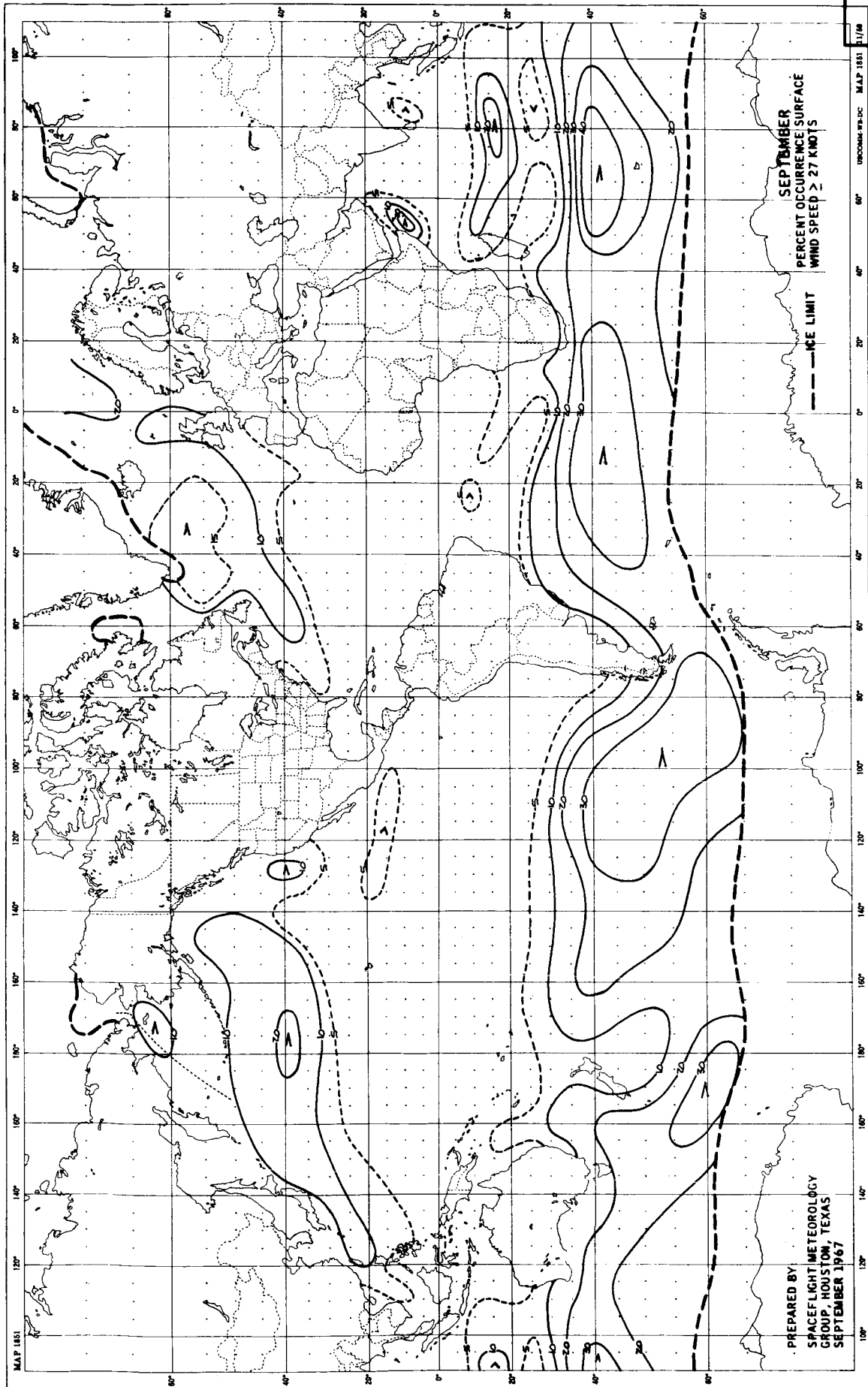


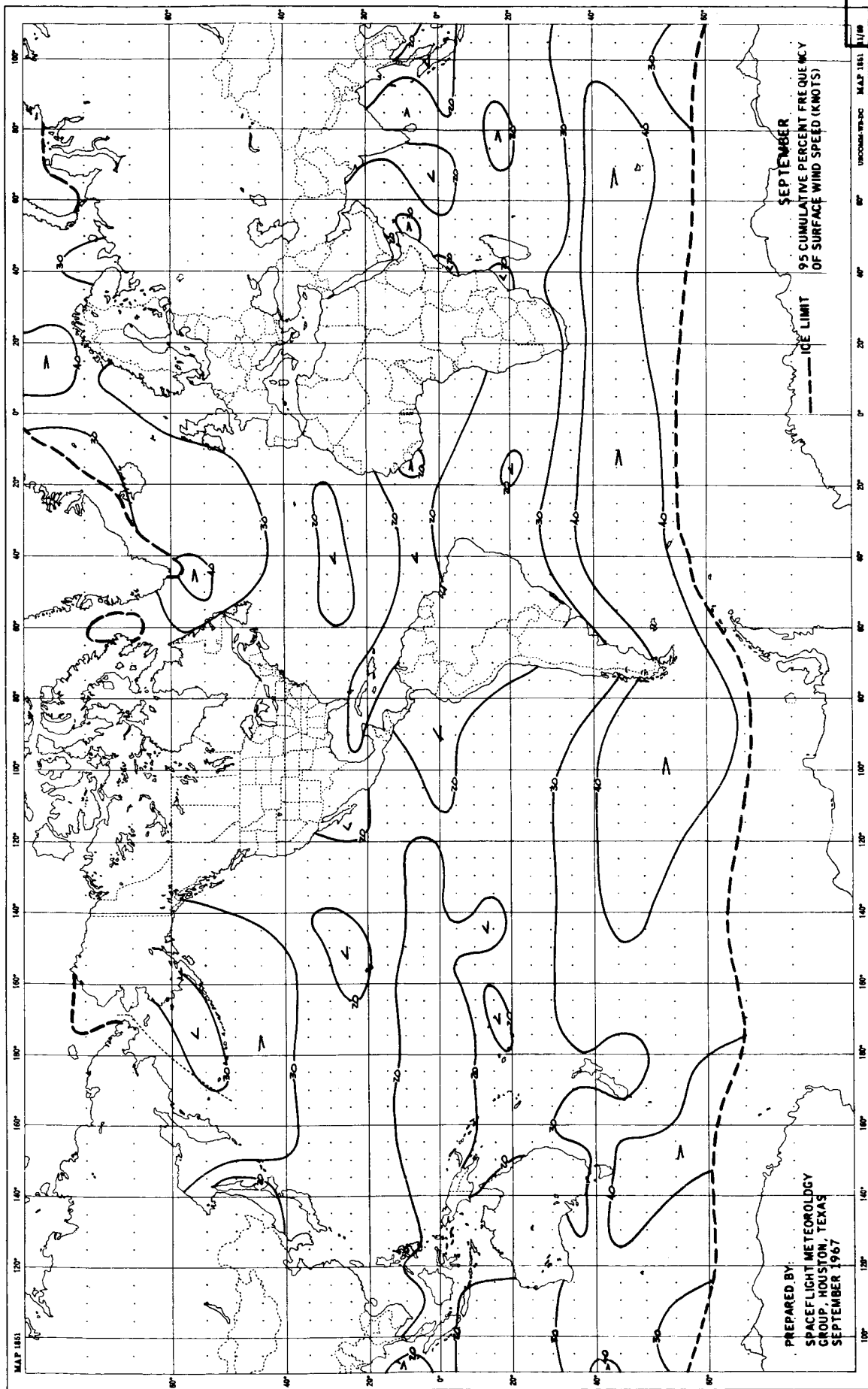










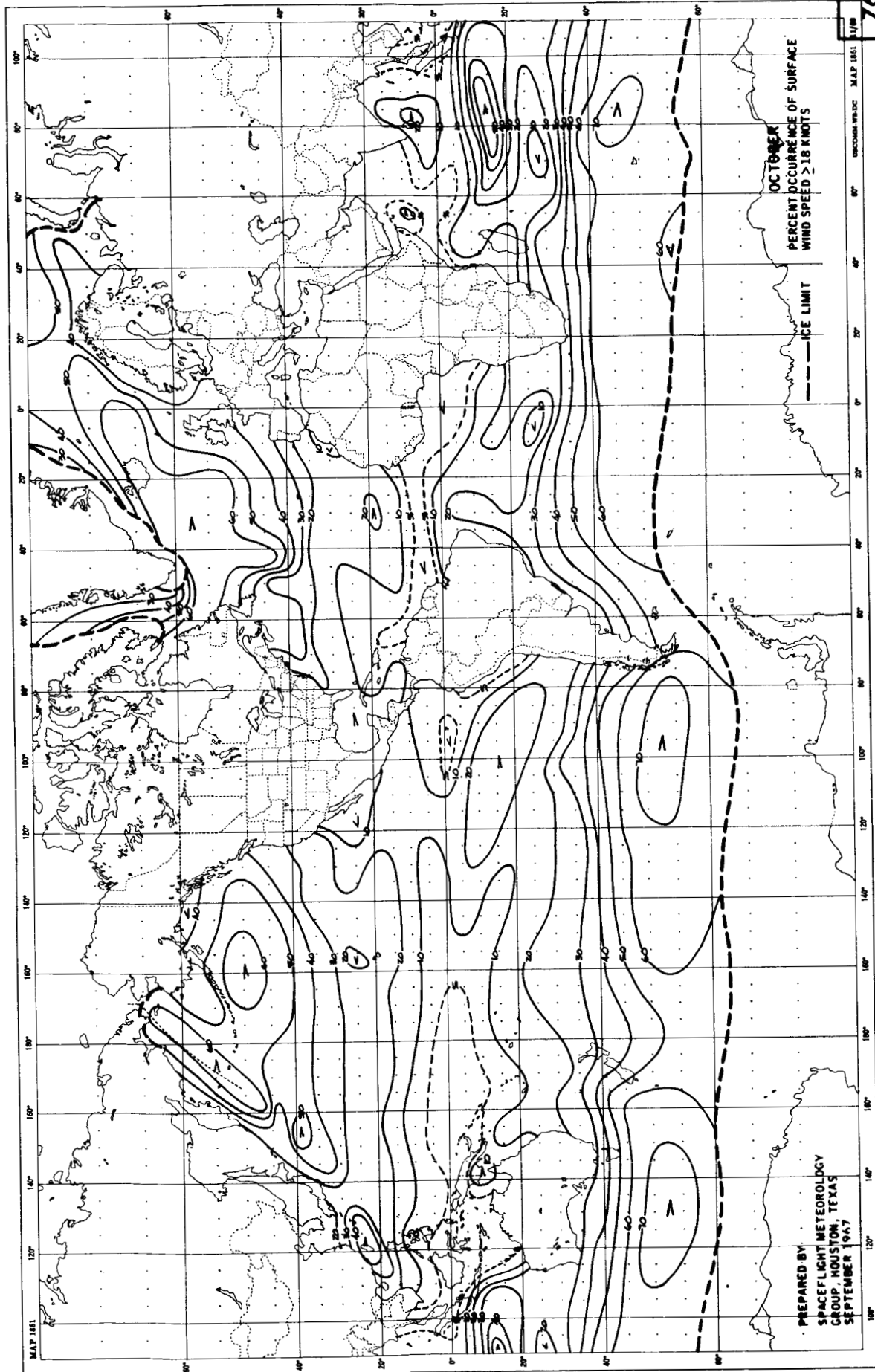


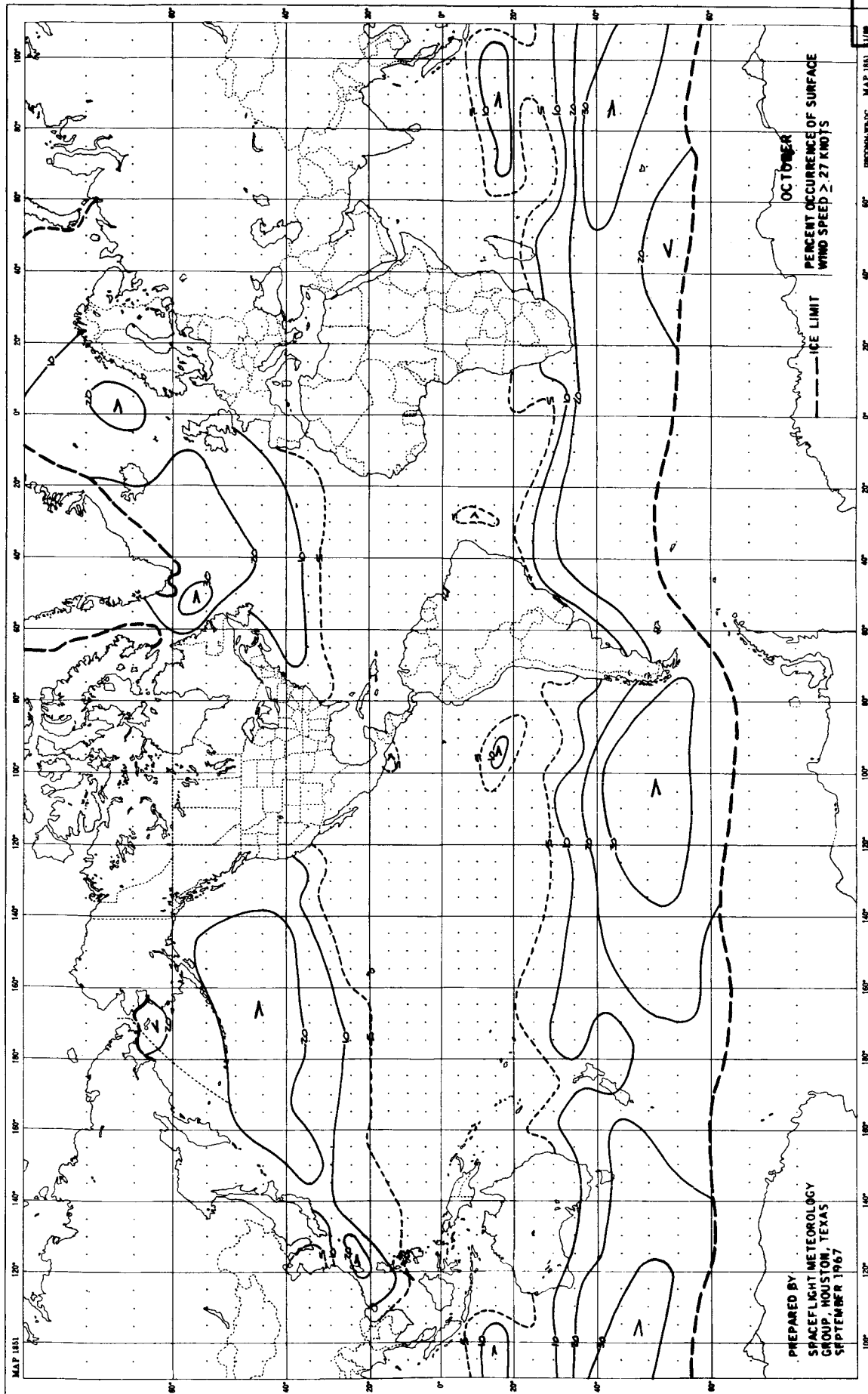
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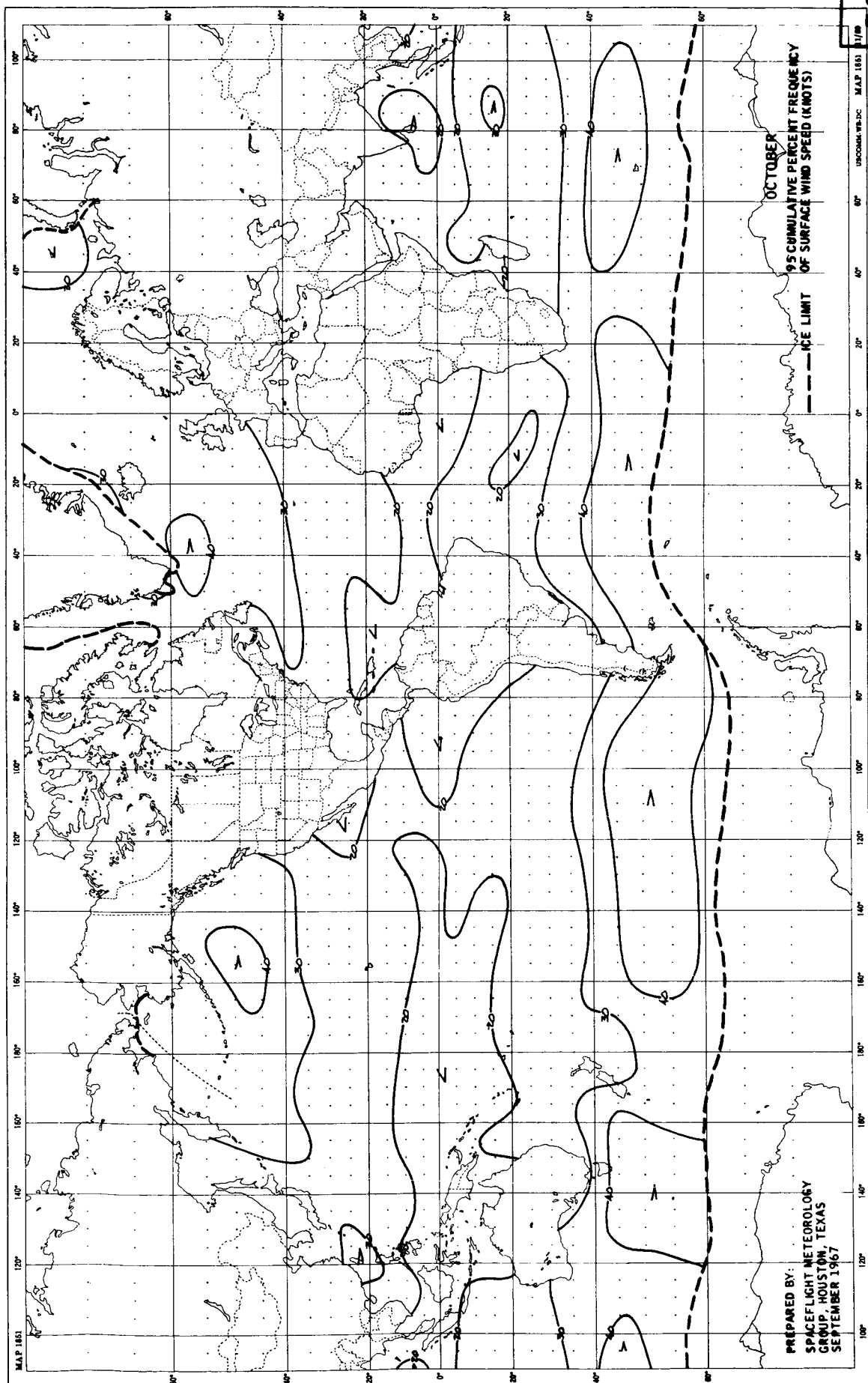
SEPTEMBER
95 CUMULATIVE PERCENT FREQUENCY
OF SURFACE WIND SPEED (KNOTS)

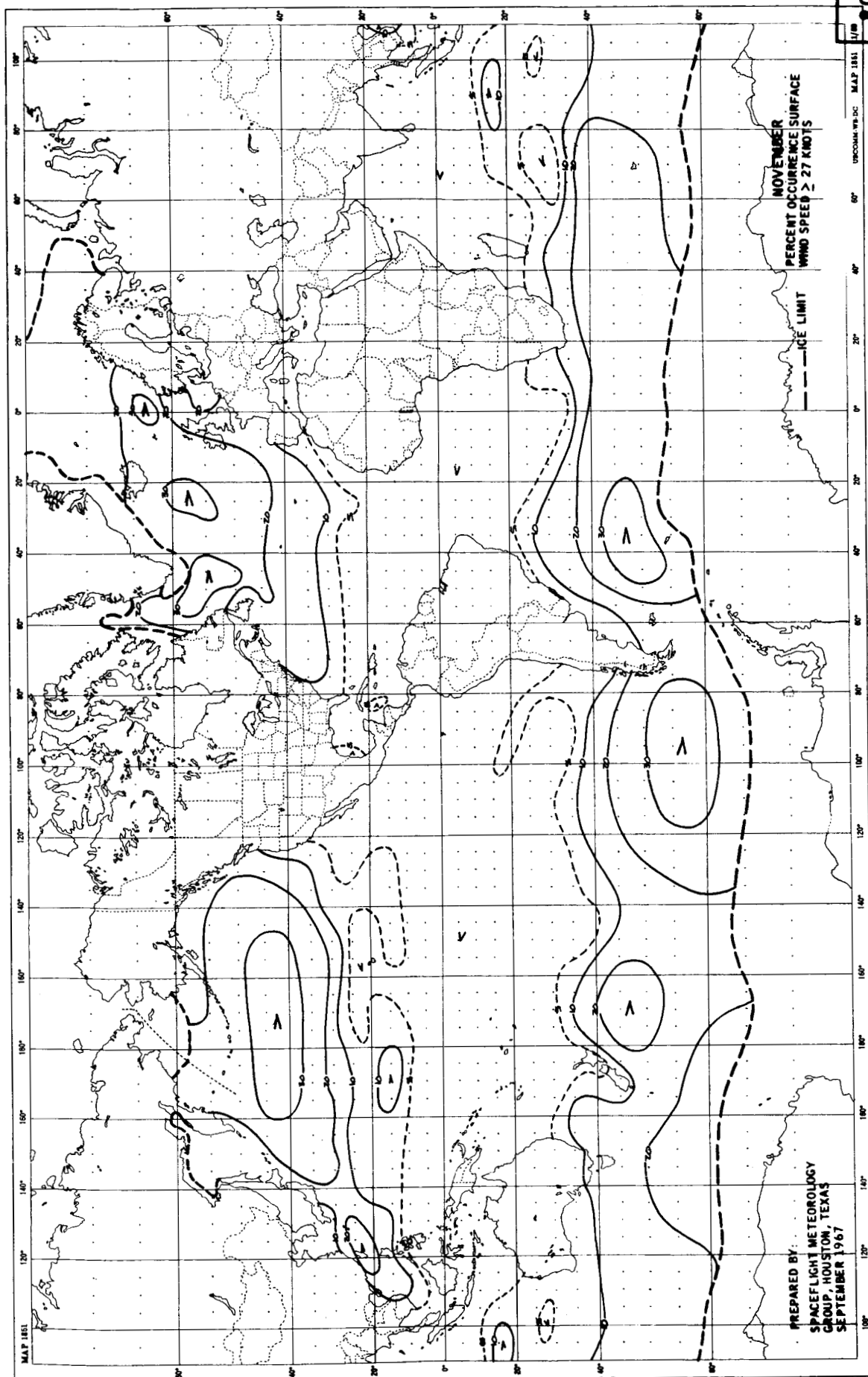
ICE LIMIT

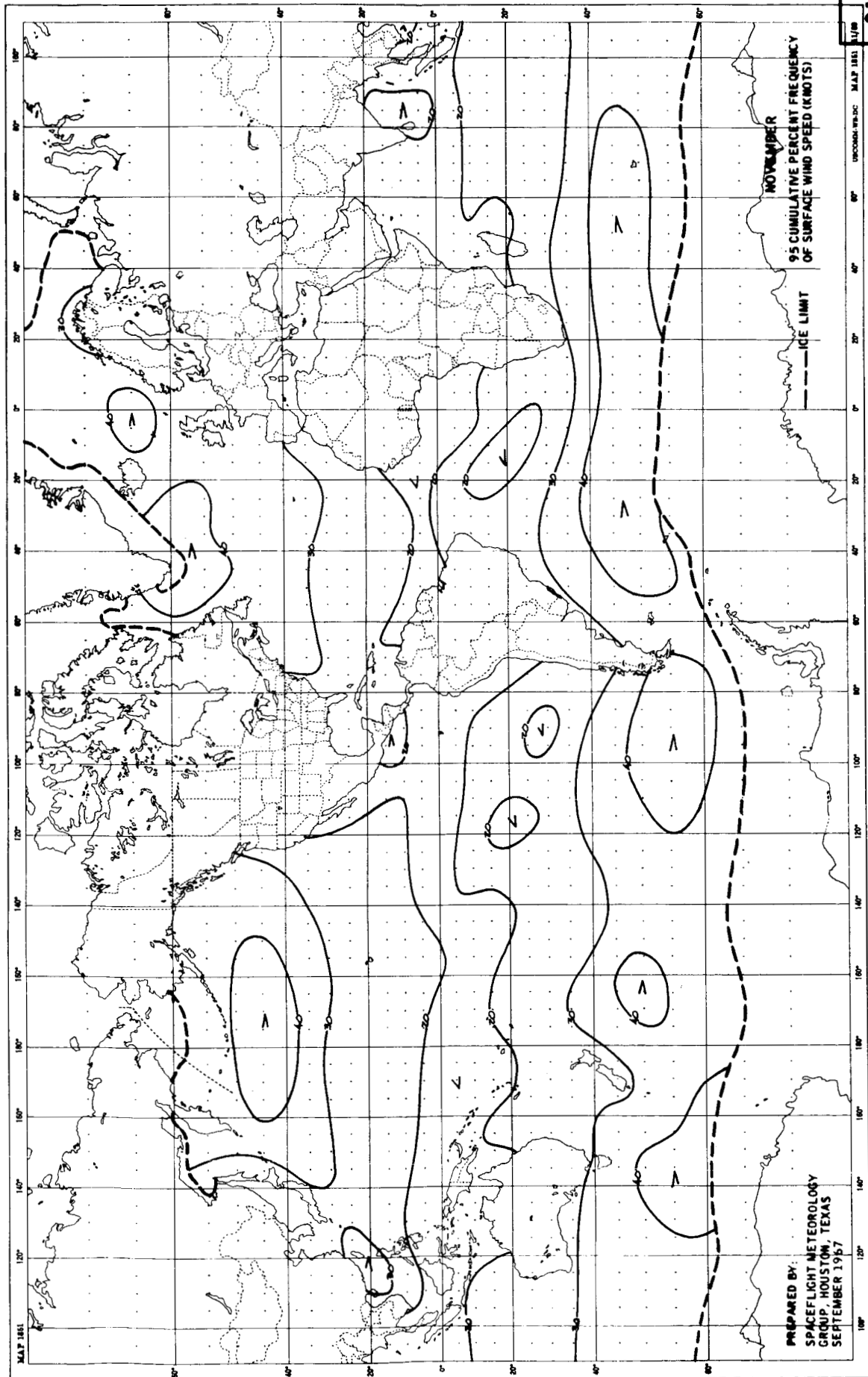
MAP 1851

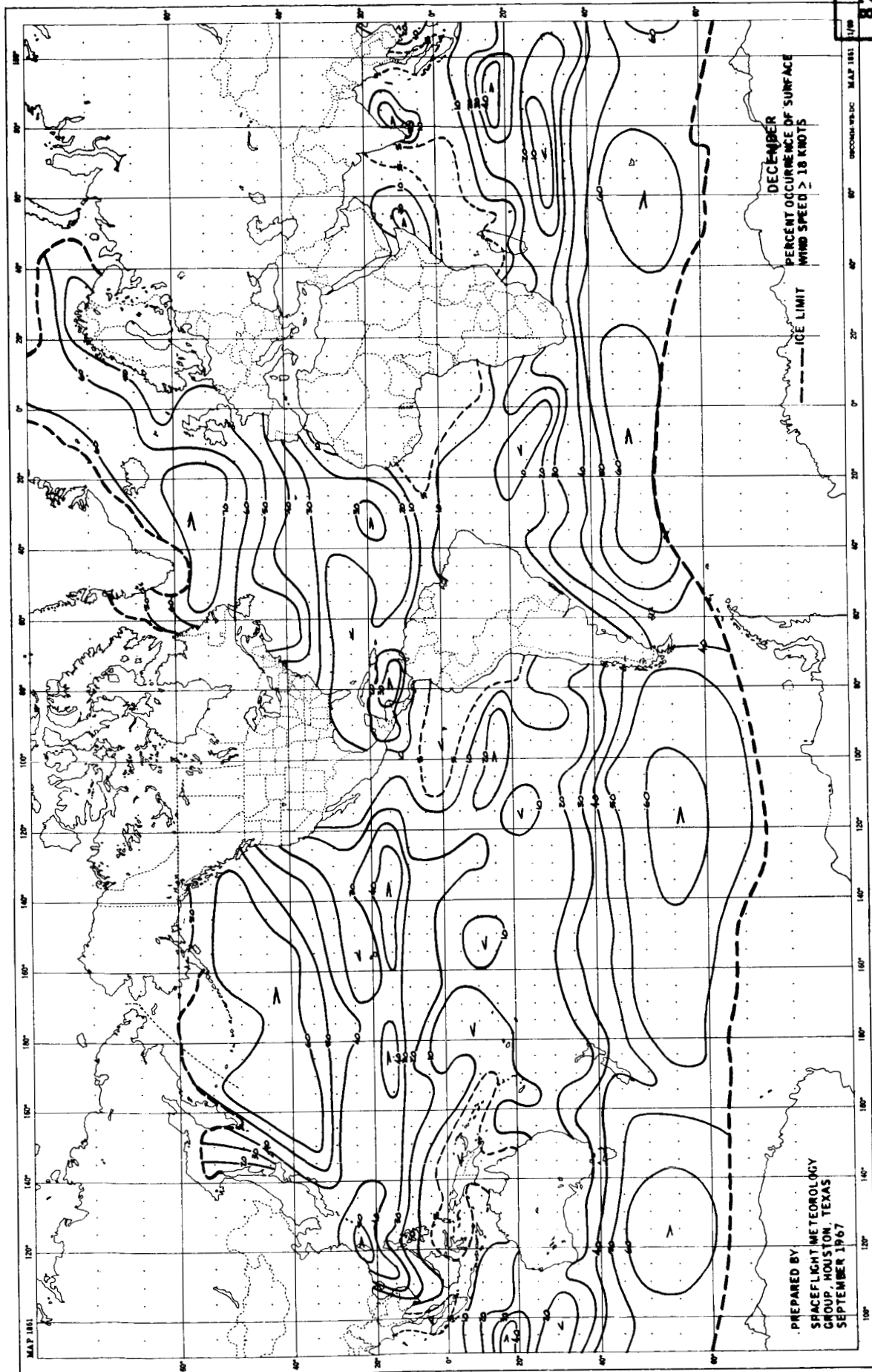


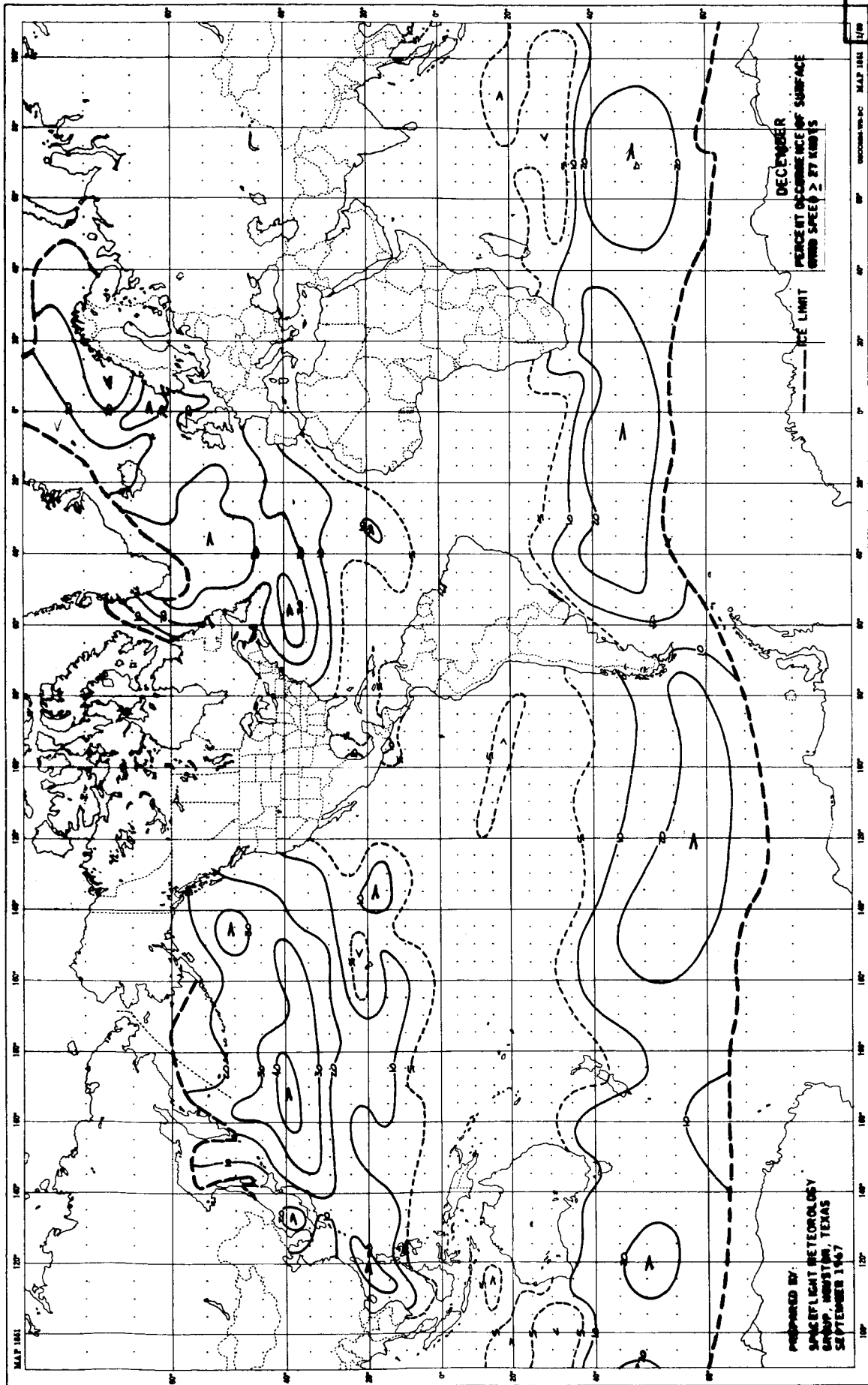


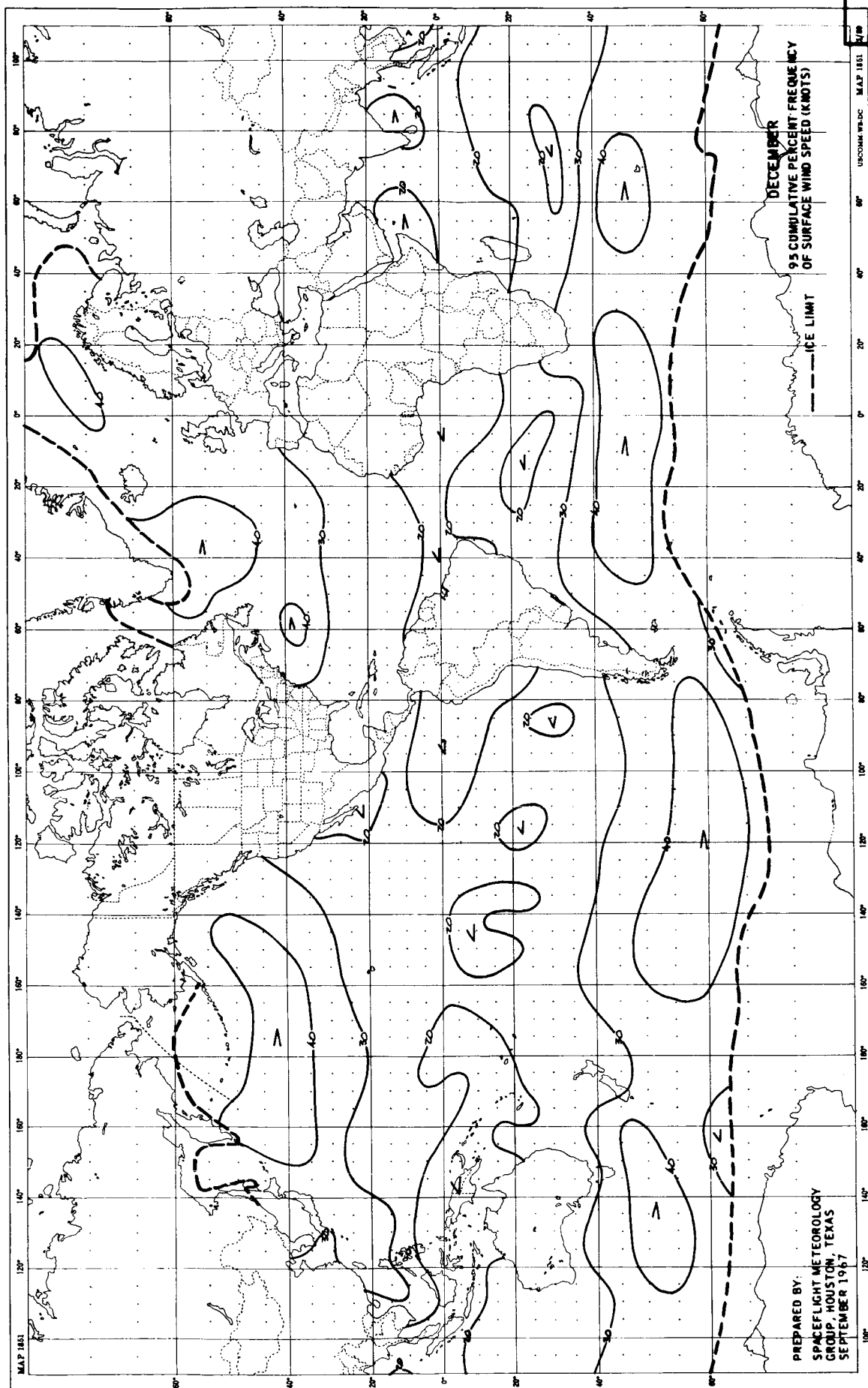


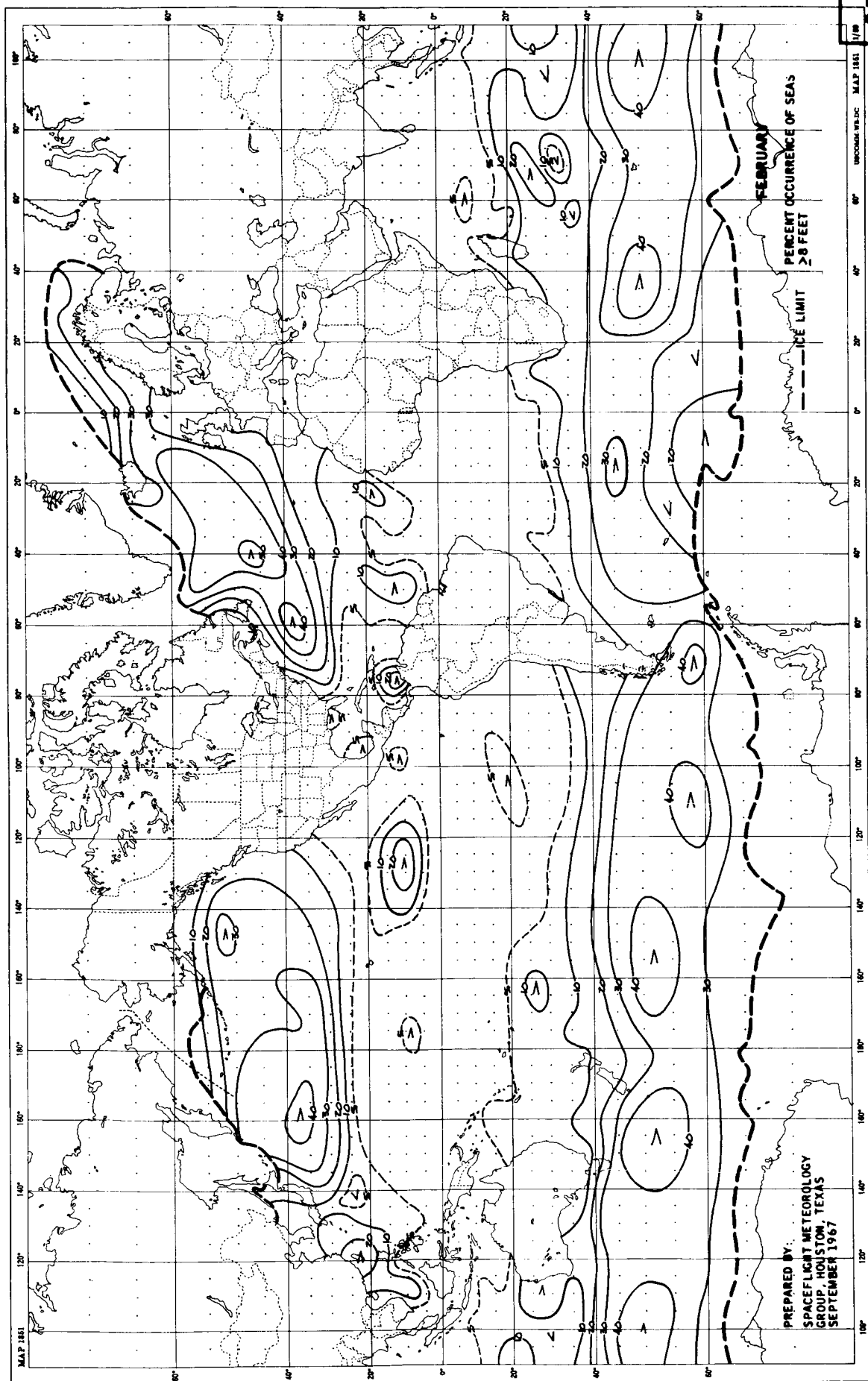


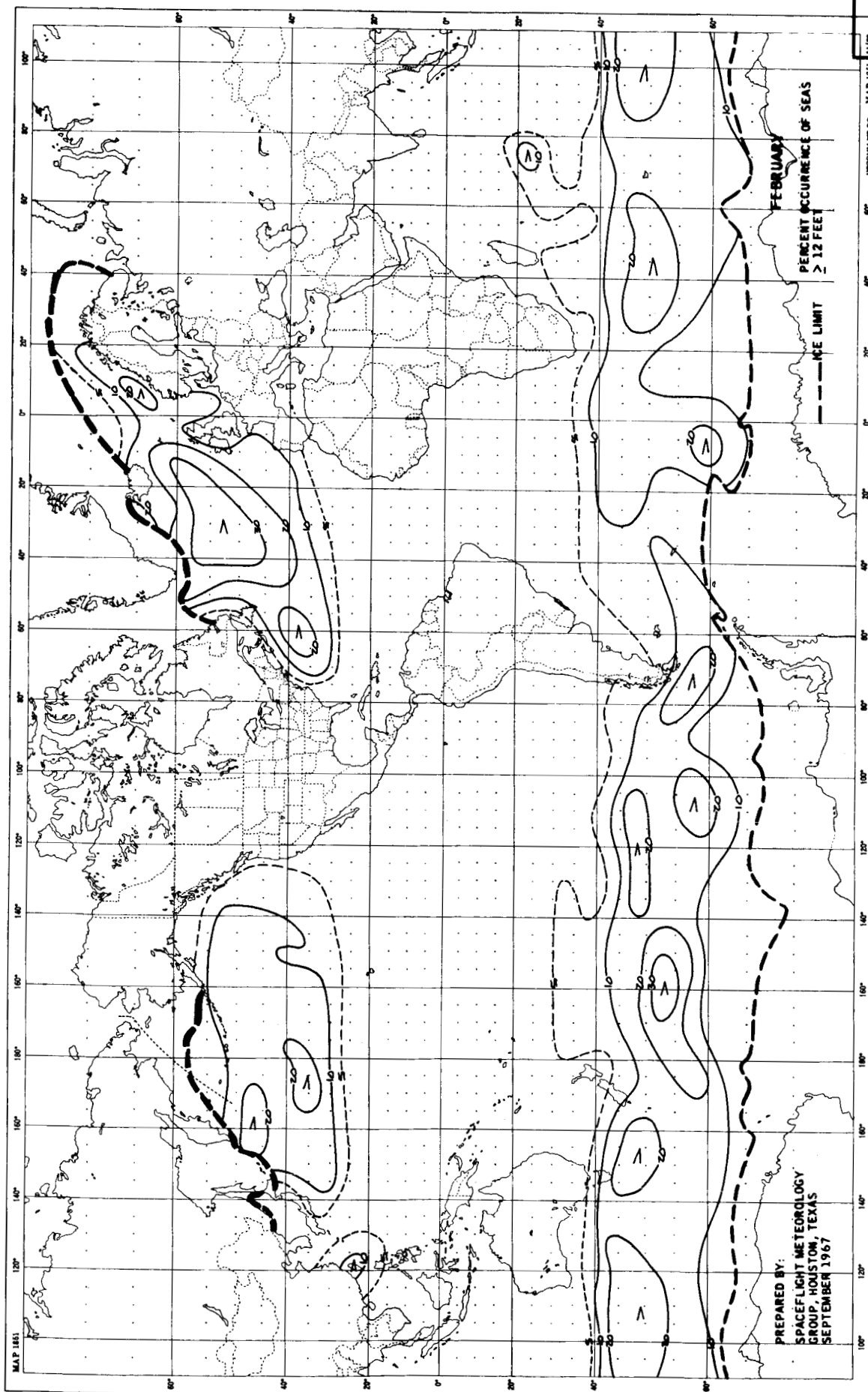


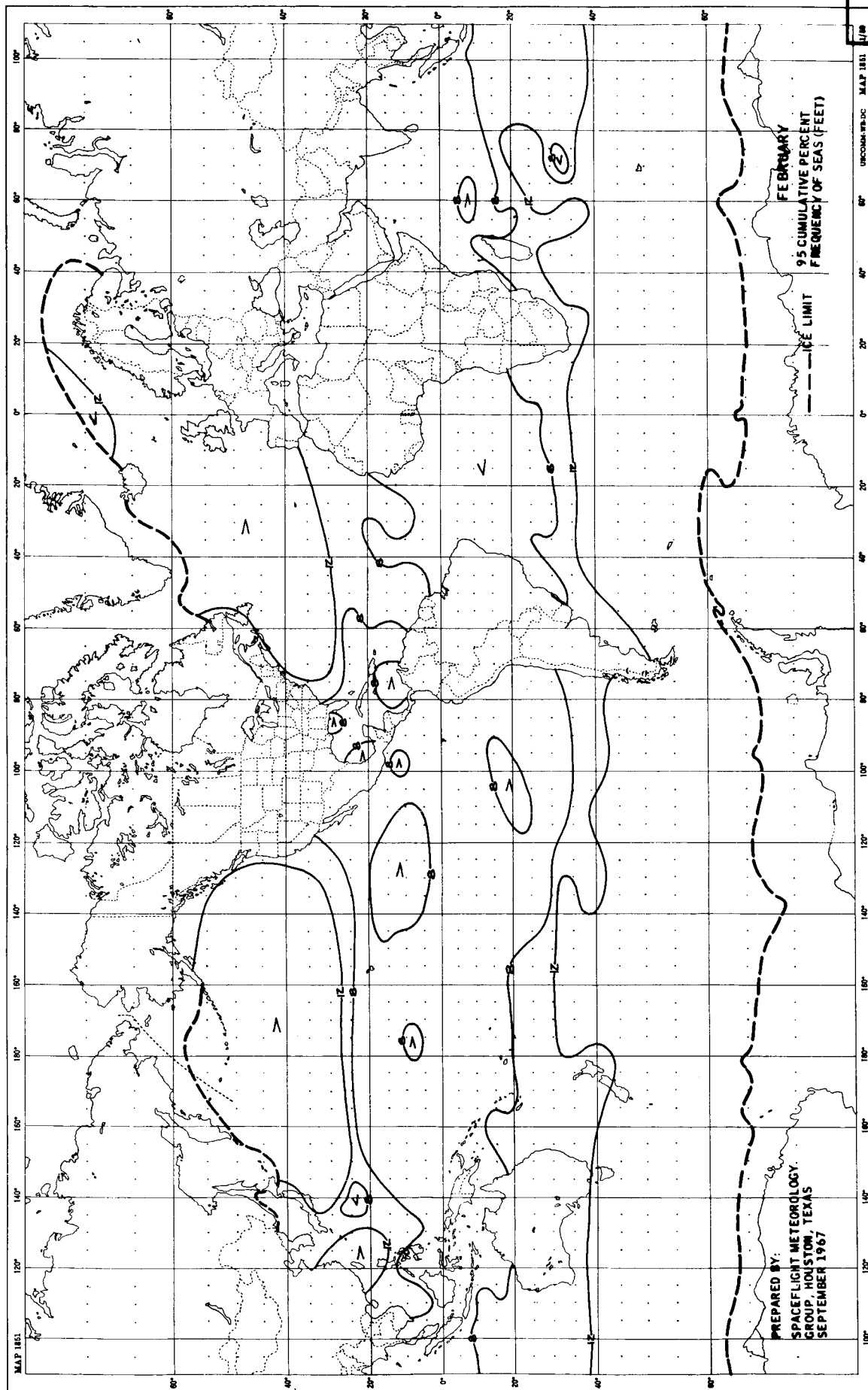


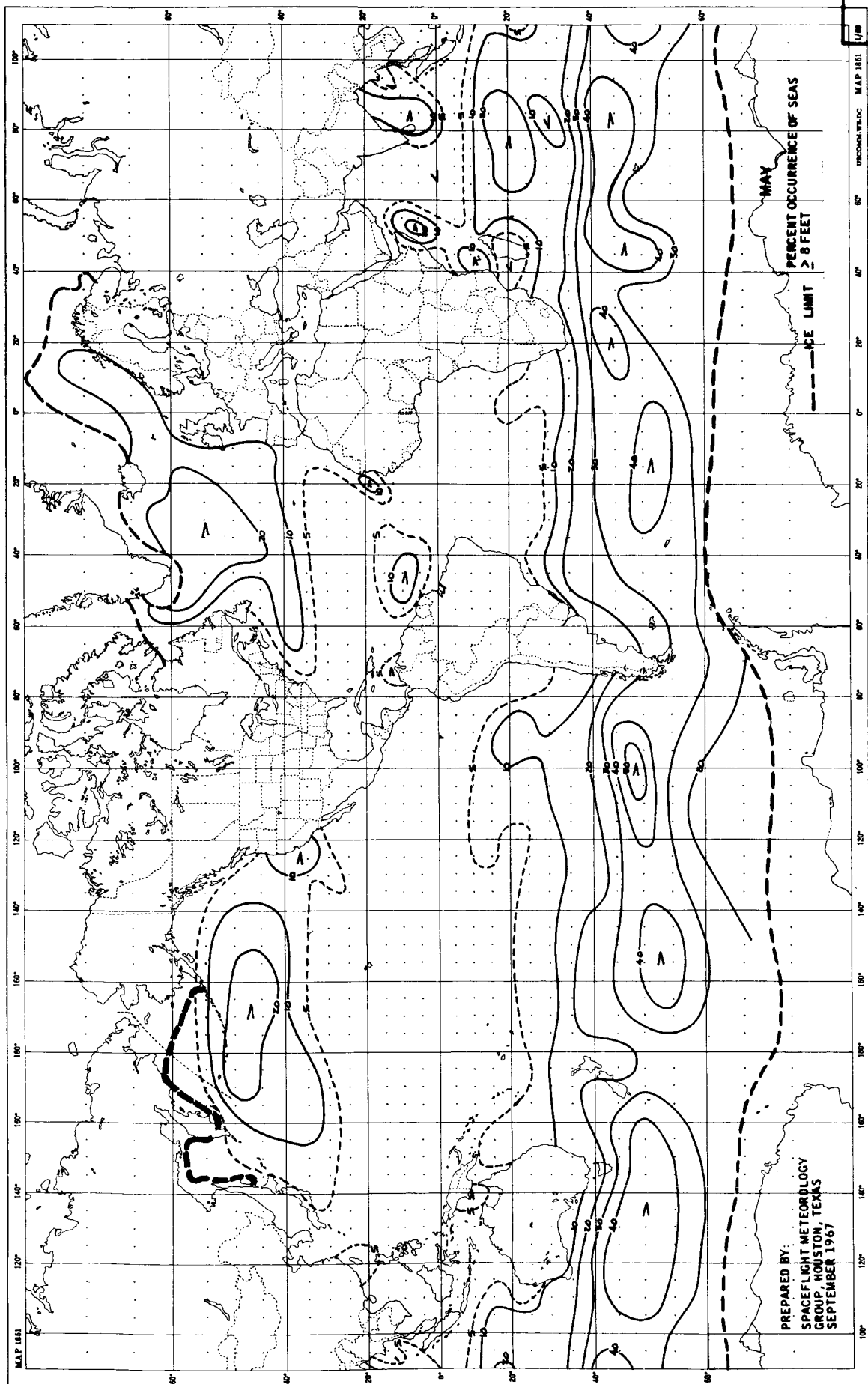


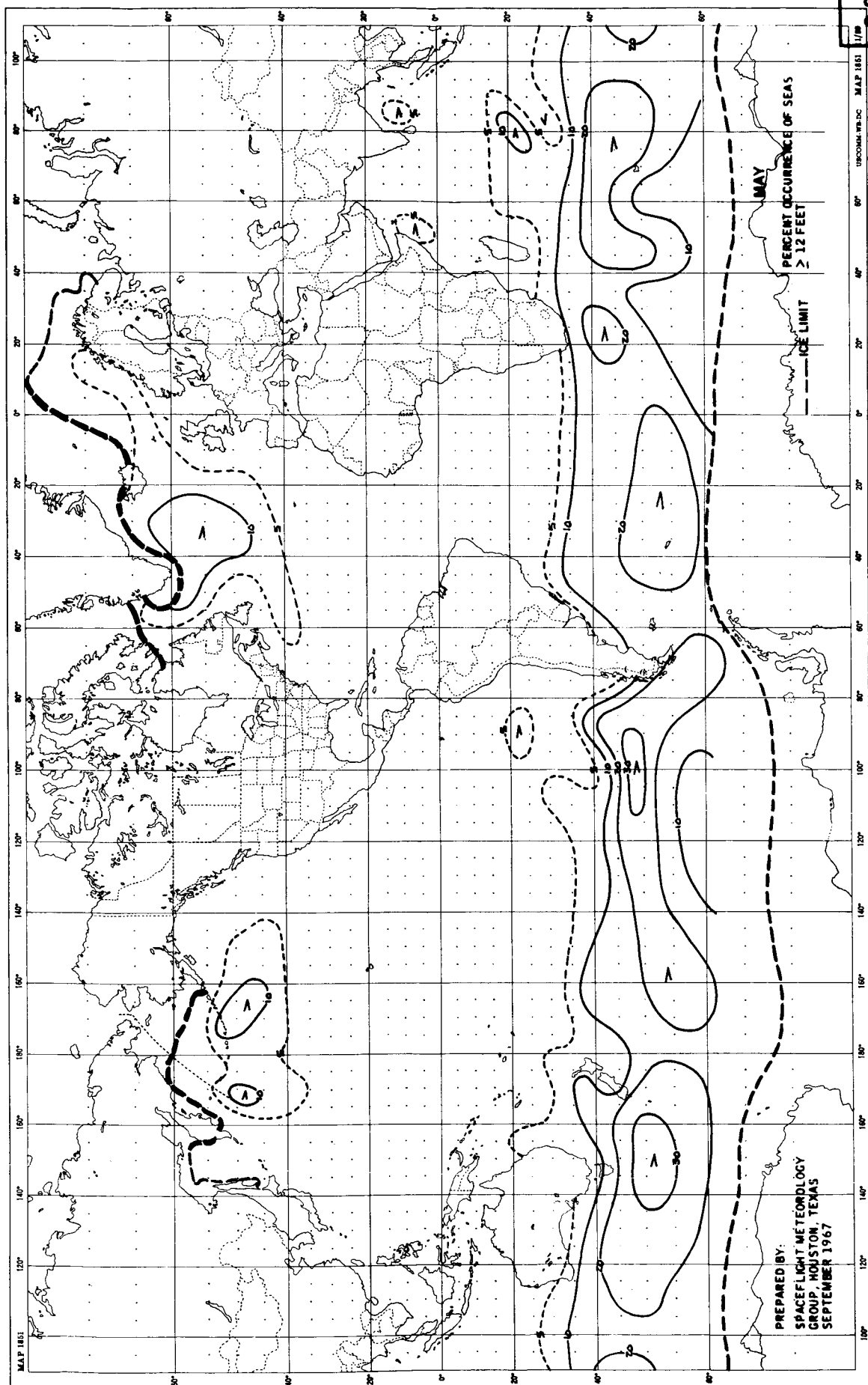


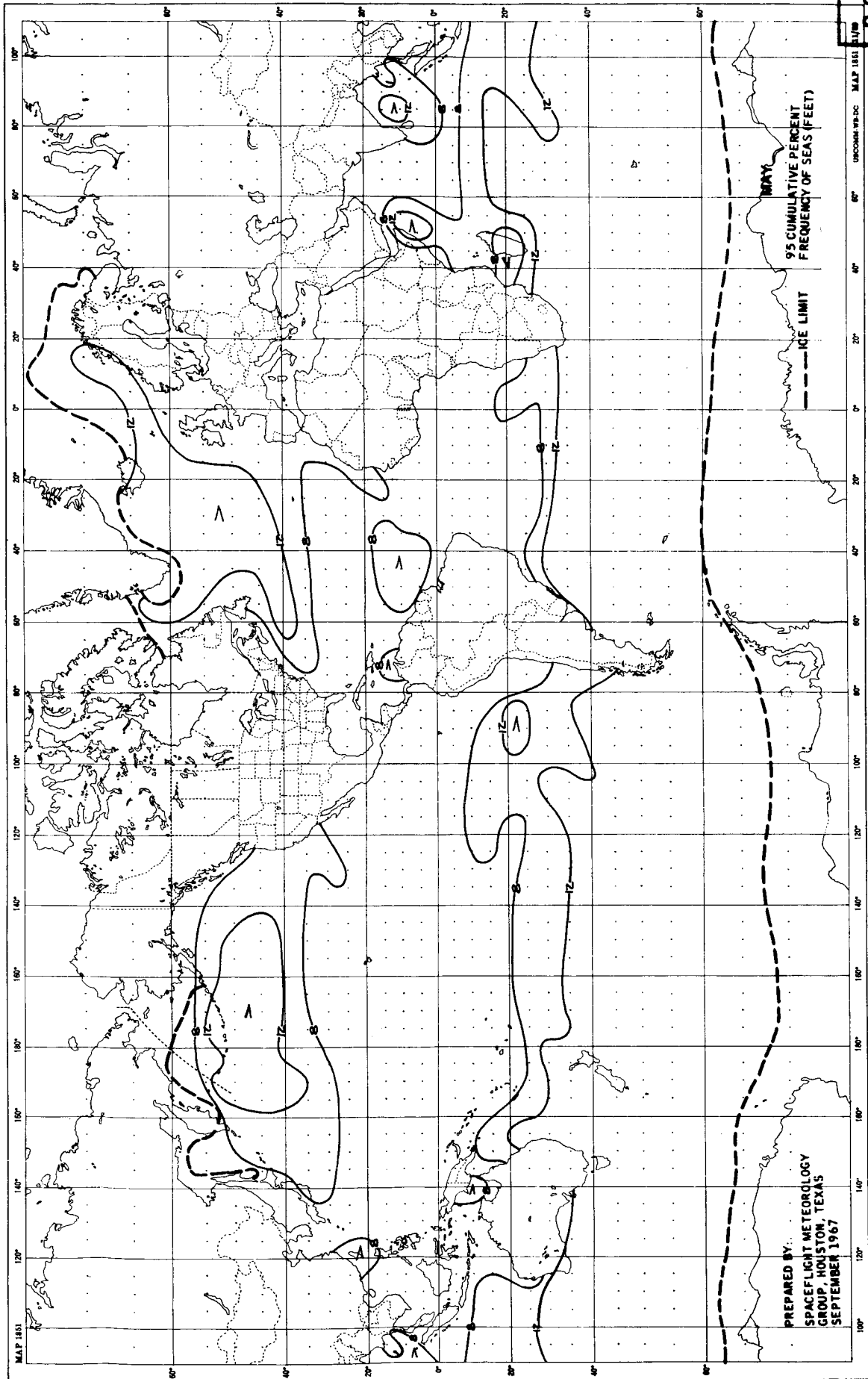


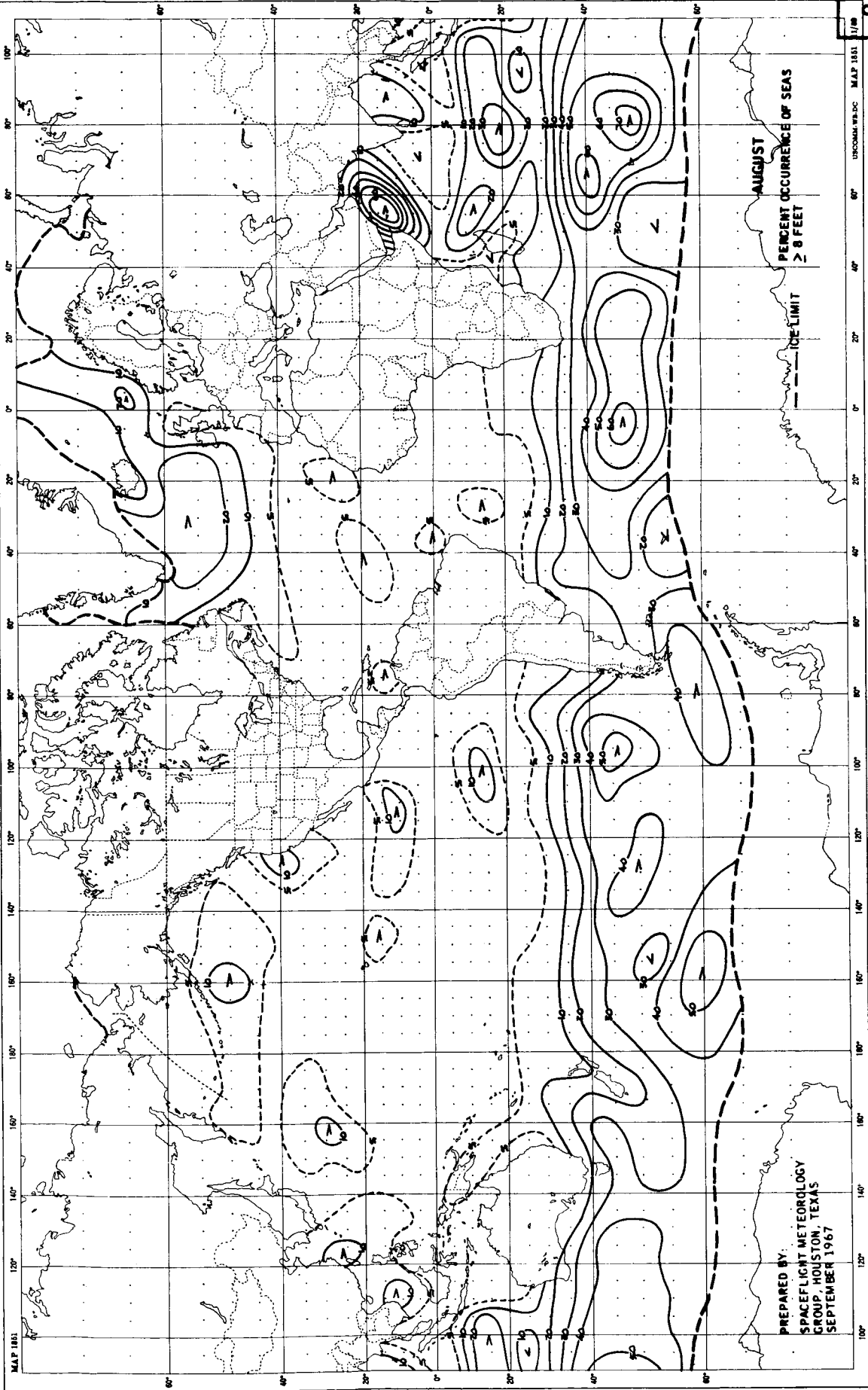




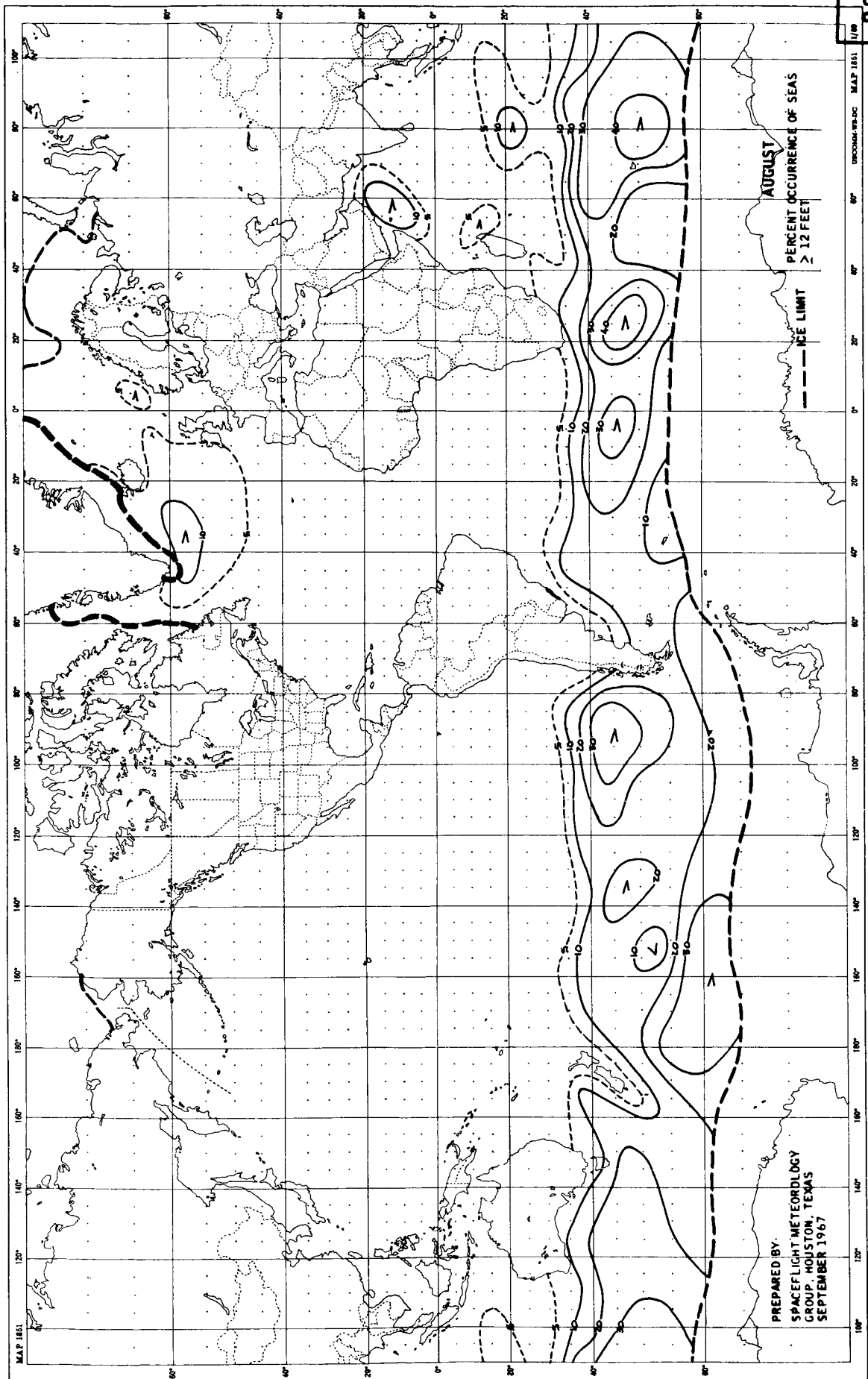


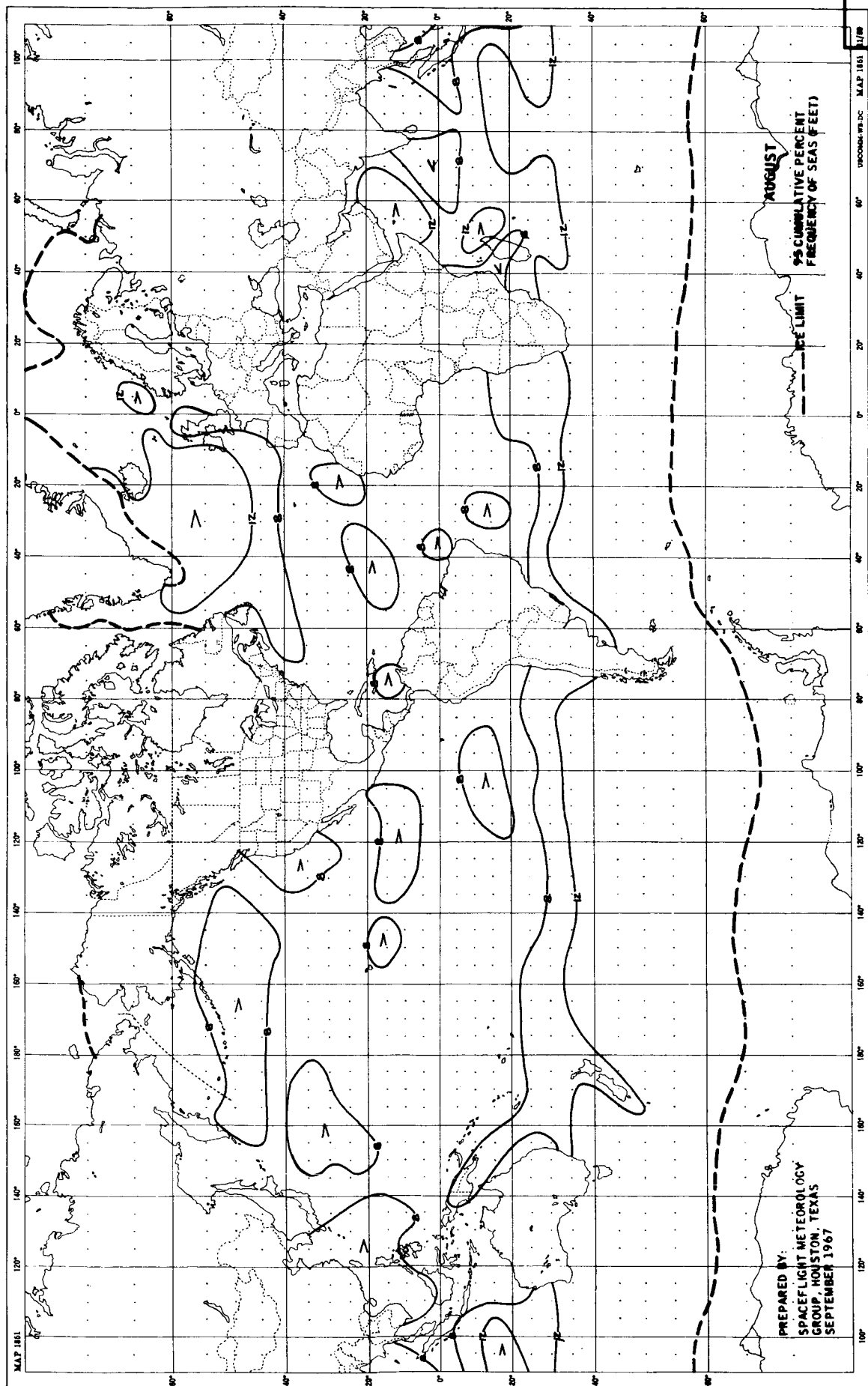


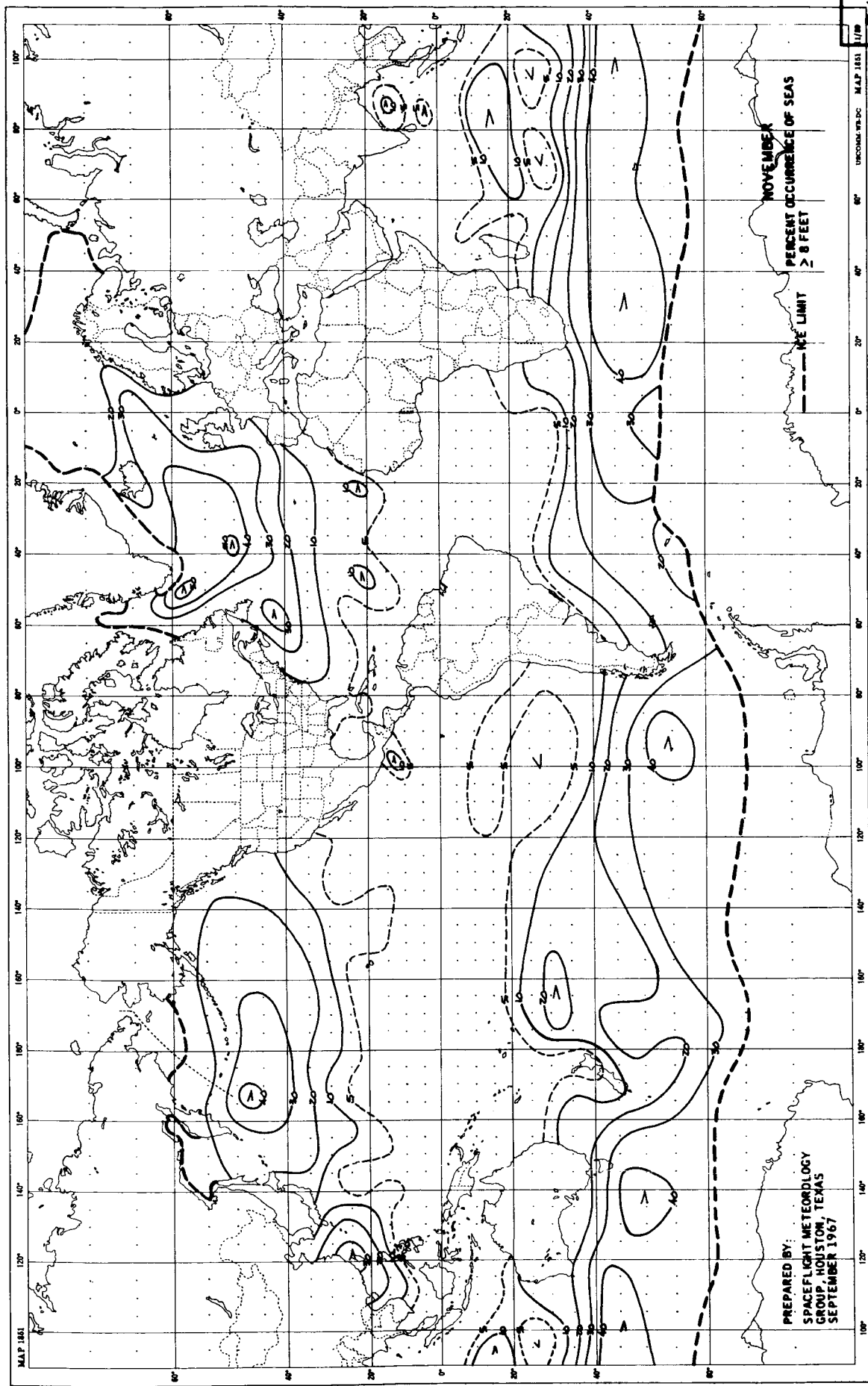




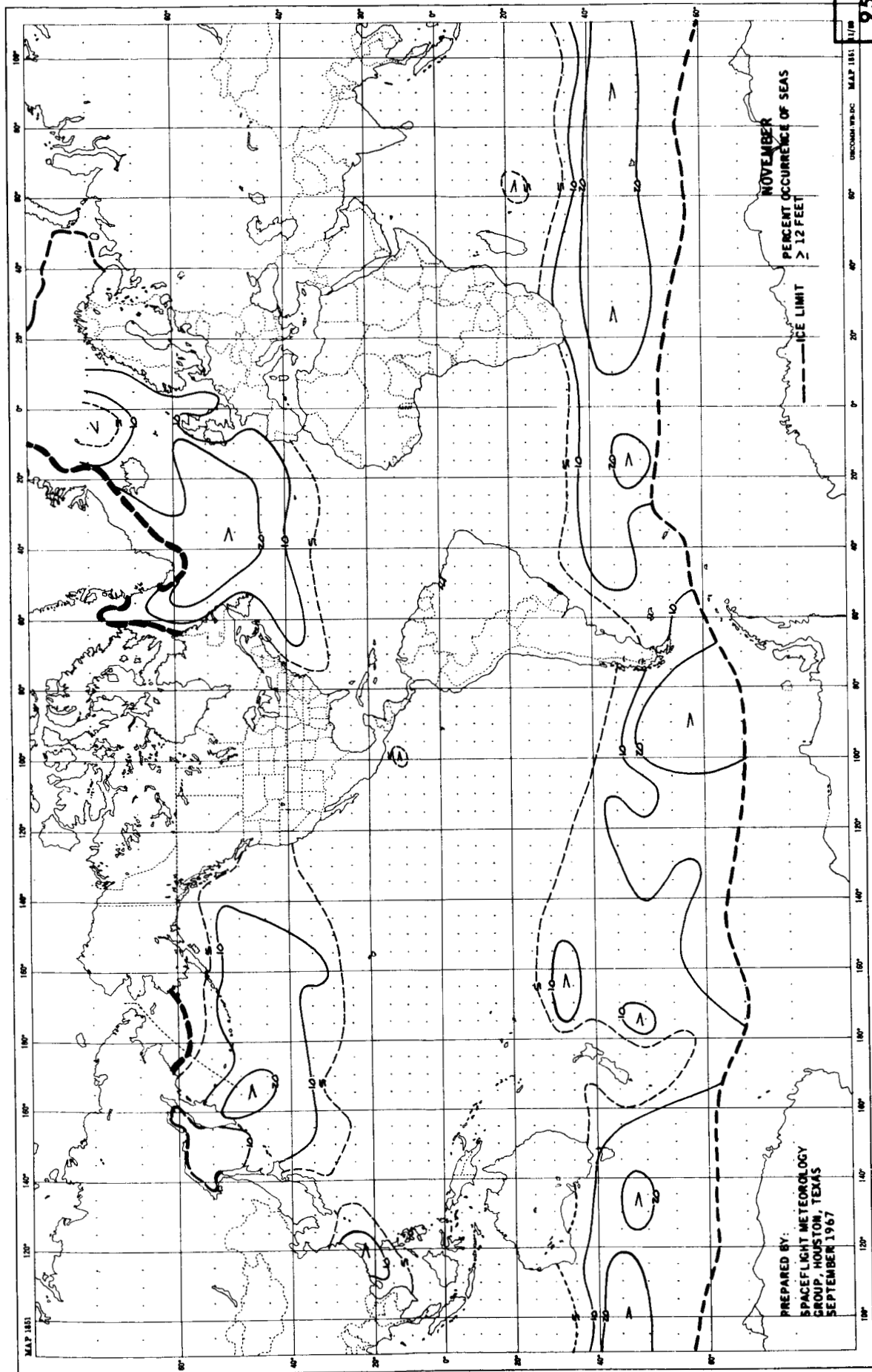
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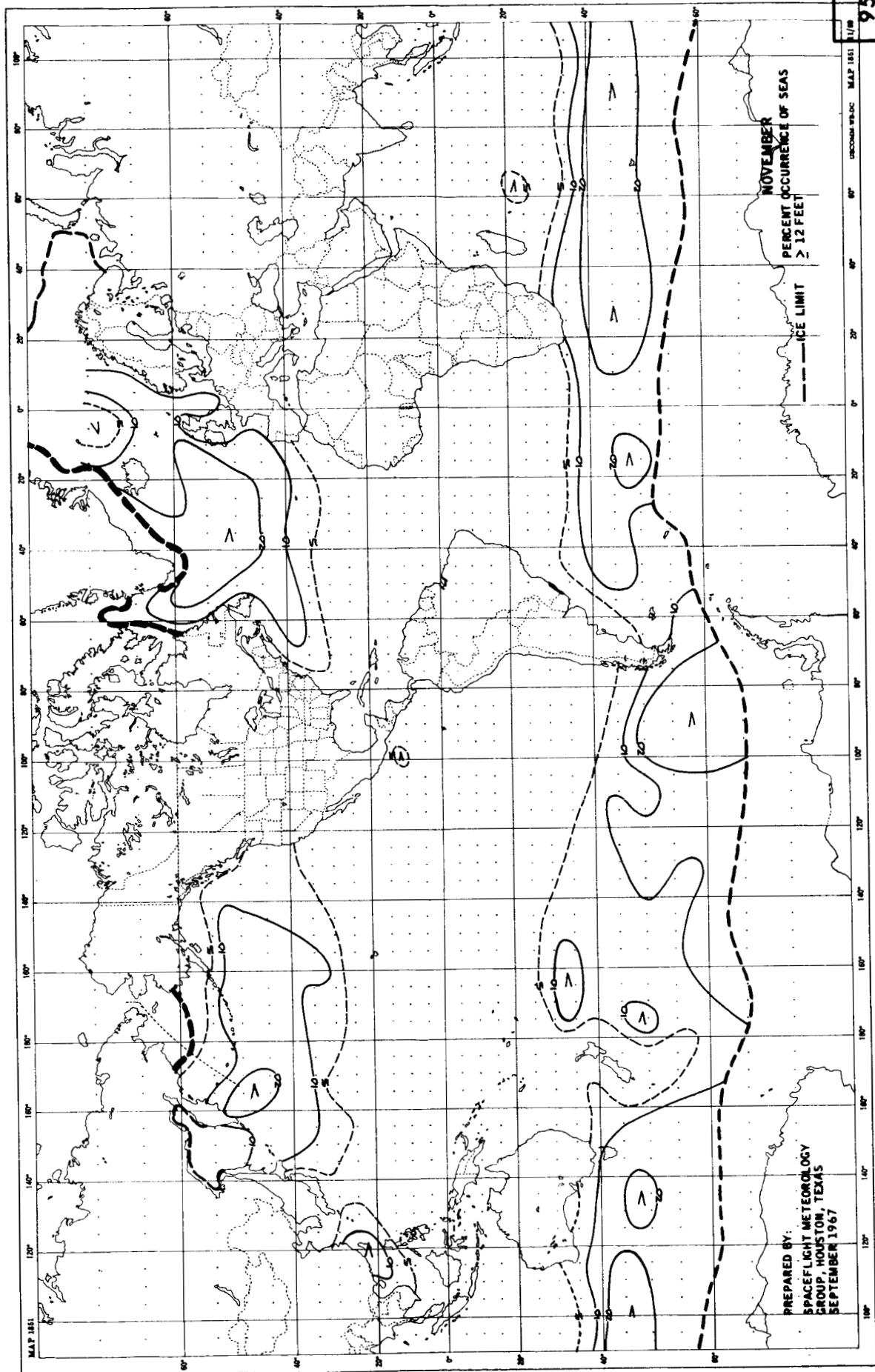


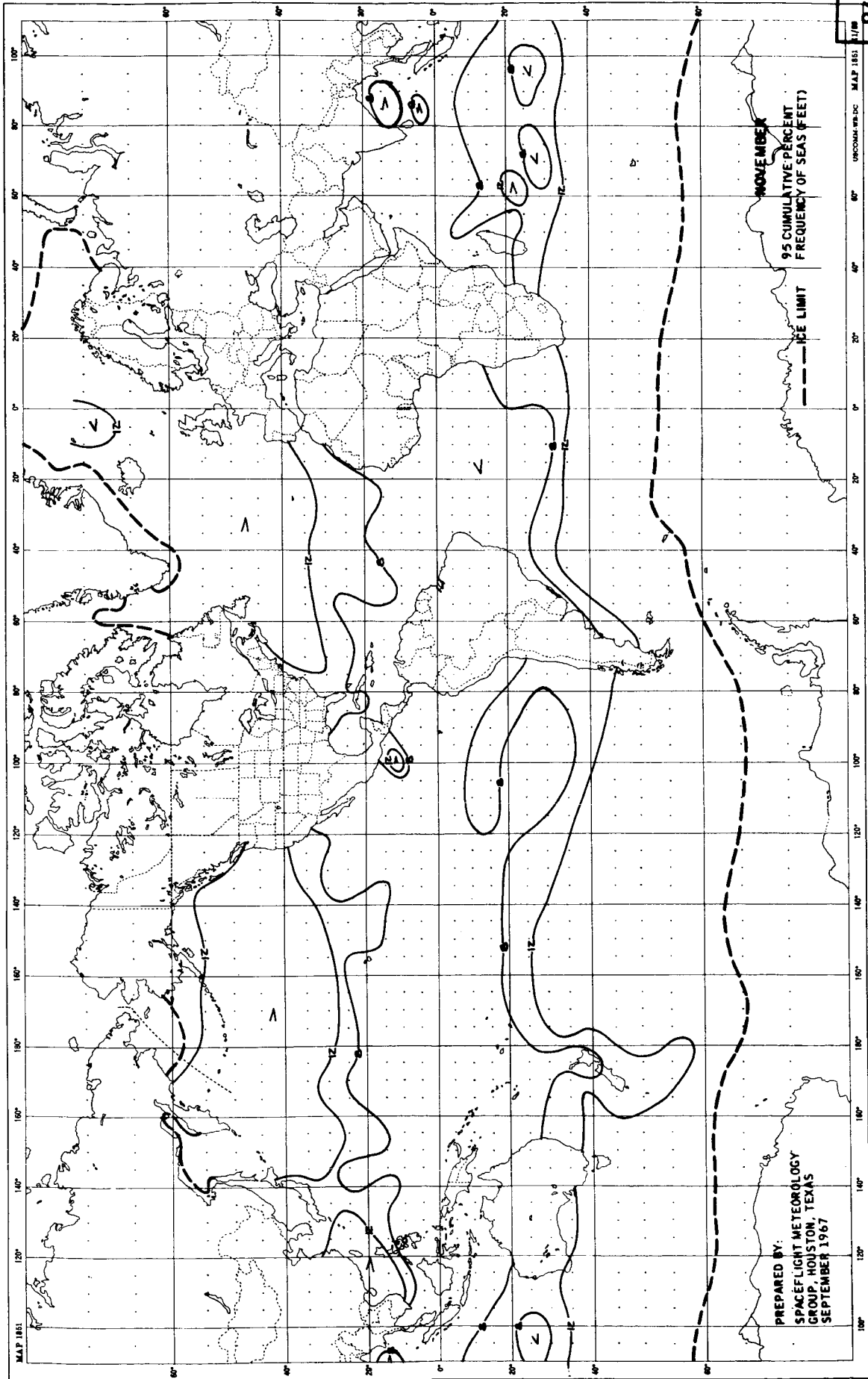


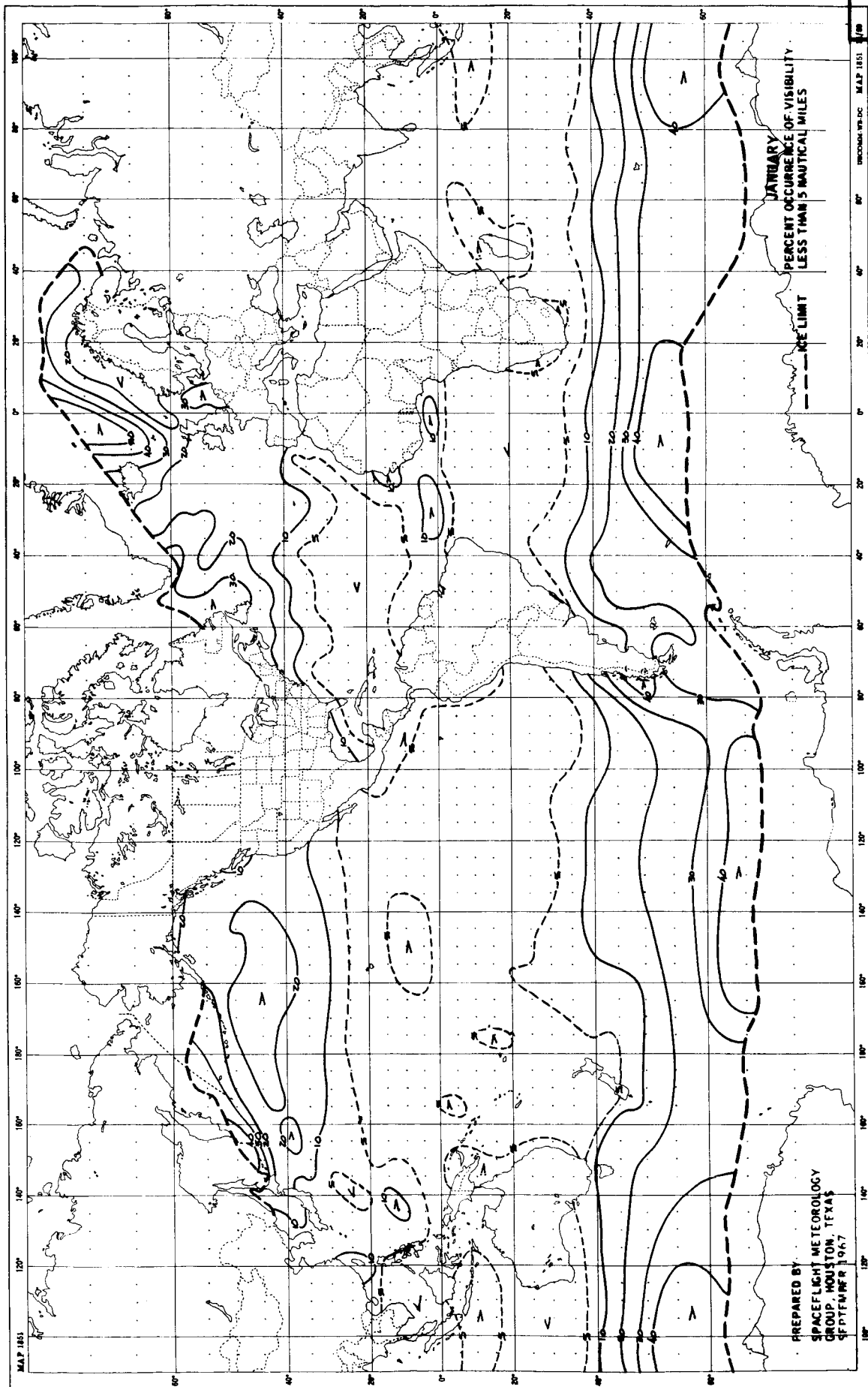


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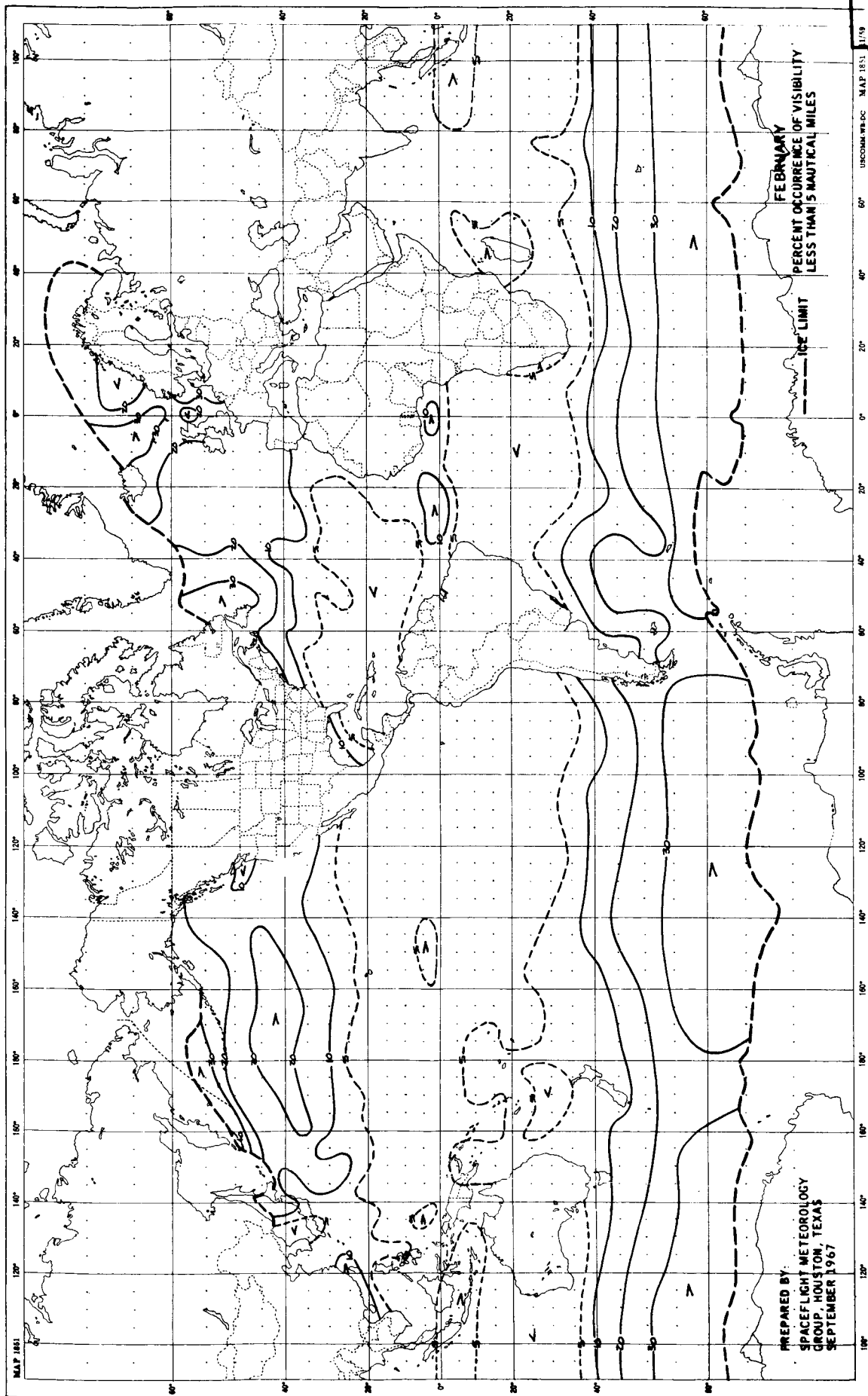


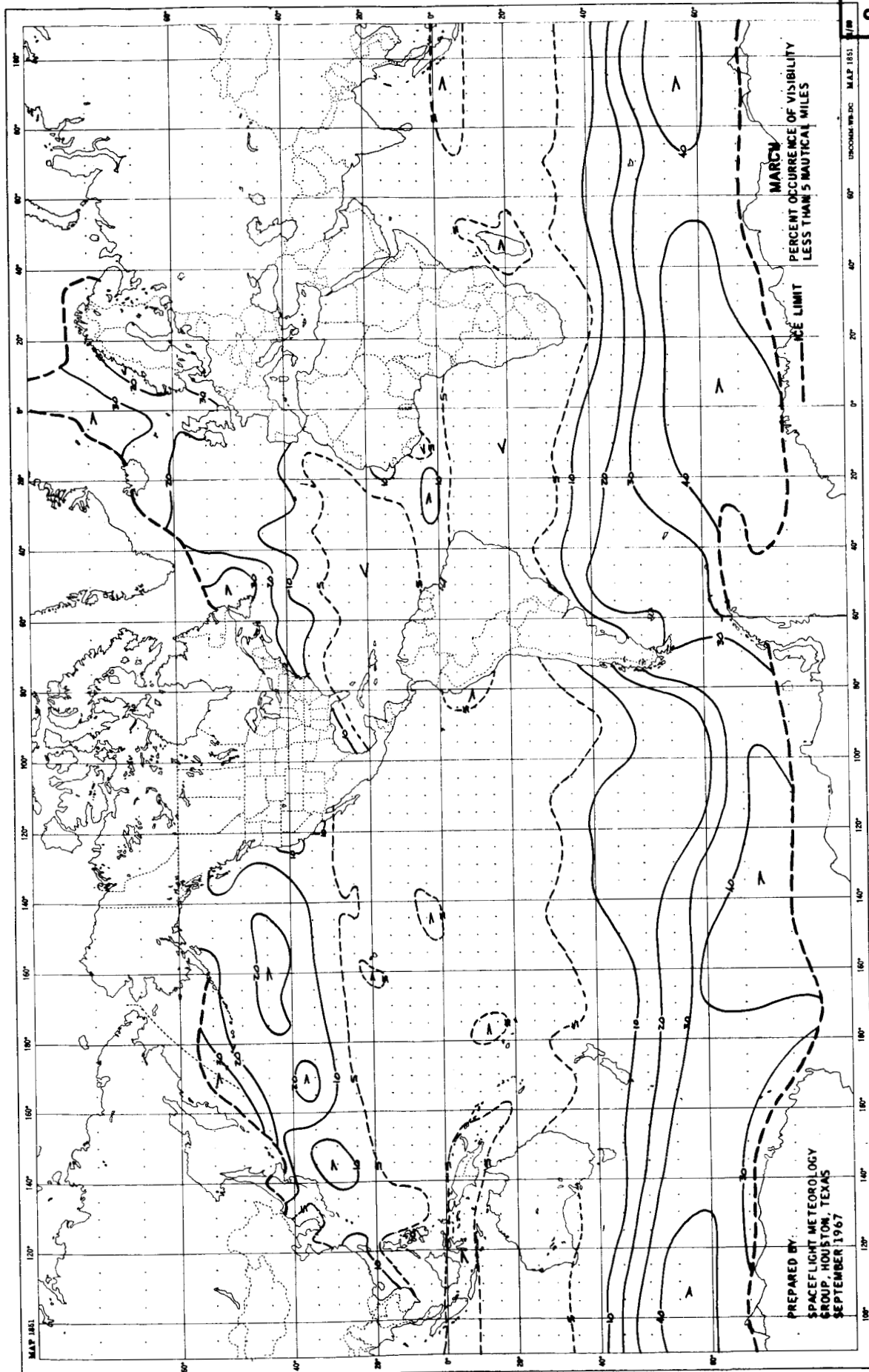


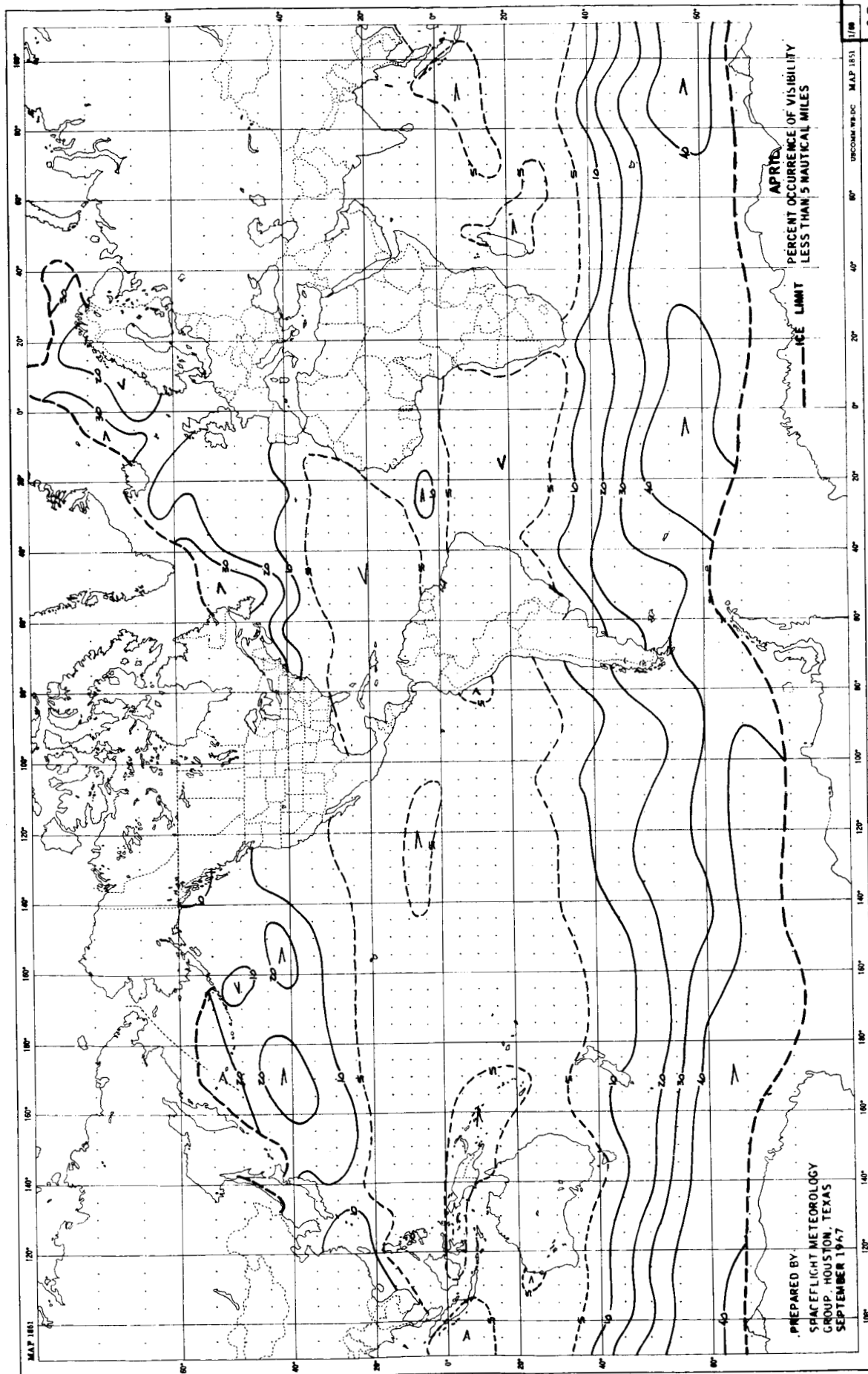


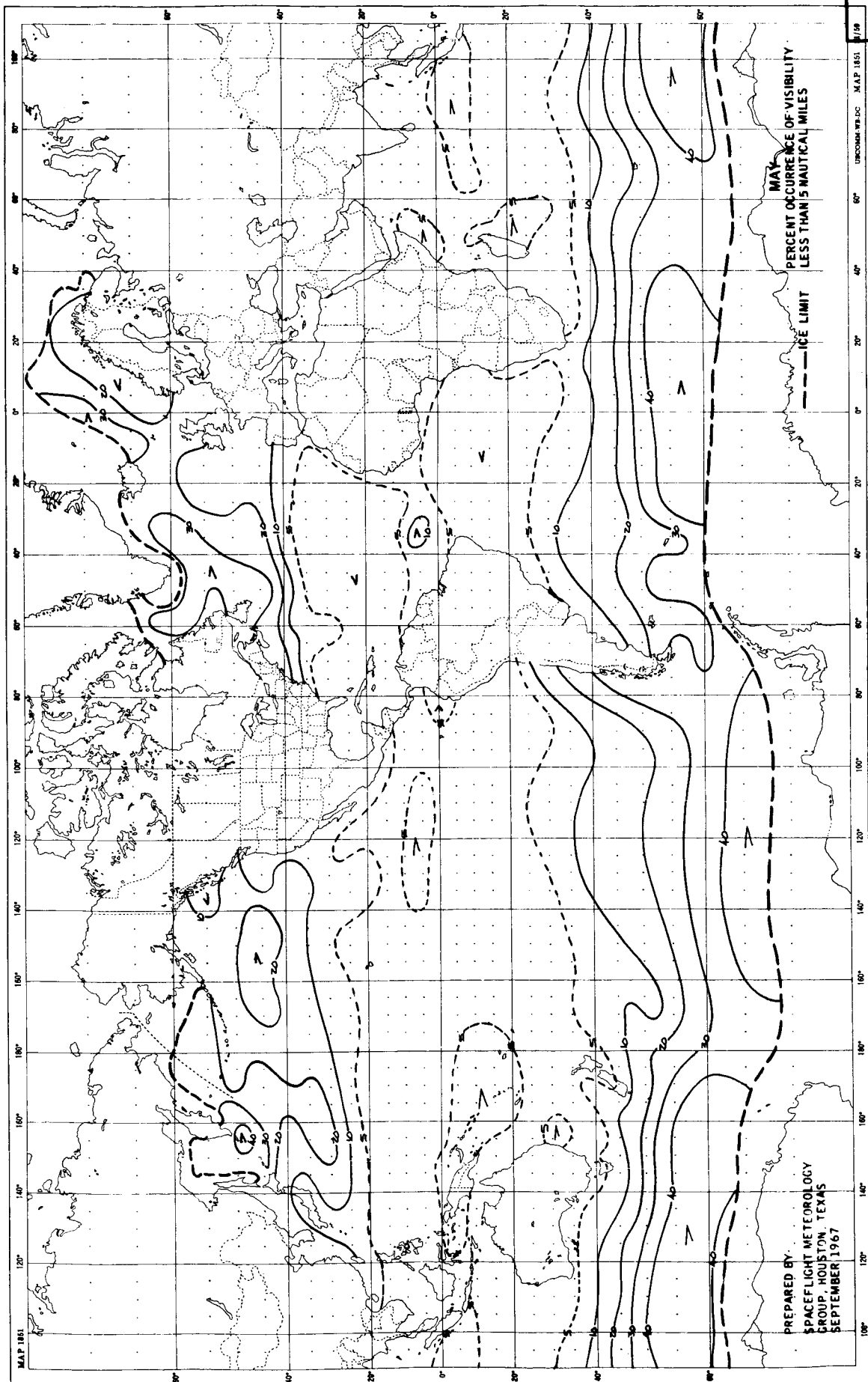


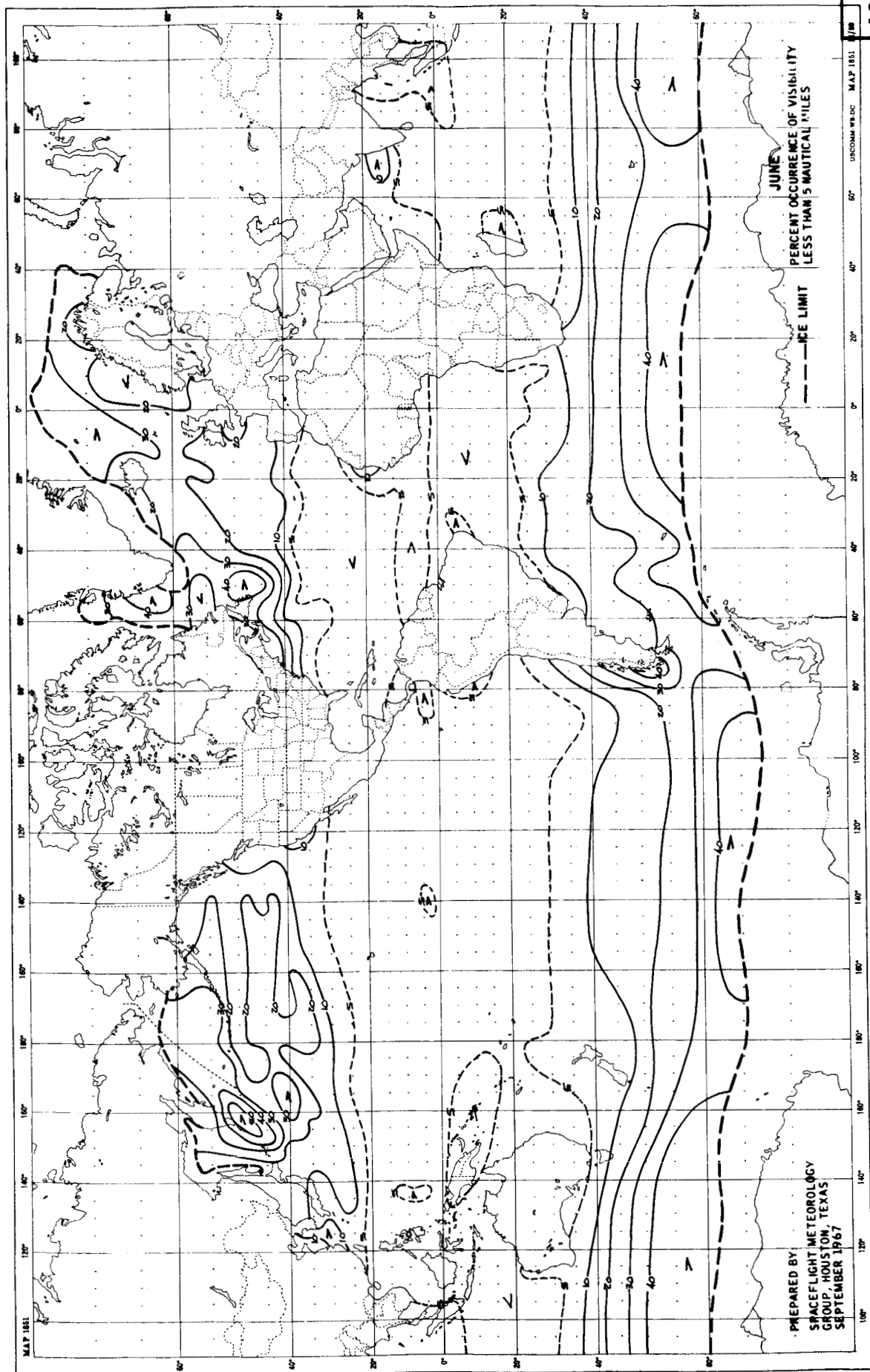
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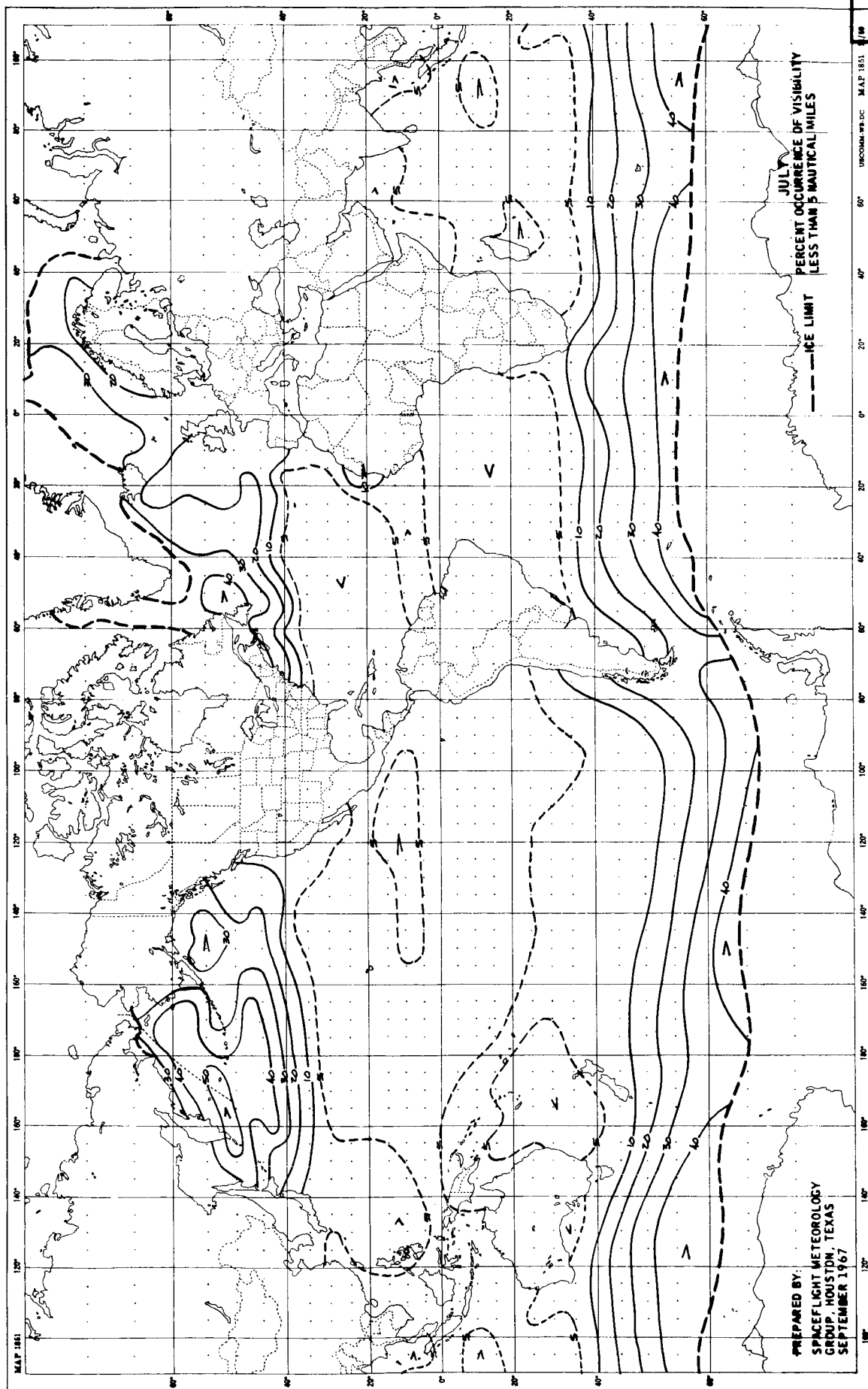


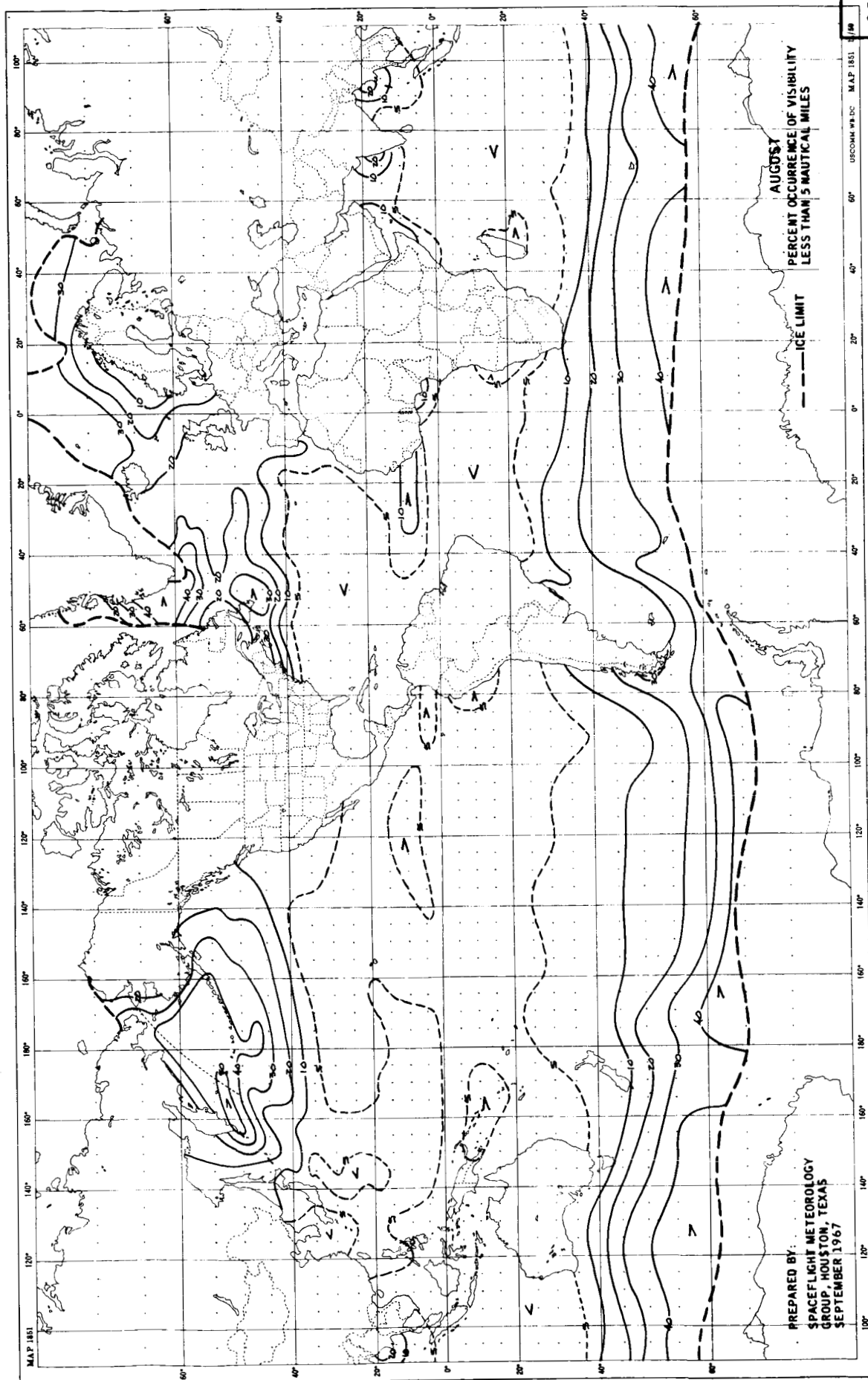




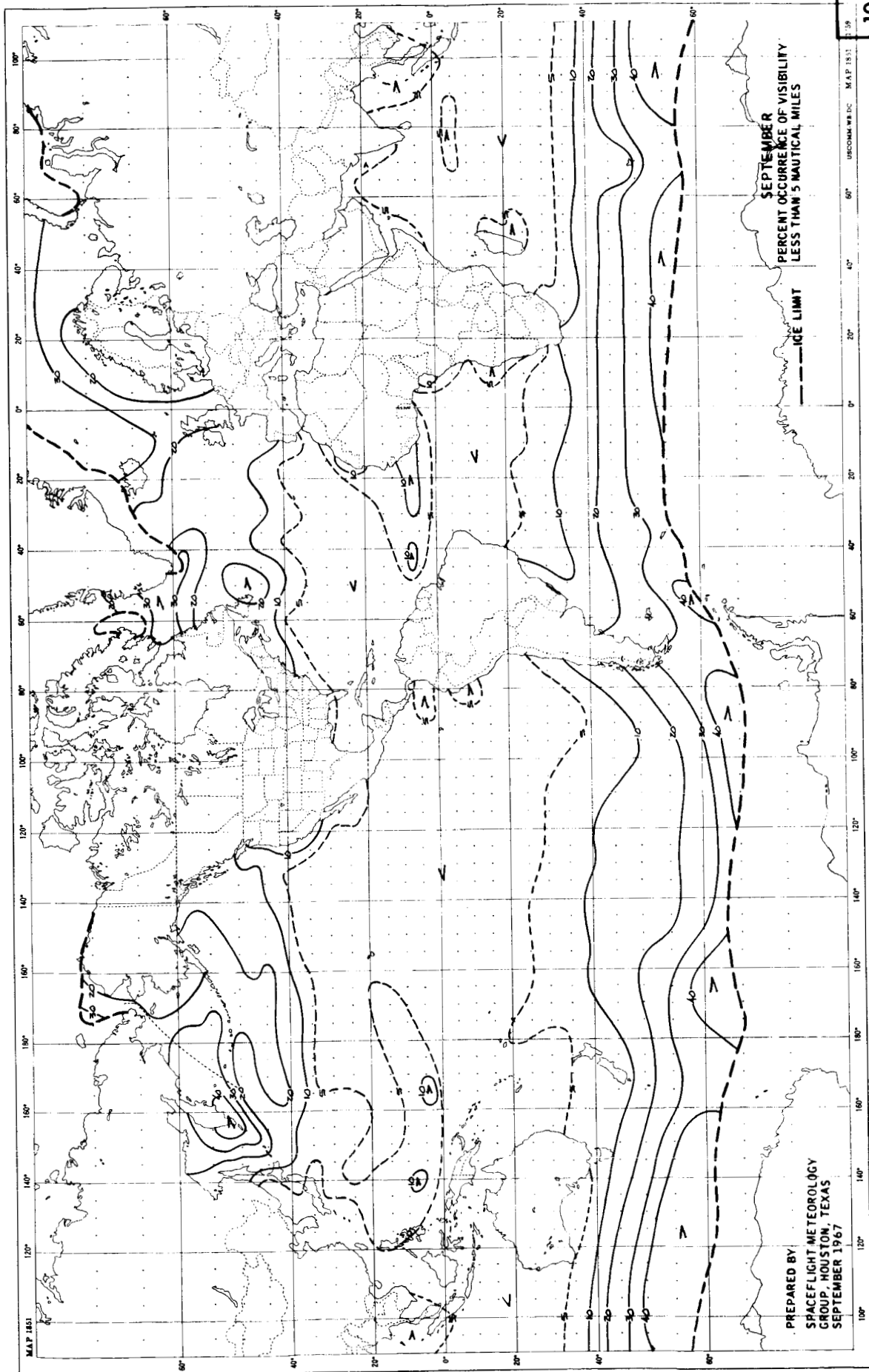


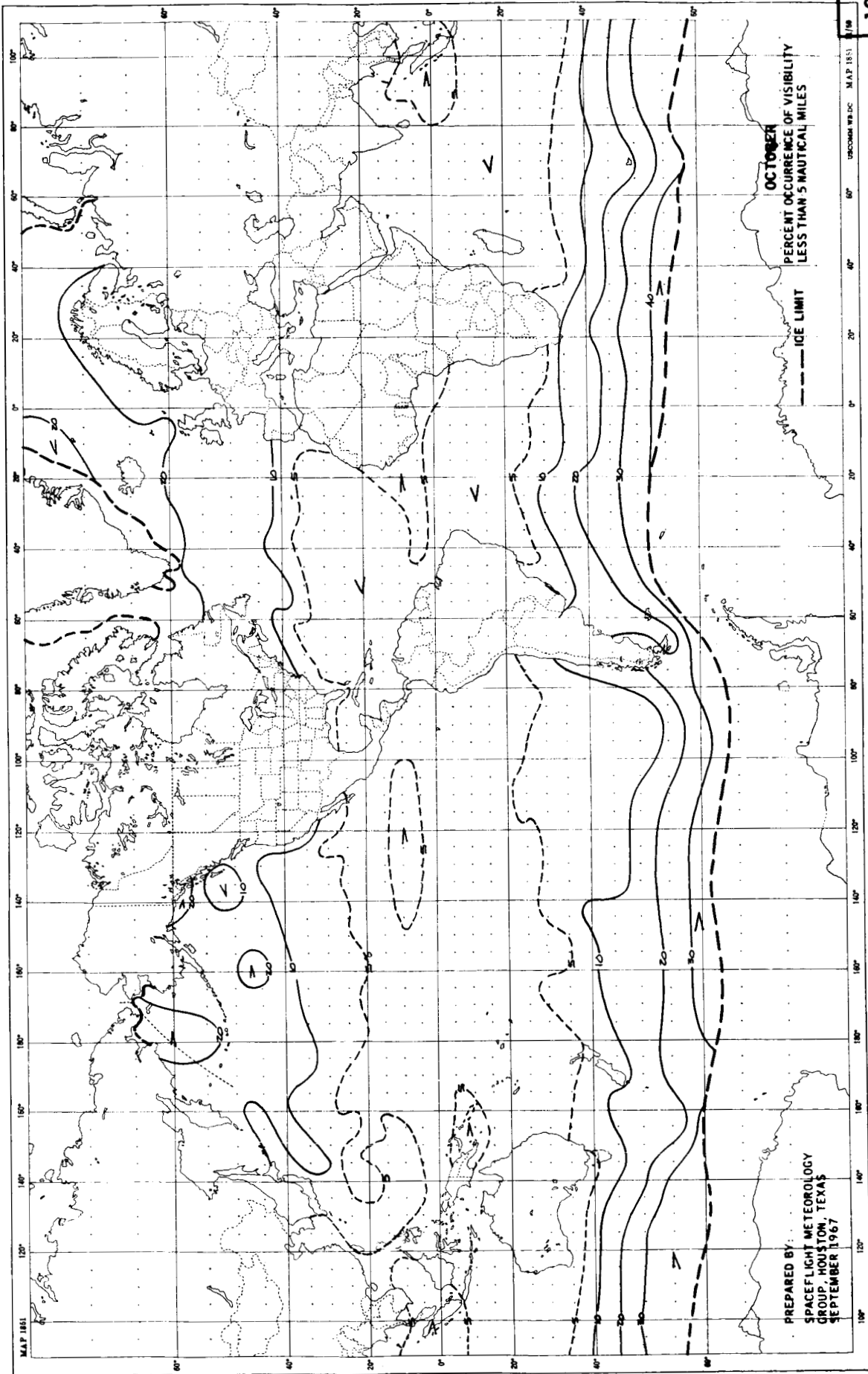


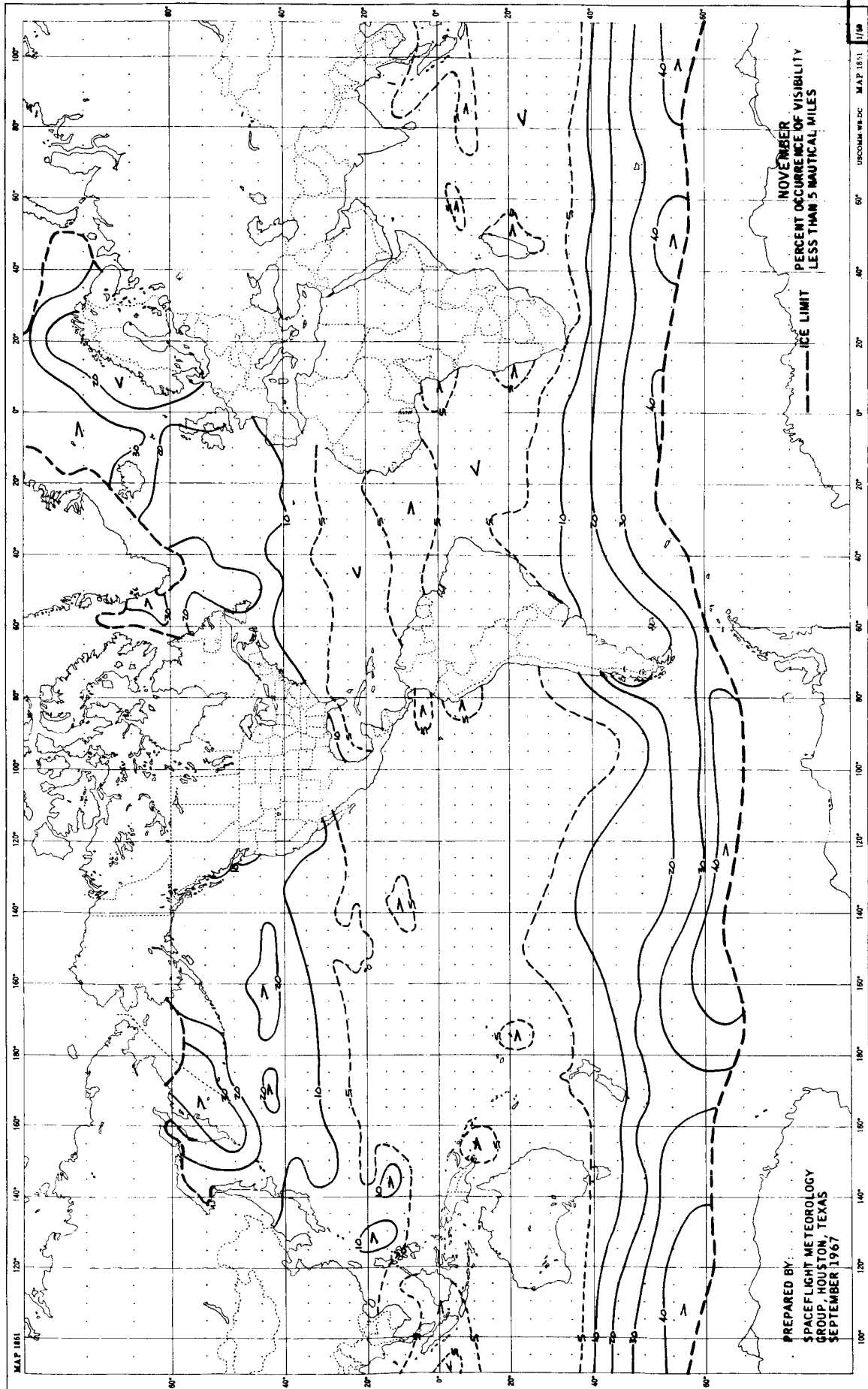


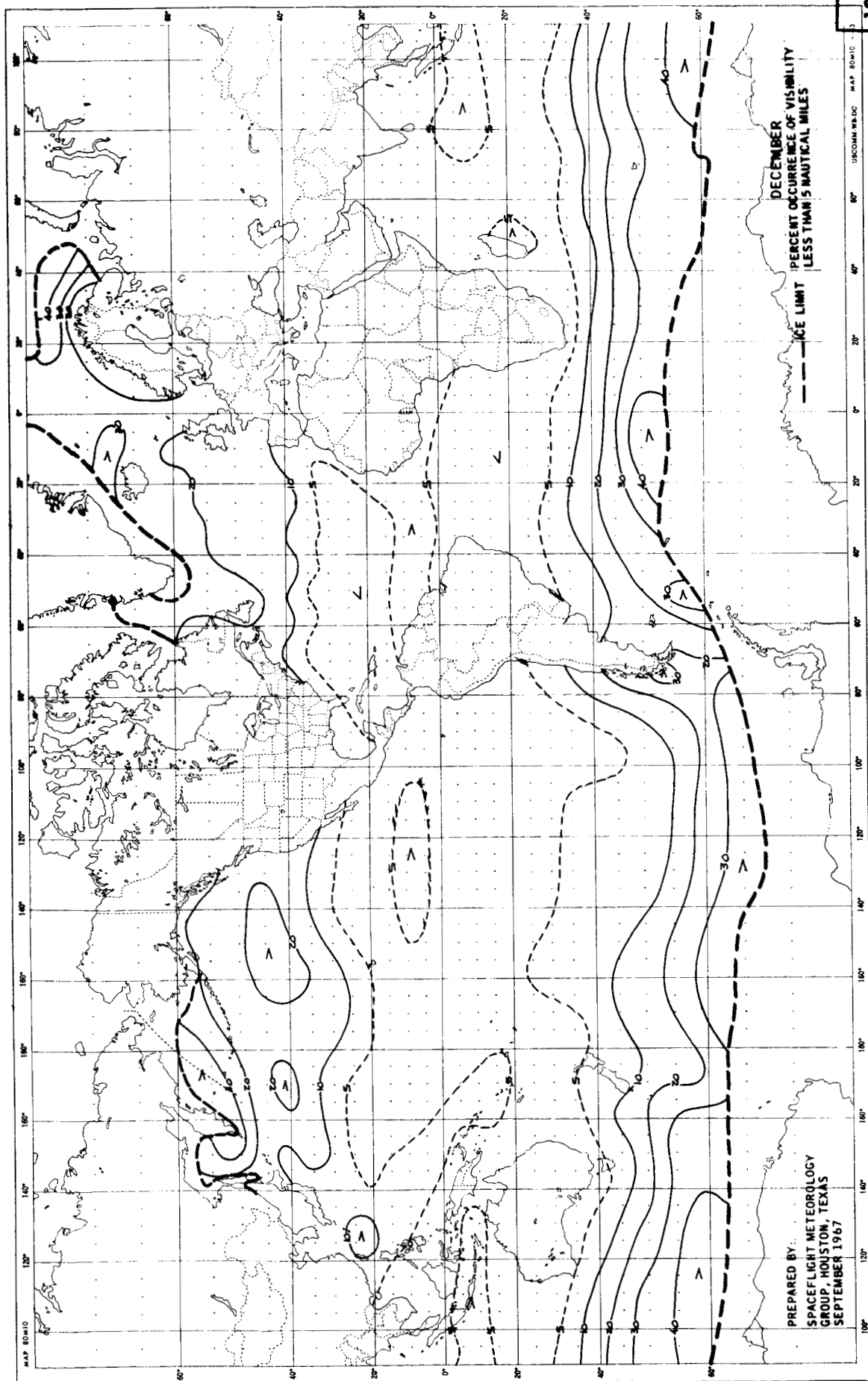


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DECEMBER
PERCENT OCCURRENCE OF VISIBILITY
LESS THAN 1 NAUTICAL MILES

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