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WEATHER BUREAU

WB 9

Weekly Synoptic Analyses, 5-, 2-, and 0.4-Millibar Surfaces for 1966

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ESSA TECHNICAL REPORT WB 9

Weekly Synoptic Analyses 5-, 2-, and 0.4-Millibar Surfaces for 1966

[Based on meteorological rocketsonde and high-level rawinsonde observations]

STAFF, UPPER AIR BRANCH,
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HILLCREST HEIGHTS, MD.
January 1969

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Weekly Synoptic Analyses, 5-, 2-, and 0.4-mb Surfaces for 1966

[Based on meteorological rocketsonde and high-level rawinsonde observations.]

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ABSTRACT

Data from meteorological rocketsonde observations, in addition to high-level rawinsonde observations have been employed to analyze a series of 5-, 2-, and 0.4-mb charts. Methods employed for processing the various types of data as well as the analysis procedure are described.

The broad-scale analyses, primarily covering North America and adjacent ocean areas, are presented at weekly intervals for 1966. A brief discussion of the circulation and temperature patterns in the middle and upper stratosphere, as indicated on the charts, is also given.

INTRODUCTION

This volume represents the third in a continuing publication series of constant-pressure charts for the upper stratosphere, based on rocketsonde and very high level rawinsonde data obtained over North America and adjacent ocean areas and analyzed by the Upper Air Branch of the Weather Bureau's National Meteorological Center. Analyses for the International Years of the Quiet Sun (IQSY, 1964 through 1965), were published (15, 16) as WB-2 and WB-3 in the *ESSA Technical Report* series.

Previous studies (8, 17, 19) demonstrated the feasibility of utilizing data obtained by meteorological rockets (10, 20) to represent the circulation patterns in the upper stratosphere and lower mesosphere (the region from approximately 30 to 60 km). However, the available data permitted the analysis of only occasional samples, which provided at best a limited view of the region.

In recent years, the locations and frequency of rocketsonde observations have increased significantly.

During 1966, rocket data from El Arenosillo, Spain, and Fort Sherman, C.Z., and gun-probe data from Barbados in the West Indies, permitted the analysis area to be enlarged considerably at the higher levels. Although data coverage for the 30- to 60-km layer is still extremely sparse in comparison with that obtained at lower levels by the present-day rawinsonde network, this coverage nevertheless appears to be adequate for preparation of broad-scale quasi-synoptic analyses on at least a weekly basis.

One of the analysis methods previously developed (17) to represent synoptic conditions in the upper stratosphere required a 10-mb chart constructed from rawinsonde data to be used as a base or foundation for application of hydrostatic build-up techniques. However, the increased number of rawinsonde observations obtained by penetrating to the higher levels during the IQSY made it possible to use the 5-mb surface as the base level, beginning in 1964.

The present series of analyses at weekly intervals includes 5-, 2-, and 0.4-mb (approximately 36, 42, and 55 km, respectively) charts nominally representing synoptic conditions on each Wednesday of the analysis period. In addition to a description of the techniques and theory employed in obtaining

these analyzed charts, a brief discussion of large-scale features is also included.

PROCESSING OF RAWINSONDE DATA

The preparation of high-level data for analysis presents many problems. Some of the difficulties encountered in the use of rawinsonde information, such as achieving compatibility between daytime and nighttime observations, extrapolation and interpolation of data, and identification of erroneous reports have been summarized (5, 6) previously.

Temperature and height adjustments designed to compensate for instrumental radiation errors were applied to all 5-mb rawinsonde reports. Initially, an adjustment was made which reduced values from daytime observations to the level of those reported from nighttime observations. The magnitudes of these day-night adjustments, which are intended to account for the effects of solar heating on the rod thermistor, were determined with the aid of a computer program which calculates monthly mean differences between reported daylight and darkness values. Input to this program consisted of all available 5-mb data for 1964 from stations in North America and adjacent ocean areas that employ U.S. outrigger-type radiosonde instruments.

Theoretical and laboratory studies (1, 12) of the rod thermistor used in present-day radiosondes indicate that a significant error may be induced by infrared cooling at stratospheric levels above about 10 mb. Therefore, a second adjustment based on estimates developed by Barr (2) was added to all 5-mb "nighttime" data, including observations made actually in darkness, as well as daytime data that had been adjusted for solar-radiation error. The magnitude of the temperature correction is a function of reported temperature, while the height adjustment varies linearly with the temperature correction.

Rawinsonde data utilized for the 5-mb charts were processed by computer methods. Inputs to the program consisted of observations from North America and adjacent ocean areas for the 7-, 5-, 4-, and 3-mb levels in the form of punched cards obtained from the National Weather Records Center. Output listings included all observations for one week at each station. Data for levels other than 5 mb were also listed in order to supply the analyst with as much supplementary information as possible. Thermal winds and corresponding horizontal temperature gradients were computed for the layers from 7 to 5, 7 to 4, and 5 to 4 mb. In addition, the 5-mb temperature and height adjustment schemes, including calculation of the required solar elevation angles, were incorporated into the system.

PROCESSING OF ROCKETSONDE DATA

Wind and temperature data derived from instruments borne aloft by small meteorological rockets form the basis for analysis of the 2- and 0.4-mb charts and are used together with rawinsonde observations at 5 mb. This information was published (22) in *Meteorological Rocket Network* (MRN) *Firings* , and was made available in the form of magnetic tape for use in computer processing.

The basic steps in the extraction of rocketsonde information and the computation of heights for the 5-, 2-, and 0.4-mb surfaces were as follows:

a. Because analyses are intended to portray synoptic-scale features, wind and temperature profiles were processed by a computer program which reduced the amplitude of rapid oscillations in the vertical using a simple smoothing technique.

b. Temperatures, when published without prior correction, were modified above 40 km in accordance with one of several recent theoretical studies. The Arcasonde 1A (the instrument most widely employed) profiles were given a correction (3) which increases to about 4° C at 50 km and to about 12° C at 60 km. Published temperature data obtained by the Deltasonde generally include a correction (18), and hence were utilized without further adjustment.

c. An initial estimate of the height at a station had to be made before the temperature at a given constant-pressure surface could be selected. This estimate was obtained by deriving the temporal trend of the height field from the lower-level analyzed charts and applying this trend to the height field of the previously analyzed upper-level charts. The selected temperature value was then utilized together with that derived from the previously completed lower-level analysis for the computation of a layer-mean temperature.

d. Heights at the upper surface for each station reporting temperature were computed hydrostatically with the aid of the mean temperature obtained as described above.

e. Wind components were extracted from the smoothed profiles at the height of the constant-pressure surface, and a resultant wind was computed.

f. Thermal winds were determined for 6-km layers surrounding each pressure surface at the reporting station.

ANALYSIS PROCEDURE

Conventional techniques, including differential analysis methods, were utilized to construct the 5-,

2-, and 0.4-mb charts. However, because of the sparsity of observations, data acquired for the entire week were scrutinized to determine conditions pertaining to Wednesday of each week. The Station Model Chart illustrates the way in which reported winds and temperatures on days closest to map time are plotted. The analysis system consisted of the following steps:

a. Isotherms were derived with the aid of processed temperatures and the computed thermal winds. Where possible, time-height sections of temperature were plotted as a further aid in deriving the isotherms.

b. A mean temperature field within the layer between the previously analyzed lower surface and the selected surface was derived graphically. This mean field represents a geopotential thickness which, when added to the lower-level height field, yields a smooth, conservative first approximation to the contour pattern at the upper surface. Daily 10-mb charts analyzed by a computerized system (4, 5) were employed for the build-up to 5-mb.

c. Reported winds and computed heights for individual stations were used to adjust the first approximation of the contour field. Winds were accorded the highest priority for this adjustment.

d. The analysis was checked for vertical and temporal consistency. For example, centers of systems, ridges, and troughs were examined with all available data to verify vertical slope and movement with time. Time-height sections and height-change charts were especially useful for these purposes.

The above procedures appear to produce excellent results at 5 mb and were successfully applied to obtain the 2- and 0.4-mb charts. Generally, only slight adjustments of the first-approximation height fields were necessary at the 5- and 2-mb levels. However, rather formidable analysis problems were evident at the 0.4-mb level. Foremost among these was the sparsity of observations. The area of analysis presented in the charts at the higher levels has thus been reduced in accordance with the available data. Another difficulty was the apparent occurrence of large day-to-day temperature changes, at times exceeding 10° C, and rapid oscillations within many wind profiles. In some cases, deviations of reported temperatures and winds from the fields derived by differential analysis techniques could be accounted for by obvious changes. Occasionally, it was impossible to make a reasonable reconciliation of station values with the values determined by differential analysis.

A further analysis problem arises from the apparent intersection of the stratopause with the 0.4-mb level. Because the normal stratospheric temperature inversion ceases at the stratopause level, the graphical method for obtaining mean temperature, which depends on the existence of a linear profile, is no longer valid. Thus, especially at lower latitudes, adjustments must be made in the computed heights.

In the course of analysis of summertime charts, an additional problem became apparent. During that season, the circulation at the upper surfaces (2 and 0.4 mb) would be expected to follow the pattern established for lower levels, that is, a rather uniform easterly flow about an anticyclone centered at or very near the North Pole. However, on a typical summertime 0.4-mb chart, the majority of the reported rocketsonde winds exhibit significant southerly components. If these winds were to be given full weight in the analysis, the resulting pattern would consist of contours oriented from southeast to northwest, spiraling toward a high center located, apparently, over northern Europe.

The prevalence of positive meridional components in summertime rocketsonde winds has been noted previously (11). Recent studies (13, 14) utilizing MRN data for several summers have demonstrated that the meridional wind component due to the diurnal tide reaches maximum southerly strength at about noon, local time. Since most MRN firings occur near noon, the measured winds naturally contain this component. The adjustment to compensate for the effects of the diurnal variation is therefore most noticeable on the summertime charts.

Although careful consideration of high-level data allows a broad-scale depiction of circulation patterns up to 0.4 mb, the sparsity of reports requires an increasing amount of subjectivity as the analysis proceeds to this high level. As yet, the analyst has little in the way of synoptic models for guidance with respect to the probable contour and isotherm patterns and the phase relationship between these patterns in areas of sparse data. In spite of these factors, surprisingly little alteration in the principal features of the circulation and temperature distribution shown in the final analysis can be made without inordinately violating some of the data. Even so, the same degree of accuracy that is found customarily in the analysis of charts at lower levels should not be expected in these maps. In general, the values with which contours and isotherms are labeled and the spacing between these values are only approximations.

It was not convenient to use the same contour interval throughout the year. During the winter months, the intense westerlies necessitated the use of 320-geopotential meter (gpm) contour intervals, but a 160-gpm contour interval was sufficient to depict the more moderate easterlies during the summer. In addition, intermediate dashed contours were used to outline areas of relatively weak

gradient, especially during the spring and fall changeover periods. The changes in contour interval, as indicated by a legend in the lower right-hand corner of each chart, show variations in intensity of circulation from season to season and from one level to another. Isotherms were drawn and labeled at 5° C intervals at all levels throughout the year.

DISCUSSION OF THE 1966 CHARTS

The middle and upper stratospheric circulation in January 1966 was dominated by a cold polar cyclone. Westerly winds were observed over most of the map area, with maximum winds reported at the highest analyzed level and in middle latitudes just north of the subtropical ridge in the Caribbean. A westerly jet was also formed at high latitudes, north of the anticyclonic circulation in the Aleutians.

During the second week in January, the temperature at 5 mb increased in the Caribbean with a corresponding rise in anticyclonic activity. This warming trend continued, and a week later the subtropical ridge at 2 mb intensified. A pronounced warm area could be seen at 5 mb on January 26 over Europe; by the following week, the same region showed temperatures above 0° C, with the strongly developed subtropical ridge sloping northward toward this warm area at the higher levels. The Aleutian anticyclone also intensified and moved eastward, as indicated by the strong northerly winds at Ft. Greely, Alaska, on February 2. The 0.4-mb map for February 9, however, showed a striking change in circulation intensity from the previous week, and the sequence of observations illustrates the rapid movement and eventual breakdown of the subtropical ridge.

The warm air at 5 mb moved northward, spreading over the polar region and reversing the normal wintertime temperature gradient. At the highest level, however, the circulation had begun to return toward normal, with only Alaska under the influence of anticyclonic flow and with westerly winds over most of the analysis area. At 5 mb, the Aleutian anticyclone continued moving northward and by March 2 was located over the North Pole. During this period, the polar cyclone split, with one center located over northeastern Canada and with another, more elongated center located over Europe. The synoptic developments during this late winter period are extremely interesting (9, 21) and merit further study.

In the second week of March, the anticyclone dissipated and the weakened low returned to the polar area. The subtropical ridge became zonally oriented, with very little anticyclonic activity at high latitudes. At the highest level, the thermal pattern continued in a disturbed state, but with very small gradients from low to high latitudes.

The initiation of the final springtime circulation change could be seen during the first week in April. The polar vortex elongated in conjunction with movement of a ridge originating in southern Asia. This anticyclone quickly became established as a closed circulation in polar regions and intensified as the cold zonal trough moved southward. Thus, westerlies became weaker throughout April and easterlies were gradually established at lower latitudes and altitudes.

During the equinoxes, the very weak height gradients were evidenced by often complex circulation regimes. On May 4, for instance, four separate zonally oriented systems are needed apparently to account for the alternating bands of westerlies and easterlies between low and high latitudes at 0.4 mb. The mid-latitude trough dissipated the following week, and thereafter the low-latitude trough retreated equatorward as easterly flow became predominant throughout the Northern Hemisphere. The mid-latitude troughs associated with the westerlies did not disappear at 2 and 5 mb until 1 to 2 weeks after their disappearance at 0.4 mb. This corresponds to the observation, based on single-station time sections, that the easterlies during the summertime descend from high to low altitudes at approximately 1 km per day.

The warm polar anticyclone intensified during May and June, reached peak intensity in mid-July, and thereafter diminished in strength. The strongest easterly winds were reported at mid-latitude stations.

In August, the temperature gradients gradually weakened and indications of cyclonic activity could be seen first at both the lowest level at high latitudes and the highest level at low latitudes. At 5 mb, a cyclonic center had developed west of Greenland by August 24. This cyclone cooled and deepened rapidly as it moved over the North Pole. The anticyclonic circulation retreated slowly southward and reached low latitudes by late October.

At the upper levels, however, a more complex pattern of changeover from easterlies to westerlies could be seen, especially at low latitudes. Small-scale systems appeared on September 21, indicating that westerlies occurred at Panama earlier than at mid-latitudes. This is accounted for by a northward tilt of a trough which could be seen on the August 21 and September 7 maps. The low-latitude ridge disappeared at 0.4 mb by September 21, leaving the entire map area dominated by westerly winds.

In October, the polar vortex continued to expand and intensify, but the subtropical ridge at the 5-mb

level remained relatively stationary at about 20° N. This ridge line sloped southward with height so that it did not appear within the map analysis area at 0.4 mb.

In November a significant event took place. On November 2, the charts showed only slight suggestions of some anticyclonic activity in the Aleutians. During the next several weeks, there was an eastward movement of this weak anticyclone, but it was accompanied by temperatures only slightly warmer than usual. Pulses of anticyclonic activity occurred over northwestern North America, and as anticyclonic activity became greater, the polar vortex migrated from its normal position on the Eurasian side of the North Pole to a mid-Asia position. During this period, the trough over the United States penetrated farther south than usual and consequently the low-latitude ridge had less zonal orientation. At the 5-mb level, the fluctuations and movements of the Aleutian anticyclone are quite well defined. However, at the higher levels these fluctuations and movements were more difficult to trace because of the lack of data at these levels over the area south of Ft. Greely, Alaska, and Ft. Churchill, Canada, in the northwestern conterminous United States.

The large-scale changes that occurred during 1966 at five chosen rocket launching sites may be seen in the time sections (figs. 1-5) of analyzed height and temperature values extracted from the weekly charts. The annual range and variability of values were greatest at the high-latitude stations and decreased at lower latitudes (7). Changes associated with the major synoptic events were also most pronounced at the high-latitude stations. Especially noteworthy are the events that occurred in February, November, and December. [This section prepared by Melvyn E. Gelman.]

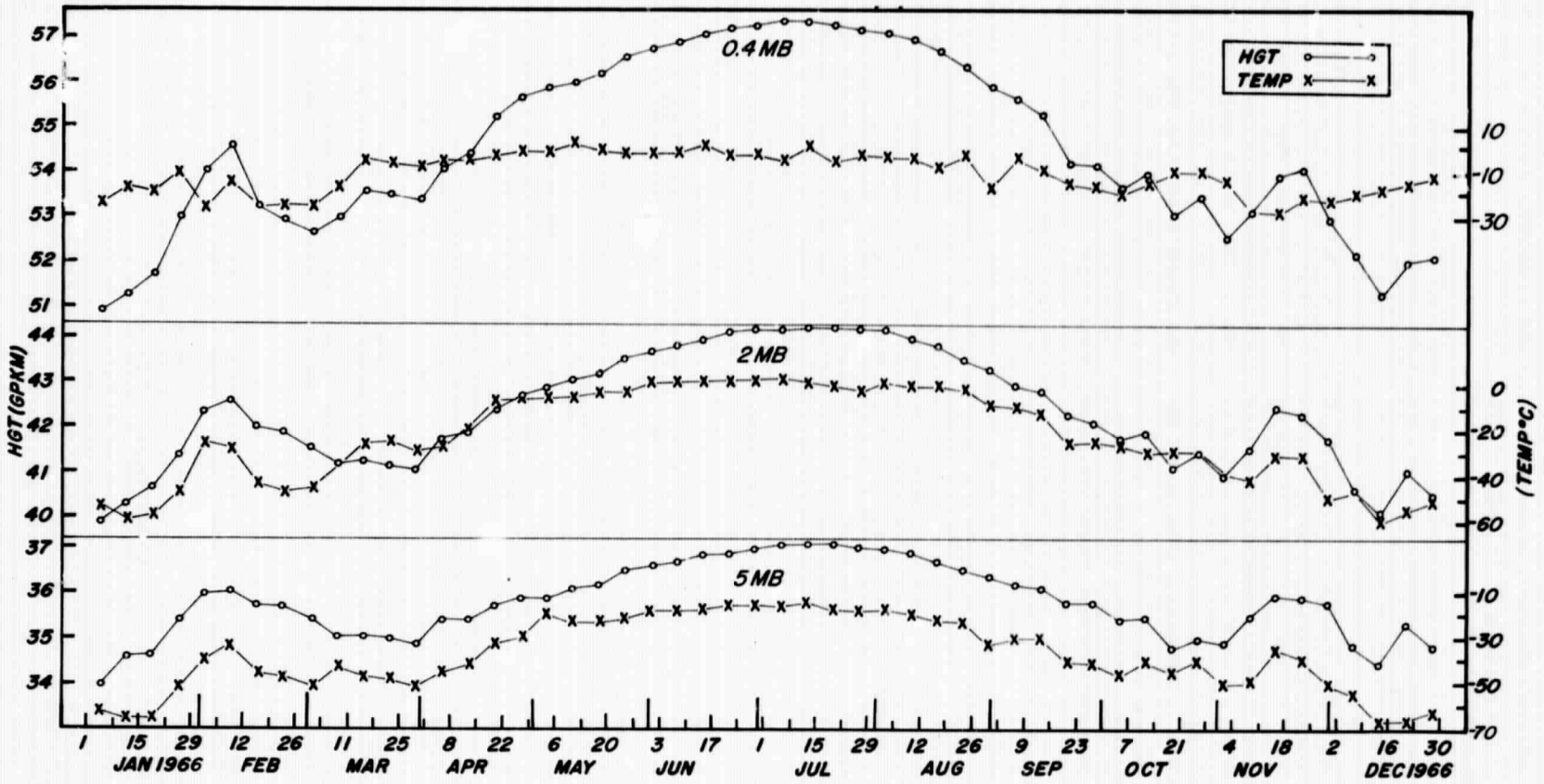


FIGURE 1. — Fort Greely, Alaska (64°00'N., 145°44'W.), analyzed values extracted from weekly 5-, 2-, and 0.4-mb charts.

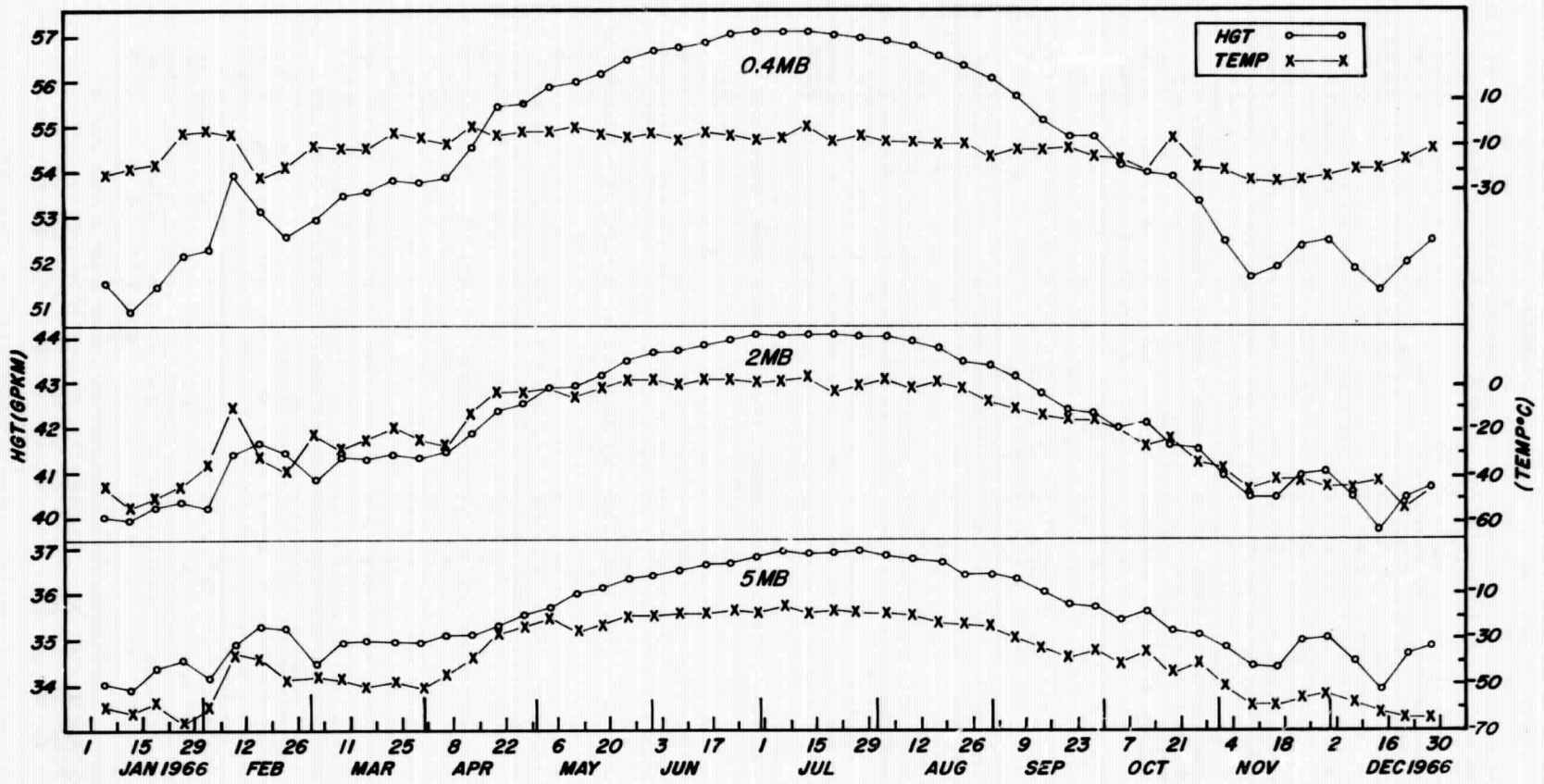


FIGURE 2. — Fort Churchill, Canada (58°44′N., 93°49′W.), analyzed values extracted from weekly 5-, 2-, and 0.4-mb charts.

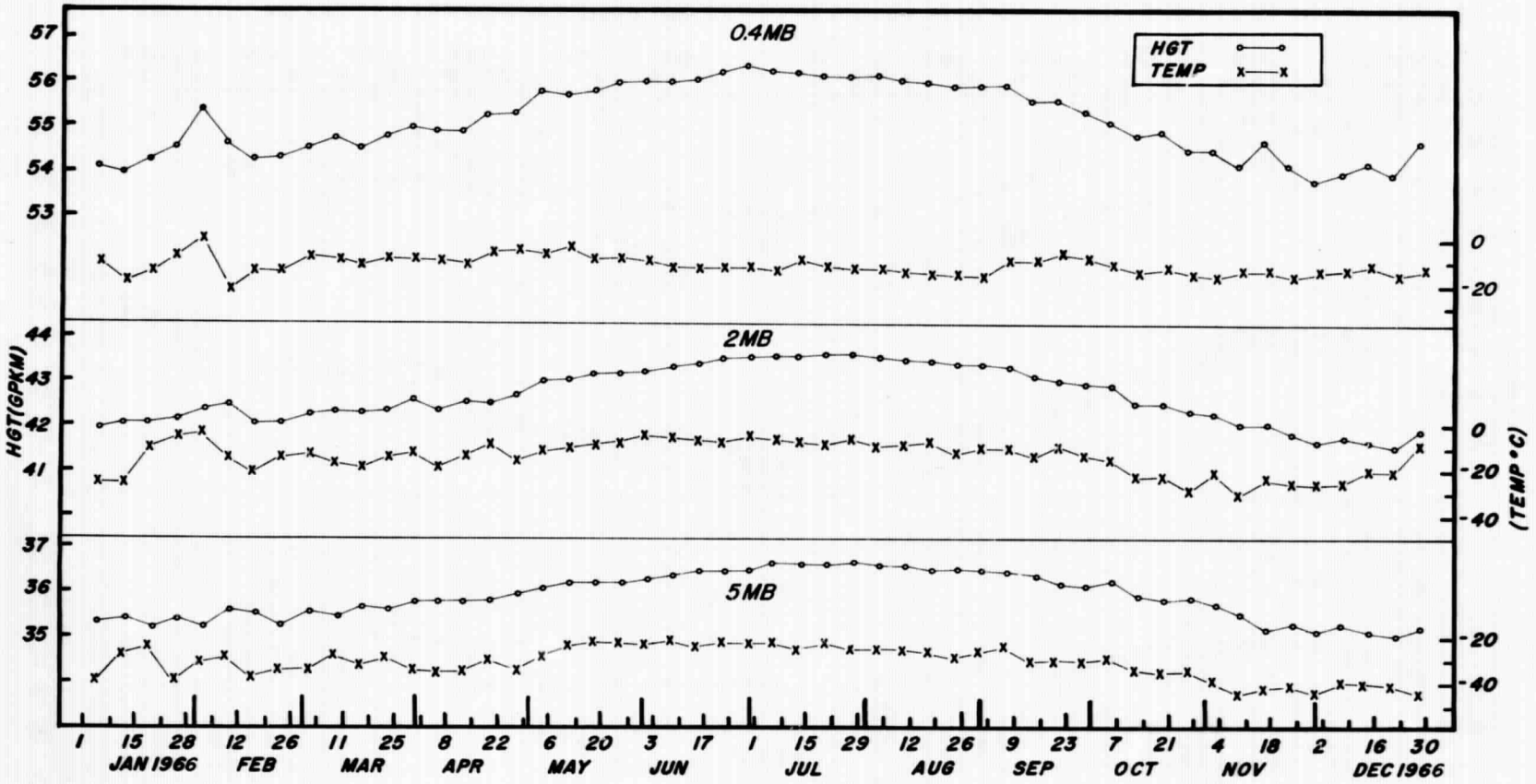


FIGURE 3. — Wallops Island, Va. (37°50′N., 75°29′W.), analyzed values extracted from weekly 5-, 2-, and 0.4-mb charts.

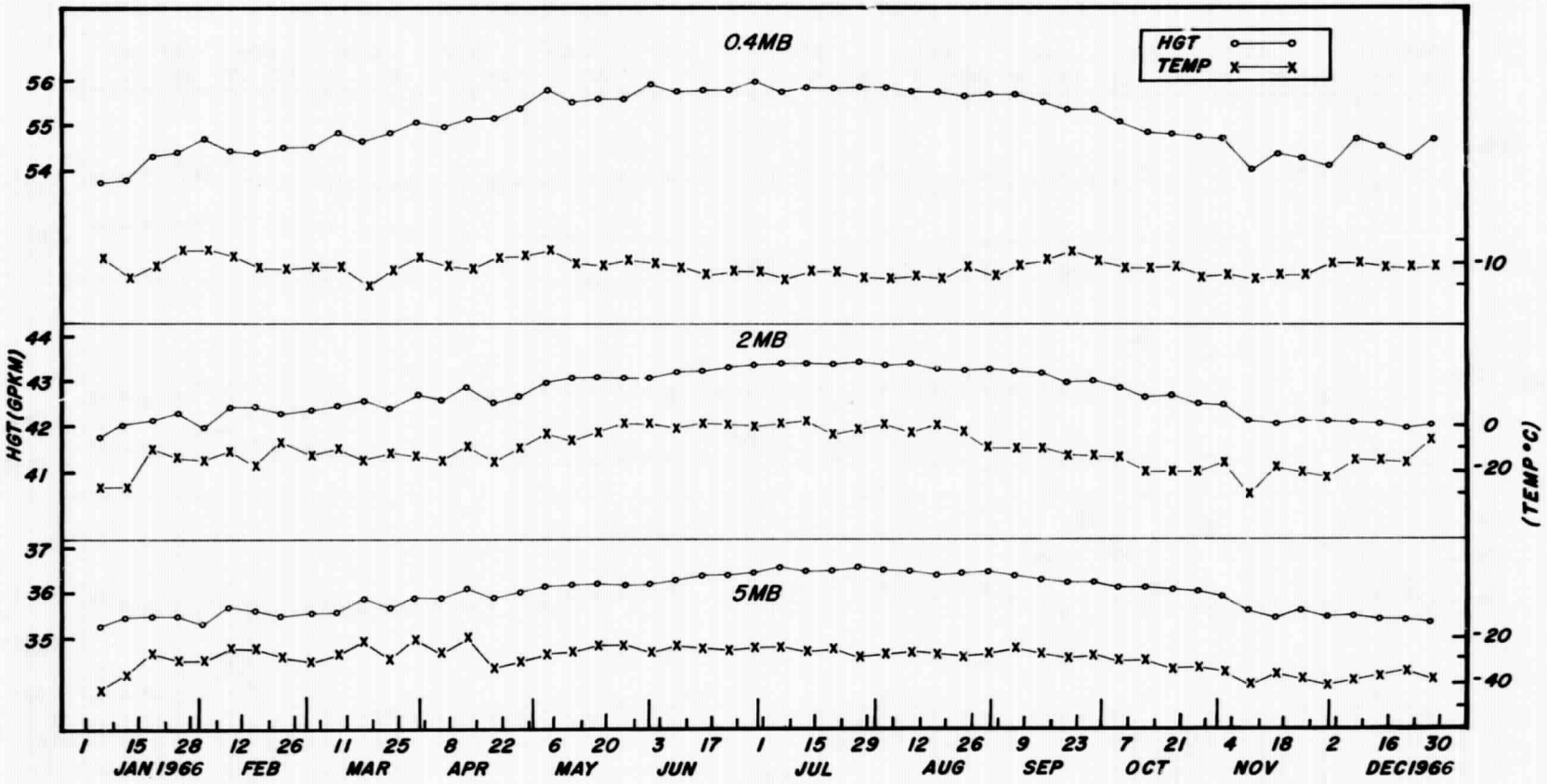


FIGURE 4. — White Sands, N. Mex. (32°23′N., 106°29′W.), analyzed values extracted from weekly 5-, 2-, and 0.4-mb charts.

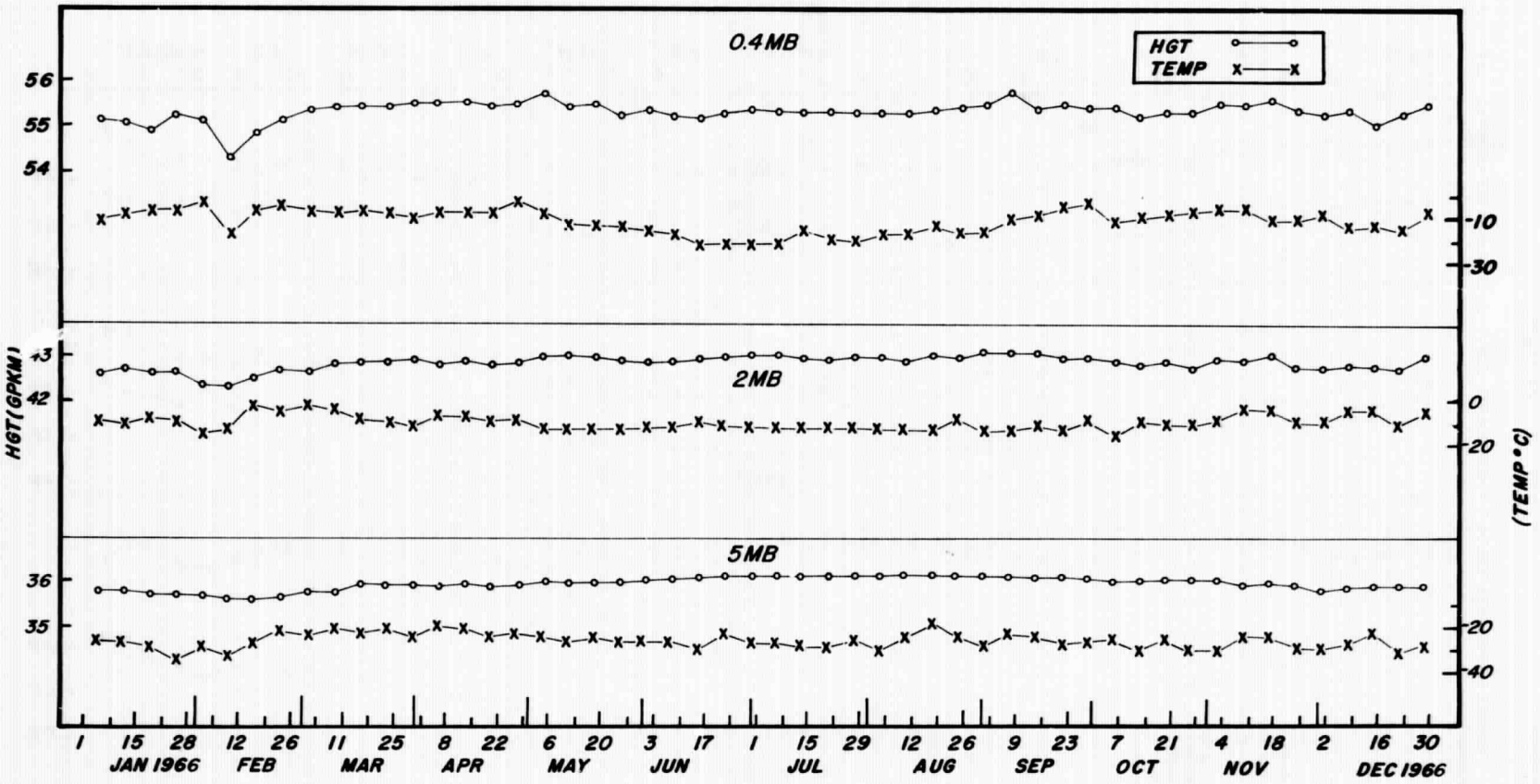


FIGURE 5. — Antigua, B.W.I. (17°09′N., 61°47′W.), analyzed values extracted from weekly 5-, 2-, and 0.4-mb charts.

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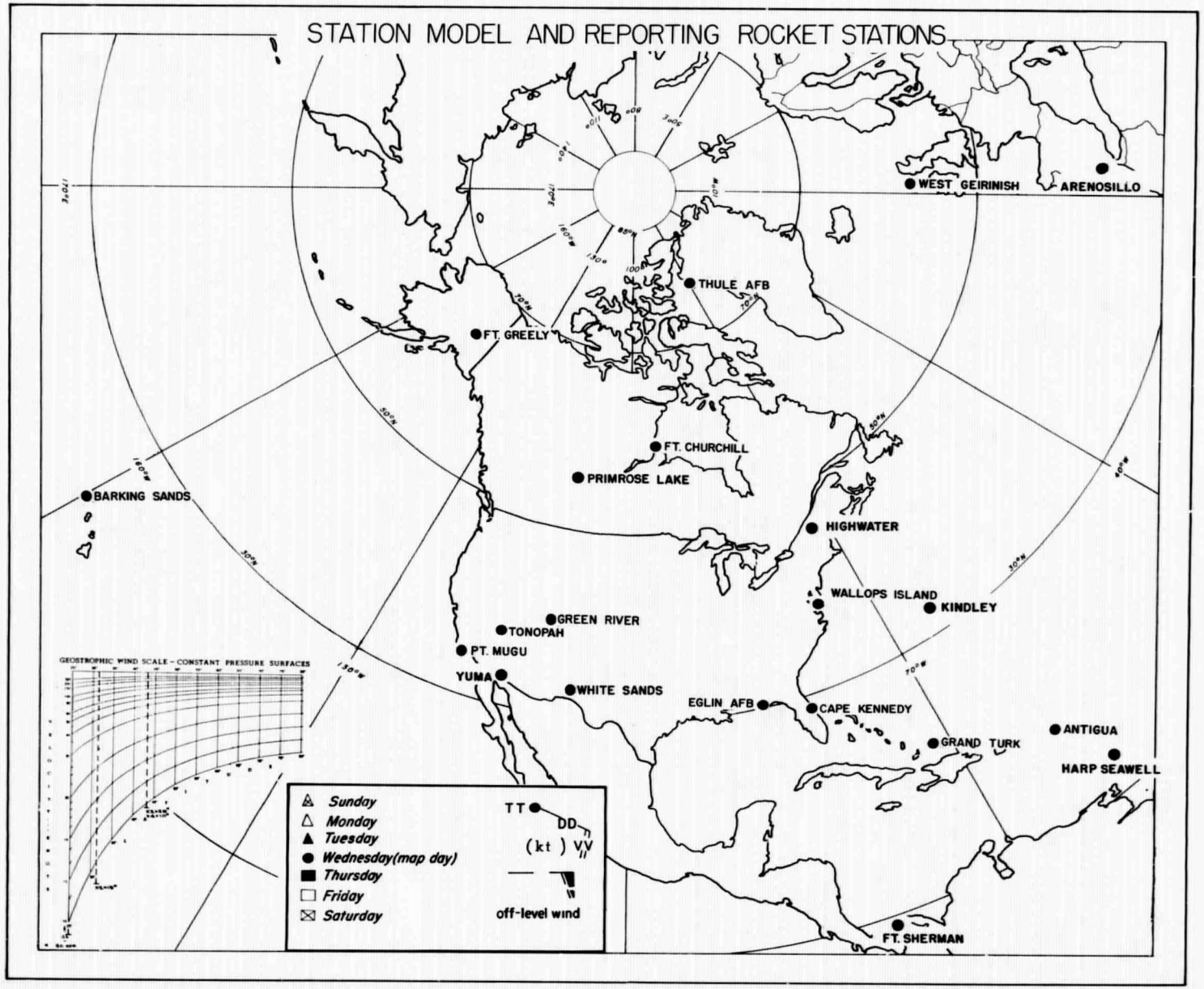
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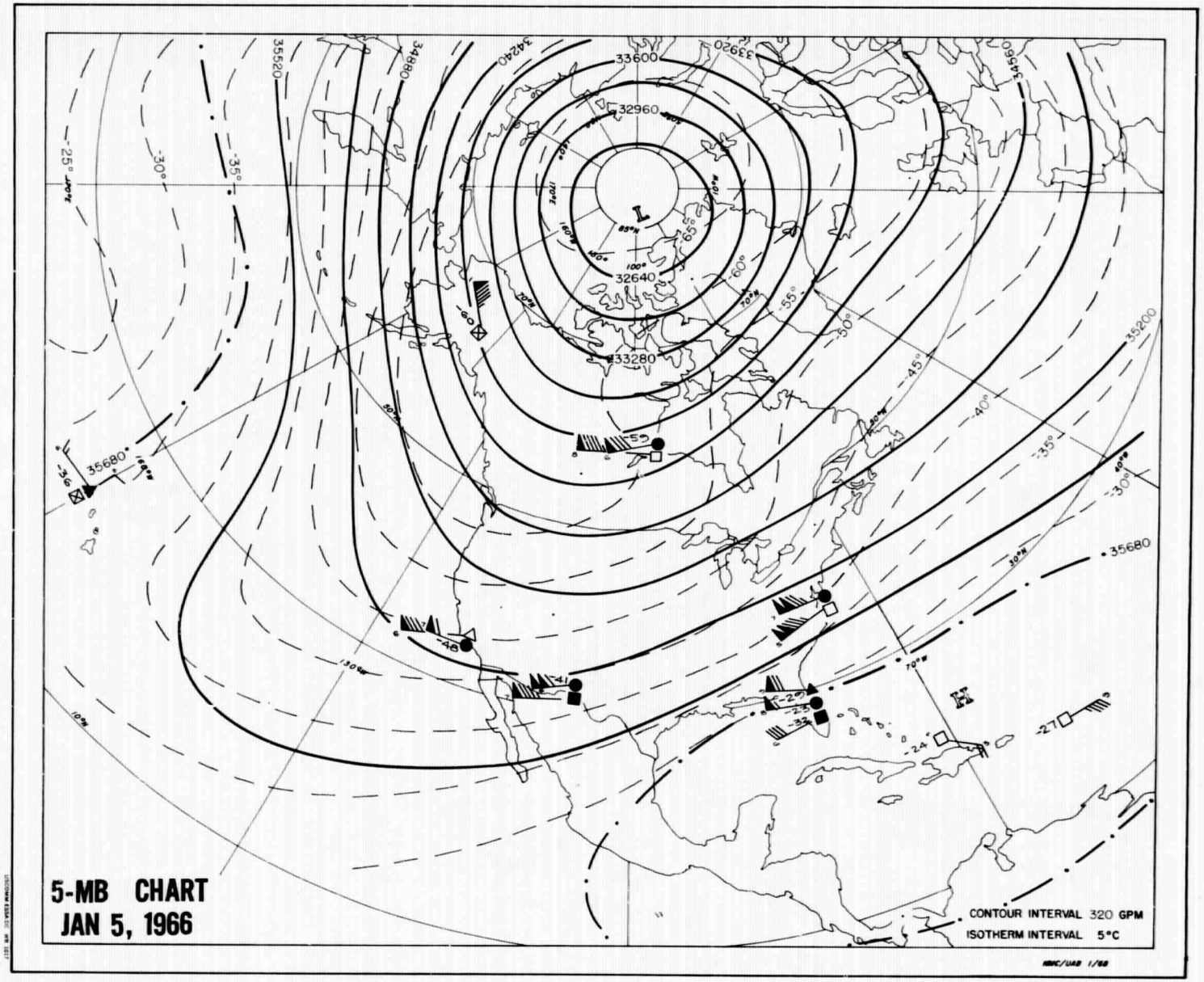
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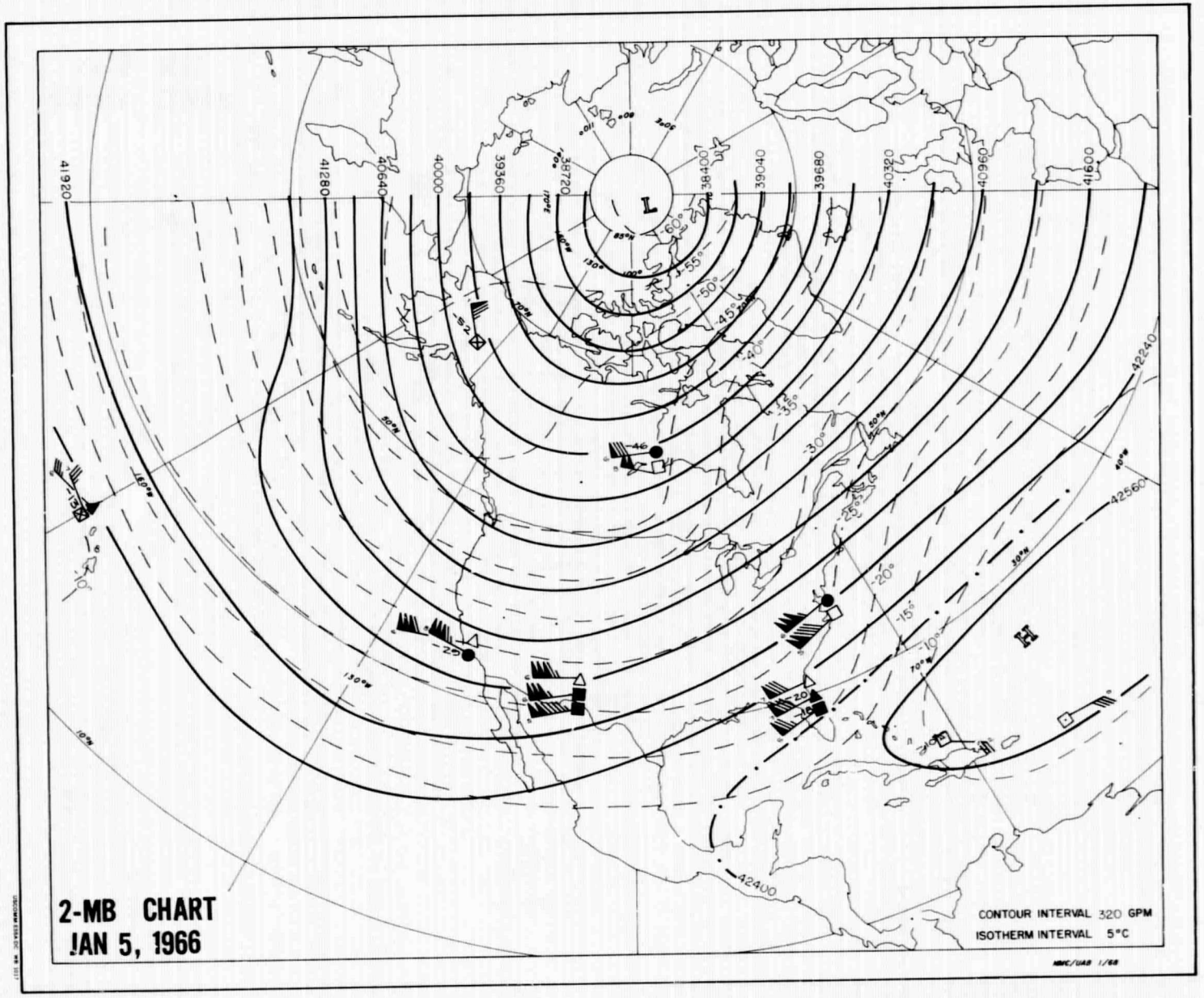
21. Williams, B. H., "Synoptic Analyses of the Upper Stratospheric Circulation During the Late Winter Storm Period of 1966," *Monthly Weather Review*, vol. 96, No. 8, Aug. 1968, pp. 549-558.

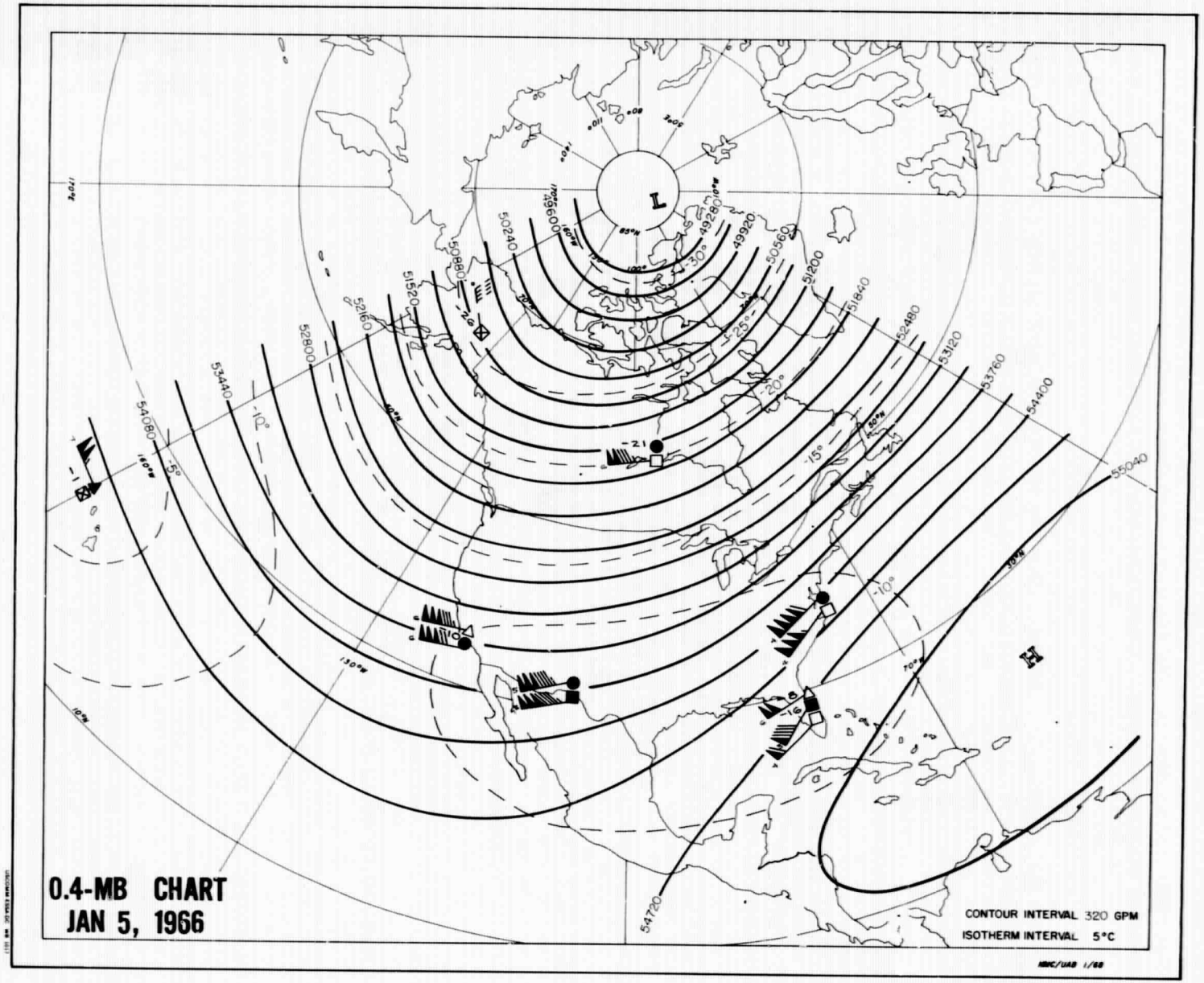
22. World Data Center A, Meteorology, *Data Report, Meteorological Rocket Network Firings 1966*, vol. 3, National Weather Records Center, Asheville, N. C., 1967.

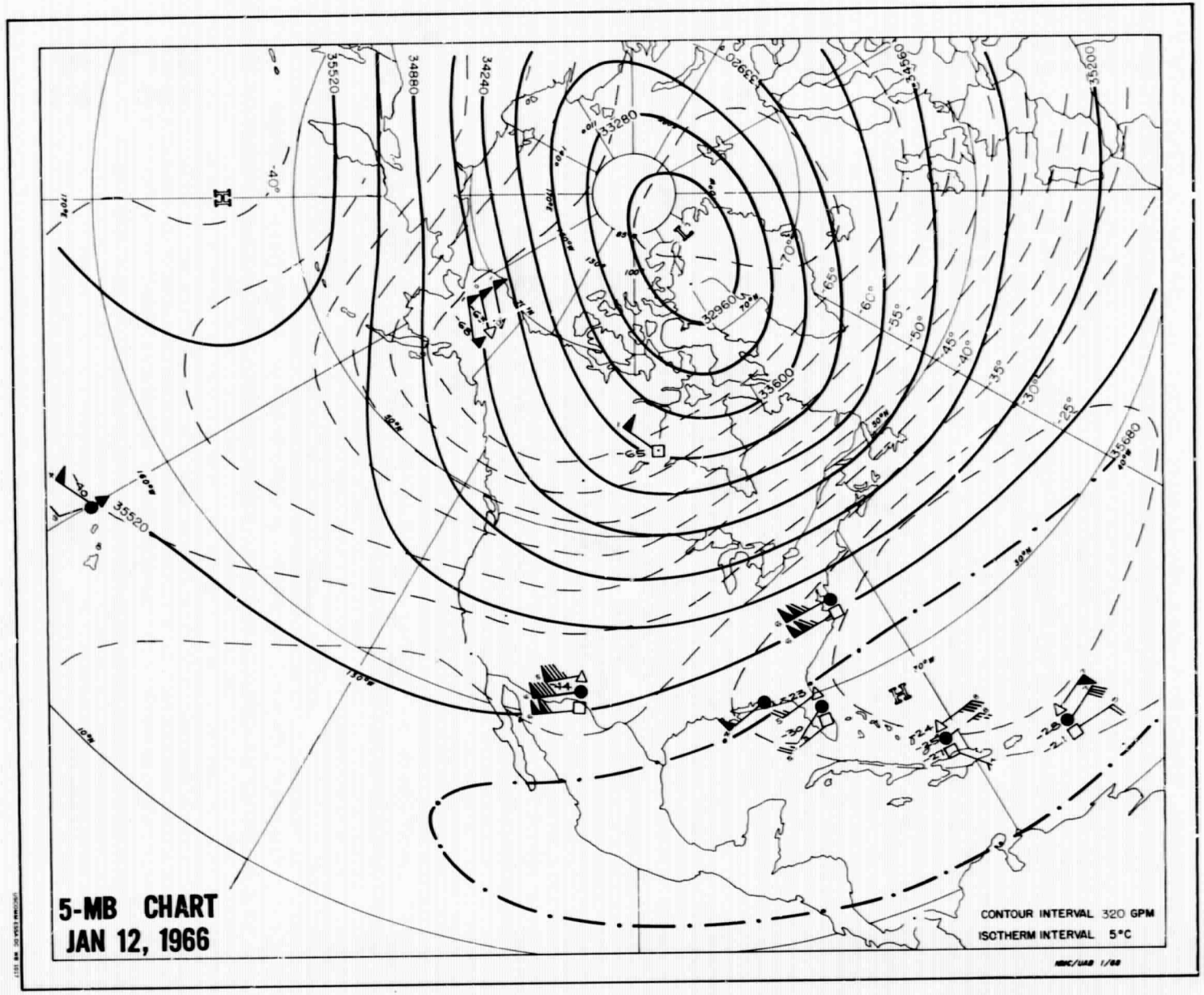
333-925 O - 69 - 2

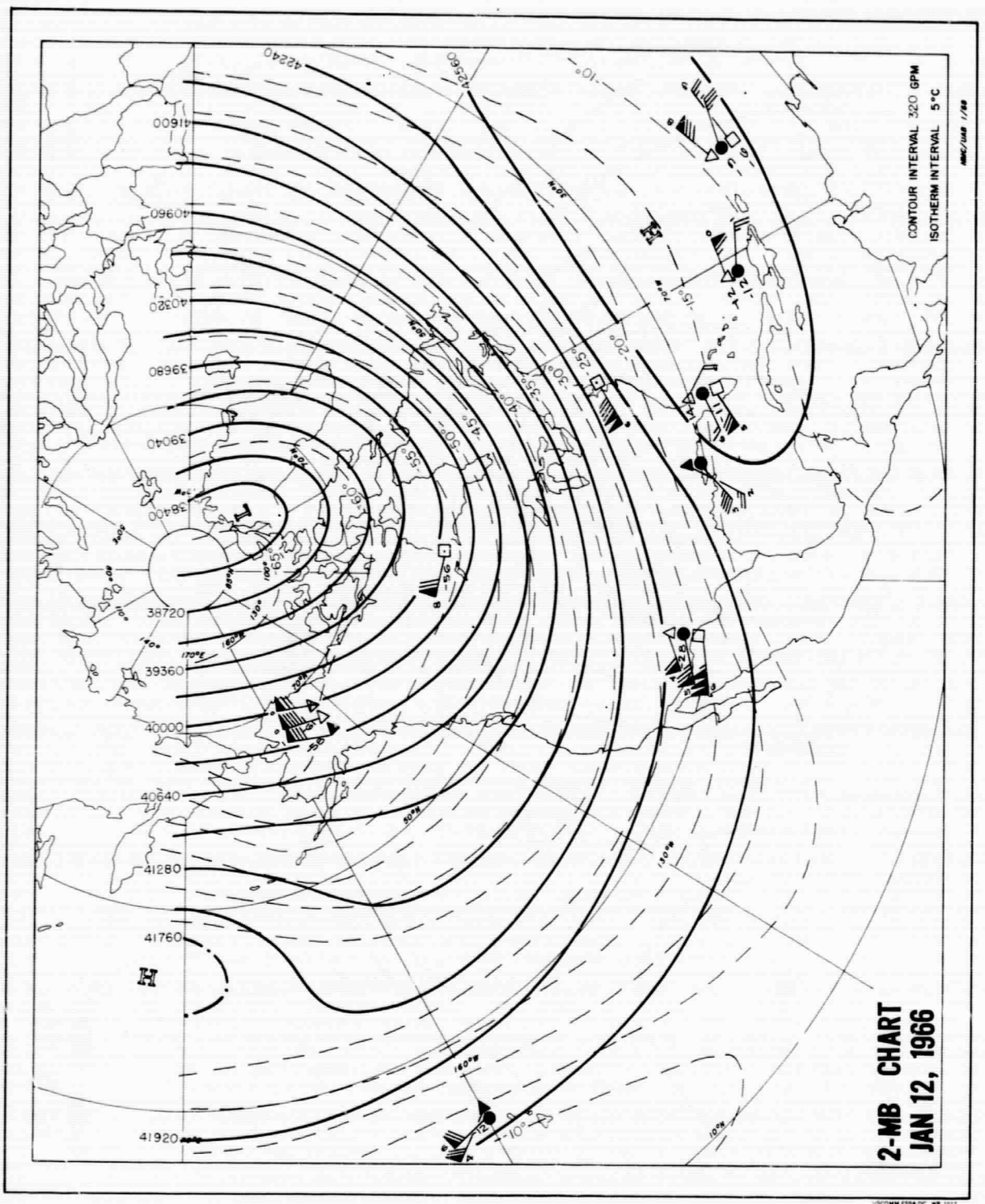

STATION MODEL AND REPORTING ROCKET STATIONS
WEST GEIRINISH
ARENOSILLO
THULE AFB
FT. GREELY
FT. CHURCHILL
PRIMROSE LAKE
BARKING SANDS
HIGHWATER
WALLOPS ISLAND
KINDLEY
GREEN RIVER
TONOPAH
PT. MUGU
YUMA
WHITE SANDS
EGLIN AFB
CAPE KENNEDY
GRAND TURK
ANTIGUA
HARP SEAWELL
FT. SHERMAN
GEOSTROPHIC WIND SCALE - CONSTANT PRESSURE SURFACES
Sunday
Monday
Tuesday
Wednesday(map day)
Thursday
Friday
Saturday
TT
DD
(kt) VV
off-level wind

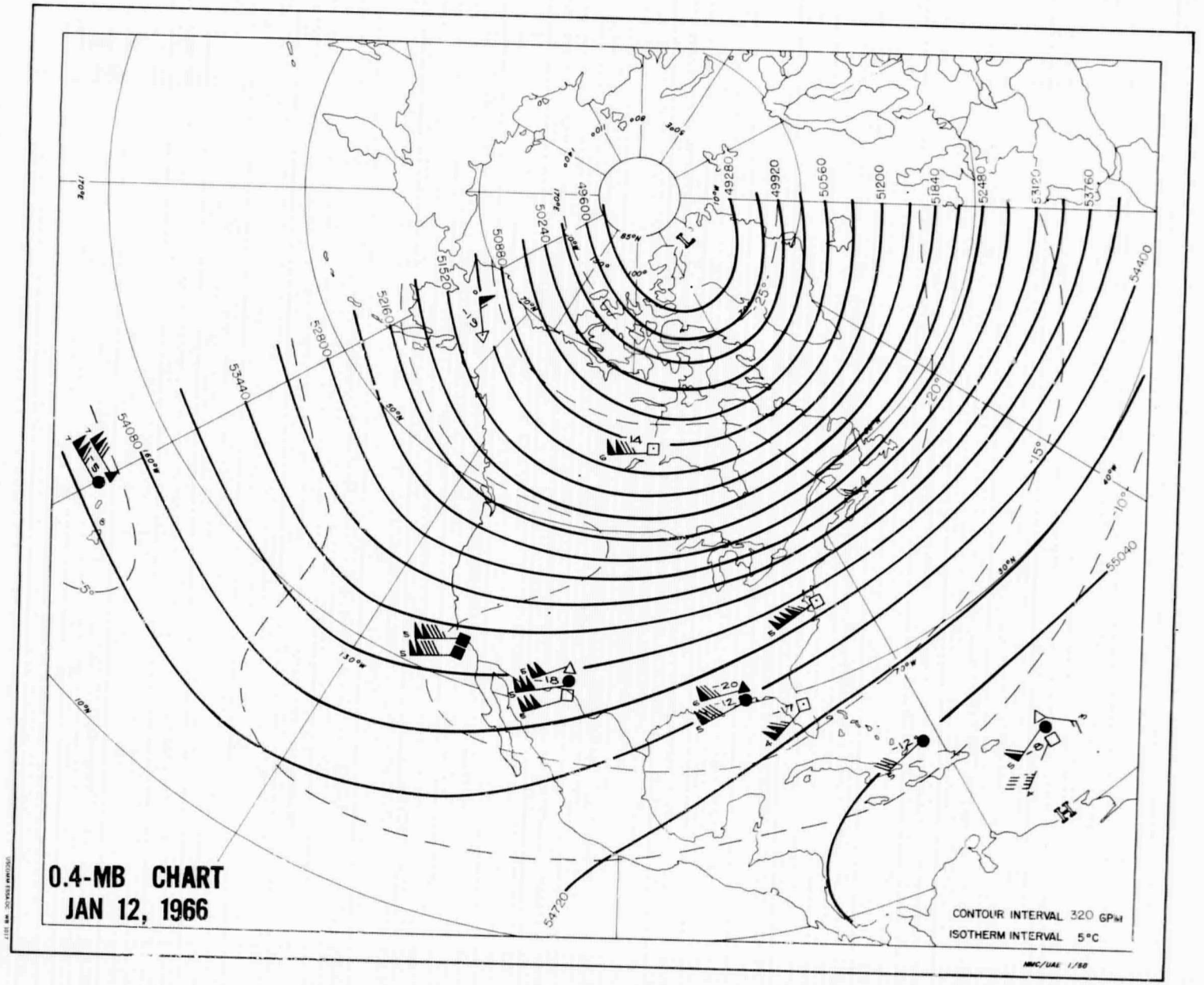

5-MB CHART
JAN 5, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAD 1/66
33600
32960
32640
33280
35520
34880
34240
33920
34560
35200
35680
L

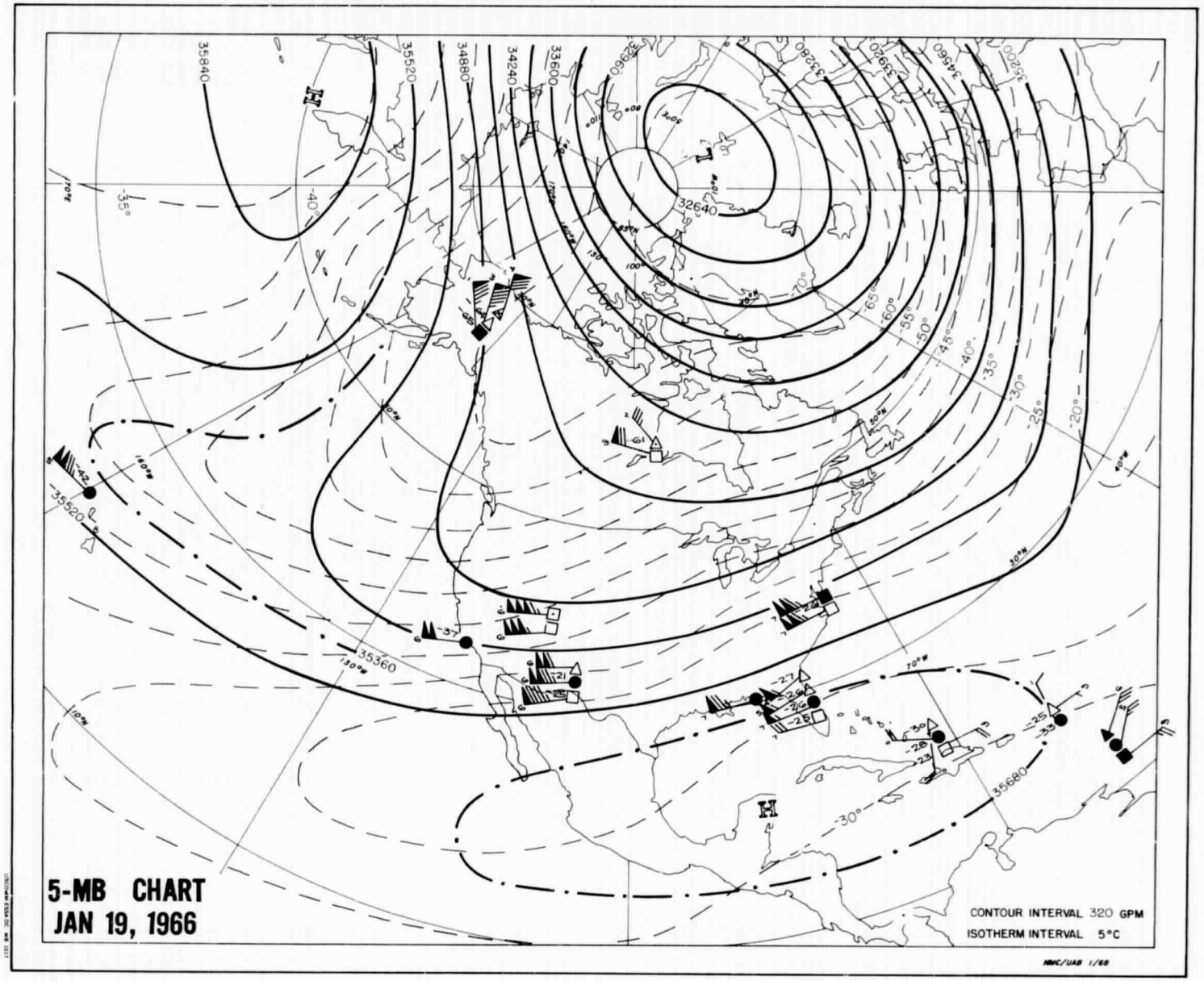

2-MB CHART
JAN 5, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
41920
41280
40640
40000
39360
38720
38400
39040
39680
40320
40960
41600
42240
42560
42400
-60°
-55°
-50°
-45°
-40°
-35°
-30°
-25°
-20°
-15°
-10°
-5°
0°
5°
10°
15°
20°
25°
30°
35°
40°
45°
50°
55°
60°
H
L

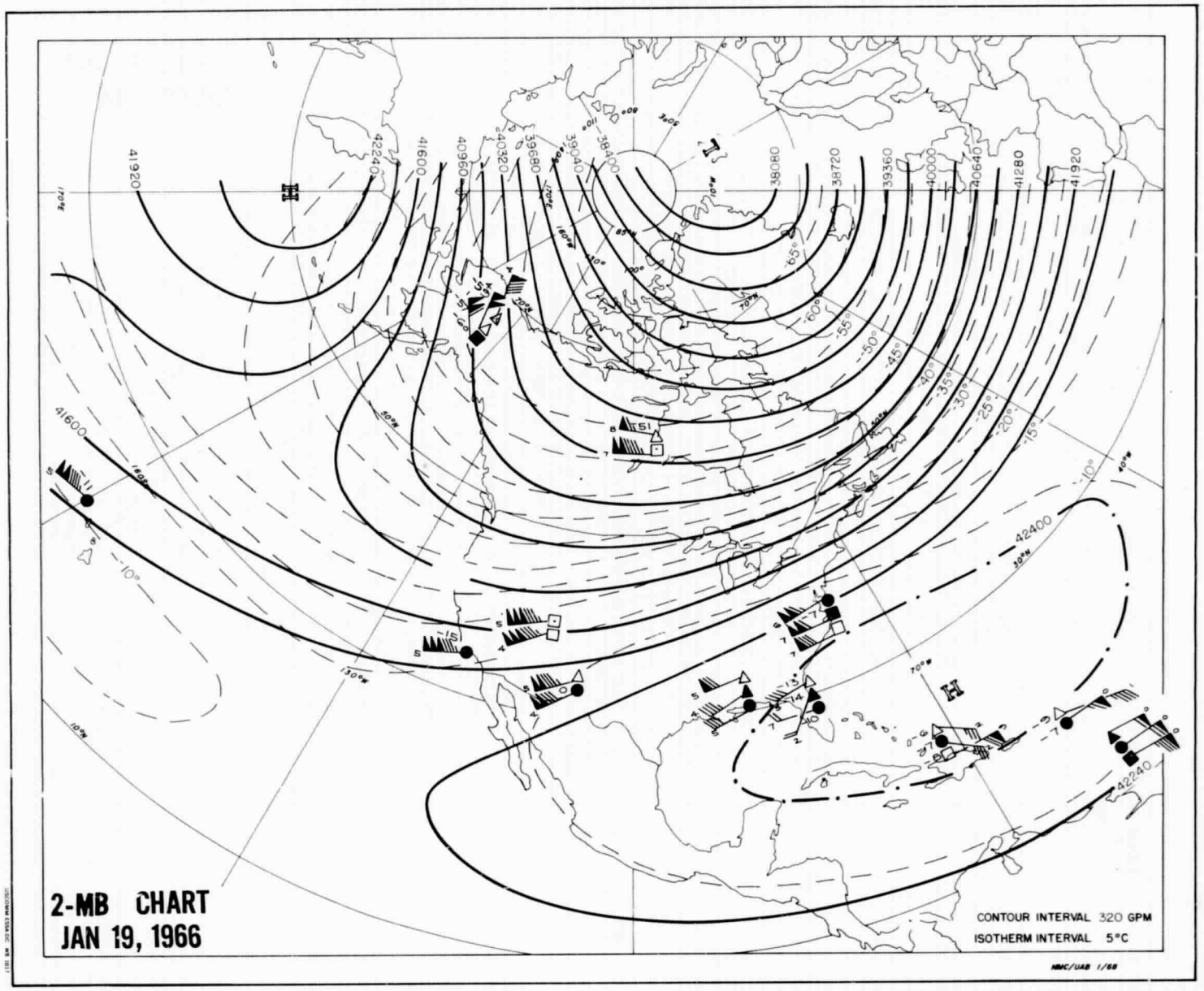

0.4-MB CHART
JAN 5, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
L
H
49600
49280
49920
50240
50560
50880
51200
51520
51840
52160
52480
52800
53120
53440
53760
54080
54400
54720
55040
-30°
-25°
-20°
-15°
-10°
-5°
-21
-16
-1
160°W
150°W
140°W
130°W
120°W
110°W
100°W
90°W
80°W
70°W
60°W
50°N
40°N

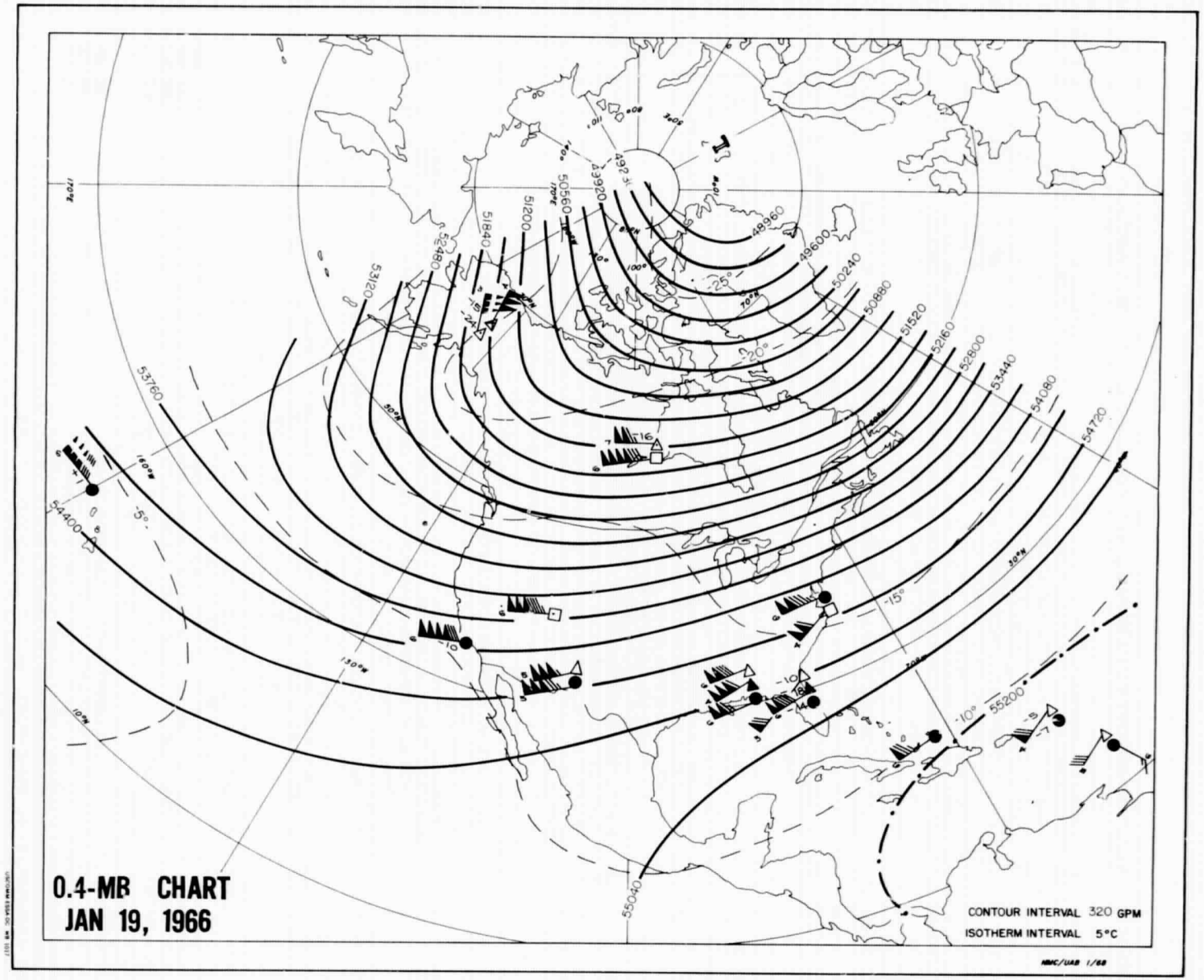

5-MB CHART
JAN 12, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
35520
34880
34240
33280
32960
33600
35200
35680

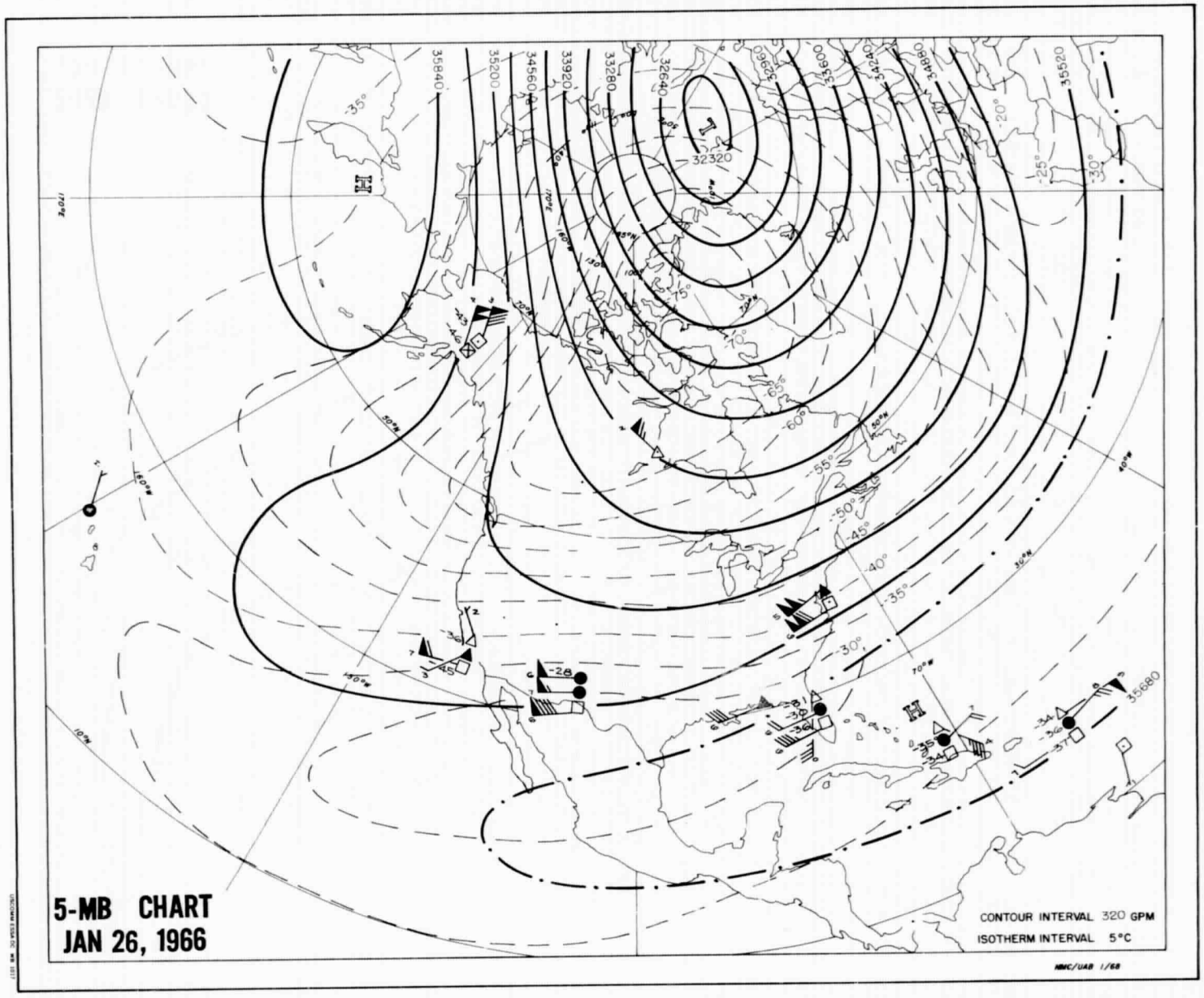

2-MB CHART
JAN 12, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
42240
42560
41600
40960
40320
39680
39040
38400
38720
39360
40000
40640
41280
41760
41920
H
L
-10°
-15°
-20°
-25°
-30°
-35°
-40°
-45°
-50°
-55°
-60°
-65°
-70°
-75°
-80°
-85°
-90°
-95°
-100°
-105°
-110°
-115°
-120°
-125°
-130°
-135°
-140°
-145°
-150°
-155°
-160°
-165°
-170°
-175°
180°
175°
170°
165°
160°
155°
150°
145°
140°
135°
130°
125°
120°
115°
110°
105°
100°
95°
90°
85°
80°
75°
70°
65°
60°
55°
50°
45°
40°
35°
30°
25°
20°
15°
10°

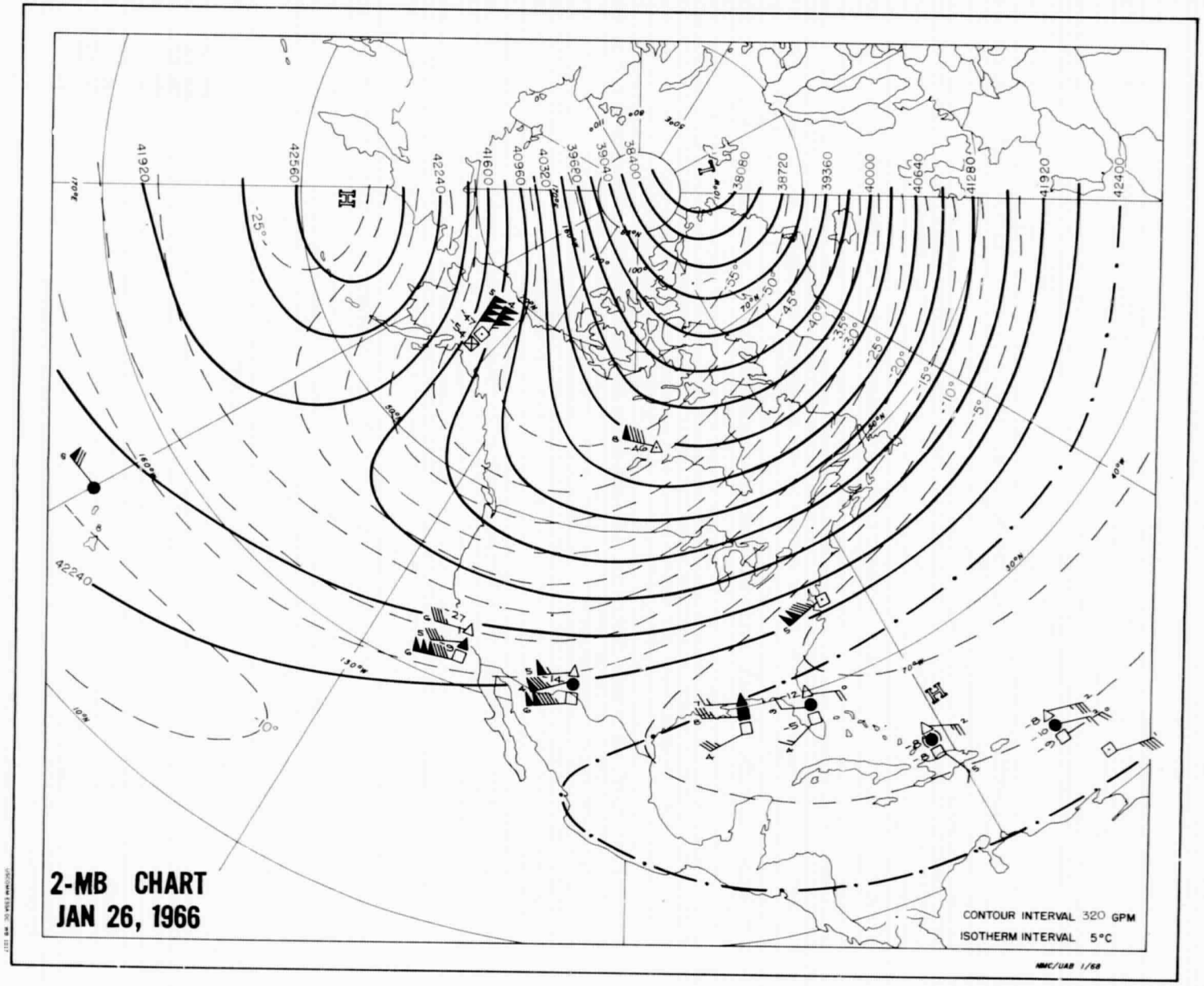

0.4-MB CHART
JAN 12, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAE 1/60

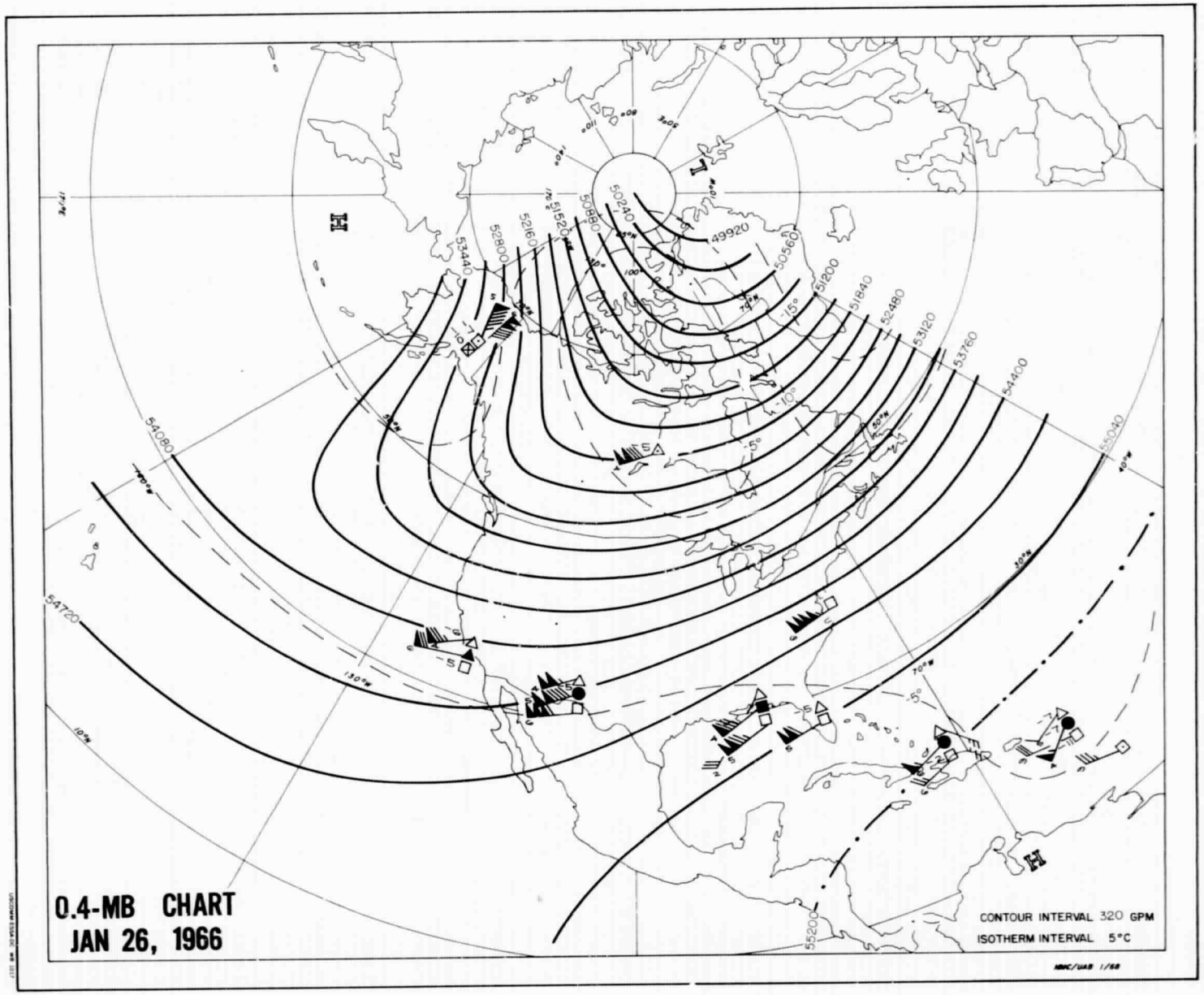

5-MB CHART
JAN 19, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

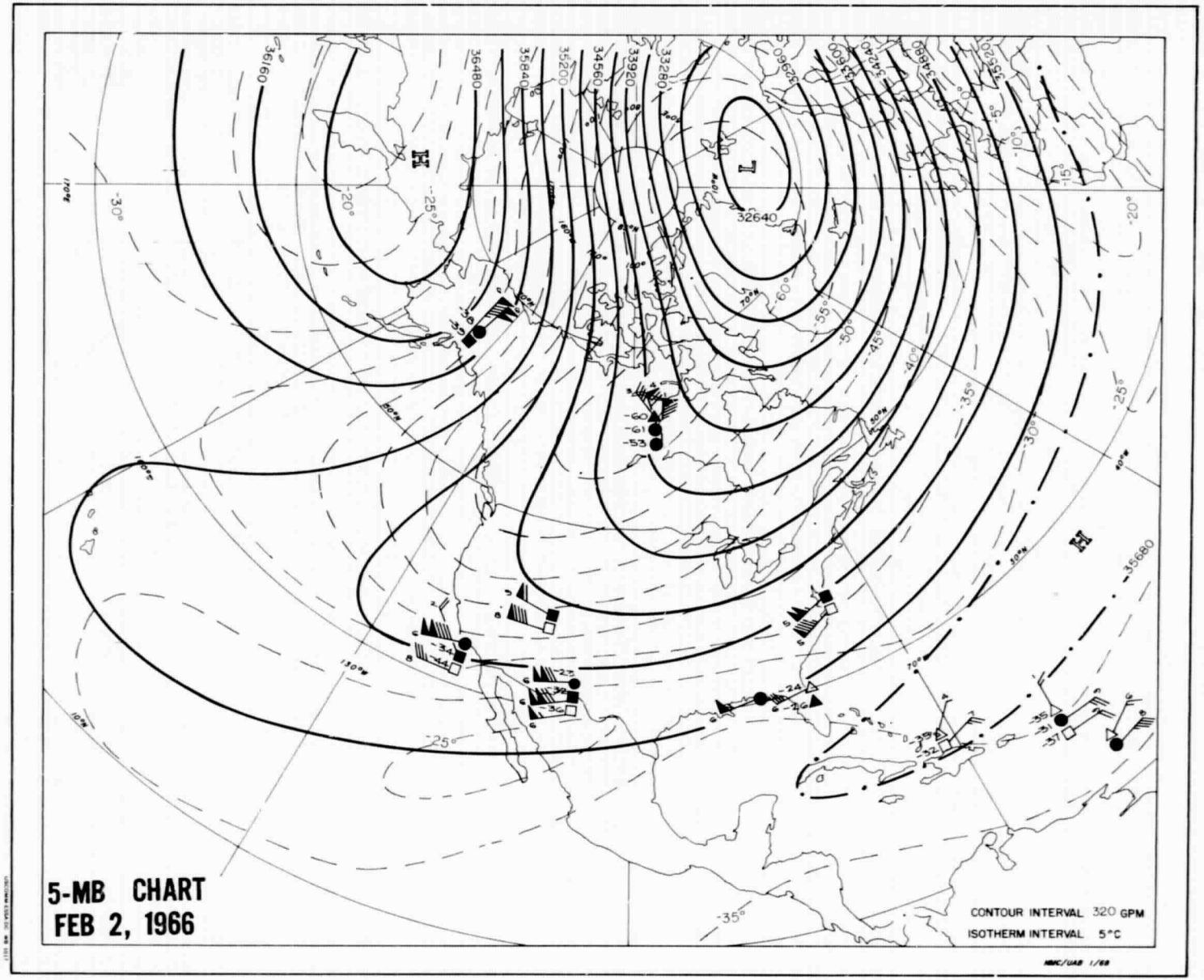

2-MB CHART
JAN 19, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

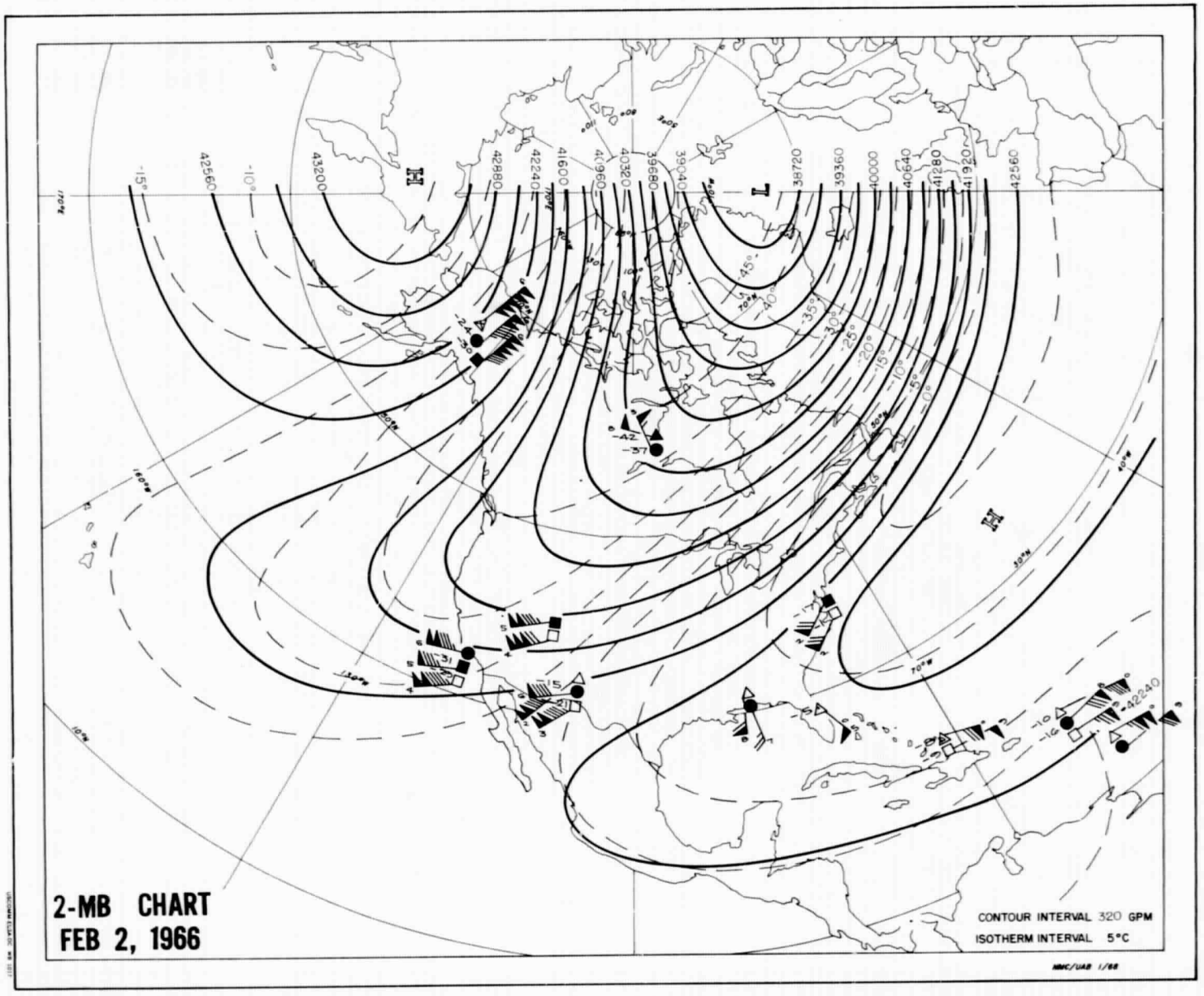

0.4-MB CHART
JAN 19, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

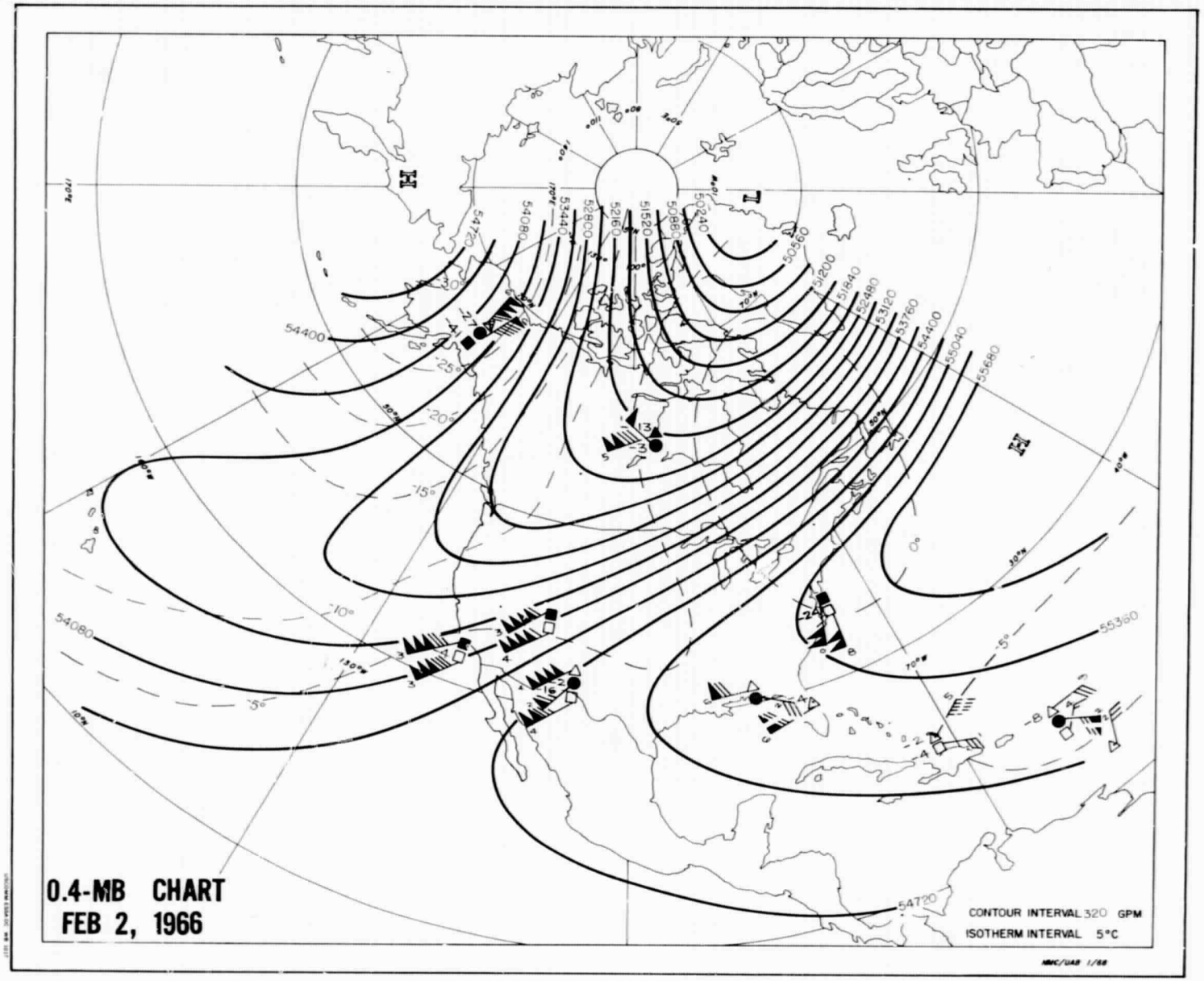

5-MB CHART
JAN 26, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

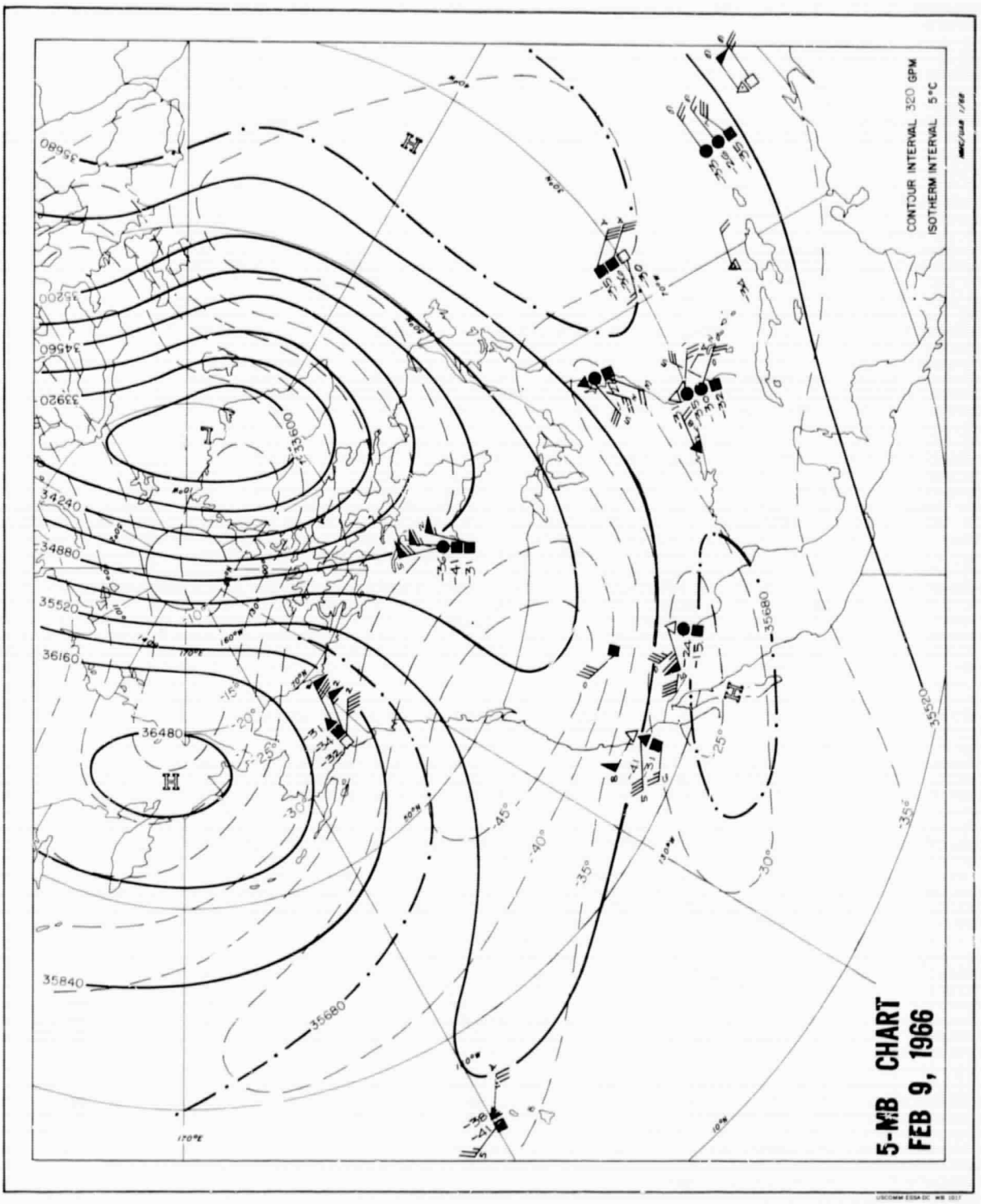

2-MB CHART
JAN 26, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68


0.4-MB CHART
JAN 26, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

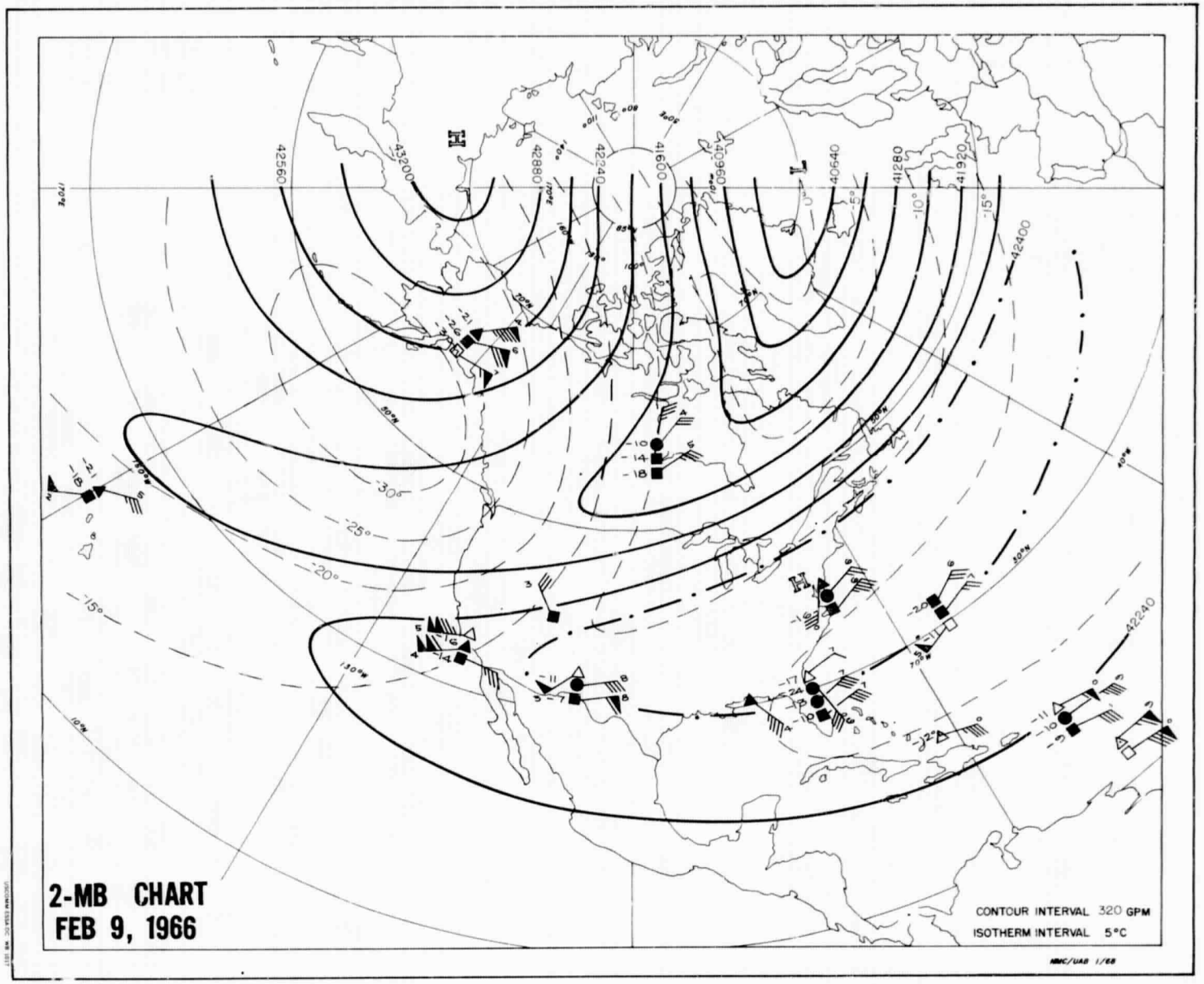

5-MB CHART
FEB 2, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
H
L
H
32640
35680

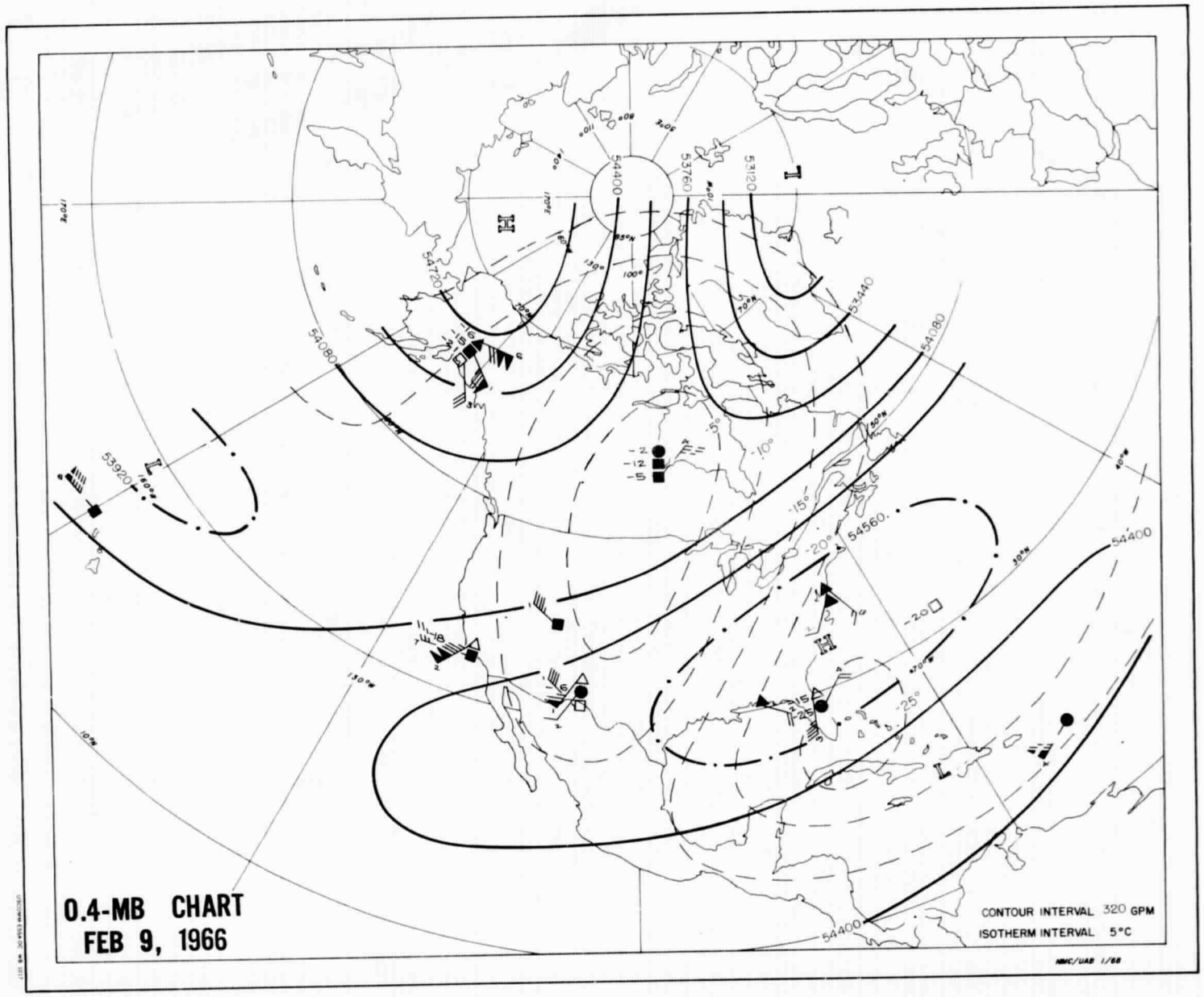

2-MB CHART
FEB 2, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
H
L
H

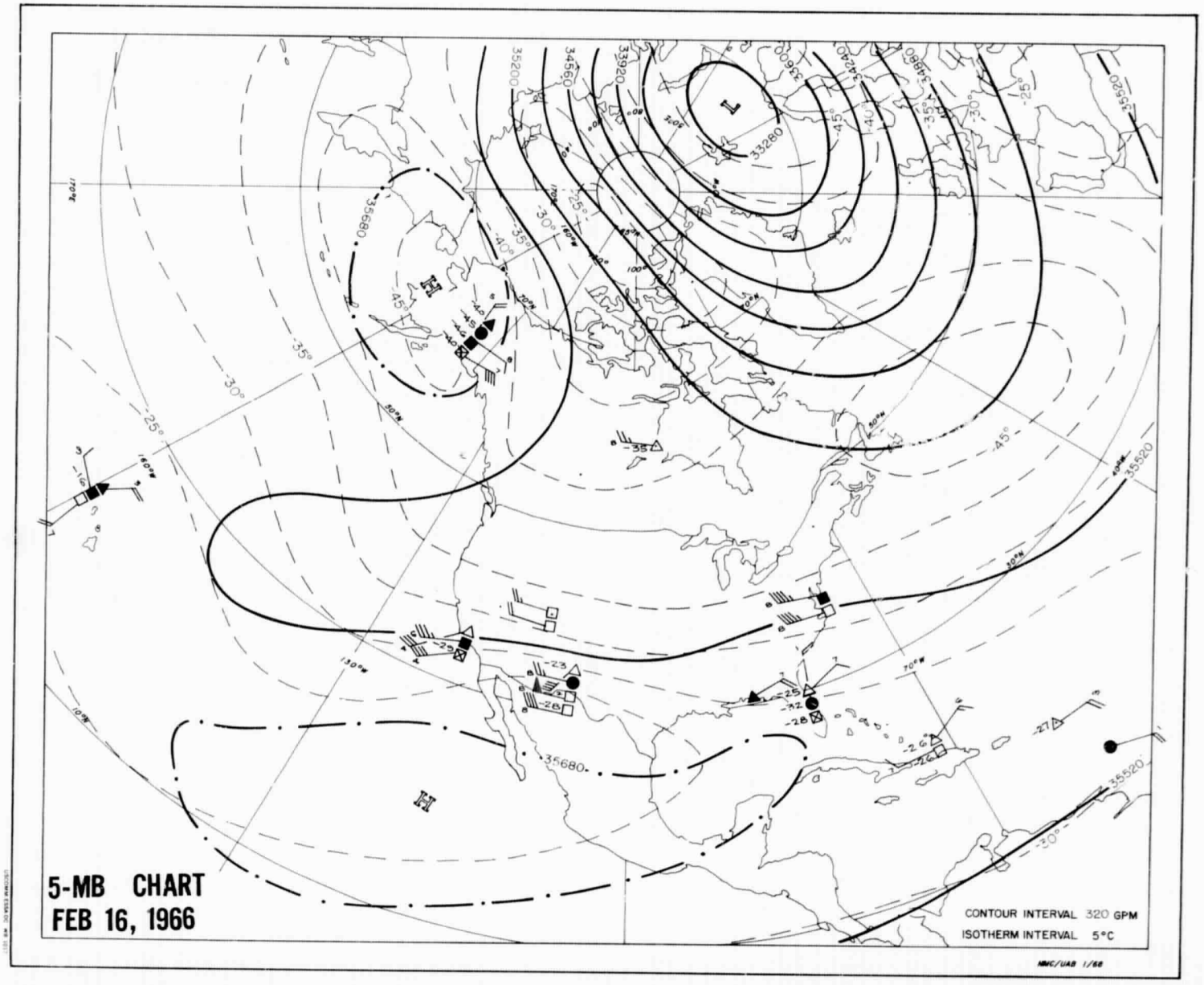

0.4-MB CHART
FEB 2, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
54400
54080
54720
55360
55680
-10°
-5°
-15°
-20°
-25°

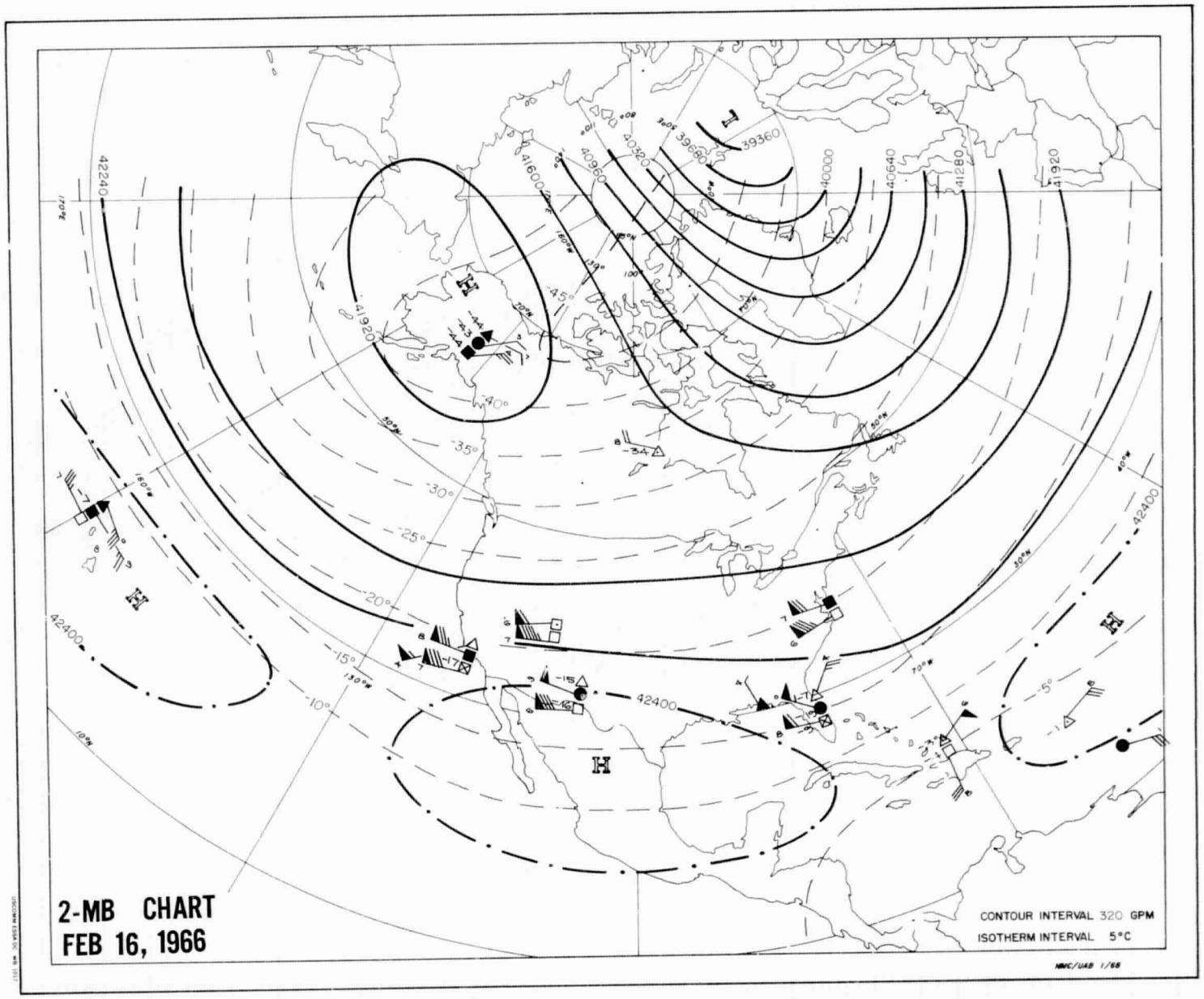

5-MB CHART
FEB 9, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
35840
35680
36480
36160
35520
34880
34240
33920
34560
35200
35680
35520
H
L
H
H
-36
-41
-31
-24
-15
-31
-34
-32
-41
-31
-35
-30
-25
-20
-15
-45°
-40°
-35°
-30°
-25°
-35°
170°E
180°
170°W
160°W
150°W
140°W

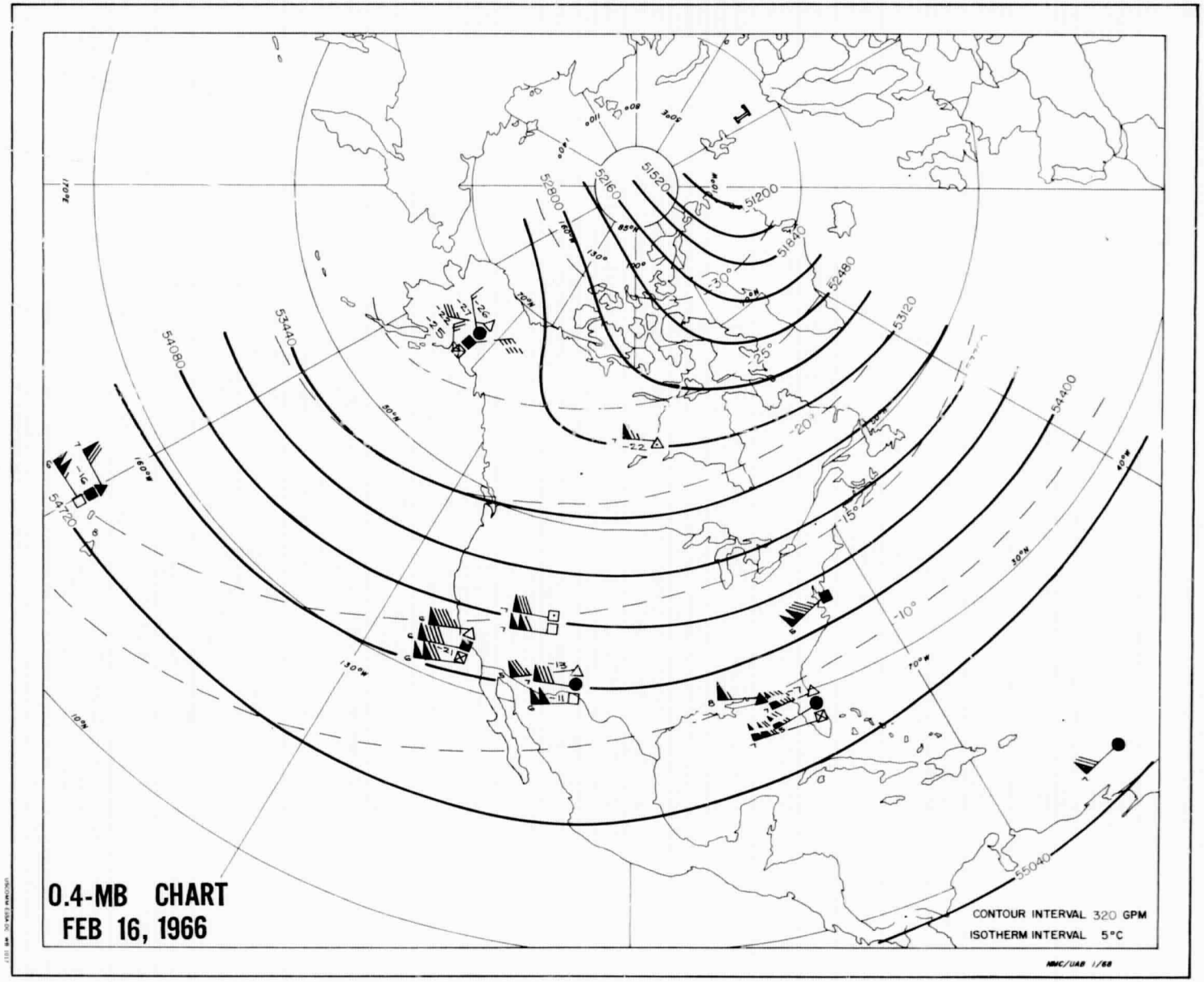
333-925 O - 69 - 3

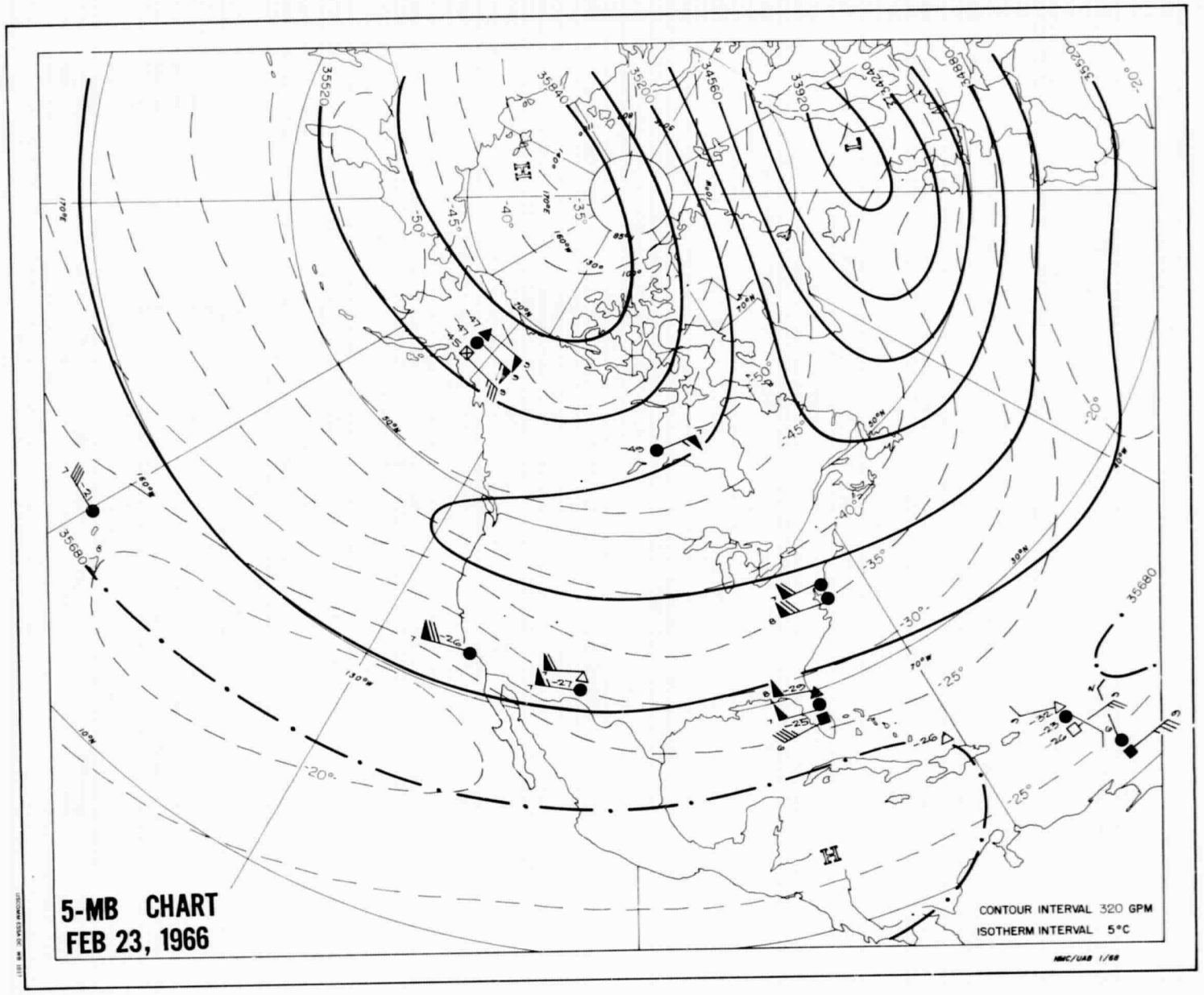

2-MB CHART
FEB 9, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

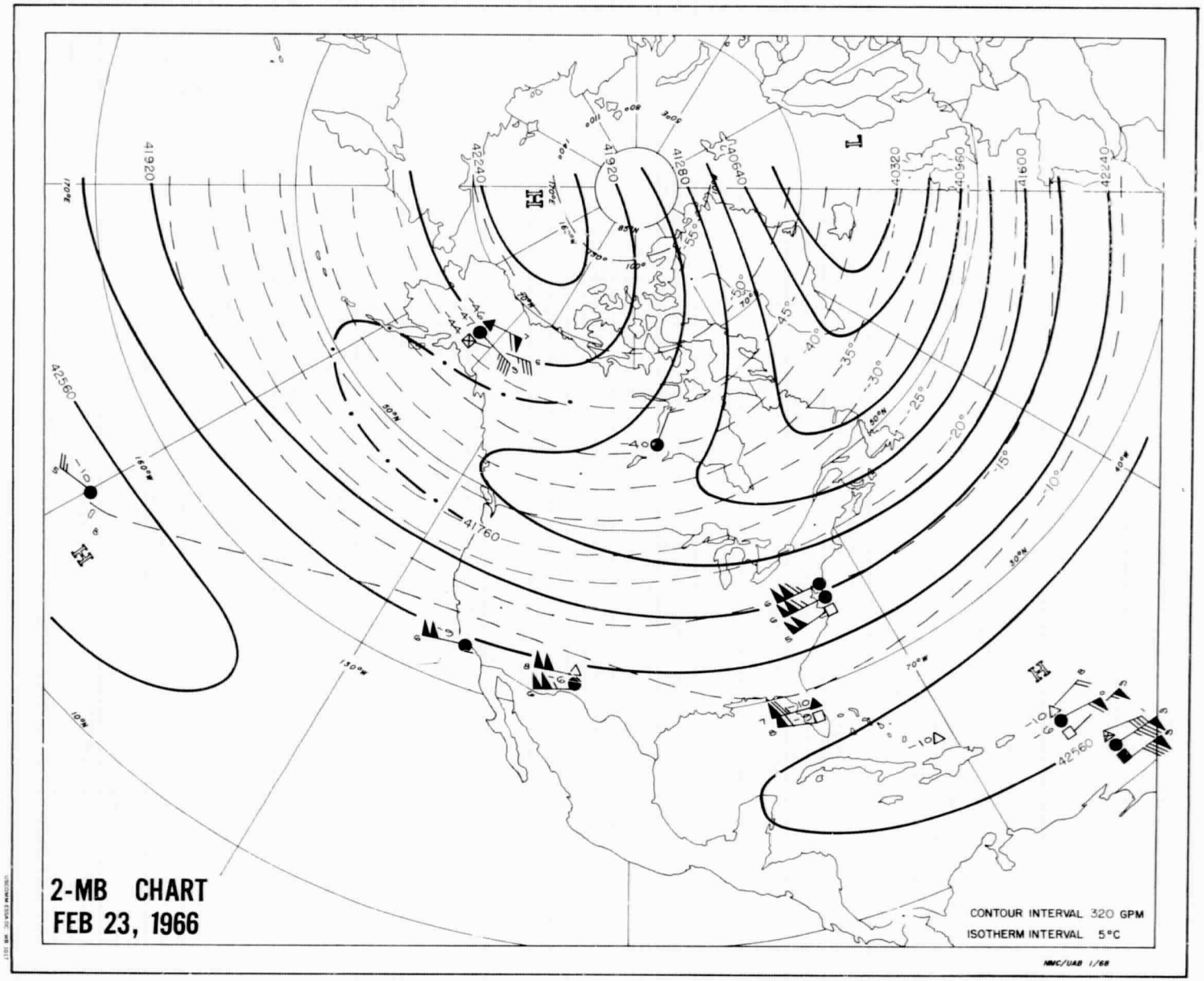

0.4-MB CHART
FEB 9, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

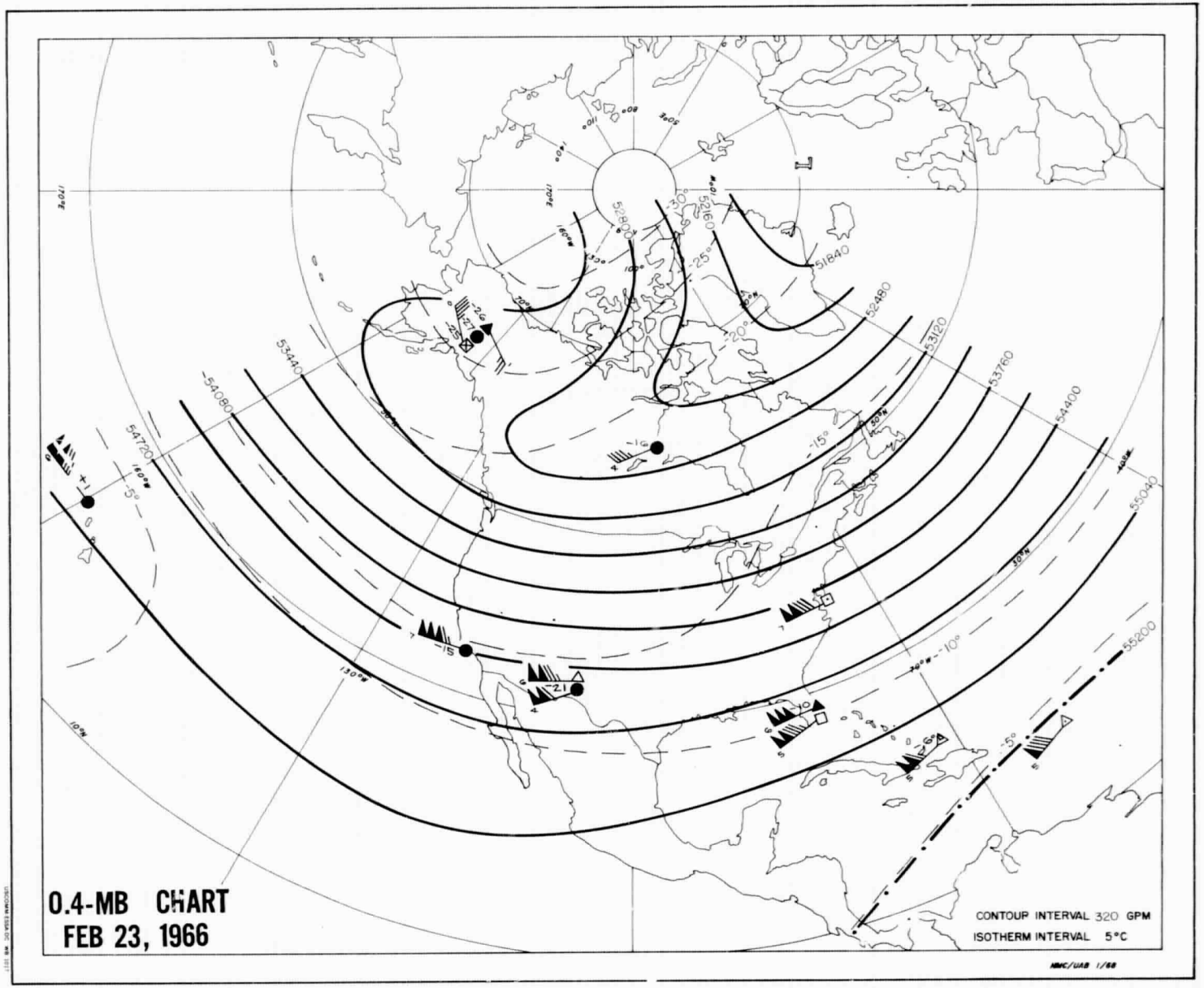

5-MB CHART
FEB 16, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
MMC/UAB 1/66

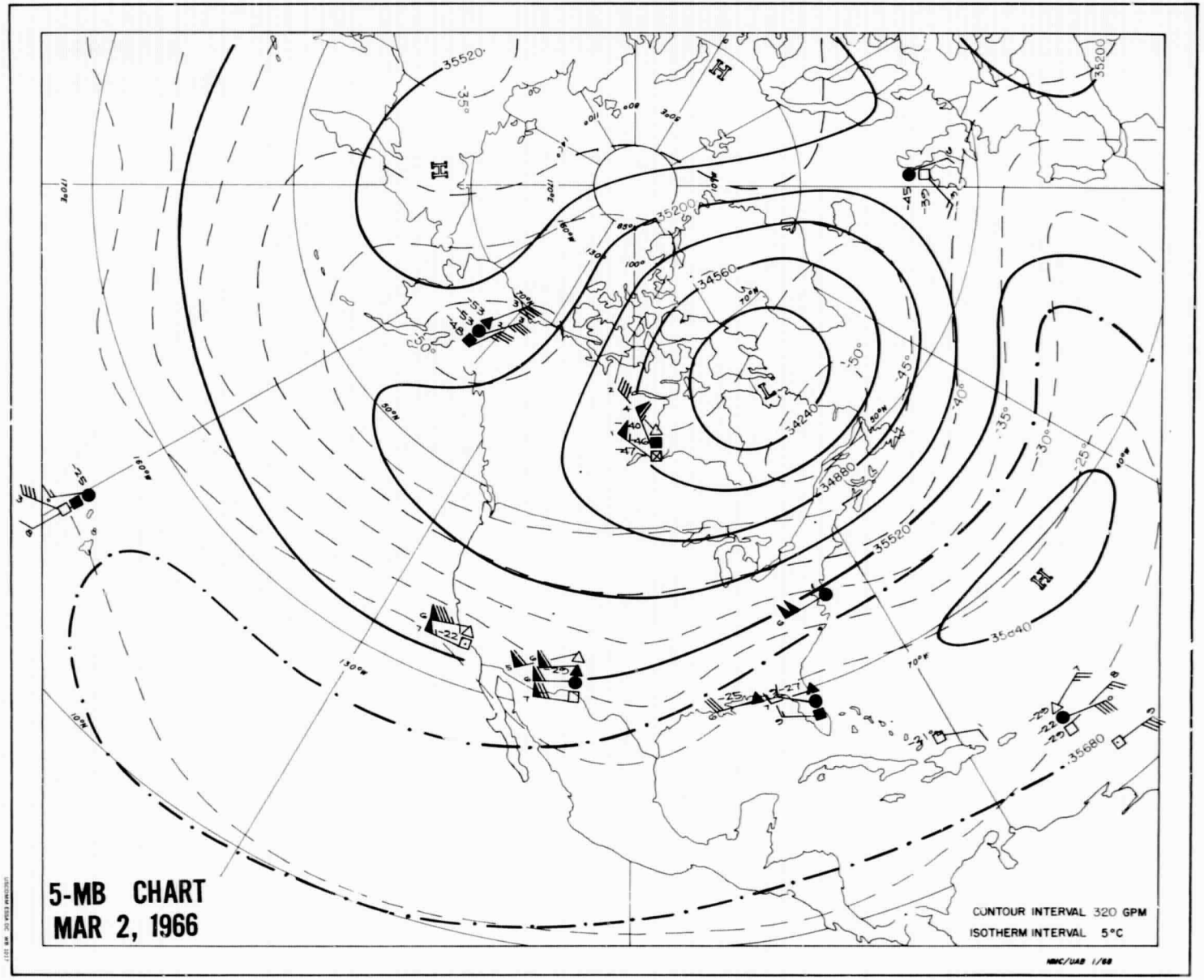

2-MB CHART
FEB 16, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

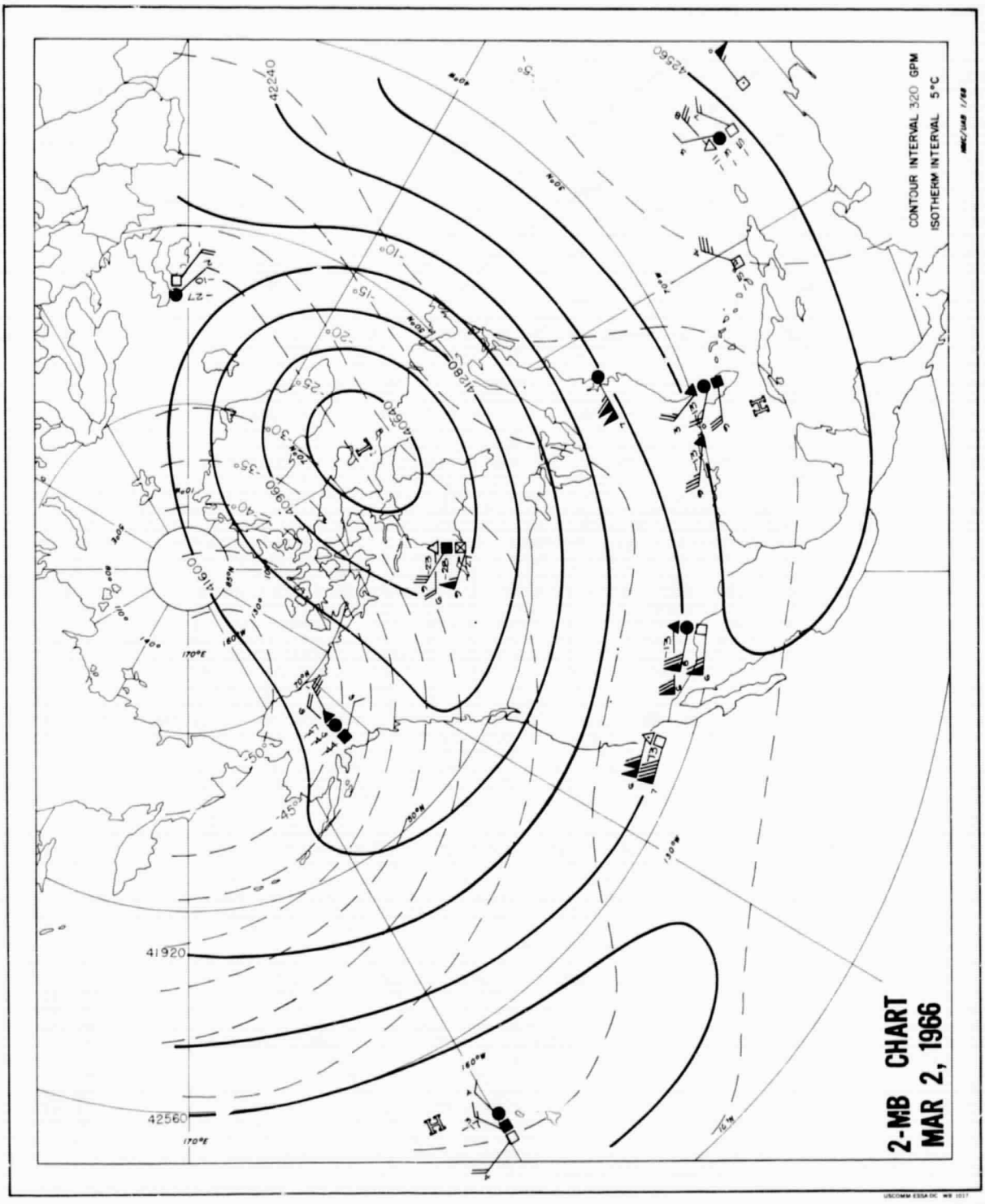

0.4-MB CHART
FEB 16, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

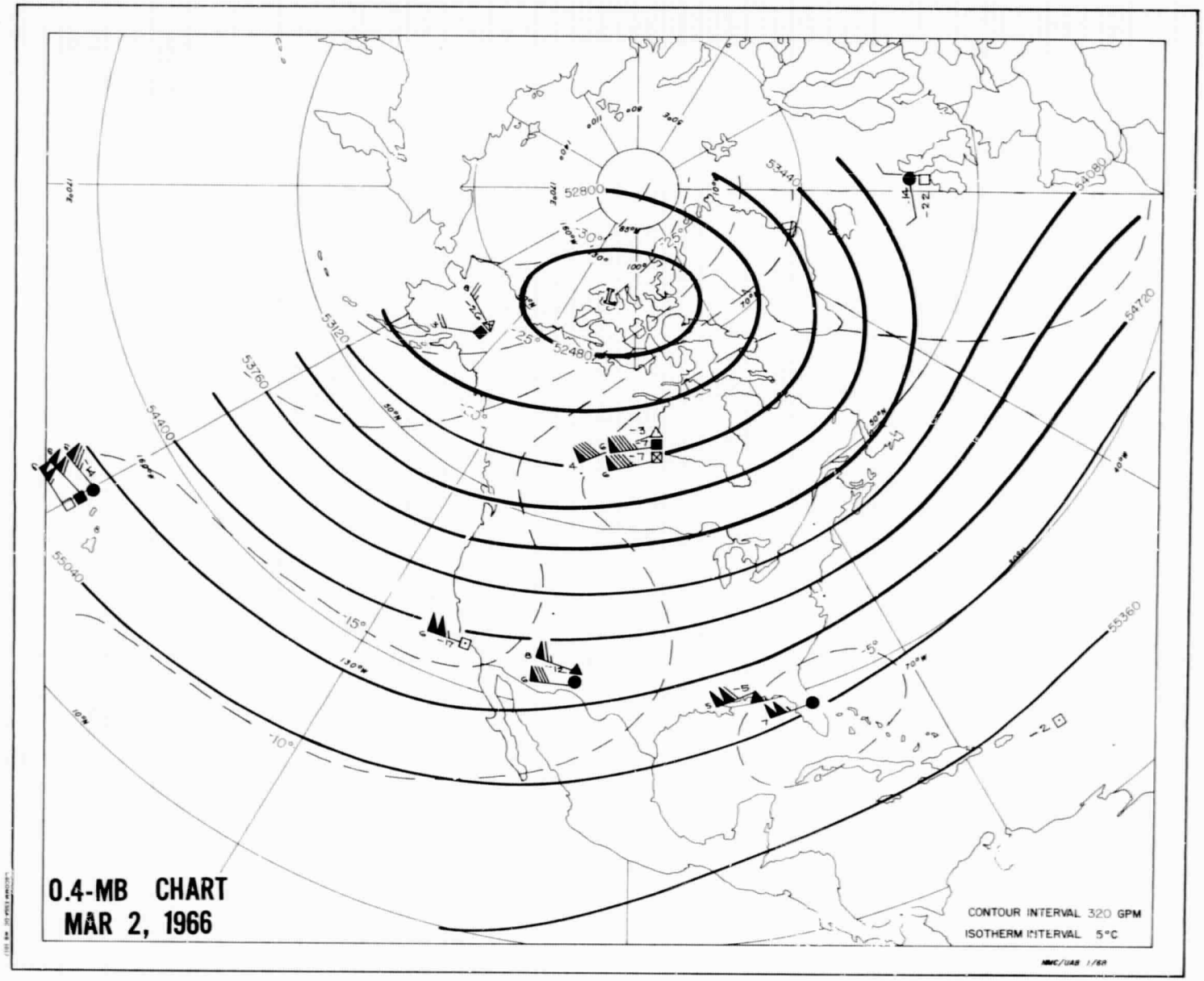

5-MB CHART
FEB 23, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/66
L
H
H
35520
35680
33920
34560

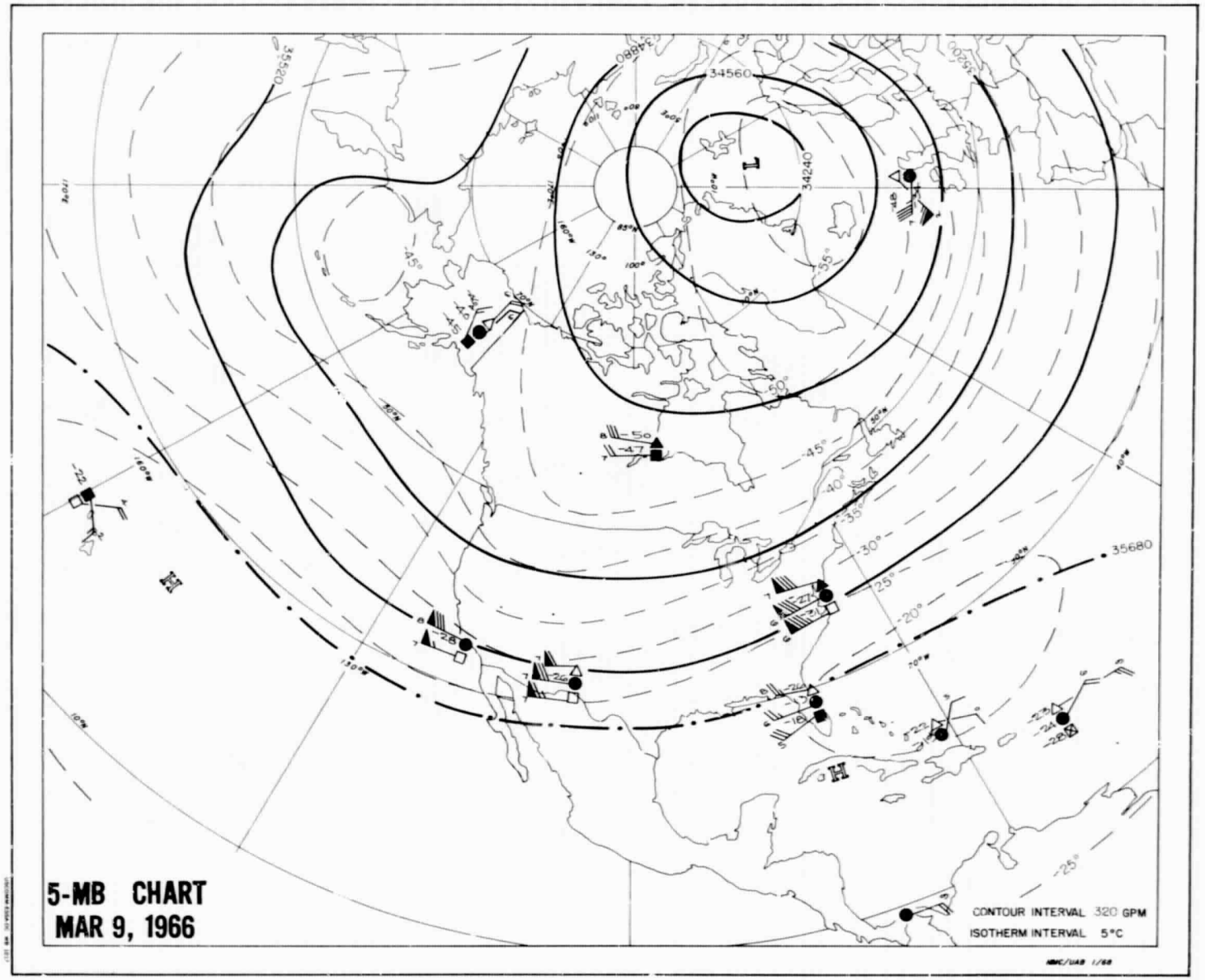

2-MB CHART
FEB 23, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

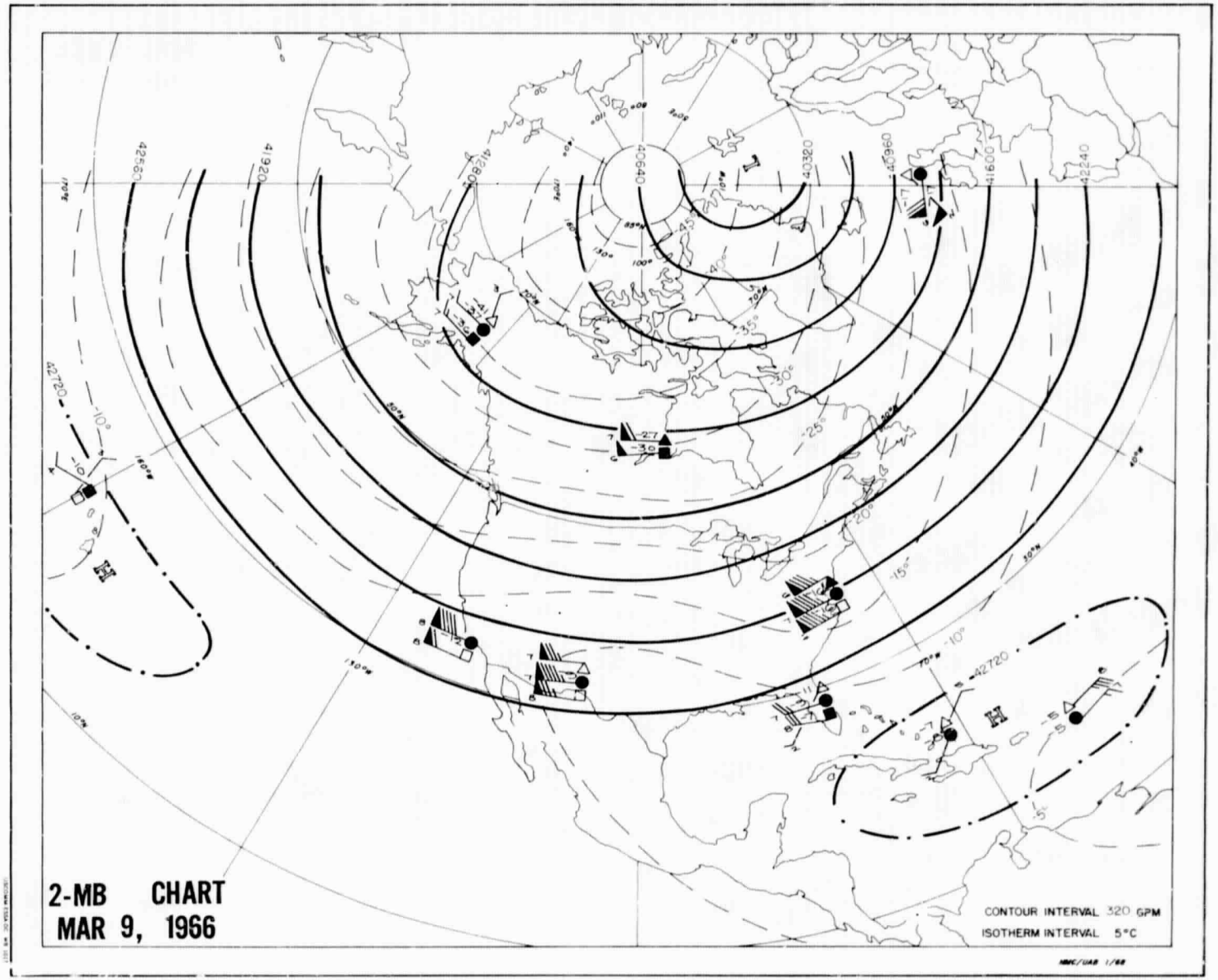

0.4-MB CHART
FEB 23, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

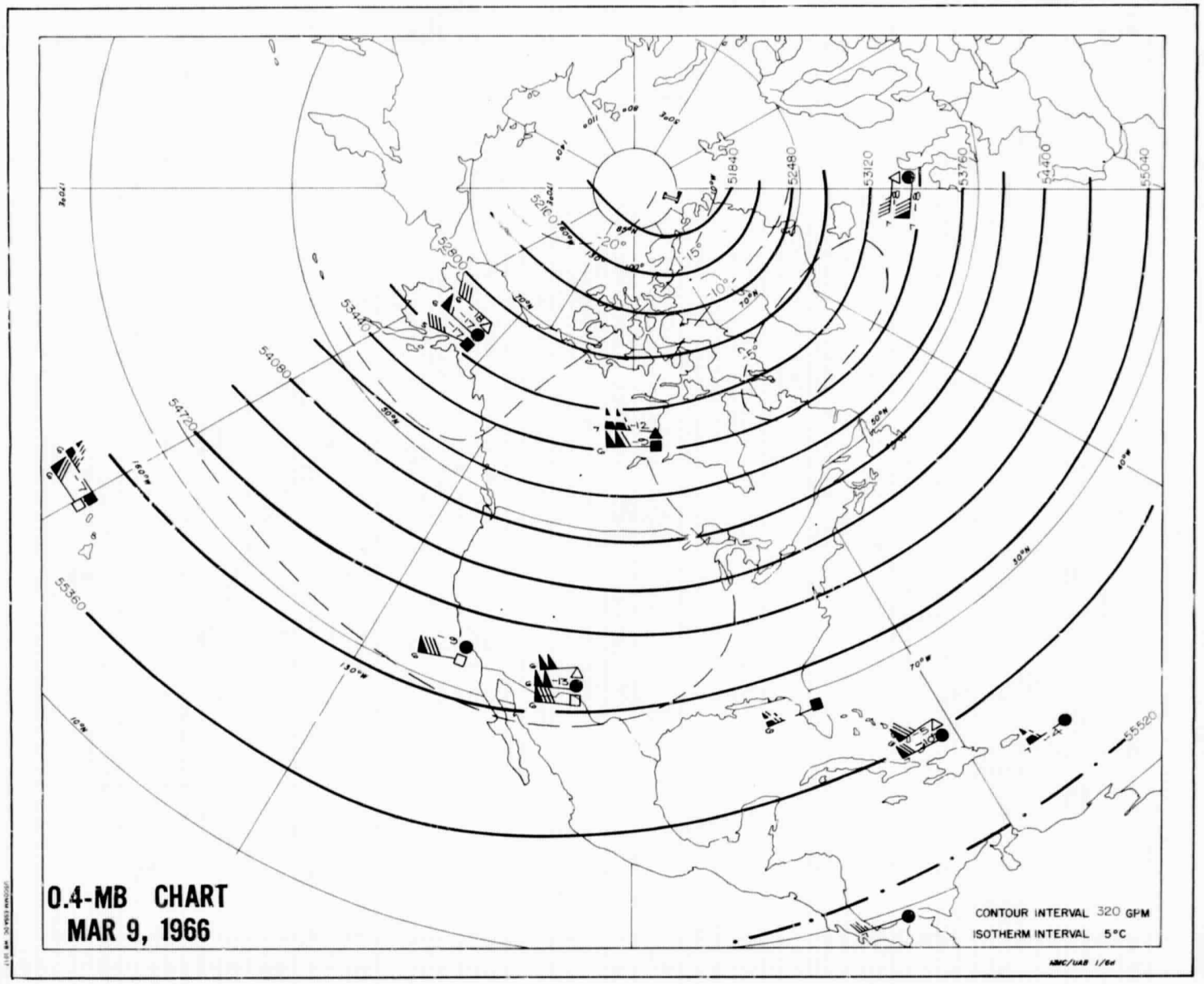

5-MB CHART
MAR 2, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
35520
35200
34560
34240
34880
35040
35680

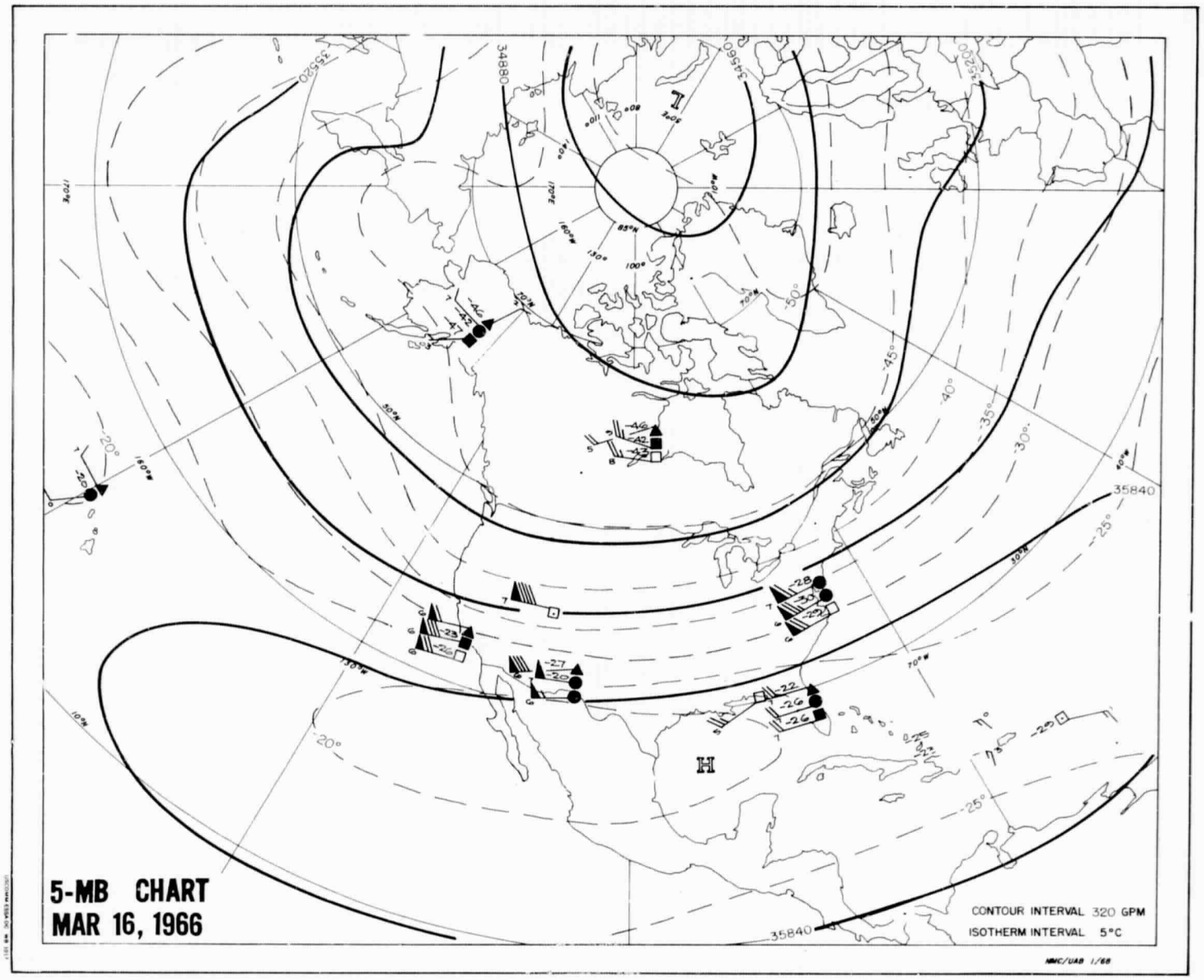

2-MB CHART
MAR 2, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
42560
42240
41920
41600
41280
40960
40640
170°E
160°W
150°W
140°W
130°W
120°W
110°W
100°W
90°W
80°W
70°W
60°W
50°W
40°W
30°W


0.4-MB CHART
MAR 2, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
52800
53440
54080
53120
53760
54400
54720
55040
55360
-30°
-25°
-20°
-15°
-10°
-5°
-2

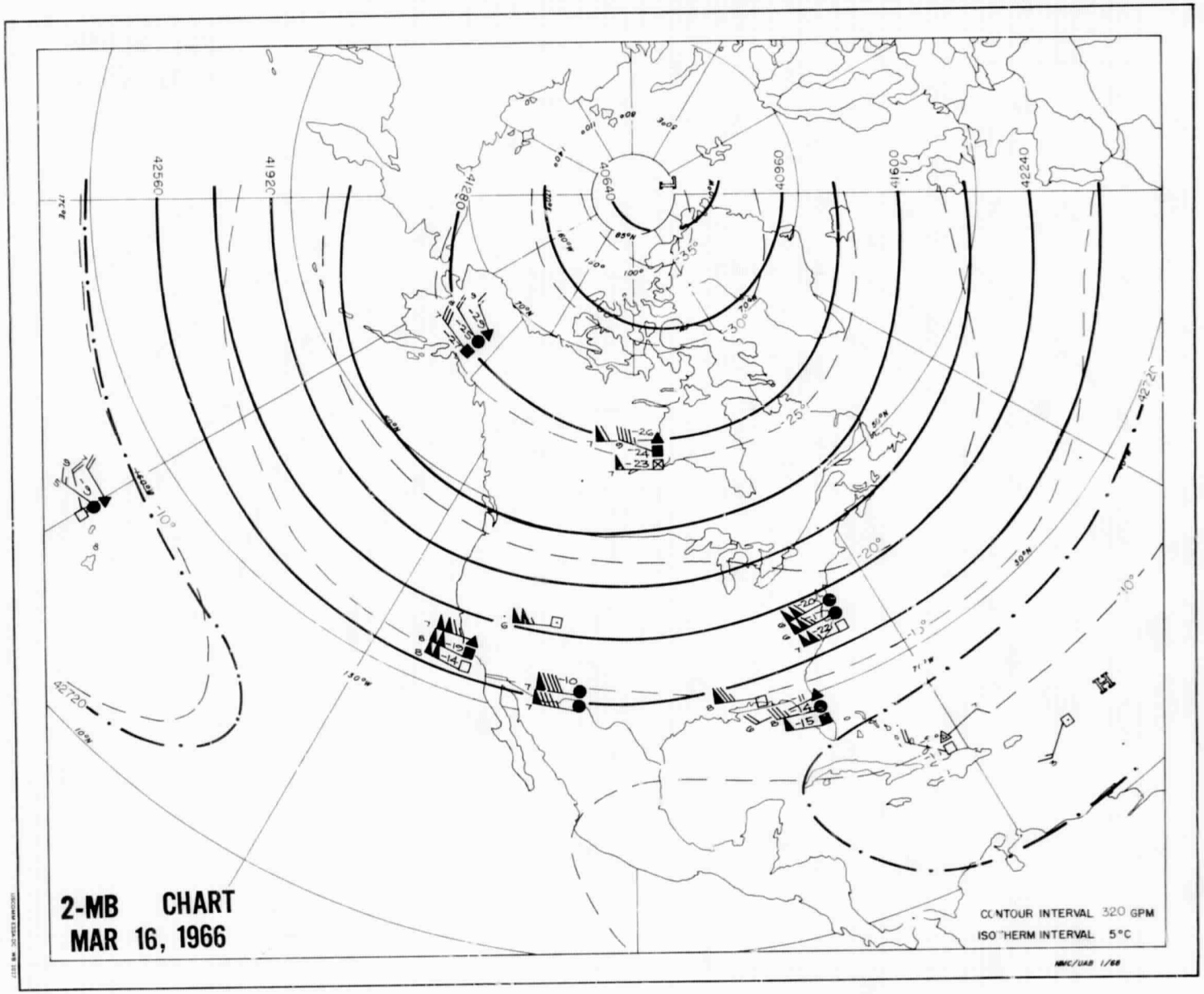

5-MB CHART
MAR 9, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
34560
34240
35520
35680
L
H
H

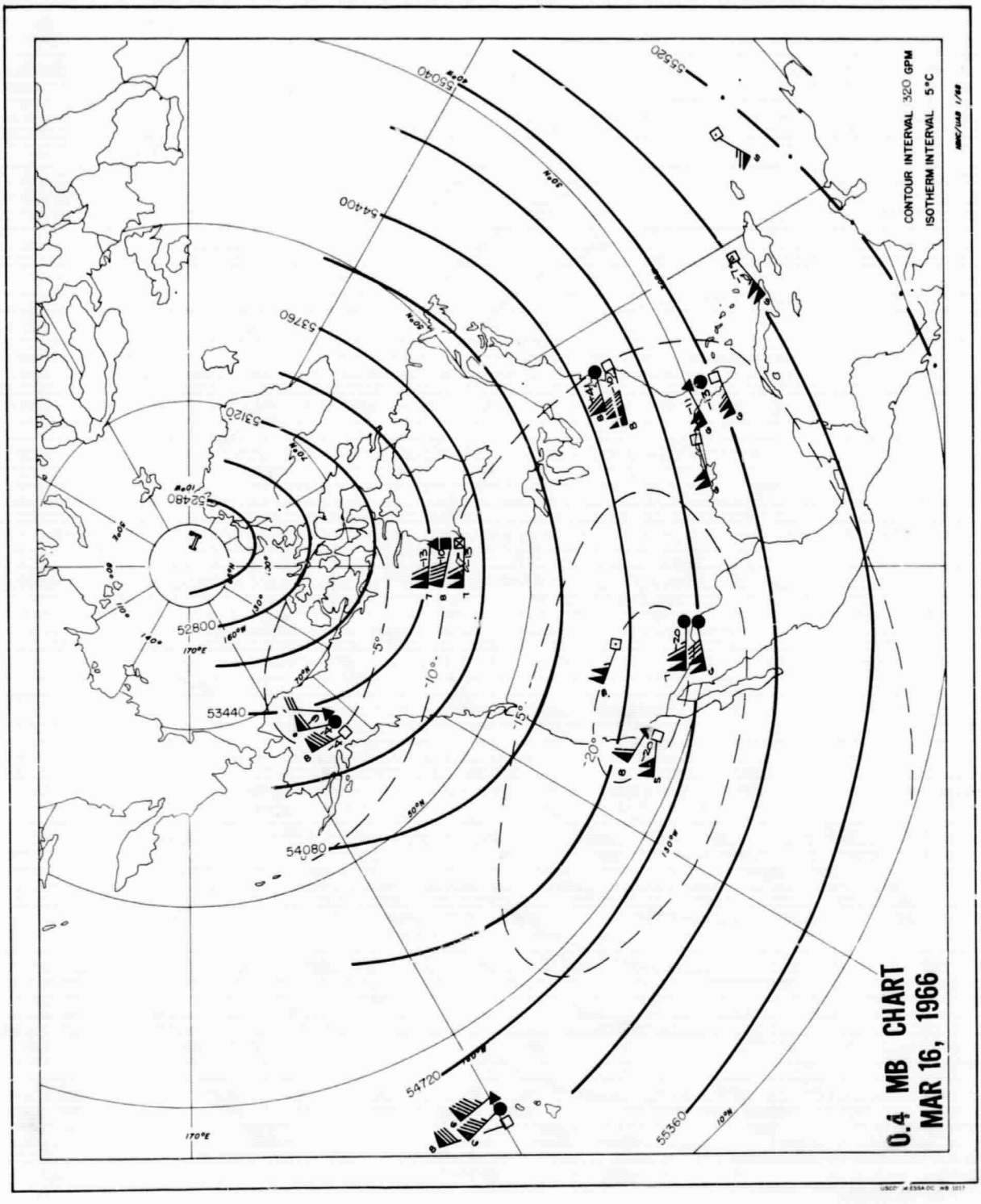

2-MB CHART
MAR 9, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/66

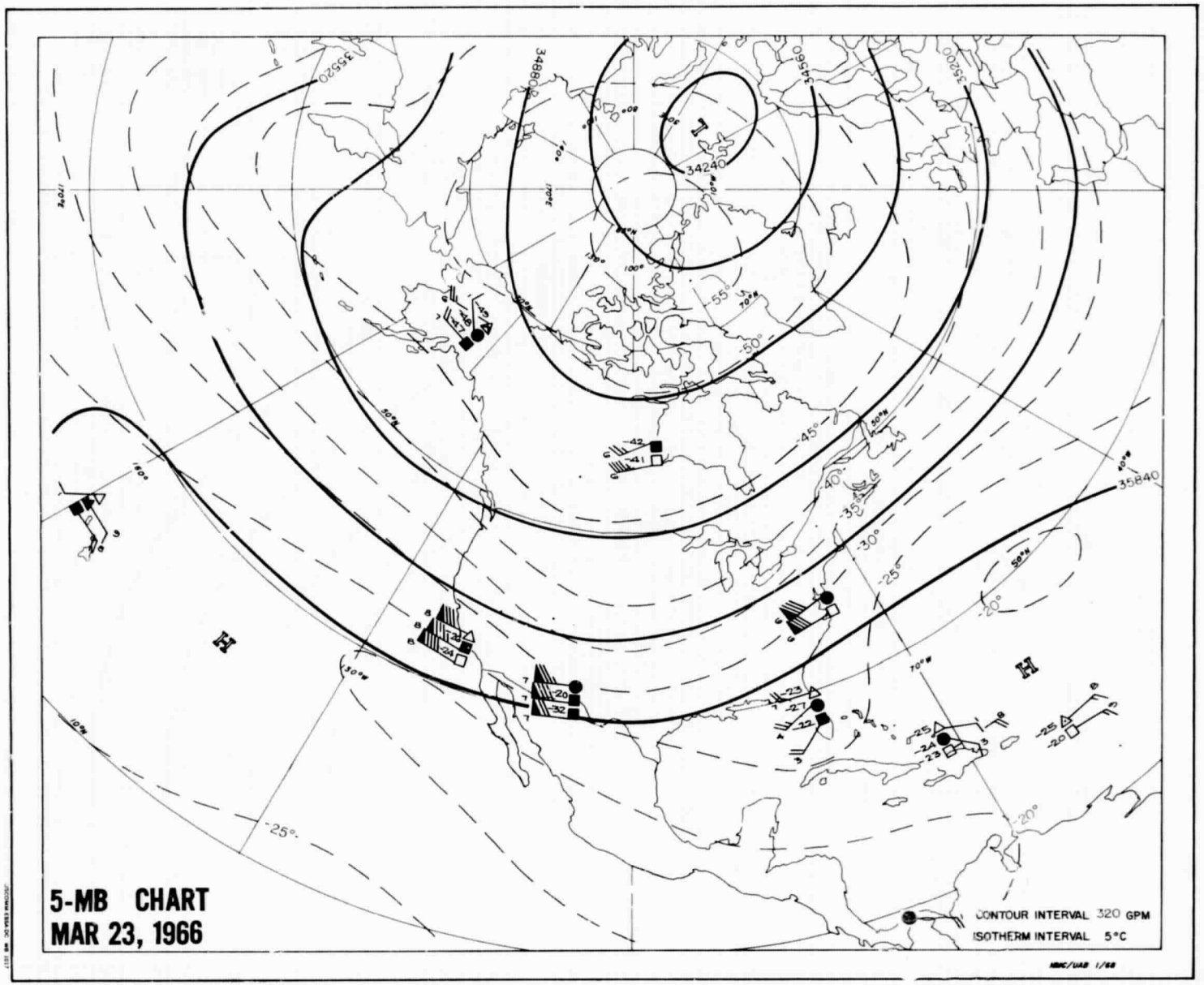

0.4-MB CHART
MAR 9, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/64

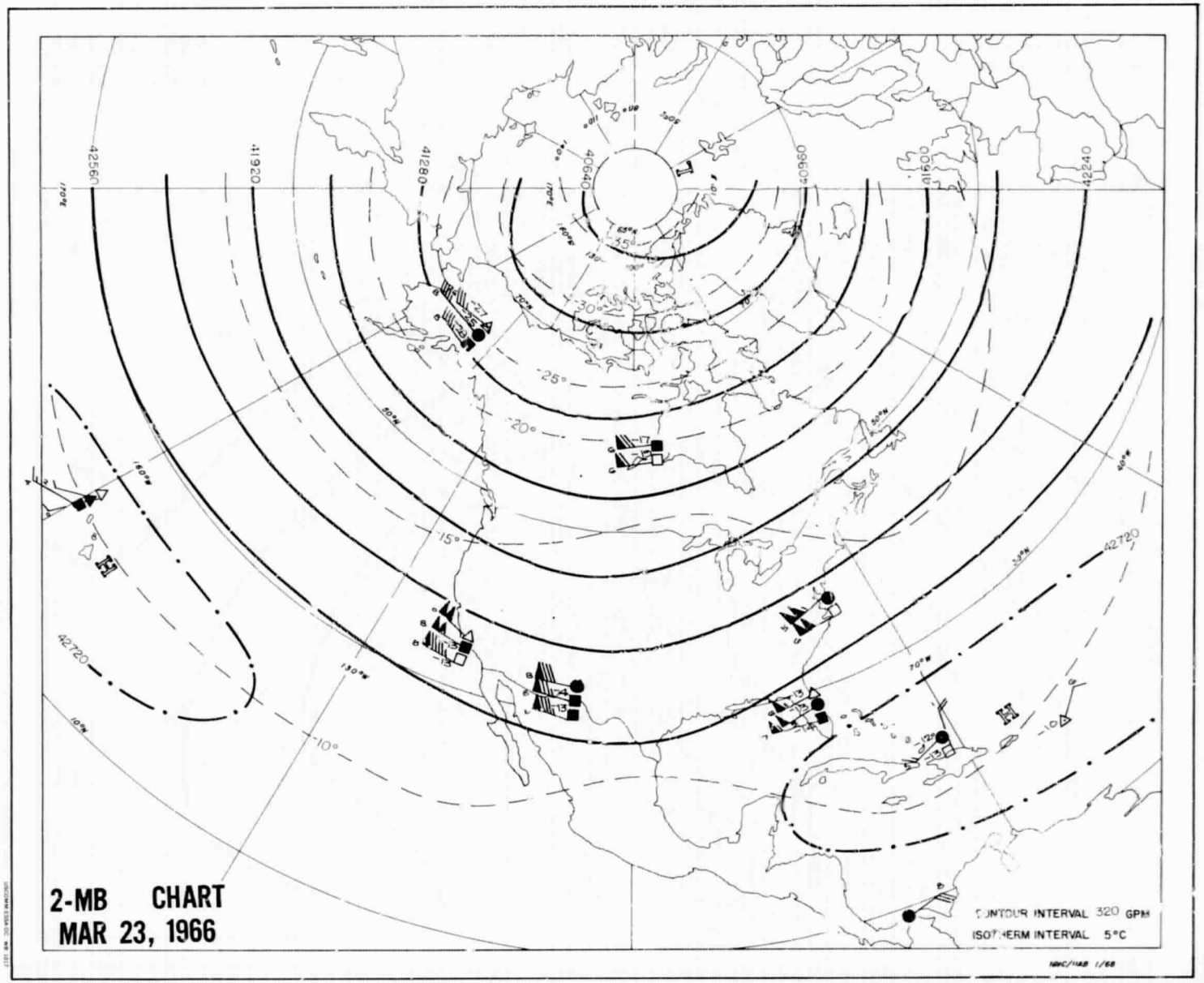

5-MB CHART
MAR 16, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68
34880
35520
35840
H

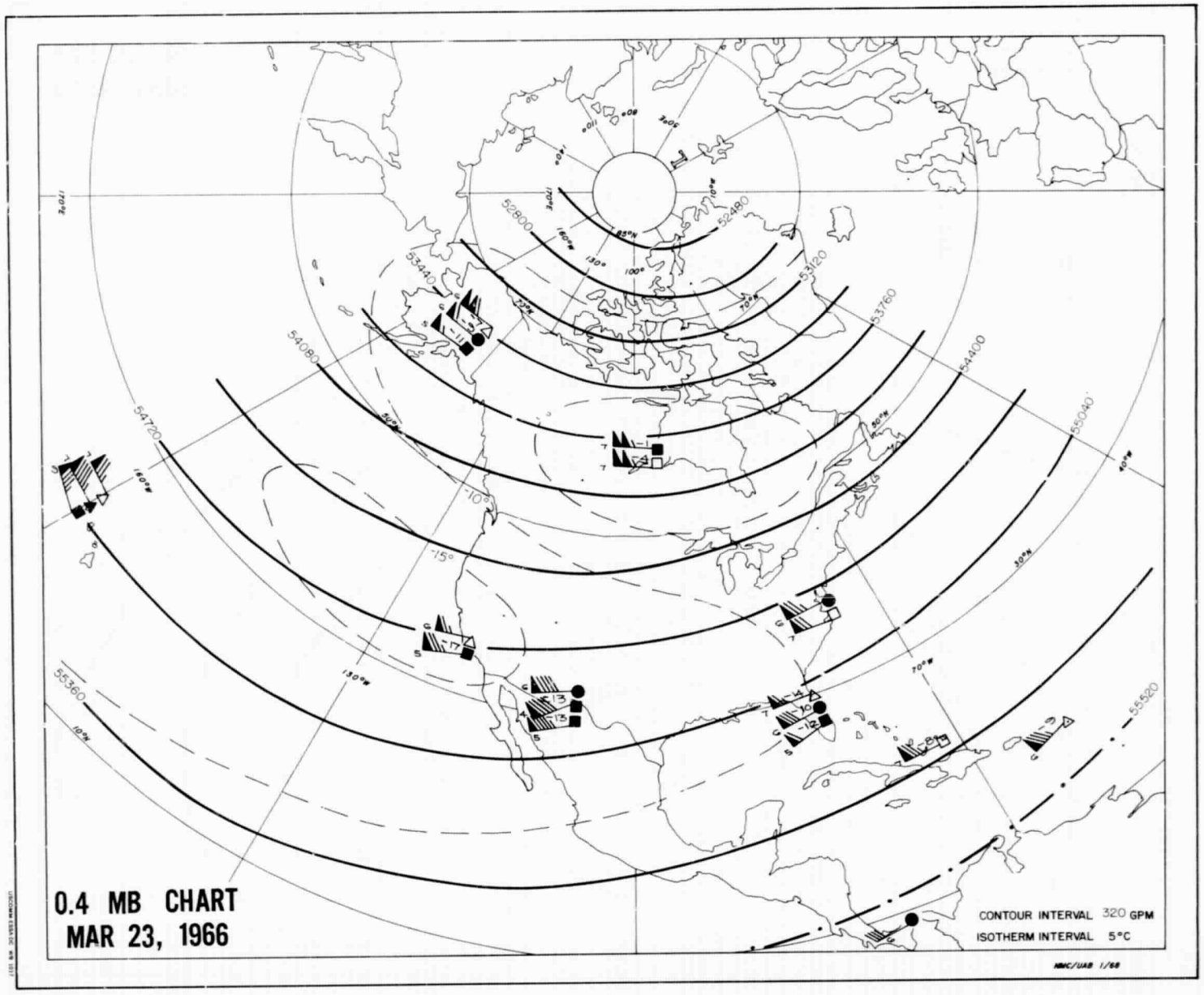
333-925 O - 69 - 4

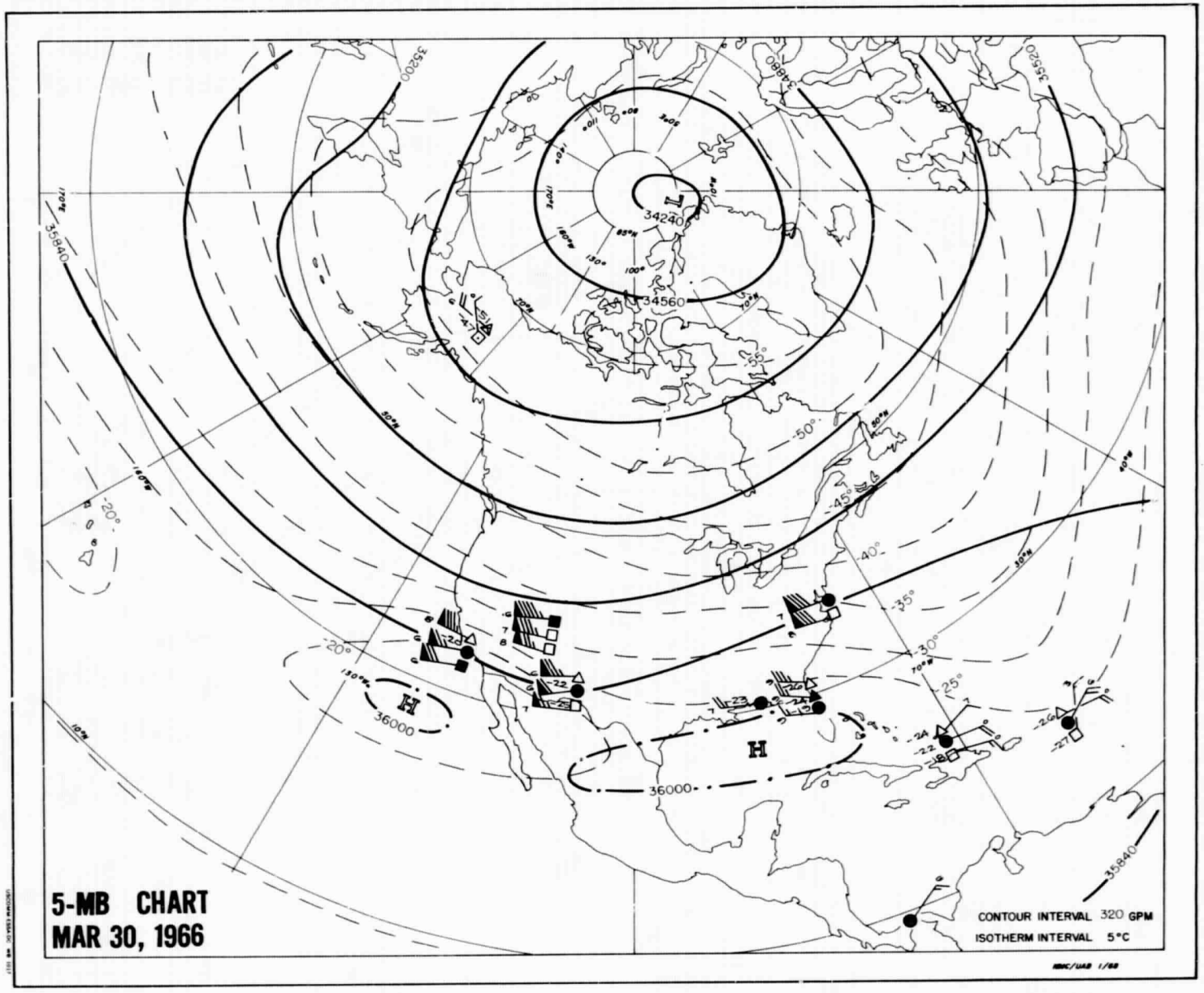

2-MB CHART
MAR 16, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68
42560
41920
41280
40640
40960
41600
42240
42720
-10°
-20°
-25°
-30°
-35°
130°W

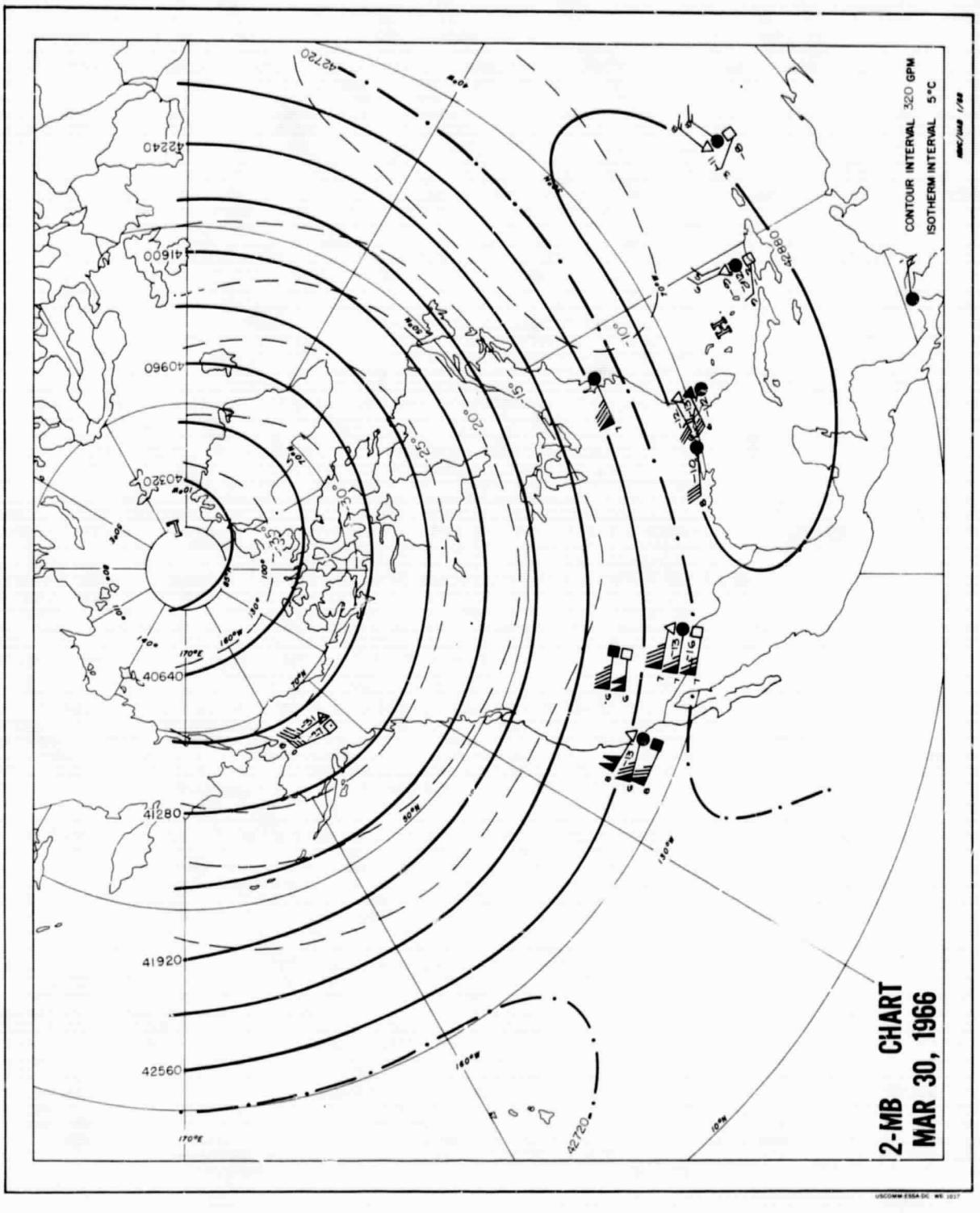

0.4 MB CHART
MAR 16, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
52480
52800
53120
53440
53760
54080
54400
54720
55040
55360
55520
-5°
-10°
-15°
-20°
50°N
70°N
90°N
110°
130°W
150°
170°E
160°W

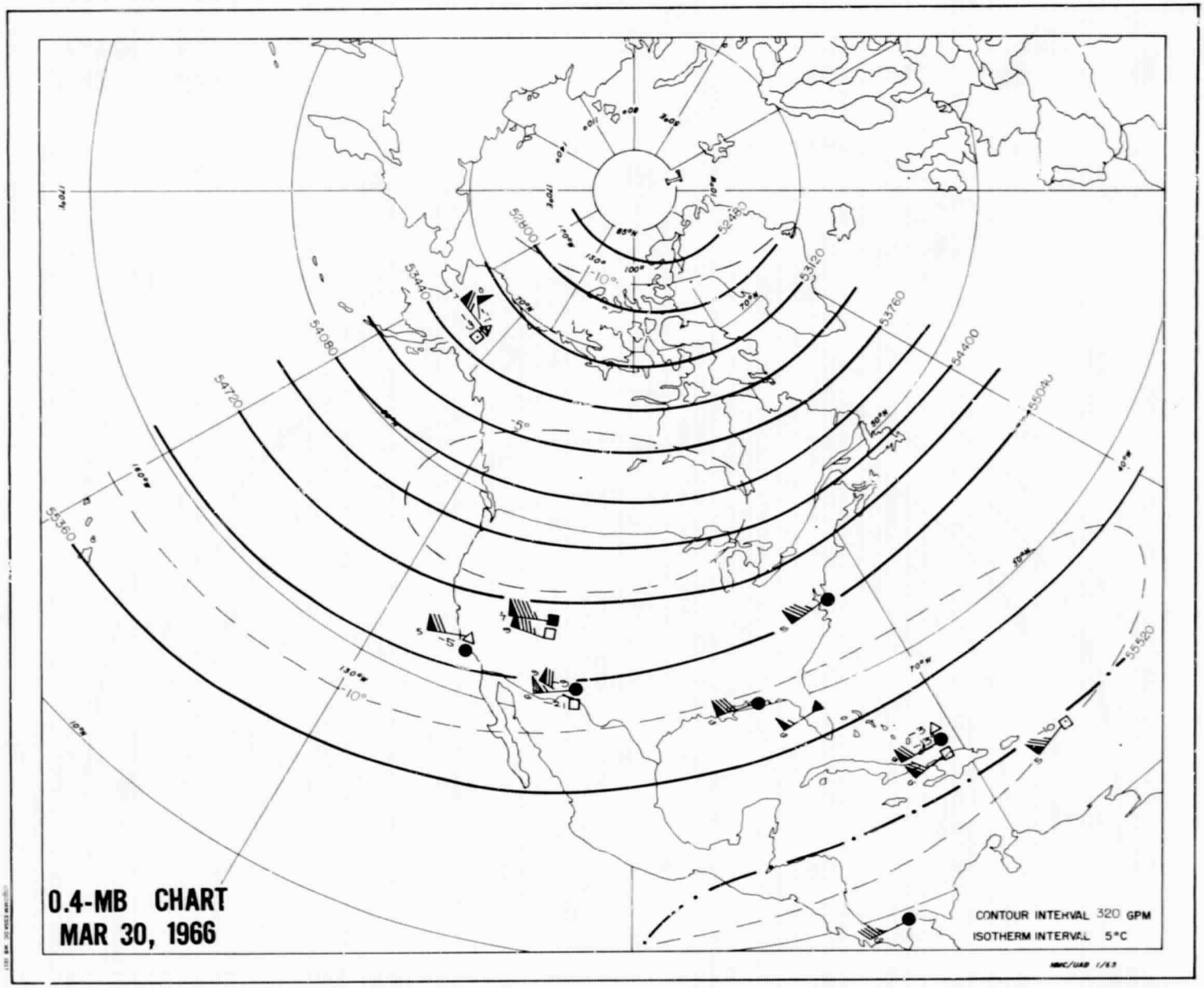

5-MB CHART
MAR 23, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

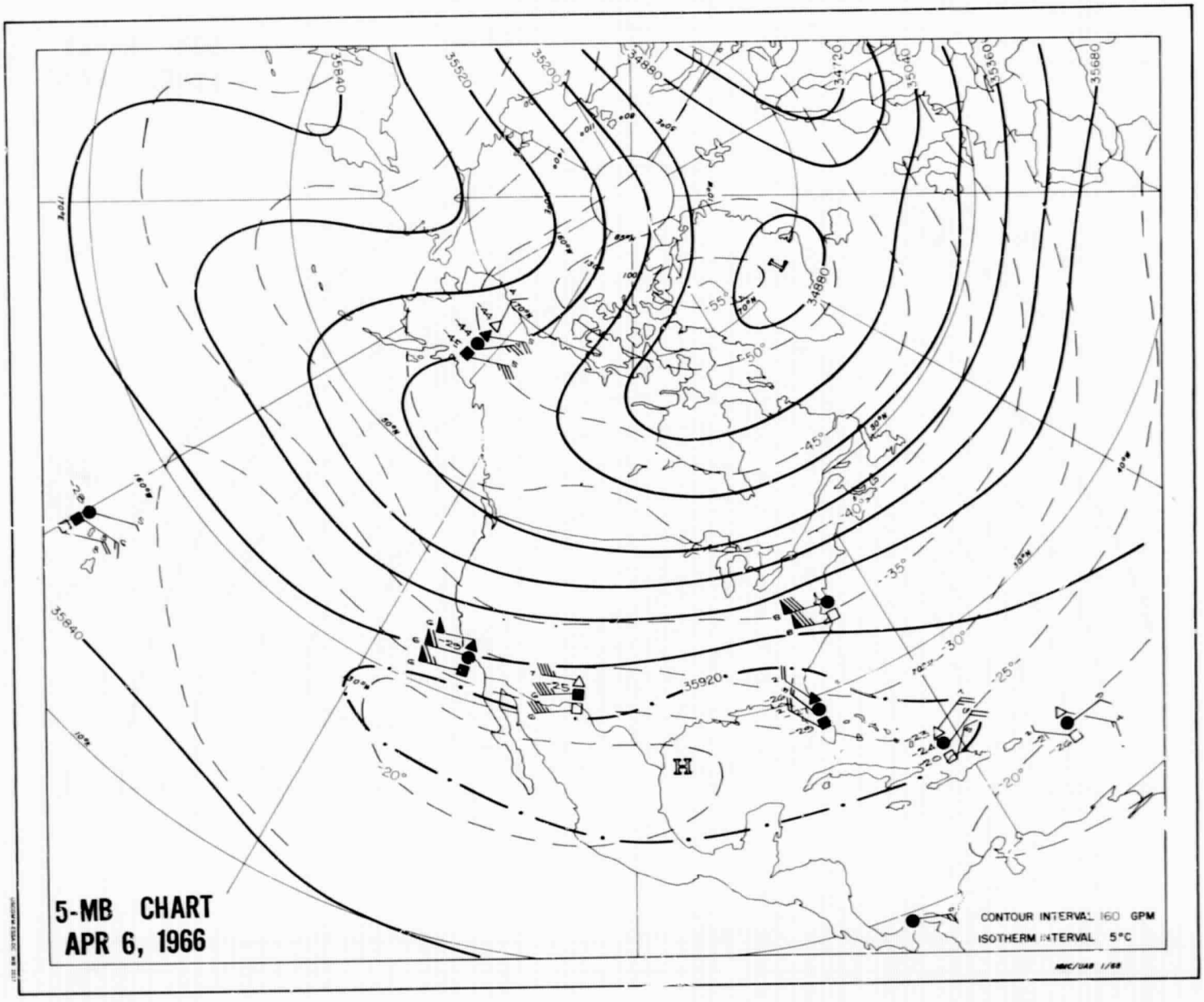

2-MB CHART
MAR 23, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/NAB 1/68

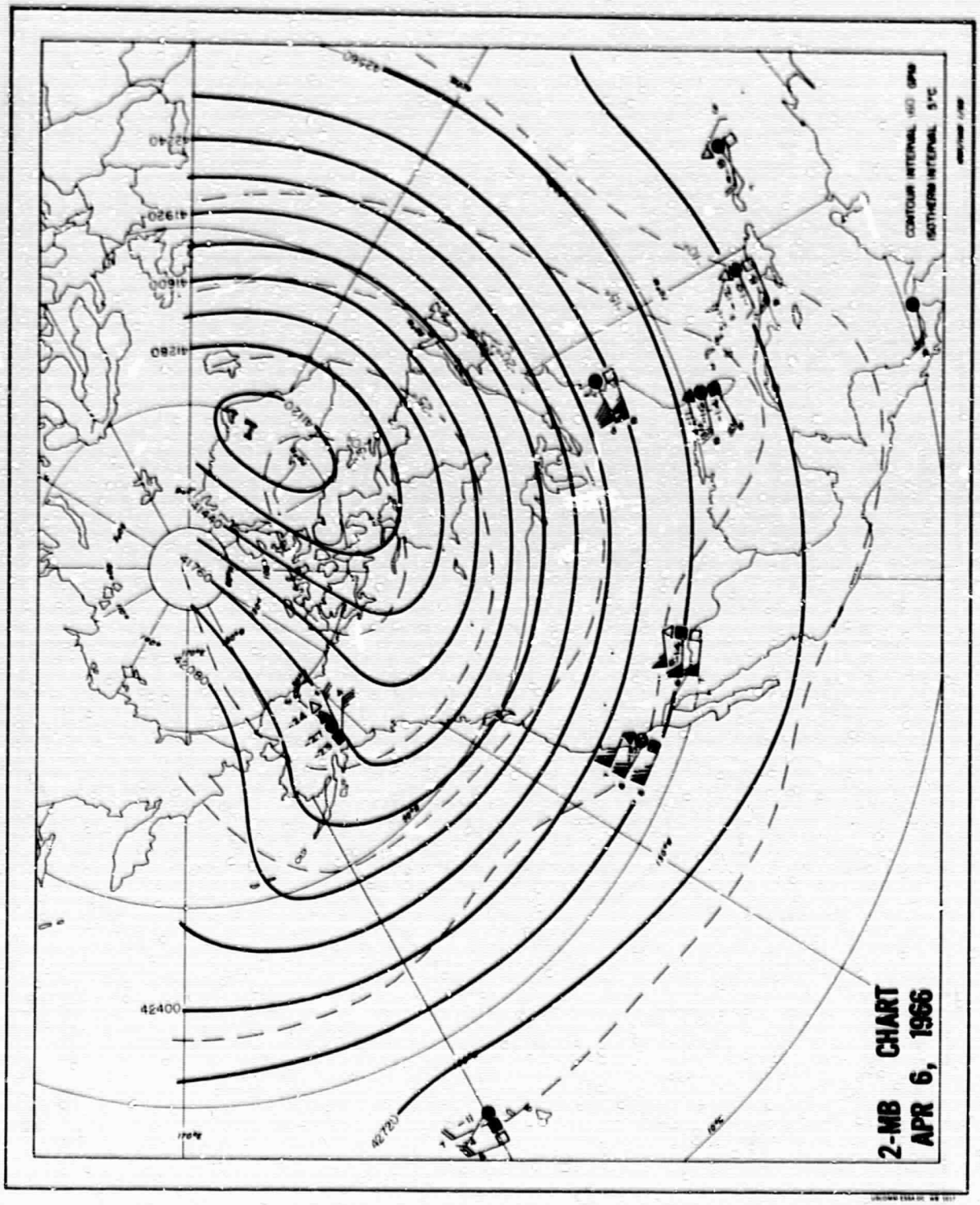

0.4 MB CHART
MAR 23, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68
52800
52480
53440
53120
53760
54080
54400
54720
55040
55360
55520
-10°
-15°
85°N
80°N
70°N
50°N
30°N
160°W
150°W
130°W
100°W
70°W
40°W

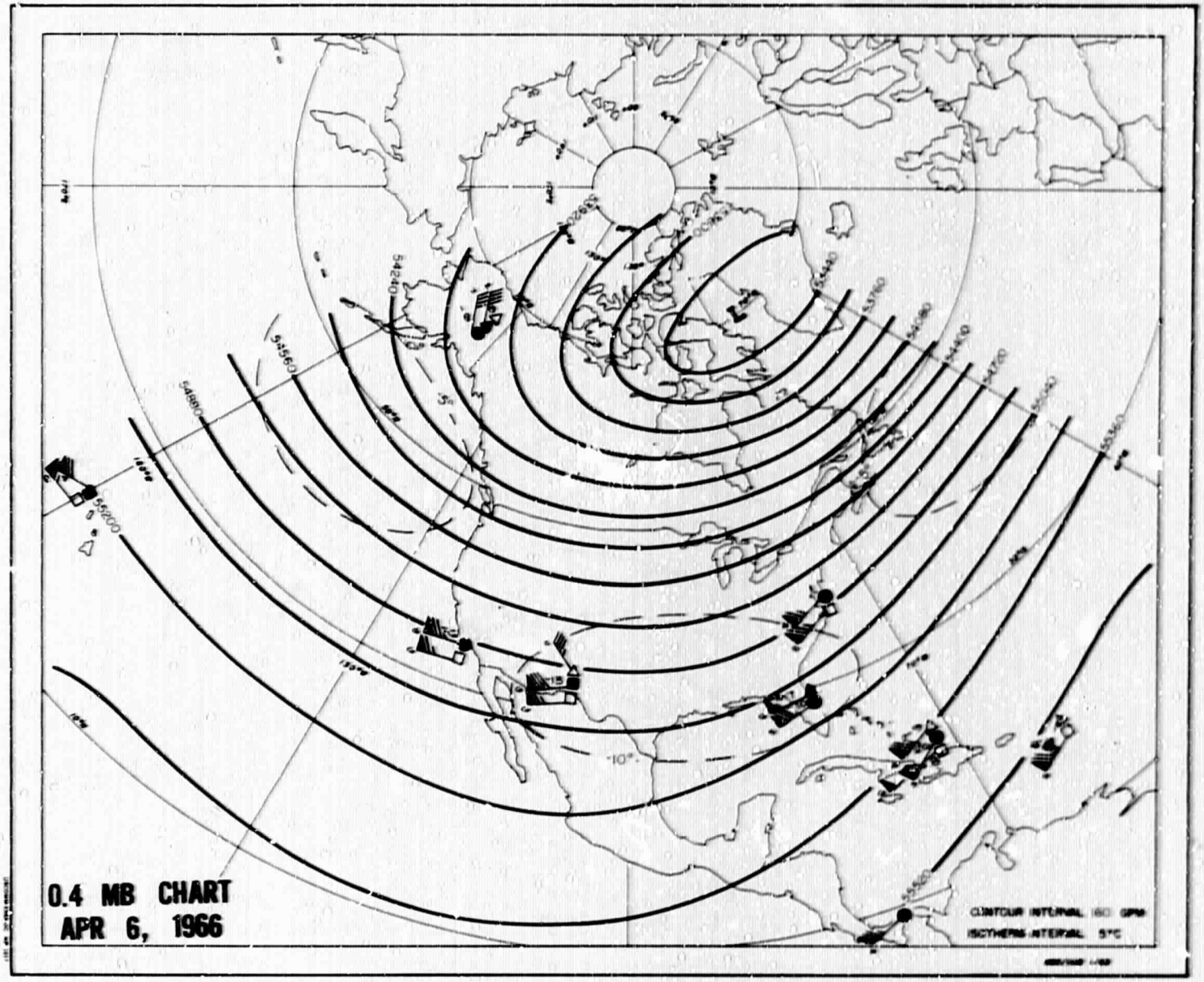

5-MB CHART
MAR 30, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
L
34240
34560
H
36000
H
36000
35200
35520
35840
-20°
-25°
-30°
-35°
-40°
-45°
-50°
-55°

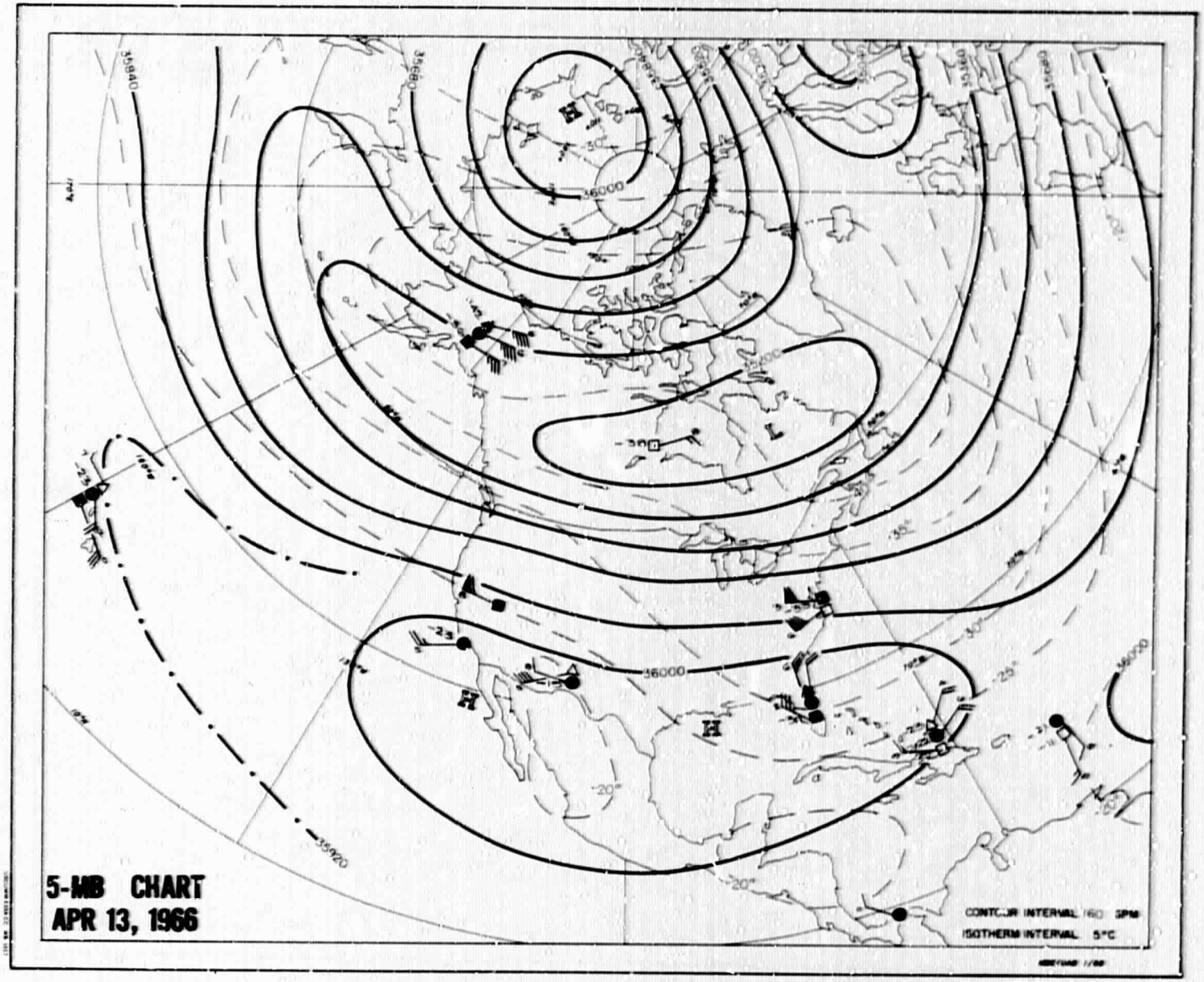

2-MB CHART
MAR 30, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
42720
42240
41600
40960
40320
40640
41280
41920
42560
42880
-10°
-15°
-20°
-25°
-30°
L
H

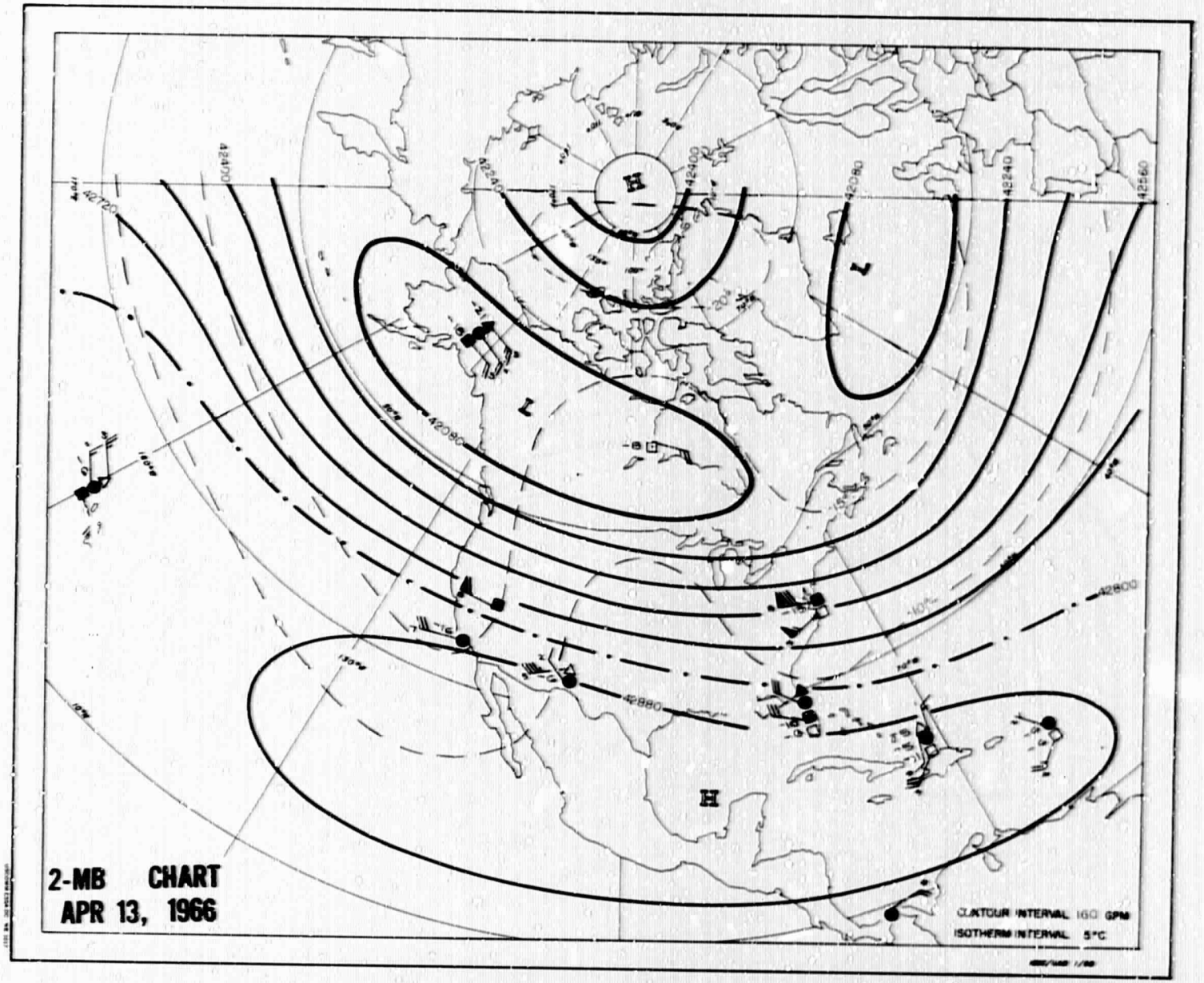

0.4-MB CHART
MAR 30, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
52480
52800
53120
53440
53760
54080
54400
54720
55040
55360
55520
-10°
-5°
-10°


5-MB CHART
APR 6, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
H
L

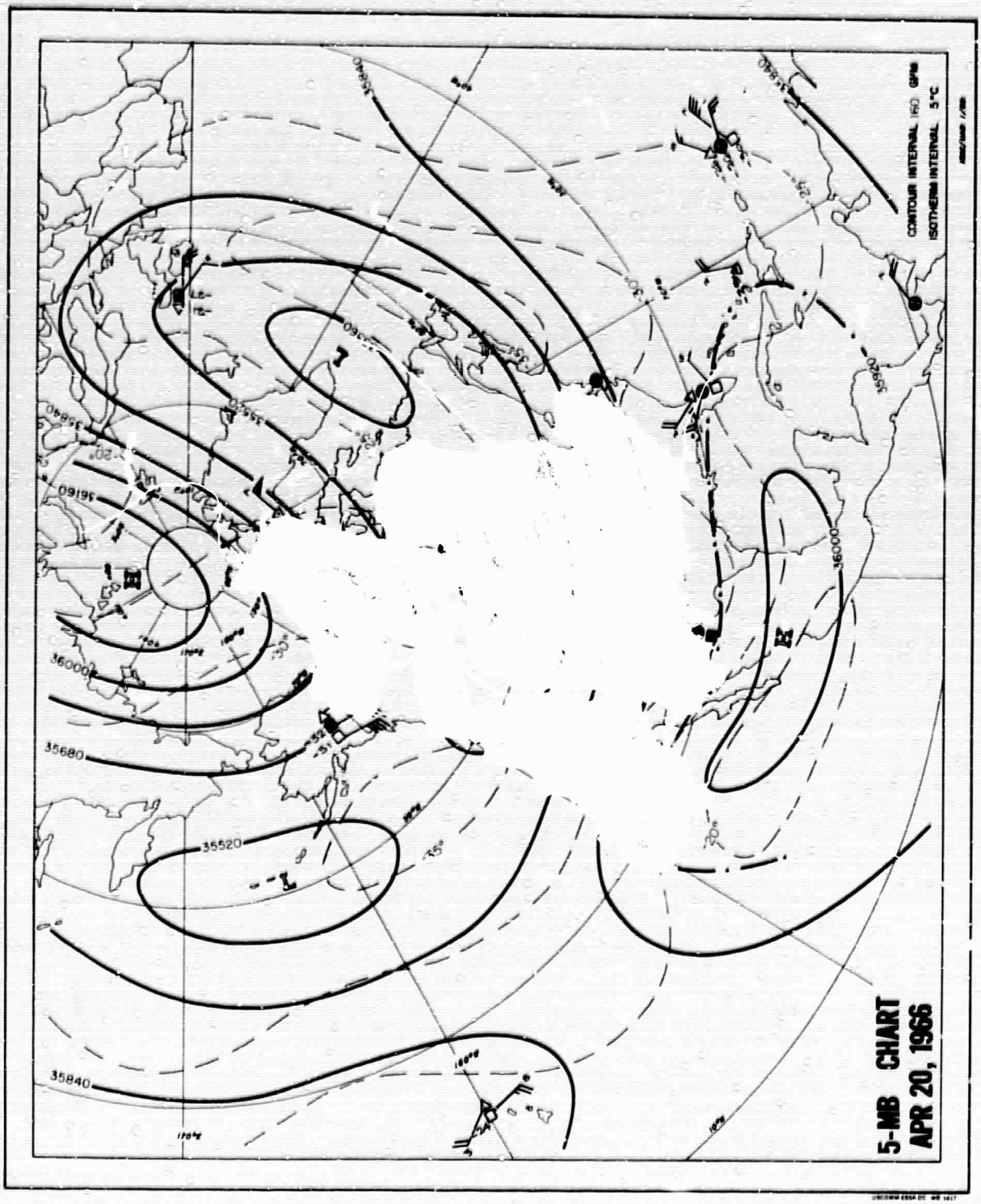

2-MB CHART
APR 6, 1966
CONTOUR INTERVAL 120 GPM
ISOTHERM INTERVAL 5°C
42400
42720

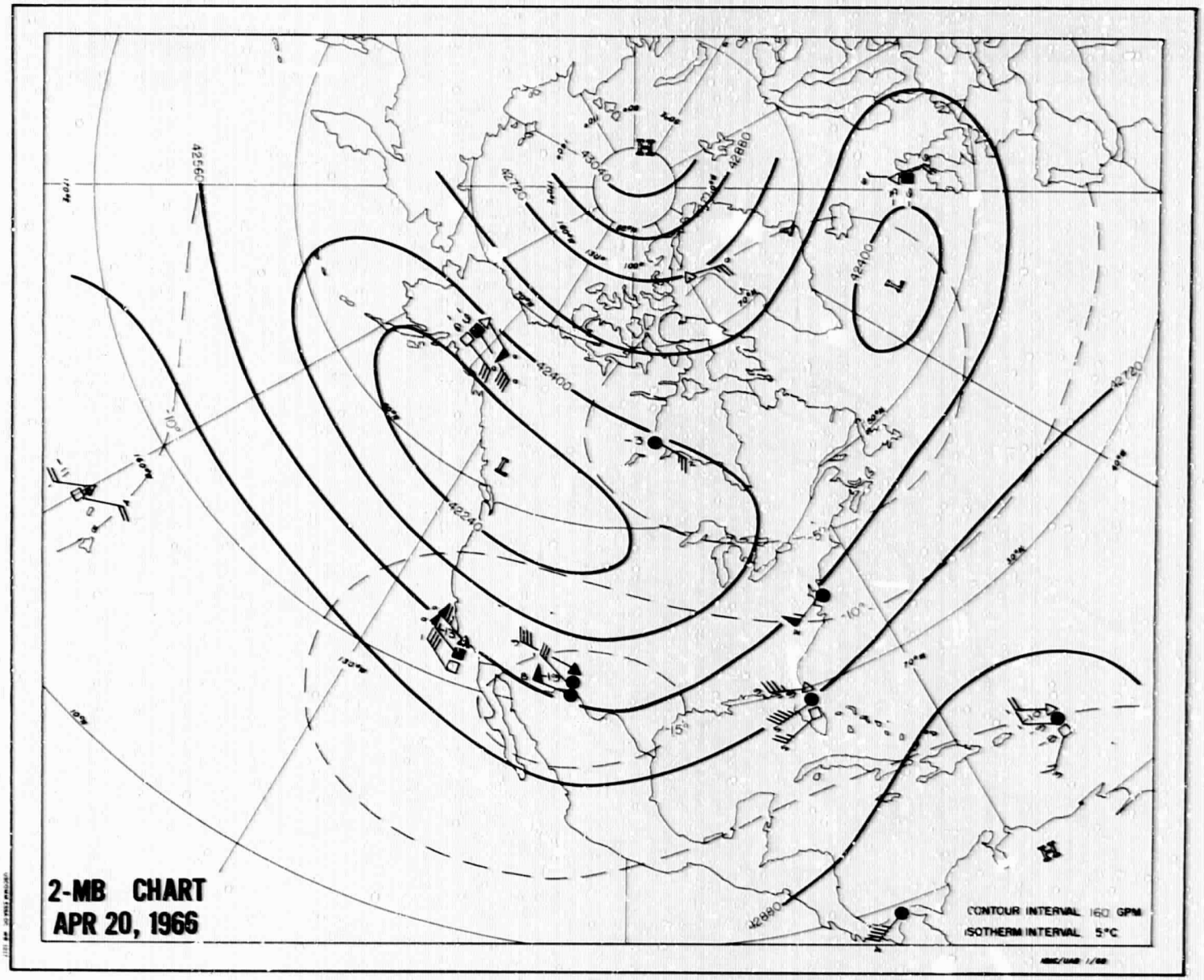

0.4 MB CHART
APR 6, 1966

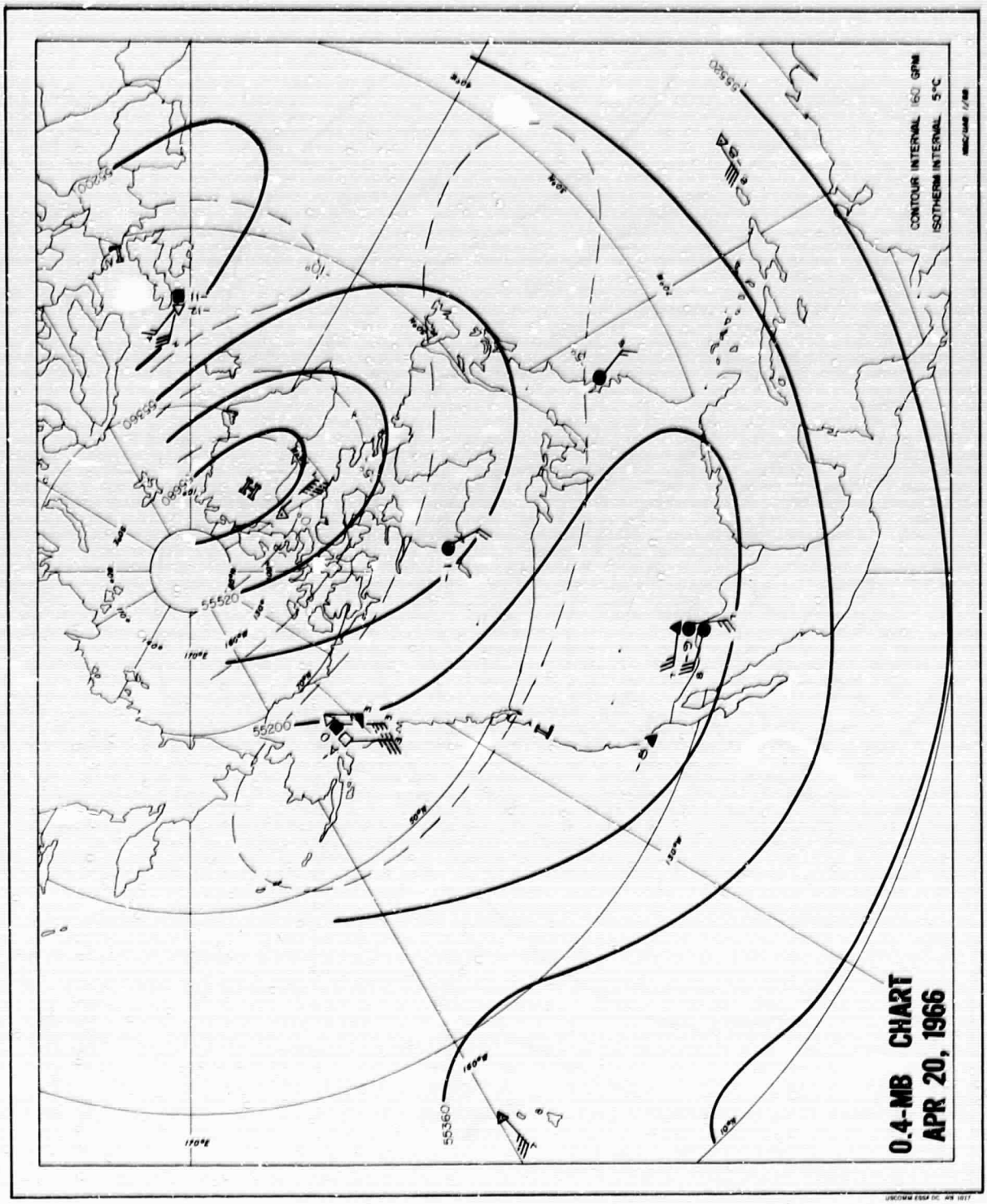

5-MB CHART
APR 13, 1966
CONTOUR INTERVAL 60 DAM
ISOTHERM INTERVAL 5°C

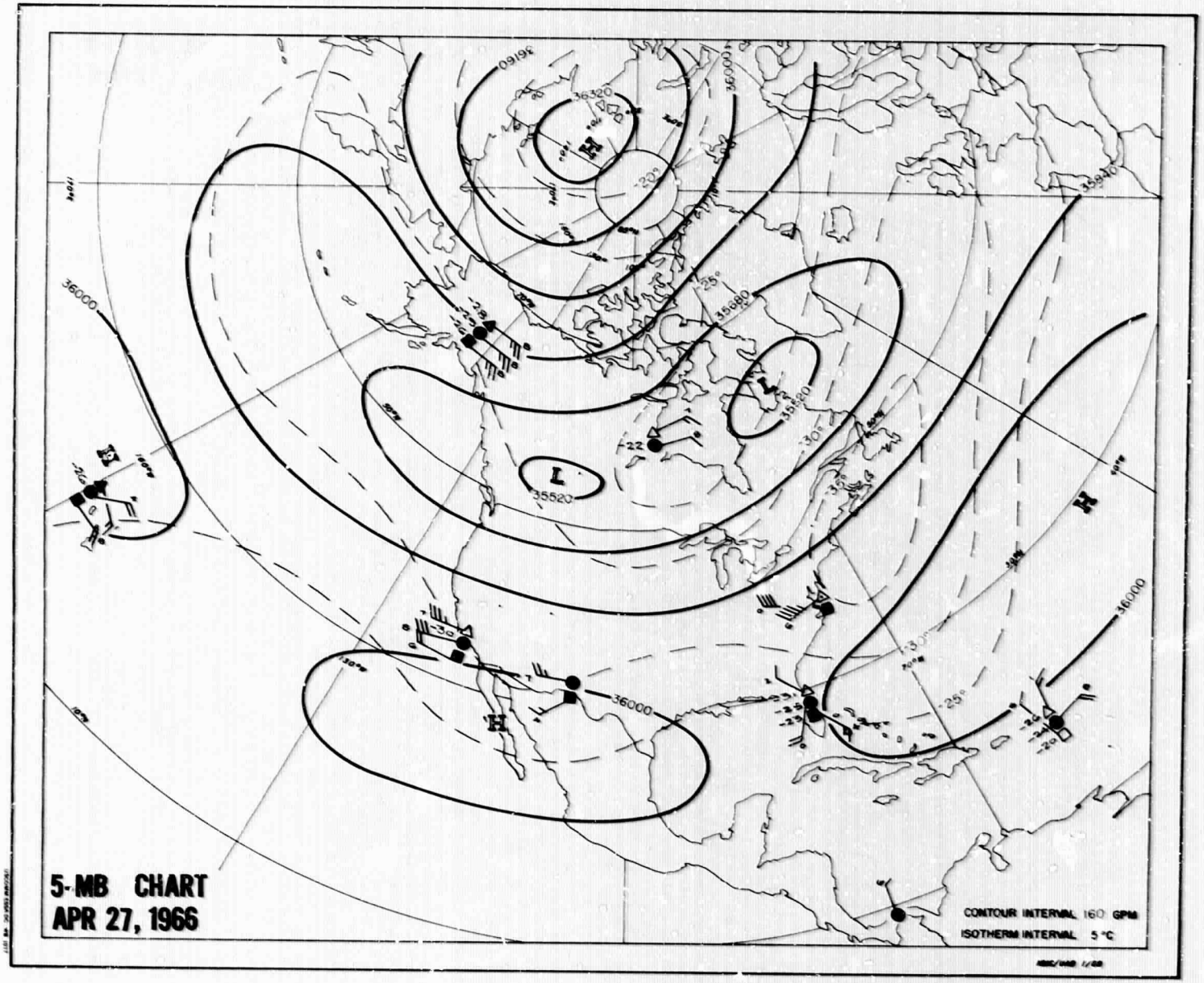

2-MB CHART
APR 13, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C

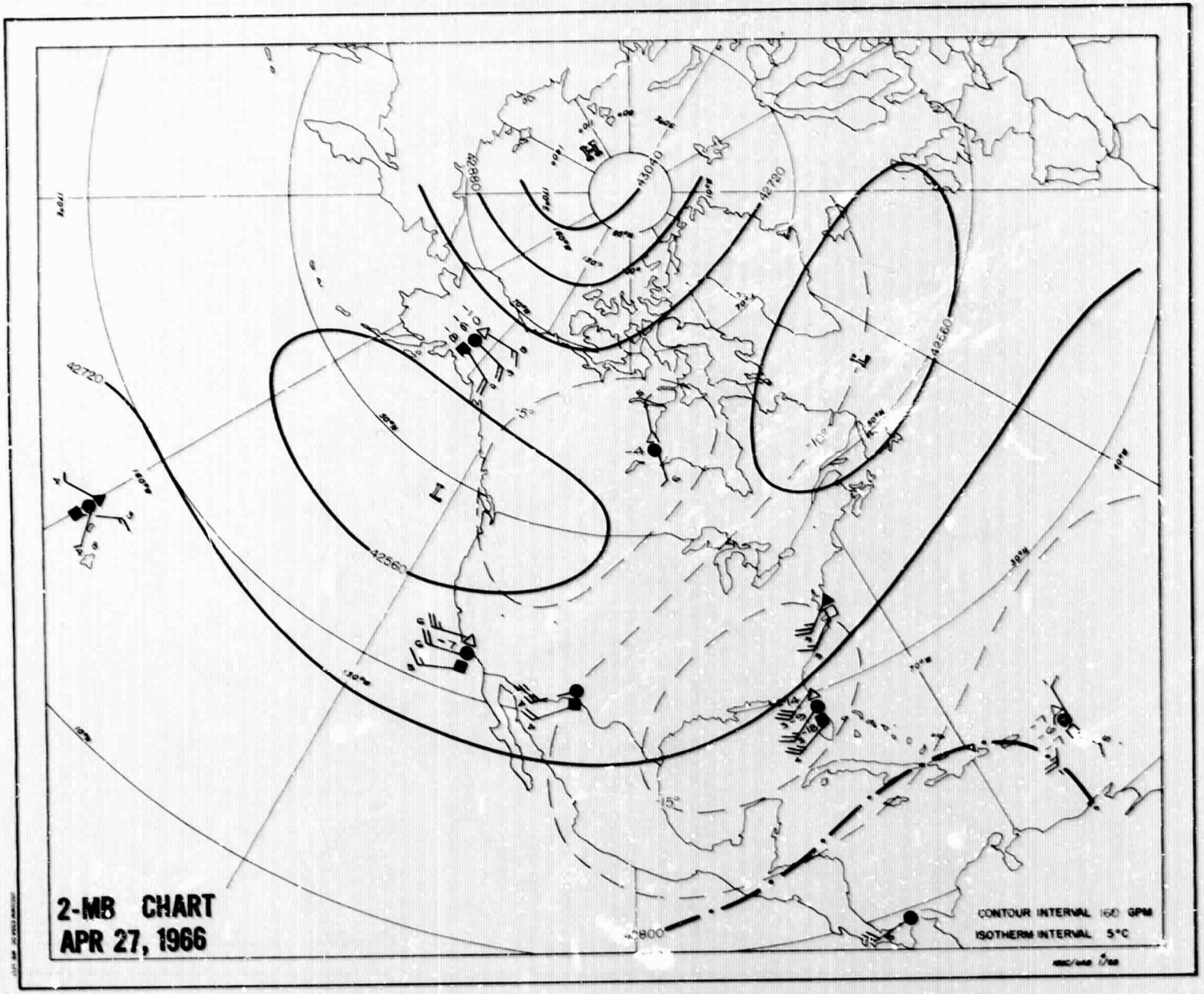
0.4 MB CHART
APR 13, 1966
CONTOUR INTERVAL 60 GPM
ISOTHERM INTERVAL 5°C
54400
54720
55040
55360
54880
54560


5-MB CHART
APR 20, 1966
CONTOUR INTERVAL 150 GPm
ISOTHERM INTERVAL 5°C
35840
35520
35680
36000
36160


2-MB CHART
APR 20, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
H
L
42560
43040
42880
42720
42400
42240
42880


0.4-MB CHART
APR 20, 1966
CONTOUR INTERVAL 60 GPM
ISOTHERM INTERVAL 5°C
55520
55200
55360

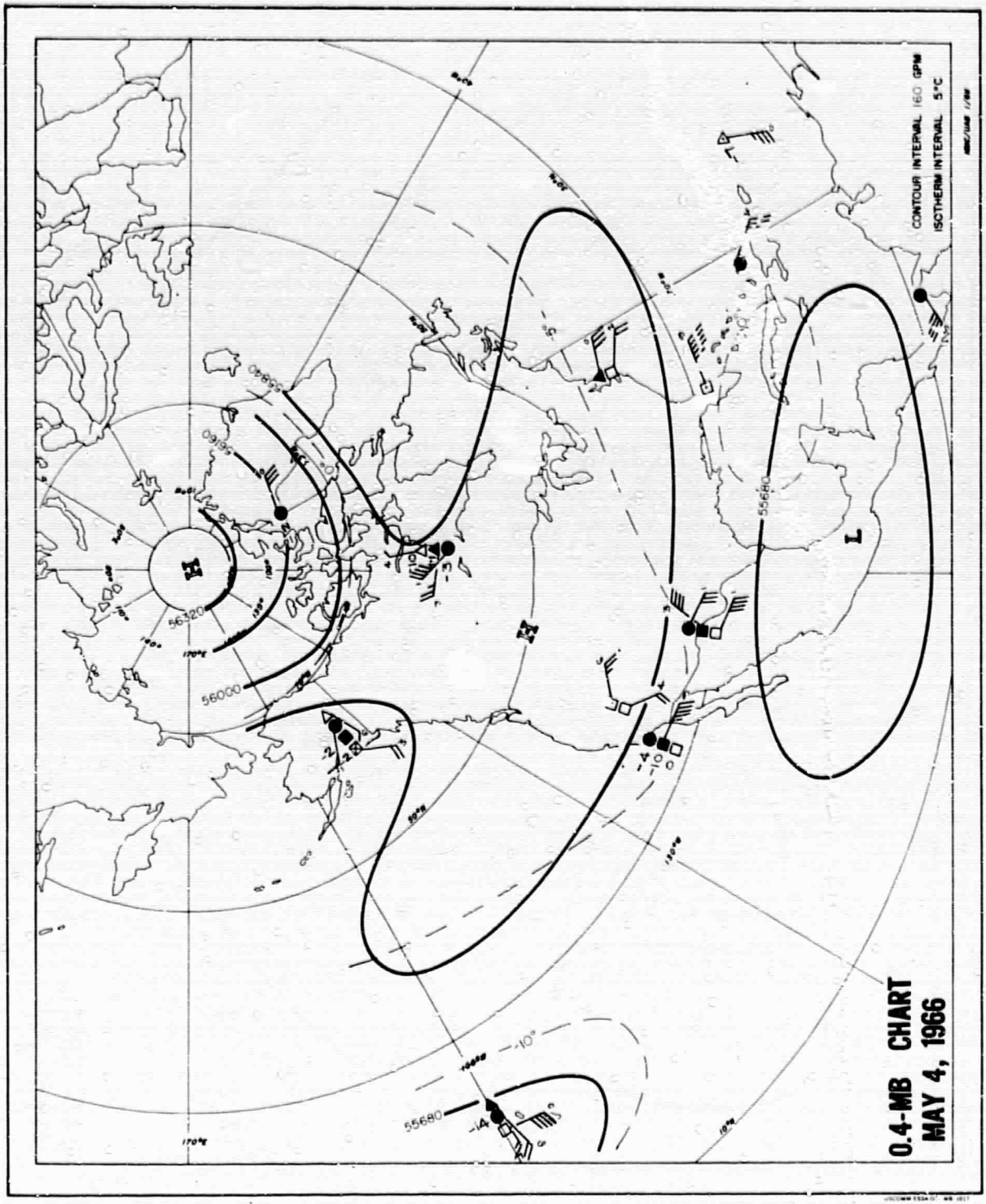

5-MB CHART
APR 27, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5 °C
36160
36320
36000
35840
35680
35520
-25°
-30°
-22
-20°


2-MB CHART
APR 27, 1966
CONTOUR INTERVAL 150 GPM
ISOTHERM INTERVAL 5°C

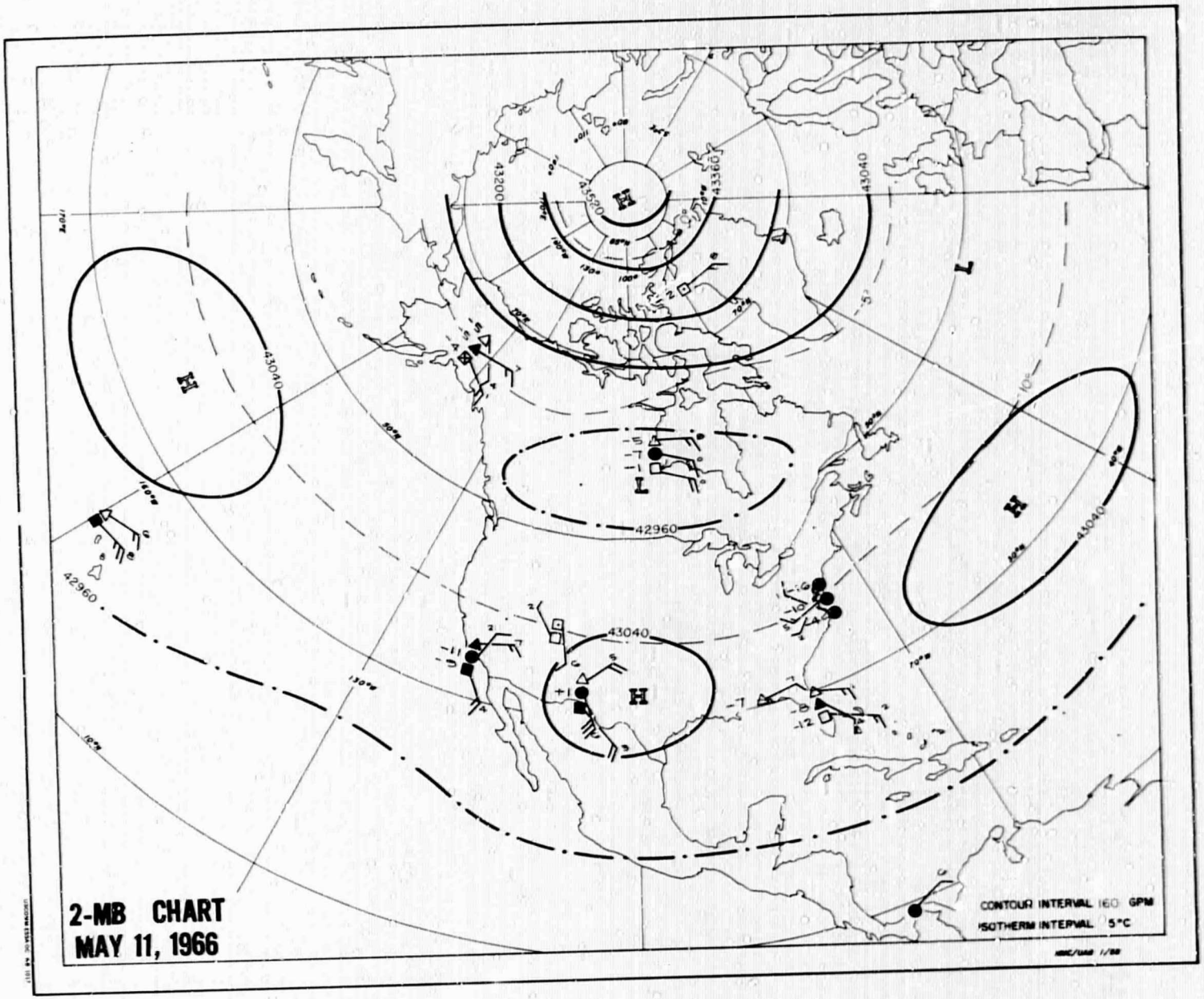
0.4-MB CHART
APR 27, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
55520
55360
55640
-5°

5-MB CHART
MAY 4, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
H
L
36080
36000
35840
35680
36320
36160

2-MB CHART
MAY 4, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
42880
43040
43200
43360
42960
H
L

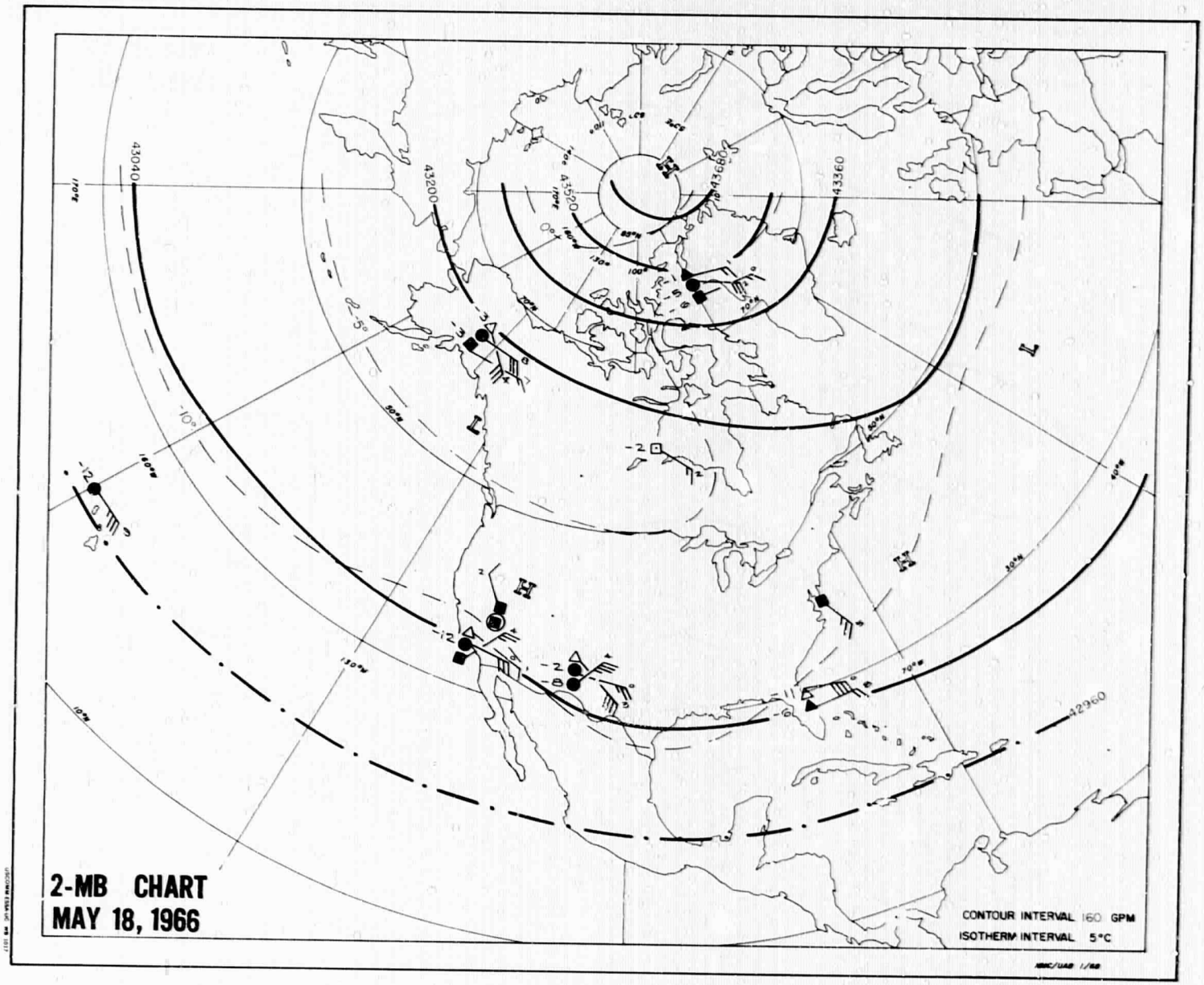

0.4-MB CHART
MAY 4, 1966
CONTOUR INTERVAL 180 GPM
ISOTHERM INTERVAL 5°C
H
L
56320
56000
55680

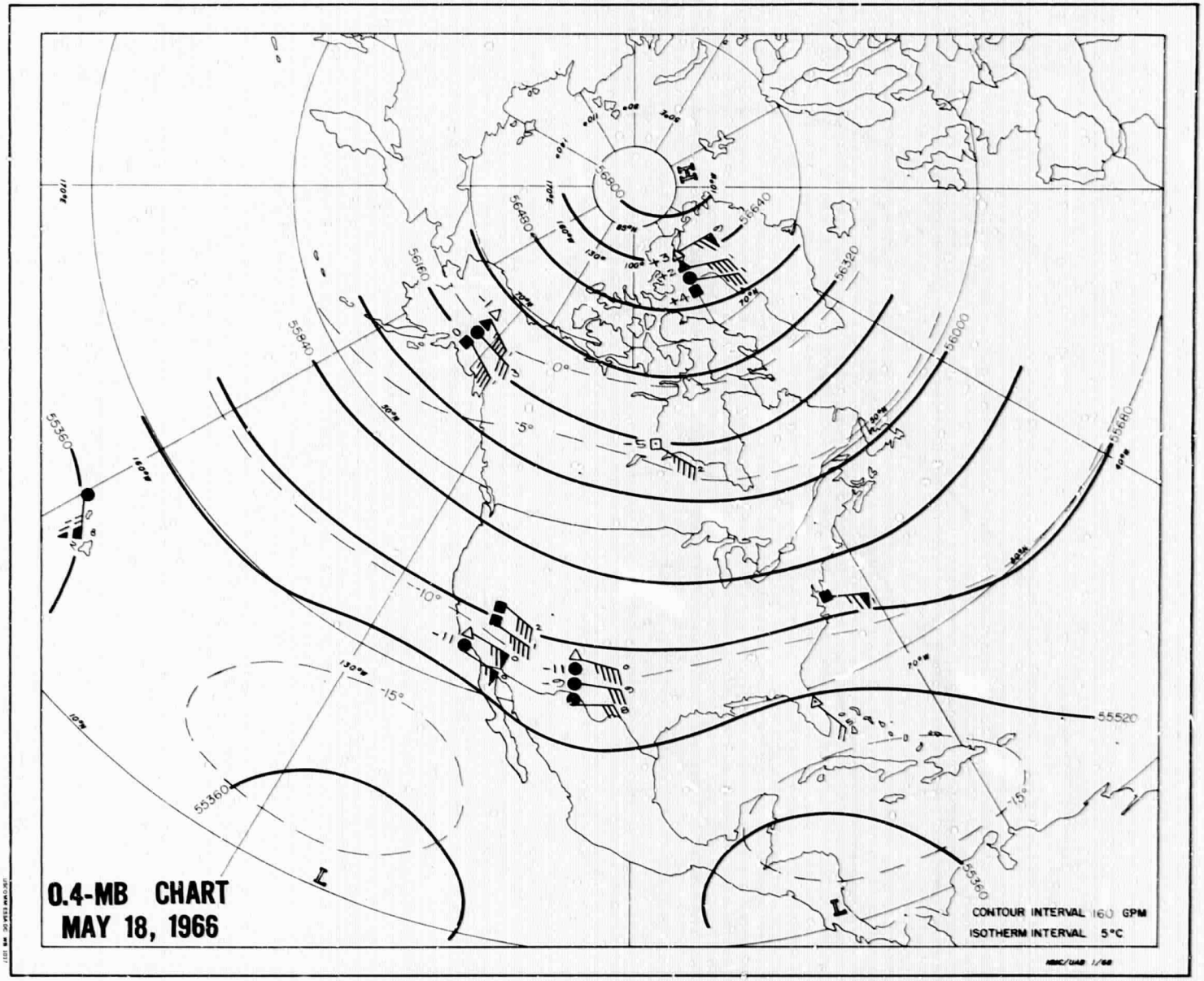
5-MB CHART
MAY 11, 1966
CONTOUR INTERVAL 120 GPM
ISOTHERM INTERVAL 5°C

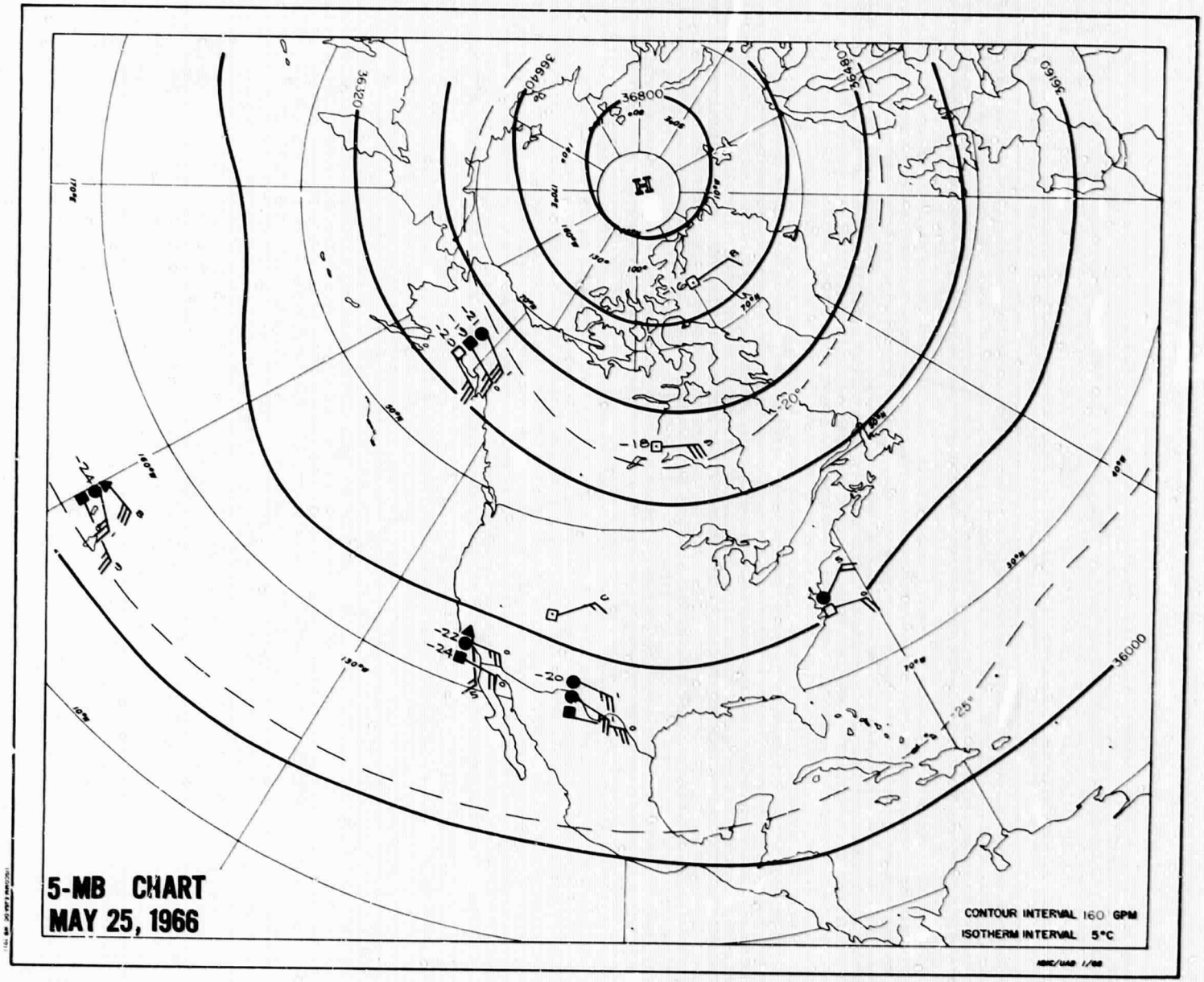

2-MB CHART
MAY 11, 1966
CONTOUR INTERVAL 180 GPM
ISOTHERM INTERVAL 5°C
H
L
43040
42960
43200
43360

0.4-MB CHART
MAY 11, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
H
L
55520
55840
56160
56320
56000
55680

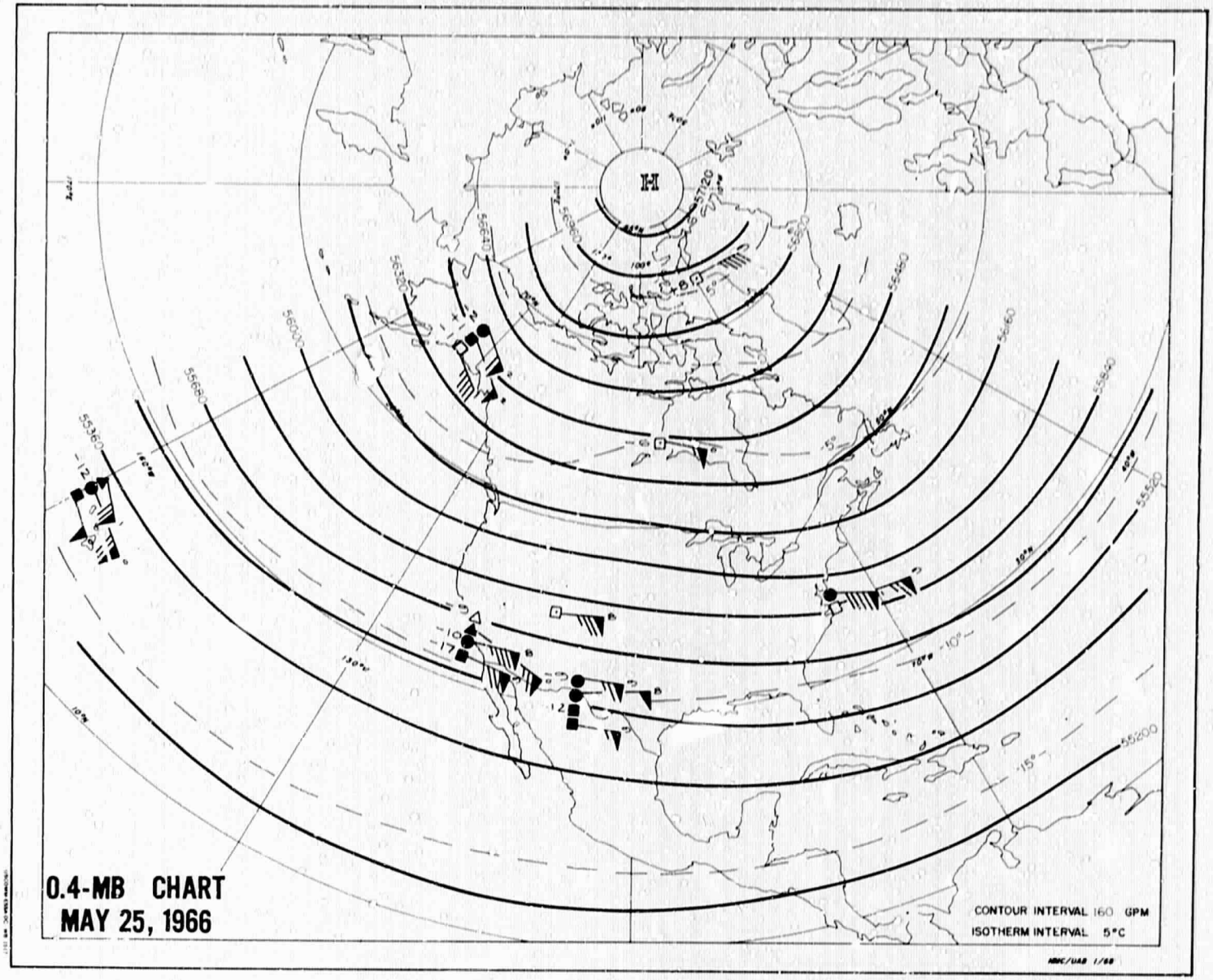
5-MB CHART
MAY 18, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
36160
36320
36480
36000
-20°
-25°
-30°


2-MB CHART
MAY 18, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
43040
43200
43520
43680
43360
42960
H
L
L

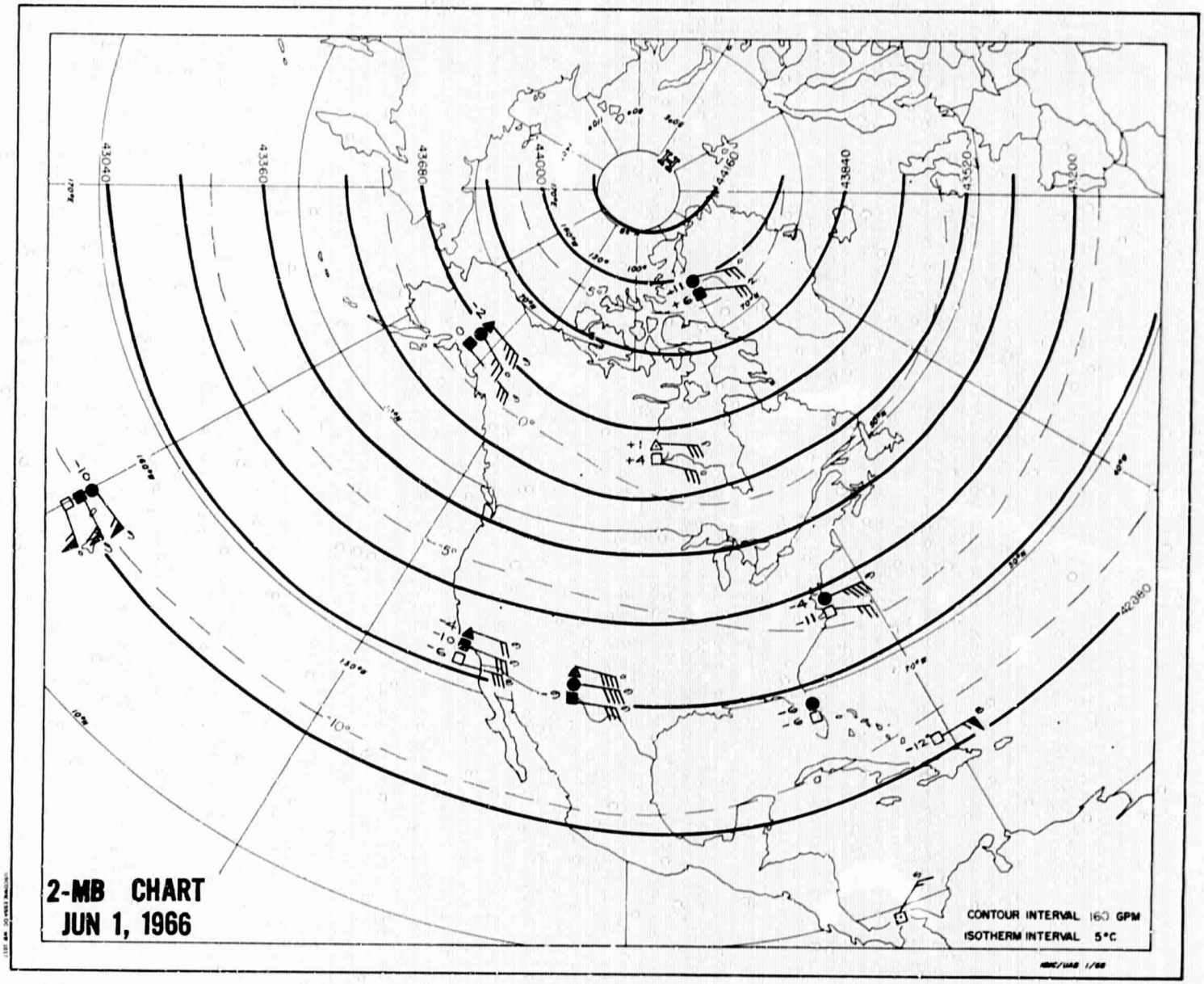

0.4-MB CHART
MAY 18, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
55360
55520
55840
56000
56160
56320
56480
56640
56800
0°
-5°
-10°
-15°

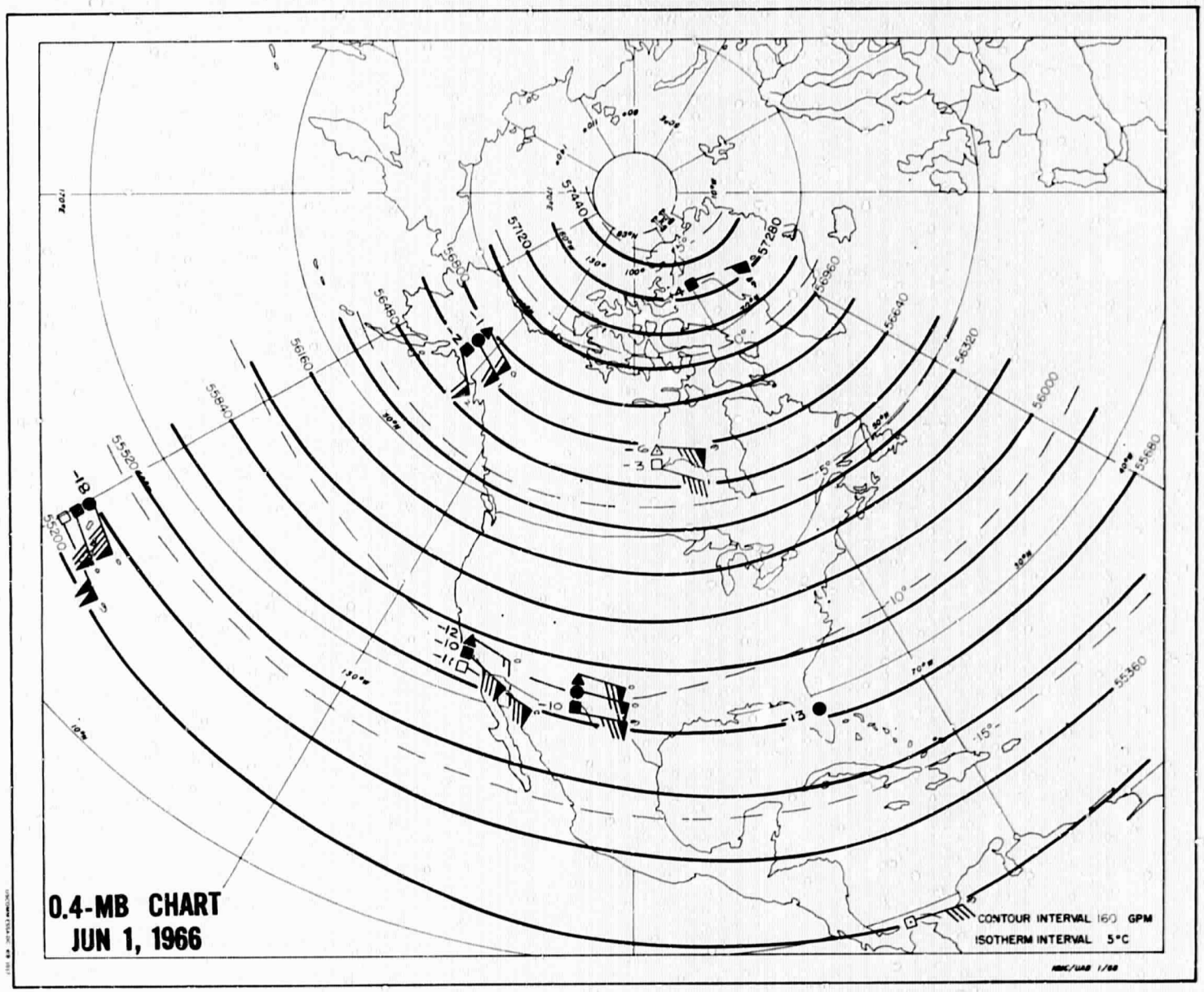

5-MB CHART
MAY 25, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
36800
36640
36320
36480
36160
36000
-20°
-25°
H

2-MB CHART
MAY 25, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
43040
43360
43680
43840
43520
43200
42880
170°E
180°
170°W
160°W
150°W
140°W
130°W
120°W
110°W
100°W
90°W
80°W
70°W
60°W
50°W
40°W
30°W
20°W
10°W


H
0.4-MB CHART
MAY 25, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

5-MB CHART
JUN 1, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
36160
36480
36800
36960
36640
36320
-25°
-20°
-15°
-10°
-5°
0°
5°
10°
50°N
70°N
90°N
170°E
160°W
150°W
140°W
130°W
120°W
110°W
100°W
90°W
80°W
70°W
60°W
50°W
40°W
30°W
20°W
10°W

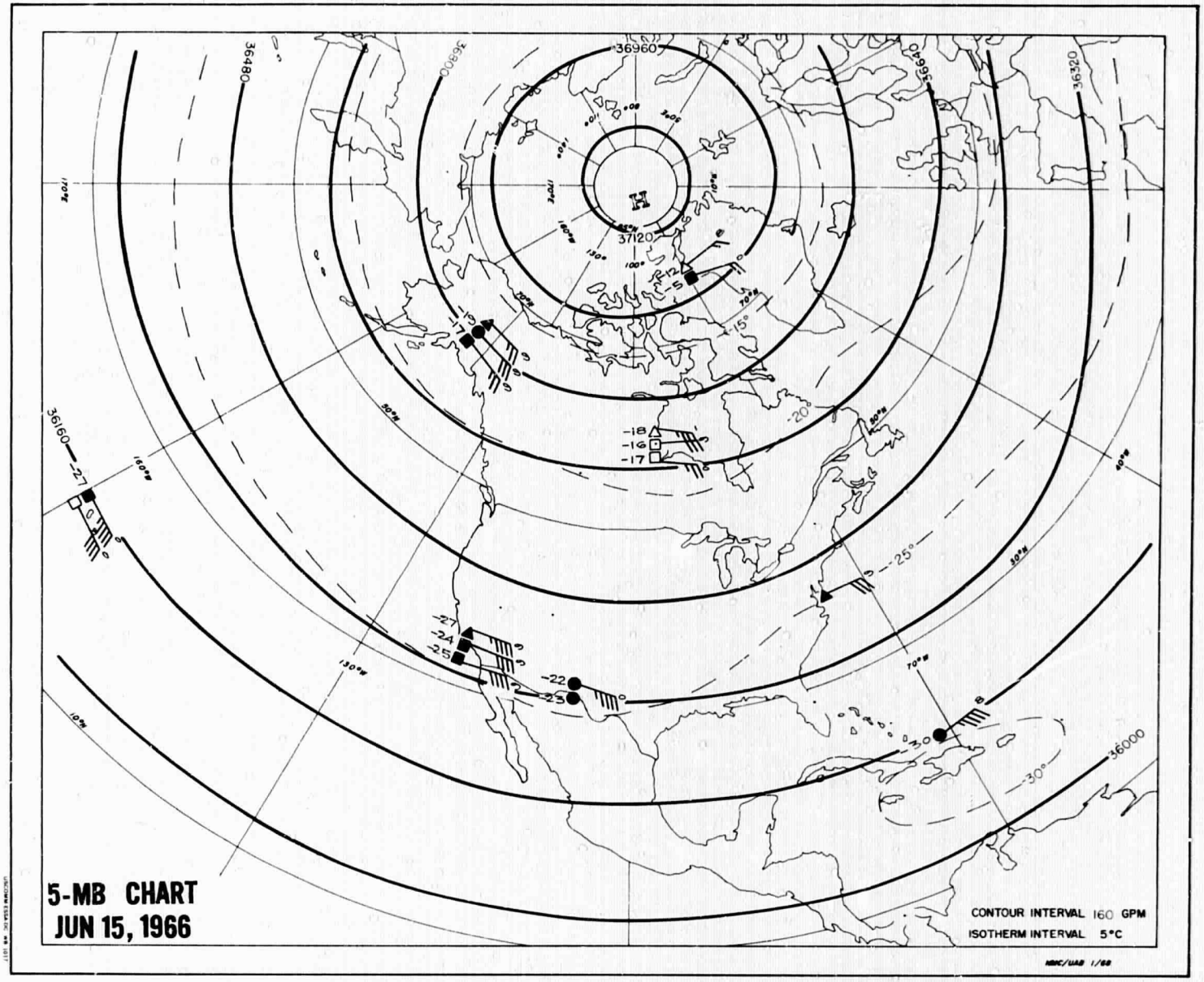

2-MB CHART
JUN 1, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
43040
43360
43680
44000
44160
43840
43520
43200
42880
-10°
-5°
0°
-5°
-10°

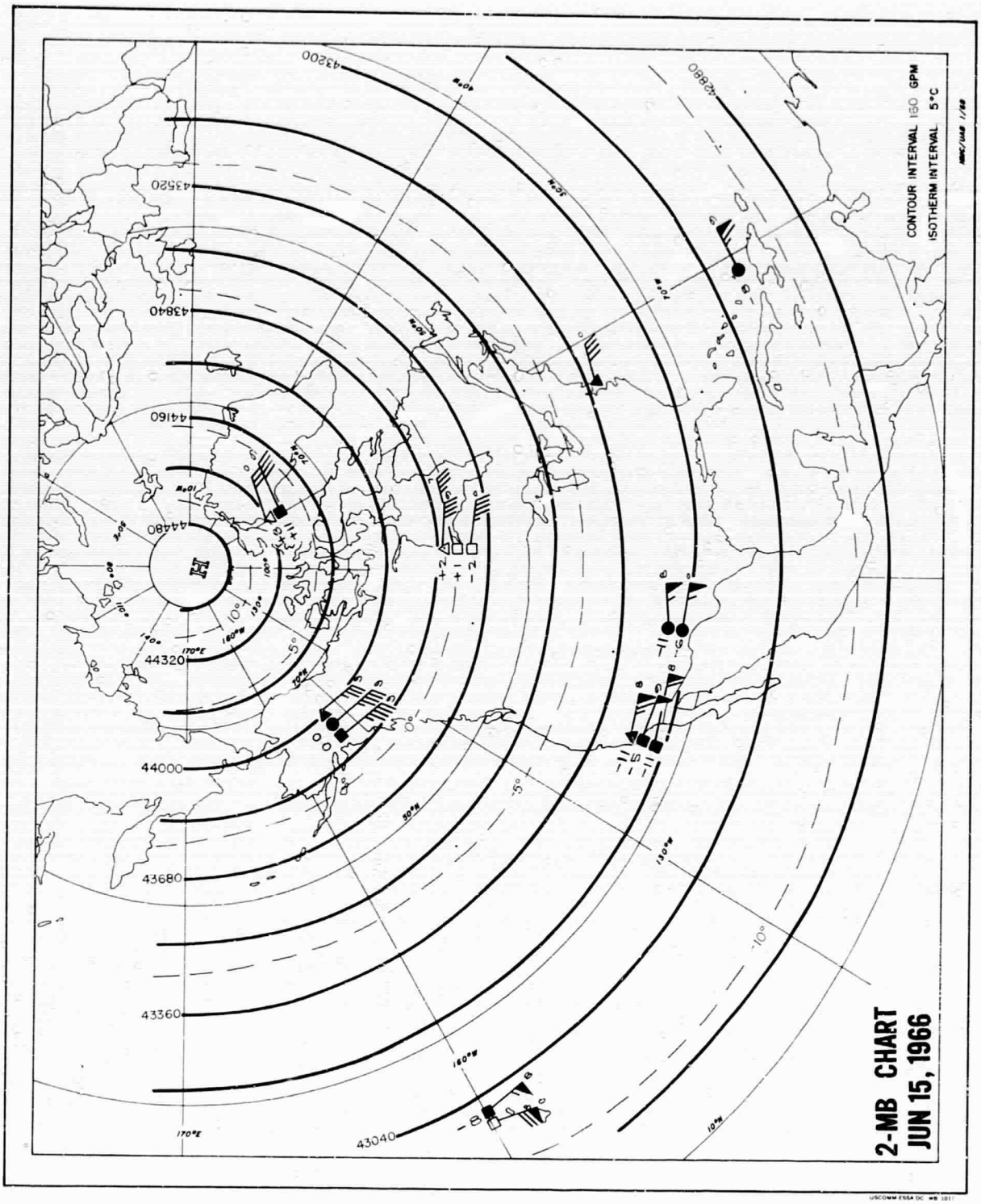

0.4-MB CHART
JUN 1, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
57440
57120
57280
56960
56640
56320
56000
55680
55360
55520
55200
56160
55840
56480
-18
-12
-10
-11
-10
-13
-3
-2
-1
-5°
-10°
-15°

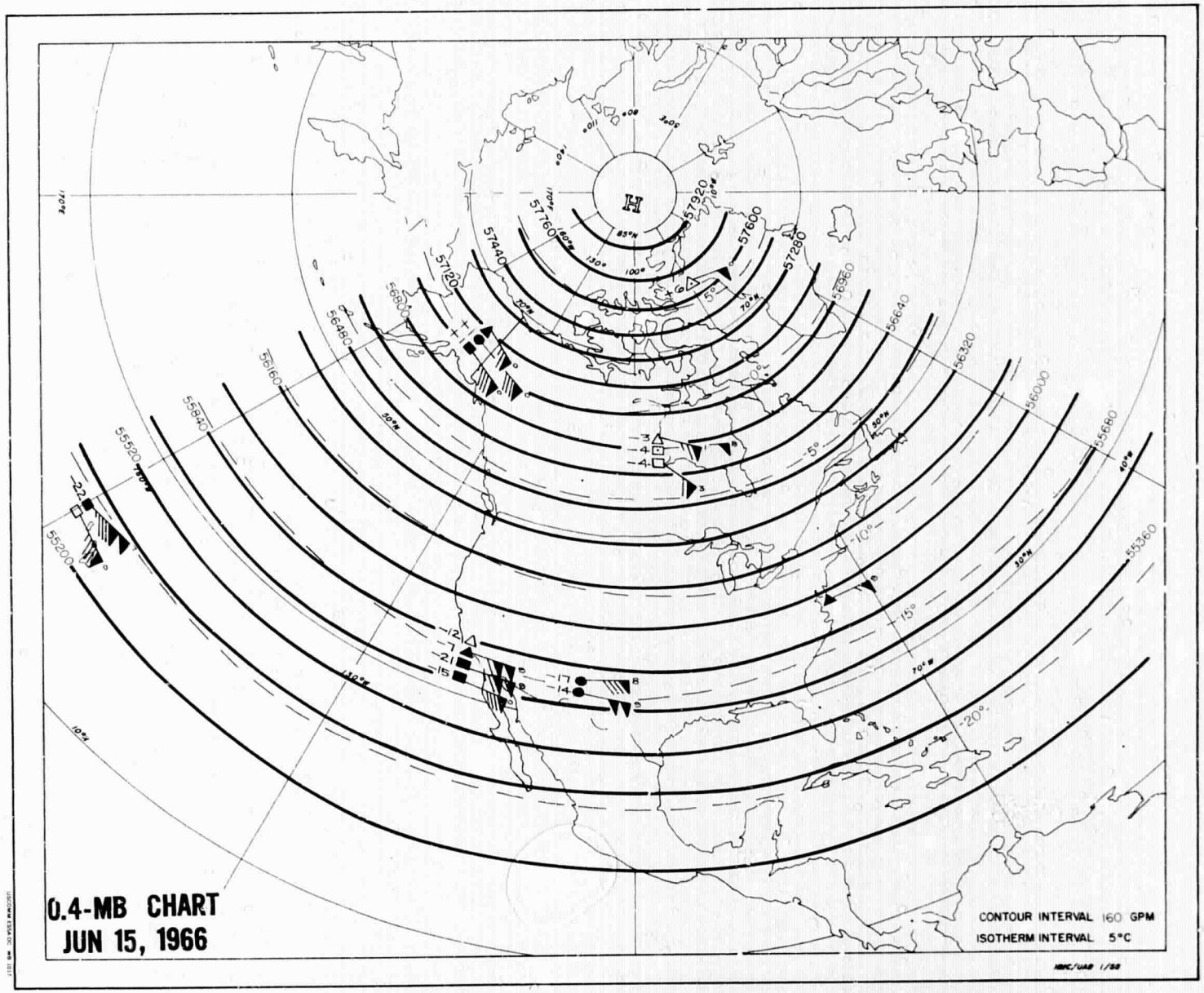
5-MB CHART
JUN 8, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
36160
36480
36800
37120
35960
35640
35320
36000

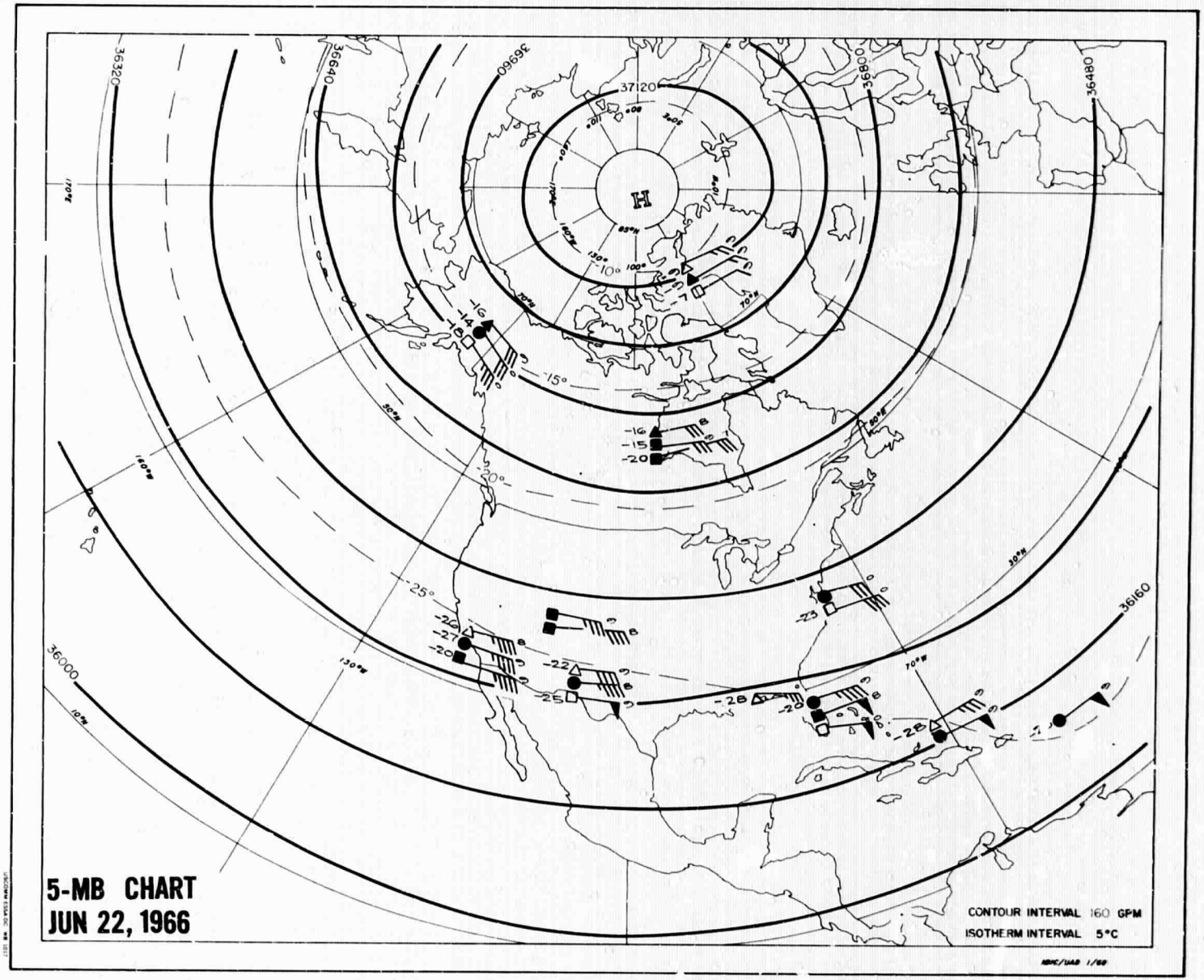
2-MB CHART
JUN 8, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
43040
43360
43680
44000
44320
44160
43840
43520
43200
42880

0.4-MB CHART
JUN 8, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
55360
55680
56000
56320
56640
56960
57280
57600
57440
57120
56800
56480
56160
55840
55520
55200
-5°
-10°
-15°
170°E

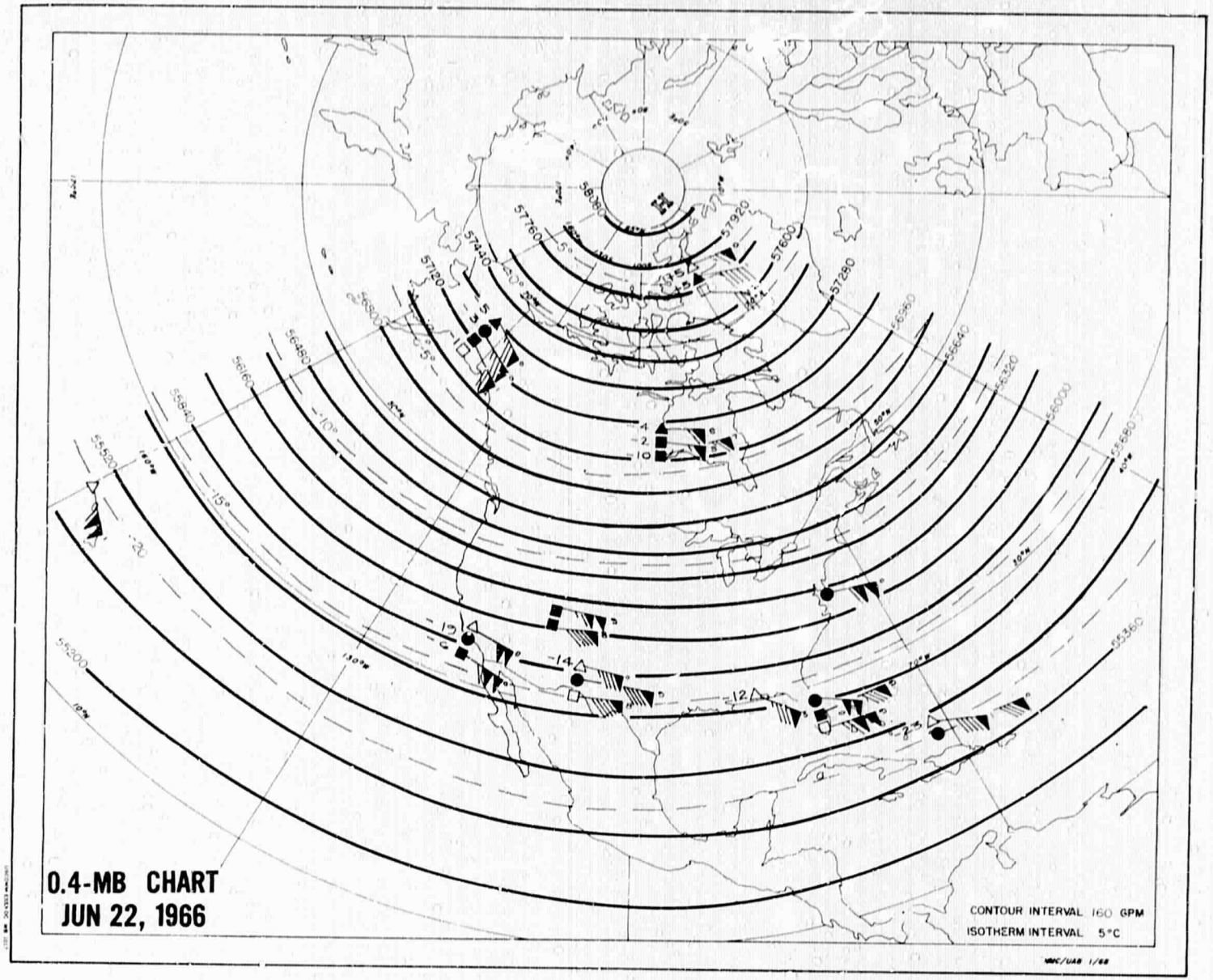

5-MB CHART
JUN 15, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
36960
36480
36320
36160
36000
37120
-27
-18
-19
-17
-22
-23
-25
-24
-30°
-25°
-20°
-15°
10°N
20°N
30°N
40°N
50°N
60°N
70°N
80°N
90°N
100°W
110°W
120°W
130°W
140°W
150°W
160°W
170°W
180°
170°E
160°E
150°E
140°E

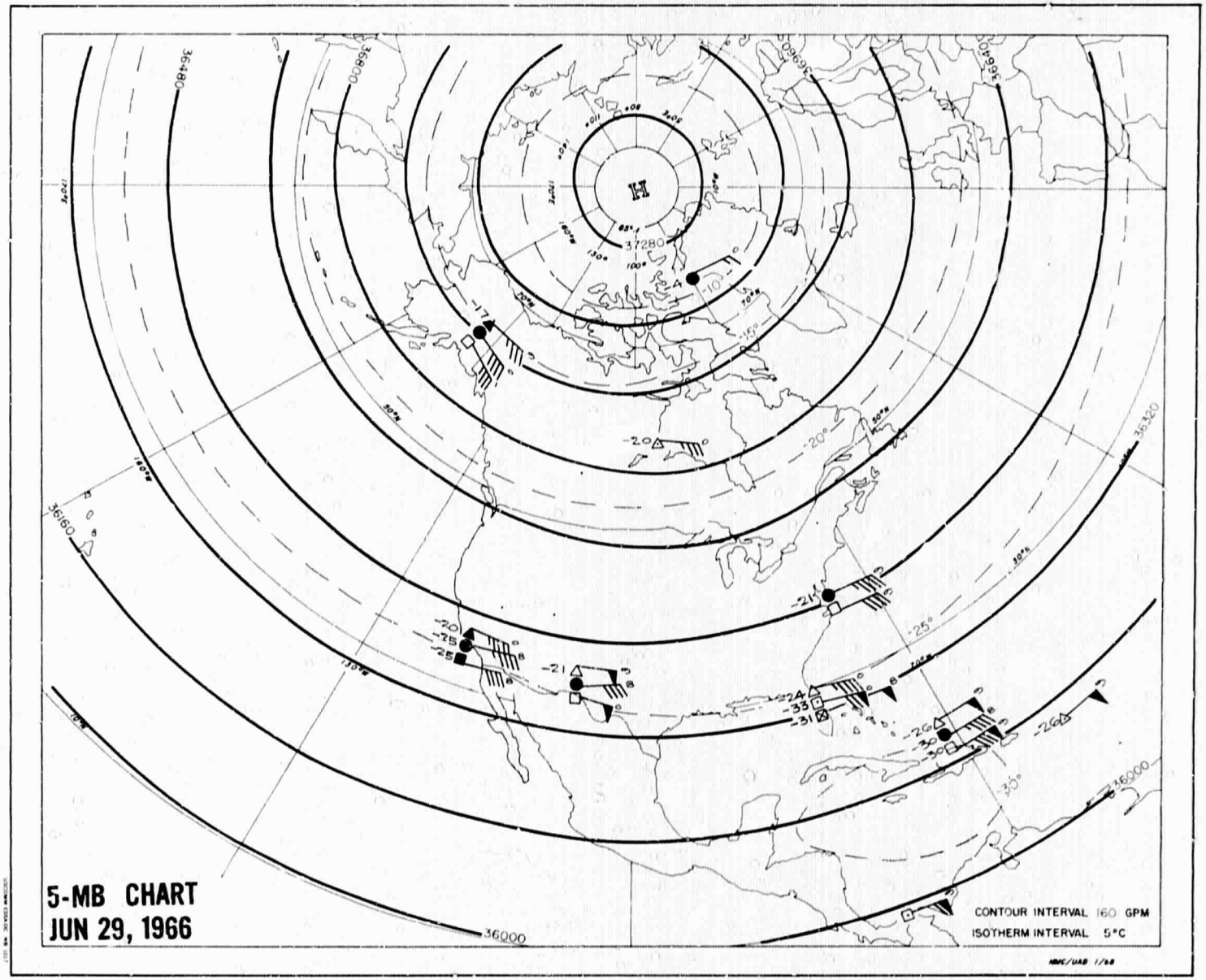

2-MB CHART
JUN 15, 1966
CONTOUR INTERVAL 180 GPM
ISOTHERM INTERVAL 5°C
43200
43520
43840
44160
44480
44320
44000
43680
43360
43040
42880
H
-5°
0°
5°
-10°
10°
50°N
40°N
30°N
10°N
170°E
160°W
150°W
140°W
130°W
120°W
110°W
100°W
90°W
80°W
70°W
60°W


0.4-MB CHART
JUN 15, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C


5-MB CHART
JUN 22, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
36320
36640
36960
37120
36800
36480
36160
36000
H

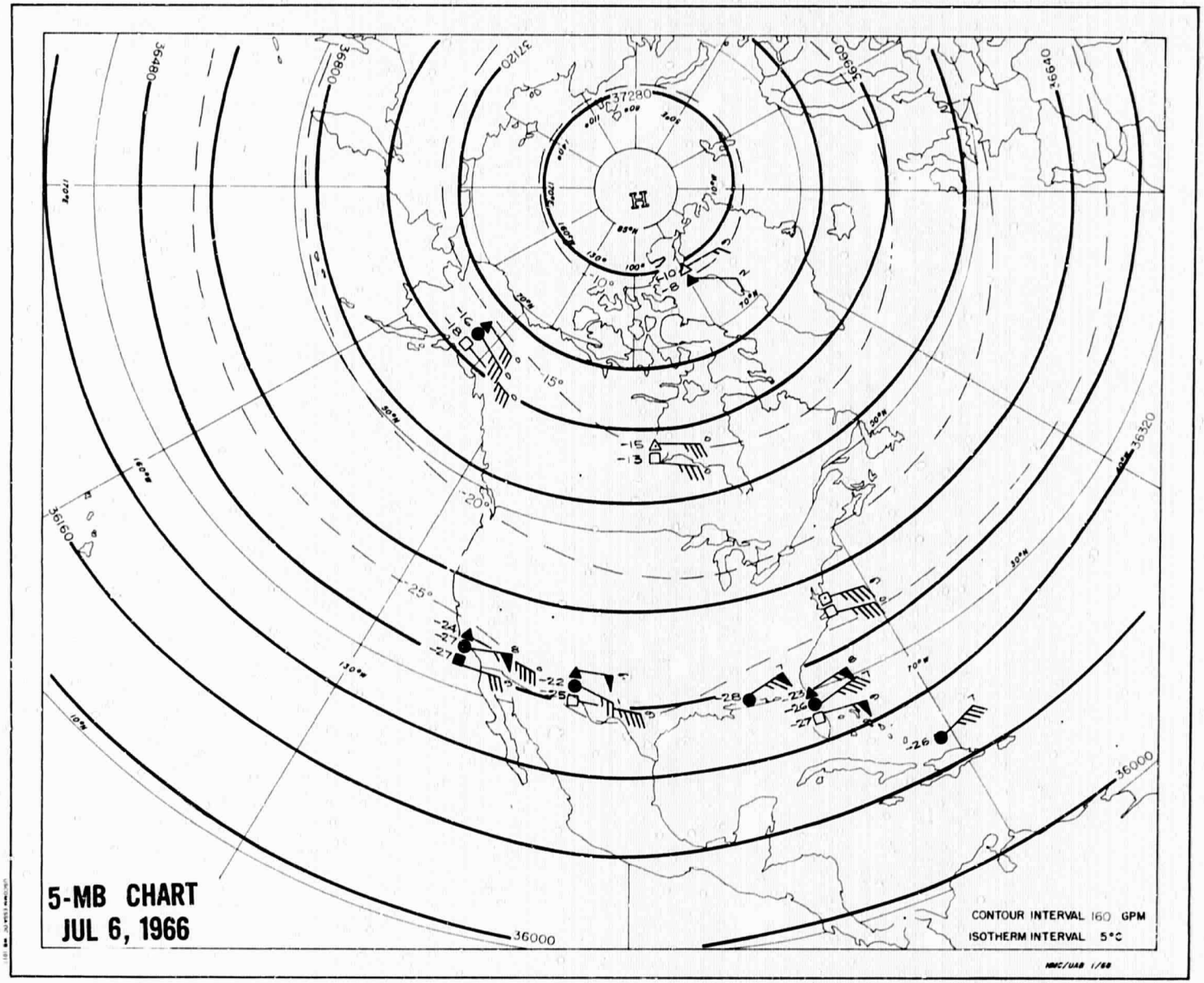
2-MB CHART
JUN 22, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
44480
44160
43840
43520
43200
42880
43360
43680
44000
44320
44640
42560
42240
42400
42720
43040

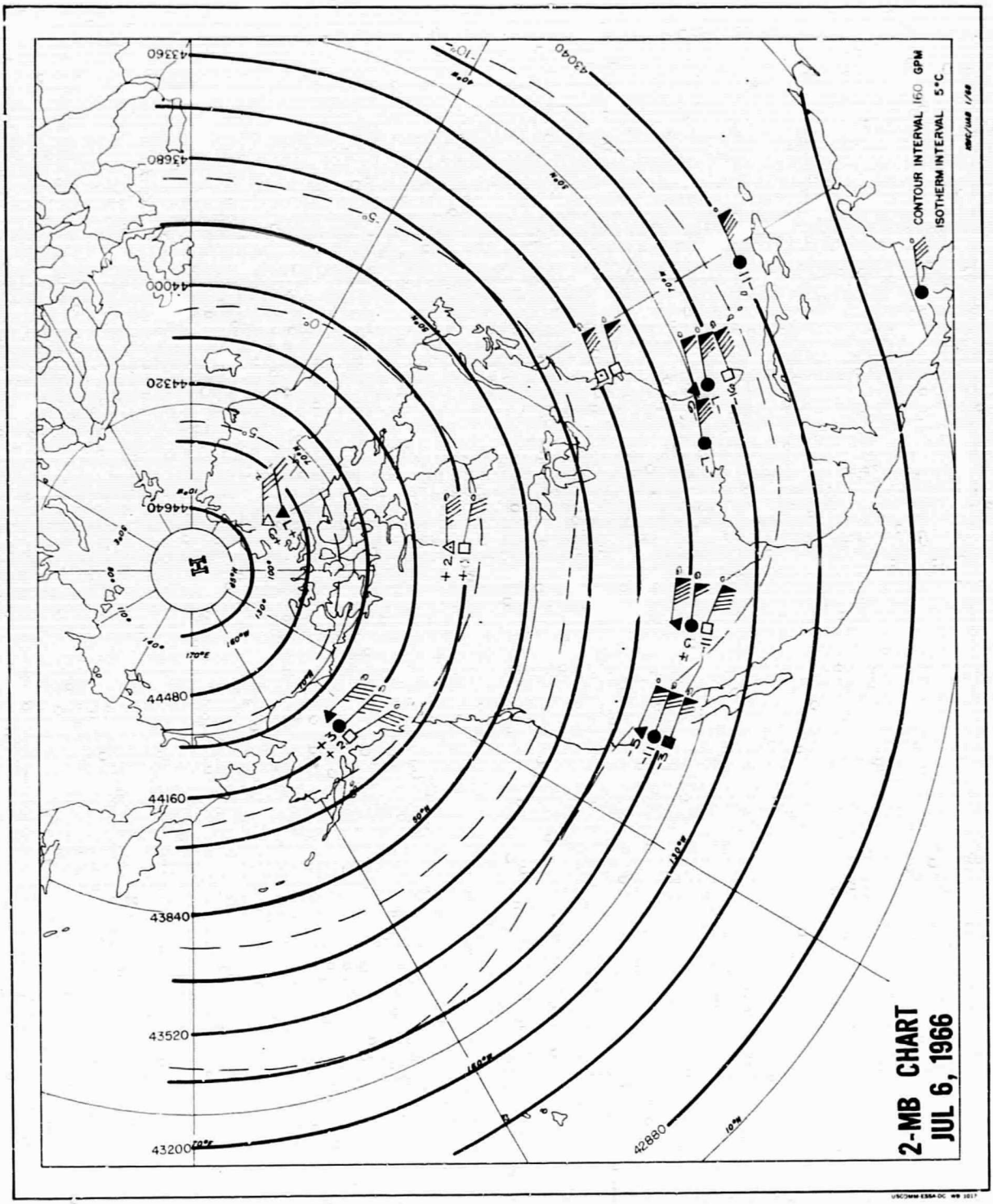

0.4-MB CHART
JUN 22, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C


5-MB CHART
JUN 29, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

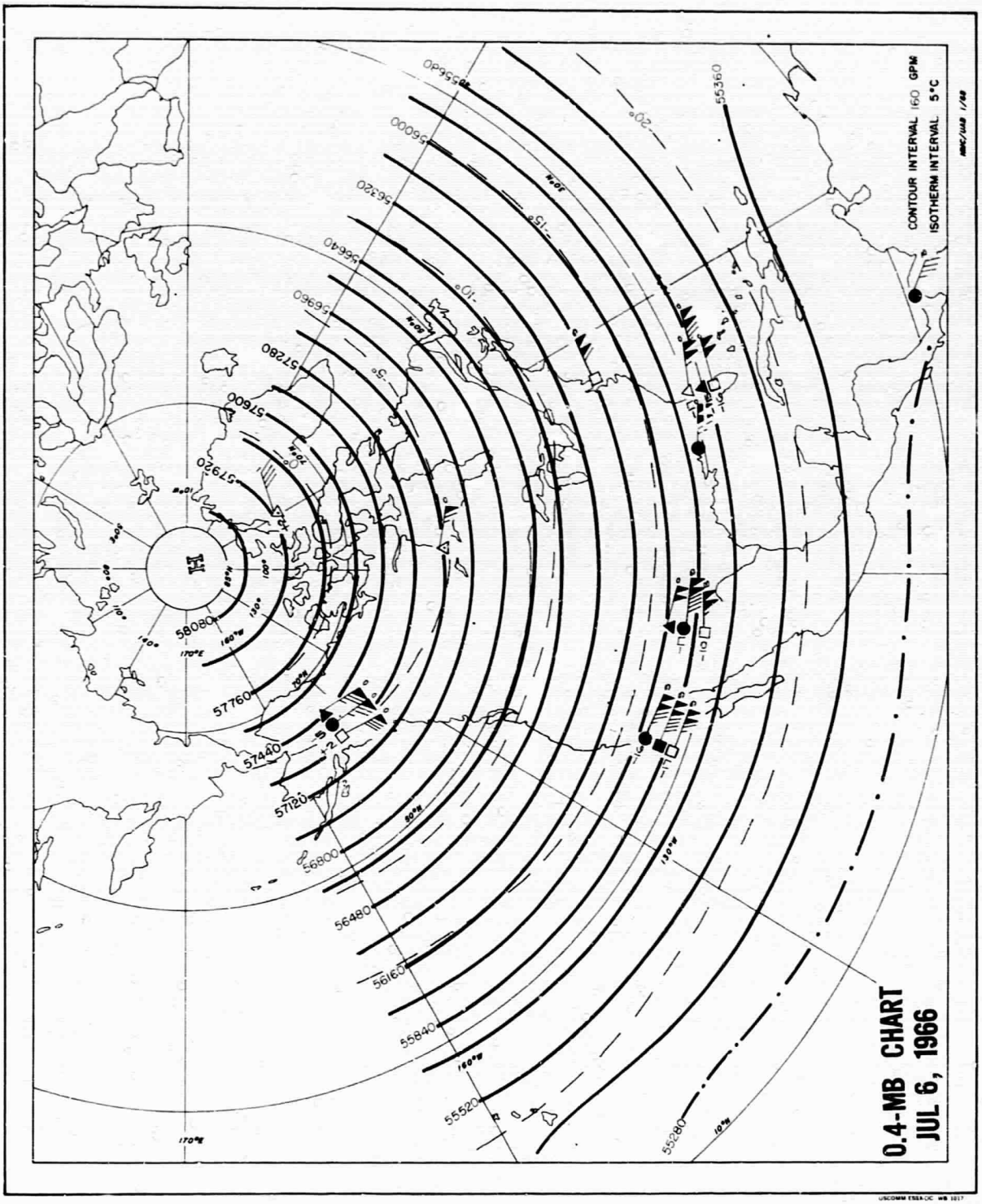
2-MB CHART
JUN 29, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
43200
43520
43840
44160
44480
44640
44320
44000
43680
43360
43040
42880

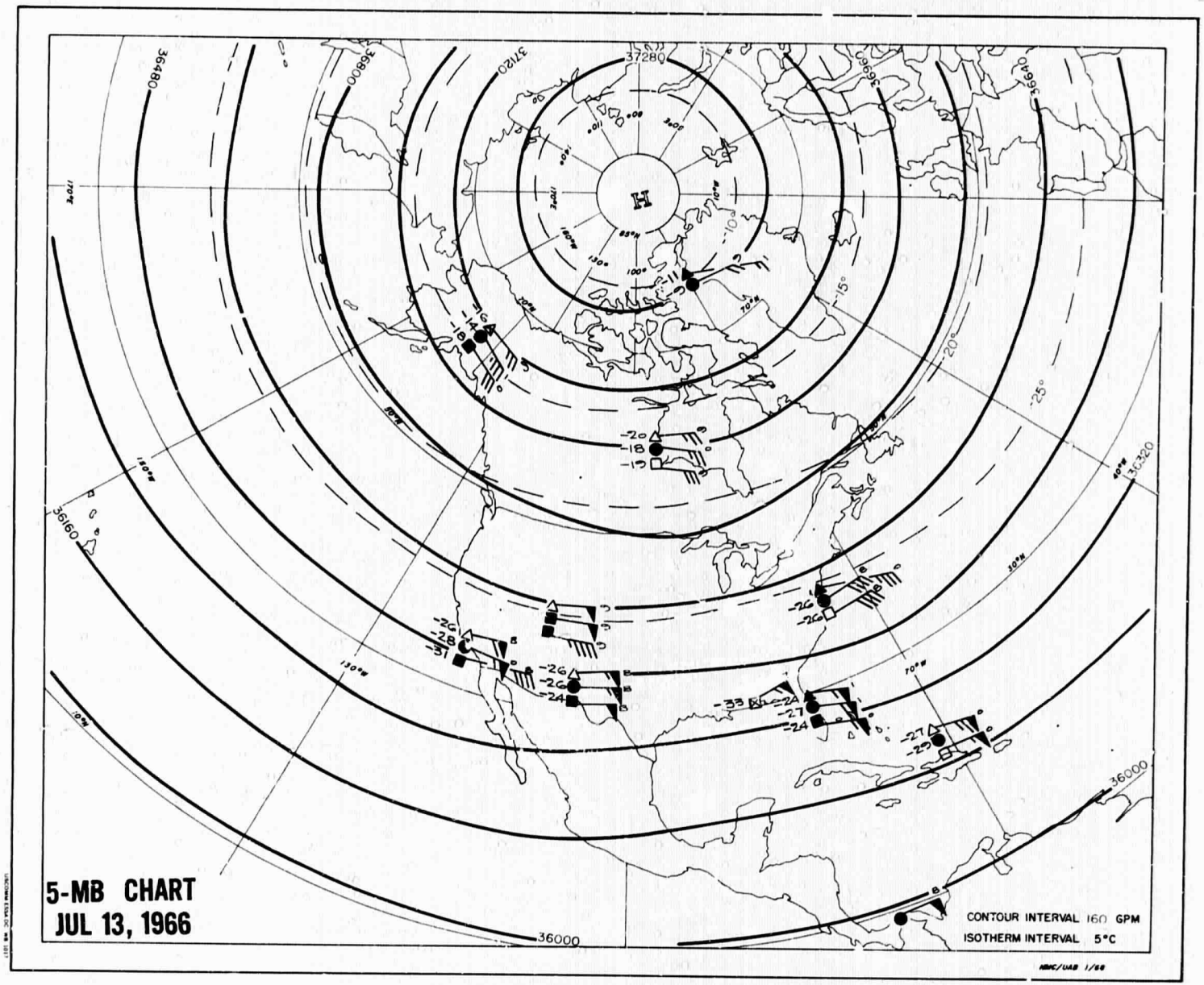
0.4-MB CHART
JUN 29, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
H
57920
57600
57280
56960
56640
56320
56000
55680
55360
55200
-2
-5°
-10°
-15°
-20°
-12
-17

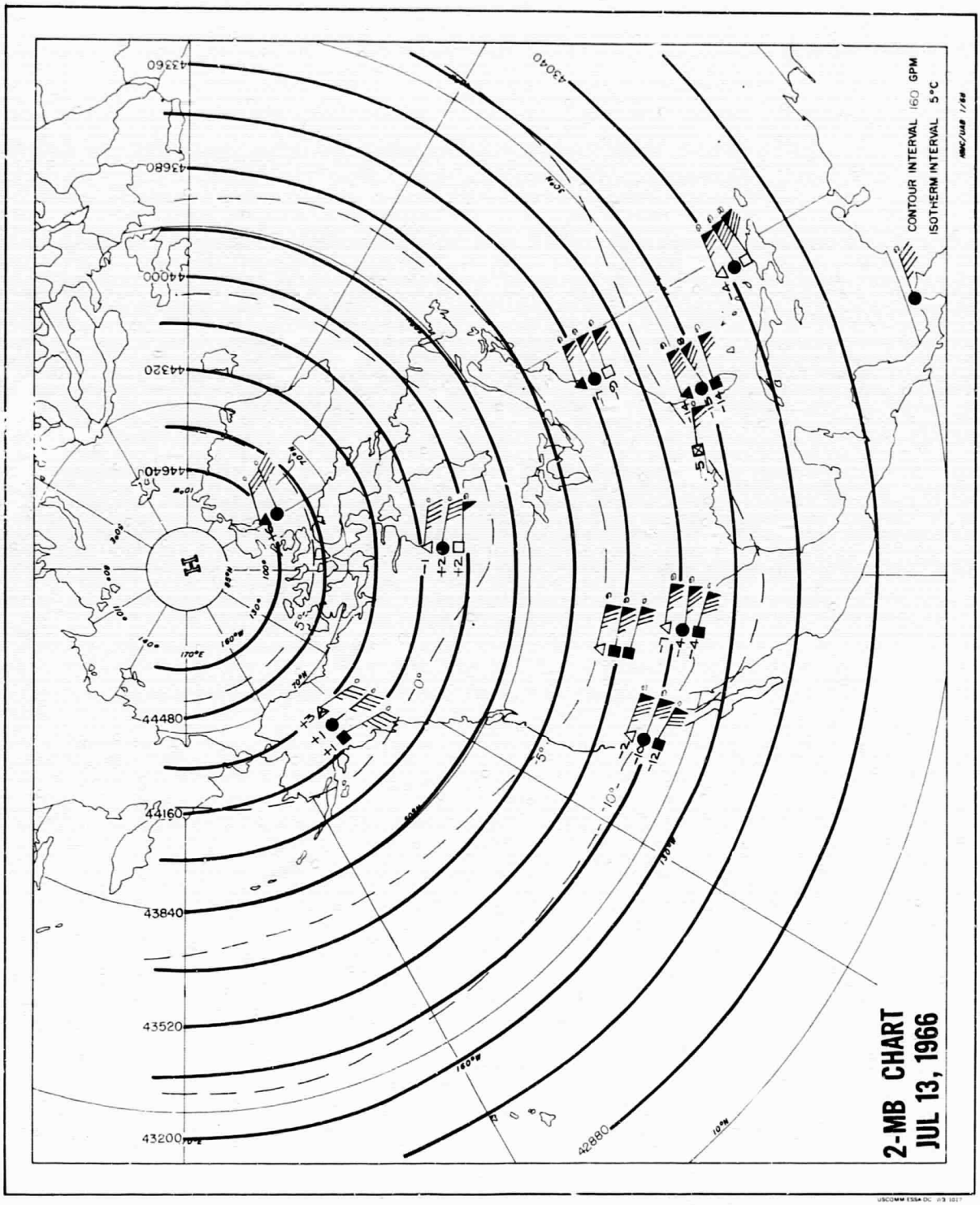

5-MB CHART
JUL 6, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
37280
36480
36800
37120
36960
36640
36320
36160
36000
H

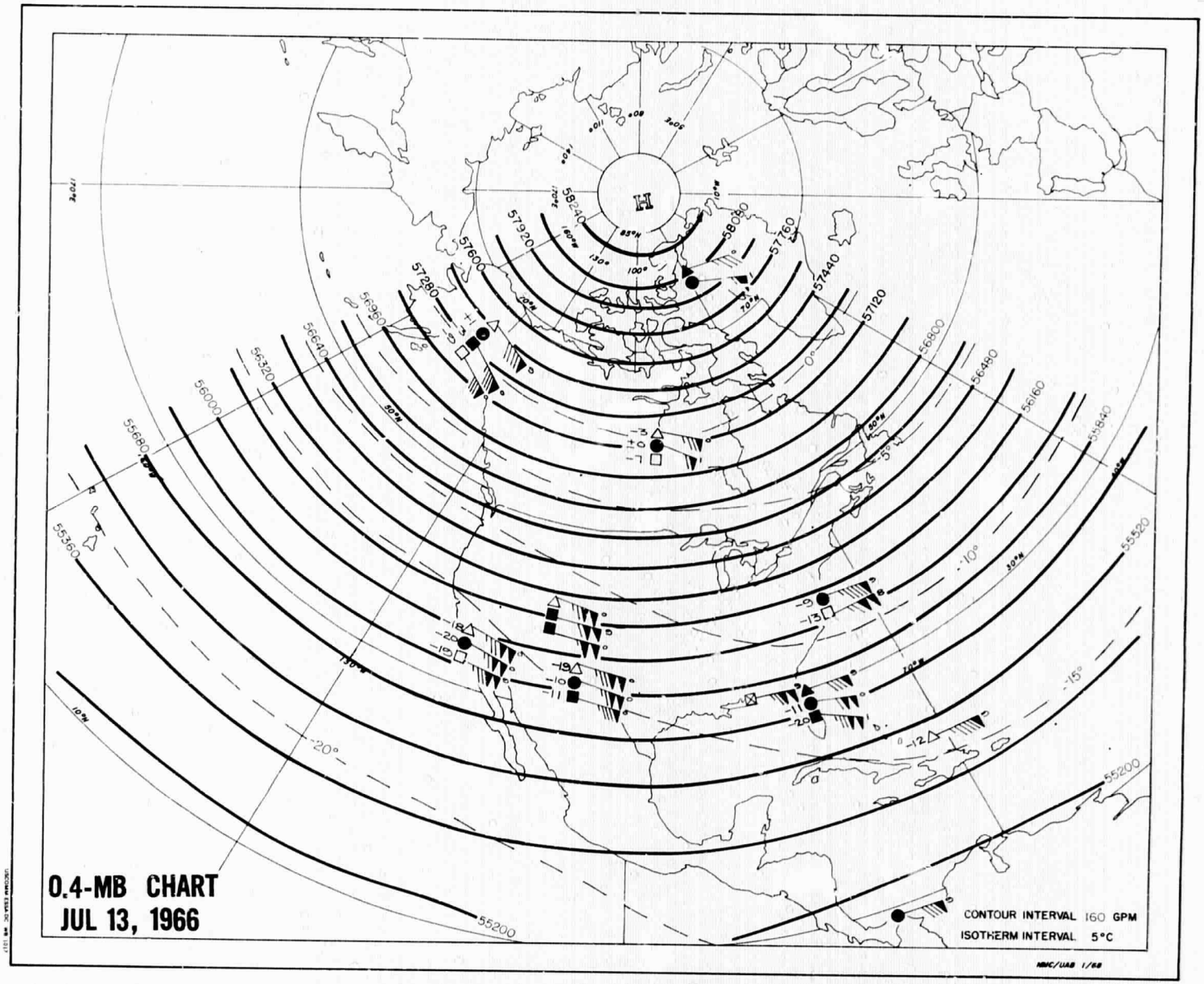

2-MB CHART
JUL 6, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
43360
43680
44000
44320
44640
44480
44160
43840
43520
43200
43040
42880

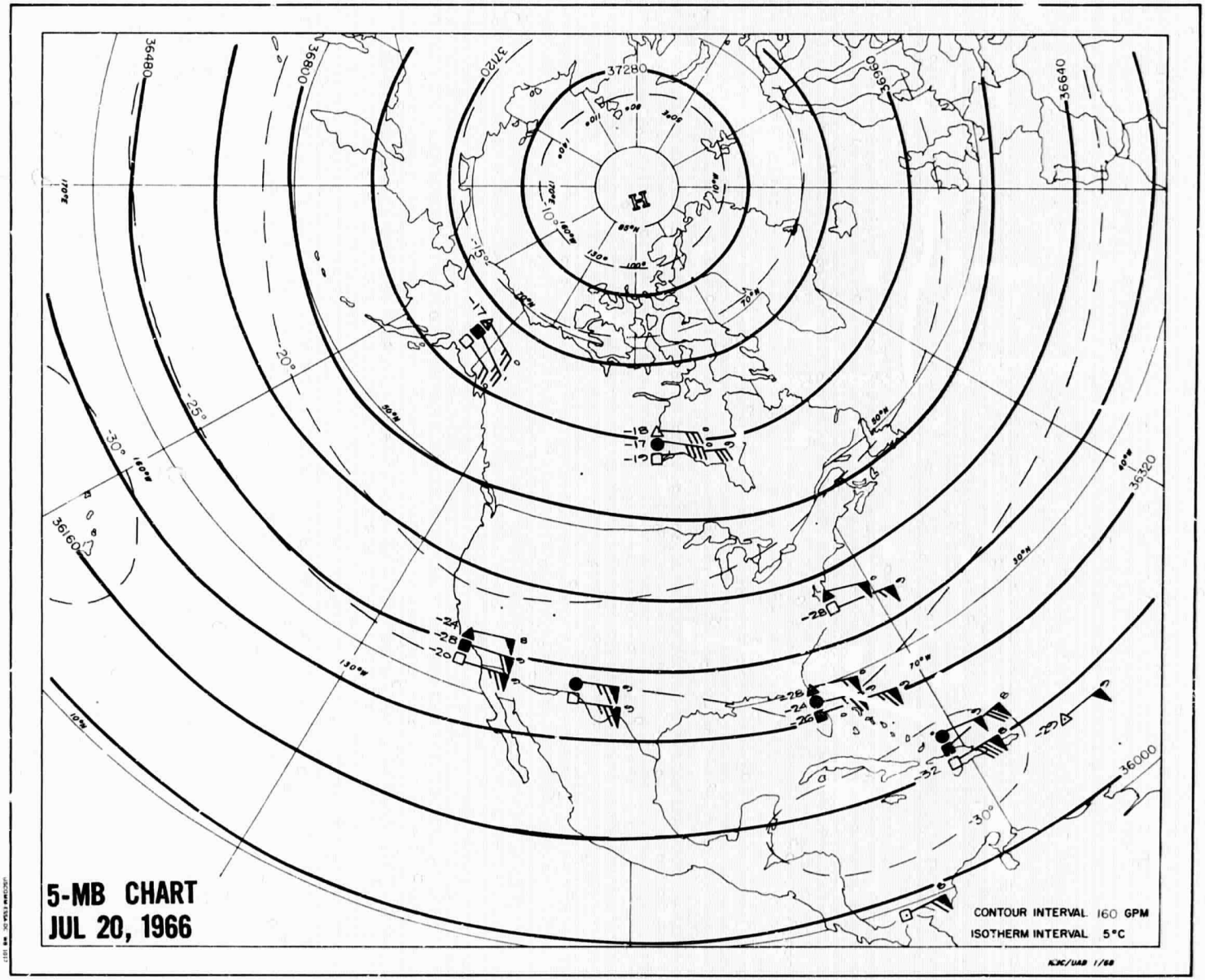
333-925 O - 69 - 7

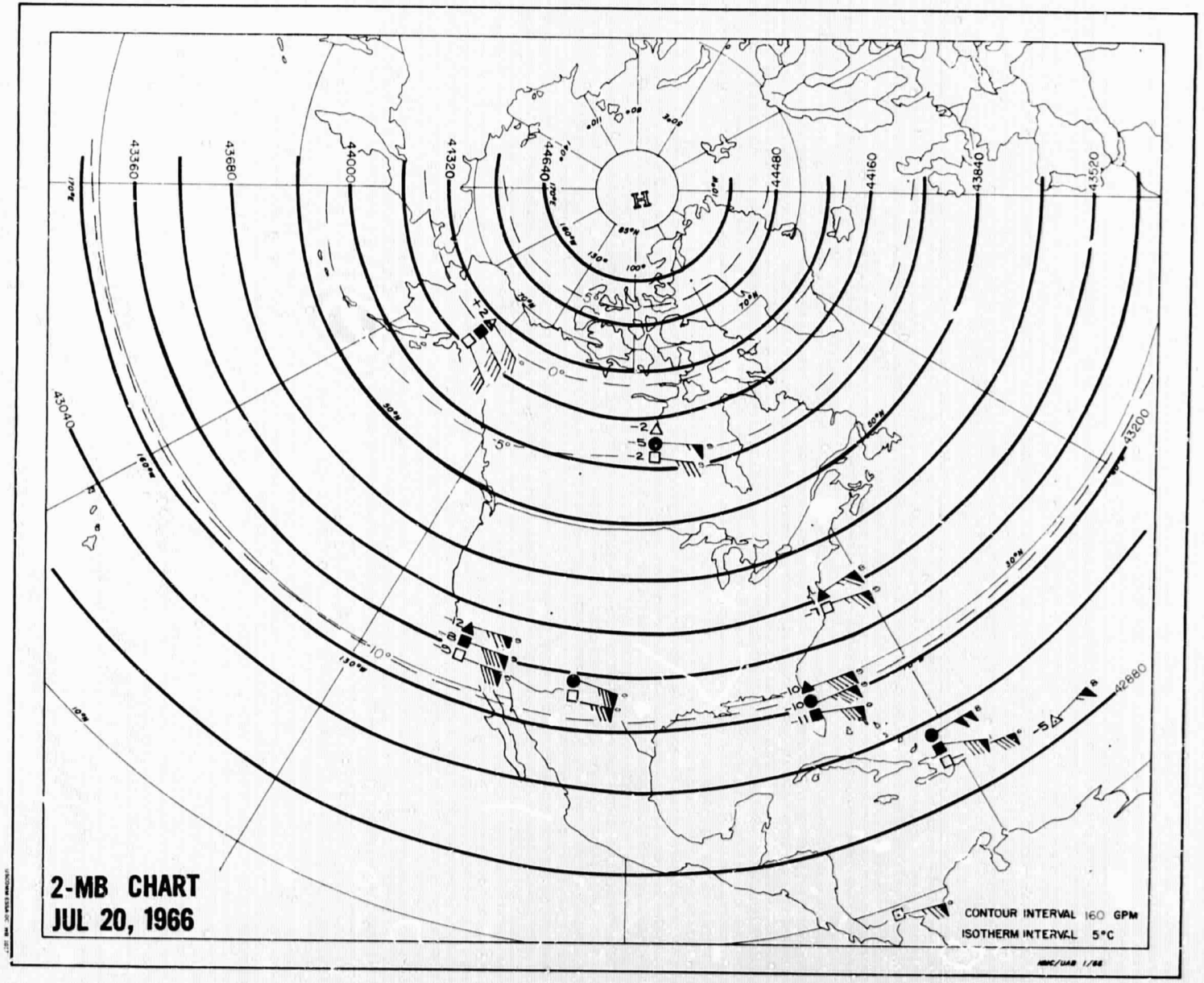

0.4-MB CHART
JUL 6, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
55360
55600
56320
56640
56960
57280
57600
57920
58080
57760
57440
57120
56800
56480
56160
55840
55520
55280
160°W
170°E
170°W
150°W
130°W
110°W
90°W
70°W
50°W
30°W
10°W
10°E
30°E
50°E
70°E
90°E
110°E
130°E
150°E
-20°
-15°
-10°
-5°
0°
5°
10°
15°
20°
25°
30°
35°
40°
45°
50°
55°
60°
65°
70°
75°
80°
85°
90°

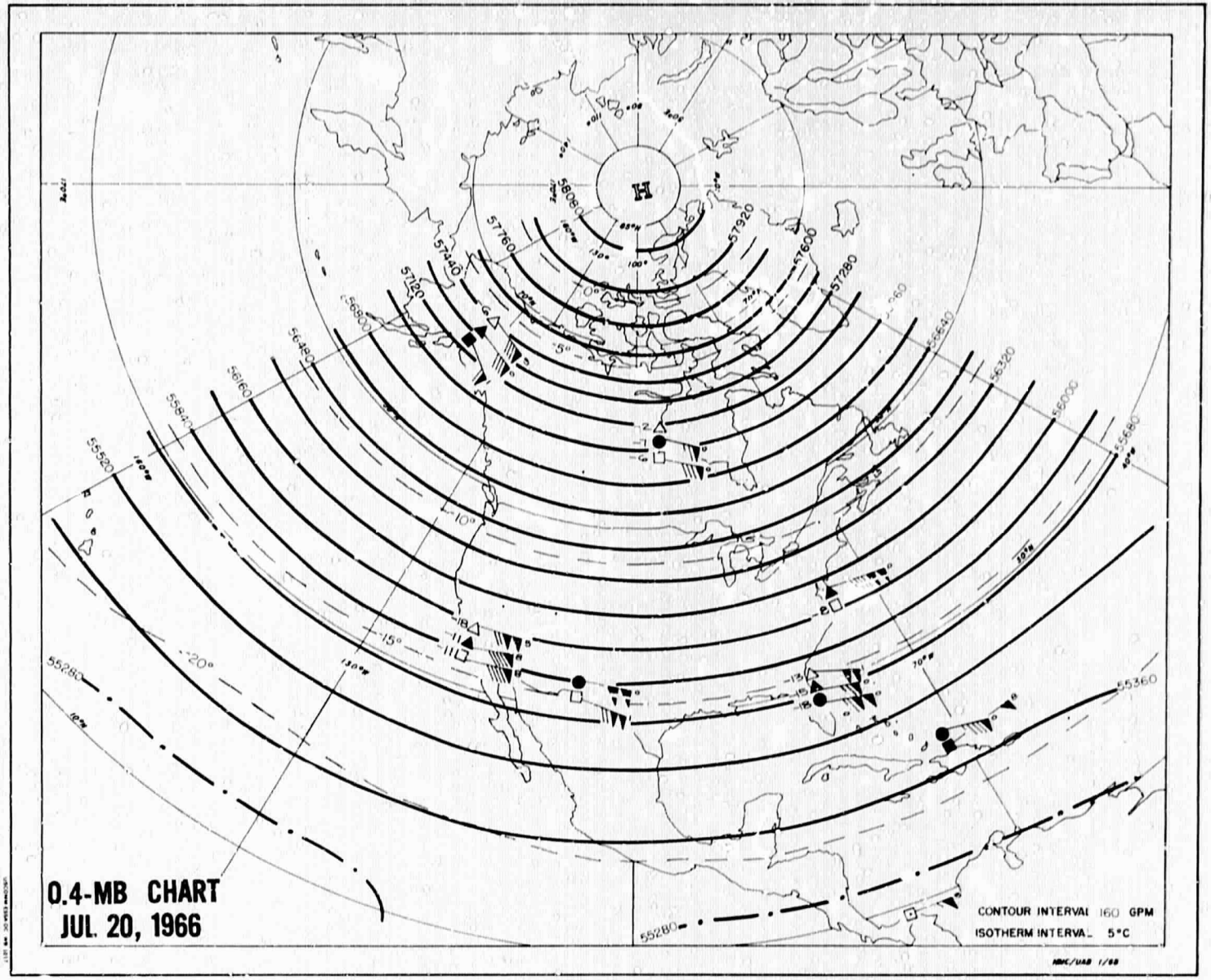

5-MB CHART
JUL 13, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
37280
37120
36960
36800
36640
36480
36320
36160
36000
-10°
-15°
-20°
-25°

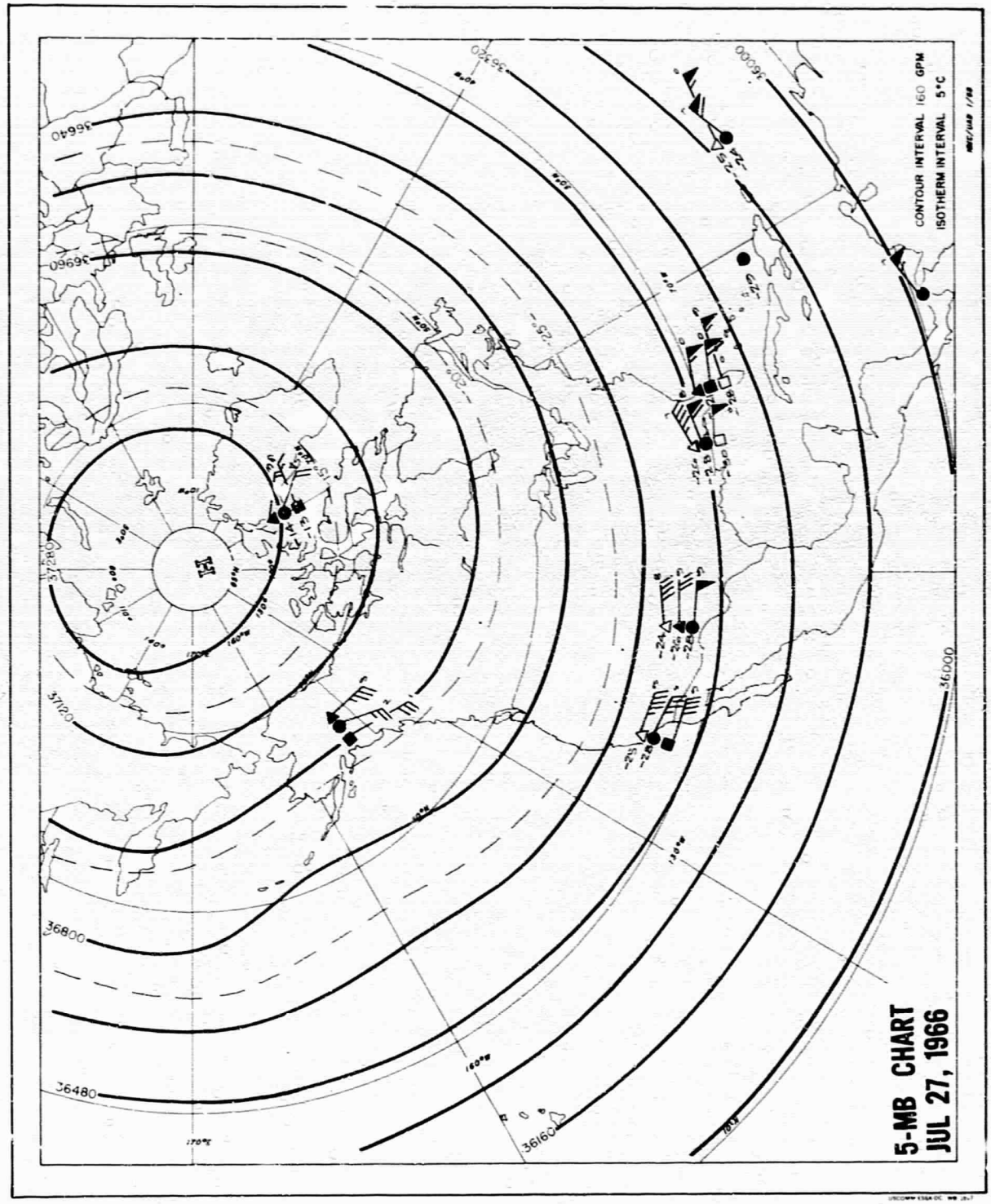

2-MB CHART
JUL 13, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
43360
43680
44000
44320
44640
44480
44160
43840
43520
43200
43040
42880
H

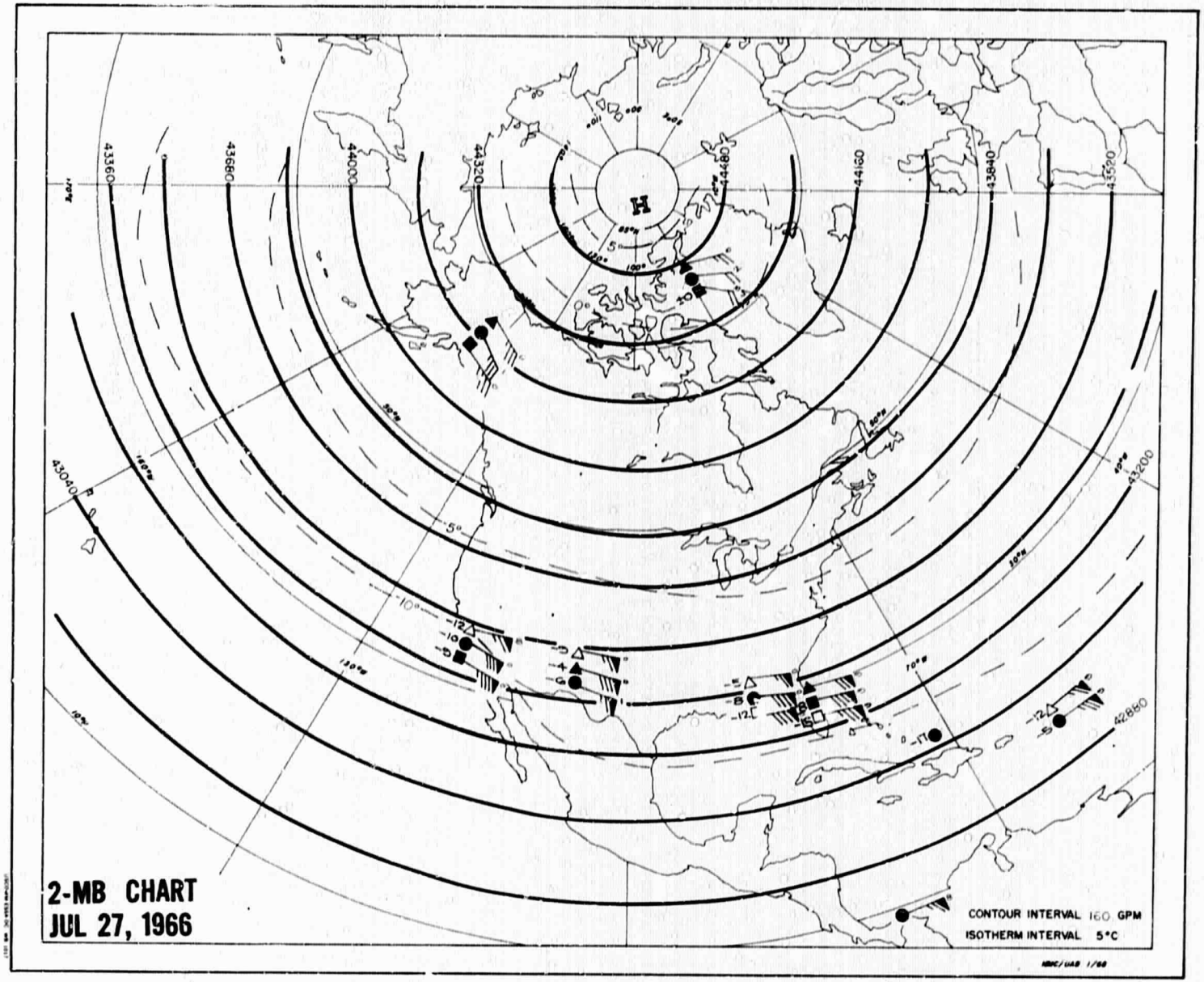

0.4-MB CHART
JUL 13, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68


5-MB CHART
JUL 20, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
NJK/UAB 1/68


2-MB CHART
JUL 20, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
H
43360
43680
44000
44320
44640
44480
44160
43840
43520
43200
42880
43040


0.4-MB CHART
JUL. 20, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
H
57760
57440
57120
56800
56480
56160
55840
55520
55200
57920
57600
57280
56960
56640
56320
56000
55680
55360
55280
-5°
-10°
-15°
-20°

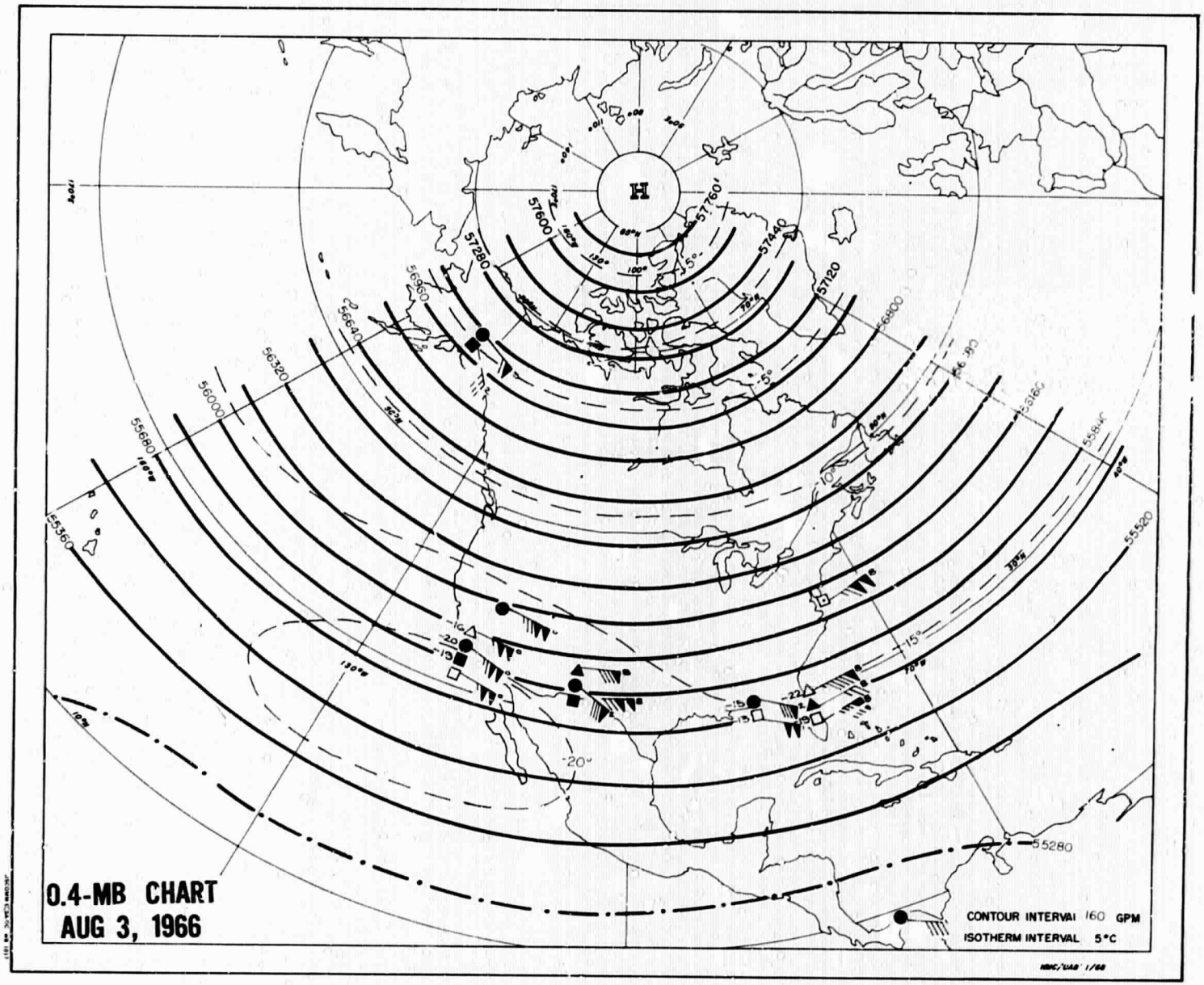

5-MB CHART
JUL 27, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
36480
36800
37120
36640
36960
36320
36000
36160


2-MB CHART
JUL 27, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
43360
43680
44000
44320
44480
44160
43840
43520
43200
42880
43040
-5°
-10°

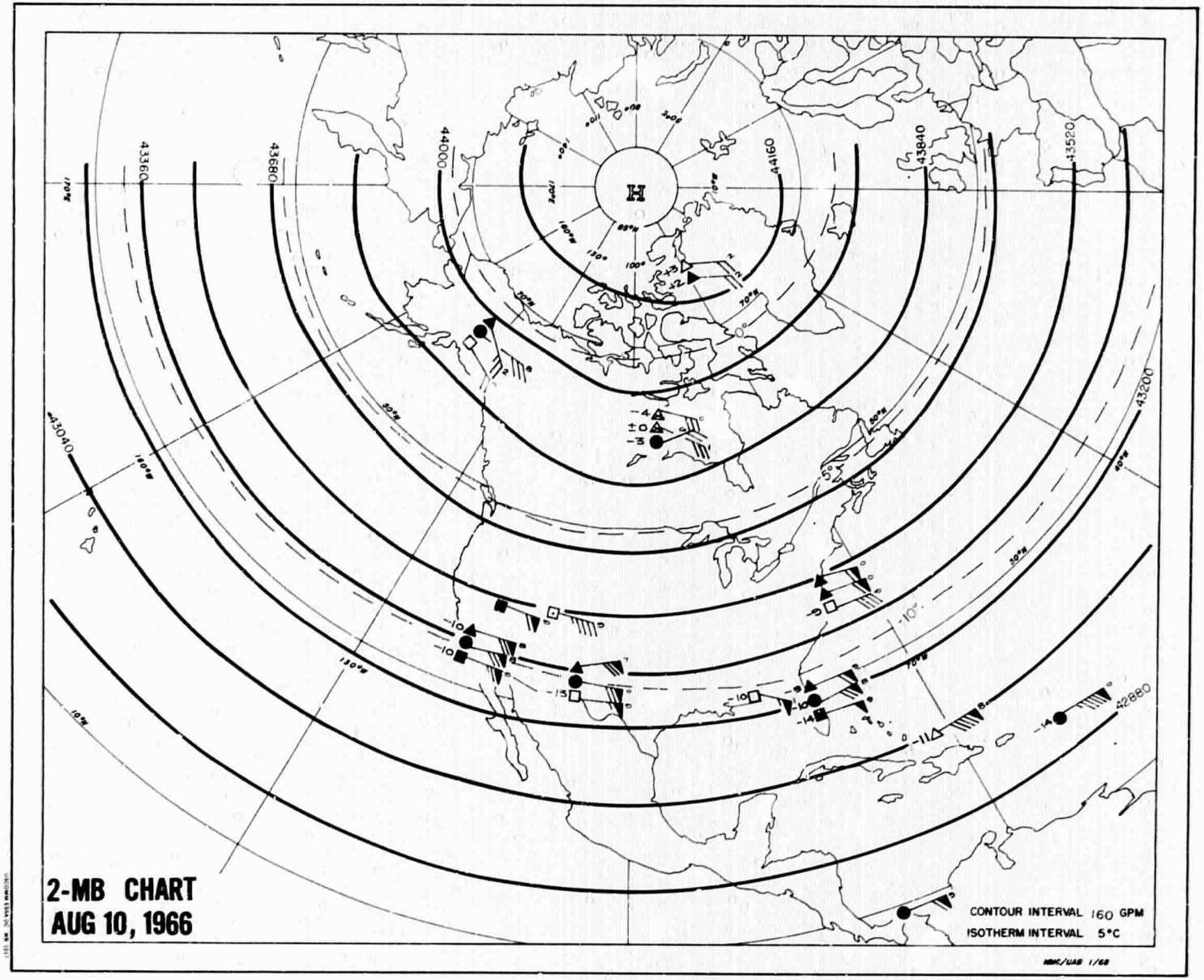
0.4-MB CHART
JUL 27, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
55360
55520
55840
56160
56480
56800
57120
57440
57760
57920
56640
56320
56000
57280
57600
-5°
-10°
-15°
-20°

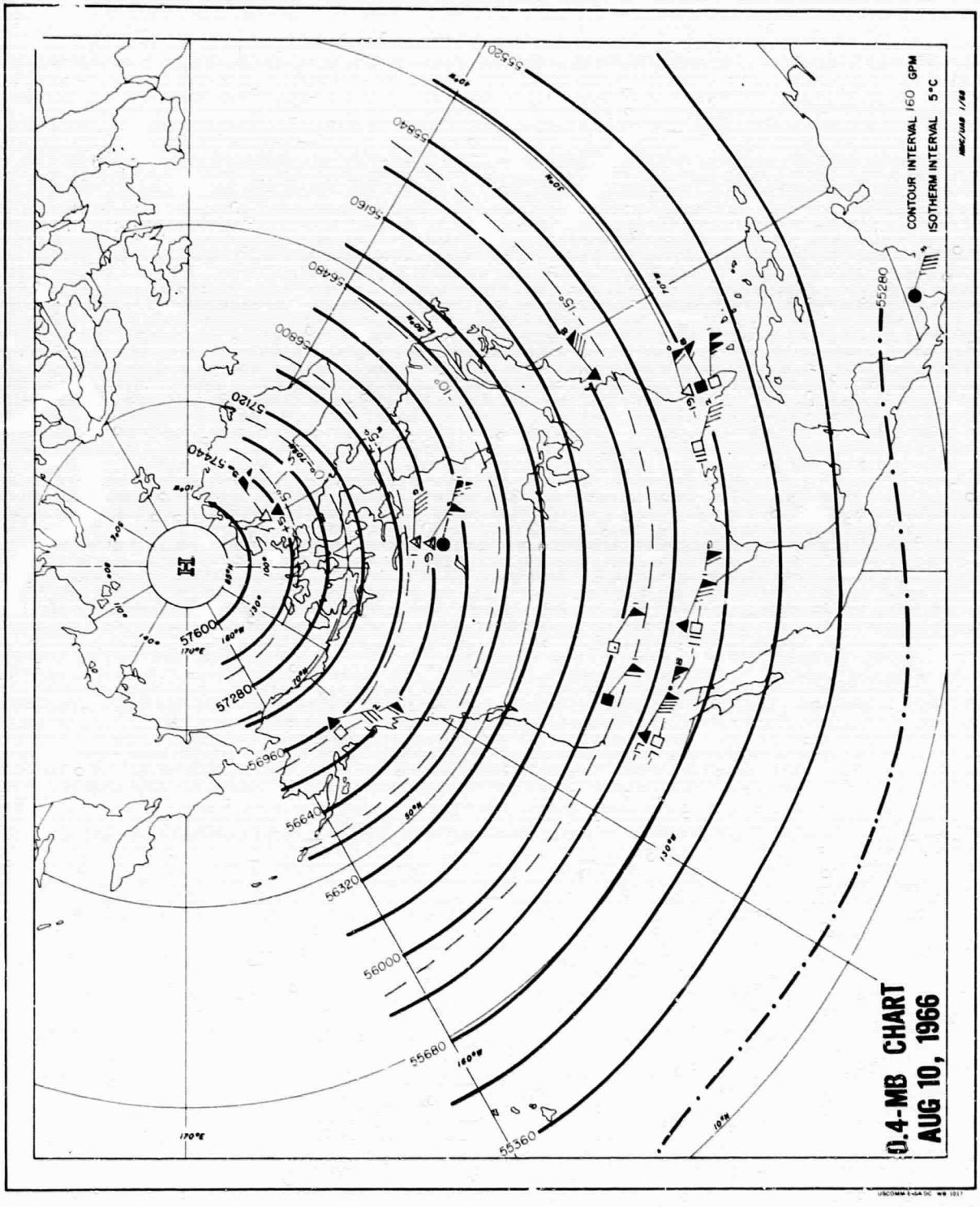
5-MB CHART
AUG 3, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
36480
36800
37120
36960
36640
36320
36000
35160
H

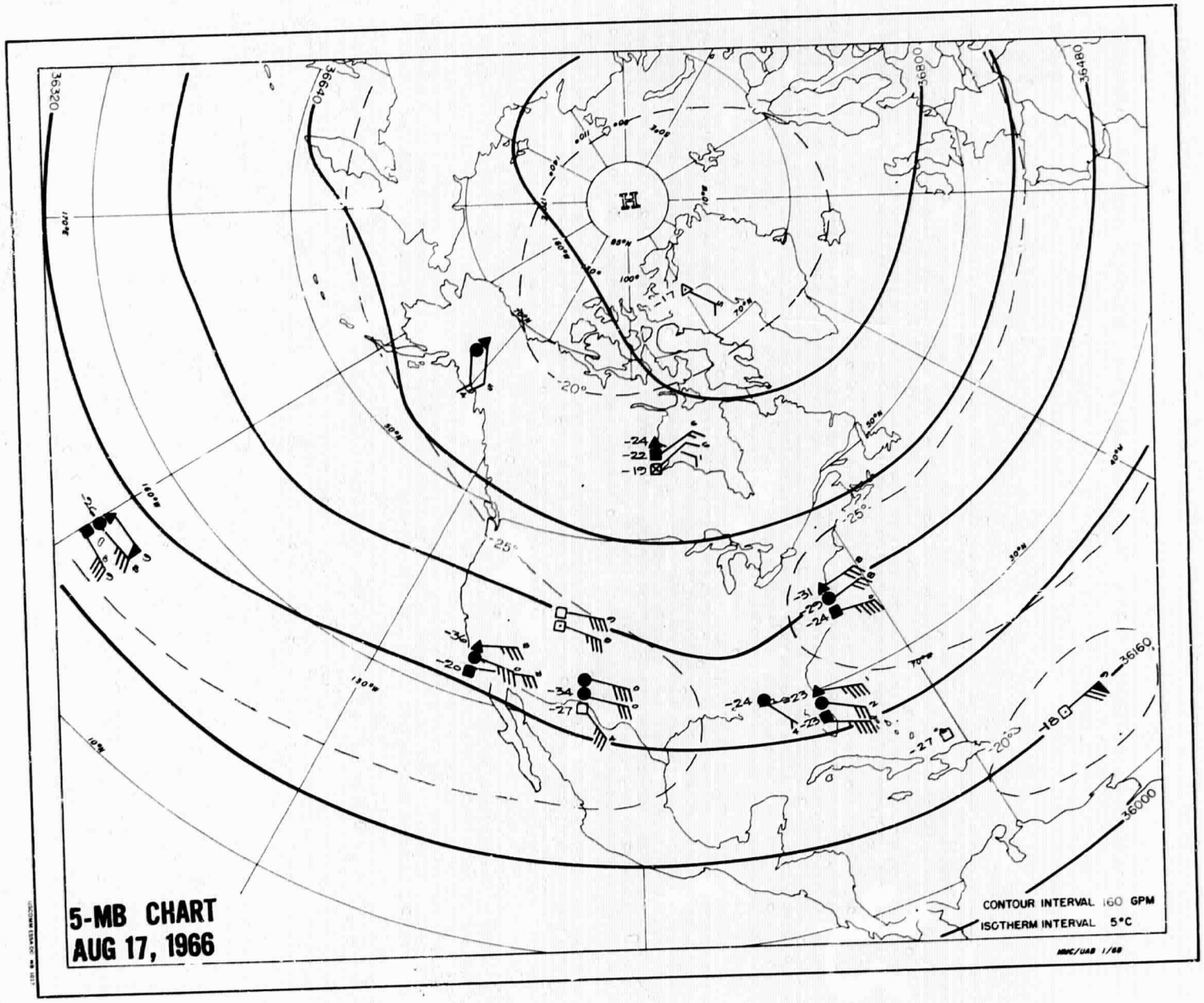
2-MB CHART
AUG 3, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
44320
44000
43680
43360
43040
44480
44160
43840
43520
43200
42880

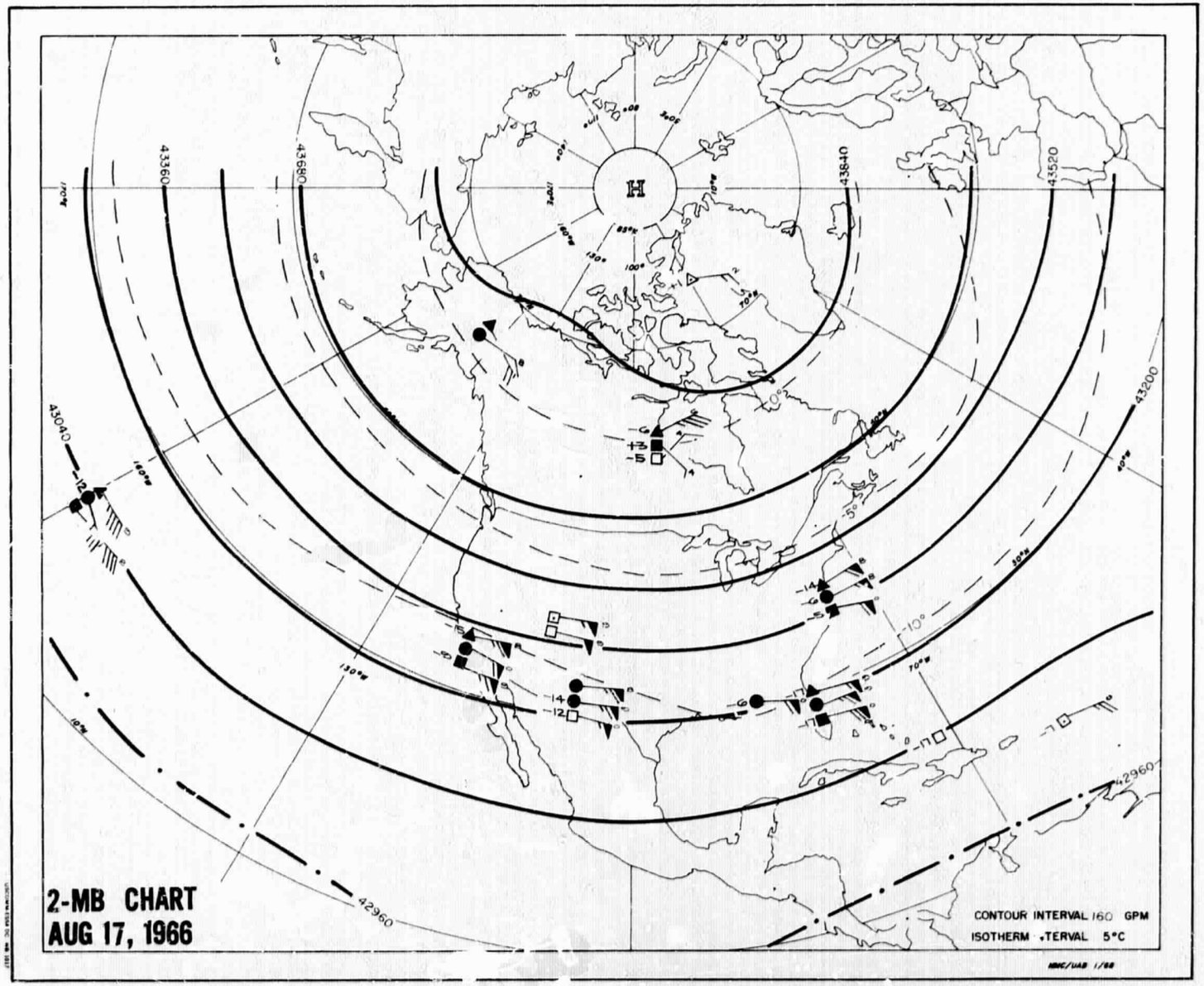

H
57760
57600
57280
57440
57120
56800
56480
56160
55840
55520
55280
56640
56320
56000
55680
55360
-5°
-10°
-15°
-20°
0.4-MB CHART
AUG 3, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C

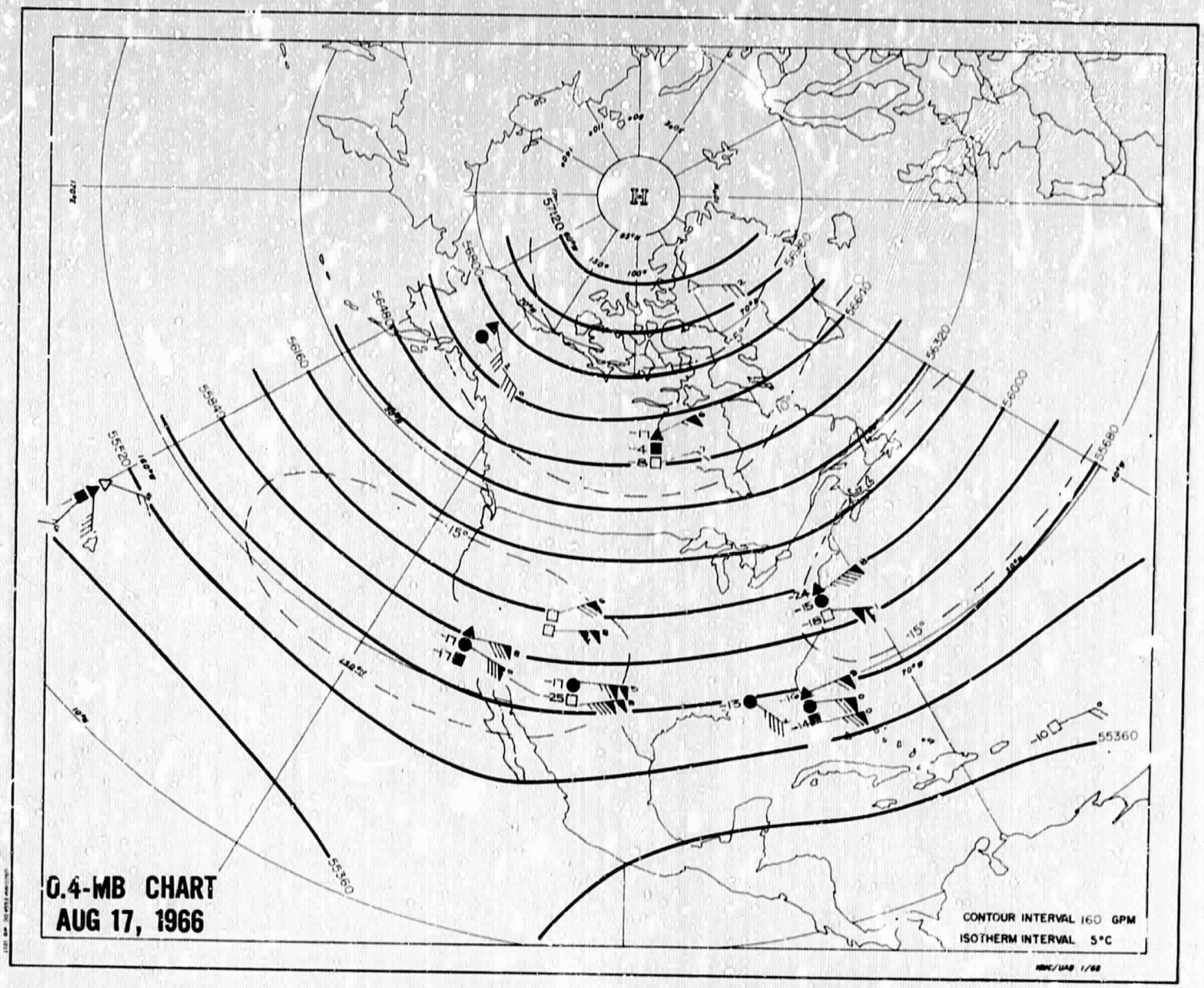
5-MB CHART
AUG 10, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
36480
36160
35840
36960
36640
36320
36000
-15°
-20°
-25°
H

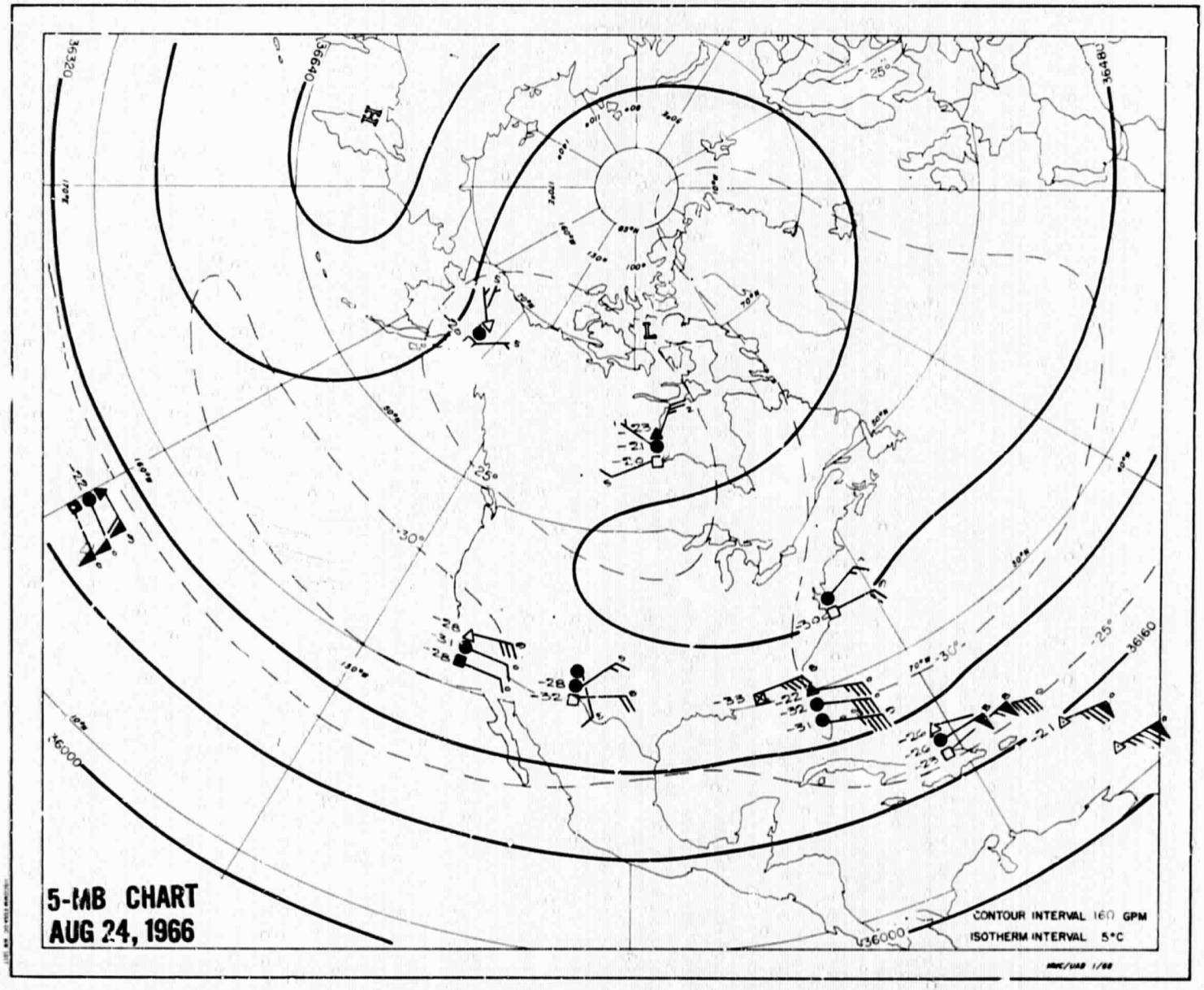

2-MB CHART
AUG 10, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
43360
43680
44000
44160
43840
43520
43200
42880
43040

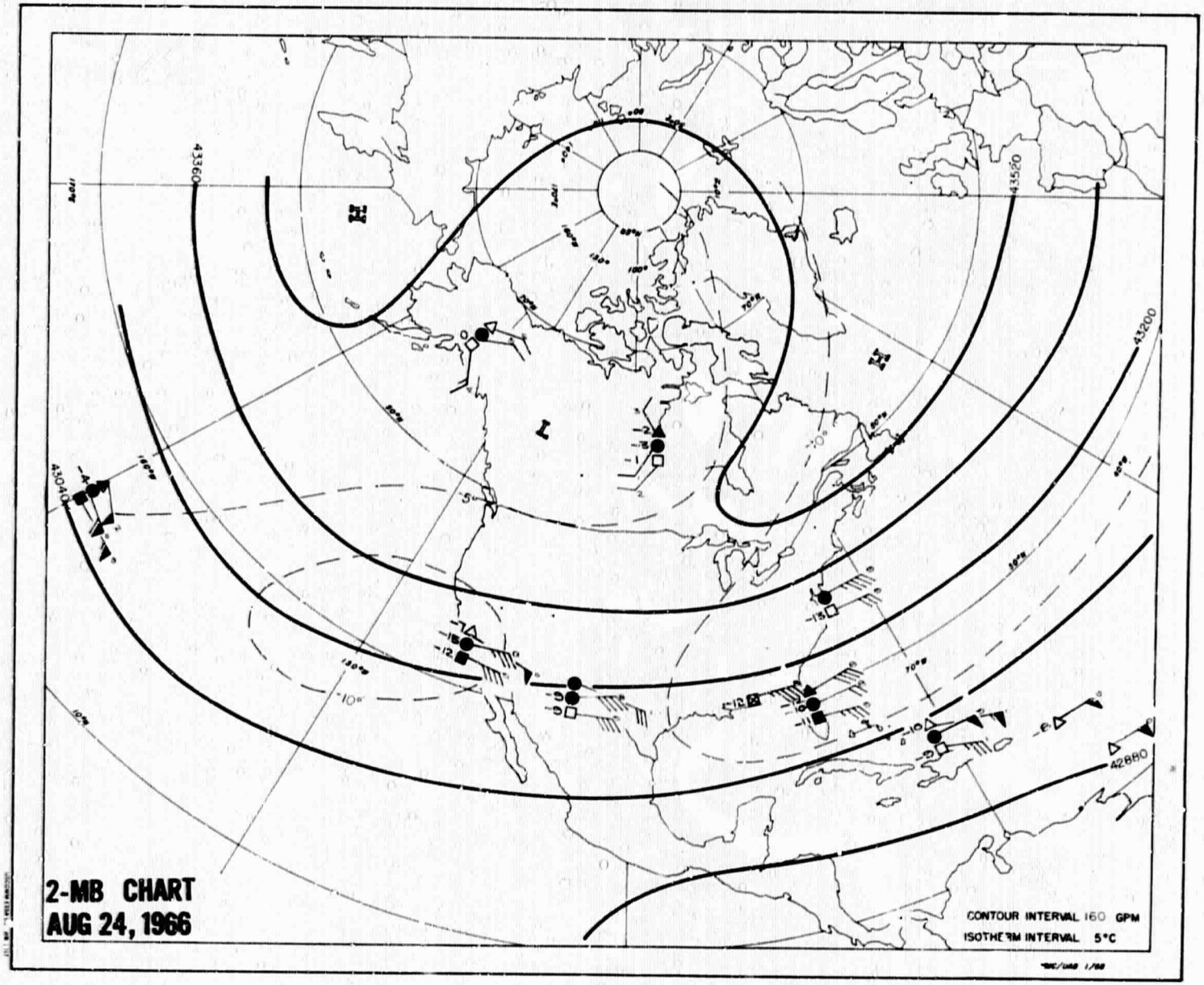

0.4-MB CHART
AUG 10, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
55520
55840
56160
56480
56800
57120
57440
57600
57280
56960
56640
56320
56000
55680
55360
55280
H
L
170°E
160°W
150°W
10°N

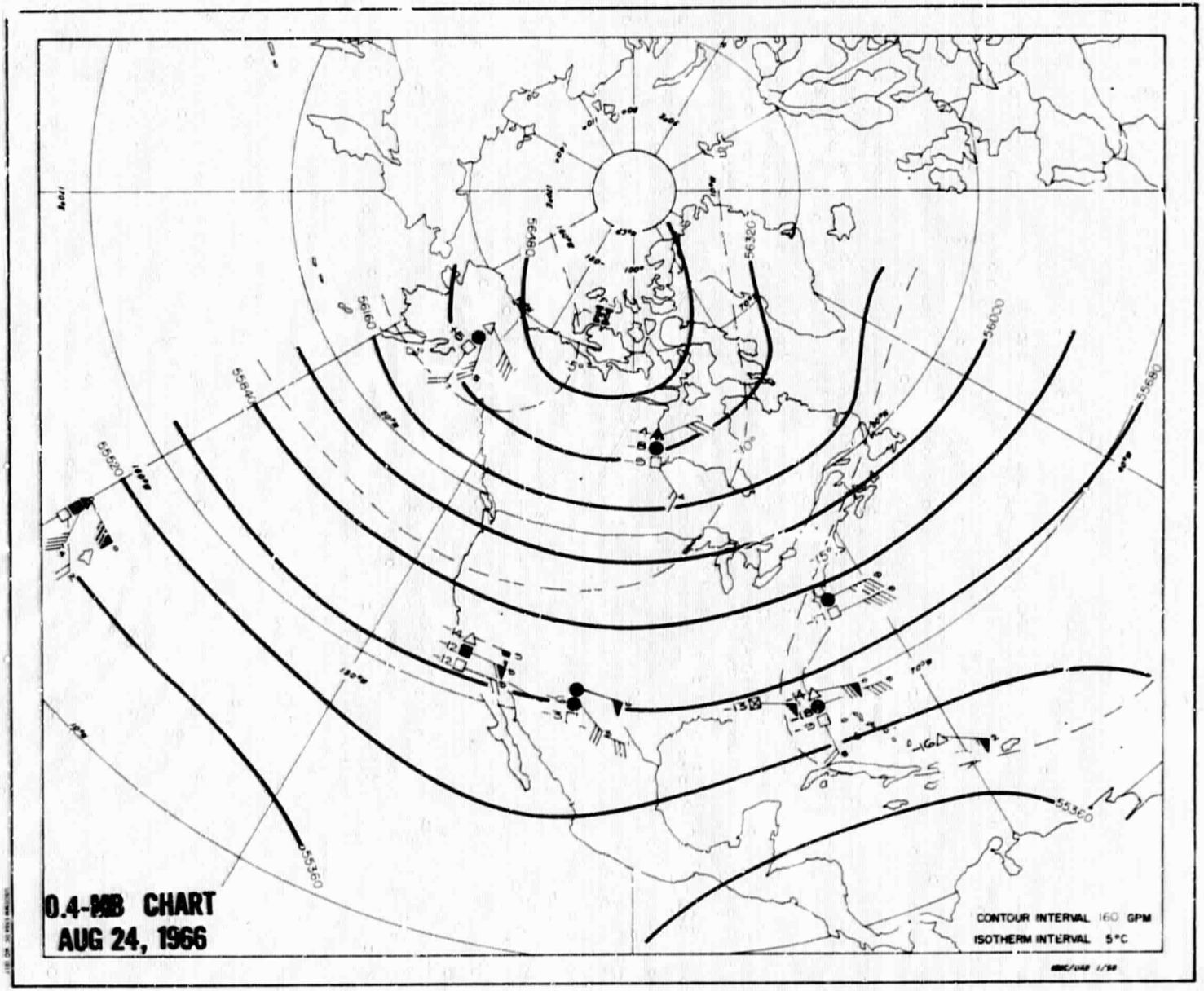

5-MB CHART
AUG 17, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
MRC/UAB 1/68

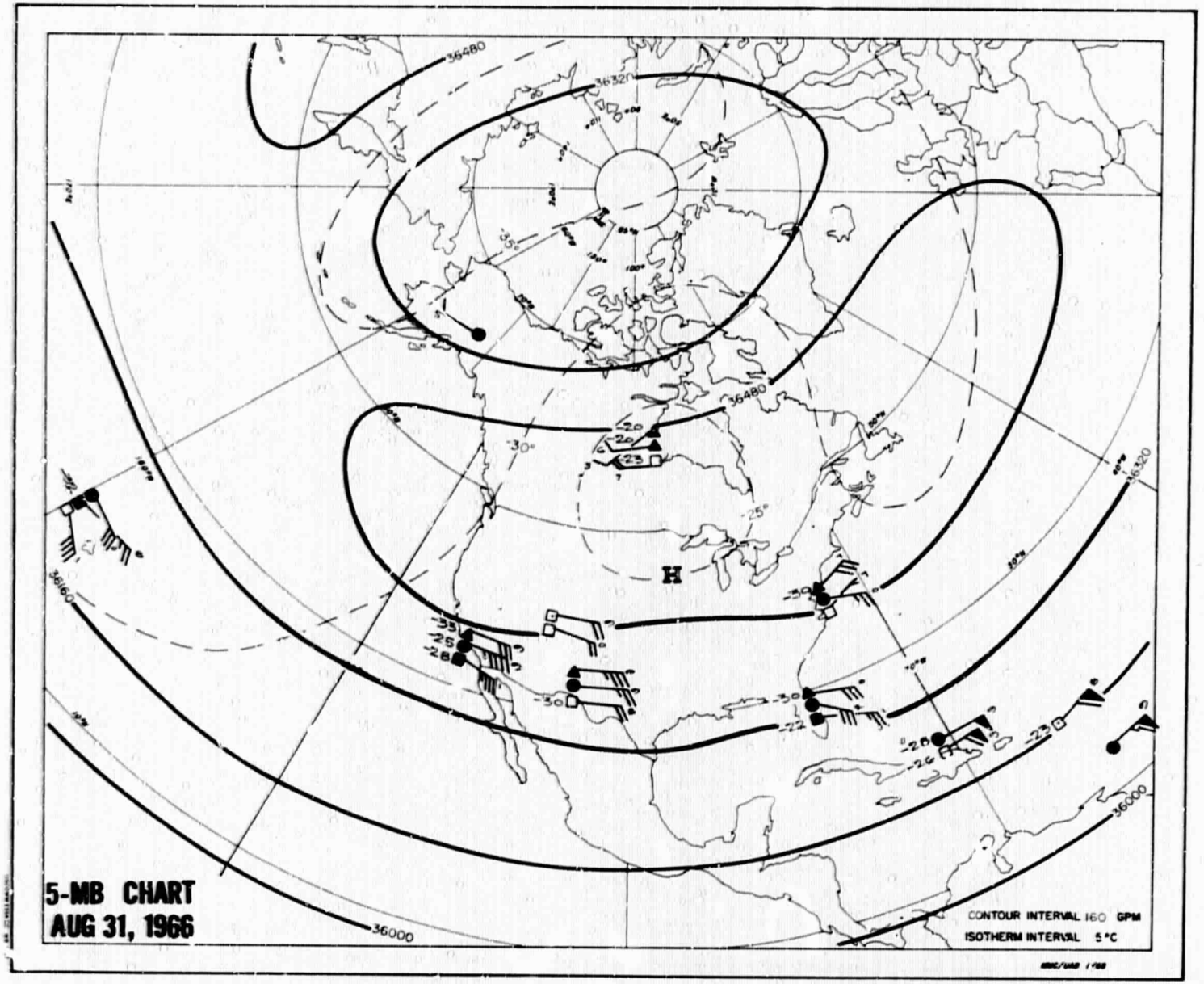

H
43360
43680
43840
43520
43200
43040
42960
-10°
-5°
0°
2-MB CHART
AUG 17, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C

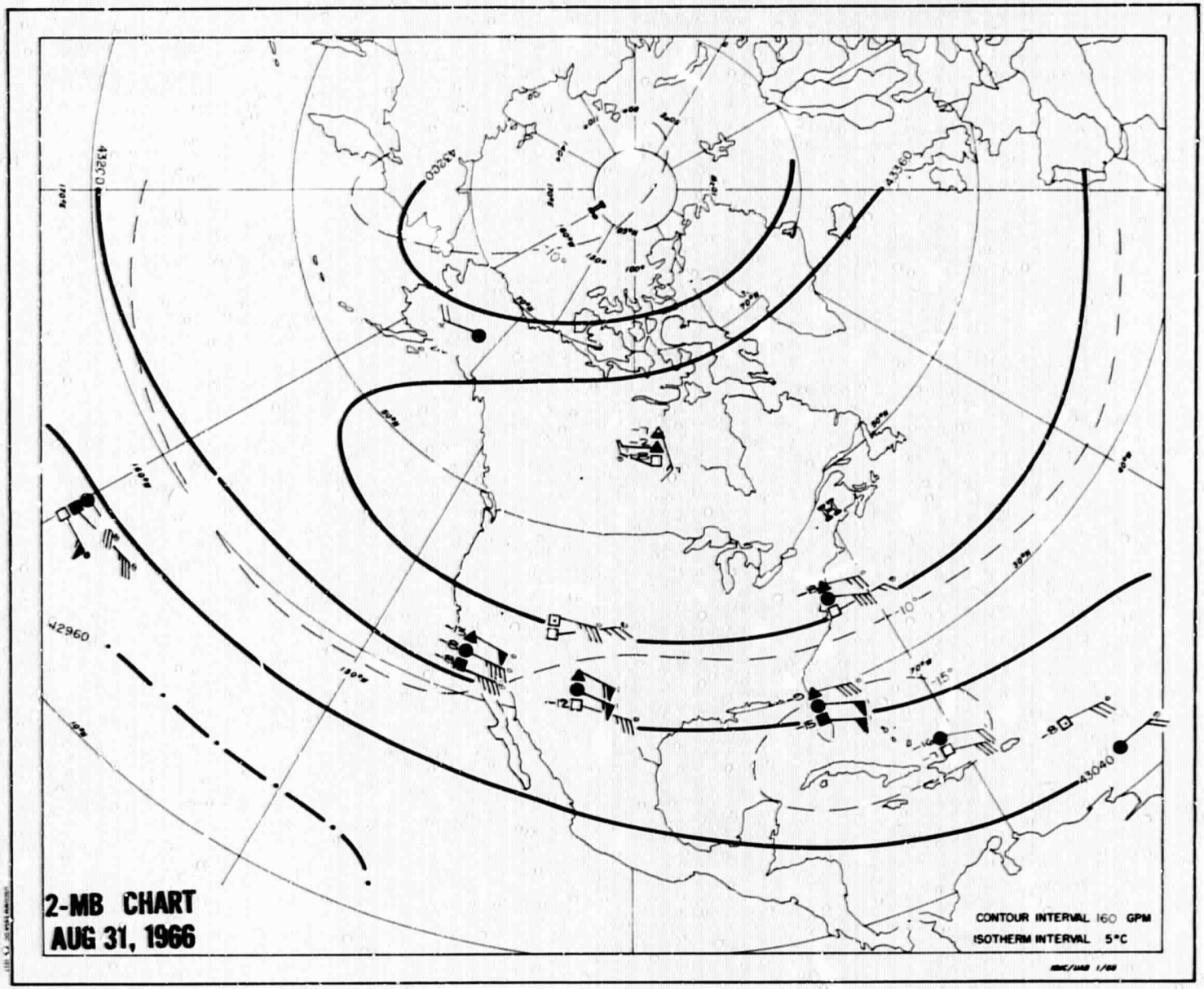

0.4-MB CHART
AUG 17, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C

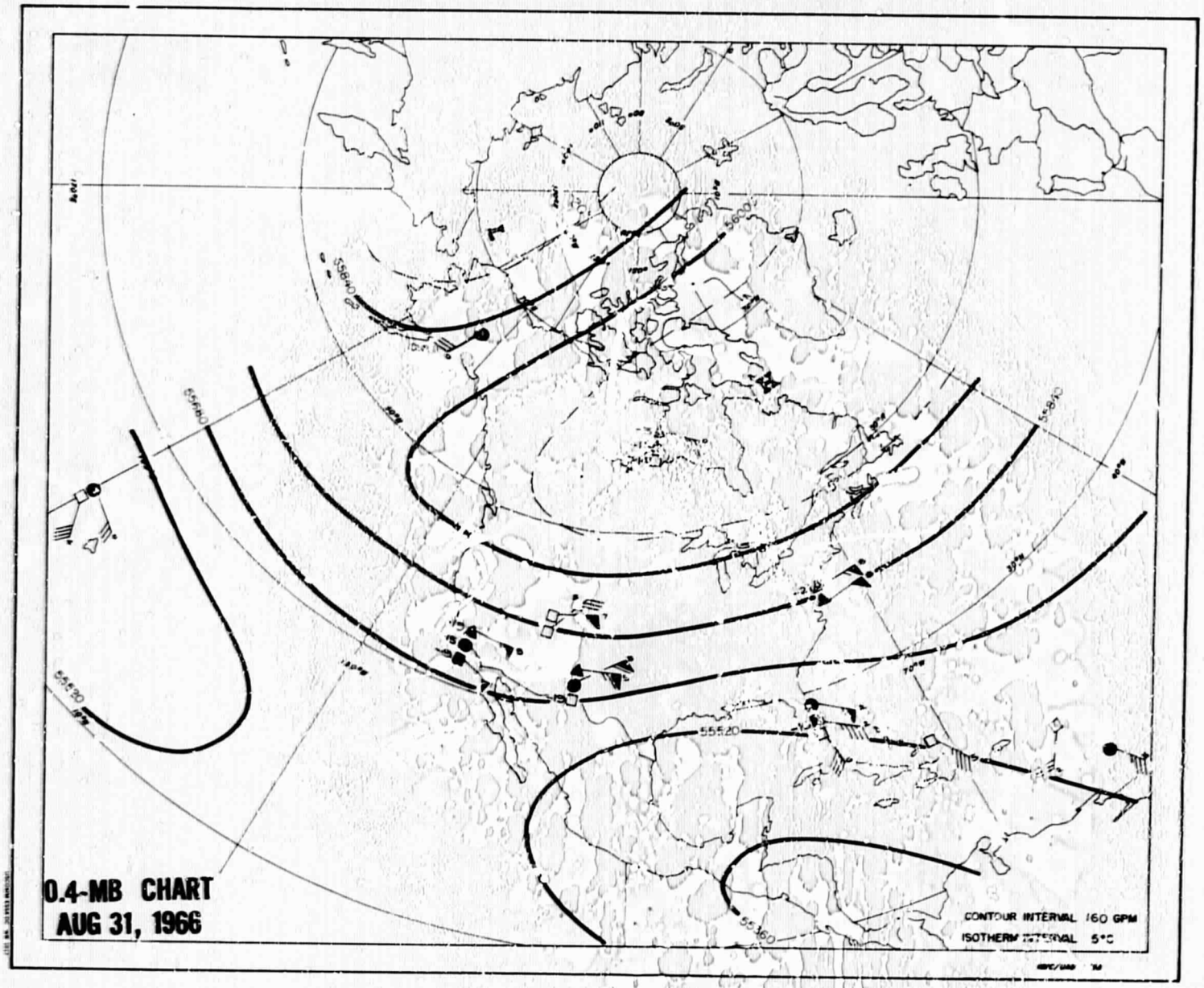

5-MB CHART
AUG 24, 1966
CONTOUR INTERVAL 180 GPM
ISOTHERM INTERVAL 5°C
H
L
36320
36640
36480
36160
36000

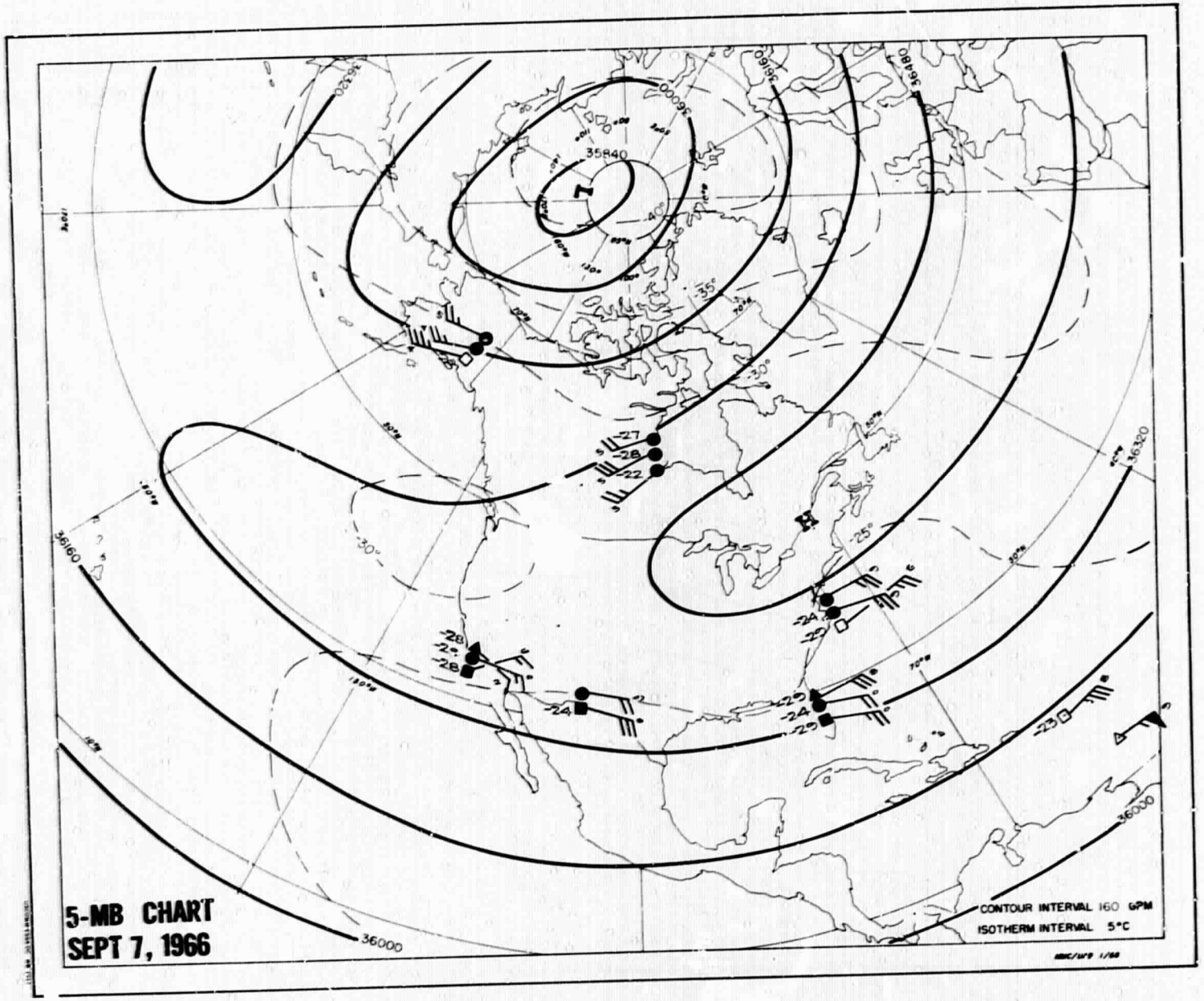

2-MB CHART
AUG 24, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
43360
43520
43200
43040
42880
H
L
-10°
-5°

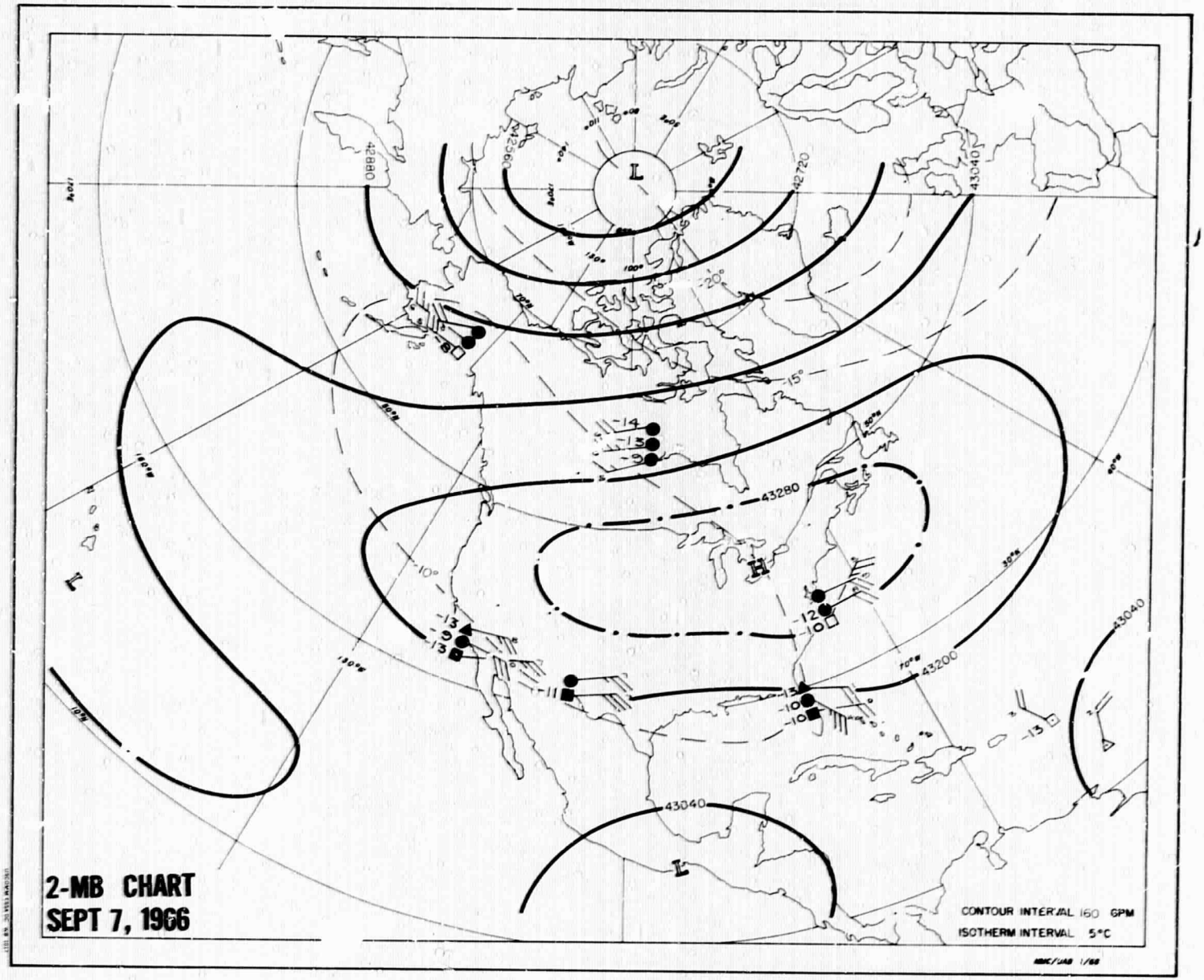

0.4-MB CHART
AUG 24, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C

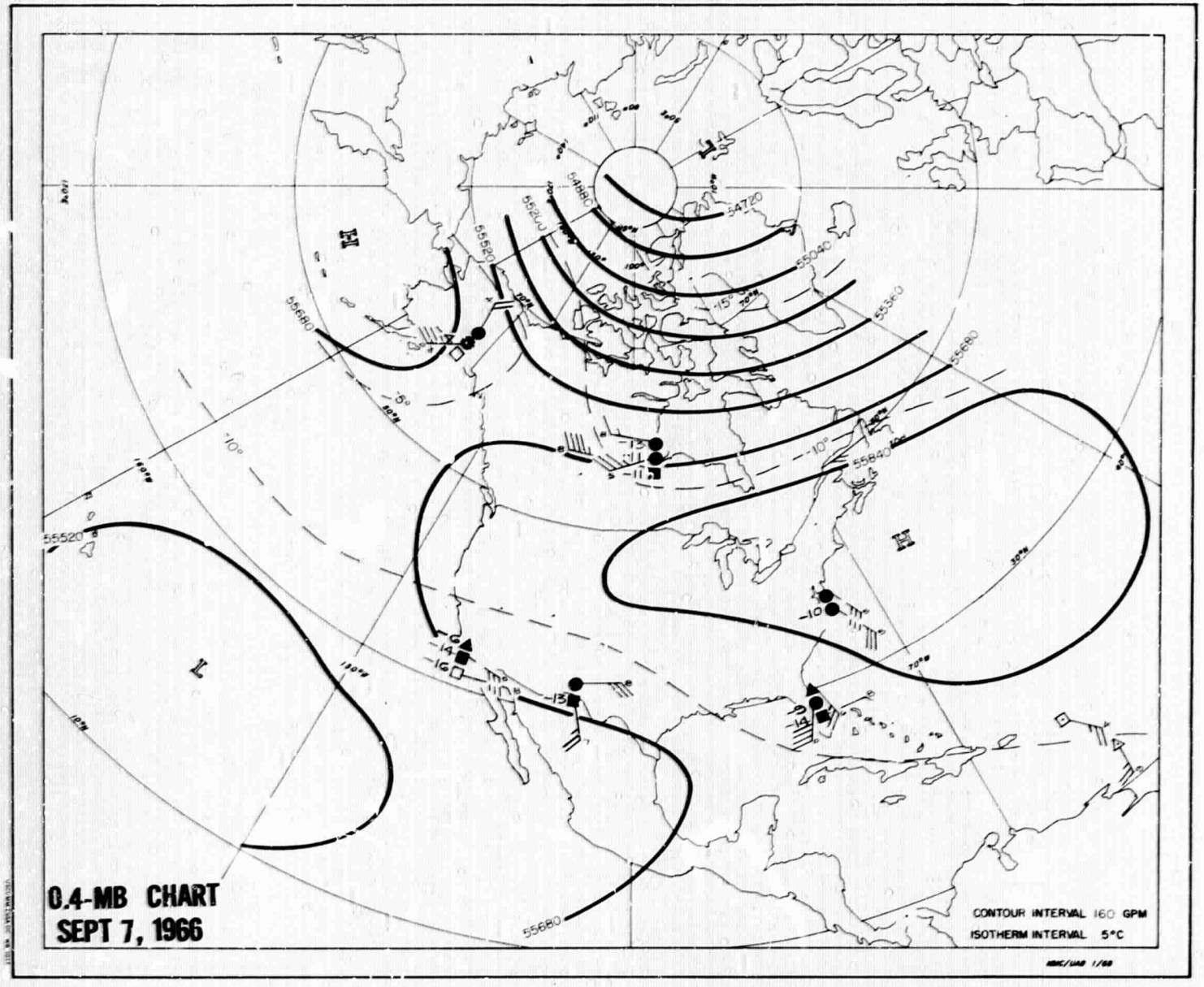

36480
36320
36160
36000
H
-30°
-25°
-35°
-20
-26
-23
-35
-25
-28
-30
-22
-26
5-MB CHART
AUG 31, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5 °C

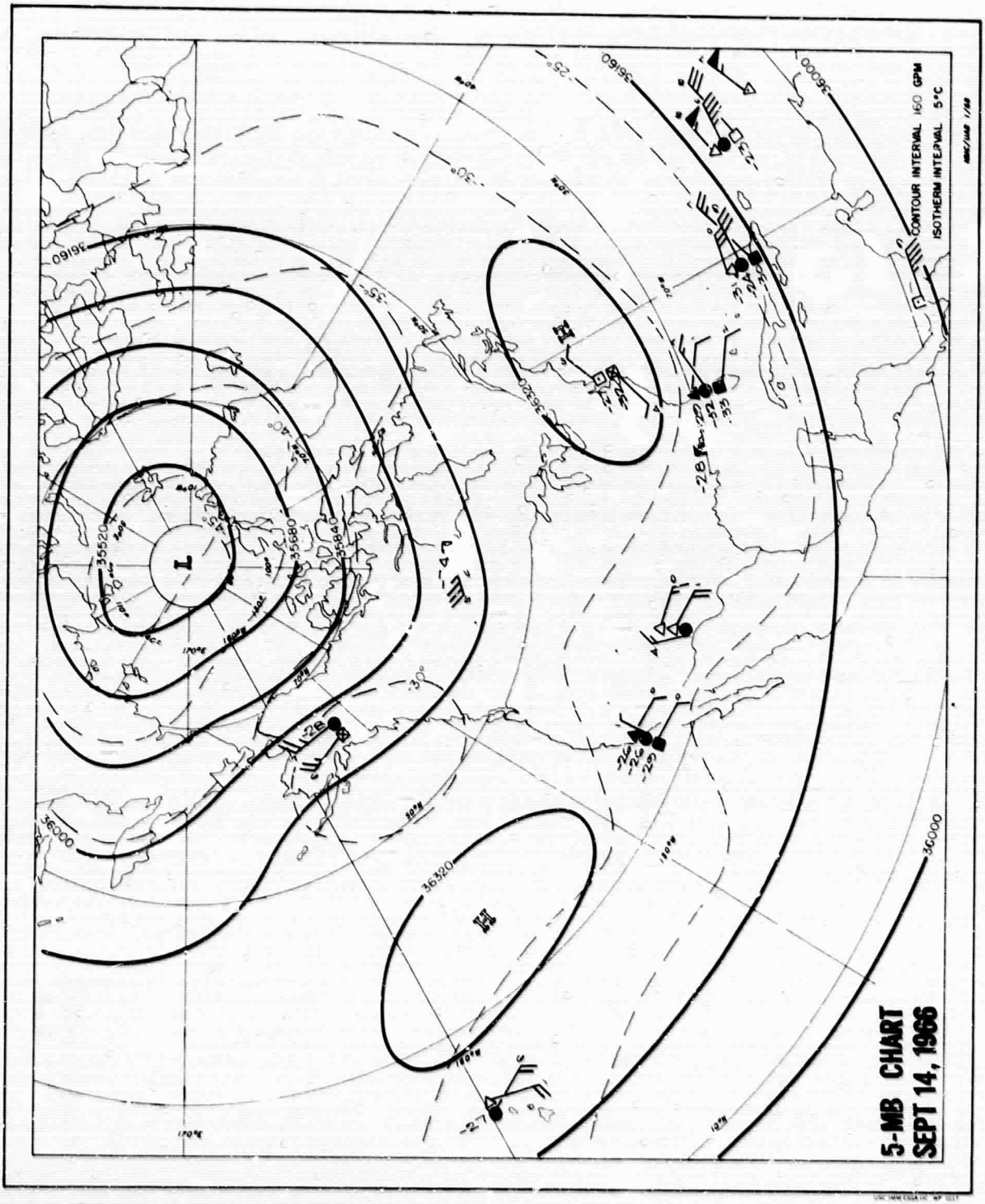

43200
43160
42960
43040
-10°
-15°
2-MB CHART
AUG 31, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C

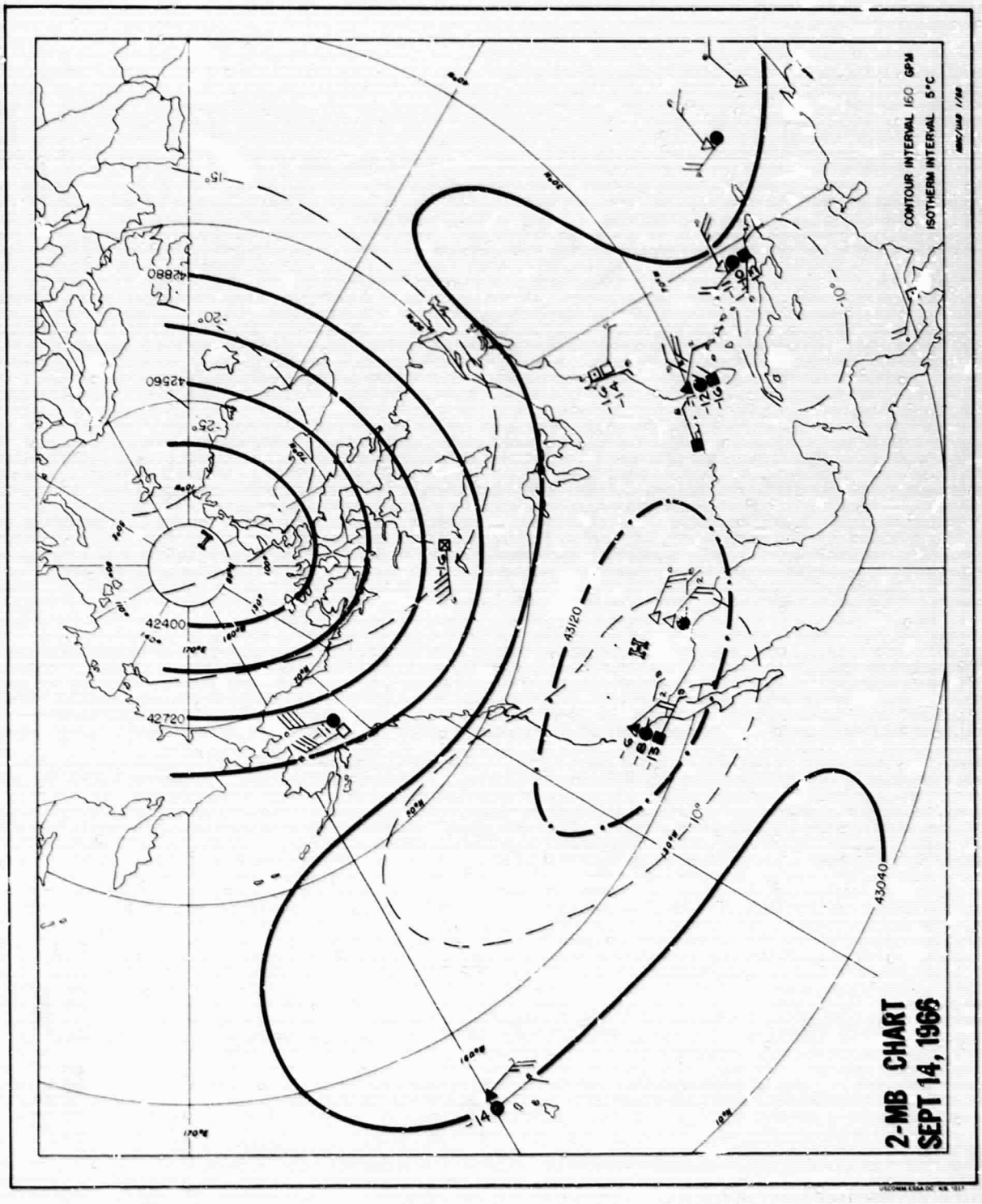

0.4-MB CHART
AUG 31, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
55520
55160

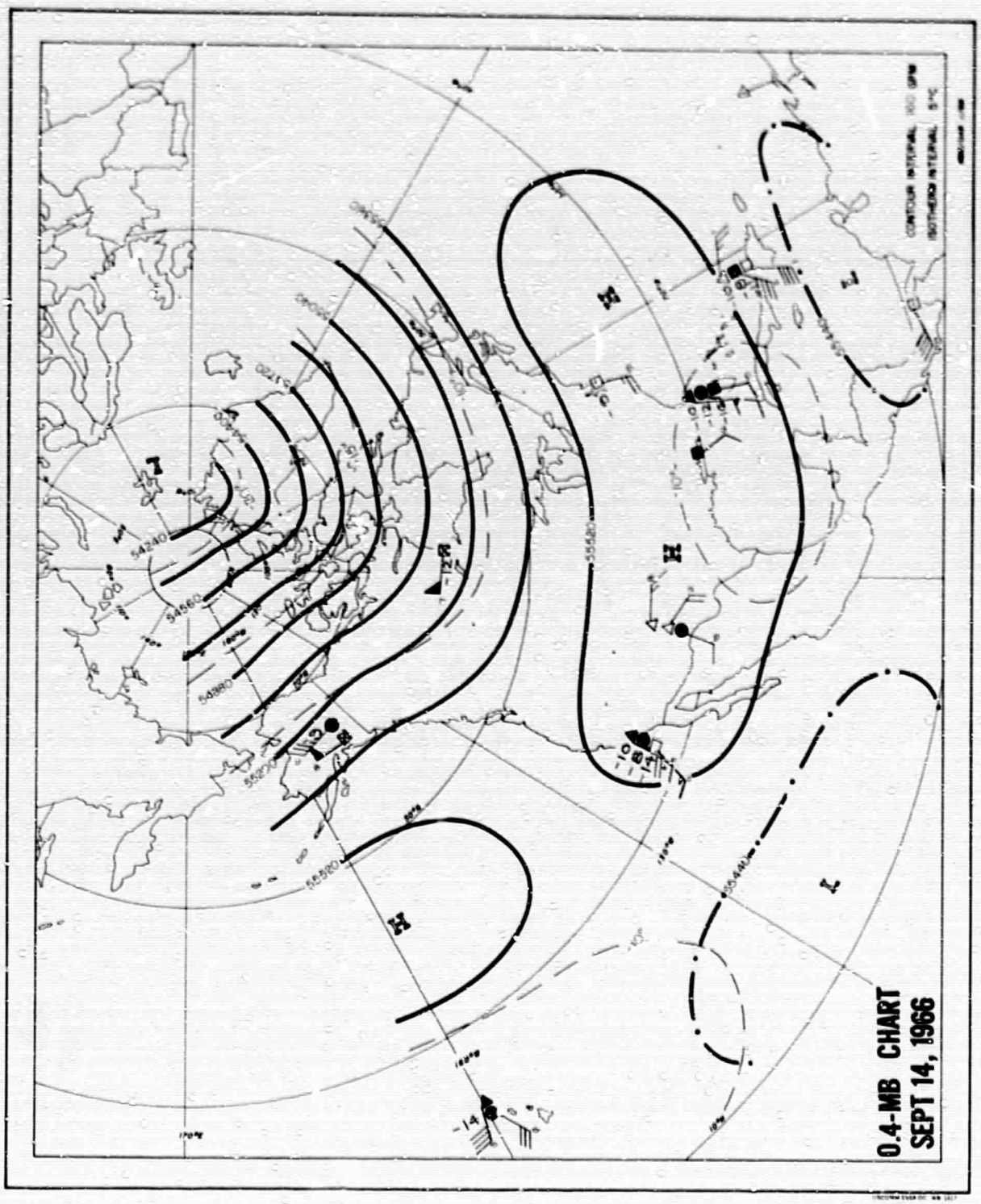

5-MB CHART
SEPT 7, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
35840
36000
36160
36320
36480
36000


2-MB CHART
SEPT 7, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
42880
42960
42720
43040
43280
43200
43040
43040
-20°
-15°
-10°
-14
-15
-9
-8
-13
-9
-13
-12
-10
-13
-10
-10
-13
L
L
L
L
H

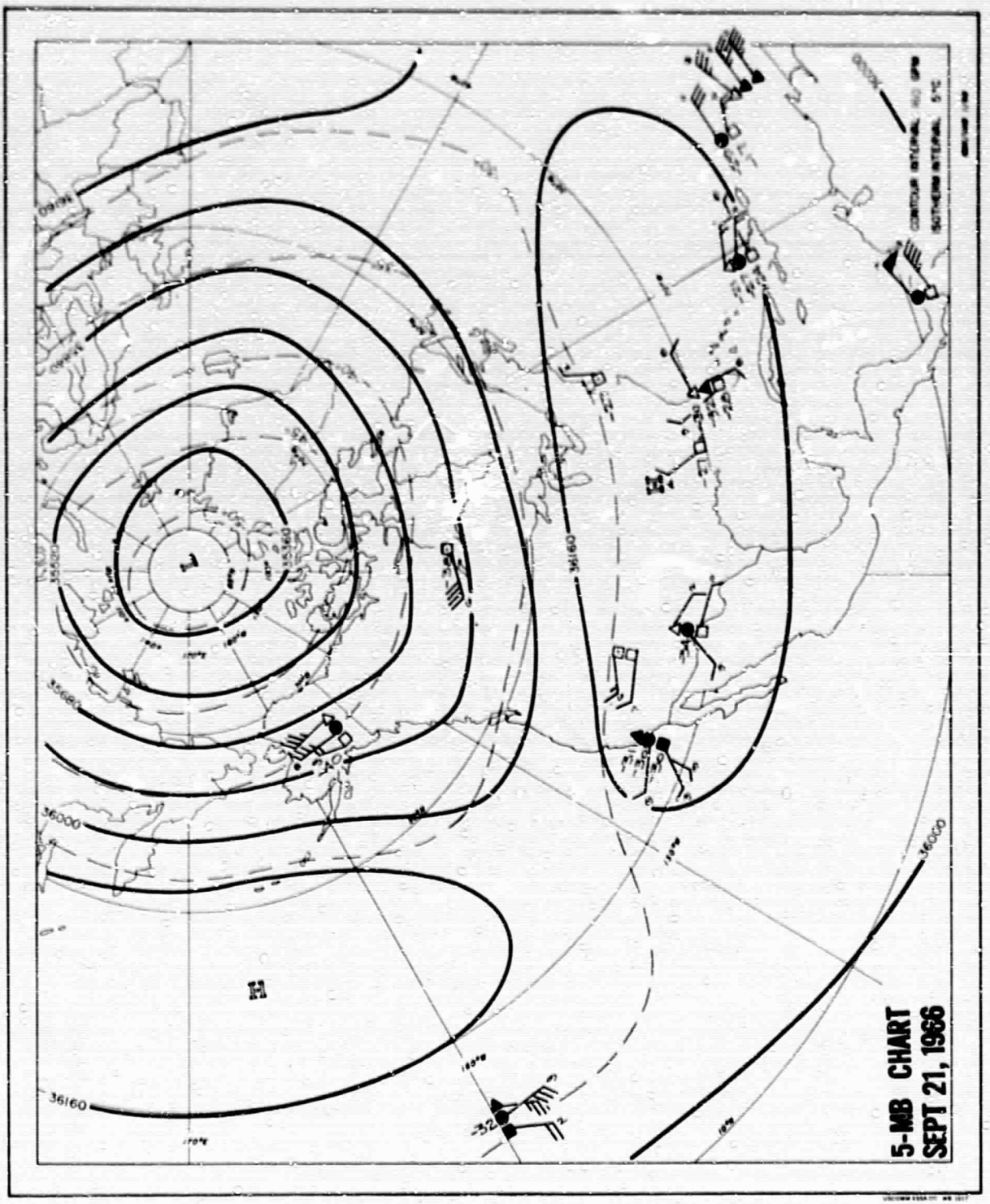

0.4-MB CHART
SEPT 7, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
54720
55040
55360
55680
55840
55520
55680
-5°
-10°
-15°


5-MB CHART
SEPT 14, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
T
H
H
36000
36320
35840
35680
35520
36160

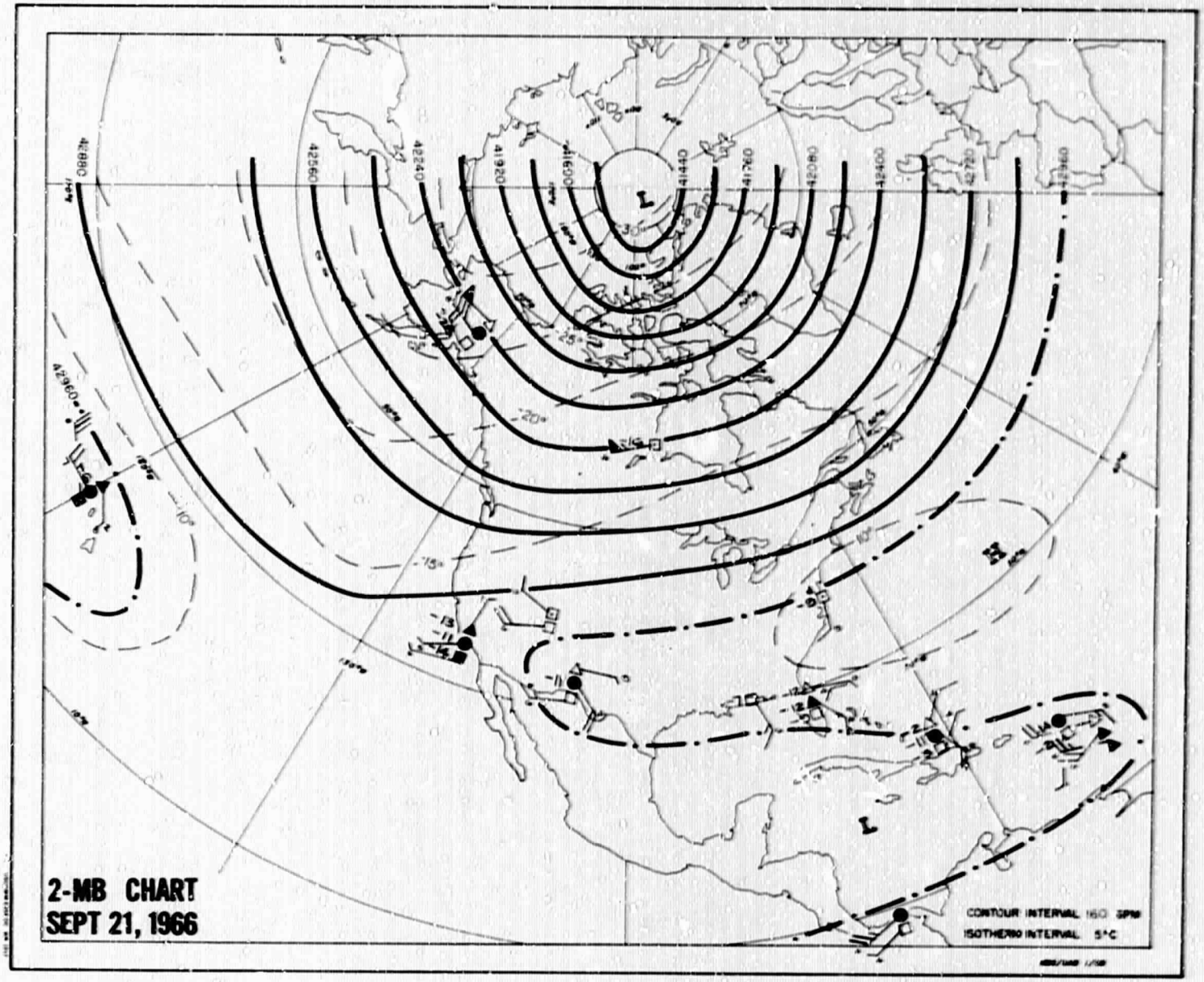

2-MB CHART
SEPT 14, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
42880
42560
42400
42720
43120
43040

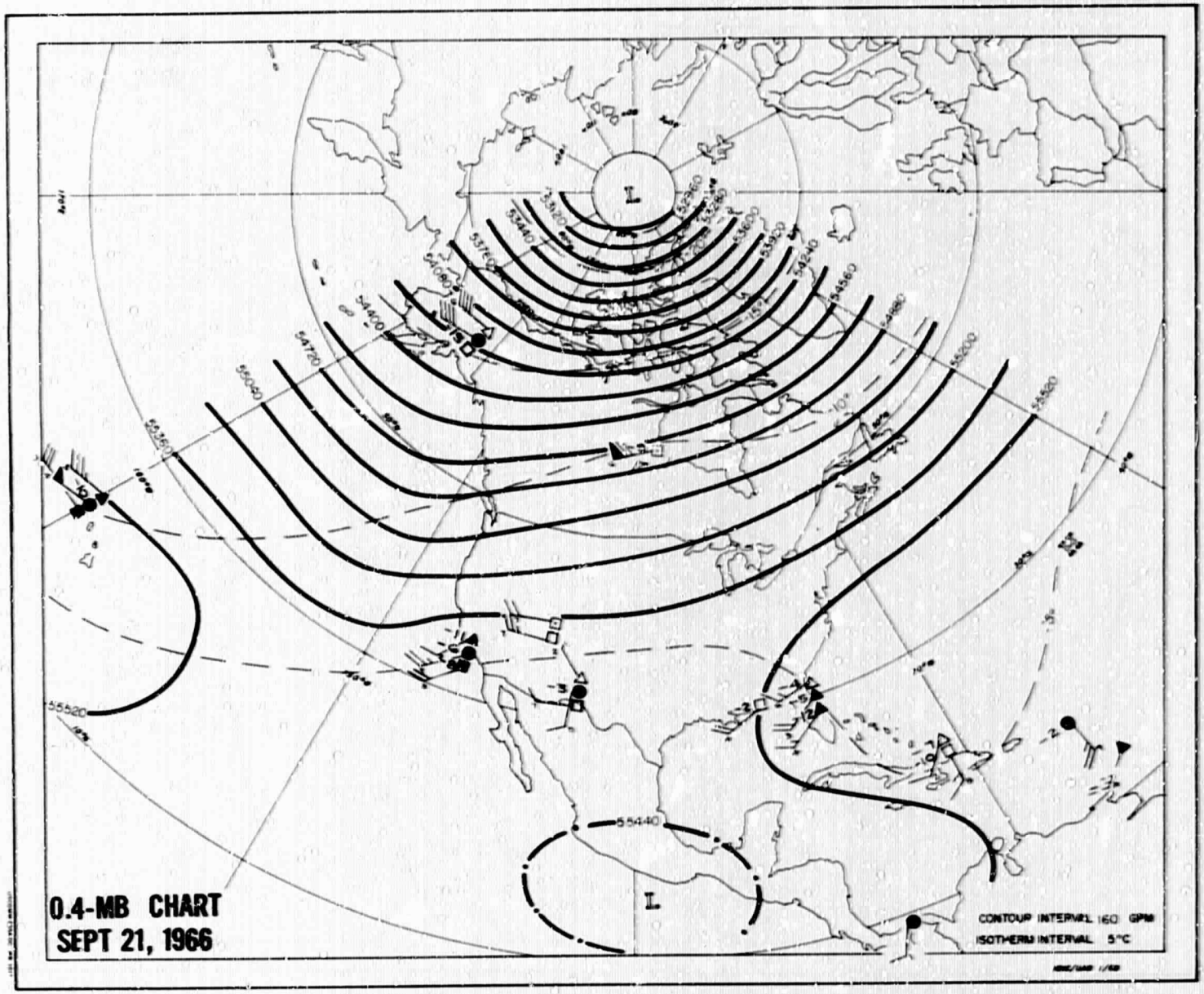


3



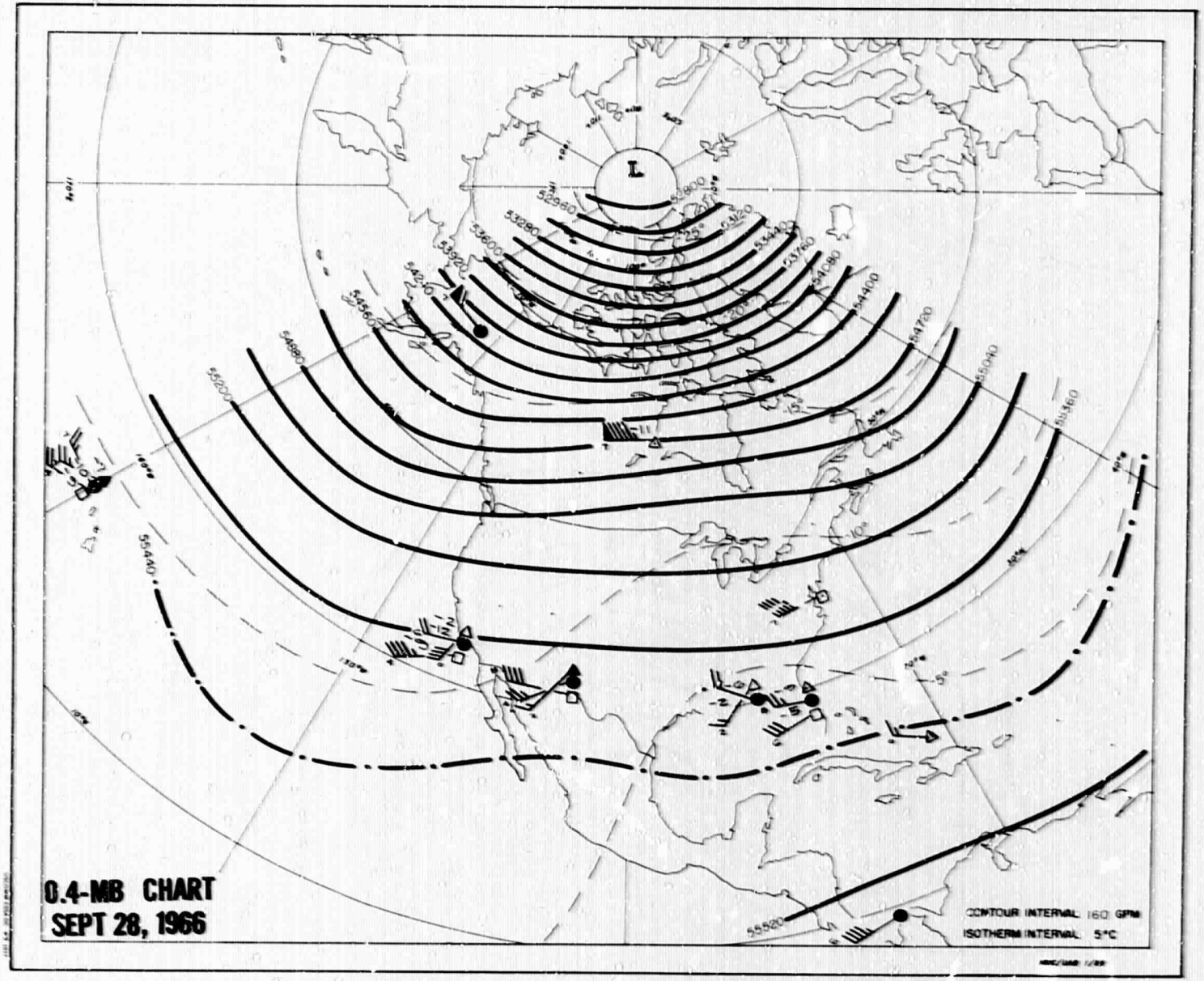
333-925 O - 69 - 9


2-MB CHART
SEPT 21, 1966
CONTOUR INTERVAL 150 gpm
ISOTHERM INTERVAL 5°C


0.4-MB CHART
SEPT 21, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C

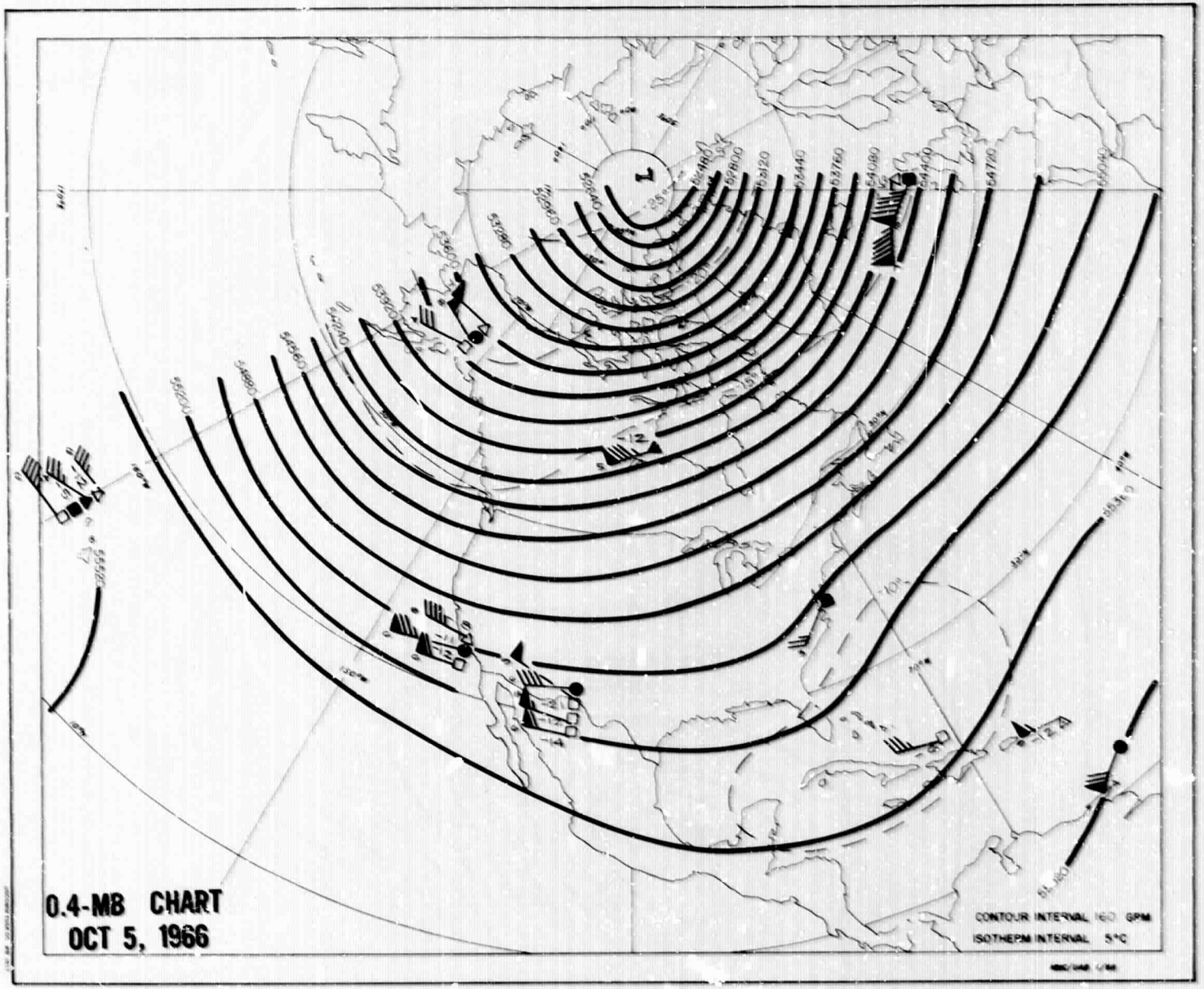
5-MB CHART
SEPT 28, 1966
CONTOUR INTERVAL 60 GPM
ISOTHERM INTERVAL 5°C
H
H
H
L
36160
35680
36000
35360
35520
35040
35200
35680
36160
36000
-32
-24
-26
-25
-30
-25
-22

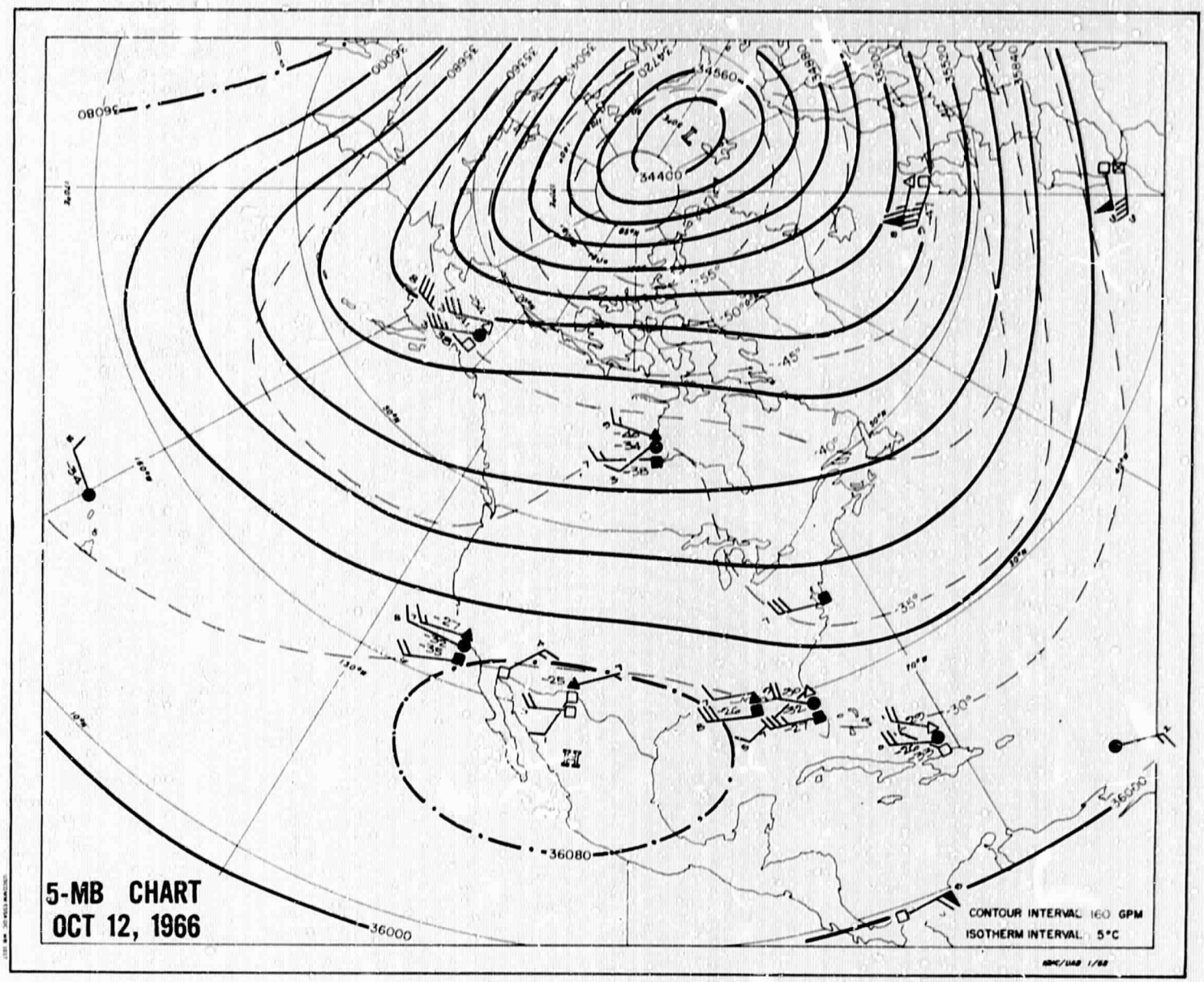
2-MB CHART
SEPT 28, 1966
CONTOUR INTERVAL 120 GPM
ISOTHERM INTERVAL 5°C
42960
42720
42480
42240
42000
41760
41520
41280
41040
42880
42560

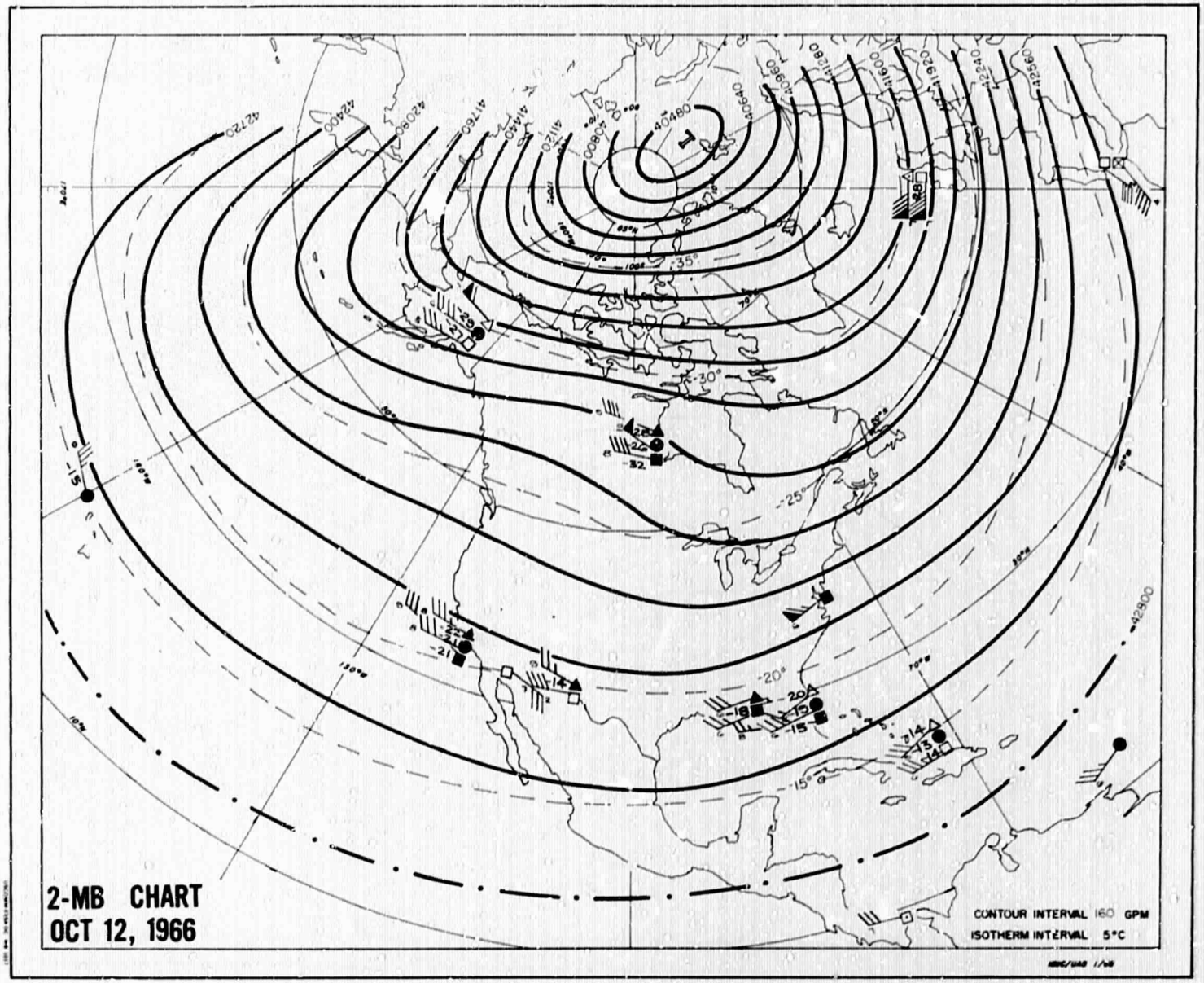

0.4-MB CHART
SEPT 28, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C

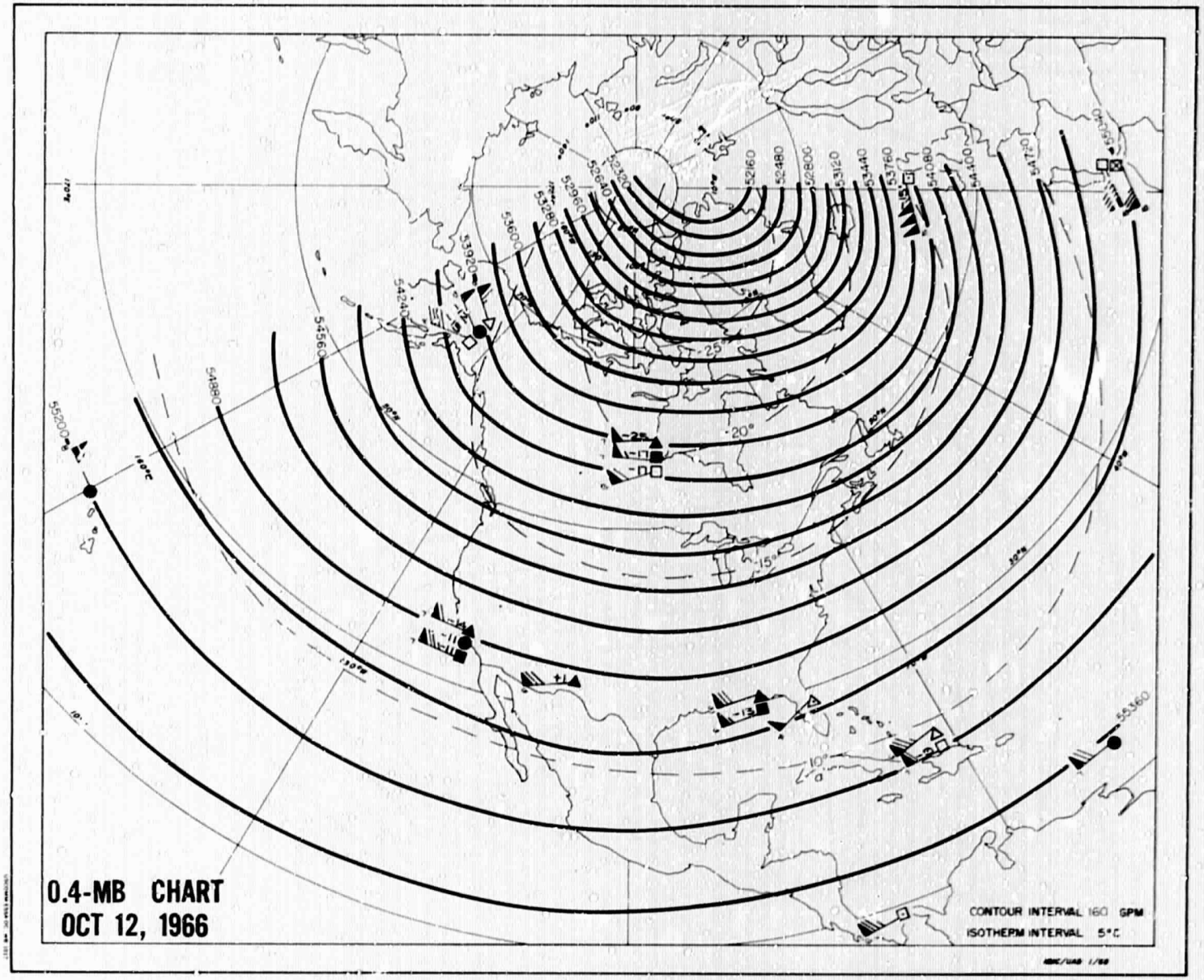
5-MB CHART
OCT 5, 1966
CONTOUR INTERVAL 180 GPM
ISOTHERM INTERVAL 5°C
H
L
34720
35040
35360
35680
36000
36080
-35°
-30°
170°E

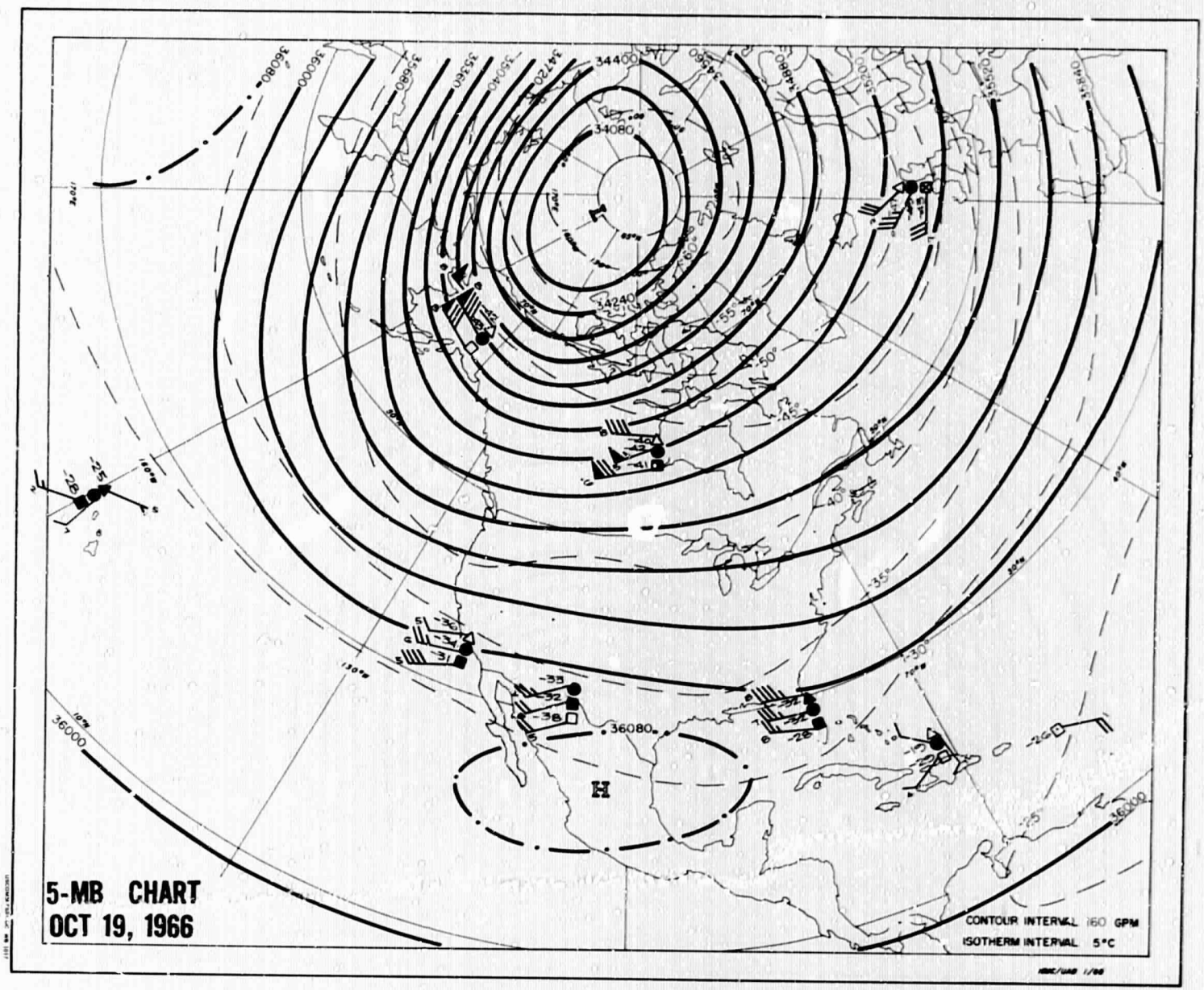
2-MB CHART
OCT 5, 1966
CONTOUR INTERVAL 120 GPM
ISOTHERM INTERVAL 5°C
42880
42560
42240
41920
41600
41280
40960
40800
41120
41440
41760
42080
42400
42720


0.4-MB CHART
OCT 5, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C

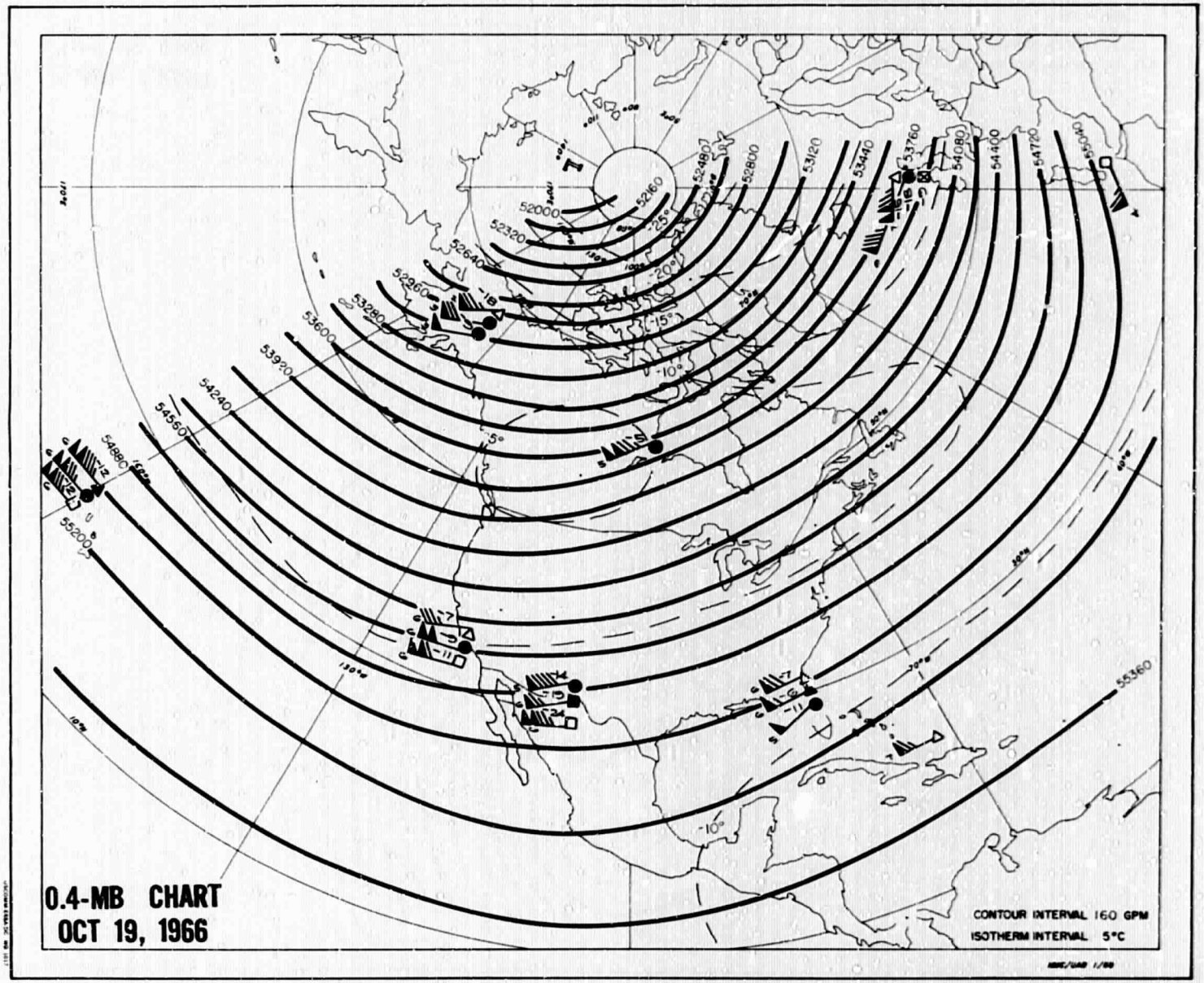

5-MB CHART
OCT 12, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
34400
34560
36080
36000
36050
-55°
-50°
-45°
-40°
-35°
-30°
-25°


2-MB CHART
OCT 12, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C

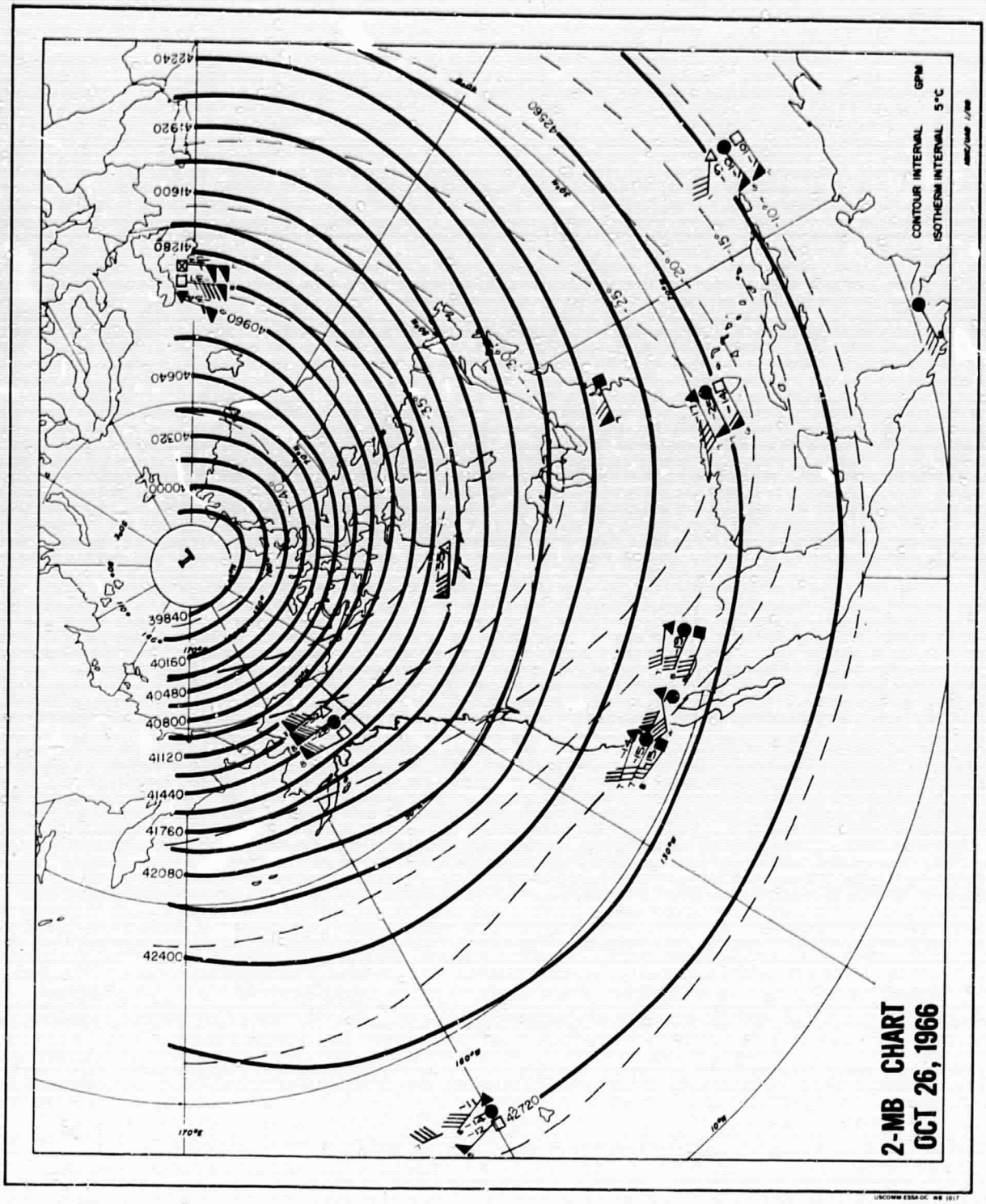

0.4-MB CHART
OCT 12, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C

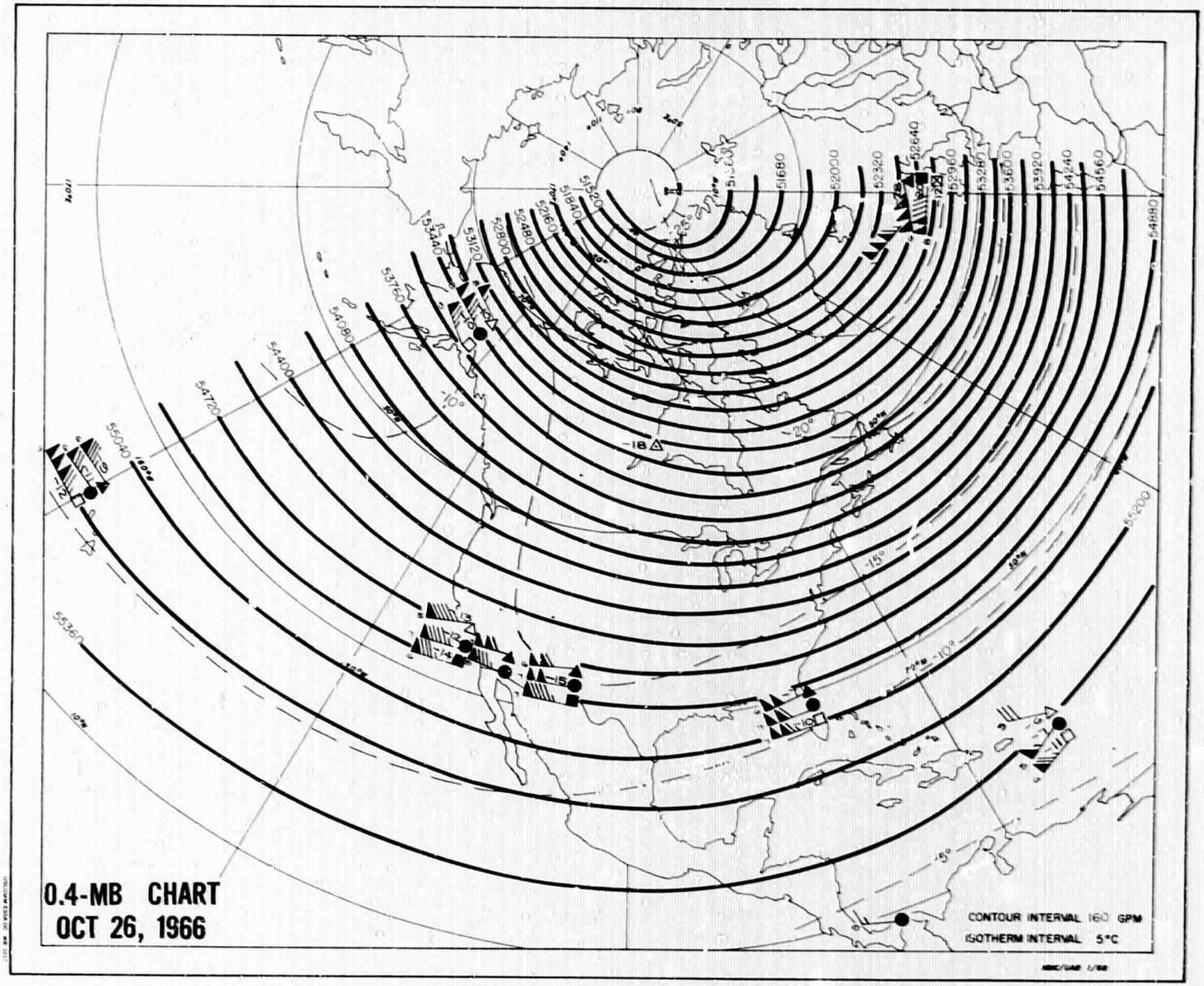

5-MB CHART
OCT 19, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
34400
34080
34240
36080
36000
H

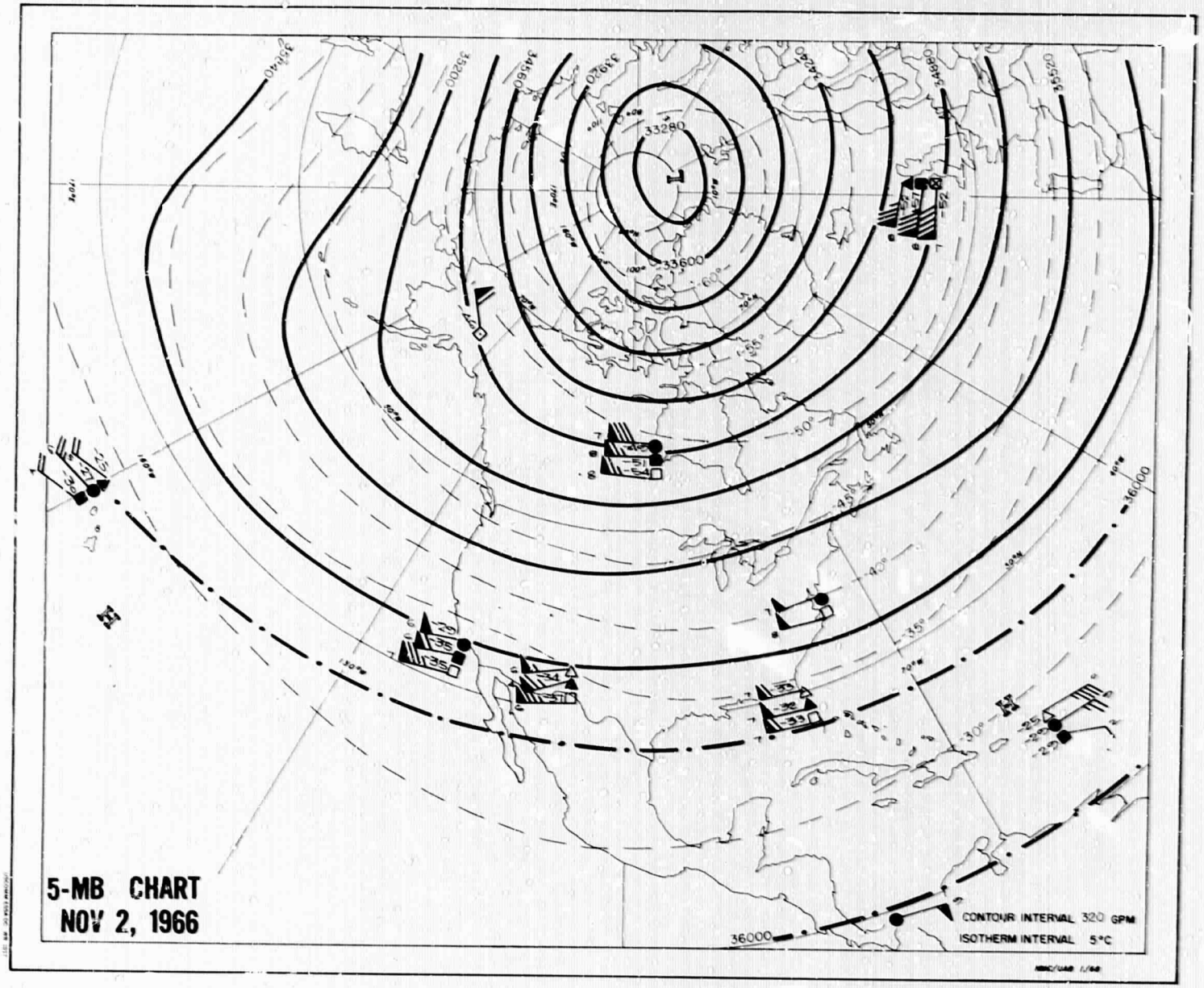
2-MB CHART
OCT 19, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
40000
40320
40640
40960
41280
41600
41920
42240
42560
42880

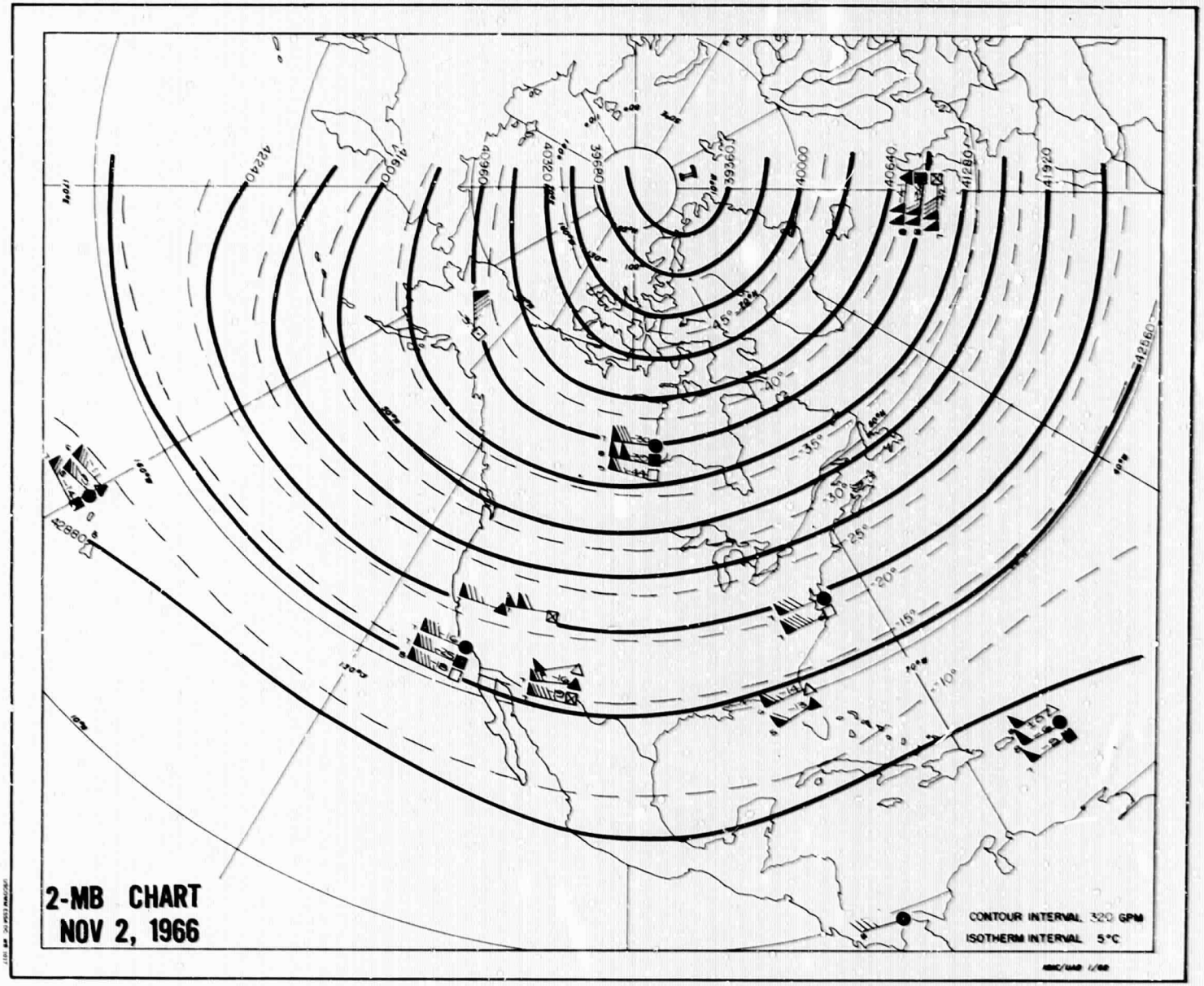

0.4-MB CHART
OCT 19, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C

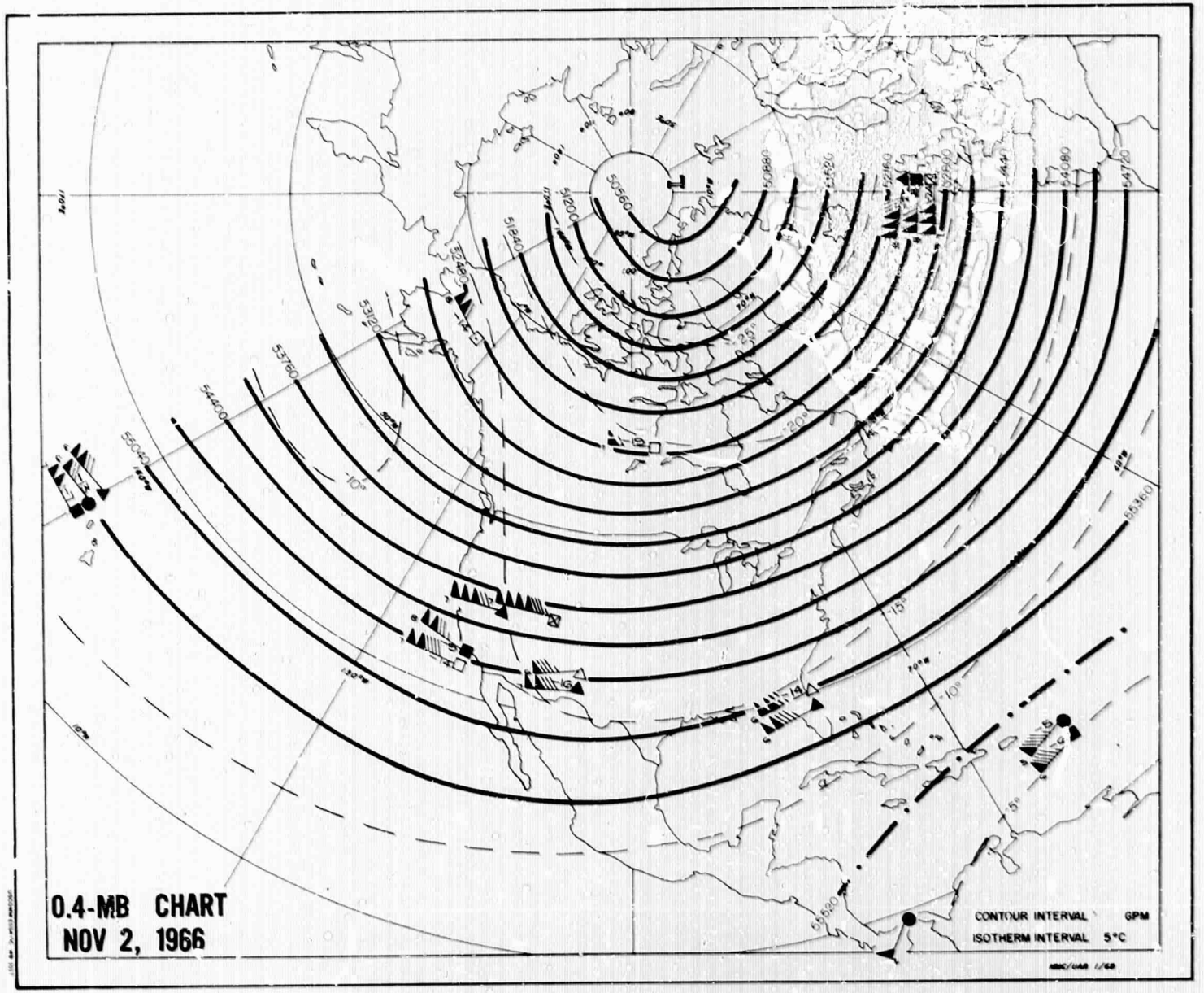
5-MB CHART
OCT 26, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C
33760
33920
34080
34240
34400
34560
34720
34880
35040
35200
35360
35520
35680
35840
36000
36160

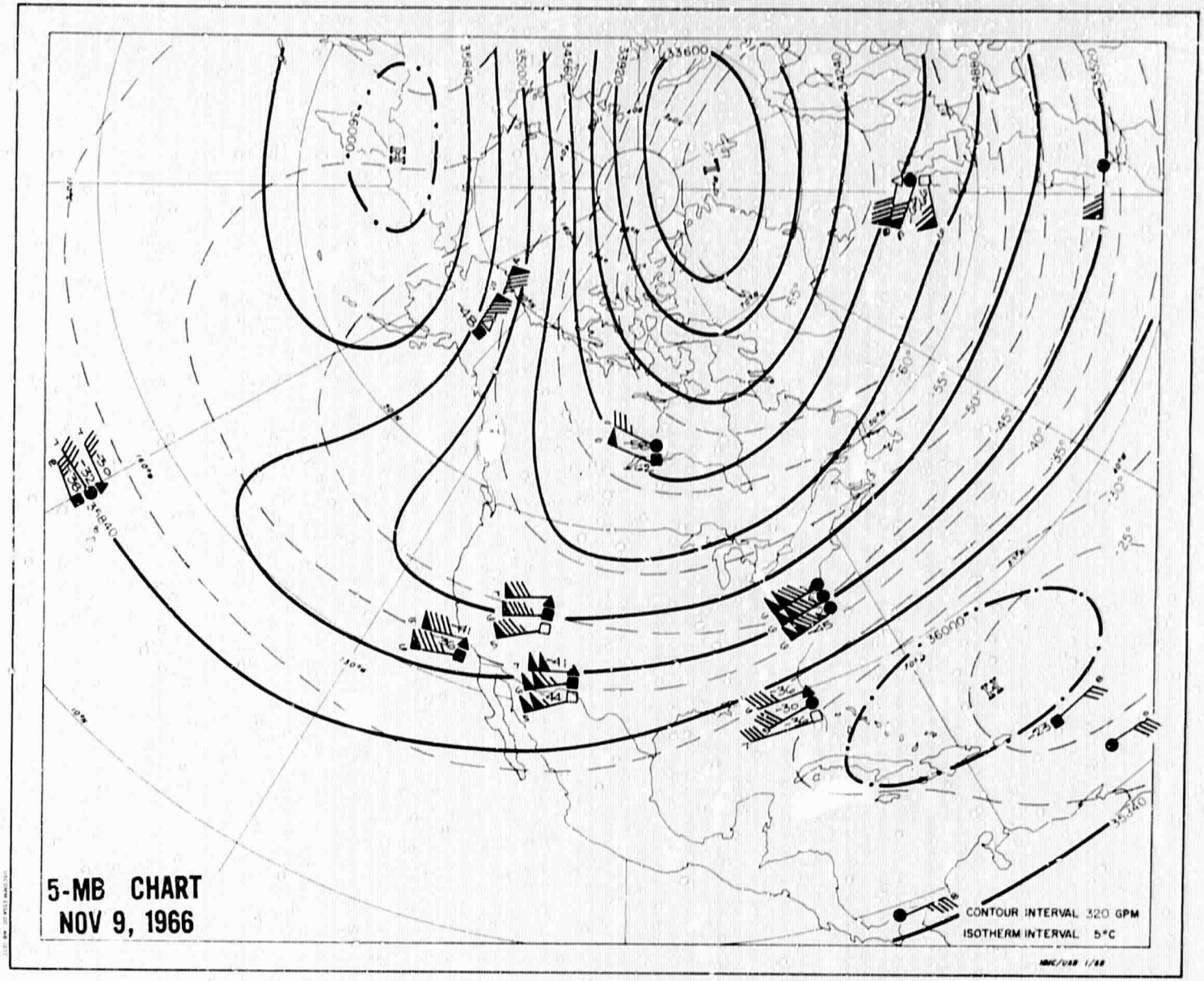

2-MB CHART
OCT 26, 1966
CONTOUR INTERVAL 60M
ISOTHERM INTERVAL 5°C
42240
41920
41600
41280
40960
40640
40320
40000
39840
40160
40480
40800
41120
41440
41760
42080
42400
42720
42560

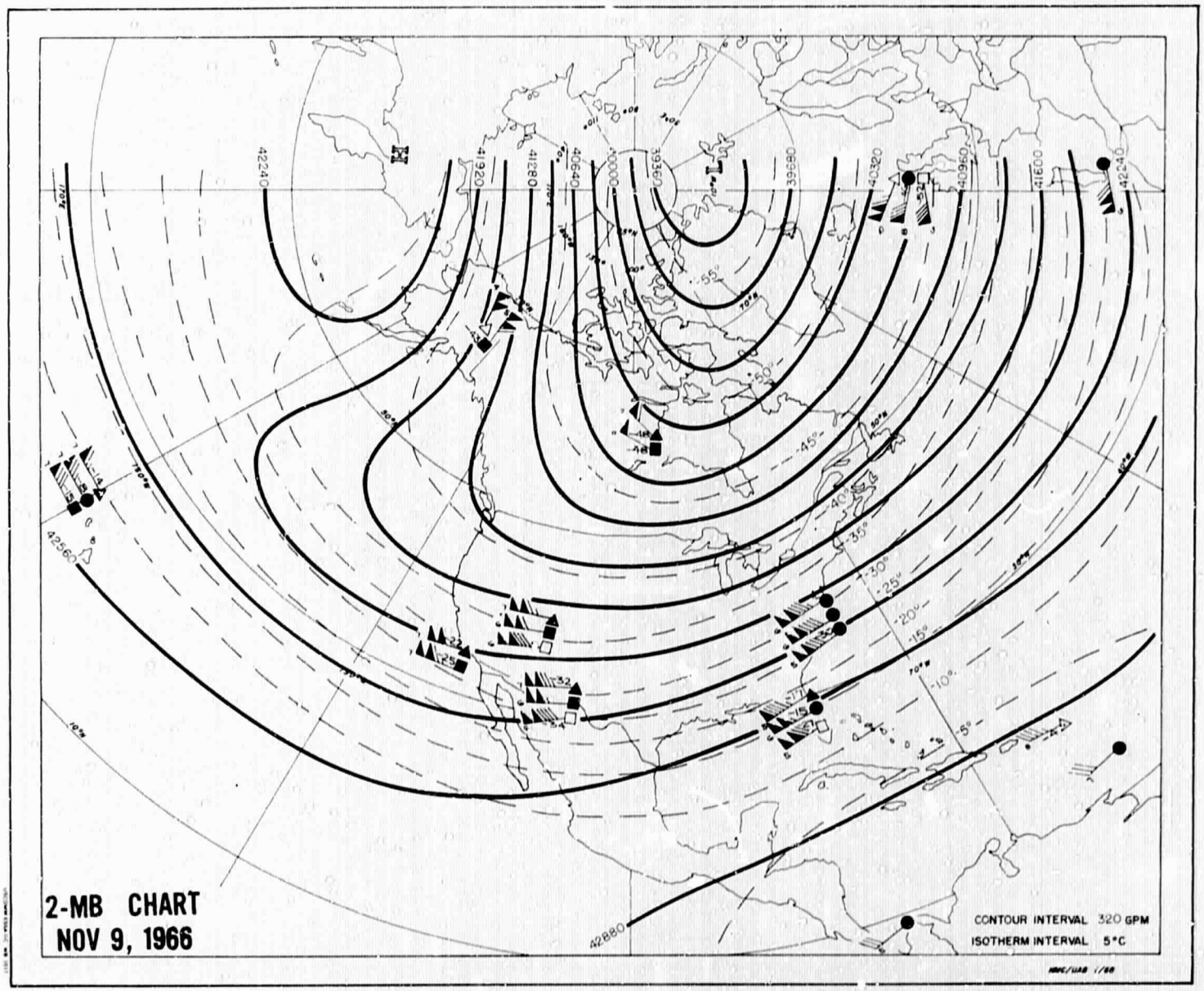

0.4-MB CHART
OCT 26, 1966
CONTOUR INTERVAL 160 GPM
ISOTHERM INTERVAL 5°C

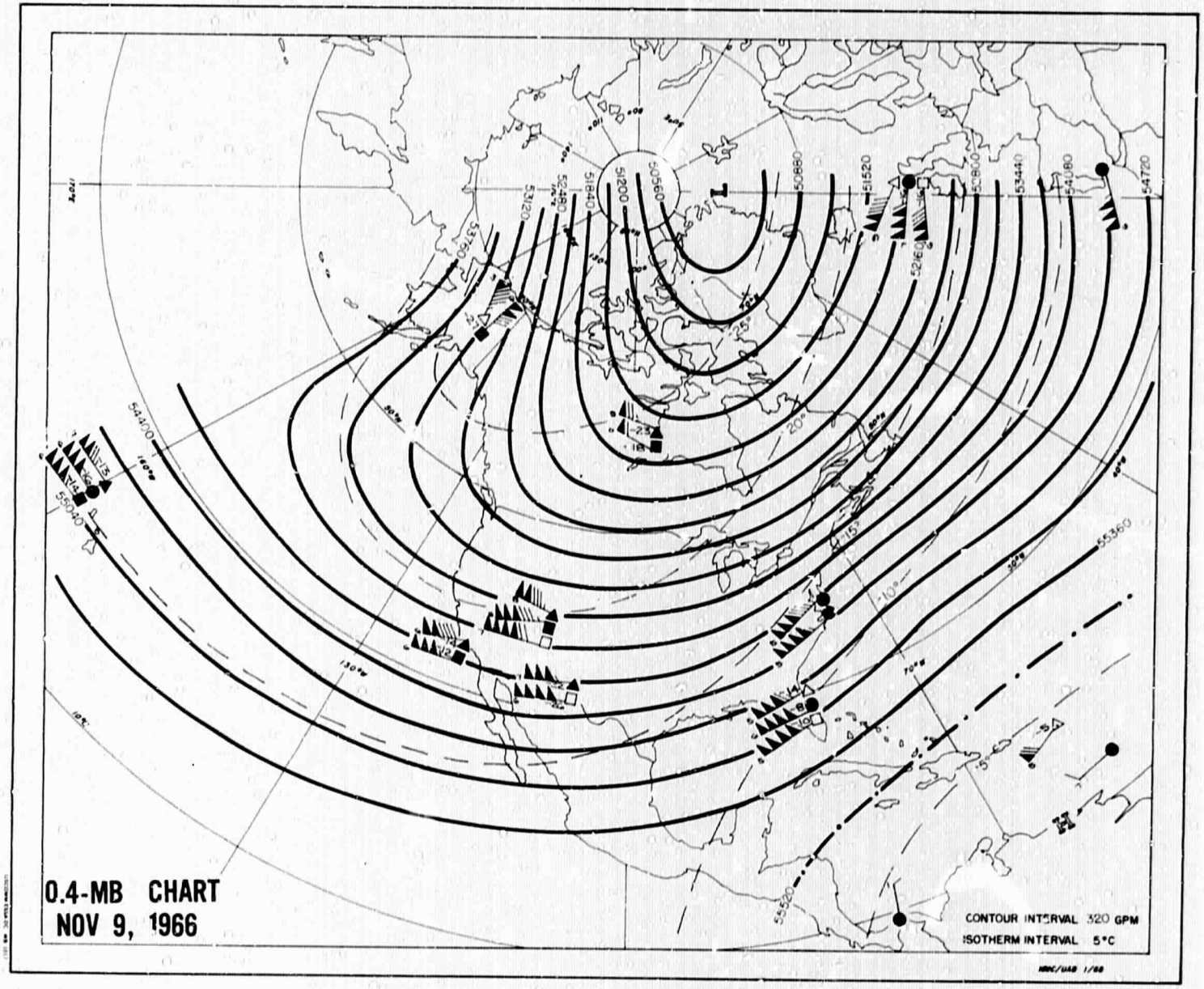

5-MB CHART
NOV 2, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
33280
33600
36000


2-MB CHART
NOV 2, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C


0.4-MB CHART
NOV 2, 1966
CONTOUR INTERVAL GPM
ISOTHERM INTERVAL 5°C

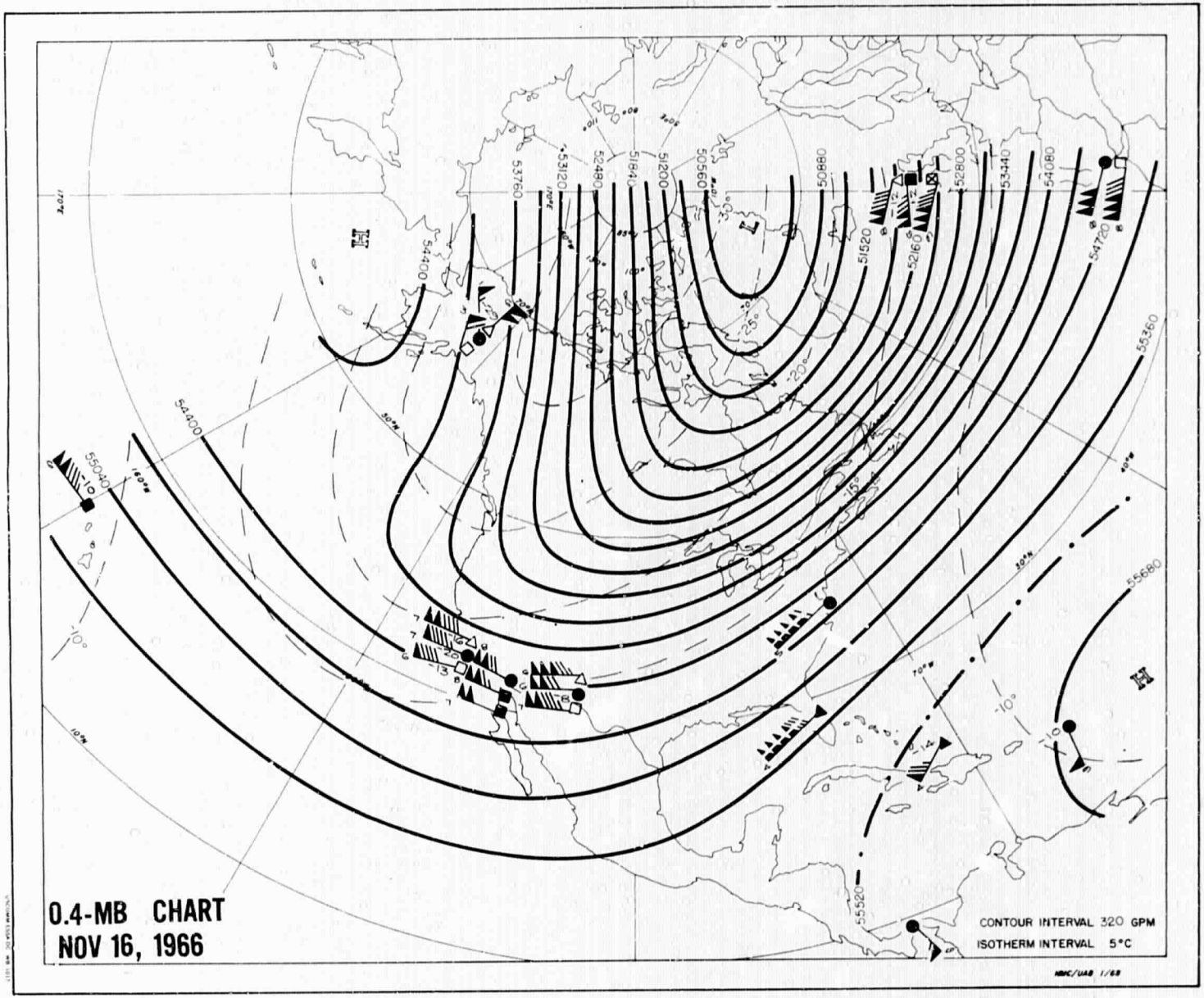

5-MB CHART
NOV 9, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C

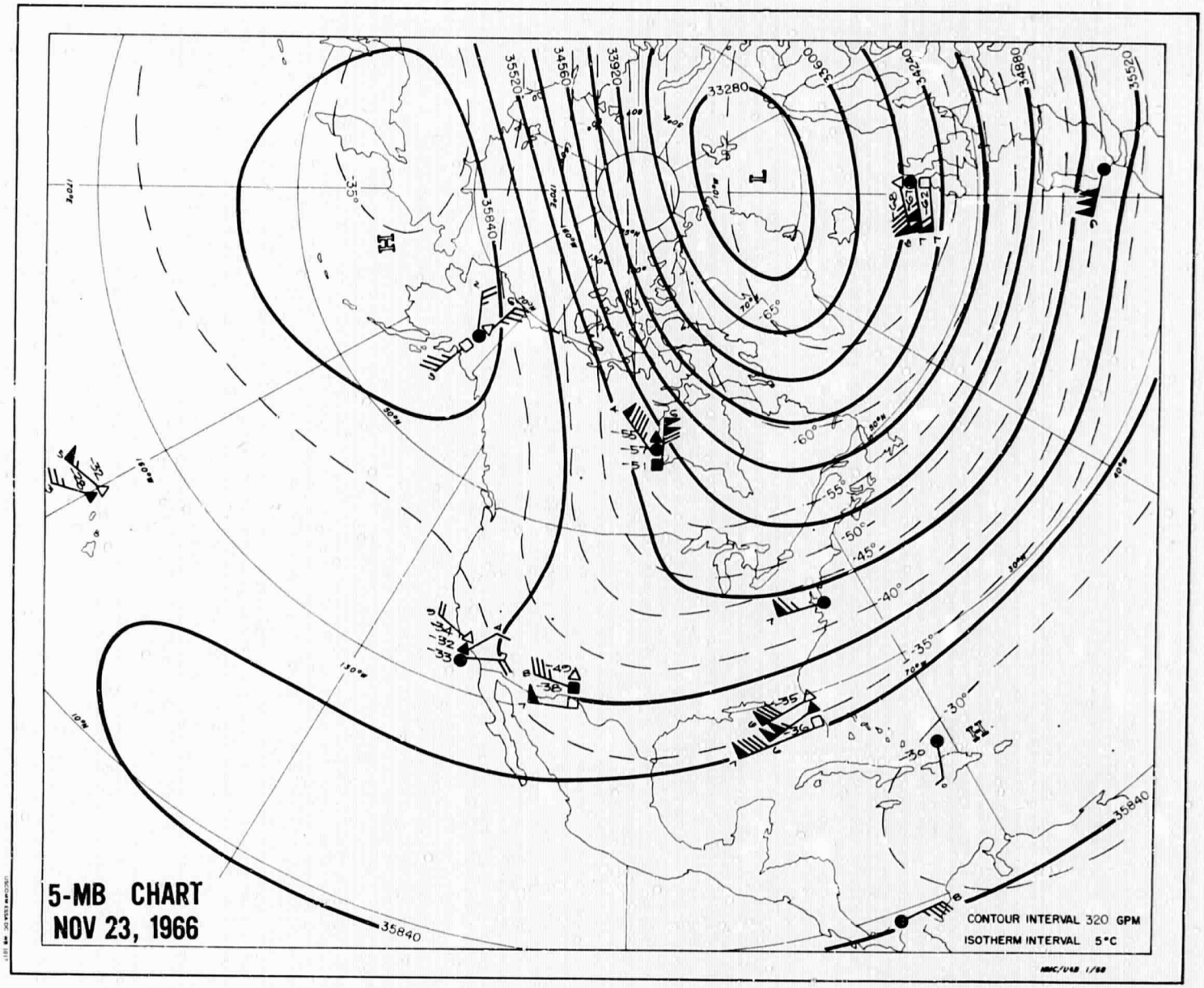

2-MB CHART
NOV 9, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C

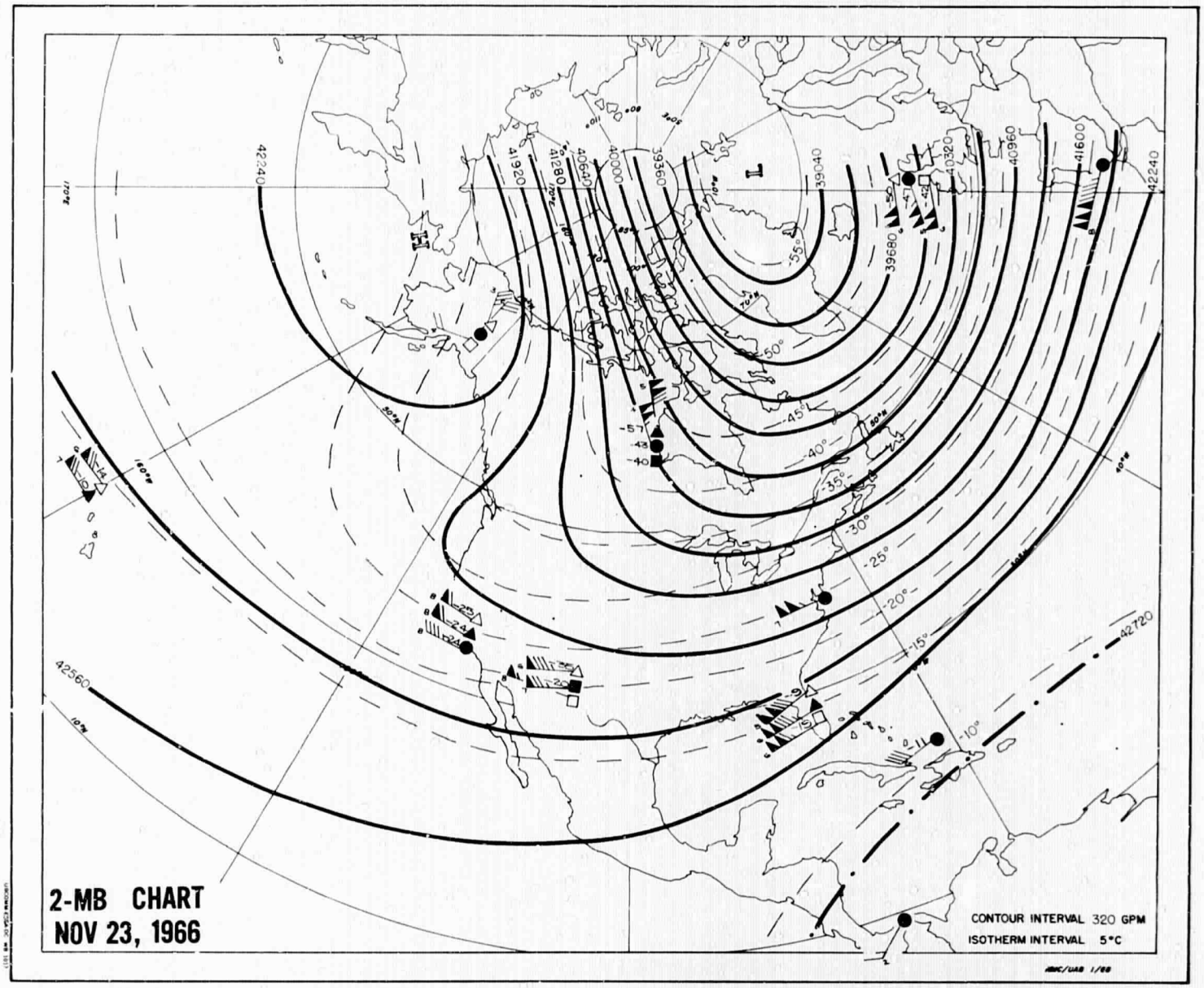

0.4-MB CHART
NOV 9, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C

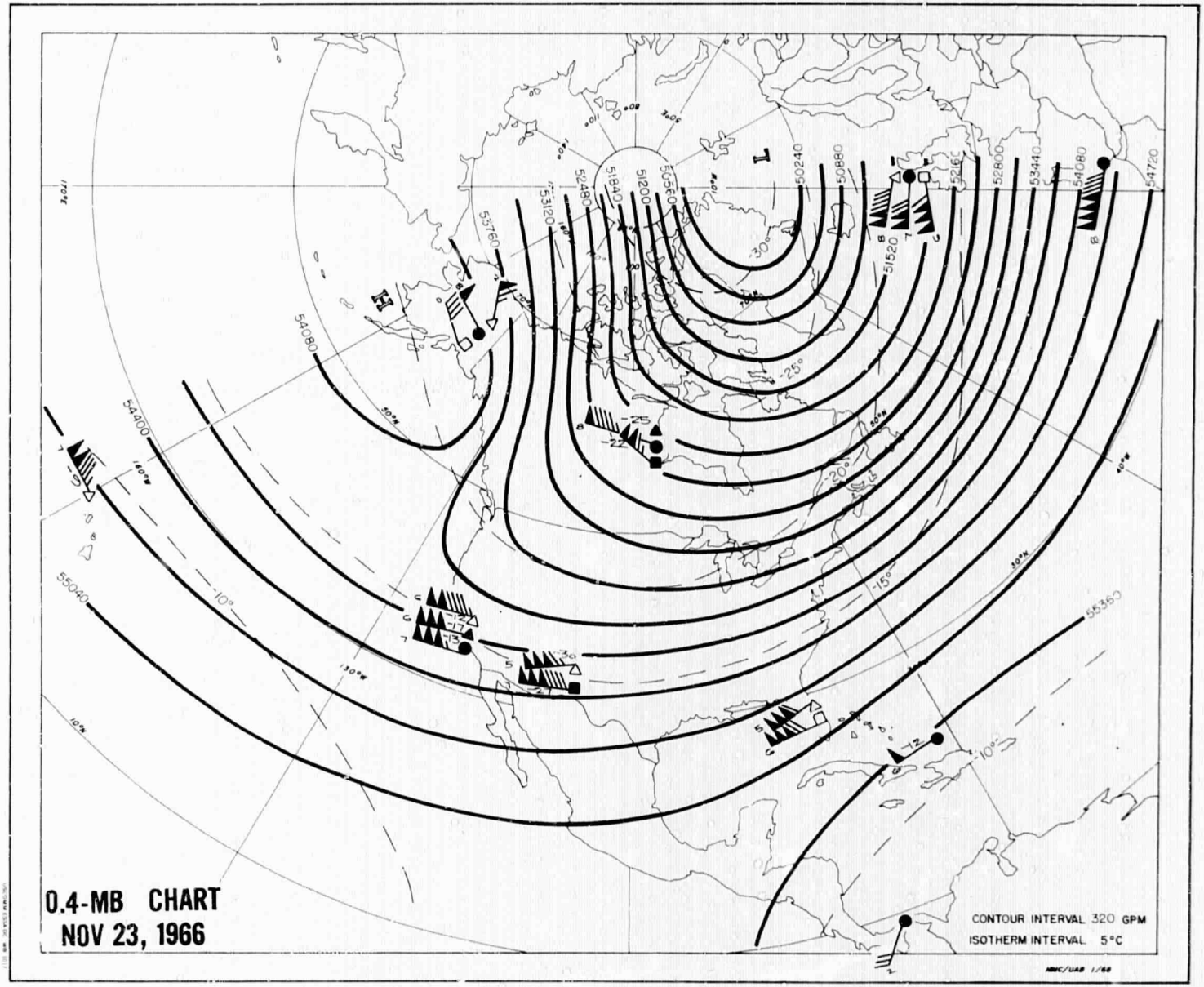
5-MB CHART
NOV 16, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
35520
34880
34240
33600
33920
34560
35200
35840
36000
-35°
-30°
-25°
-40°
-45°
-55°
-60°
-65°
H
L

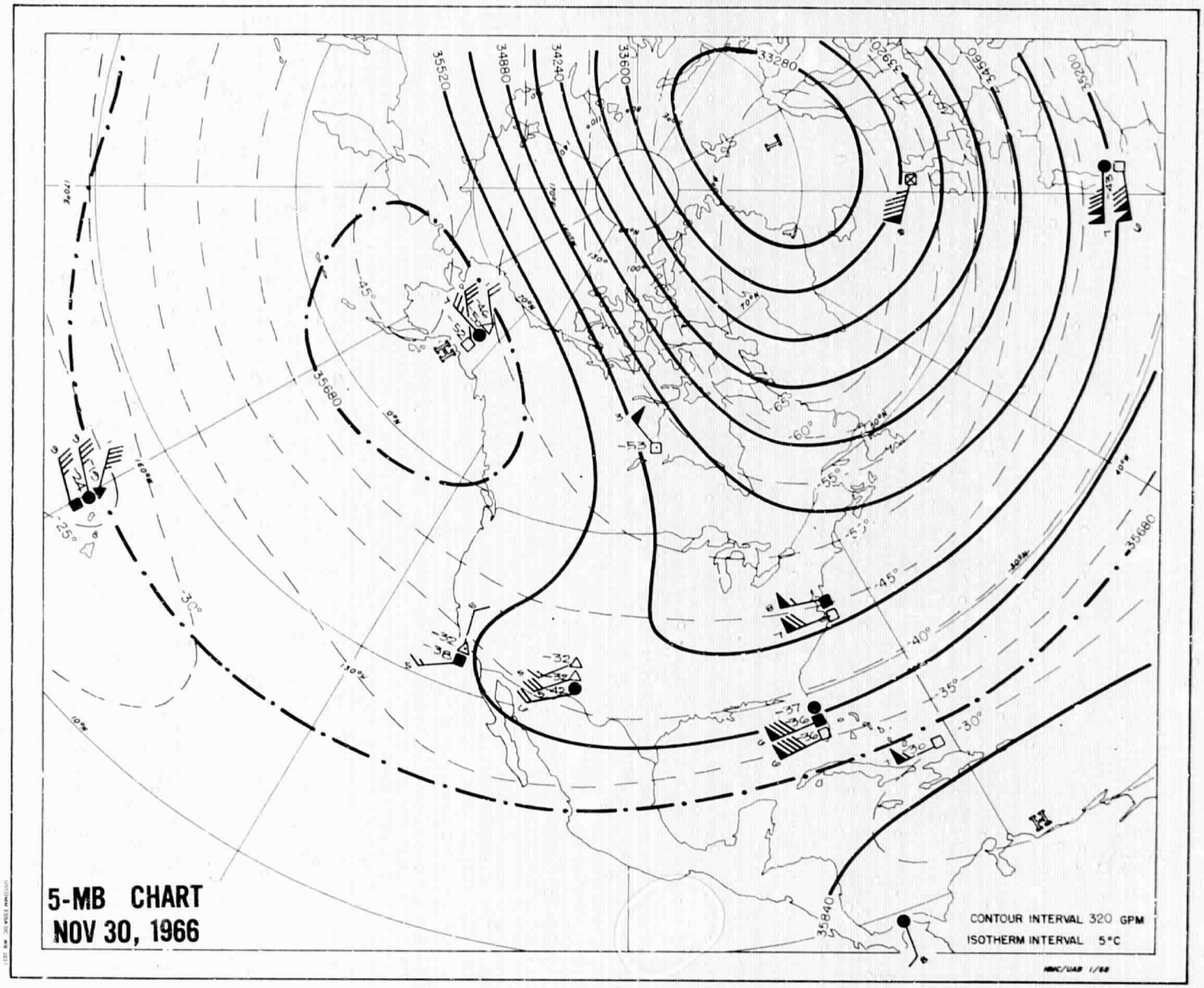
2-MB CHART
NOV 16, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
42240
41600
40960
40320
39680
39360
40000
40640
41280
41920
42560
42880
H
L
H
42560


0.4-MB CHART
NOV 16, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NCAR/UAB 1/68


5-MB CHART
NOV 23, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
H
L
35520
34560
33920
33280
33600
34240
34880
35520
35840
-35°
-60°
-55°
-50°
-45°
-40°
-35°
-30°
35840

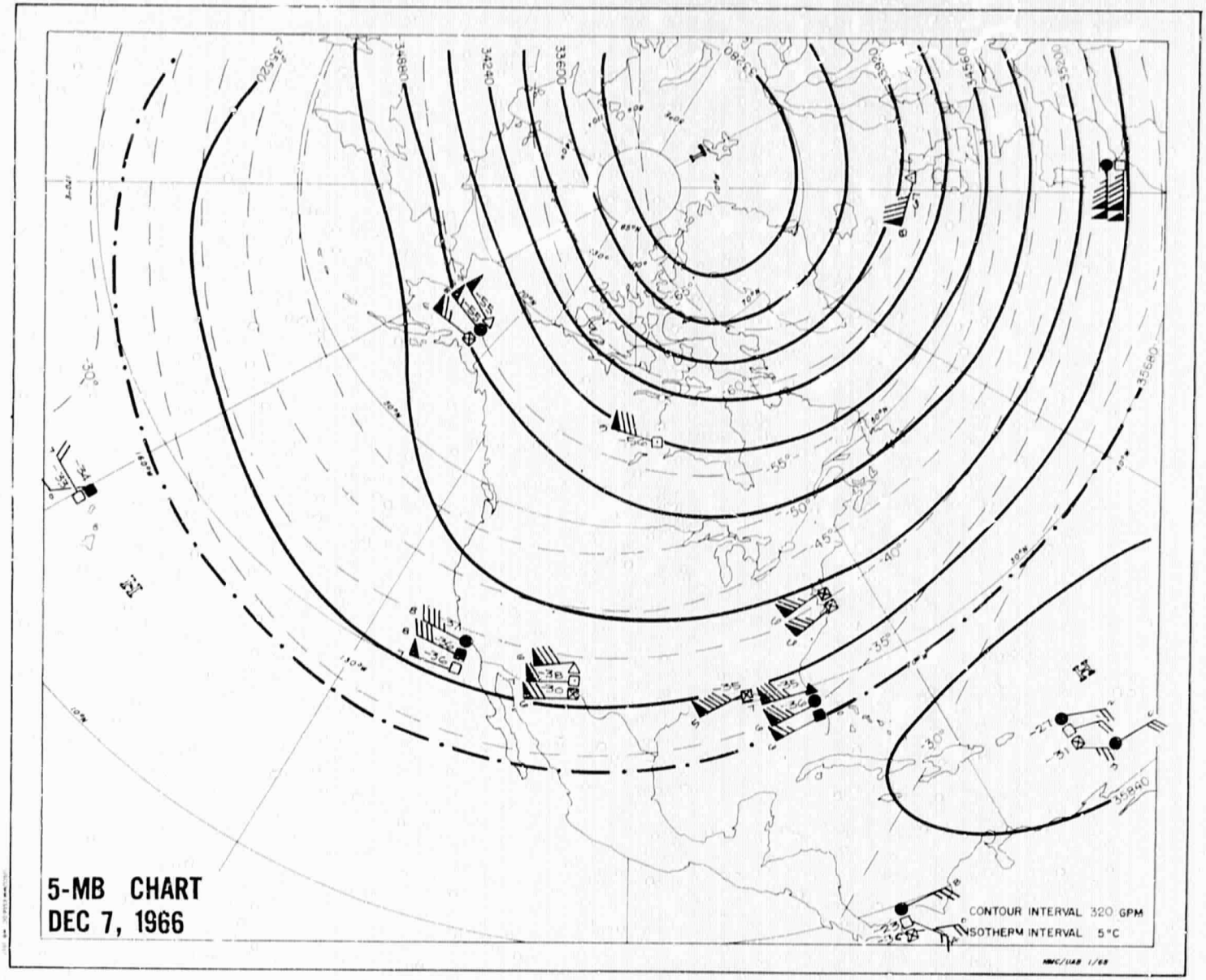

2-MB CHART
NOV 23, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
42240
41920
41280
40960
40000
39360
39040
39680
40320
40960
41600
42240
42560
42720
-55°
-50°
-45°
-40°
-35°
-30°
-25°
-20°
-15°
-10°

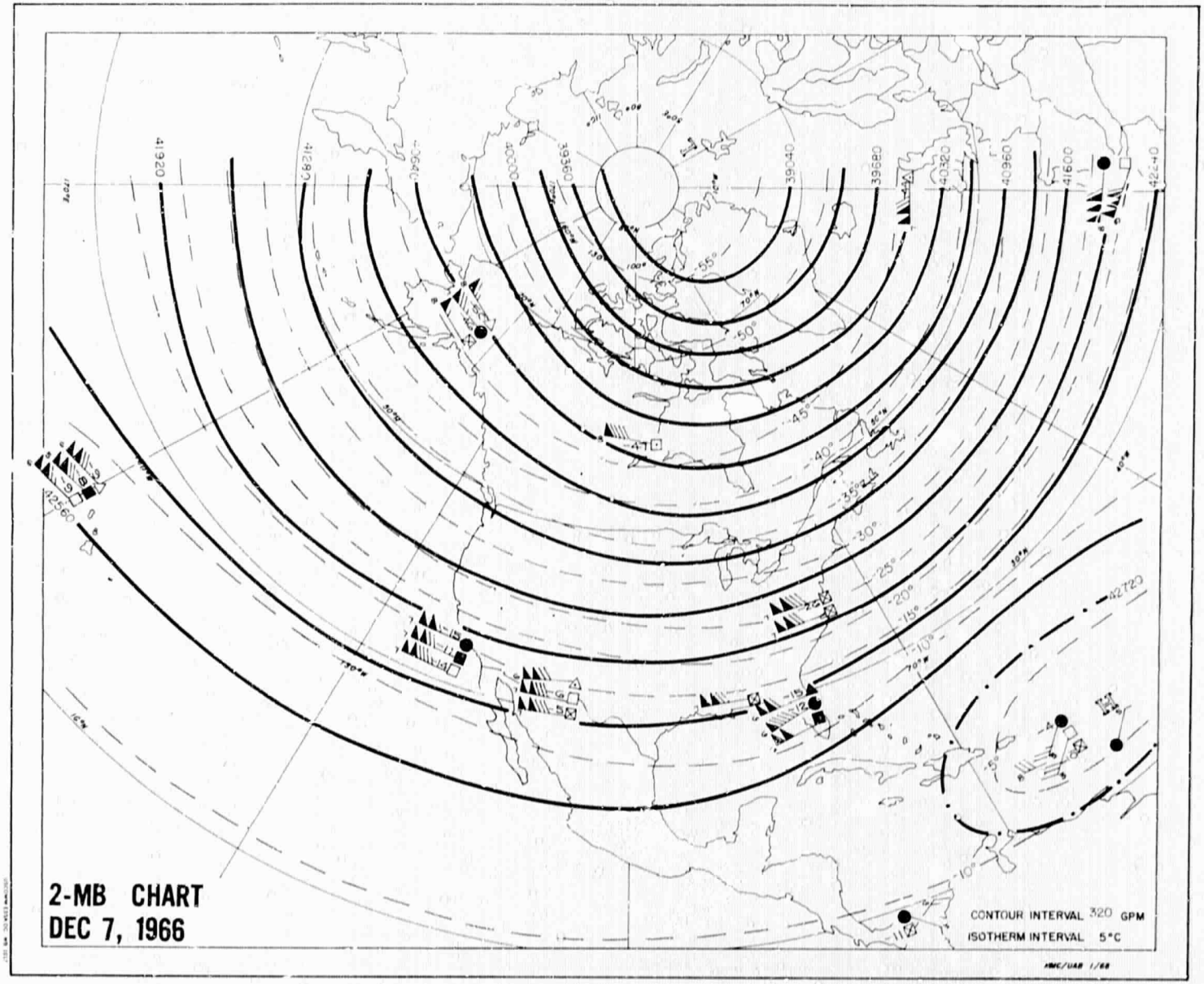

0.4-MB CHART
NOV 23, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

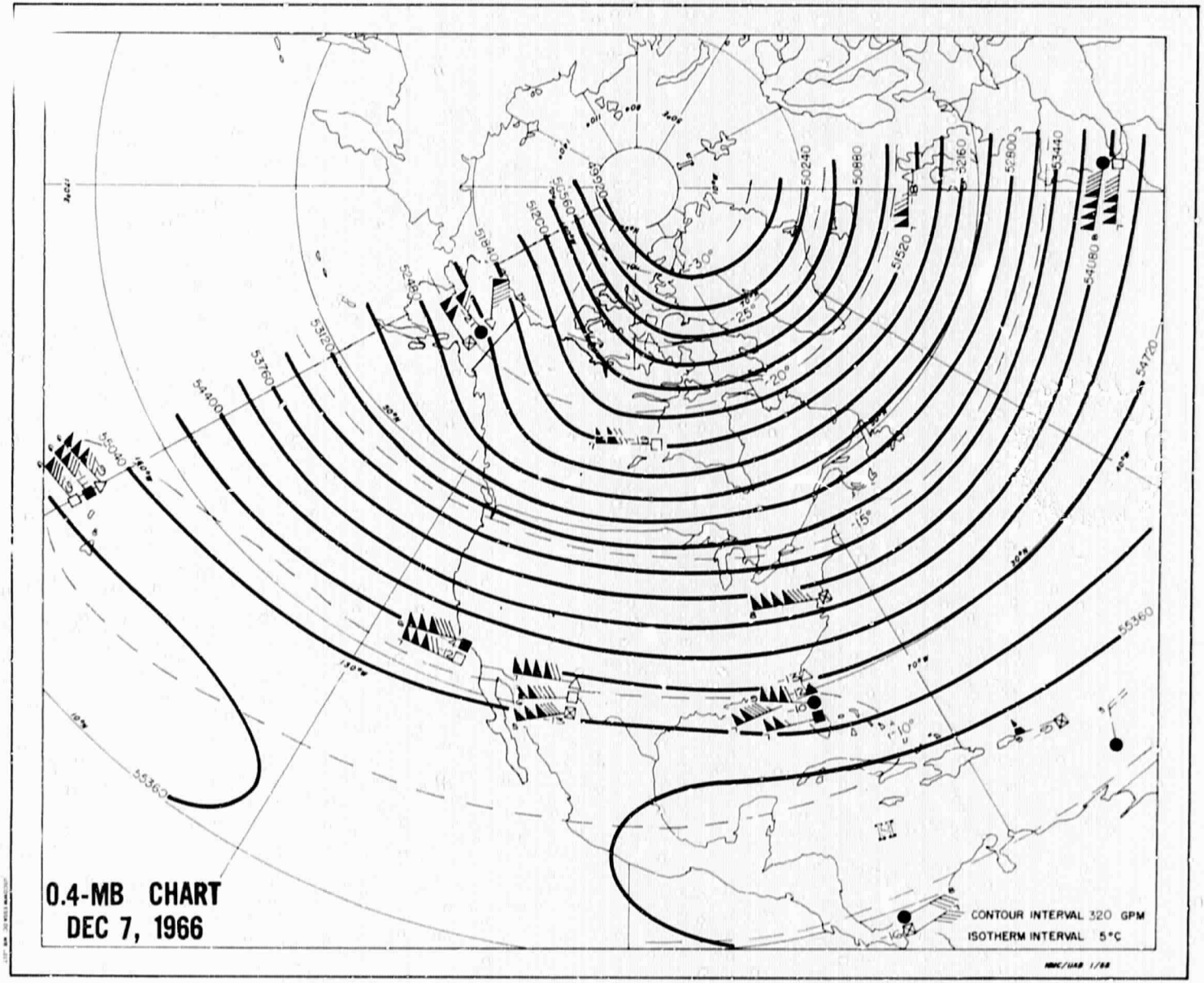

5-MB CHART
NOV 30, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68

2-MB CHART
NOV 30, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
41920
41280
40640
40000
39360
39040
39680
40320
40960
41600
42240
42560
42720

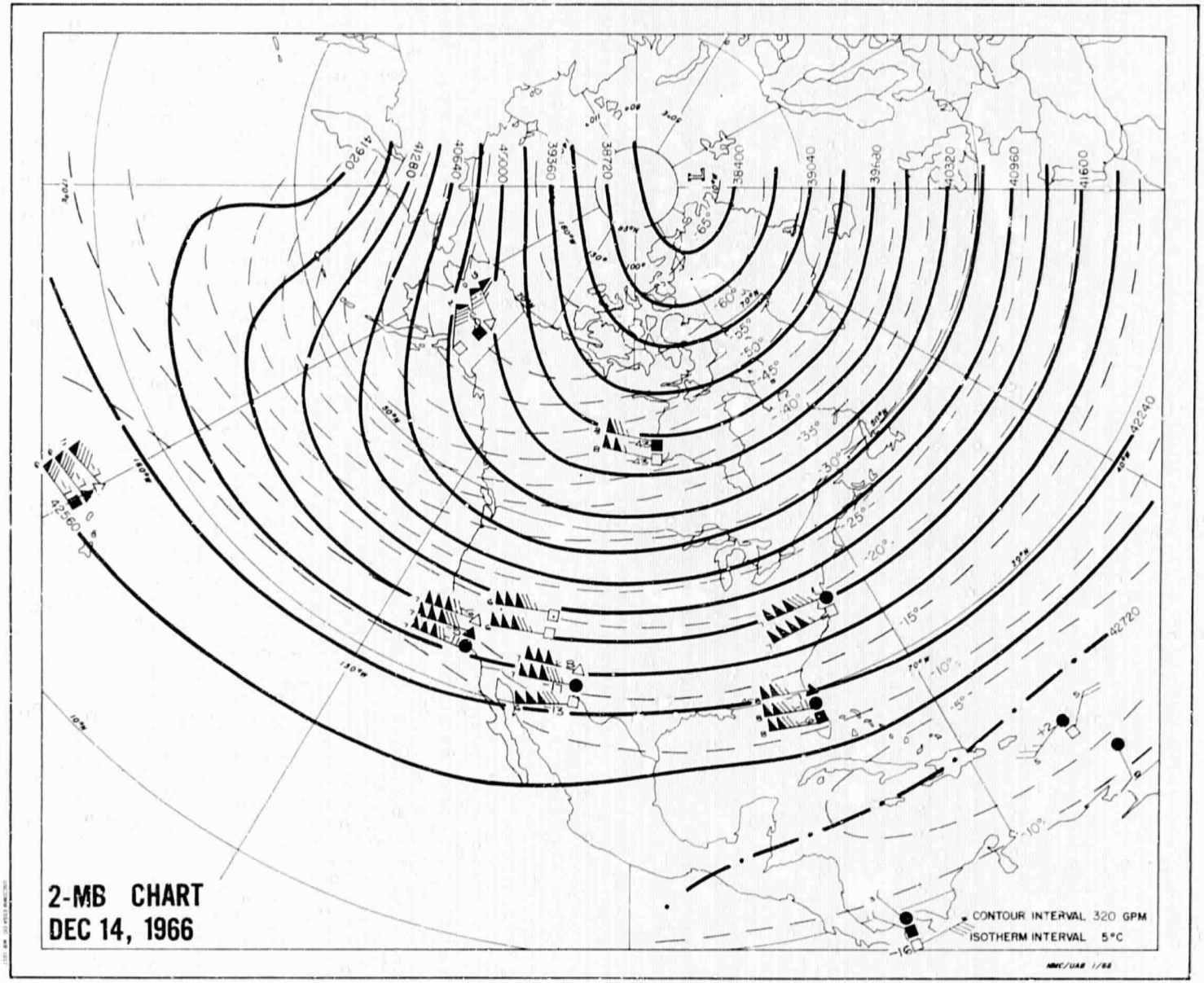
0.4-MB CHART
NOV 30, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
54720
54080
53440
52800
52160
51520
50880
50240
50560
51200
51840
52480
53120
53760
54400
55040
55360
170°E
160°W
150°W
140°W
130°W
120°W
110°W
100°W
90°W
80°W
70°W
60°W
50°W
40°W
30°W
20°W
10°W
-10°
-15°
-20°
-25°
-30°
-5°
-2°

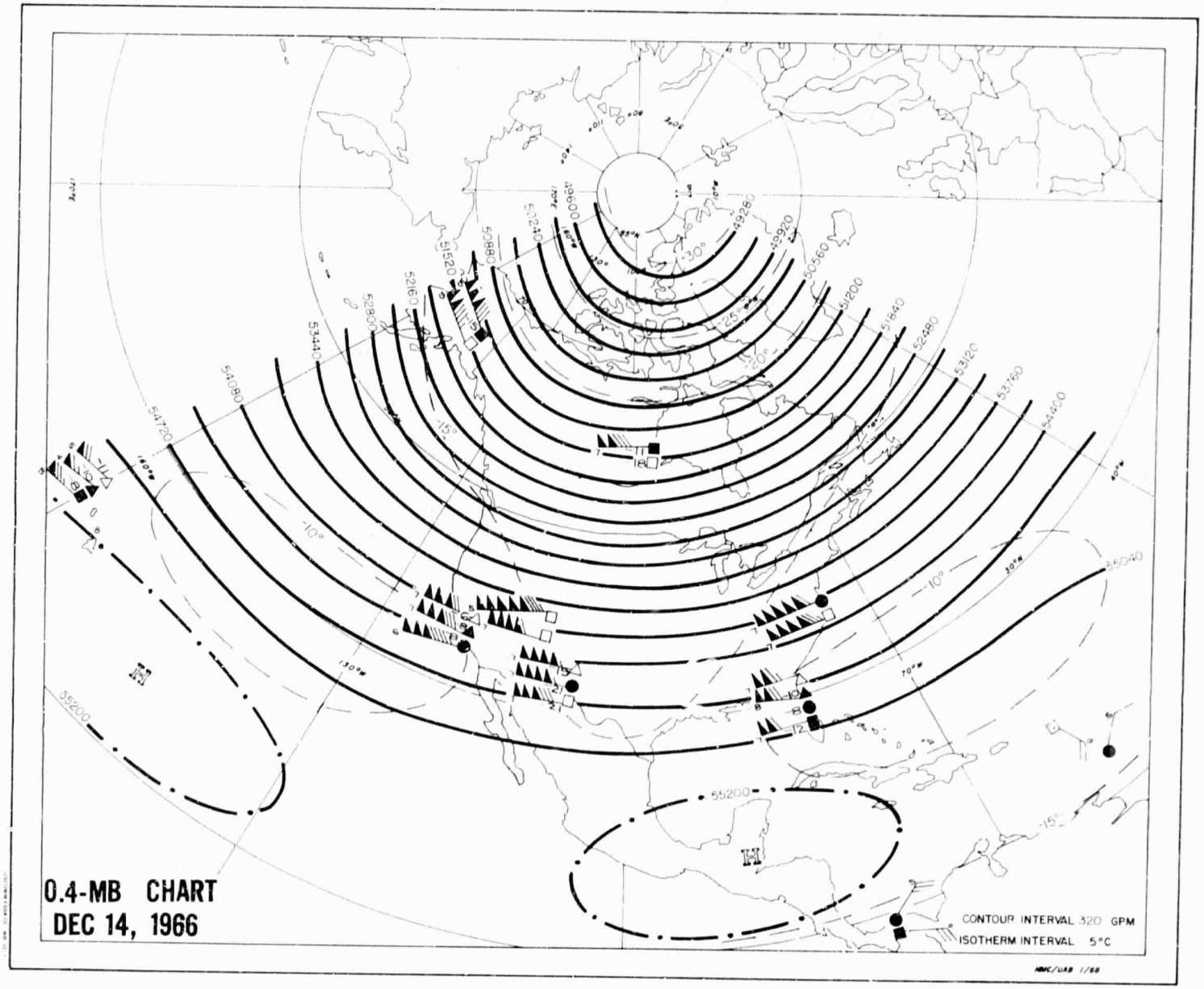

5-MB CHART
DEC 7, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C

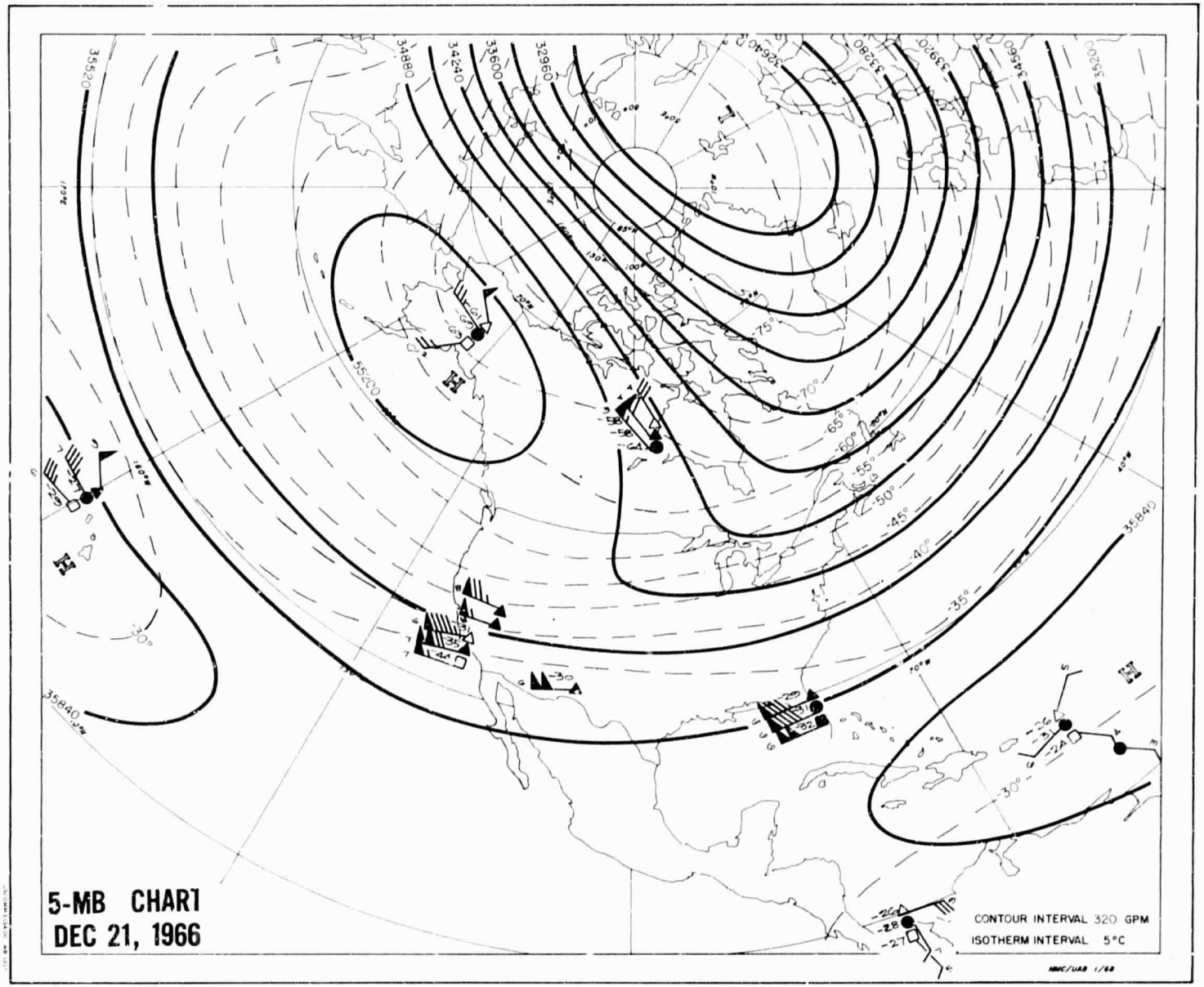

2-MB CHART
DEC 7, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C

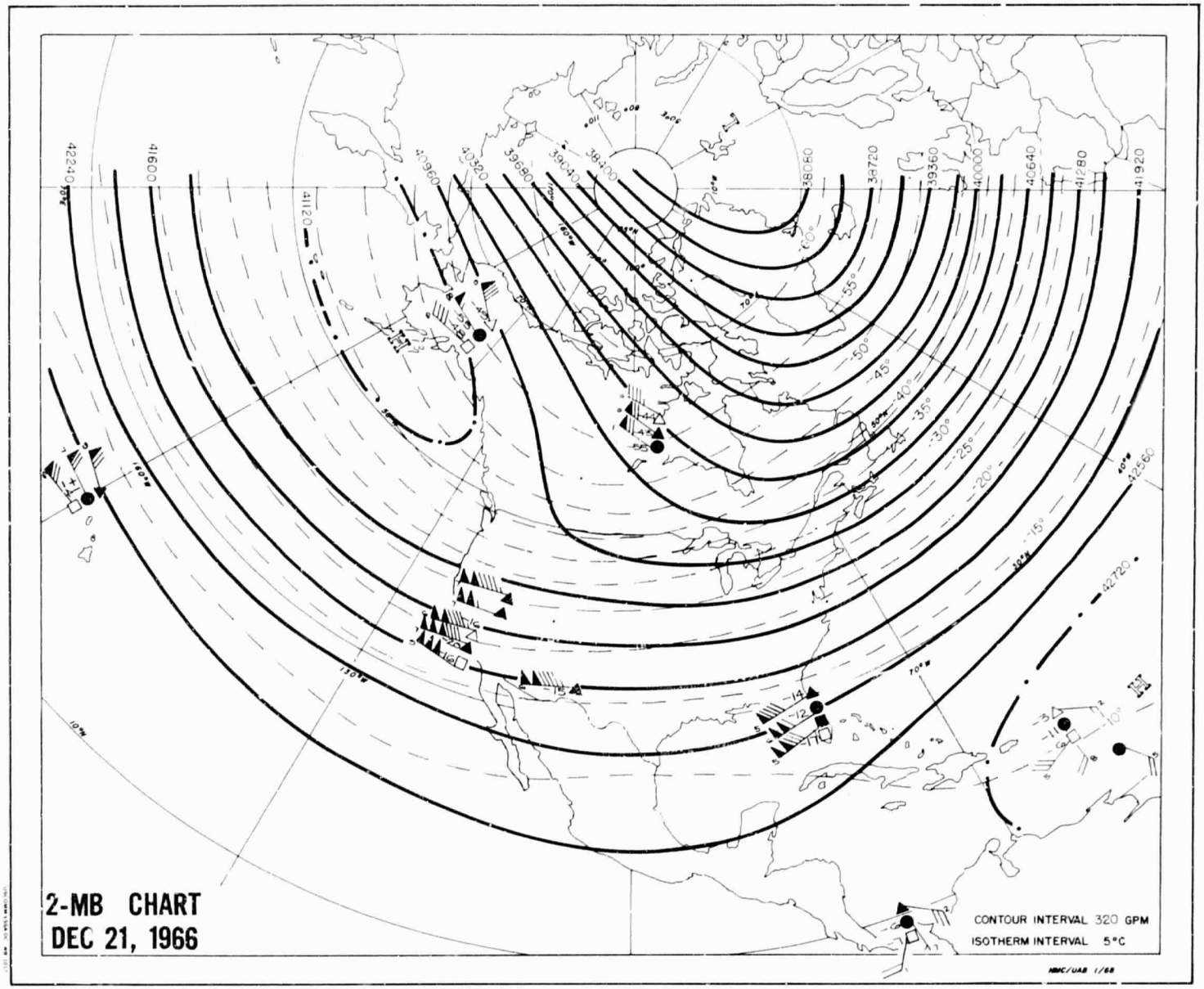

0.4-MB CHART
DEC 7, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C

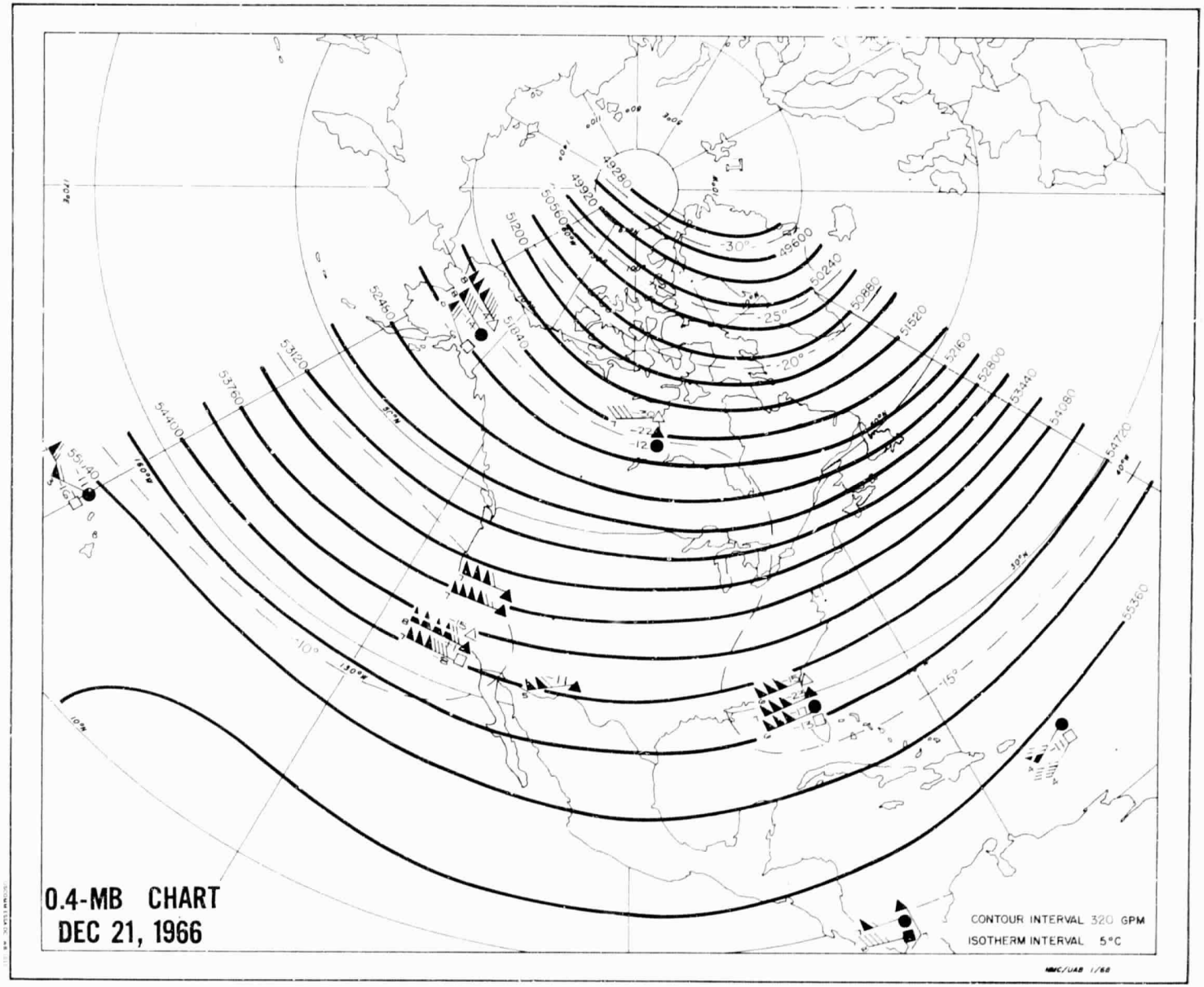
5-MB CHART
DEC 14, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
32960
33280
33920
34560
35200
35840
35680

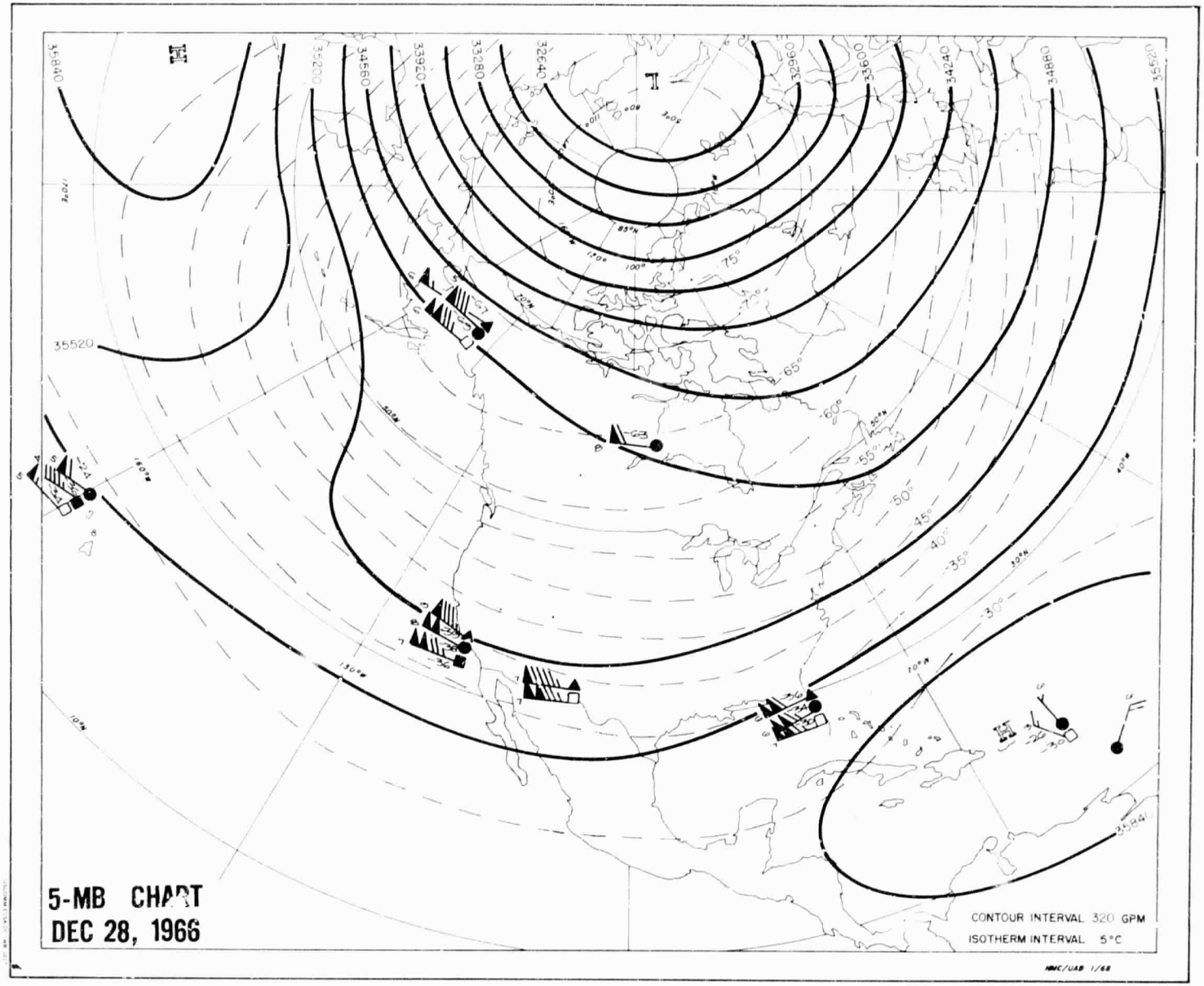

2-MB CHART
DEC 14, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/66

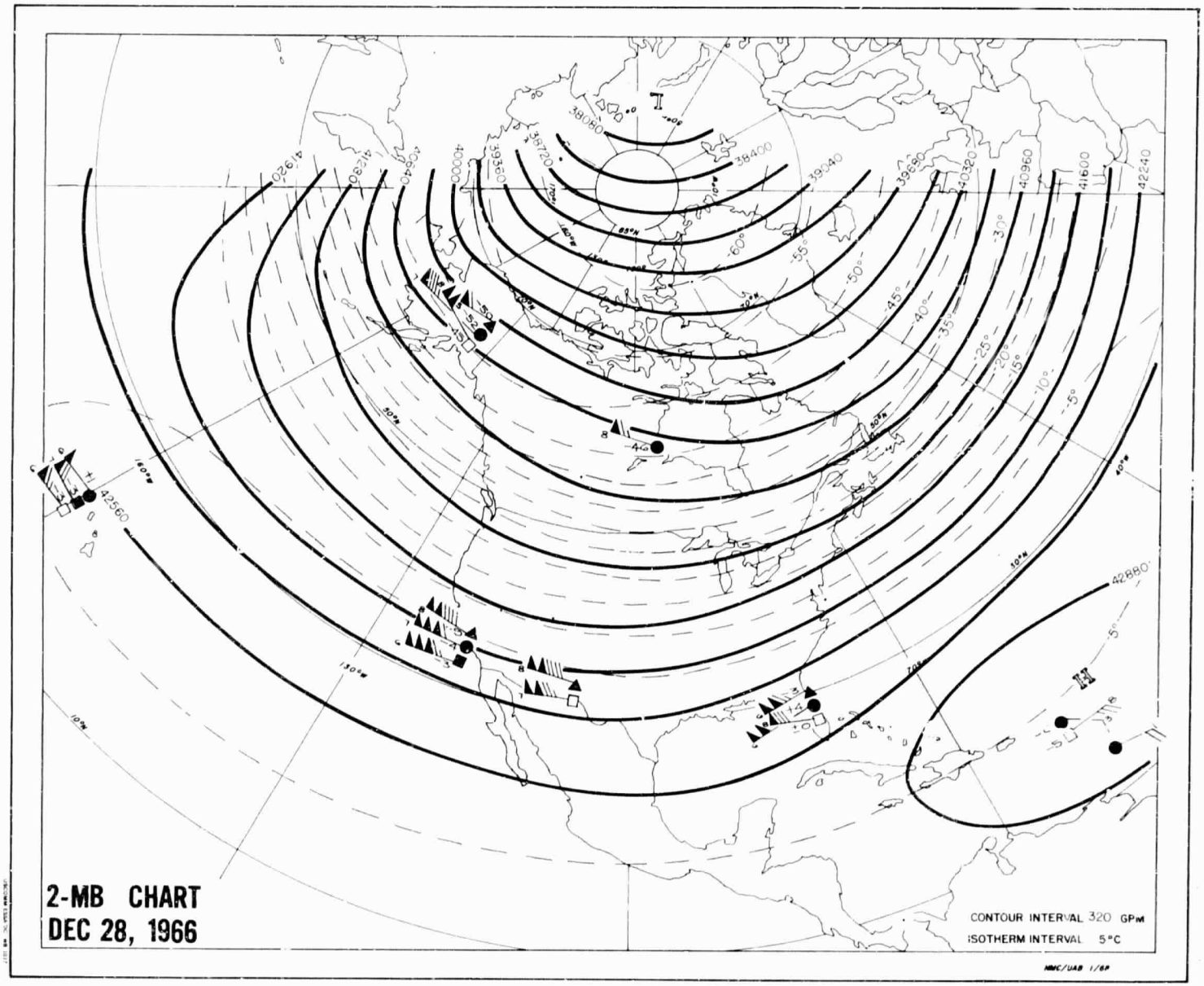

0.4-MB CHART
DEC 14, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
H
H
55200
55200

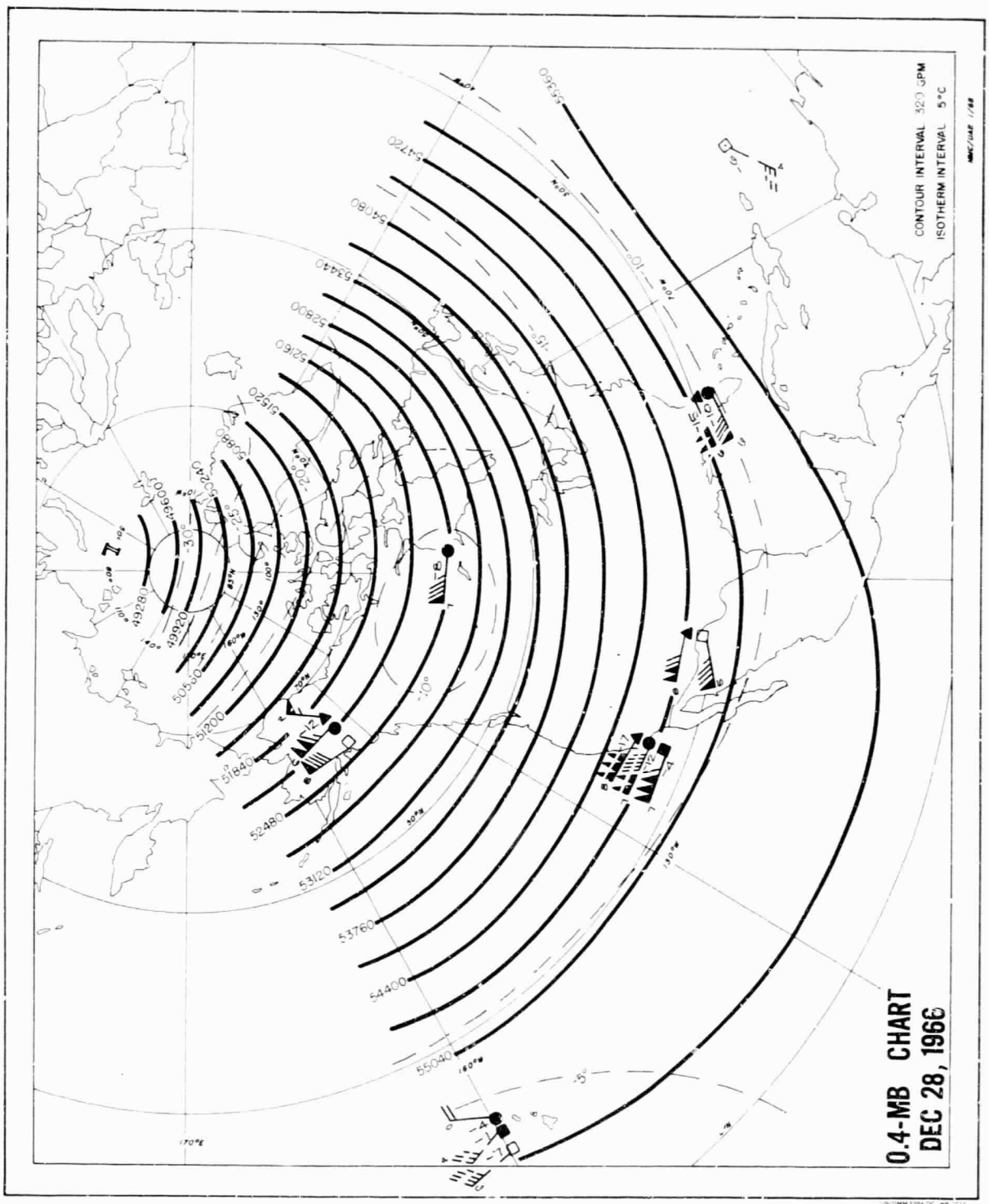

5-MB CHART
DEC 21, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
NMC/UAB 1/68


2-MB CHART
DEC 21, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
HMC/UAB 1/68


0.4-MB CHART
DEC 21, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
49280
49920
50560
51200
49600
50240
50880
51520
52160
52800
53440
54080
54720
55360
52480
51840
53120
53760
54400
-30°
-25°
-20°
-15°
-10°
-5°
150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
180°
-22
-12
-11
-7
-5
-2
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90


5-MB CHART
DEC 28, 1966
CONTOUR INTERVAL 320 GPM
ISOTHERM INTERVAL 5°C
HMC/UAB 1/68


2-MB CHART
DEC 28, 1966
CONTOUR INTERVAL 320 GPm
ISOTHERM INTERVAL 5°C
NMC/UAB 1/69



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