UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

in cooperation with

SOCIETY OF EXPLORATION GEOPHYSICISTS

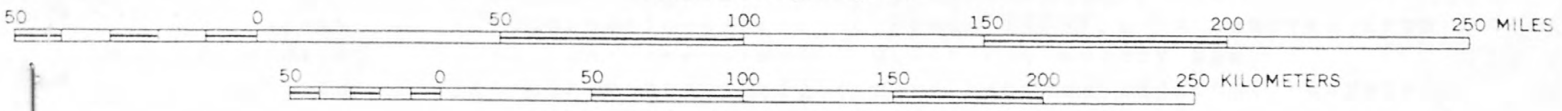
Preliminary Composite Magnetic Anomaly Map Of Part Of The Northwestern United States

by

Isidore Zietz

1981

Scale 1:2,500,000



Albers Equal Area Projection

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This report is preliminary and has not been reviewed for conformity with U. S. Geological Survey editorial standards.

The magnetic anomaly data open-filed in this report represent part of a much larger data set covering most of the conterminous United States. The anomaly map consists of 10 sheets covering an area in the northwestern United States. These were prepared primarily from existing aeromagnetic data, and secondarily from ground data, the latter located primarily in North Dakota and South Dakota.

This map is a part of the composite magnetic map of the conterminous United States, compiled from hundreds of data sources, each with its own specifications. Flight altitudes and spacing varied from project to project; no attempt has been made to adjust the data to form a consistent data set. In general, only slight adjustments were necessary to make the contours match across project boundaries. All of the data were compiled at a 1:1,000,000 scale using the Albers equal area projection. When the data are reduced to 1:2,500,000, the maps can be superimposed on the geologic, tectonic, basement rock and gravity maps of the United Sates already published by the U.S. Geological Survey and cooperating professional societies.

The method of compilation is straightforward, simple but time-consuming. The initial step is to select contours at 100 gamma contour intervals from a particular survey and to reduce the data to the 1:1,000,000 compilation scale. The map is then suitably placed on a master chart of the United States scale 1:1,000,000, Albers equal area projection, and contour adjustments are made visually between adjacent areas.

The earth's main magnetic field, specifically the International Geomagnetic Reference Field (IGRF), is removed from the data, adjusted for the time at which the survey was conducted. Although contour adjustment between adjacent surveys was relatively simple, the over-all adjustment for large areas, for example, an area of size of one quarter of the United States was more difficult. This is because the time span during which the surveys used in the compilation were made is as much as thirty years and the field variation for the IGRF over such long periods has not been accurately determined.

To overcome this difficulty, use was made of the aeromagnetic maps obtained through the National Uranium Resource Evaluation (NURE) program of the Department of Energy. For this program the entire country was flown at a low altitude (400 ft.) above mean terrane and broad spacing (3 to 6 miles) but, importantly, in a relatively short time span (approximately 4 years). All of the aeromagnetic data were contoured and the IGRF removed. The NURE data described above were used as a base to control the net of the several hundred individual surveys making up the map of the entire United States.

In 1979, the Naval Oceanographic Office flew a series of north-south aeromagnetic traverses spaced approximately one degree apart across the entire United States. The profiles, following removal of the IGRF, were compared with the data presented in this report. This comparison showed discrepancies in the data no greater than 100 gammas anywhere in the United States.

Individual surveys are outlined by short dashed lines; state boundaries are represented by longer dashed lines. It must be stressed that the accuracy of each survey is determined by the flight specifications. Unfortunately these specifications are too numerous to be included even for this relatively small area in the northwestern U.S.. They will, of course, be listed in the final publication of the cooperative effort between the U.S. Geological Survey and the Society of Exploration Geophysicists.

References Cited

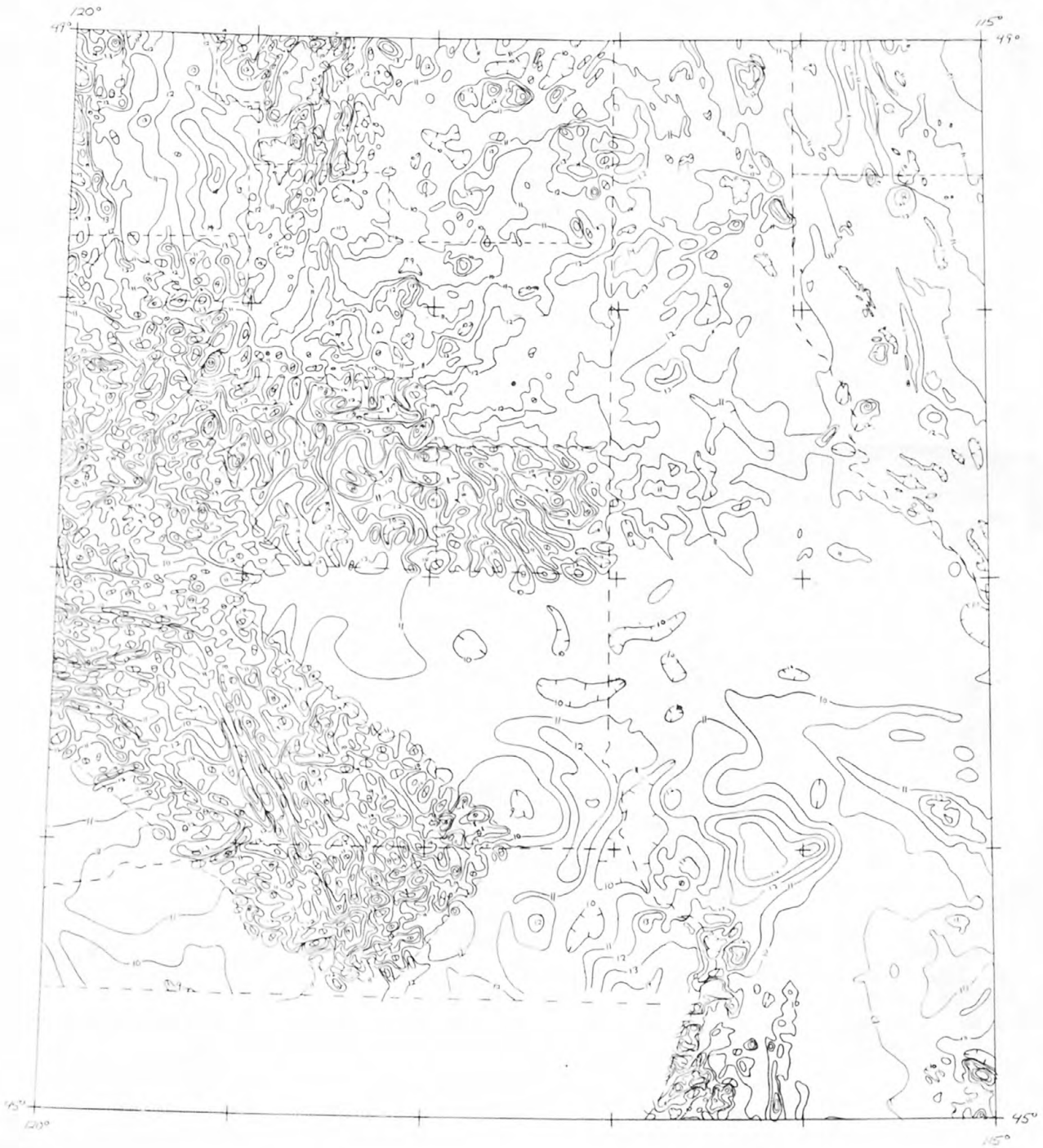
Fabiano, E. B., and Peddie, N. W., 1969, Grid values of total magnetic intensity, International Geomagnetic Reference Field-1965: U.S. Environmental Science Service Administration Technical Report C and GS 38, 55p.

Barraclough, D. R., and Fabiano, E. B., 1978, Grid values and charts for the International Geomagnetic Reference Field: U.S. Department of Commerce, National Technical Information Service PB-276 630, 139 p.

EXPLANATION

Magnetic Contours

Showing magnetic field of the earth in hundreds of gammas relative to an arbitrary datum. Data includes ground as well as total-intensity airborne measurements. Hachured to indicate areas of lower magnetic intensity; dashed where data are incomplete. Main magnetic field of the earth from Fabiano and Peddie (1969), and Barraclough and Fabiano (1978), has been removed. Contour interval 100 gammas.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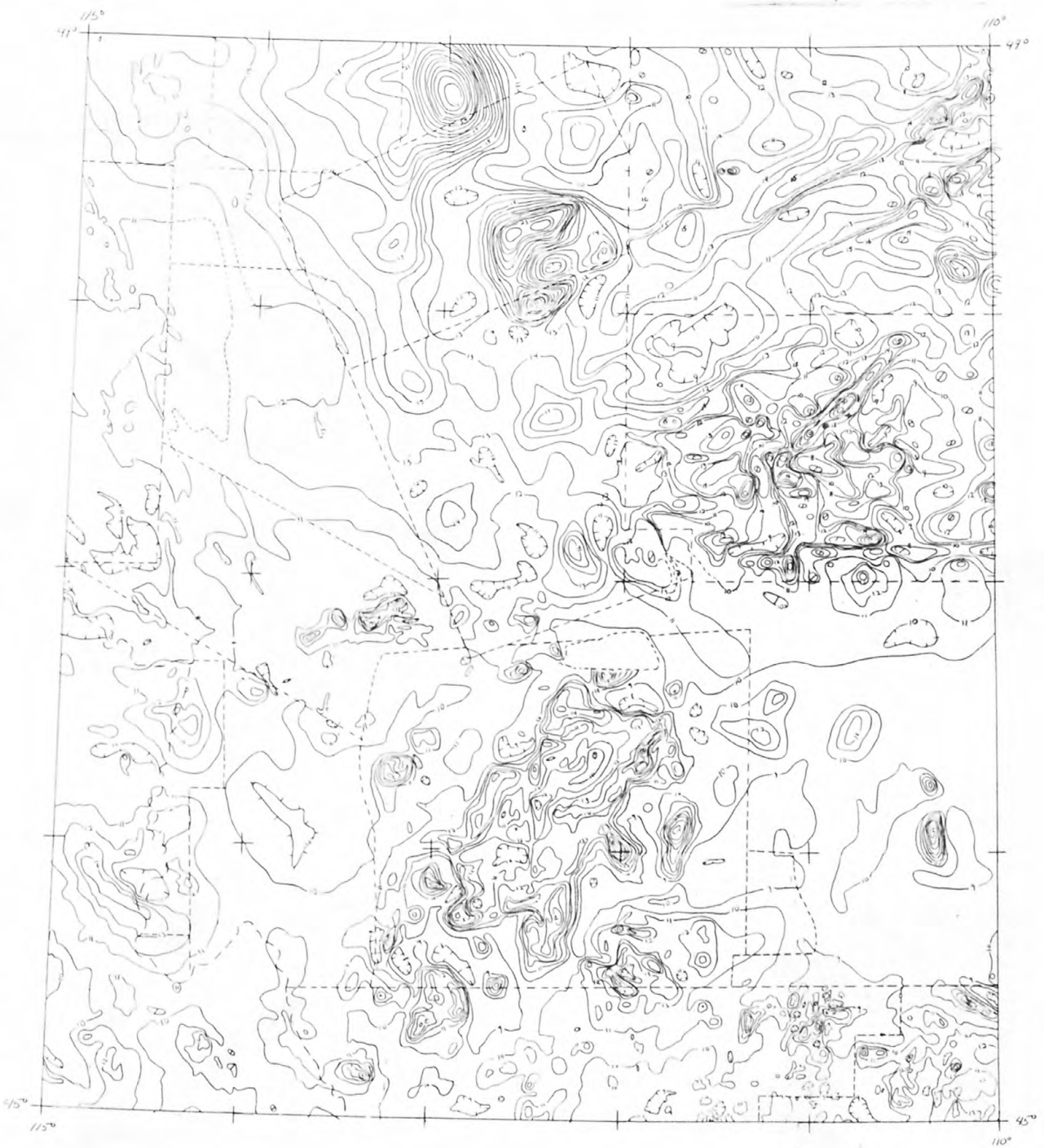
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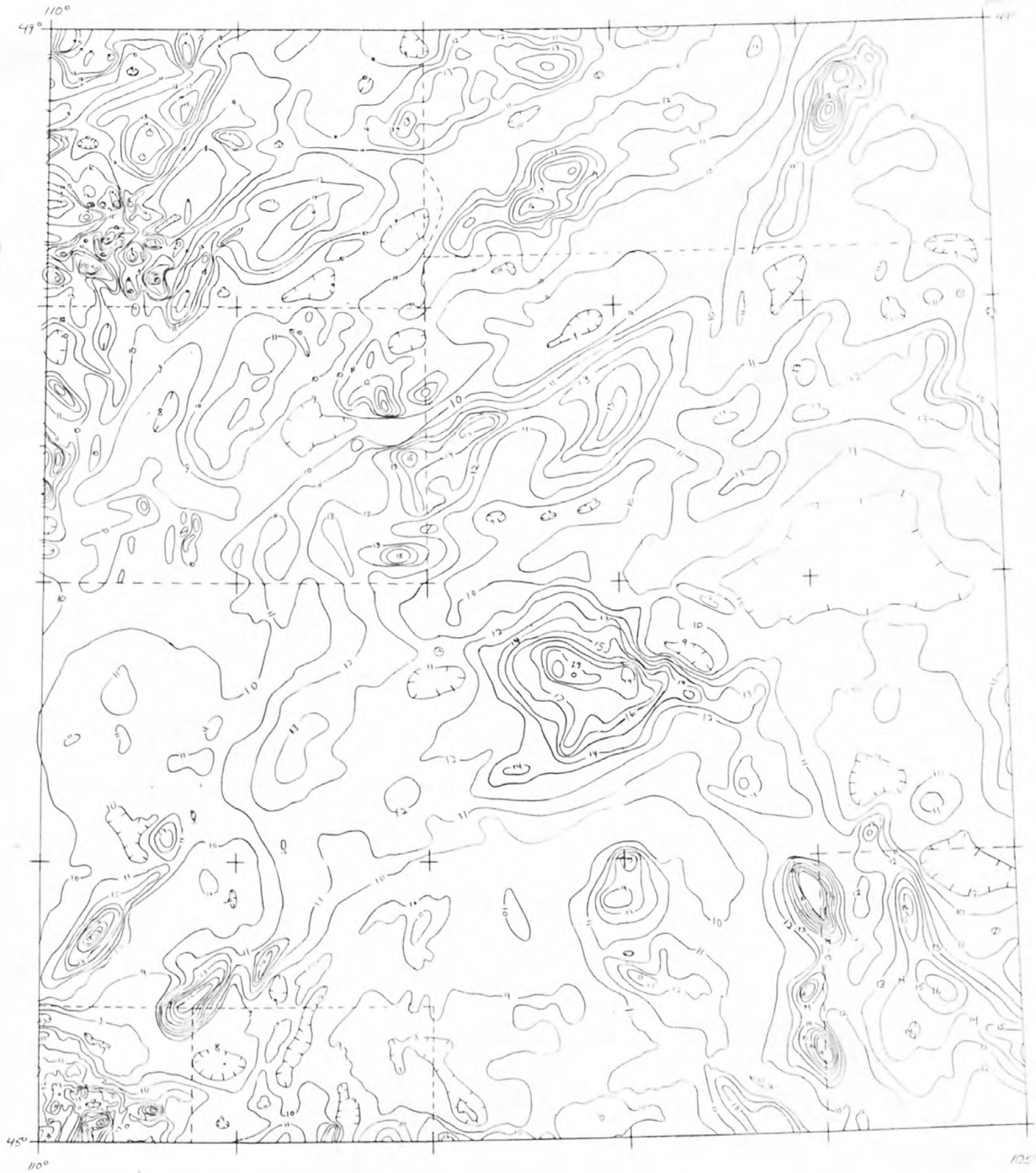
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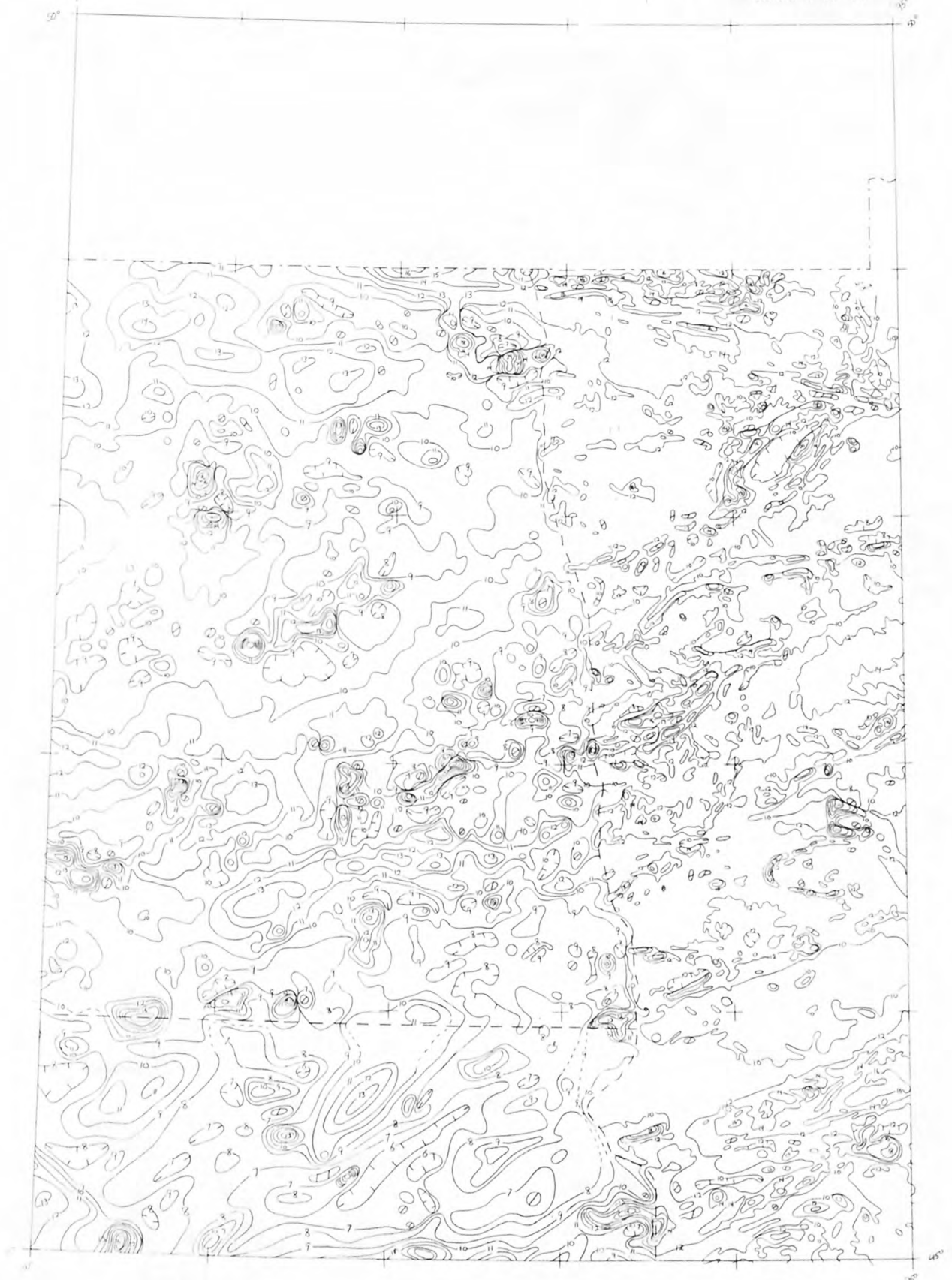

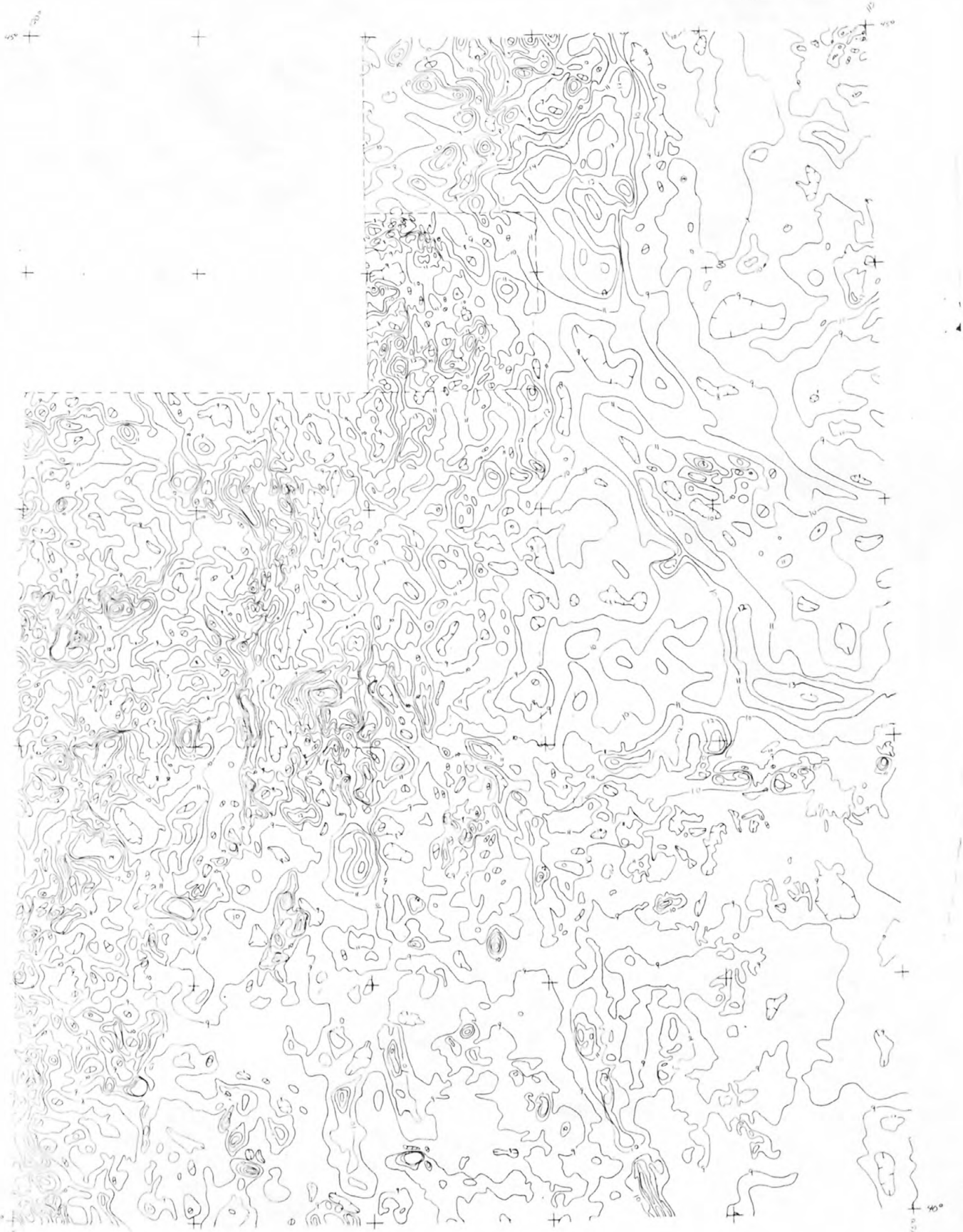

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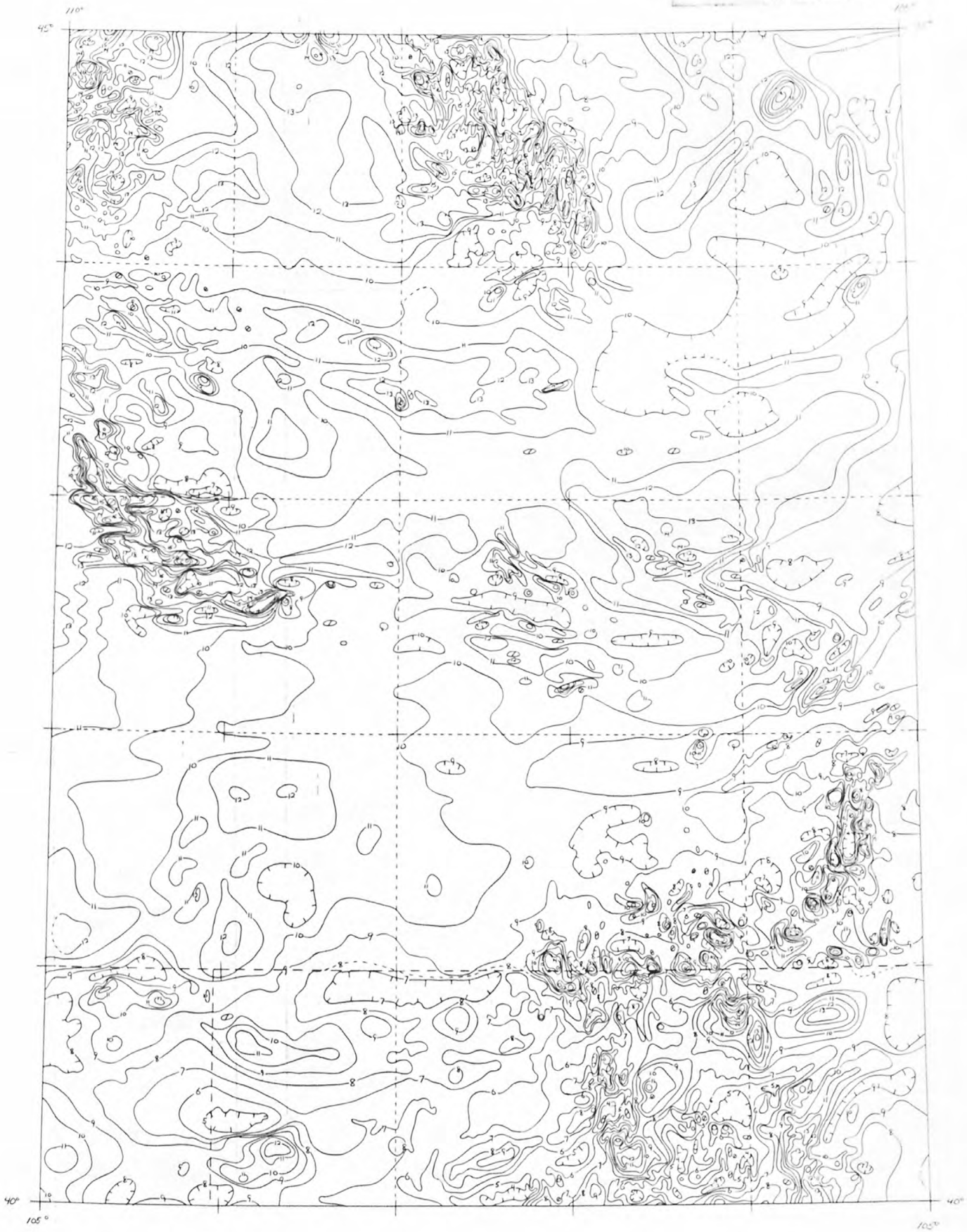
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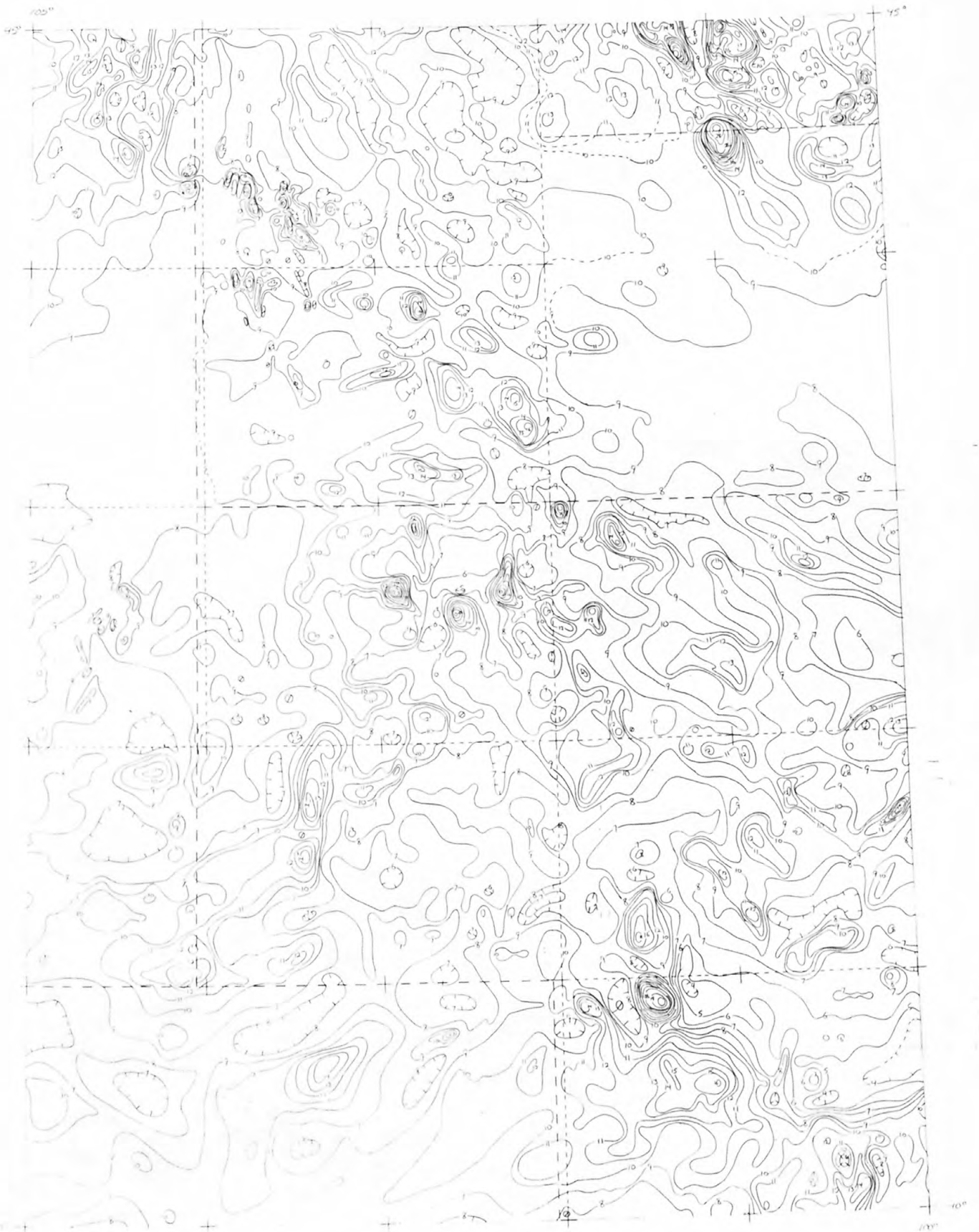

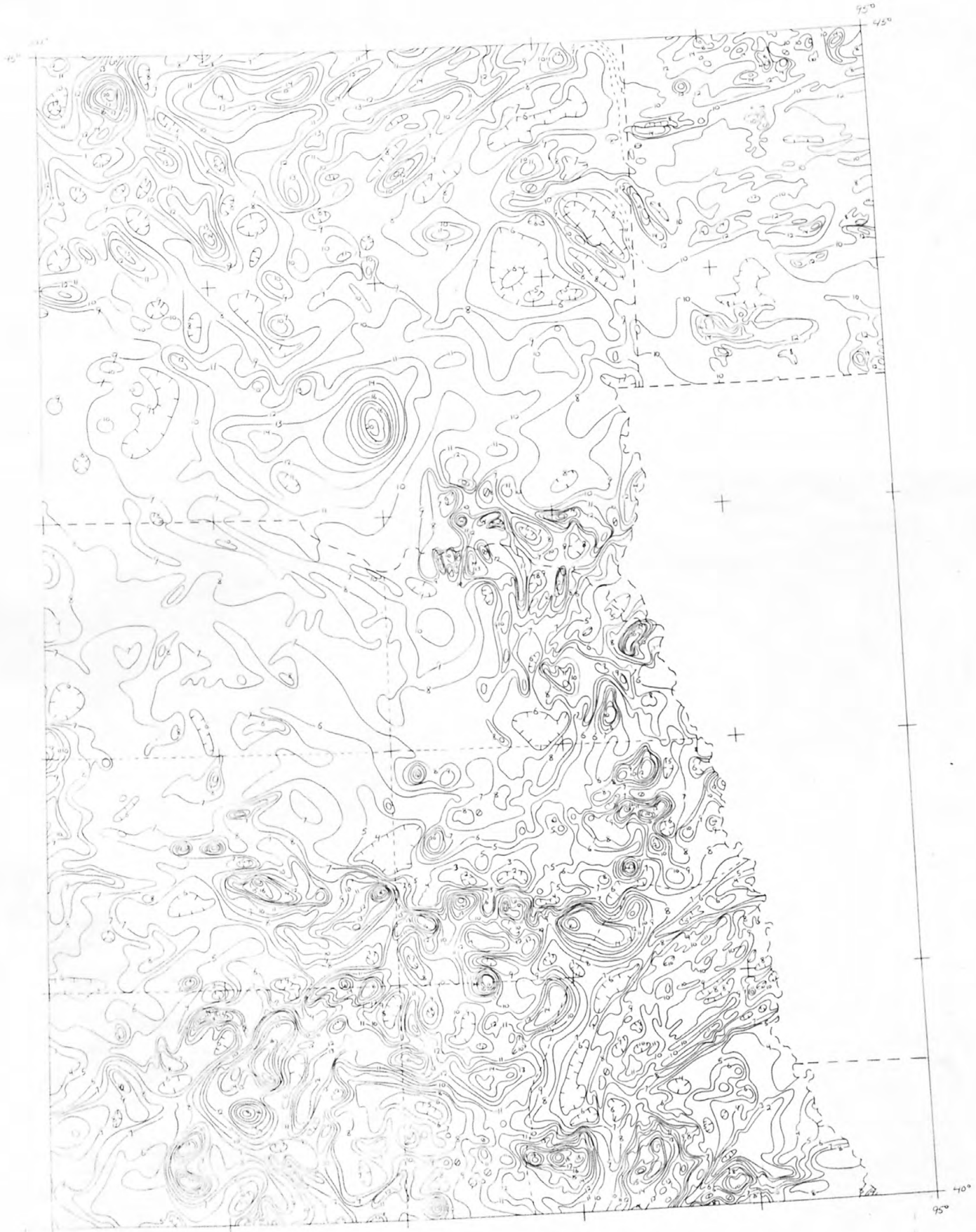
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