



EXPLANATION

Magnetic contours with flight traverses;
dashed contours indicate incomplete or doubtful data

Magnetic contour enclosing area
of lower magnetic intensity

X 2543

Measured maximum or minimum intensity
within closed high or closed low

AREA FLOWN
1947-49

Index map of Minnesota

An aeromagnetic survey covering an area of approximately 20,000 square miles in north-central Minnesota was undertaken during May and August 1947, May 1948, and September and October 1949 by the U. S. Geological Survey in cooperation with the Minnesota Geological Survey. The purpose of the survey was to delineate the major magnetic trends associated with the known iron ore deposits and to indicate areas which may be favorable for additional exploration.

North-south traverses were flown at 1-mile intervals. This spacing was selected to cover as large an area as possible with a minimum of flying. The aeromagnetic information is presented in two forms: as an aeromagnetic map, contoured to a common arbitrary datum, and as magnetic profiles which accompany the map.

The measurements were made with an AN/ASO-3A airborne magnetometer installed in a Beechcraft AT-11 airplane for the 1947 and 1948 flights and in a Douglas DC-3 for the 1949 flights, the detecting element of the magnetometer being towed about 75 feet below the plane. The elevation of the plane, ranging between 900 and 1,100 feet above the ground, was recorded on a continuous-recording radio altimeter. Aerial photographs were used for pilot guidance during the flights, and the flight path was recorded by a gyro-stabilized continuous-strip camera. Positional accuracy of all the surveys after 1947 was increased by use of a gyro-stabilized vertical sight.

The drill hole and geologic information presented on this map has been supplied by Dr. G. M. Schwartz, Director of the Minnesota Geological Survey.

Probably the entire area shown by this map is underlain with glacial drift more than 350 feet thick. No drill hole has reached bedrock in the mapped area, but a few miles to the west, in sec. 36, T. 139 N., R. 43 W., one drill hole penetrated solid rock, believed to be granite, at a depth of 455 feet. Several wells throughout the mapped area have been drilled to depths ranging from 250 to 399 feet without entering bedrock.

The existence of the anomaly in the southeastern corner of this mapped area was discovered during diorite surveys conducted many years ago, but exploration of the region has been delayed because of the difficulty of penetrating the thick glacial drifts. The connection of this anomaly with the similarly shaped one in Otter Tail County, where non-ironiferous iron ore was found, suggests that this anomaly also may be covered by a belt of iron-formation. The anomaly extending diagonally across the map from the northwestern corner is a continuation of a very strong belt in Hubbard and Cass Counties to the east. This anomaly has not yet been explained.