

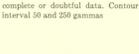
C A N A D A
M A N I T O B A



EXPLANATION



Magnetic contours with flight traverse dashed contours indicate incomplete or doubtful data. Contour interval 50 and 250 gammas



Magnetic contour enclosing area of lower magnetic intensity



Measured maximum or minimum intensity within closed high or closed low



Drill hole



Index map of Minnesota showing area covered by this map

This aeromagnetic contour map and accompanying profiles are a part of a series showing the results of aeromagnetic surveys over approximately 40,000 square miles in Minnesota. The survey was conducted by the U. S. Geological Survey in cooperation with the Minnesota Geological Survey. The purpose of the investigation was to delineate the major magnetic trends associated with known iron ore deposits and to indicate areas that may be favorable for additional exploration.

Total-intensity aeromagnetic data were obtained by flying north-south lines spaced a mile apart at altitudes close to 100 feet above the ground. Magnetic detecting equipment consisted of the continuous recording AN/ASQ-3A airborne magnetometer modified for geophysical use with the detecting element towed about 75 feet below the aircraft. A continuous record of the altitude above ground was obtained by a recording radio altimeter. Flight lines plotted on aerial photos were used for pilot guidance. The actual flight path was recorded by a geostabilized continuous-strip camera establishing ground location control. A system of simultaneous identification points marked the camera, altimeter, and magnetometer records. East-west base lines were flown to facilitate correction for diurnal variation and drift, and to adjust the flight lines to a common arbitrary datum.

The magnetic anomalies shown on this map result from differences in the magnetic properties of the buried Precambrian rocks and not of the overlying rocks described in this text. The available data on both the depth of the drift and the nature of the rocks underlying the glacial drift—although meager—are as complete as possible.

The area mapped was once entirely covered by glacial Lake Agassiz. It consists of level bogs and poorly drained upland with a relief of only 20 feet. Bedrock is overlain by a thick cover of drift, glacial lake silt, clay deposits, and peat with a combined thickness ranging from 100 to 250 feet. There are no outcrops within the area and information on bedrock is scanty.

The drift is underlain at places by outcrops of sedimentary rocks of Cretaceous age but no Paleozoic rocks are known. The Precambrian surface slopes very gently to the west, the altitude ranging from 900 feet above sea level in the east to 700 feet in the west. Residual clays that are 50 to more than 100 feet thick covered the Precambrian rocks at places. The nature of the Precambrian rocks is little known, but granite probably underlies many areas; greenish rock and greenish clays suggest the possibility of gneiss or other basic rock at other places. One well at Roseau reports granite at 160 feet. The magnetic anomalies of moderate intensity in the northern part of the map area are fairly typical of areas underlain by gneiss, thus adding support to the hypothesis that a belt of gneiss extends across the northern half of the map area. The magnetic variation is even less in the southern half and suggests an area of granite.

Note

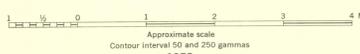
Aeromagnetic data are obtained and compiled along a continuous line, whereas ground magnetic surveys are made at separate points. Errors within the normal limits of any magnetic measurement may cause slight discrepancies between flight lines in an aeromagnetic map, which would be more obvious than similar discrepancies between points in a ground magnetic map. For this reason as much care should be exercised in evaluating magnetic features that appear as elongations along a single aeromagnetic traverse as in interpreting an anomaly indicated by a single ground station.

Base map from Minnesota Department of Highway maps
Planimetry does not meet national standards map accuracy

AEROMAGNETIC MAP OF WESTERN ROSEAU COUNTY, MINNESOTA

TOTAL INTENSITY CONTOURS RELATIVE TO ARBITRARY DATUM

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Approximate scale
Contour interval 50 and 250 gammas
1958