



C A N A D A

AEROMAGNETIC AND GEOLOGIC MAP OF NORTHWESTERN
KOOCHICHING COUNTY, MINNESOTA

This aeromagnetic contour map and accompanying profiles are a part of a series showing the results of aeromagnetic surveys over approximately 4,500 square miles in Minnesota. The survey was conducted by the U.S. Geological Survey in cooperation with the Minnesota Geological Survey. Total-intensity aeromagnetic data were obtained by flying north-south lines spaced one mile apart at elevations ranging between 900 and 1,100 feet above the ground. Magnetic detecting equipment consisted of the continuous-recording AN-ANSLA airborne magnetometer modified for geophysical use with the detecting element towed about 75 feet below the plane. A continuous record of the elevation above the ground was obtained by use of a recording radio altimeter. Flight lines plotted on aerial photos were used for pilot guidance. The actual flight path was recorded by a geolocalized continuous-strip camera. A system of automatic identification points marked all records, and strip film established the ground location control. 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.

This map area lies within the basin of former glacial Lake Agassiz, and is largely swamped with little or no relief. The surface deposits are glacial drift overlain by lake deposits. Two bedrock outcrops occur along the Rainy River at Manitow Rapids in sec. 36, T. 160 N., R. 25 W., granite is exposed, and at Long South Rapids in sec. 27, T. 159 N., R. 27 W., hornblende schist is exposed.

Recent exploration by geologists of the M. A. Hanna Co. has revealed an area of numerous outcrops in T. 159 N., R. 25 to 29 W. Two north-south-trending areas of diabase occur in R. 25 and 26 W., and Knife Lake slate crops out in the north-central and southern parts of R. 25 W., and in the central and northeastern parts of R. 27 W. There is a belt of granite in the northern part of R. 27 W. and two more exposures in the east-central part of R. 28 W. At the border of R. 28 and 29 W. a small group of exposures of granite, diabase, and slate are found. The geologic complexity of the region is indicated by the close association of the slate, granite, and diabase. The only surface outcrops of the prominent magnetic high extending north-south across the map area are diabase in T. 159 N., R. 25 W. Further important information, however, has been furnished from four holes drilled by the W. S. Moore Co. in T. 159 and 158 N., R. 27 W. The drill record from one hole is as follows:

Depth (feet)	Description
187-187	Slaty units
187-190	Cherty iron-bearing units with magnetic beds
190-199	Graywacke slate with thin-banded iron formations
199-206	Chert and slate
206-234	Graywacke slate with some chert; magnetic zones at 226 feet and 242 feet
234-256	Graywacke slate
256-271	Cherty iron formation with fine-grained magnetite
271-276	Graywacke slate
276-278	Iron formations and graywacke slate with magnetite
278-285	Iron formations and graywacke slate with magnetite
285-294	Graywacke slate with disseminated magnetite in bottom half
294-313	Diabase with some disseminated pyrite

The abundance of magnetite in the slaty unit is reflected in the magnetic high over this area.

Note
Aeromagnetic data are obtained and compiled along a continuous line, whereas ground magnetic surveys are made at separate points. Errors in the vertical 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.

EXPLANATION

FORMATIONS

Granite, with numerous inclusions of older rocks

Knife Lake group, with granite, pegmatite, and diabase intrusions

OUTCROPS (Lithologic symbols)

Diabase

Granite

Granite and schist

Knife Lake group

Schist

Indefinite contact

Magnetic contours with flight traverse; dashed contours indicate incomplete or doubtful data; hatched contour encloses area of lower magnetic intensity; "a" and number denote location and value of measured maximum or minimum intensity within closed contour.

Drill hole



AEROMAGNETIC AND GEOLOGIC MAP OF NORTHWESTERN KOOCHICHING COUNTY, MINNESOTA
TOTAL-INTENSITY AEROMAGNETIC CONTOURS RELATIVE TO ARBITRARY DATUM

By
J. L. Meuschke, K. G. Books, John R. Henderson, Jr., and G. M. Schwartz
Scale 1:63,360

