



AEROMAGNETIC AND GEOLOGIC MAP OF SOUTHWESTERN KOOCHICHING COUNTY, MINNESOTA

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. Total-intensity aeromagnetic data were obtained by flying north-south lines spaced one mile apart, at elevations ranging between 900 and 1,300 feet above the ground. Magnetic detecting equipment consisted of the continuous-recording AN-4500A airborne magnetometer modified for geophysical use with the detecting element towed about 75 feet below the plane. A continuous record of the situation 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 gyro-stabilized continuous-strip camera. A system of simultaneous identification points marked all records, and strip film established the ground location control. East-west base lines were drawn to facilitate correction for diurnal variation and drift, and to adjust the flight lines to a common arbitrary datum.

The northern part of the map covers an area within the "Big Bog," an eastern extension of the bed of former glacial Lake Agassiz. The two southern tiers of townships are covered mainly by ground moraine deposits of the late Wisconsin glacier. Glacial deposits are relatively thick over most of the area and rock exposures are few. As the area is sparsely inhabited, very little information is available from well logs.

The known outcrops occur in the northeastern part of the area and consist of mica schist intruded by pegmatite and granite. The mica schist is probably the metamorphosed equivalent of the Knife Lake slate to the east, whereas the granite and pegmatite represent extensions of the Vermilion batholith.

Incomplete records from a series of eight diamond-drill holes, including the cores from one hole in sec. 22, T. 151 N., R. 28 W., give additional important data on the underlying rocks. The hornblende schist noted in the log that follows probably represents the metamorphic equivalent of the Ely greenstone.

Depth (feet)	Formation
0-117	Glacial drift
117-120	Hornblende schist
120-125	Hornblende schist, somewhat porphyritic with white feldspar
125-130	Hornblende schist plus quartz and granite stringers
130-143	Hornblende schist
143-145	Hornblende schist partly replaced by feldspar
145-165	Hornblende schist, granite stringer at 165 feet
165-175	Hornblende schist
175-200	Core missing
200-237	Hornblende schist
237-250	Granite
250-284	Hornblende schist plus granite stringers
284-295	Granite

The trend of the magnetic anomalies extending across the central part of the map area is a continuation of that noted in the southwestern corner of the area to the east. This lineation indicates a belt of rocks of a higher magnetic susceptibility.

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.

EXPLANATION

- FORMATIONS**
- Granite, with numerous inclusions of older rocks
 - Knife Lake group with granite, pegmatite, and diabase intrusions
 - Ely greenstone

- OUTCROPS (Lithologic symbols)**
- Diabase
 - Granite
 - Greenstone
 - Schist
 - Schist and pegmatite
 - Slate hornfels

- Indefinite contact**
- 60

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



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 TOTAL-INTENSITY AEROMAGNETIC CONTOURS RELATIVE TO ARBITRARY DATUM

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 Scale 1:63,360
 Contour interval 50 and 250 gammas
 Aeromagnetic survey flown 1000 feet above the surface
 1957