DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
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PREPARED IN COOPERATION WITH
THE MINNESOTA GEOLOGICAL SURVEY
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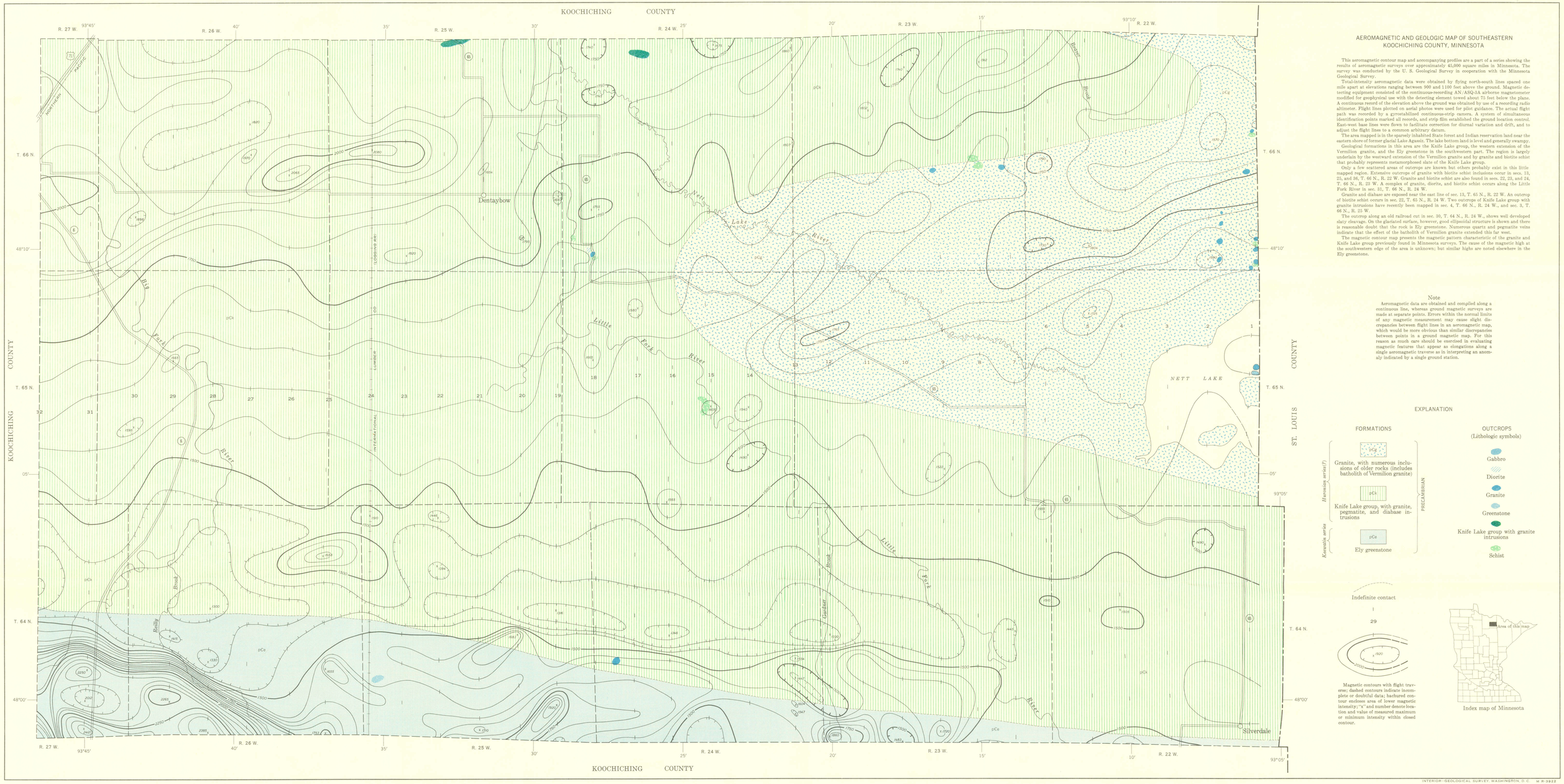
GEOPHYSICAL INVESTIGATIONS
MAP GP 134



AEROMAGNETIC AND GEOLOGIC MAP OF SOUTHEASTERN KOOCHICHING COUNTY, MINNESOTA

This aeromagnetic contour map and accompanying profiles are a part of a series showing the results of aeromagnetic surveys over approximately 45,000 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 1100 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 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 gyrostabilized 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 flown to facilitate correction for diurnal variation and drift, and to adjust the flight lines to a common arbitrary datum.

The area mapped is in the sparsely inhabited State forest and Indian reservation land near the eastern shore of former glacial Lake Agassiz. The lake bottom land is level and generally swampy.

Geological formations in this area are the Knife Lake group, the western extension of the Vermilion granite, and the Ely greenstone in the southwestern part. The region is largely underlain by the westward extension of the Vermilion granite and by granite and biotite schist that probably represents metamorphosed slate of the Knife Lake group.

Only a few scattered areas of outcrops are known but others probably exist in this little mapped region. Extensive outcrops of granite with biotite schist inclusions occur in secs. 13, 25, and 36, T. 66 N., R. 22 W. Granite and biotite schist are also found in secs. 22, 23, and 24, T. 66 N., R. 23 W. A complex of granite, diorite, and biotite schist occurs along the Little Fork River in sec. 31, T. 66 N., R. 24 W.

Granite and diabase are exposed near the east line of sec. 13, T. 65 N., R. 22 W. An outcrop of biotite schist occurs in sec. 22, T. 65 N., R. 24 W. Two outcrops of Knife Lake group with granite intrusions have recently been mapped in sec. 4, T. 66 N., R. 24 W., and sec. 3, T. 66 N., R. 25 W.

The outcrop along an old railroad cut in sec. 30, T. 64 N., R. 24 W., shows well developed slaty cleavage. On the glaciated surface, however, good ellipsoidal structure is shown and there is reasonable doubt that the rock is Ely greenstone. Numerous quartz and pegmatite veins indicate that the effect of the batholith of Vermilion granite extended this far west.

The magnetic contour map presents the magnetic pattern characteristic of the granite and Knife Lake group previously found in Minnesota surveys. The cause of the magnetic high at the southwestern edge of the area is unknown; but similar highs are noted elsewhere in the Ely greenstone.

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

PRECAMBRIAN

Hunronian series(?)

pCg — Granite, with numerous inclusions of older rocks (includes batholith of Vermilion granite)

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

Keewatin series

pCe — Ely greenstone

OUTCROPS (Lithologic symbols)

Gabbro

Diorite

Granite

Greenstone

Knife Lake group with granite intrusions

Schist

Indefinite contact

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

Area of this map

Index map of Minnesota

Base from Minnesota Department of Highway maps

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D.C. M R-3922

AEROMAGNETIC AND GEOLOGIC MAP OF SOUTHEASTERN 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

1 ½ 0 1 2 3 4 Miles

Contour interval 50 gammas

Aeromagnetic survey flown 1000 feet above the surface

1957

SHEET 1 OF 2

Aeromagnetic survey 1949 and 1951

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For sale by U. S. Geological Survey, price $ 1.00 per set