

EXPLANATION

FORMATION	OUTCROPS (Lithologic symbols)
Duluth gabbro (Middle Keweenaw)	Gabbro
Virginia slate (Animikie)	Granite
Bivahik iron-formation (Animikie)	Schist
Pokegama quartzite (Animikie)	
Giant Range granite (Algonquin)	
Knife Lake slate, schist (Knife Lake)	
Ely greenstone	
	Indefinite contact

The stratigraphic classification and nomenclature of this report follow the usage of the Minnesota Geological Survey.

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.



An aeromagnetic survey covering an area of approximately 30,000 square miles in north-central Minnesota was made 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 known iron ore deposits and to indicate areas that 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 that accompany the map.

The measurements were made with an AN/ASQ-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 was towed about 75 feet below the plane. The elevation of the plane, ranging between 700 and 1,100 feet above the ground, was recorded with 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.

G. M. Schwartz, Director of the Minnesota Geological Survey, furnished the geologic data used on this map.

Part of the Mesabi district crosses the area east of Eveleth and continues beyond the northeastern corner of the area. The geology may be conveniently divided into three parts—the Mesabi range and the areas lying north and south of the range.

South of the Mesabi range there are two areas of very different magnetic characteristics underlain by distinctly different types of rock. The southwestern part lacks outcrops, but it is known to be underlain by the Virginia slate, which overlies the Bivahik iron-formation and dips 10° to 15° S. The southeastern part is underlain by the Duluth gabbro. There are only a few outcrops known, but outcrops both to the north and to the south leave no doubt of the existence of the gabbro here.

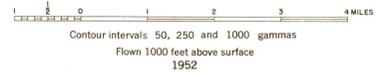
The northwestern part of the area north of the Mesabi range is underlain by the Giant Range granite. Numerous outcrops are known, but they have not been mapped in detail. The northern part of T. 60 N., Rs. 15 and 16 W., is probably underlain by Knife Lake slate.

The formation boundaries shown on this map have been transferred from the geologic maps included in Minnesota Geological Survey Bulletins 17 and 19.

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.

TOTAL INTENSITY AEROMAGNETIC AND GEOLOGIC MAP OF EAST-CENTRAL ST. LOUIS COUNTY, MINNESOTA
RELATIVE TO ARBITRARY DATUM



Mesabi (St. Louis Co., east-central). Aeromagnetic. 1:63,360.



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Sheet 1
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