



**AEROMAGNETIC SURVEY IN NORTHEAST ALASKA**  
PARTIAL SURVEY

Aeromagnetic surveys of Naval Petroleum Reserve No. 4 (Nelson and others, 1962) and of a 500-square-mile area near Fairbanks (Anderson and others, 1964) are the only published aeromagnetic reports on northeastern Alaska.

General total intensity aeromagnetic profiles, primarily over the Yukon Plate in the central part of the area shown on Figure 3, were obtained by the U.S. Geological Survey in 1954 and 1958 and were released for public inspection in 1960 (Anderson, 1960a, 1960b). Most of these profiles were flown north and south at a barometric elevation of about 5,000 feet. All of these north-south profiles are shown in this report. One north-south profile parallel to the Yukon River between long. 147° W. and 148° W. are not included.

**FIELD SURVEY**

An experimental aeromagnetic reconnaissance of northeastern Alaska was made in July and early August of 1965, in the area extending from lat. 64° N. to the Arctic Ocean, and from the Alaska-Yukon boundary to long. 147° 30' W. (Fig. 3). The survey was planned by Leland Hays and supervised in the field by Randolph W. Bromery. J. C. Topp compiled the aeromagnetic data as profiles and J. R. Kirby contoured these profiles with the method of Anderson (1960a, 1960b) to form a preliminary contour map.

The flight elevation was 5,000 feet above sea level, except in the mountainous areas where it was slightly higher. Twenty-one north-south flight lines were flown 10 miles apart, except at the western edge of the area shown. Only one east-west flight line was flown near the Arctic Ocean; otherwise magnetic conditions made it necessary to skip the north-south line extended all the way to the Arctic Ocean. The locations of the flight lines (60-90) are shown in Figure 1. A continuously recording flux-gate magnetometer was used for the measurements, and many of the surveying and processing techniques were those described by Nelson (1955). However, the aircraft's equipment included some experimental modifications designed for eventual digital processing of magnetic data, and position control was obtained by Doppler navigation as well as by star-plate control. The published 1:250,000 scale Alaska topographic maps were used for compilation and initial data control. Position accuracy was generally better than needed for the 1:100,000 scale of the published maps and profiles, but a few position errors of 1 to even 4 miles could have occurred in places where Doppler navigation failures coincided with poor star-plate records or inadequate topographic maps.

The magnetic profiles are all relative to an arbitrary datum and include any instrumental or diurnal drift that occurred in the recording interval. Daily phone checks were made with the U.S.C. & G.S. magnetic observatory at College, Alaska, and in the recording interval. Daily phone checks were made with the U.S.C. & G.S. magnetic observatory at College, Alaska, and in the recording interval. Daily phone checks were made with the U.S.C. & G.S. magnetic observatory at College, Alaska, and in the recording interval. Daily phone checks were made with the U.S.C. & G.S. magnetic observatory at College, Alaska, and in the recording interval.

Anderson, C. R., 1960a, Total intensity aeromagnetic profiles of the Yukon Plate-Fairbanks area, Alaska: U.S. Geol. Surv. open-file report, Nov. 30, 1960, 7 sheets.

Anderson, C. R., 1960b, Total intensity aeromagnetic profiles of the Brooks Range, Alaska: U.S. Geol. Surv. open-file report, Nov. 30, 1960, 3 sheets.

Anderson, C. R., Washburn, Clyde, and Stone, Isadore, 1964, Aeromagnetic reconnaissance of the northeast Tazewell-Lewis area, Alaska: U.S. Geol. Surv. Geophys. Inv. Map GP-242, scale 1:125,000.

Hickler, J. R., Jr., 1952, Aeromagnetic surveying pp. 1-6 of Washburn, R. E., ed., Advances in geophysics, p. 213-248.

Nelson, J. R., and others, 1965, Balance and gravity surveys of Naval Petroleum Reserve No. 4 and adjoining areas, Alaska: U.S. Geol. Surv. Prof. Paper 300-A, 25 p.

**EXPLANATION**

Magnetic contours  
Showing total intensity magnetic field of the earth in gammas relative to an arbitrary datum. Dashed lines indicate areas of lower magnetic intensity. Contour intervals are 20 gammas.

**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 areas between map lines which 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 aeromagnetic traverses as in interpreting an anomaly indicated by a single ground station.

Line of airborne magnetometer traverse

82 Elevation 5000 feet above sea level where possible  
15 Elevation 2500 feet above sea level where possible  
6A Elevation 4000 feet above sea level where possible

A  
Approximate boundary and designation of major area of distinctive magnetic character

(5)  
Location of magnetic rock feature

Compiled by John R. Kirby  
Regional gradient removed by Elizabeth R. King

Base map compiled by U.S. Geological Survey from uncontrolled mosaic of Alaska Topographic Series quadrangle maps

Figure 3 Aeromagnetic map of northeastern Alaska  
by W. R. Brosge, E. E. Brabb, and E. R. King

THIS MAP IS PRELIMINARY AND HAS NOT BEEN CHECKED OR REVIEWED FOR ACCURACY BY THE U.S. GEOLOGICAL SURVEY STANDARDS AND TECHNIQUES