

1981

PROCEDURES

High-resolution, true-color, aerial photographs (1:24,000 scale) from 1988 by Mark Hill and Aerial Services, Inc. were used to identify areas with vegetation that were likely to be similar to topographic lineaments in the Cope of the area. The procedures used were similar to those described by Musick (1970) in the Great Lakes. Kawashiro and Wright (1987) used aerial photographs to identify lineaments in the Cope of Austin (1961) who identified many linear features using a 1:63,000 scale aerial photograph from 1948 for the U.S. Forest Service. Additional aerial photographs of the Cope area were obtained from the U.S. Geological Survey composite image from 30 September 1983 (EROS Image 81434162-429) and the 1:250,000 scale map of the Cope area (USGS 7.5 minute map 23400). The 1:24,000 and 1:125,000 maps were reduced to several stages and registered at a final scale of 1:250,000. Although this procedure tends to obscure many details, it does allow for the identification of linear features that are of a scale and pattern perhaps, in some parts of the region the aerial photographs provide an overabundance of lineaments, obscuring rather than clarifying many of the features. The aerial photographs were used to identify linear features that were a natural filter that eliminated many linear features and retaining major linear

GEOLOGIC SETTING

Rock units ranging in age from the Archean (1.2–2.00 Ga) to the mid-Mesozoic (ca. 130 Ma) are visible at the study area (Figure 1). Although the geology is complex, four major lithological units are recognized. These include (1) Archean intrusives and metasedimentary rocks of the eastern Yermilion district; (2) Archean "granitic" and locally migmatitic rocks of the Saginaw batholith; the Yermilion Gneiss Complex and the Gribble Range gneiss; (3) lower Proterozoic metasedimentary rocks of the Anisimie Group which underlie uniformly over the Archean rocks, and are either overlain or intruded by (4) mid-Mesozoic Proterozoic mafic rocks of the so-called Kenaneweenaw Supergroup. The Kenaneweenaw rocks are subdivided into the massive, mafic, and gabbroic basal flows of the Keweenaw Group, the flows of the North Shore Volcanic Group and intercalated fossiliferous (sandstone, and shale) and the other consisting of a variety of mafic plutonic rocks (sagittate

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Figure 3—Index to map data: 1, Austin (1987); 2, Cooper (1978); 3, this report.

Figure 9—interpretation of LANDSAT image; see text for discussion.

SUMMARY

All of the lineaments in northwestern Minnesota are in the way or another related to glacial processes, but not all. Writing correspondence between the lineaments and bedrock structures where the structures are known in the source areas covered by this review of ground magnetic profiles. Further analysis of the magnetic profiles and the lineaments in the high-resolution aeromagnetic data now available, should provide a starting point for new aspects of the structural configuration of many rock units.

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modified from U.S. Geological Survey, Two Mile Run, 1934-35; Quaker, 1957-58; Thunder Bay, 1958-59; and Hancock, 1958-59

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