Uranium Exploration

AEROMAGNETIC VERTICAL GRADIOMETER AS AN EXPLORATION TOOL

L. J. KORNIK
Geological Survey of Canada
601 Booth Street
Ottawa, Ontario
K1A 0E8

ABSTRACT

Aeromagnetic vertical gradiometer surveys have been completed over different areas in Saskatchewan, in various geological and structural environments. In all cases, the surveys have contributed to a better understanding of some aspect of the geology or structure. This arises because the data portrayed on the maps are a consistent, continuous, and objective portrayal of the distribution of the magnetic minerals in the underlying rocks. Therefore, the data has a direct correlation to some aspect of the geology. The magnetic method also penetrates overburden, water and swamps and is usually not affected by them. The interpretation of the magnetic maps therefore requires an understanding of the relationship between the magnetic components of the rocks and the geologic environments and structures.

In northern Saskatchewan vertical gradiometer surveys have been extremely useful in delineating structures within the Athabasca Group and in outlining the geology of the underlying basement and structures within the basement. Areas in Saskatchewan, adjacent to the Canadian Shield and covered by a blanket of Paleozoic rocks, are also areas which have already benefitted from the use of vertical gradiometer surveys. These surveys permit the extrapolation, at a reasonable cost, of Shield geology, into the basement areas which are buried. Surveys in the Shield itself also contribute to an understanding of the geology and structures, again because the data is detailed and continuous. Digital processing of the data can allow them to be displayed in a variety of derived maps, such as shaded relief, band-pass filtering, etc. Each map can contribute to a better understanding of the size, shape and inclination of various geological features and structures. The utility of vertical gradiometer data will be illustrated by several examples in Saskatchewan.