

### Geological structure from surface geochemistry

P.H. Davenport and W.L. Nolan

*Geological Survey, Newfoundland Department of Mines and Energy, St. John's, Newfoundland A1B 4J6, Canada*

The topographic expression of geological structure has long been a useful tool in geological mapping. Topographic linears are recognized from airphotos and topographic maps, and more recently, from digital airborne or spaceborne sensors measuring passive (visible or infra-red) or active (radar) electromagnetic radiation. The widespread availability of regional geophysical data, especially aeromagnetic data, affords another approach to the mapping of geological structures, either from contoured data or processed images.

Techniques similar to those used to enhance linear features in geophysical data can be applied to digital geochemical data. Although based on the geochemistry of surficial media, shaded-relief maps of lake sediment geochemistry display some clear linear and curvilinear features that can be related to bedrock structures. Both geochemical and geophysical surveys map

compositional variations in bedrock, and linear features are caused in three main ways: (1) the juxtaposition of two geological units of contrasting composition (e.g., along an intrusive or faulted contact), (2) alteration along a linear zone (commonly fault-controlled), and (3) the offset of continuous geological units along a fault.

Geophysically and geochemically defined linears are complementary in that they reflect different aspects of variations in bedrock composition, and they both in turn complement topographic linears which reflect variations in the mechanical properties of bedrock. The use of video display systems, especially those incorporating data overlay and analysis capabilities are useful in identifying the more significant of what can be a plethora of linears.