The digital index concept of accessing information from geophysical survey databases

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As part of the Geological Survey's mandate, geophysical data collected within the province are being processed to a more useable form and archived for ready access by user groups (mining industry, government and university). The two main sources of this data are systematic regional government-sponsored surveys collected to enhance mineral exploration activities within the province and industry-sponsored surveys designed to investigate specific mineral properties. These surveys vary widely in area covered, detail geophysical parameters measured, from potential fields to electromagnetic and induced polarization responses, or combinations of these. This diversity has implications for the design of the digital database used to store the results. A further complication arises in that older data were collected by analog means and interpreted, or interpolated products were submitted in analog form with assessment reports.

From the data management perspective, the shear volume of geophysical information requires a means by which data from various sources may be efficiently catalogued and accessed. As well, if analog datasets are to be converted to digital for inclusion in a structured database, the first logical step is to determine the magnitude of the task by compiling a digital catalogue and then to prioritize certain surveys on such criteria as data quality and assessed need.

The digital index concept is created by attaching some

georeferencing information to the geophysical survey catalogue so that standard library searches can be restricted spatially. When properly constructed, a visually-oriented digital index can serve many purposes. For those involved in assembling databases, a digital index can be a tool for both project planning and for the management of quite diverse databases. For the user groups, a digital index can be quickly searched to determine the level of information available for an area of interest and can also provide a means of efficiently navigating through a maze of compiled databases.

Following initial attempts using other software packages, ArcView was adapted as an effective tool to query and display information from digital indexes of airborne geophysical surveys conducted within the province. Several features of ArcView are particularly suited to this task:

(a) all geographic entities (points, lines and polygons) are coregistered;
(b) each entity is directly linked to a database file record and these records can be easily altered or updated;
(c) information contained in each field can be selectively queried to limit a search and to classify the data;
(d) thereby changing the characteristics of an image or map; and
(e) ArcView operates on several computer platforms within the Windows GUI which provides an intuitive environment for the user.

Two digital indices in ArcView have been built for geophysical surveys, one for insular Newfoundland and one for Labrador. As airborne surveys often overlap, the descriptive information for these indexes has been associated with a line coverage, which is comprised of polygonal extents of each survey. Similar province-wide digital indexes are currently being constructed for ground-based geophysical surveys. Digital indexes have also been constructed for regional and detailed geochemical surveys in Labrador and for systematic bedrock mapping in Newfoundland.