New Airborne Geophysics in British Columbia
Nouveau géophysiques aéroportée en Columbie Britannique

Geoscience BC

CANADA 1842 GEOLOGICAL SURVEY - COMMISSION GÉOLOGIQUE

Jennings River

A high-resolution aeromagnetic survey over the 1:250 000 Jennings River map area (NTS 104 O), northern British Columbia, has been completed. Funding for the survey was provided by Geoscience BC and project management was undertaken by the Geological Survey of Canada. The survey was flown under contract by Goldak Airborne Surveys, Saskatoon. The survey provides aeromagnetic coverage where none previously existed. The aim of the project is to spark new private sector investment in resource exploration. This objective falls within the mandate of Geoscience BC, as well as the scope of Natural Resources Canada's Earth Science Sector's Northern Resource Development Program.

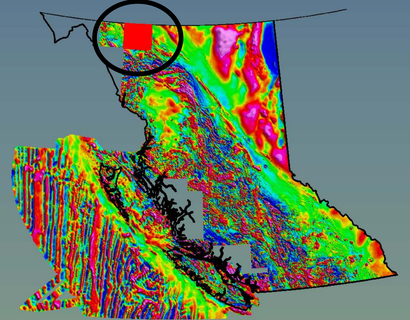
The Jennings River map area in northern BC is considered prospective for a number of mineral deposit types including carbonate hosted Ag-Pb-Zn deposits, porphyries (Mo and W), and skarns (Cu and Mo). In addition, the possibility of volcanogenic massive sulphide occurrences is indicated by belts containing felsic rock contemporaneous with such deposits in neighbouring Yukon. Despite these positive factors exploration in the region has been limited. In part this can be attributed to the extensive Quaternary cover, the lack of public-domain geophysical data, and the status of geological mapping. Although regional bedrock maps were produced for the northern half of the map area in the past decade or so (Mihalynuk et al., 2000, 2001; Nelson and Bradford 1993; Nelson et al., 2000, 2001), mapping in the southern half of the map area dates from the 1960's and is reconnaissance in scale (Gabrielse, 1969).

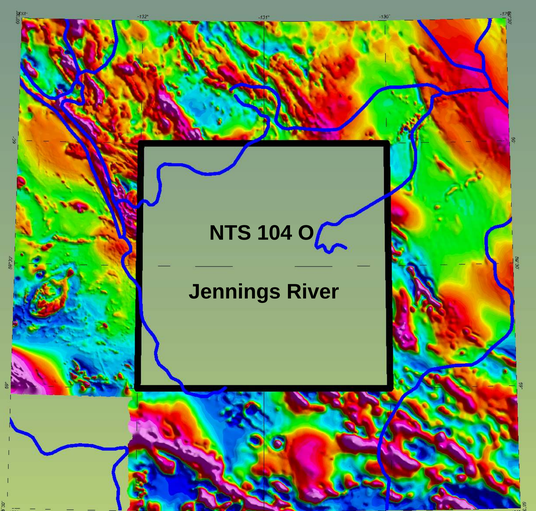
Aeromagnetic surveys provide a rapid, cost-effective means of preliminary geological evaluation of large tracts of bedrock and are basic resource exploration infrastructure. The data acquired by these surveys provide information on lithology and the extent of regional rock units, help delineate fault and dyking patterns, and allow for the estimation of source depths. In regions of poor exposure, aeromagnetic data would be valuable for extrapolating mapped geology beneath areas of cover. Therefore, it is expected that the new data acquired in Jennings River will significantly advance understanding of the geologic and mineral resource potential of the area.

A Request for Proposals was generated by the Geological Survey of Canada for a competitive bidding process to perform the aeromagnetic survey. The contract was awarded to Goldak Airborne Surveys of Saskatoon. Surveying began on May 15, 2006 and concluded on June 22, 2006. Two Piper PA-31 Navajo aircraft performed the survey consisting of 33,752 line km covering all of NTS 104 O. The traverse flight line spacing was 500 m with an N45°E orientation. The control line spacing was 2,000 m with an orientation of N135°E. The survey altitude was a nominal mean terrain clearance of 150 m on a pre-determined smooth draped surface. Magnetometer calibration was performed at the Meanook, Alberta test site. The magnetic data were recorded at 10 Hz using a split-beam line cesium vapour magnetometer, with a sensitivity of 0.01 nT, mounted on board the aircraft. The maximum tolerance for diurnal variation was 3.0 nT per minute. Flight-path information was recovered using post-flight differential Global Positioning System.

The Regional Geophysics Section of GSC Central Canada Division performed project management, including quality assurance and quality control, for the survey. The scientific authority for the survey performed a site inspection of the contractor as the survey began. Quality control was performed on the data as they were acquired. The data were tie-line leveled and determined to be acceptable for archiving in the Canadian Aeromagnetic Data Base. Project plans call for joint publication of sixteen 1:50,000 total field magnetic anomaly and vertical derivative maps (GSC Open Files 5351-5382 and Geoscience BC Maps 2006-3-1 to 2006-3-16 and 2006-4-1 to 2006-4-16) on January 30, 2007. Vertical derivative images enhance short wavelength components (shallow sources) in a data set at the expense of longer wavelength components (deep sources) and can provide important insights into the near surface geology. Additionally, the digital profile and gridded data will be made available on-line and at no cost via the Geoscience Data Repository for Aeromagnetic Data (**http://gdr.nrcan.gc.ca/aeromag/index_e.php**). Bitmap images and PDFs of the maps will be available on-line and at no cost via the Geoscience Data Repository's MIRAGE application (**http://gdr.nrcan.gc.ca/mirage/index_e.php**). Bitmap images and gridded data sets will also be available on the Government of British Columbia's MapPlace (http://www.em.gov.bc.ca/mining/Geolsurv/MapPlace/).

An interpretation of the aeromagnetic data by Geological Survey of Canada will be undertaken and the findings will be published in Spring, 2007.





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Bonaparte Lake

Airborne gamma-ray spectrometric and magnetic geophysical surveying has been completed over the Bonaparte Lake area, BC, in the eastern half of NTS 92 P. The survey was funded by Geoscience BC, Natural Resources Canada's Targeted Geoscience Initiative (TGI3), Candorado Operating Company Ltd., GWR Resources Inc., and Amarc Resources Ltd. Surveying consists of a fixed-wing component over the flatter western portion and a helicopter-borne component over the more rugged eastern portion of the survey area. The aim of the project is to encourage new private sector investment in resource exploration, to aid in the assessment and development of targets for mineral exploration, and to support future bedrock and surficial geological mapping.

The Bonaparte Lake area in south-central British Columbia is prospective for a number of mineral deposit types, particularly copper porphyries. However, an extensive Quaternary cover, Tertiary volcanic cover and a lack of public domain geophysical data have limited exploration in the region.

Airborne gamma-ray spectrometry provides a physical measurement which contributes to geochemical mapping of the top 30 cm of the earth's surface. The technique provides bedrock and overburden mapping assistance by fingerprinting the radioactive element signatures inherent in all rocks and soils. Where the normal signatures are disrupted by mineralizing processes, anomalies provide direct exploration vectors.

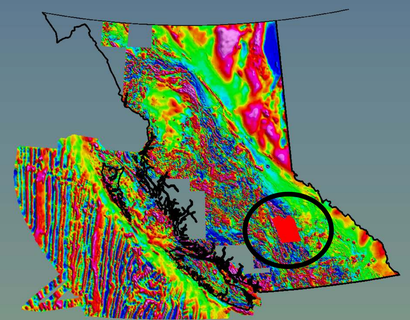
Aeromagnetic surveys provide structural and lithological information from rocks located at surface down to considerable depths. In the proposed surveys area, the technique allows determination of magnetic source depths, key to understanding lithology and mineral potential under the extensive cover sequences.

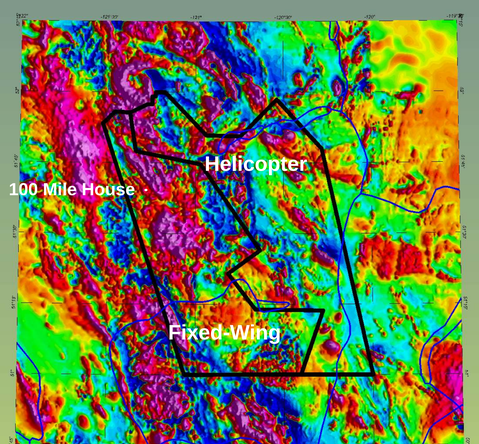
When these two techniques are integrated into a single-pass airborne survey, they provide complimentary information that serves as a long-standing geophysical/geochemical framework, supporting new geological and practical mineral exploration models for a wide variety of commodities. For example, similar surveys conducted recently in areas adjacent to the proposed surveys have improved geological understanding and exploration for porphyry Cu-Au, skarn, and other deposit types.

The fixed-wing survey (Figure 2) was flown with a Britten-Norman Islander (C-GSGX) and consists of 13,968 line km covering the survey area. The traverse flight line spacing was 400 m, except in the Rayfield and Amarc blocks (Figure 2, areas B and C of the fixed-wing area) where the line spacing was 200 m. All traverse lines have a N55°E orientation. The control line spacing was 2,400 m oriented perpendicular to the traverse lines. The survey altitude was a nominal mean terrain clearance of 125 m on a pre-determined smooth draped surface. Gamma-ray spectrometric data were recorded at 1.0 second intervals using a 256-channel Exploranium GR820 spectrometry system with 50.4 litres of downward-looking crystals and 8.4 litres of upward-looking sodium iodide detectors. The magnetic data were recorded at 10 Hz using a Scintrex split-beam line cesium vapour magnetometer, with a sensitivity of 0.01 nT, mounted in a stinger attached to the aircraft. Magnetometer calibration was performed at the GSC Calibration Range at Bourget, ON. The maximum tolerance for diurnal variation was 2.0 nT per minute. Flight-path information was recovered using post-flight differential Global Positioning System.

The helicopter-borne survey (Figure 2) was flown with a Eurocopter AS350B2 helicopter and consists of 14,780 line km. The traverse line spacing was 420 m, except in the Rail block (Figure 2, area B of the helicopter area) where the line spacing was 210 m and in the Murphy block (Figure 2, area C of the helicopter area) where the line spacing was 250 m. The traverse line orientation was N70°E with control line oriented N165°E. The survey altitude was a nominal mean terrain clearance of 125 m. The magnetometer system was mounted in a stinger attached to the helicopter skids, while the spectrometric system had smaller detector volumes with 33.6 litres of downward-looking crystals and 4.2 litres of upward-looking crystals. Magnetometer calibration was performed at the GSC Calibration Range at Meanook, AB. The maximum tolerance for diurnal variation was 2.0 nT per minute. Flight-path information was recovered using post-flight differential Global Positioning System.

The data will be published jointly as GSC Open Files and Geoscience BC Maps by April 1, 2007. The digital profile and gridded data will be made available on-line and at no cost via the Geoscience Data Repository for Aeromagnetic Data (**http://gdr.nrcan.gc.ca/aeromag/index_e.php**) and the Geoscience Data Repository for Radioactivity Data (**http://gdr.nrcan.gc.ca/gamma/index_e.php**). Bitmap images and PDFs of the maps will be available on-line and at no cost via the Geoscience Data Repository's MIRAGE application (**http://gdr.nrcan.gc.ca/mirage/index_e.php**). Bitmap images and gridded data sets will also available on the Government of British Columbia's MapPlace (**http://www.em.gov.bc.ca/mining/Geolsurv/MapPlace/**).





Northern Resources Development Program
La mise en valeur des ressources du Nord

Targeted Geoscience Initiative Program
Initiative géoscientifique ciblée