

Hot off the Press: High Resolution **Aeromagnetic survey, Jennings River** Area, Northern B.C.

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Canada



Earth Science Sector

Ressources naturelles Vatural Resources Canada



Acknowledgements

Project Initiation and Funding



Data Acquisition



Goldak Airborne Surveys

Saskatoon

Saskatchewan



Project Management



Geological mapping and insights 1965-2002





Data Acquisition

May 15 - Jun 22, 2006

The Details!

59° - 60° N, 130° - 132° W, NTS 104 O;

Total of 33,752 line km data acquired;

Traverse Lines: NE-oriented, 500 m apart;

Control Lines: SE-oriented, 2000 m apart;

Altitude: ~150 m MTC on pre-determined smooth-draped surface;

Sensor: Cesium Vapour Magnetometer, sensitivity = 0.01 nT, calibrated at Meanbrook, Alberta test site;

Differential GPS used to recover flight-path information.



Piper PA-31 Navajo aircraft

New data set is *spectacular!*

It is characterized by numerous anomalies, rich & contrasting magnetic fabrics that provide new insights into the geology, structure and mineral potential of the region.



Geological Setting



Geological Setting

Intrusive Suites



Geological Setting



Correlation of new magnetic data with surface geology



- In general, CC & NA magnetically subdued.
- QN, YTT, & SM are heterogenous with moderate to intense magnetic anomalies, some mafic volcanic units in SM are magnetically weak, UM typically generate intensely positive anomalies.
- Mapped faults readily imaged in new data many longer than previously recognized, potential 'new' structures and additional fault splays identified.

Permian mafic/ultramafic rocks in YTT

Intensely magnetic, more extensive than previously recognized





ULTRAMAFIC ROCKS



Correlation of new magnetic data with surface geology



The four main intrusive suites

- Characteristic magnetic signatures associated with each intrusive suite
- The Christmas Creek Stock and Glundebery Batholith are lithologically, magnetically and geochemically unique among the Mid Jurassic and Late Cretaceous suites, respectively;
- Tuya Volcanics, strongly magnetic, more extensive than previously recognized.

Late Triassic – Early Jurassic Suite

- magnetically heterogeneous
- moderate to intense anomalies
- margins typically more magnetic than cores
- highs associated with the more mafic, earlier phases which commonly include gabbros, hornblendites and pyroxene-hornblende ultramafites
- farther south, the Ni-PGEbearing Turnagain and Polaris ultramafic bodies are part of this suite





Mid Jurassic Suite

• magnetically, it is difficult to distinguish these intrusions from their host;

• Like CC, they typically generate weak, low-amplitude magnetic anomalies;

the Christmas Creek Stock is distinct in this suite – it is strongly magnetic and is also associated with elevated concentrations of Au, Sb, As, Cu and Mo in stream seds.
Contains several porphyrystyle Cu-Mo showings.



Creek

Mid Cretaceous Suite

 Cassiar Batholith parallels & is controlled by Cassiar Fault;

 spatial variations in the associated magnetic signature likely delineate areas dominated by contrasting magma sources;

 Highest anomaly values observed in the north where Pb and Zn concentrations are highest in the entire map sheet;

•LILE concs also elevated here (Ce, Rb, U)

 several strong magnetic linears observed within batholith may demarcate previously unrecognized structures within it.



Late Cretaceous Intrusions

•Most are generally felsic, in places garnet-bearing, and contain abundant metamorphic screens – all indications that they are melts of felsic crustal material. They are typically weakly magnetic and for the most part, homogeneously magnetized.

 Glundebery batholith is strongly magnetic with locally intense anomalies. Anomalous composition: Highly variable, mafic to felsic.

Ta, Sb, Zn, As, Hf, La, Lu, Mo, Sm, Tb, Yb & Zr concentrations are elevated in this body and Au is elevated in its western lobe. Contains Mo porphyry-type showings.



uva

Parale

Creek

Glundebery

Tuya Volcanics

Widely distributed, topographically controlled, little mineral potential;

Generate prominent magnetic anomalies, particularly in gradient images;

Magnetic data suggest some are reversely magnetized, i.e. not all same age;

Likely more extensive than previously recognized, i.e. many potential 'new' outcrops/subcrops.

CAUTION!





Magnetic fabric and structures in the Big Salmon Complex

Big Salmon stratigraphy

Quartzose clastics low response Jennings marker Mn-exhalite etc.

Mafic metatuff strong, variable magnetics



The Jennings River aeromagnetic survey 2006: a book of secrets revealed



Get your **FREE** copy of the data from 2 convenient web sites:

1. Geological Survey of Canada's Geoscience Data Repository:

www.gdr.nrcan.gc.ca

2. BC Ministry of Energy, Mines and Petroleum Resources's The Map Place:

www.em.gov.bc.ca/Mining/Geolsurv/MapPlace

Hard copy 1: 1:50,000 maps available at GSC sales offices (there's one right here!)

See paper by Miles et al. in Geological Fieldwork 2006 for more technical details

Have a happy and successful 2007 exploration season in Jennings River!