

## The Exploration Applications of Aeromagnetic Data to the WCSB North of 60°N

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### Abstract

Using high-resolution aeromagnetic data early in the exploration cycle should prove a cost-effective means of exploring in areas where little or no geological information is available. Since 1998, ~750,000km of high-resolution data have been collected north of 60°. This presentation will show the utility of aeromagnetic data to delineate a variety of geological structures with exploration significance.

Subsurface structures with significant (>1km) vertical displacement can be seen in the observed magnetic field. Examples of this type of structure are seen in the Norman Wells, Colville Hills, and Peel Plain areas. Magnetic anomalies can be correlated to Proterozoic structures and sediments identified by seismic data.

Where strongly magnetic Pre-Cambrian basement rocks are less than 1000m below surface, this allows for high-resolution imaging of structures. Faults mapped seismically can be correlated with linear magnetic anomalies evident in aeromagnetic data. Dykes of the Mackenzie igneous event provide strong magnetic anomalies that act as markers for determining subsequent fault deformation along structures. By combining magnetic, seismic, and well data it is possible to extrapolate fault systems far beyond the limits of the seismic coverage.

Outcropping sedimentary units produce mappable magnetic anomalies that outline major structures. Anomalies broadly correlate to formational contacts, and as such may be used to predict surface outcrop patterns. Combining data from these 'magnetostratigraphic' markers with detailed topographic models allows for the production of structure contour maps. This technique adds valuable information about the geographic position of structural closures, geometry of the fold structures, and the presence of possible faulting.