

It's Not Your Fault



You just didn't have the right prescription.

In these days of risk-oriented exploration, we need all the help we can get. Aeromagnetic data helps you see faults and other geological structures that are not detected by seismic alone.

Look for Aeromagnetic data for most of the WCSB already acquired, processed and available at GEDCO.

Look to GEDCO to Brighten Your Prospects

**GEDCO will be at the I.C.E 2004 Joint Conference
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How Aeromagnetic Data can Benefit the Working Geologist

GEDCO, Emily Duncan, Lisa Griffith, John W. Peirce and Serguei Goussev

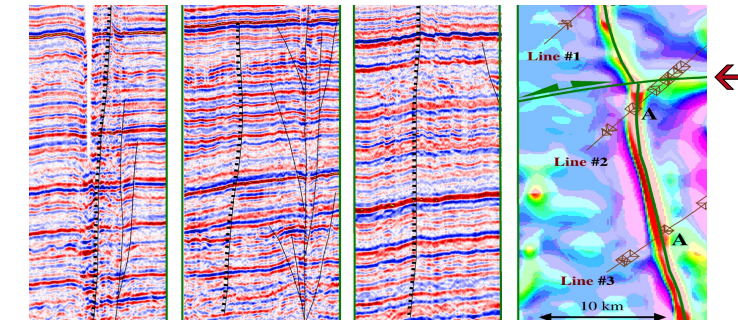
As technology in exploration continues to push the envelope in determining acceptable risk, the new interpretation mandate requires a more integrated approach to geoscience. We are all familiar with the term 'magnetism', but how many of us understand why it is beneficial to integrate magnetic data with our everyday exploration tools of seismic and well control? Aeromagnetic data, in particular, is one of the most underutilized but available data types in the oil and gas industry.

In our industry, creativity, risk mitigation, and technical insights give the explorationist a competitive edge in identifying drillable prospects. We are innovative by combining new and old technologies to stimulate progressive ideas. The oldest method of geophysical exploration, magnetic surveying, has traditionally been employed at the initial stages of basin exploration. It is still applied in determining the depth to basement, in mapping faults on a regional scale (the same ones that affect the overlying sediment), in defining possible trapping mechanisms, and in understanding regional migratory pathways and thermal maturity*. Magnetic data has remained the most widely used geophysical method* in terms of line kilometers surveyed annually due to its cost effective utility.

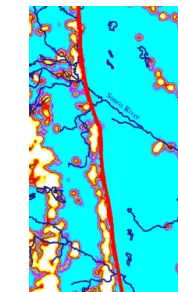
However, it is not widely understood that magnetic data can also be integrated with the prospect generation workflow for reservoir, trap and seal prediction in ways that seismic cannot. To realize these benefits of magnetic data, we first require data that has a much finer resolution than what is available from the government. The advent of High Resolution Aeromagnetic (HRAM) fills this requirement by flying the plane with the magnetometer close to the ground on tight line spacing resulting in superior resolution. Secondly, experienced geophysicists must interpret the data. With interpreted HRAM data, structural grain (fault networks) on a regional scale (100 Twps) can be more accurately mapped as the data images the basement and the sedimentary section.

Where seismic alone is insufficient, the addition of HRAM allows the working geologist to: map simple normal faults offsetting a formation with very high mafic mineral content (e.g. Bad Heart); resolve buried Pleistocene river channels filled with high magnetic susceptibility gravel; predict trends of reef systems and/or paleo-shorelines as they initiate and stack on basement discontinuities; identify ancient river systems

that often follow old faults; map wrench faults that are difficult to image seismically due to their limited vertical displacement; and correlate faults on sparse 2D seismic sets because one can trace the faults that show up magnetically between the seismic lines. The regional significance of faulting at different depth intervals in the sediment is not easily seen by seismic due to its limited areal extent, but can be mapped in detail using MaFIC™, GEDCO's in-house 3D mapping technology.



A lateral fault is detected in the seismic data. However, when HRAM is added, you can detect a wrench fault, not visible with seismic alone.



Using MaFIC, we can map out the fault at depth in detail and interpret it.

A fully integrated approach is mandatory in these days of risk-oriented exploration. Magnetic data is a great exploratory tool on the regional scale, and High Resolution Aeromagnetic data is key in defining sedimentary characteristics that seismic is incapable of providing as HRAM is very effective at providing a framework for correlating seismic. It is also an economic addition to a seismic planning strategy to ensure that a seismic budget is spent wisely. Most of the Western Canadian Sedimentary Basin has HRAM data coverage already acquired, processed and available at GEDCO...so use our advantage to Brighten Your Prospects.

** Suggested reading*

Dobrin, M.B. and C.H. Savit: "Introduction to Geophysical Prospecting Fourth Edition," McGraw-Hill, Inc, Toronto, 1988.
Paterson, J.R., and C.V. Reeves: Applications of Gravity and Magnetic Surveys: The State-of-the-Art in 1985, *Geophysics*, **50**, pp. 2558-2594, 1985.

Pawlowski, R.: Integration of Gravity and Magnetic Methods in the Risk-weighted Exploration Decision Process: Basin Reconnaissance, pp.6, in R.I. Gibson and P.S. Millegan (ed.), *Geologic Applications of Gravity and Magnetics: Case Histories*, SEG Geophysical References Series, No.8, SEG, Tulsa, 1998.

