Computation of magnetic anomalies caused by two dimensional structures of arbitrary shape: new formula and Matlab implementation

<u>D Hnatyshin</u>[a], V Kravchinsky[b], and W Alemie[b]

[a] *Earth and Atmospheric Sciences, University of Alberta, AB, Canada*
[b] Department of Physics, *University of Alberta, AB, Canada*

Talwani and Heirtzler (1964) were first to suggest a numerical technique of forward modelling for a uniformly magnetized 2D body approximated by a polygonal prism to develop a computer program for such modeling. The detailed derivation of this classical approach have never been shown. Therefore, we decided to re-derive the formula, and obtained a different result. The result of our derivations was implemented to the Matlab software.

User friendly computer programs can be used to great effect in the geosciences for both data analysis and teaching purposes. However, often the programs required for a specific application may be difficult to use, expensive, or do not even exist at all. For example, there is no free and user friendly program in the earth science community for modeling magnetic object effects on the subsurface. To remedy this we developed such a program.

In this talk I focus on the following aspects:

- How do magnetic anomalies arise (i.e. what is the basic physics).
- How do we determine the cause of an anomaly (i.e. what are the geologic interpretations).
- How does our new program work.

What are my opinions on creating and using geoscience programs

Talwani, M., and Heirzler, J.R., 1964, Computation of magnetic anomalies caused by two dimensional structures of arbitrary shape. *In* Parks, G. A. (Ed.): "Computers in the Mineral Industry". Stanford University Press, Stanford.

Corresponding author: dh10@ualberta.ca