

Western Newfoundland Aeromagnetic Data and the Potential of Self-Organizing Maps

Angela Carter-McAuslan

Memorial University of Newfoundland

acartermcauslan@mun.ca

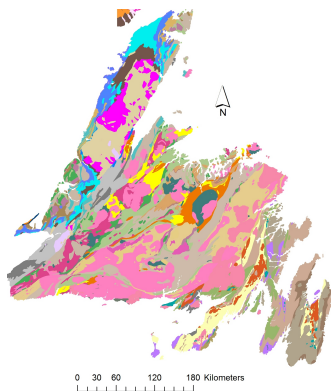
October 22, 2013

Overview

- 1 Introduction and Goals
- 2 Magnetic Data for Western Newfoundland
- 3 Self-Organizing Maps
 - SOMs in Geoscience

Impetus

- New data sets collected by Nalcor, GSC and NL Geological Survey
- Interest in oil potential in strike-slip basins adjacent to the Cabot Fault
- Interest in application of automated interpretation techniques

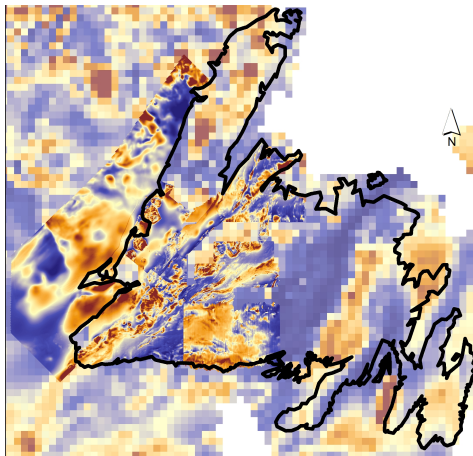


Goals

- 1) Interpretation of the available geophysical data for western Newfoundland particularly in the region of the Cabot fault and off-shore between the available seismic lines and areas of on-shore mapping

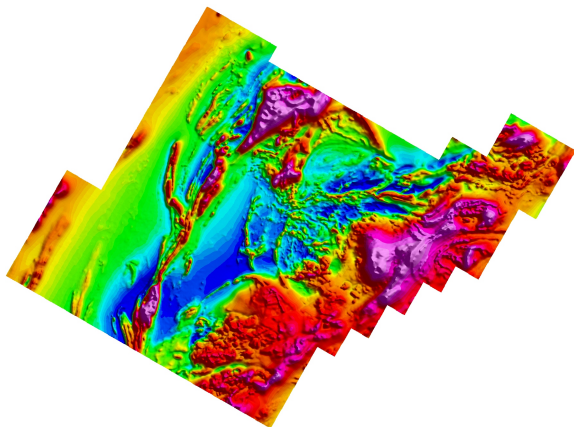
- 2) Investigate the effectiveness of the self-organizing map technique for the automated interpretation and classification of regional datasets

Compilation



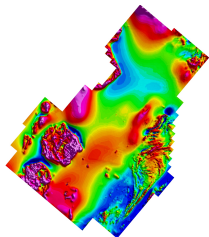
Magnetics

New Data - 2007

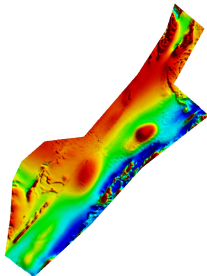


Baie Verte Magnetic Survey

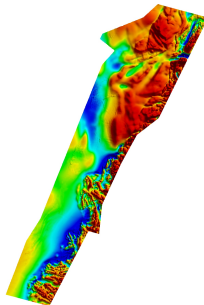
New Data - 2008/2009



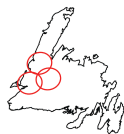
Corner Brook



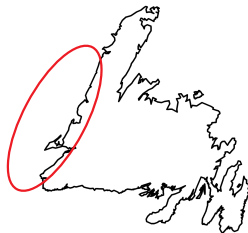
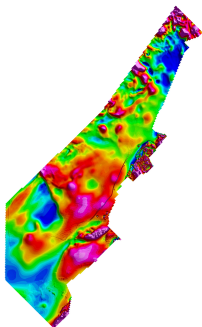
Deer Lake



Gros Morne

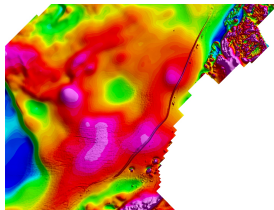


New Data - 2012

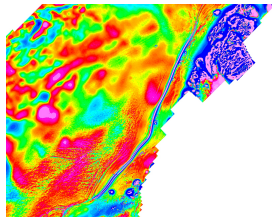


Off-Shore Western Newfoundland

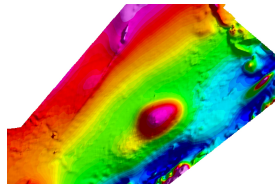
Some Interesting Anomalies



Donut Anomaly
Anomaly



Odd Twins
Anomaly



Deer Lake Basin
Anomaly

What are Self-Organizing Maps?

- Developed by Kohonen in the 1980s
- A unsupervised neural networking algorithm
- Used for clustering and classification



Neurocomputing 21 (1998) 1–6

NEUROCOMPUTING

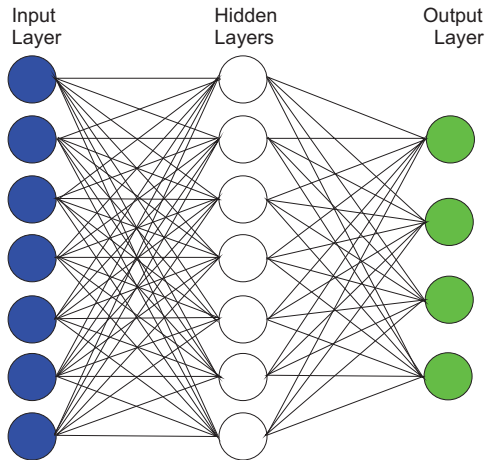
The self-organizing map

Teuvo Kohonen

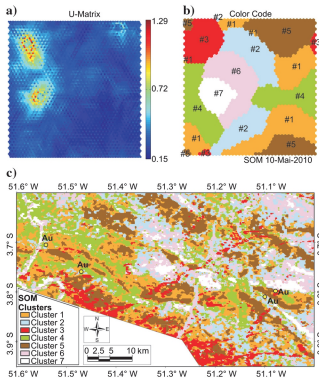
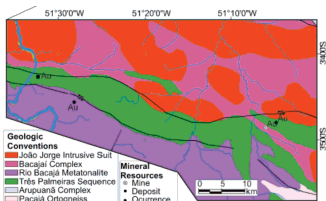
Helsinki University of Technology, Neural Networks Research Centre, P.O. Box 2200, FIN-02015 HUT, Finland

Accepted 26 May 1998

What are Self-Organizing Maps?

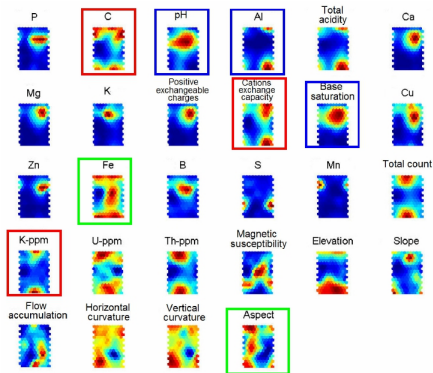


Carneiro et al., 2012



Semiautomated geologic mapping using self-organizing maps and airborne geophysics in the Brazilian Amazon

Iwashita et al., 2011



Using Self-Organizing Maps to Analyze High-Dimensional Geochemistry Data
across Parana, Brazil

How I plan to use Self-Organizing Maps

- Application of SOMs to regional scale, survey scale and along a profile
- Application of SOMs to diverse datasets