

Electromagnetic induction study of the Kapuskasing Structural Zone using an array of magnetic variometers

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As part of the Canadian Lithoprobe Phase I project, a large-scale electromagnetic induction investigation has been carried out over the Kapuskasing Structural Zone (KSZ) in Northern Ontario using an array of 30 magnetic variometers (Fig. 1). The instruments recorded three components of geomagnetic field fluctuation for an 8 week period in July and August, 1984. Analysis of the data, which primarily involves comparisons of simultaneously recorded fluctuations between stations, has led to the following observations and tentative conclusions:

(1) The magnetograms reveal a general uniformity of response across the area, suggesting that the conductivity contrast between the KSZ high grade metamorphic rocks of lower crustal origin and the surrounding greenstone-granite terrain is relatively low.

(2) Indications of an anomalous response in the immediate vicinity of the Ivanhoe Lake Cataclastic Zone (ILCZ), primarily from comparisons of the Fourier transformed magnetic fluctuations at relatively high frequency, suggest that the ILCZ may be locally conductive.

(3) A strong response observed along the most northerly line of stations, which is coincident with the Highway 11 transportation corridor, is most likely due to electromagnetic induction and the concentration of electric currents in the buried trans-Canada gas pipeline.

Further interpretation will involve analysis of the recorded data over a wider frequency range, combined with induction arrow and numerical modelling techniques.

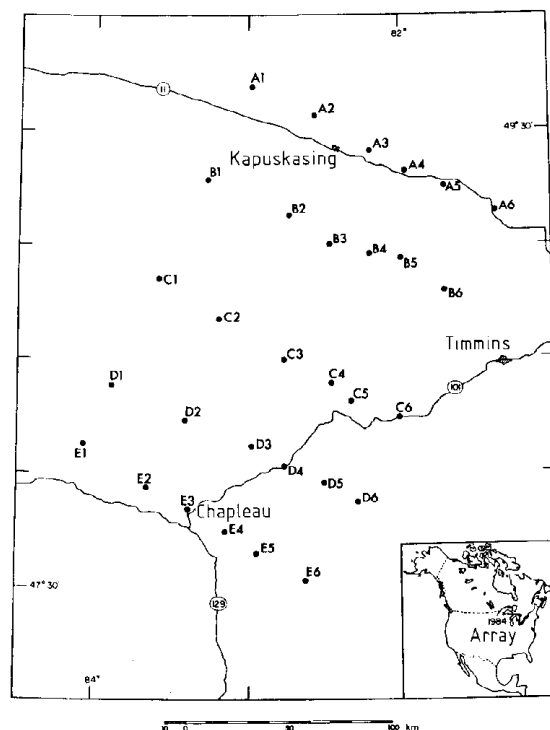


Fig 1 Map of the Kapuskasing magnetometer array showing station locations in relation to the highway network in north-central Ontario, Canada.