Canadian Association of Physicists | Association canadienne des physiciens et physiciennes

Contribution ID: **1779** Type: **CLOSED - Oral (Student, Not in Competition) / Orale (Étudiant(e), pas dans la compétition)**

WITHDRAWN - Accounting for the effect of Earth's rotation in magnetotelluric inference

Wednesday 31 May 2017 08:30 (15 minutes)

The study of geomagnetism has been documented as far back as 1722 (Graham) with increased interest at the end of the 19th century (Lamb, Schuster, Chapman, and Price). The Magnetotelluric Method was first introduced in the 1950's (Cagniard and Tikhonov), and, at its core, is simply a regression problem. The result of this method is a transfer function estimate which describes the earth's response to magnetic field variations. This estimate can then be used to infer the earth's subsurface structure; useful for applications such as natural resource exploration.

The statistical problem of estimating a transfer function between geomagnetic and induced current measurements has evolved since the 1950's due to a variety of problems: non-stationarity, outliers, and violation of Gaussian assumptions. To address some of these issues, robust regression methods (Chave and Thomson, 2004) and the remote reference method (Gambel, 1979) have been proposed. The current method provides reasonable estimates, but requires a large amount of data.

An examination of the correlation between geomagnetic and induced current measurements shows strong correlation between these series at offset frequencies such as one cycle per day. The current method does not incorporate this correlation information. This talk will discuss the results of incorporating this high correlation offset frequency information into the statistical model.

Authors: RIEGERT, David (Queen's University); Prof. THOMSON, David (Queens University)

Presenter: RIEGERT, David (Queen's University)

Session Classification: W1-2 DASP General Contributions II (DASP) | DPAE: contributions générales II (DPAE)

Track Classification: Atmospheric and Space Physics / Physique atmosphérique et de l'espace (DASP-DPAE)