

Electromagnetic Data Processing and Inversion Workshop

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When: Saturday 9th September (Full day) & Sunday 10th September (1/2 day practical)

Minimum Delegates: 20

Includes: Lunch, Tea/Coffee

COST: R2 950 (VAT incl.) [Special student rate: R1 100] (VAT incl.)

Presenter: James Macnae (Professor, RMIT University)



James Macnae grew up in South Africa, where he graduated with Bachelor's Degrees in Physics and Mathematics, with Honours in Geophysics. After 3 years as a field Geophysicist with Geoterrex, he moved to Canada and completed Masters and PhD degrees under the supervision of Gordon West. With Yves Lamontagne, his research on ground EM (the UTEM system) led to an award by the SEG of "Best Paper in Geophysics, 1984" with Gordon West. Since then Macnae has received two further best paper awards from the Australian Society of Exploration Geophysicists.

Macnae is the author or co-author of many other publications on EM. These include the theoretical "Physics of EM" paper with Gordon West and "Time Domain EM systems" with Misac Nabighian in the SEG volumes on Electromagnetics. Other papers are on ground, borehole and airborne EM acquisition, modelling and interpretation. Macnae has authored patents on Low Temperature Squid sensors and non-contacting ground and airborne electrodes.

After 15 years in Canada, Macnae moved to Australia and was part of the small team awarded the Cooperative Research Centre for Australian Mineral Exploration technologies. Since then, Macnae has

completed numerous research projects, including 7 collaborative projects through AMIRA. Program EMFlow developed by Macnae in the 1990's in the center was the first commercial software for the automatic transform of AEM data to stitched 1D conductivity-depth sections. The software remains in extensive use today. Since then he has been Professor of Geophysics at RMIT University, where he has worked on AEM software and developed fast approximations for AEM data processing in relation to 3D target interpretation and the extraction of Airborne Induced Polarization and Superparamagnetic effects. In 2015, Macnae was a Minerals and Energy finalist in the Australian Innovation Challenge for his work on the ARMIT EM sensor design. He continues to develop sensors for electromagnetic exploration, including low-frequency IP sensors, borehole, ground and airborne sensors, as well as novel GPR antennas for physical property mapping.

Macnae is a Gold Medallist of the Australian Society of Exploration Geophysicists.

The workshop will cover the following:

- Fundamentals of EM data processing from streamed data to final stacked data and windowed responses for modelling
- Examples of noise minimisation, s/n applications of the choice of sensor (E, B, dB/dT), transmitter base frequency, sample windows and their shape will be discussed
- A presentation and comparison of available modelling algorithms and software packages (to transform processed data into useful 3D physical property maps and sections)
- Fast approximate and formal inversion methodologies using stitched 1D, newly available 2D and 3D algorithms will be covered
- The half-day practical will provide tools to process streamed data; derive conductivity-depth and target geometry parameters for several example data sets.