

2nd International Salinity Forum

Workshop

Airborne Electromagnetics (AEM) for Groundwater and Salinity Mapping and Broader Natural Resource Management Applications

A review facilitated by the Academy of Sciences and the Academy of Technological Sciences and Engineering for the Natural Resource Management Ministerial Council in 2005 found that airborne geophysical techniques, combined with ground and borehole control, are important tools in understanding salinity and hydrology at depth at a variety of scales. The Review also concluded that the only broad acre, remote sensing technique that can detect and resolve salinity in the subsurface deeper than the root zone is electromagnetics (Spies & Woodgate, 2005).

Internationally, airborne electromagnetic (AEM) surveys have been successful in aiding a broad range of natural resource management projects in Africa, South America, China and Europe. In Australia, appropriately designed and interpreted AEM-based products have proven important to salinity management through contributions to design of salt interception schemes, the location of water storage facilities, the development of saline groundwater disposal options, informing irrigation re-zoning, mapping and predicting salinity risk in floodplain environments, mapping salt water intrusion, and for underpinning strategies to target environmental water flows for sustaining floodplain biodiversity. Airborne surveys have also been used to map fresh groundwater resources.

AEM instruments are flown by specialist contractors highly experienced in the acquisition of AEM data in a range of environments. A high level of expertise is required to translate the conductivity data to a suite of products relevant to groundwater and salinity mapping and other natural resource management issues. This commonly requires a multidisciplinary approach with a team of geoscience specialists (eg geophysicists, geomorphologists and hydrogeologists).

In Australia, successful outcomes from the AEM surveys have been attributed to a high level of consultation between scientists, decision makers and local community groups at all stages in project design, implementation, product development and product delivery, communication and up-take.

This workshop is designed for a broad spectrum of NRM decision makers and scientists, farmers and local community members who are likely to use AEM-based products, who are interested in acquiring AEM surveys, or are likely to have some involvement in the use of AEM derived data products in the future.

The workshop will provide an overview of AEM technologies, survey strategies and design, calibration, validation and interpretation, and provide examples of the successful application of AEM for salinity and groundwater projects.

This workshop is free to full registrants of the 2nd International Salinity Forum, however those wishing to participate must register in advance. Those who are not registered for the conference but wish to participate, may do so by paying the one day conference registration fee.

Workshop Agenda

- 12.00 – 1.00pm** Registration and Lunch provided
- 1.00 – 1.10pm Welcome, OH&S Issues (*Tim Munday, Drue Edwards & Ken Lawrie*)
- 1.10 – 1.20pm Workshop goals (*Tim Munday, Drue Edwards & Ken Lawrie*)
- 1.20 – 1.40pm AEM technologies - How do they work and what is measured (*Andrew Fitzpatrick*)
- 1.40 – 2.10pm Calibration/Validation/models (inversions) - why and how (*Andrew Fitzpatrick/KP Tan*)
- 2.10 – 2.40pm Survey strategies, cost, scale and resolution (*Tim Munday/Ken Lawrie*)
- 2.40 – 3.10pm The “considered approach” - what to use and where; (with examples...). What to ask for from consultants. (*Ken Lawrie/ Tim Munday Drue Edwards*)
- 3.10 – 3.30pm** **Coffee/Tea**
- 3.30 – 4.30pm Applications – Case studies on the applied use of AEM data in natural resource management
- Murray-Darling Basin examples***
- Salinity and groundwater mapping- Lower Macquarie River (Scott Macaulay)*
- SIS- Loxton/Sunraysia (Tim Munday)*
- River Murray Corridor (Ken Lawrie/Drue Edwards)*
- Recharge modelling – Tintinara/Riverland (Tim Munday)*
- Lower Balonne, Qld (BRS/Andrew Fitzpatrick)*
- Saline groundwater disposal - Stockyard Plain/Mourquong (Andrew Fitzpatrick)*
- Honeysuckle Creek (BRS)*
- Irrigation systems (BRS/Tim Munday)*
- AEM vs in-river surveys (Andrew Fitzpatrick)*
- Other Australian examples***
- WA Palaeochannels (Tim Munday)*
- Salt water intrusion- Coffin Bay (Andrew Fitzpatrick)*
- Groundwater resources – Angas Bremer Plains (Andrew Fitzpatrick, Richard Cresswell/BRS)*
- International Case studies- salt water intrusion, salinity mapping, groundwater resources, baseline environmental studies (Ken Lawrie & Tim Munday)- Examples from Brazil, Africa, China, Europe and USA***
- 4.30 – 4.45pm** **Coffee /Tea break**
- 4.45 – 5.15pm Derived products from AEM and ancillary data – what do you need, and what is realistic? What ancillary datasets and information are required? (*Drue Edwards/Ken Lawrie/Tim Munday*)
- 5.15 – 5.45pm AEM and NRM - What are the research challenges? (*Ken Lawrie/Tim Munday*)
- 5.45 – 6.00pm A community perspective (*Glen Sutherland*)
- 6.00 – 6.25pm AEM Technologies and NRM. Tried, tested and relevant? Discussion – All
- 6.25 – 6.30pm Closing remarks (*Drue Edwards/Tim Munday/Ken Lawrie*)
- 6.30pm** Close- Wine and cheese poster session (Exhibition Hall)