

AEM surveys of Saline Water Interfaces

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Tidal encroachment in areas where groundwater extraction is high has the potential to cause significant damage to water resources. Electromagnetic surveys have been used to map saline incursions and time domain airborne electromagnetic surveys have potential to map the saline wedge in three dimensions. Four areas along the Pilbara coast were surveyed using TEMPEST airborne electromagnetic system to evaluate the potential for groundwater exploitation. As part of this study the saline interface was interpreted to evaluate potential saline incursion into the alluvial aquifers.

The results illustrate the difficulties using EM to map the saline incursion along a regressive coastline. The results show that the nature of the interface depends upon the evolution of the shoreline. Regressing shorelines have different saltwater freshwater interfaces to those of transgressing and static shorelines. The electromagnetic response of clay rich sediments in palaeo-lagoonal sediments has an electromagnetic response similar to that interpreted as due to the wedge of seawater along the coast. Other data such as digital terrain, airborne radiometrics and satellite data should be used to interpret the regolith type in order to distinguish the clay rich lagoon sediments from salt water in more sandy aquifers along the coast.