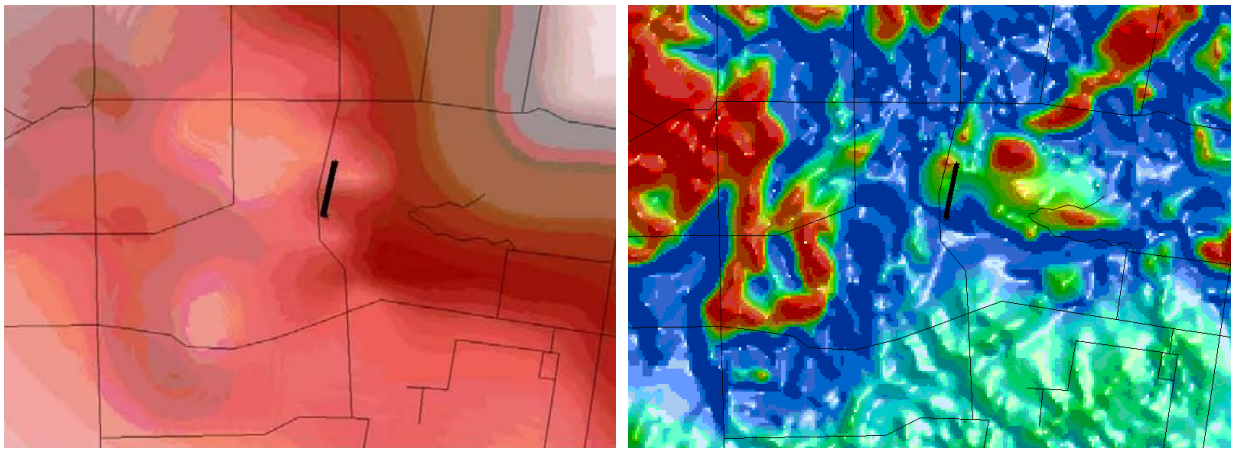
## Case Study – Groundwater Mapping

### *Introduction*

A terraTEM survey was completed on the western flank of Mt. Major, Dookie, Victoria, Australia, for the purpose of defining a fault-confined aquifer system. The survey was completed on cleared farming land with gently undulating terrain. The profile extended for 875 metres and utilised a 50 x 50 metre coincident loop configuration.

For comparative purposes data was also recorded on a SIROTEM Mk3 system. While transmitter parameters were consistent the main difference between the two systems was the receiver bandwidth.

There are transmission towers in close proximately to the site (see previous photograph), making this site hostile to TEM data collection. The site had the advantage of having extensive data sets available over it from the Geological Survey of Victoria, including gravity and aeromagnetic data (see below), with some borehole information. The heavy



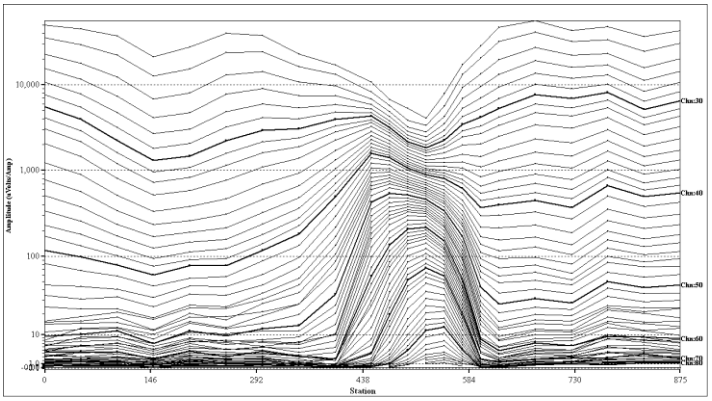
***Gravity Data over the Site*** ***Aeromagnetic Data over the Site***

black line indicates the profile location.

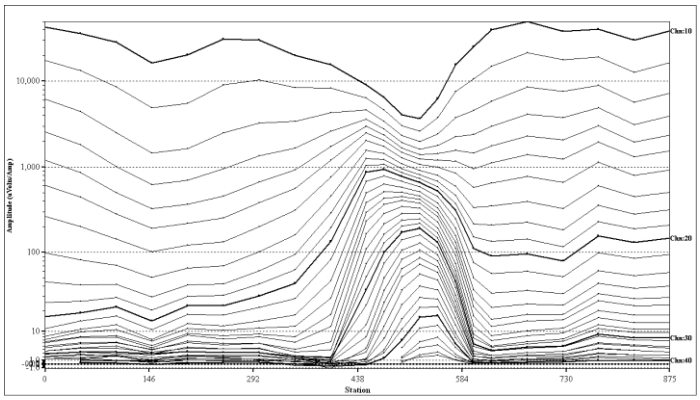
Data was collected from the terraTEM survey and displayed using the in-build data processing software package. The data provides clear evidence of a confined conductor situated between 400 and 600 metres. The high acquisition rate (2 µs) combined with customised time series allow significant detail to be extracted from individual soundings when compared to a SIROTEM Mk3 system. Multiple pre-defined time series specific for the terraTEM are available depending on the application. However, an experienced operator can create their own time series or select time series available on other TEM systems.

Noise levels in both systems are comparable. A significant improvement in acquisition time was obtained over the SIROTEM Mk3 as the 500 kHz acquisition rate of the terraTEM is achieved without interleaving. In contrast, SIROTEM Mk3 does interleave when the High Resolution time series is selected (bandwidth is 67 kHz).

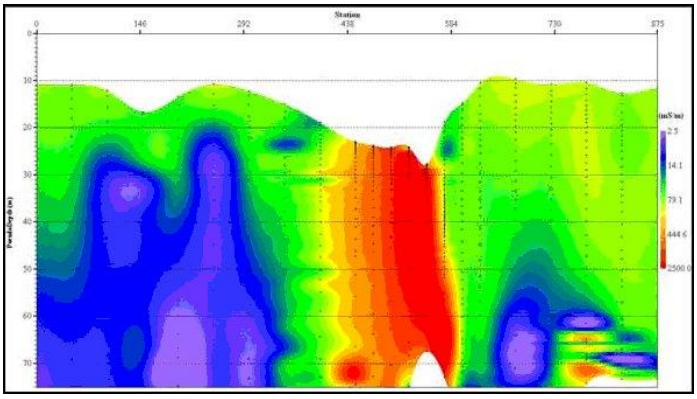
## *Comparing terraTEM against Sirotem Data*



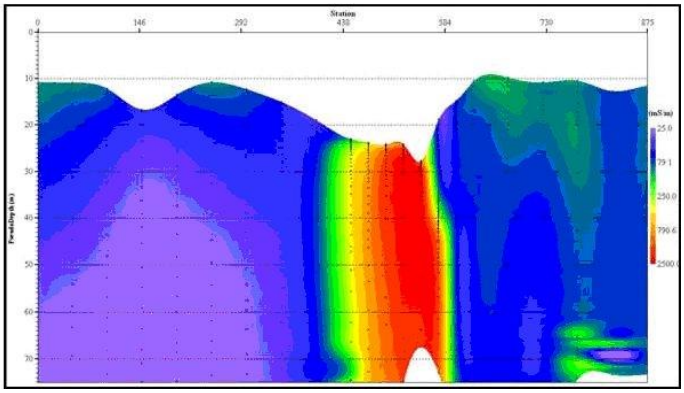
***terraTEM Data over the Mt. Major Site (Amplitude Profile)***



***Sirotem Data over the Mt. Major Site (Amplitude Profile)***



***terraTEM Apparent Conductivity Section Derived from Data Above (note high resolution)***



***SIROTEM Apparent Conductivity Section Derived from Data Above***

## *Summary*

The terraTEM EM system provides a very high resolution dataset that is eminently suitable for a variety of applications including ground water, near surface investigations, mineral exploration and borehole surveying.

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