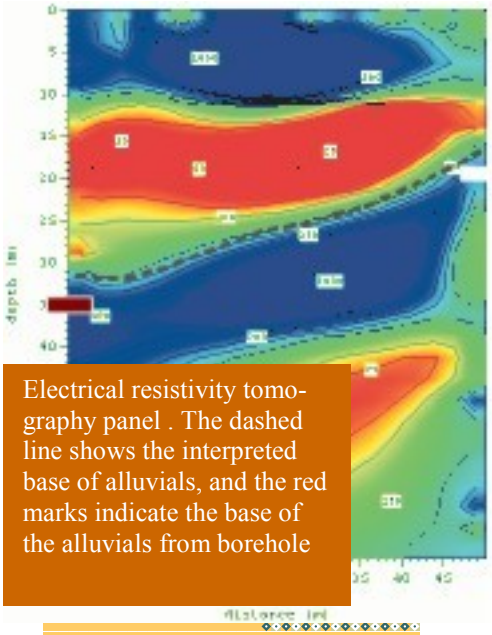
Application Note

In Mine Geophysics



Electrical resistivity tomography panel . The dashed line shows the interpreted base of alluvials, and the red marks indicate the base of the alluvials from borehole

CLEAR SUBSURFACE IMAGES

This project was using ERI to map an iron ore prospect. The deposit is pisolitic which can exceed 40 m in thickness, and is overlain by up to 40 m of alluvium. The alluvial deposit grades into the ore zone of clay/pisolite at depths of 40 – 60 m. The objective of the resistivity imaging was to map out the top boundary of the ore package in order to track areas where a major alluvial channel has eroded into this.

The resistivity methods were:

Surface electrical resistivity imaging to track the alluvial channel

Crosshole electrical resistivity tomography (ERT) also to track the alluvial channel

Data aquisition

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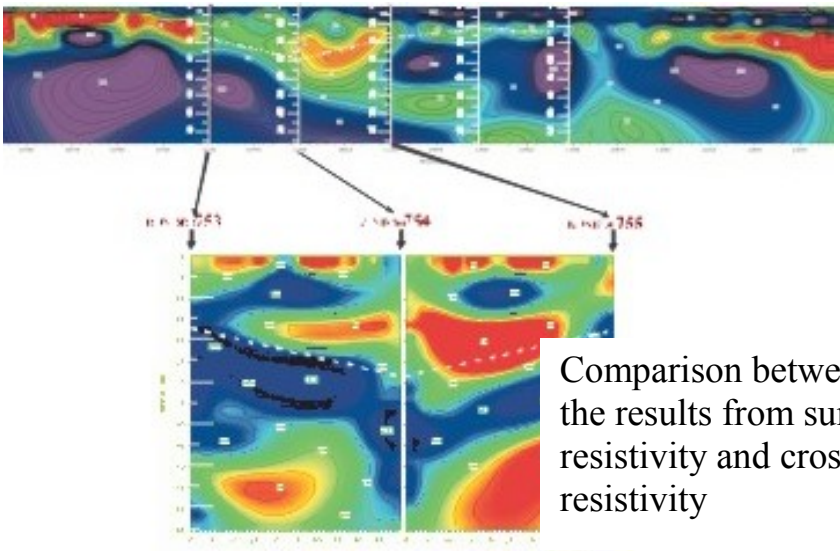
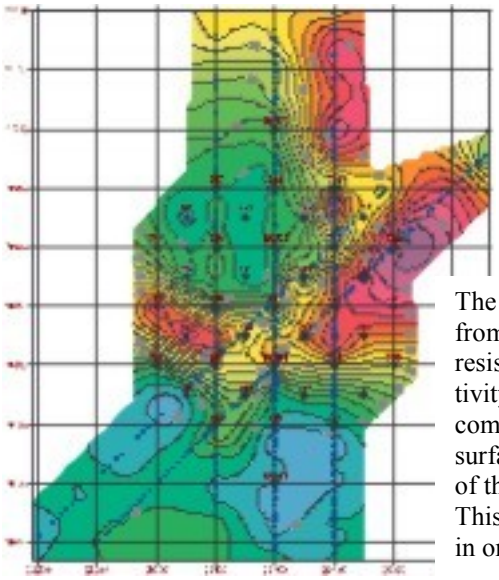


Comparison between the results from surface resistivity and crosshole resistivity

Application Note p2

There were multiple surface resistivity profiles. These lines gave cross-sectional images to a depth of approximately 70 m.

The note also shows cross-hole Electrical Resistivity Tomography (ERT) using boreholes on these lines. This gave a direct comparison between surface and cross-hole ERT for different borehole configurations.



The resistive ore zone (typically hundreds to a few thousand Ohm.m) was overlain by conductive alluvial, and underlain by progressively more conductive ore/clay waste.

The interpretations from the surface resistivity and resistivity tomography is combined into a 3D surface of the base of the alluvials. This data can help in ore volume

Data aquisition

There was good correlation between surface and cross-hole ERT.
It was possible to map the alluvial boundary very precisely, sometimes to 1 – 2 metres resolution.

A large area could be efficiently and cost effectively covered in a short time by using electrode configurations which concentrate in the zone of interest.

Surface resistivity imaging is a fast and cost effective alternative to extensive in mine drilling. Crosshole resistivity data can compliment either surface resistivity and/or existing boreholes to clarify more complex areas.

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