perfiles

…YOUR GEOPHYSICAL NESLETTER

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Induced polarization - resistivity – spontaneous potential – magnetometry – electromagnetics - seismics – well-logging
MINING – GROUNDWATER – ENGINEERING - ARCHAEOLOGY

¡CHEERS!

Welcome to our May 2005 *Perfiles.* We are pleased to see all the work Dr. Loke has done in the development and improvements of 3D modeling of IP and Resistivity. We have spent time in testing and discussions for the improvement of these techniques, which are providing more reliable results every day. In 2002 we started these 3D modeling techniques with very favorable results since the beginning. It is clear that time proved us right and we are proud to have marked the steps to follow in the application of at least some geophysical applications.

José R. Arce

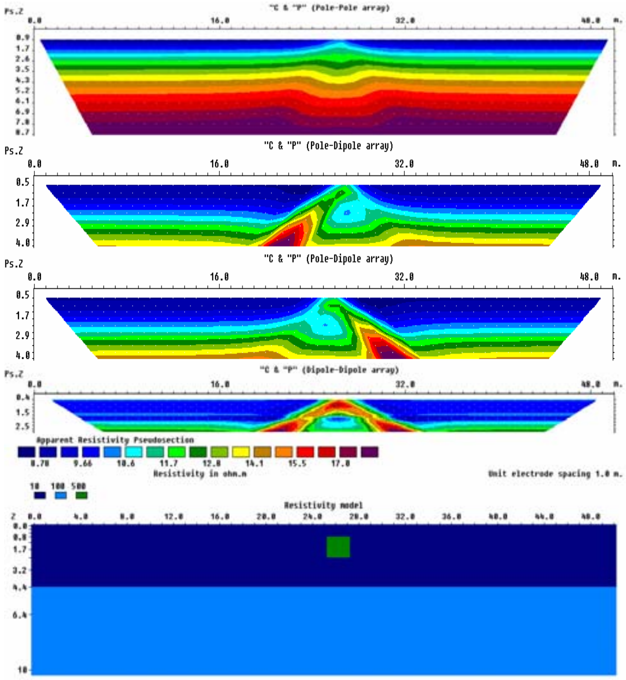
INSTRUMENTS

Just as we mentioned in previous editions of *Perfiles*, our Scintrex Navmag magnetometer with a cesium vapor sensor was scheduled to arrive to Perú on March 2005. We are pleased to announce that this state-of-the-art instrument is already here, and it has the highest possible resolution for magnetometry (0.001 nT), due to its advanced sensor technology, only available to airborne surveys in the past. This instrument also has an internal GPS and a color graphics screen, which allows our operator to view his advance over a typical color Autocad map.

“P” & “C” EFFECTS

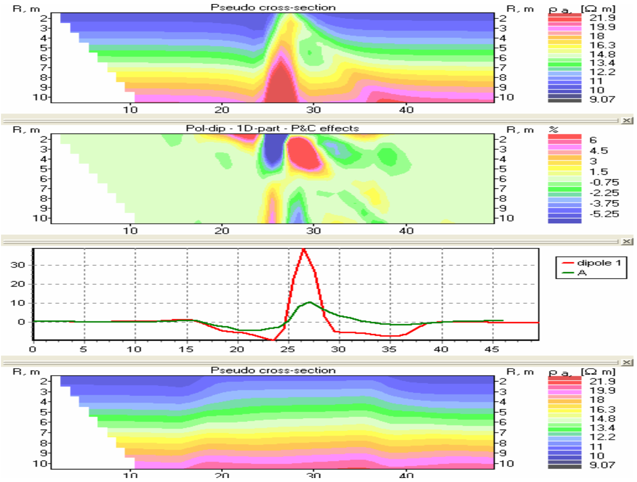
One of the biggest problems in IP/Resistivity is field data qualification and analysis. Our last generation high-impedance Elrec Pro IP receivers can obtain high quality measurements under adverse conditions, but even this technology may encounter irregularities. This is why it is extremely important to make appropriate data analysis of the Resistivity readings, as well as of the IP decay curves. We strongly emphasize the use of electrode arrays with high signal to noise ratios, just as we analyzed in our February 2005 issue of *Perfiles*.

Many of you probably remember that old pseudo-sections of apparent field readings commonly showed 45 and 90 degree “contacts”. Since plotting of these “false” sections is done at 45 degrees, it is obvious that this could not be a coincidence. There are two main causes of these “contacts”. The first one is when an electrode arrives in an area of high contact resistance which may not be improved, generating a Resistivity or Chargeability “anomaly”. The second is when an electrode set encounters small and shallow resistive masses. When these distortions are vertical, they are known as “P” effects and when at 45 degrees, “C” effects. The following images show the effects of a shallow 500 ohm-m block in a conductive overburden (20 ohm-m) and overlaying a resistive layer with 100 ohm-meters. The synthetic pseudo-sections represent from top to bottom the following arrays: Pole-Pole, Pole-Dipole, Pole-Dipole reverse and Dipole-Dipole. The last section is the model used for this exercise. Pole-Pole shows the least effect of shallow inhomegeneities, while Pole-Dipole shows a 45 degree response pointing in the direction of surveying, and dipole-dipole shows a double 45 degree effect.



“P” and “C” effects do not permit correct modeling of deeper anomalies, so they need to be carefully selected and eliminated. All our IP/Resistivity surveys are analyzed to eliminate these influences prior to 2D and 3D modeling. This is one of various pre-modeling techniques we employ for data quality control to assure a higher quality 3D model.

The “P” and “C” effect elimination procedure starts with the pseudo-section (top image), following by the removal of “P” and “C” distortions, and finally arriving to the correct pseudo-section (bottom image) which will then allow improved modeling.



Until next time…