perfiles

...YOUR GEOPHYSICAL NEWSLETTER

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induced polarization-resistivity–self potential–magnetics–gravity-radiometrics-electromagnetics-seismics–downhole
MINING – GROUNDWATER – ENGINEERING - ARCHAEOLOGY

CHEERS!

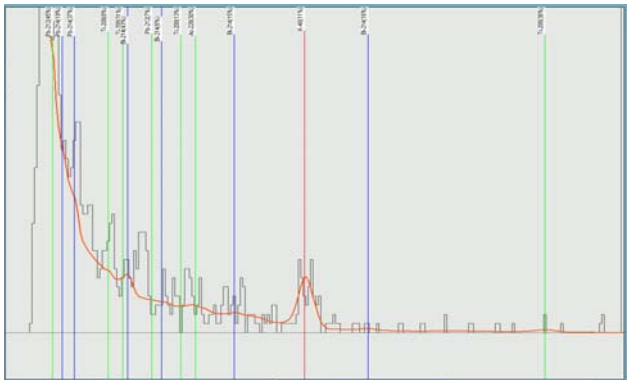
Welcome to our August edition of *Perfiles*. For the last several years we have been doing geophysical surveys targeting karst cavities in rocks, using a combination of geophysical methods. We would like to present you in this occasion with some of these applications, which were practically impossible to do with the technology available until a few years ago.

José R. Arce

NEW INSTRUMENTS

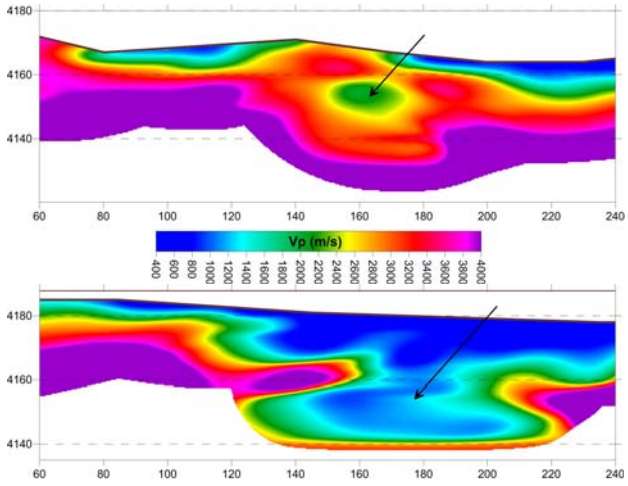
In our May 2009 edition of *Perfiles*, we mentioned that we had placed the order for a new natural gamma radiation spectrometer from Pico Envirotec, a Toronto-based manufacturer of geophysical instrumentation. We would like to announce that this instrument is now in our Lima office, and with a few simple modifications to the software we have requested from the manufacturer, we should be able to offer this new service very soon. With this new instrument we complete our suite of potential field methods for mining and engineering geophysical applications.

To select an appropriate data processing, analysis and modeling software, we investigated all currently available options and chose Praga 4, developed by the Australian company Spectronica, which is the most renowned option for ground and airborne radiometrics surveys. Even though this new instrument provides direct output measurements of potassium (%), uranium (ppm) and thorium (ppm) concentrations, with Praga we have an additional suite of processing algorithms to identify more natural and artificial elements.

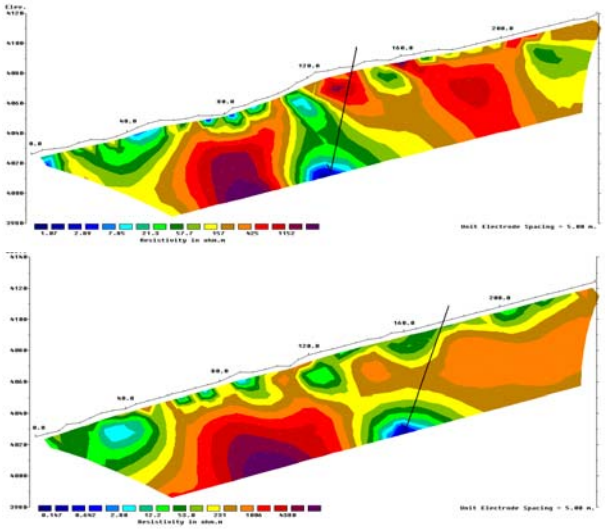


GEOPHYSICAL SURVEYS FOR KARST AND VOIDS

One of the most challenging applications in engineering geophysics is the proper identification of karst dissolution void spaces in rocks. To detect these targets we employ a combination of seismic (P-wave velocity) and electrical (galvanic resistivity) tomography. The examples shown next are models of seismic refraction tomography in hard rocks where we detected old unknown mine workings, in an area were our client suspected there were several abandoned tunnels and shafts, with no maps to locate them. The arrows show the location of these air spaces, which were confirmed afterwards with drilling as abandoned mine workings.



The following 2D resistivity tomography models were obtained in an area for a projected tailings dam location, with a possibility of finding saturated caverns. These are clearly shown in these examples.



Both methods had satisfactory results with a high degree of precision, but we must mention resistivity had better results in saturated caverns.

Until next time...

Av. Petit Thouars 4380, Miraflores, Lima 18, Perú. T(51-1)4227205/2215406, F(51-1)4426946.
perfiles@geofisicos.com.pe http://www.geofisicos.com