

### CHEERS!

We have started this year with a very fast paced workload. We are currently operating five simultaneous field crews, which will probably continue until the end of April. Mining exploration, engineering studies and groundwater exploration are mainly related to exploration and mine expansion programs. We think the introduction of 2D and 3D electrical and seismic eikonal tomography back in 2002 has been a crucial part of our continuous expansion in the last years. The improvements we have pursued and obtained in geophysical data processing with renowned scientists like Dr. M.H. Loke, creator of the Res2dinv & Res3dinv packages we use in IP/Resistivity, have been of utmost importance.

We are very pleased to know that some of our local and foreign competitors are considering using the same software packages Arce Geofísicos uses for data processing, instead of other alternatives, as we are satisfied to know that they value and follow our work and results.

*José R. Arce*

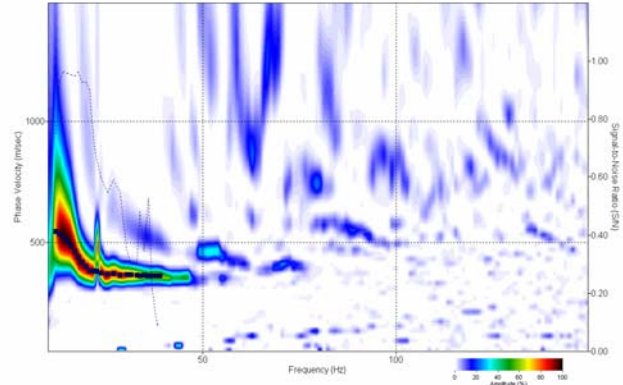
### NEW INSTRUMENTS

In January we received our new TDS Ranger 300X data collector, to be used together with our Trimble AGPS 114 Omnistar receiver antenna, which was solely dedicated to work with our Scintrex SM-5 Navmag cesium vapor magnetometer. The Ranger 300X uses the Solo Field software, developed by TDS, a subsidiary of Trimble Navigation, and allows us to navigate in a color graphics environment through the use of images or Autocad maps. This new accessory in our range of field instruments will allow us to perform line staking and mapping for geophysical applications with sub metric precision, in terrain with good GPS signal strength.

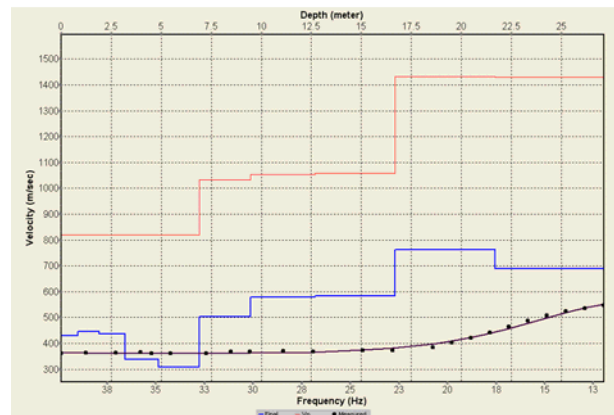
### MASW

Probably the most state-of-the-art method in geophysical applications is the MASW or SASW, which stand for Multichannel Analysis of Surface Waves or Spectral Analysis of Surface Waves. This method was originally developed by the Kansas University researchers and was introduced commercially about two years ago. We have been using this technique since June 2005. The main requirements for MASW that differ from standard seismic tomography are the lower frequency geophones (4.5Hz) and one of the two commercial modeling software packages (Surfseis by Kansas University or Seisimager SW by Geometrics, both of which we own). The method obtains an inverted model of S wave velocities under a specific field location by analysis of surface (or Rayleigh) wave dispersion. This is possible because the surface waves have approximately 98% of S-wave component while under 2% of P-wave component. Another property of surface waves is that their phase velocity greatly decreases with increasing signal frequency. This is why most surface wave dispersion generally occurs between 5 and 30Hz. In the following

image, the surface wave was identified because of its amplitude (yellow-red) and its decrease of phase velocity with increasing frequency.



Once the surface wave signal has been correctly identified, as may be seen above with the small black squares marked within the high-amplitude signal, S-wave velocity modeling may be initiated. If P-wave tomography velocity information is available at the MASW station being surveyed, then we can include this information in the inversion process to obtain the results shown below, where the blue line shows the S-wave velocity, the red line is P-wave velocity and the black circles and line represent dispersion curve selection (see above graph) and model fit for the final iteration, respectively.



Having P and S-wave velocities readily available, we can quickly and accurately calculate elastic moduli factors (Poisson coefficient, shear modulus, Young modulus and bulk modulus). If we obtain densities for the various materials at the location where the MASW was performed, we can multiply all these factors by density to obtain the final elastic moduli. Also, if we have several contiguous MASW stations, we can perform a 2D inversion from individual 1D stations to obtain an S-wave velocity section as well as elastic moduli sections.

Until next time...

