

## **Integrated real time Multi-Parameter Borehole sensor system**

Cansun Guralp, Suleyman Tunc, and Oguz Ozel

Gaiacode, Dickers Farm, Silchester, Nr Reading, United Kingdom (cguralp@gaiacode.com)

Integrated real time Multi-Parameter Borehole sensor system

Construction and installation of multidisciplinary borehole seismic station at Gazikoy, Tekirdağ, TURKEY known as MARSite is described. Instrumentation installed within two side by side cased 150 meters' deep boreholes is detailed with instrument specification and performance.

Sensor systems near an active strike slip fault requires instrumentation to monitor strain, tilt and seismic signals over a very wide dynamic range. Results from a compact but integrated 200 db dynamic range encapsulating strong and weak motion instrumentation with frequency range from Earth tides to 150 Hz will be presented. The quality of the recorded seismic signals is compared to seismically "quietest" surface observatories.

The grouted cost effective strain meter design principles are provided. Results comparing strain measurements with that of Very Broad Band (VBB) borehole sensor and tilt meters with nano-radian sensitivity is presented. Calibration issues associated with strain measurements are discussed. Local and tele-seismic events recorded by the strain meter are compared to the calibrated broadband VBB sensor outputs.

The distributed real time strong and weak motion data can be used by engineering, seismological and geophysical communities. The advantages of multidisciplinary borehole observatory especially at seismically active locations are highlighted.