Getting It Perfect at OIINK

Gary Pavlis and Terry Stigall of Indiana University are proud of their geophysics students. The students were helping them to deploy some new direct-burial stations with Trillium broadband sensors for the OIINK project (a.k.a. SDYNAC, “Structure and Dynamics of the North American Craton”), and Terry directed them to get them perfectly level and lined up to north accurately. The students outdid themselves, and helped to make this a superb installation.

These students are from Gary Pavlis’ Applied Geophysics class. They spent a weekend installing stations for the OIINK project.

Clockwise from upper right: Tyler Merrell, Steven Downey, Crystal Wespestad, and Brenden Fenerty.

Photographs courtesy Terry Stigall.

This research project, supported by the National Science Foundation, is playfully dubbed “OIINK” after its principal study area — the Ozarks, Illinois, Indiana, and Kentucky. The OIINK experiment includes a 3-D, broadband, passive seismic array centered over the depocenter of the Illinois Basin. The array was designed to provide enhanced station density of 3 to 1 relative to the Earthscope Transportable Array (TA). The design builds on the experience of the first major EarthScope Flexible Array (FA) experiment (SNEP, a.k.a. the Sierra Nevada EarthScope Project) that was set up in the southern Sierra Nevada.

Here, the students align the sensor to magnetic north. Terry Stigall writes “I love this photo. Gary’s geophysics students were determined to align the Trillium perfectly to north. They really took me seriously to get them perfectly level and lined up to north, and they set the declination on the Brunton correctly.”
Here are the condensed instructions for the OIINK team regarding direct burial posthole installations.

- Transport sensor in case or shipping box
- Pick site with drainage and some relief
- Auger hole so top of sensor is at least .5 meter from surface and there is at least 1.5 inches between wall and sensor for tamping
- Use some type of flexible drainage hose split to protect cable sensor cable from shovel blades when removing later
- Tamp bottom of hole to consolidate disturbed soil
- Add 2-3 inches of mortar quality sand and tamp
- Keep cable and sensor connectors clean and check for 2 O-rings, one in bottom of sensor connector and one on plug end of cable to sensor and hand tighten
- Connect cable to sensor before lowering in hole
- Place sensor, lowering in with hook, rotate and check for alignment
- Push down on top of sensor to set feet and compress in to sand, check level with bubble level and remove before burying
- Its best to use "local" material for filling in and tamping around sensor but this is in debate as some want to use sand. The problem I experienced is it become the preferred place for water drainage
- Only tamp material top of sensor, connect and try to relevel with DAS before completely burying sensor
- After successfully testing sensor operation, finish burying sensor, push cable down into loose coil as burying but not tamping!
- Top 2-3 inches of fill should be clay rich to discourage water draining through bore, mounding decreases diurnal thermal changes and sheds rain water, so not a bad thing!
- Use standard PIC best practices for rest of station...

Here, Indiana University student Xiaotao Yang tests the Trilliums and other equipment on the isolated pier before deployment in Kentucky.
Here, students Brenden Fenerty (L) and Tyler Merrell (R) program the ReTek RT-130 with recording parameters for the sensor deployment.

The Partners for OIINK include:

- Indiana Geological Survey
- Illinois State Geological Survey
- Indiana University
- Purdue University
- University of Illinois at Urbana-Champaign

With the increased interest in direct burial of posthole seismic sensors, the results of the OIINK project should prove both interesting and useful. PASSCAL wishes the project continued success.

Read more about OIINK on the project website, and in the OIINK newsletter. There is also an article on OIINK in the Fall 2012 edition of EarthScope's OnSite newsletter.

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