American Geophysical Union (AGU) Dec 13-17 in San Francisco

The AGU this year was the premier conference in the US for geophysicists, and it attracted over 18,000 participants. QuakeFinder was invited to present a paper at the AGU this year: **"Current progress in using multiple electromagnetic indicators to determine location, time, and magnitude of earthquakes in California and Peru".** In the talk, we showed there is a pre-earthquake pattern of magnetic pulsations (unipolar in shape), air conductivity changes, magnetic pulse "clusters" in the approximate direction of the future quake, and in some cases, infra red (IR) apparent night time heating as detected by the GOES weather satellite's IR cameras. These represent patterns that we are looking for in future quakes in California, Peru and Taiwan. QF also presented a poster, **"(Magnetic) Pulse Azimuth Clusters Possibly Associated with Earthquakes in California and Peru 2005-10"**.

The AGU Natural Hazards Session also had interesting papers on various electromagnetic indicators, observed prior to earthquakes by others in the international community. For example:

DEMETER satellite (French) has detected ion and electron density changes over a future earthquake (e.g. the M 7.0 quake on Jan. 12, 2010 in Haiti).

Magnetic signals were observed in Peru prior to the M8 quake in 2007 (Japan)

Models exist now that describe how electromagnetic signals may originate in the ground and propagate to the surface (Romania, Russia and USA).

VLF radio wave propagation was shown to change prior to earthquakes (Japan).

Integrating ground and satellite observations prior to earthquake (Case L'Aquila quake) (Italy)

Finally, a Multidisciplinary Approach for Earthquake Atmospheric Precursors was described (USA, Japan, Russia, Taiwan, Greece, etc.)

Processing IR images for earthquake precursors

We are collaborating with NASA JPL and Chapman University to get GOES, MODIS, and ASTER IR data, and we are just starting to process the GOES IR data ourselves in order to reduce the time to get and analyze the images. We have started receiving daily GOES images now, but need to "tie the pixels" to known ground locations (compensates for the camera which wobbles a bit at geosynchronous orbit), and we will also develop a cloud identifier to eliminate false positives caused by (cold) clouds passing over warm land masses.
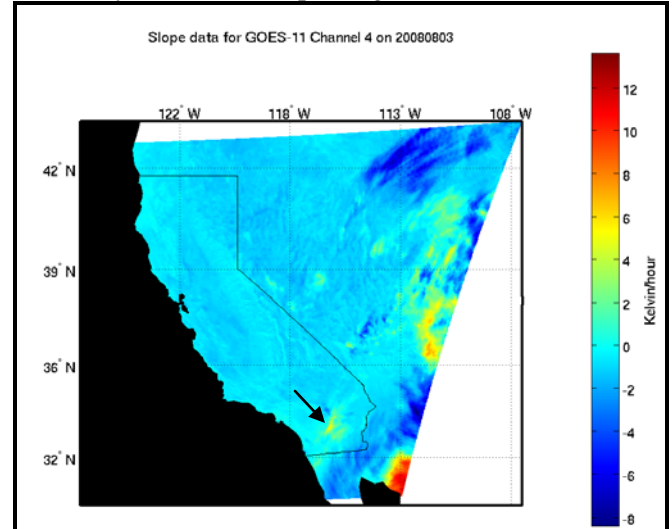
Example of GOES night time heating data (arrow)

Increasing our coverage area for earthquakes

Building magnetometer instruments is expensive today. QuakeFinder has been developing a lower cost unit which has both solar power and cell modem (3G) connectivity to the Internet. Below is a picture of the development unit under test in our lab. We hope to finish the first unit and deploy it to the field for testing in January. This development is essential to dramatically increase the instrument coverage in California (adding 30 new or replacement sites in 2011), and to expand into 10 new countries (2 units each). The system will be thoroughly tested first, and then installed at field sites in 1/4 the time it takes to install existing units.

Please visit our new website at www.quakefinder.com. If you have any questions, or comments, please contact Tom Bleier at tbleier@quakefinder.com