QUAKEFINDER

Leading the Quest for Quake Forecasting

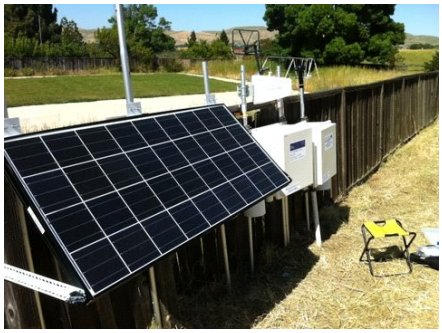
NEWSLETTER

Third Quarter, 2011

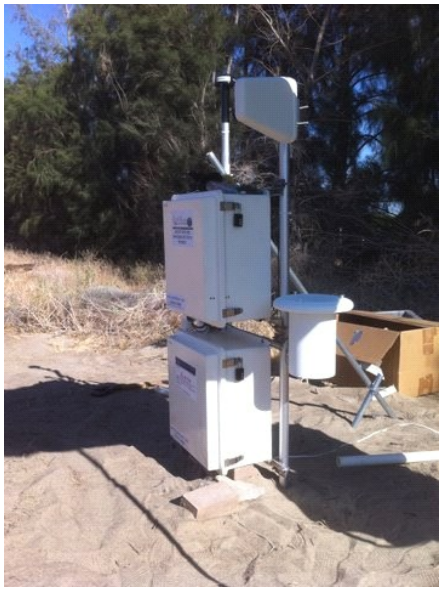
Recent Media Coverage

QuakeFinder has been fortunate to receive much media coverage in recent months. Here are several links to follow to read what others have reported about us. Note that much of the reporting is driven by the need for balance, and thus much weight is given to the skeptical view of USGS scientists.

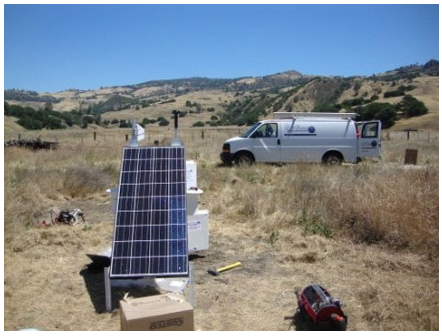
- Coverage on KRCB
- KCBS and KGO interviewswith QuakeFinder
- BayCitizen.org informs another article about QuakeFinder
- **Coverage of QuakeFinder on The New York Times**
- **Article on BayCitizen.org covers QuakeFinder**
- **NBC-LA covers QuakeFinder again!**
- **More coverage -- KNBC-LA interviews Tom Bleier**
- **Coverage of QuakeFinder on NBC Bay Area TV**
- **Perlman of the SF Chronicle writes about QuakeFinder: "Skepticism for claims of earthquake predictibility"**



Concord



Borrego Springs



San Ardo

Catch More Quakes: Network Expansion Progress

Our mission is to save lives by forecasting major earthquakes. To get there, we need to refine our understanding of how the signals we record relate to earthquakes. And the only way to do that is to record signals associated with more quakes. This means we need to have instruments in place when and where earthquakes occur. We are expanding our network as rapidly as we can so we can catch more quakes as soon as possible.

Since April, the QuakeFinder team has installed 30 of the 50 new instruments planned for 2011. The remaining 20 systems are being readied for shipping to overseas destinations.

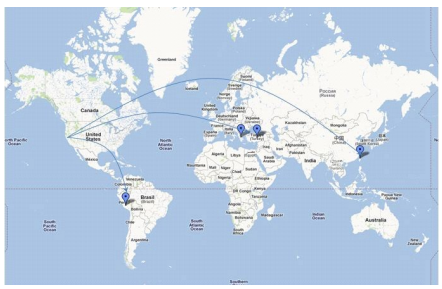
Our California goal of replacing 20 aging systems and installing 10 new sites is complete. But even with this upgrade, we are still well short of our goal of covering all the major faults in California with instruments every 20 miles or so. To do this will require an additional 150 systems at a cost of about $5 million dollars.

We are actively seeking corporate and individual sponsors to help fund completion of the California network. Contact Tom Bleier to discuss how you or your company can help: tbleier@quakefinder.com; 650-473-9870.

Travel the World: Expansion in South America, Asia, and Europe

During the next several weeks, QuakeFinder lead researcher Tom Bleier will rack up frequent flier miles as he makes three overseas trips to install new instruments on three continents. In late September he will travel to Peru to increase our installation there from two units to six. And there is the potential to expand this by two more if some expected outside support comes through. We were planning to install new sites in Chile as well, but the student unrest there has caused us to postpone those until next year.

In October, Bleier will re-visit Taiwan to expand QuakeFinder's footprint in Asia from two units to six. And November will find him in Europe, opening new



Where in the world is Thomas Bleier?

territory for us in Greece and Turkey.

The common denominator among these locations is frequency of earthquakes. In order to capture as much useful data as possible as soon as possible, we must go where the quakes are. By expanding the number of countries in which we have a presence, we also intend to raise awareness of the potential of earthquake forecasting in more governments and corporations, and obtain financial support for the research globally.

Better, Faster, Cheaper: New Instrument Design

QuakeFinder instruments have captured the apparent signatures of three earthquakes and these results are described in several scientific journal papers. But better understanding of the electrical and magnetic signals we believe to be earthquake precursors requires recording and analysis of more quake-related signals, which means deployment of more sensors as soon as possible.

The research team has continually updated the instrument system to be more sensitive, reliable, and affordable. More than six generations have been developed, starting in the 1990s with the kits of parts that Tom Bleier presented to high school classes, and proceeding through the first professional-grade systems sponsored by NASA in 2003, the line has reached a very high point of refinement.

The latest model incorporates custom-designed magnetometers that provide almost all of the capability of the previous ones at a fraction of the cost. It also includes more sophisticated air conductivity sensors that should be less susceptible to moisture contamination and provide more reliable and calibrated readings.

A key consideration in the new design was to lower the power consumption so the unit could be self-powered by solar panels and a battery. The latest model upgrades the processor from a Geode x86 processor to an ARM RISC core, dropping consumption from 40 to under 8 watts of precious power.

The power goal was not achieved without some challenges. First, we found that although it's pretty sunny in California, there are many sites that have foggy mornings due to marine layer incursion. This reduced the number of hours the solar panels are illuminated, so we had to double up on the panels at some of these foggy locations.

And that's not all - read the next section for the most interesting part of the solar conversion story.

Adventures in Signal Processing: A Quiet Solar Charge Controller

The greatest challenge of the new solar-powered systems came from the charge controller. It turns out that in order to check whether the battery is fully charged, digital controllers disconnect the solar panel from the battery at regular intervals. As a consequence there are enormous split-second electrical spikes generated every time the battery is disconnected - approximately every minute.

Unfortunately, the spikes are large enough to be picked up by our sensitive magnetometers 15 ft. from the solar panels and recorded in our data stream! This doesn't happen with the older systems, because the steady plug-in line voltage prevents the surges.

Obviously we needed to find a way to eliminate this noise. Options considered were: lengthen the magnetometer cables to 30 feet; write software to filter the noise from the data; or get a charge controller that did not cause the surges. We chose to solve this in hardware as opposed to software because it is the most elegant and reliable way to ensure that the data is clean. Our software works hard enough without having to process glitches of our own making. Longer cables would have prevented the surges from being recorded, but they would still be there. So a new charge controller was determined to be the best approach.

After buying and testing several more controllers and talking to the vendors, the team determined that the only way to get the noise-free operation they wanted was to design a custom analog charge controller. The new design softly eases from full charge to trickle charge as the battery reaches capacity, thus avoiding big, sudden surges of current. With these new controllers in place, there will be no spikes that could be recorded in our magnetometer data.

QuakeFinder is a humanitarian R&D project supported primarily by Stellar Solutions. Our work, based on sound scientific theory and practice, aims to create a system for short-term (days to weeks) forecasting of major earthquakes.