Title
Subduction Zone Seismic Experiment in Peru: Results From a Wireless Seismic Network

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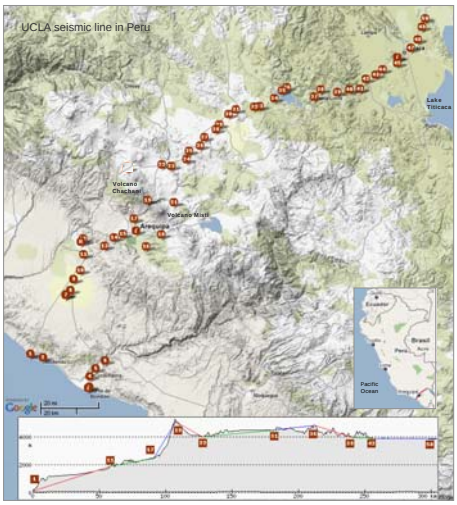
50-station wirelessly linked seismological network

Peru Network

CENS at UCLA developed Wirelessly Linked Seismological Network that was successfully installed in Mexico and is now deployed in Peru.



A map of the 50 wireless UCLA sites.

The sites are spaced 6 km apart and are connected wirelessly with each other. The software system in charge provides dynamic link quality based routing, reliable data delivery and a disruption-tolerant shell interface for managing the system from UCLA without a need to travel to Peru. The near real-time data delivery to UCLA allows us to immediately detect any problems that exist at the sites.

Multihop wireless 802.11b network taps into internet at various sinks.

Objective:
To build a geodynamical model of the subduction process from Mollendo to Lake Titicaca beneath the Andes and the Atacama desert.

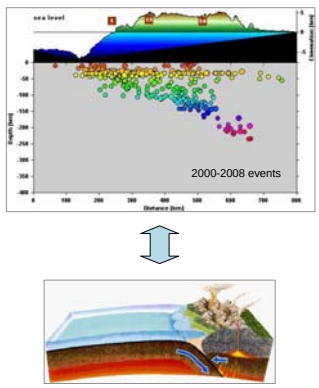
Challenges:
Selection of site locations limited to permanently occupied properties.
Difficult to obtain end to end connections.
Getting permissions/access to the sites, security.

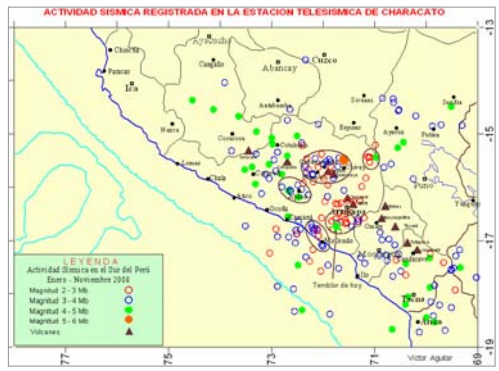
A typical site installation.

Scientific goals

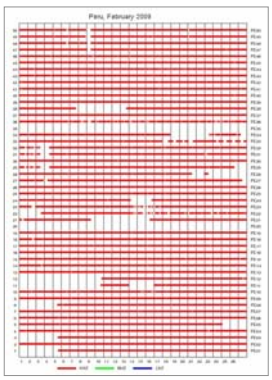
The following specific tasks will be addressed:

- Obtain receiver functions for crustal and mantle interfaces.
- Identify sheer wave splitting areas.
- Locate areas of microseismicity and double Benioff zones, compare them with tectonics.
- Study slab dewatering and mechanical interaction between the slab and the overlying plate.
- Look into critical taper wedge modeling and mechanics of mountain building.
- Build fan shooting tomographic image using Green's function from ambient noise correlation.

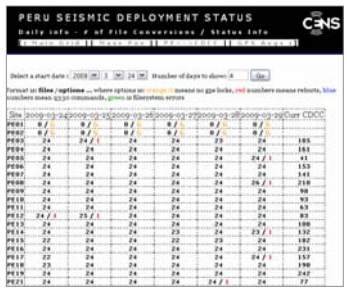




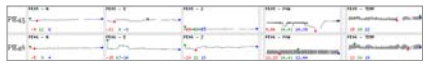
Data delivery and quality control



Delivery status for February 2009



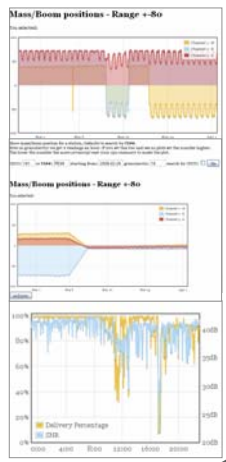
The main grid showing the number of files per day for the first 21 stations on March 24th, 2009.
PE01 and PE02 are the only two sites that are standalone and require driving there to collect the data.



Sparklines showing the mass position, power, and temperature for PE45 and PE46 for February and March of 2009. The red, green, and blue numbers and marks indicate the min, max, and most recent values. The PE45 Z mass is at its limit and requires centering.

Right:
Examples of boom positions for a Guralp 3T. A "well" behaved sensor, was centered on March 10th successfully, and a sensor with problems. The N, E, Z components don't function properly.

Bottom right:
Delivery percentage and wireless SNR ratio.



May 2009