Abstract

The PBO borehole strainmeter (BSM) network contains 75 sites along the Western Coast of the United States of America and Southern Canada. Each site contains a Gladwin tensor strainmeter, Malin borehole geophone, and in some cases GPS, pore pressure and/or tilt meter. The strainmeters and geophones are at depths between 400 to 800 feet, which is free of most surface noise. There are four additional geophone only sites in Humboldt County, California at depths of 400 feet. All sites in Anza, California also have borehole accelerometers. Over the course of 2010 the PBO BSM network observed several tectonic events throughout the network. Along the Juan de Fuca plate episodic tremor and slip (ETS) events were observed in late March and late August. The January 9, 2010 magnitude 6.5 and the February 4, 2010 magnitude 5.9 earthquakes offshore on the Gorda plate, near the Mendocino Triple Junction, are clearly recorded by the Humboldt CA array. In Parkfield, California, along the San Andreas fault creep events are observed in the Gorda triple junction, on the Gorda plate.

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San Andreas Fault near Parkfield

On August 20, 2010 two PBO borehole strainmeters, B079 and B901, observed a creep event along the San Andreas Fault near Parkfield. Strainmeters observe the progression of aselastic slip. Each strainmeter is between 450 to 800 feet below the surface in the Parkfield area, with a seismometer 15 to 20 feet above the strainmeter.

San Jacinto Fault

On July 7, 2010 there was a M5.4 earthquake near the Coyote Creek segment of the San Jacinto Fault, within 25 miles of the 8 station Anza borehole strainmeter array. The following plot shows the two components of shear strain recorded by the Anza stations for that event.

M8.8 Chile Earthquake

The strain transient associated with the Feb 27 2010 M8.8 Chile earthquake was well resolved across the PBO strain network. Several coastal strainmeters on Vancouver Island were also able to resolve the areal strain associated with the tsunami following the 8.8 Chile earthquake.

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