

The EarthScope Plate Boundary Observatory

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EarthScope is a bold undertaking to apply modern observational, analytical and telecommunications technologies to investigate the structure and evolution of the North American continent and the physical processes controlling earthquakes and volcanic eruptions. EarthScope is funded through the National Science Foundation and consists of three main elements: USArray, a modern digital seismic array to produce three-dimensional images of the continental crust; The Plate Boundary Observatory (PBO), a geographically dispersed geodetic array consisting of 852 GPS stations, 103 borehole strainmeters and 5 laser strainmeters to measure the active deformation in the entire western US; and the San Andreas Observatory at Depth, a deep borehole observatory which will provide measurements of the physical state and mechanical behavior of the San Andreas Fault at Parkfield. One of the major scientific rationales of Earthscope in pushing the frontiers of modern deformation analysis is the combination of all of these geophysical measurements across the entire observational spectrum and the combination of Earthscope data with observations from other disciplines of Earth Science. This will provide for enhanced analysis and improved understanding of the structures and processes that affect our environment.

The Plate Boundary Observatory is being constructed by UNAVCO, a community based facility dedicated to advancing high-precision techniques for the measurement of crustal deformation. PBO is ahead of schedule and on budget as it enters the third year of the five-year construction phase. By August of 2006 we anticipate the completion of over 400 GPS stations, 23 borehole strainmeter/borehole seismometer installations, and one laser strainmeter. PBO produced over 170 GB of raw GPS and strain data in over 300,000 data files, and over 60 GB of seismic data, all of which are freely available to research community from the UNAVCO website. PBO produces many levels of GPS data products including GPS station position estimates from two separate processing facilities and combined GPS station position estimates, position time, periodic estimates of long-term GPS station velocity, velocity fields, time series noise properties, and periodic time series components. Borehole and laser strainmeter data products include station strain scaled to natural strain units, conversion to areal, shear, and linear strain, fully corrected and scaled tensor and linear strain time series. UNAVCO is committed to making freely available all data products from PBO instruments, any software developed as part of EarthScope, and the transfer of technology, successes, and failures in building a state-of-the-art, geographically distributed observational network.

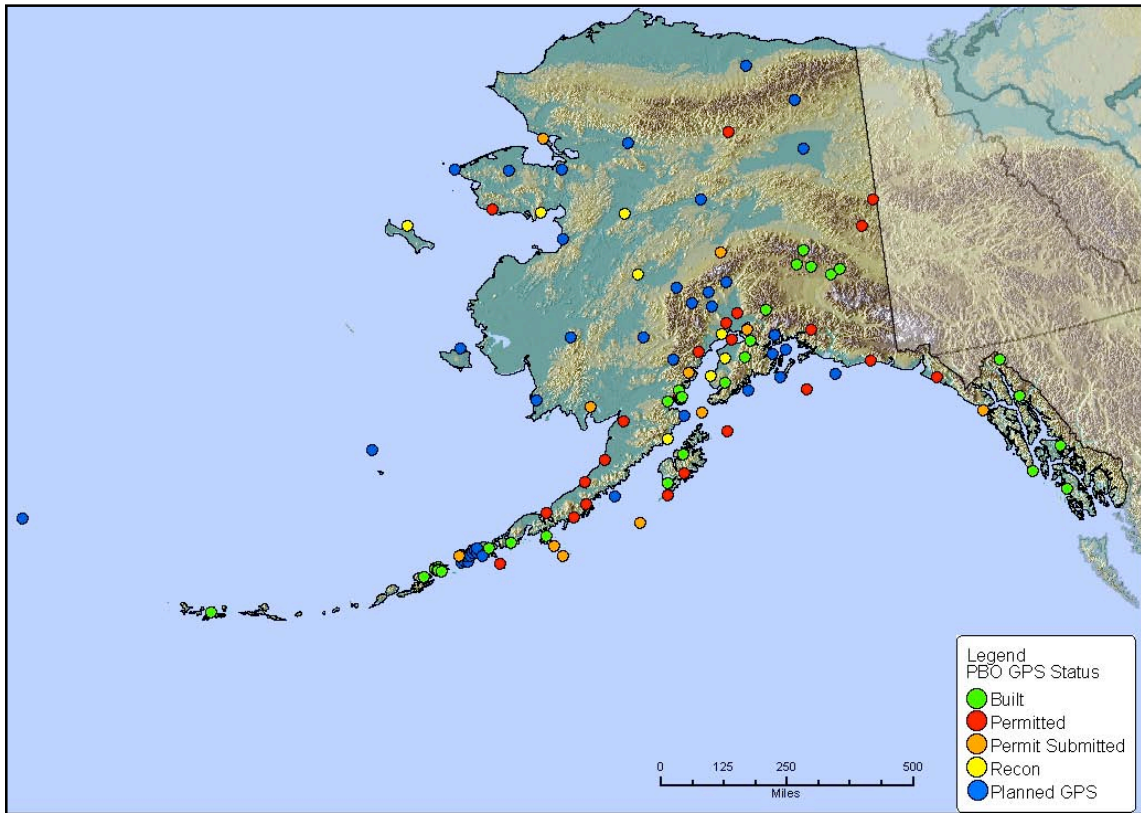
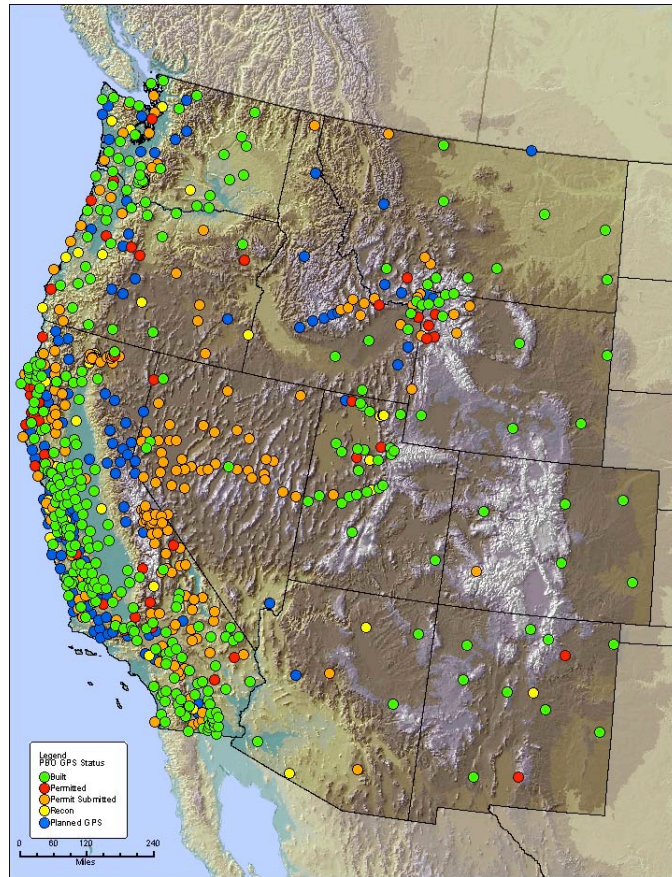


Figure 1. EarthScope Plate Boundary Observatory status, June 1, 2006