



## **PBO Borehole Strainmeter Earth Tide Measurements and Calibrations**

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The Plate Boundary Observatory (PBO) is the geodetic component of the U.S. N.S.F. funded Earthscope Program. The observatory, built and maintained by UNAVCO, consists of over 1100 continuously operating GPS sites, 79 borehole stations and 6 long-baseline strainmeters. Four-component Gladwin Tensor Strainmeters were installed at depths of up to 250 m in 75 of the boreholes. This presentation will focus on the performance of the borehole strainmeters in the tidal band and the use of the tidal signal to provide an in-situ calibration of the instruments. As of January 2011, there are two to five years of data from seventy-four PBO strainmeters. About eighty percent of strainmeters have an average signal to noise ratio greater than 10 in both the M2 and O1 tidal bands. In a least squares comparison of the observed M2 and O1 areal and shear strains with those predicted by earth tide plus ocean load models, 70% of the strainmeters have a root mean square difference of less than 1.5. Residuals are greatest in coastal areas. We will examine the discrepancy between the observed and predicted tides when the areal and shear strains are calculated using the vertical coupling calibration model of Roeloffs, 2010, which is based on the strainmeters tidal measurements. We will also compare tides recorded at PBO's two long-baseline laser strainmeters sites with those of nearby PBO borehole strainmeters and the predicted earth tides.