

PBO H₂O: Plate Boundary Observatory Studies of the Water Cycle

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The Plate Boundary Observatory was built to measure mm changes in position of GPS stations over time periods of days to years. The resulting station velocities derived from these data provide important constraints on how the North American continent is deforming. PBO stations can also be used to measure ground displacements at much higher frequencies for studies of fault slip during large earthquakes and for warnings of volcanic eruptions. There is also a long history of using atmospheric delays on the GPS signals to estimate precipitable water vapor (weather/climate) and total electron content (space weather). However, there was no expectation that PBO data would be used to study the terrestrial water cycle. Over the past five years the PBO H₂O group has developed methods to do just that, quantifying soil moisture, snow depth, and vegetation growth rates using reflected GPS signals. These water cycle products are distinctive in that they are created from the same GPS data files used by the positioning community. Last fall we officially released our water cycle data portal for these new products: <http://xenon.colorado.edu/portal>. These data are updated every day. We will show examples of our water cycle products and how they are used by hydrologists and climate scientists. We will also update the EarthScope community on using GPS to measure sea level and detecting volcanic ash plumes. We have also developed an education and outreach web portal about GPS aimed at middle school Earth science classes, <http://xenon.colorado.edu/spotlight>.

