ABSTRACT TEMPLATE

Title Dr. **Family Name** ...Robert.....

Given Name ...TREUHAFT.....

Institution ...Jet Propulsion Laboratory, California Institute of Technology

Address ...4800 Oak Grove Drive, MS 138-212.....

.....

Country .....U.S.A..... **Post Code** 91109 **Phone No.** 818-354-6216..

Fax No. ...818-393-5115... **Email Address** rnt@radar-sci.jpl.nasa.gov..

Presentation Preference: **Oral** ...√.... **Interactive (poster)** .....

Preferred topic number ...B10..

Abstract title: Ground-Based GPS Altimetry: The Crater-Lake Experiment and Coastal Monitoring

Name of author(s): Robert N. TREUHAFT, Yi CHAO, Stephen T. LOWE, and Cinzia ZUFFADA

Corresponding author: Robert N. Treuhaft

Abstract: A GPS altimetric experiment from a cliff over Crater Lake in Oregon shows cm-level determination of the lake surface height. This experiment serves to test the limiting accuracy of air- and spaceborne GPS altimetric remote sensing. It also suggests the feasibility of accurate, ground-based GPS altimetric coastal monitoring, which is difficult for spaceborne techniques. This paper describes the physical model used to estimate the surface-height parameter, as well as lake-roughness parameters for the Crater Lake experiment. Tropospheric effects cause a dominant error in accuracy at the many-cm level. Lake surface precisions of 1 cm can be obtained with just a few seconds of C/A phase- and group-delay data, but a few minutes of data are required to fix cycles and minimize tropospheric errors to achieve 1-cm accuracy. Analysis of this experiment shows that tropospheric effects may be at the meter level for airborne and spaceborne experiments. This paper also describes the application of ground-based GPS altimetry to coastal monitoring. Coastal monitoring is of interest to determine nutrient cycles, ocean carbon budgets, and the thermodynamic properties of the ocean near the coast. Altitude features of less than 100 km can potentially be detected with a sparse array of GPS

receivers along the coast, filling a performance gap that exists for space-based altimetric sensors. The rougher ocean surface may degrade GPS accuracy relative to the Crater-Lake demonstration, but a 10-cm error budget for ocean altimetry will be shown. Preliminary results from data collected from the Southern California coast will also be shown.