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Improved surface loading from GRACE and GPS and OBP combination

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On the Earth's surface, changes occur in continental water storage, ocean and the atmosphere. These masses cause gravitational perturbations, which can be detected by the GRACE satellites. At the same time, the crust will deform under those surface loads, which can be detected by a network of GPS stations.
In this study, we exploit those effects by combining data from GRACE gravimetry, site deformations from a reprocessed GPS network and simulated ocean bottom pressure (OBP). In a least squares adjustment, we estimate surface loading coefficients with weekly time resolution. We elaborate on the results, with special attention to the geocenter motion. Furthermore, the results are propagated back to the GPS site and compared with the station residuals. In addition, reference frame issues arising from the combination of GPS and GRACE are discussed. Over the ocean, the results are compared with time series of insitu bottom pressure recorders.