

Title: Using Ocean Tidal Load Displacements from GNSS to Invert for Earth Structure in the Crust and Upper Mantle

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Seismic models form the foundation of Earth structure, but in the crust and upper mantle, seismic models cannot separate small variations in shear modulus, bulk modulus, and density. How Earth's surface responds to a load is fundamentally a function of elastic moduli and density. During ocean tidal loading, tides load Earth's surface by displacing the ocean and atmosphere. If we have a model for the ocean tides and measurement for the surface displacement, we can invert for Earth structure. Our study updates Ito and Simon's 2011 inversion for structure for the western United States with more data, new tide models, and an investigation of reference frames. To linearize, we invert for perturbations to a starting Earth structure model, such as PREM. Our initial study has focused on regularization methods such as zeroth and first order Tikhonov Regularization.

