Oceanic Load Tides in the Western U.S.

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Earth's response to periodic surface loading by ocean tides is controlled by the density and elastic structure of Earth's interior. Thus, observations of surface deformation induced by ocean tidal loading (OTL) may be inverted to probe the material properties of the crust and mantle. Global Navigation Satellite Systems (GNSS) record OTL-induced horizontal and vertical displacements of Earth's surface of up to several cm in amplitude with sub-mm precision. Oceanic load tides are particularly well-suited to the study of Earth's crust and upper mantle, and complement information gained from observations of body tides and seismology. Here, we revisit and expand upon the study of Ito & Simons (2011). We focus on oceanic load tides in the western United States in three frequency bands: semi-diurnal (M₂), diurnal (O₁), and fortnightly (M_f). By leveraging longer data records and new advances in geodesy, we aim to improve constraints on allowable models for regional elasticity and density structure through the regional crust and mantle in the western US.

