A Multi-methods Analysis of Vertical Land Movement in Coastal Washington

Tyler Newton
University of Oregon
Motivation

- Provide an estimate of vertical land motion from diverse datasets to assist sea level rise assessments

Method

- 3D linear interpolation which incorporates regional data, their uncertainties, and a tectonic uplift model
Inputs

Data Coupling

- Data is adjusted to a common reference frame with propagated uncertainties.
Locking Model

Geometry modified from McCrory et al. (2004)
Inputs
Interpolated Surface
Interpolated Velocity: 0.1 Degree Resolution
Interpolated Surface
Interpolated Surface
Interpolated Coastline Vertical Velocity Uncertainty
Inputs

Geodetic Leveling  GPS  Tide Gauges  Locking Model

Figure: McCaffrey et al. 2013
Interpolation with and without Locking Model
Interpolated Coastline Vertical Velocity Uncertainty
Extrapolation to 2100

Cumulative Vertical Displacement by 2100 (m)
Hypothetical Rupture in 2100

Vertical Displacement for Rupture at 2100
Future Work

- More complex interpolation methods, incorporating data weighting
- Comprehensive incorporation of GIA into analysis
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