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Initial stages in investigating stress drops on the Blanco Oceanic Transform Fault

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We present initial results in estimating stress drops for M $\geq$ 4.0 earthquakes on the Blanco Oceanic Transform Fault, off the coast of Oregon. We plan to examine stress drop variation spatially and temporally, particularly in foreshocks, aftershocks and earthquake swarms. We estimate stress drops by examining phase coherence between stations. Phase coherence evaluates phase differences between station records for co-located earthquakes.

These phase differences depend on the spatial extents of two co-located earthquakes. If the energy of an earthquake is generated over a large rupture then source time functions vary by station, dependent on the rupture history of the two earthquakes. The phase difference is frequency dependent and most pronounced at frequencies higher than the reciprocal of the seismic travel times across the larger earthquake rupture length of the co-located earthquakes.

To isolate the apparent source time function of co-located earthquakes from the path effects, we cross correlate signals from co-located earthquakes at individual stations. We then calculate phase coherence between the remaining source time function phases. The coherent frequencies allow us to identify the rupture length. Using this rupture length, as well as the earthquake moment, we derive the stress drop.

We present phase coherence results for several pairs of earthquakes. We find a consistent rupture length of a single earthquake for multiple co-located pairs, demonstrating the reliability of this method for the Blanco fault. We test the phase coherence method on earthquakes of varying magnitude, to examine the accuracy of the method as the relevant frequency band changes. We derive rupture lengths and stress drops for several earthquakes, and compare them with expected values.