

Comparing subduction zone strain observations in Costa Rica and Cascadia

Observations of Episodic Tremor and Slip using continuous GPS have been made in Cascadia since the 1990's and in Costa Rica since 2003. Both settings exhibit considerable similarities in the nature of slip. However, differences are also observed, and may reflect either real differences in strain accumulation processes or artifacts that reflect differences in monitoring networks. Similarities include coincident tremor and geodetic transients, periodic behavior, deep slow slip events, and along strike variations in locking rates. Differences include along strike and dip migration of slip and tremor in Cascadia and shallow slow slip offshore of the Nicoya peninsula. Further, the timing of the earthquake cycle Costa Rica has allowed for the observation of the interaction of slow slip with the a large earthquakes in Costa Rica (M 7.6 2012), and subsequent evolution of afterslip in relation to previously documented slow slip areas and locked zones. We compare observations in the two regions and discuss whether the differing observations are a function of setting or are due to the differing characteristics of the monitoring networks.

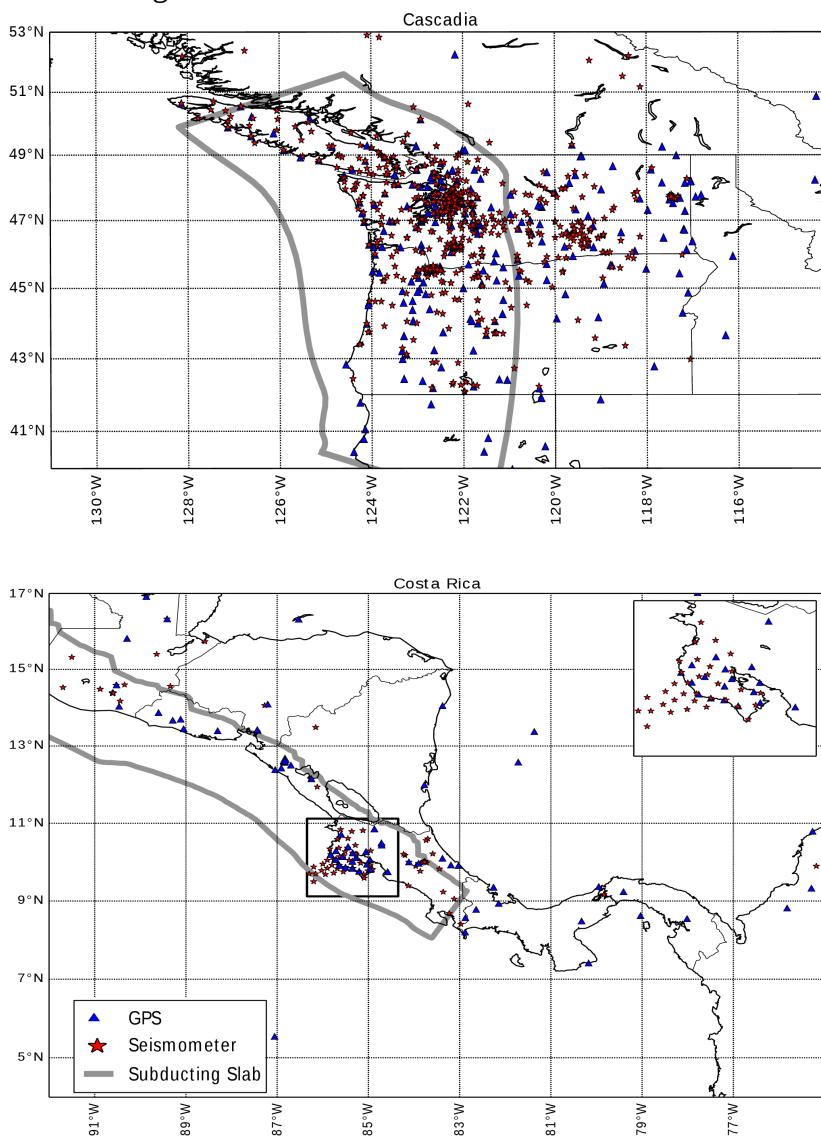


Figure: Comparing the network size and density in Cascadia and along the Middle American Trench in Nicoya Costa Rica. The inset map below shows the dense network used in the study of subduction zone processes in Costa Rica. Plotted in the gray is the outline of the Slab 1.0 model for the two regions. It can be seen that Nicoya Peninsula (box) allows for observation much closer to the shallow part of the subduction zone. However, the lack of station spatial coverage makes observation of along strike changes in behavior difficult. This is compared with Cascadia where station spatial coverage is excellent, however stations predominately overlay the deeper part of the subducting slab.