Tremor location in Guerrero, Mexico from catalog comparison: identification of new clusters

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Tectonic tremor are known to occur in two areas in the Guerrero subduction zone, one updip of the other. However these locations are obtained from only 29 months of recording and more precise location is needed. To do this we used two datasets, the previously used MASE dataset and the GGAP dataset. The MASE network is a linear network that allows good along dip resolution. The GGAP network is located around the downdip cluster and is better able to locate the events in this area. We generate a tremor catalog by envelope correlation method for the two time periods. In a second step we estimate their moment tensor from stacking broadband seismograms in the VLF band (0.02-0.05 Hz).
Results shows two different tremor distributions depending on the time period. From MASE data we detect the previously known two clusters, one southern transient cluster and one northern more active cluster. The second dataset reveals that the northern cluster is in fact formed of two clusters in the strike direction. Analysis of the error of the first dataset shows the lack of resolution in the strike direction due to the linearity of the network explaining the difference between the two catalog. To confirm these results our tremor locations are also compared to other catalogs obtained with the tremor energy and polarization (TREP) method [Cruz-Atienza et al, 2015] and the cross station cross correlation method [AGU abstract Peng and Rubin, 2015]. Results from these methods agree globally with our result. The comparison of these three different catalogs underlines the complexity of determining tremor location.
Moment tensor inversion reveals low angle thrust mechanism with slip direction in agreement with TREP results and close to the convergence direction. Additionally the depth of the VLF events is coherent with the depth of the subduction interface highly suggesting that these events represent shear slip on the plate interface.

Keywords: tremor location, moment tensor of slow earthquakes

