Onshore-Offshore velocity models north of the Mendocino Triple Junction in Northern California. Alan Jacquez. Dr. Marianne Karplus. Dr. Aaron Velasco, and Dr. Rodrigo A. Romero., [1]The University of Texas at El Paso(mkarplus@utep.edu), [2]The University of Texas at El Paso (AAVELASCO@utep.edu). The University of Texas at El Paso (raromero2@utep.edu).

The Mendocino Triple Junction (MTJ) is the area where the Gorda plate, North American Plate, and Pacific Plate meet. It separates the Cascadia subduction zone from transform tectonics of the San Andreas plate boundary and is an actively deforming region experiencing high seismic activity. We examine offshore and onshore seismic wide-angle reflection and refraction data north of the MTJ crossing the Cascadia subduction zone offshore northern California. We image subsurface structures in this region by creating *P*-wave velocity models using datasets collected in 1993 to 1994 during the MTJ seismic experiment (Trehu et al., 1995). The survey consisted of 200 km of onshore seismic refraction and reflection data and 120 km of offshore data in order to capture wide angle aperture data of the area. We will be processing data from seismic line WA6 North of the Mendocino Triple Junction that consists of 566 onshore receivers accompanied by 8 shots, and 8 ocean bottom seismometers (OBS) spaced at 1km spacing accompanied by 2468 air gun shots spaced at 50m. The new velocity models will offer insight into the structure and composition of both the Gorda and North American plates as well as the plate boundary megathrust in the region. Modeling was performed using RAYINVR to construct a 2-Dimensional (2-D) *P*-wave velocity model from travel time modeling and Tomo2d was used to construct a 2-Dimensional tomography model of the subducting slab (Korenaga et al. 2000 and Zelt and Smith, 1992). Previous studies have created separate offshore *P*-wave velocity models using ocean bottom seismometer (OBS) data and onshore *P*-wave velocity models using onshore wide-angle, explosive-source seismic data. We will merge these datasets to create an integrated offshore-onshore *P*-wave velocity model. Changes in *P*-wave velocities will illuminate subsurface geology and tectonics north of the MTJ beneath the Cascadia subduction zone region. We study an area with a high rate of seismicity – including frequent events greater than Mw5.0 – so we compare the locations of seismicity to the velocity model. This research represents an important contribution to understanding earthquake hazard in Northern California.

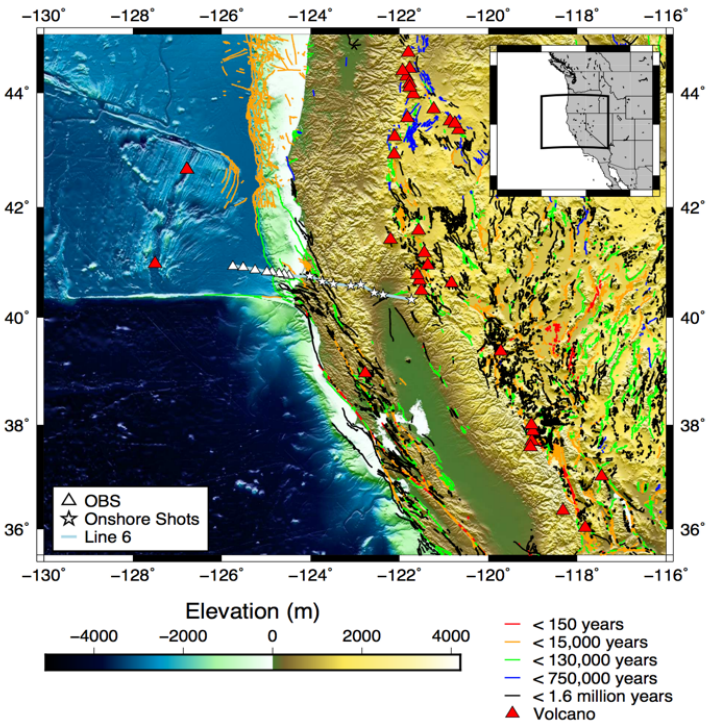

Figure 1. Map view of the Mendocino Triple Junction and refraction profile shown in context of regional tectonics. Active fault systems from 150 years to 1.6 million years are labeled from red being the youngest fault to black being the oldest fault activity (USGS quaternary Fault and Fold Database of the United States). The map shows seismic line WA6 the tectonic, volcanic activity, and topography of Northern California. Volcanoes are indicated by red triangles (NOAA Volcano Location Database Search).