Analysis of Moho Depth and Crustal Vp/Vs Ratios in the Western U.S.

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The purpose of this study is to analyze the Mohorovičić discontinuity, commonly referred to as the Moho, using seismic receiver function analysis. The depth to the Moho and average Vp/Vs ratio of the crust (P-wave velocity divided by S-wave velocity) can be estimated by analysis of the moveout (delay time versus incoming angle) of P-to-S conversions (Ps) and reverberations ending in an S-phase (Pps and Pss). In general, these phases will only line up when stacked and converted to depth if the correct Vp/Vs ratio is used in depth conversion. Data was used from permanent networks such as Anza, Berkley, and United States Array, and select stations from the EarthScope Transportable Array (TA) across the western U.S. The TA is a network of 400 high-quality seismometers that are being placed in temporary sites then moved across the United States from west coast to east coast in a 70km grid pattern. This type of spacing is excellent for imaging the subsurface of the Earth. Average Vp/Vs ratio for the study area was 1.82 with a range of 1.67 to 1.93, and Moho depth range of 20 to 60 km across the study area. Vp/Vs ratios can also be associated with felsic rocks (lower Vp/Vs values) and mafic rocks (higher Vp/Vs values). With an average Vp/Vs ratio of 1.82 in study area, crust may be more mafic than normal continental crust.