Lowermost Mantle Anisotropy Beneath the Central Pacific

Juliana M. Rokosky, Thorne Lay • University of California, Santa Cruz
Edward J. Garnero • Arizona State University

Analysis of lowermost mantle anisotropy is a crucial step in fully characterizing the deep mantle. We utilize a large number of Tonga-Fiji events recorded by California stations to assess shear-wave splitting of core reflections (ScS). Shear-wave splits (ScSH-ScSV) and differential travel times (ScS-SDATA – ScS-SPREM) are calculated for over 390 records from 37 events, a nearly five-fold increase in data from previous work in the region. There is a trend of increasing ScS travel-time delays from the southwest to the northeast, suggesting that deep-mantle shear velocity decreases in this direction. While ScS splitting is pervasive, when measured by simple peak-to-peak methods (valid for VTI-like anisotropy) it is not as simply organized as suggested in prior work. To assess whether azimuthal anisotropy can better explain observed shear-wave splitting under the Central Pacific, we perform polarization analyses on suitable data following the methods of Silver and Chan (1991). While preliminary results do suggest a bimodal pattern reported in previous work (Russell et al. 1999), significant remaining scatter hints that other factors may be obscuring our ability to easily characterize deep mantle anisotropy in this region. Work is currently being done to assess the accuracy of receiver corrections applied to the data, as such inaccuracies could contribute to this scatter.