

Waveform inversion studies of the S velocity structure in D'' beneath several regions and geophysical implications

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We study the fine structure of the lowermost several hundred km of the large low shear velocity province (LLSVP) beneath the western Pacific by inverting the transverse components of long period (20-200 s) broadband seismic waveforms. We find a low S-velocity zone in the depth range from about 2550-2750 km, with the greatest decrease (relative to PREM) of about 0.2 km/s at depths of about 2650-2700 km. This suggests the presence of significant amounts of mid-ocean ridge basalt (MORB), for which the phase transitions from pv to ppv and from CaCl₂-type to alpha-PbO₂-type SiO₂ result in a decrease in S-velocities. We also find an increase in the S-velocity, relative to this minimum, of about 0.15 km/s, peaking in the depth range from about 2750-2800 km, which is consistent with the phase transition from pv to ppv expected for average composition models such as pyrolite.

In the presentation, we are going to compare it with the model obtained in the other regions and show their geophysical meanings.