

## Evidence for phase transitions in pyrolite and MORB beneath the Western Pacific

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We study 1D shear velocity structure within the lowermost mantle (between the core-mantle boundary (CMB) and 300-400km above CMB) beneath the Western Pacific using waveform inversion of the transverse components of long period broadband waveforms (20-200 s). We once use the Preliminary Reference Earth Model (PREM) as a starting model for the inversion and obtain a main feature. However, the preliminary result implies that the average velocity is quite lower than PREM. The existence of lower velocity than PREM is also discussed in other studies such as [Takeuchi, 2007], which argues the Pacific large low shear velocity province (LLSVP) whose northwest part is our target region.

In order to obtain a finer structure from the inversion, we attempted to modify the starting model since we can only perform a linear inversion.

Our final model shows that the average velocity in our target region is about 0.04 km/s slower than that of PREM, which is consistent with previous tomographic studies. It means the target region is certainly located in LLSVP. As we focus large velocity jumps in our final model, the velocity decrease at 2600-2700 km could be interpreted as the phase transitions in MORB from Mg-pv to Mg-ppv [Tsuchiya and Tsuchiya, 2006] and from CaCl<sub>2</sub>-type to alpha-PbO<sub>2</sub>-type SiO<sub>2</sub> [Karki et al., 1997] and the velocity increase at 2700-2800 km could be interpreted as the phase transition in pyrolite from pv to ppv [Tsuchiya et al., 2004].