

## **Studies of the 410 km discontinuity beneath Tonga - Fiji subduction zone using receiver function from regional deep-earthquakes**

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We investigated the structure of the 410 km seismic discontinuity beneath the Tonga-Kermadec subduction zone using a regional deep-earthquake receiver function method.

We used clear P-to-S converted phases from 113 deep-earthquakes (deeper than 410 km) recorded by 12 SPaSE (Southwest Pacific Seismic Experiment) and 27 SAFT (Seismic Array in Fiji and Tonga) broadband seismic stations. In this study, 1-D ray tracing, move-out correction and CDP (Common Conversion Point) stacking techniques are applied to detect the weak P-S converted phases for estimating the depth variations of the 410 km discontinuity under the Tonga region.

Our CDP stacking results indicate that the depth of the 410 km discontinuity varies between 388 and 428 km, which is consistent with the previous results (e.g., Flanagan and Shearer, 1998b; Tibi and Wiens, 2005). The 410 km discontinuity beneath the Lau ridge and Tonga ridge are depressed and uplifted, respectively. The depression of the 410 km discontinuity beneath the Lau ridge may be caused by high temperature in the mantle wedge and the deep dehydration of the subducting Tonga slab. The uplift of the 410 km discontinuity beneath the Tonga ridge may be due to the lower temperature of the subducting Tonga slab.