

## S-wave triplication anomalies associated with the 660-km discontinuity overlain by the stagnant slab beneath Eastern China

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Triplicated shear waves from the 660-km discontinuity are clearly observed by the broadband networks of China and Taiwan for a deep earthquake with an epicenter located in Sakhalin (PDE; 2003:07:27; 47.15N; 130.67E; 470 km depth; 6.3 Mb). The observed triplication of travel times deviates significantly from the theoretical travel curve of PREM and shows different patterns according to geographic positions of stations. The later phase reflected at the 660-km discontinuity shows the comparable amplitude to the first phase (S-wave refracted upward below the 660) and can be traced up to about 35 degrees in epicentral distance, far beyond the prograde end of the PREM triplication. Such a behavior of the later phase is observed only in an azimuthal range of 220-270 degrees.

We attempted to explain the observed anomalies by a combination of velocity anomaly and depth anomaly of the 660-km discontinuity. The observed first arrival times can be explained if the shear velocity in the stagnant slab region down to 800 km depth is increased by 1 % relative to PREM with and if the 660-km discontinuity in the stagnant slab region is deepened to 700 km depth. For some stations, the observed later arrival times can also be explained by this model although the observed later arrival amplitudes are too large to be explained by this model. For the other stations, the observed later arrival times are further delayed relative to the above model and the observed amplitudes are again anomalously large. These observations should carry important information about the fine velocity structure with the laterally varying 660-km discontinuity in the stagnant slab region.

This study has an additional co-author, Prof. Bor-Shouh Huang of Academia Sinica, Taiwan.