On the S-P converted waves observed for the 2003 Off Kii peninsula deep earthquake

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Several anomalous seismic phases were observed between the P and S arrivals and after the S arrivals on the Hi-net seismograms for the 398km-depth earthquake off southeast coast of the Kii peninsula, 12 November, 2003. The three of these phases (X1, X2 and X3) have the following characteristics.

The X1-phase arrives about 20 s after the P and its apparent velocity is slightly faster than the P. The particle motion indicates that this is a longitudinal wave. This phase is recorded only in the Chubu region (epicentral distance 1-5 degree; azimuth 345-15 degrees). The amplitude is as large as that of the P. The X2-phase arrives about 0-30 s before S and its apparent velocity is slightly faster than or equal to the P. The particle motion indicates that this is a longitudinal wave.

This phase is recorded in the Kanto-Tohoku region (epicentral distance 2.5-6 degrees). The X3-phase arrives about 0-40 s after the S and its apparent velocity is faster than the P. This phase is recorded in the Kyusyu region and Yamaguchi pref.

(epicentral distance 3-6 degrees).

The above characteristics indicate that the X1, X2 phases are the S-P converted phases. An estimation is made for the location of S-P conversion of the X1-phase based on the travel-time and apparent-velocity data. The conversion points distribute in epicentral distance and depth ranges of (0.3 degree-480 km) to (1.3 degree-420km) in the vicinity of the bottomface of the subducted slab of the Pacific plate. The observed X1-phase may be related to the lower boundary of the subducted slab.