Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

SIT003-10 Room:101 Time:May 26 11:20-11:35

Depth Variation of Inner Core Hemisphericity from PKP(DF) and PKP(Cdiff): P-Wave Velocity and Attenuation Structures

Satoru Tanaka[1*]

[1]IFREE, JAMSTEC

The hypothesis of inner core hemisphericity is supported by both observations of body waves and free oscillations. However, its fine structure is controversial. Here I examine the depth variation through the travel times and amplitudes of PKP(DF) with respect to PKP(Cdiff) in the distance range from 150 to 160 degrees. The use of PKP(Cdiff) as a reference phase makes it possible to extend the available depth of PKP(DF) from the inner core boundary (ICB) with high accuracy. As PKP(Cdiff) can not be properly treated with the ray theory, the reflectivity method is used for the comparison. I have measured differential travel times and amplitude ratios in short-period (1-5 Hz) using the cross-correlation method, then collected 583 data (229 and 354 for Eastern and Western hemispheres, respectively). Global averages of PKP(Cdiff)-PKP(DF) times and PKP(DF)/PKP(Cdiff) amplitude ratios are well explained by AK135, the geographical pattern of the data scatter is consistent with the hemispherical distribution. Forward modelling suggests the inner core P-wave velocity in Eastern hemisphere is 0.5 % faster than AK135 at the ICB and gradually closes to AK135 with the transition thickness of 500˜600 km. On the other hand, P-wave velocity at ICB in Western hemisphere is 0.5 % slower and the transition thickness is about 200 km. The apparent Q values in Western hemisphere are approximately 400 and almost constant in the concerned distance range. However, those in Eastern hemisphere are approximately 270 around 151 degrees and 400 in the distance greater than 154 degrees.

Keywords: the inner core, hemisphericity, PKP(DF), PKP(Cdiff)