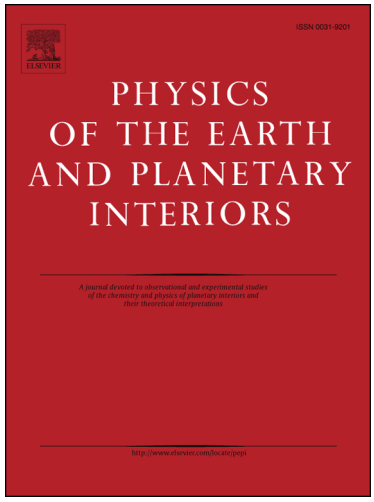

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Detection of small scale heterogeneities at the Inner Core Boundary

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Abstract

The hemispherical pattern of seismic velocities in the uppermost inner core has been described at the global scale in many studies. In this paper, we investigate shorter scale heterogeneities in the vicinity of the Inner Core Boundary (ICB) using differential travel time and amplitude measurements between the pair of core phases PKP(DF) and PKiKP. Seismic events occurring close to Sumatra and recorded at USArray stations in the distance range 132 -142 ° are used to investigate the velocity and attenuation structure at the ICB and in the uppermost 110 km of the inner core beneath Eastern Russia.

In this distance range, PKP(DF) and PKiKP are difficult to separate due to their proximity in travel time. We present a new method based on the envelope of the seismic signal to identify them, following which we measure differential travel time residuals and amplitude ratios by comparison with synthetics computed using the Direct Solution Method, which allows us to take into account the correct phase shift of the PKiKP. We found that, in our region of study, the compressional velocity is slower in the uppermost inner core than the AK135 model. However, the sampled region is located in the Eastern hemisphere generally considered as faster and more attenuating than the AK135 model. This suggests significant regional departures from the simple hemispherical pattern reported in the literature.

We also deduce from the amplitude ratios that the attenuation is stronger than the

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