Seismic structure near the inner core boundary in the north polar region

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The upper inner core of the Earth has quasi-hemispherical heterogeneity [Tanaka and Hamaguchi, JGR 1997]. A region that occupies a smaller area, called as 'East', has higher P-wave velocity and attenuation and smaller anisotropy compared with the rest, which is called as 'West'. To determine the boundary between these two regions at high latitudes, we analyze waveforms from Central America earthquakes observed at temporal broadband seismic network in Thailand (Thai Seismic Array; TSAR) [Tanaka et al., *Bull. Earthq. Res. Inst. Univ. Tokyo*, 2019]. Rays from C. America earthquakes to the network pass in the inner core, and have their turning points near 180˚E in the north polar region, which is close to the supposed boundary by several seismic studies. We pick differential traveltimes between PKPbc, which turn in the lower outer core, and PKIKP, which turn in the inner core, on the waveforms, and obtain differential residuals relative to ray-theoretical values predicted by PREM. The observed residuals are compared with those for global models and regional inner core models which represent 'East', 'West', and the South Pole. The residuals are also compared with residuals of South America earthquakes observed in Japan, which sample the 'western' upper inner core.

Keywords: P-wave velocity, inner core, heterogeneity

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