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S-wave attenuation structure around the western part of Nankai subduction zone
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Seismic imaging of lithospheric structure is crucially important to investigate spatial distribution of geofluid and its role in dynamics of the Earth's interior. Even though Vp and Vs structures are widely imaged in various regions in the world, these structures cannot explain complex and broadened seismic waves at higher frequency (>1Hz). Such complex wave trains can be described by considering wave scattering and attenuation due to random inhomogeneities and inelasticity of the medium [e.g., Sato & Fehler, 1992]. It can be expected that medium containing fluid-filled cracks is one of the possible causes of S-wave scattering and attenuation. Therefore, medium inhomogeneities and inelasticity are also important to elucidate geofluid distribution. In Nankai subduction zone, we have estimated the 3D distribution of random inhomogeneities [Takahashi et al. submitted to JGR]. This study estimated the spatial distribution of 1/Q of S-wave around the western part of the Nankai trough. In Kyushu and Shikoku regions, most of the medium shows weak attenuation (1/Q < 1/1500 at 8-16Hz). Volcanic area in Kyushu region shows strong attenuation (1/Q = 1/600 ~ 1/300 at 8-16Hz). Beneath west Shikoku, slightly strong attenuation (1/Q=1/1000~1/800 at 8-16Hz) are imaged at 20-40km depth. This anomaly is approximately located in or above the non-volcanic tremor zones [e.g., Obara et al. 2010]. If we compare the random inhomogeneities and 1/Q, there are clear differences of medium properties in volcanic area and tremor zone. This difference suggests that random inhomogeneities and attenuation may reflect fluid properties (magma or aqueous fluid) or amounts of geofluid in medium.

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