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南海トラフにおいて津波ポテンシャルを持つ浅部プレート境界断層の反射特性と空間分布
Seismic reflection character and spatial distribution of the Nankai shallow decollement with tsunami potential

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One of the biggest features of the subduction-zone processes is tsunami earthquake that generate tsunamis disproportionately large for their seismic energy. Tsunami earthquakes have been reported in the subduction zones worldwide: for example, 1896 Sanriku, 1946 Aleutian, 1992 Nicaragua, and 1994 Java. Most of the tsunami earthquakes appear to propagate along shallow decollement up to near trench. However, the tsunamigenic decollement is not clearly identified and its nature is largely unknown. Here we report seismic reflection character and spatial distribution of the tsunamigenic, shallow decollement along the Nankai subduction zone, southwest Japan. Seismic reflection profiles along and across the Nankai Trough reveal clear shallow plate-boundary fault (i.e., decollement) with variation of negative and positive polarity reflections. Very-low-frequency earthquakes suggesting slow seismic slip and shear failure occur around the decollements with tsunami potential. Although fluid-poor decollement with positive polarity reflection too may have tsunami potential, fluid-rich decollement with negative polarity reflection could be much easier to slip due to elevated fluid pressure leading to low effective normal stress so that it is conditionally stable. On the whole, the fluid-rich decollement is identified off Shikoku Island and Cape Shiono. The fluid-poor decollement is recognized off Kii Channel. Alteration of the fluid-rich and fluid-poor decollements is observed off Kumano Basin. The huge, fluid-rich decollement zone off Shikoku Island is almost consistent with tsunami source area of the 1605 Keicho event. On seismic reflection profiles, we also identify three distinct turbidites underthrusting along the shallow decollement immediately beneath the Nankai accretionary wedge. Deep sea turbidite subduction may affect formation of the fluid-rich decollement with much more tsunami potential.
Keywords: Nankai Trough, decollement, seismic reflection, spatial distribution, tsunami