

3D Seismic Velocity Structure and geometry of plate boundary around the rupture area of the 1968 Tokachi-Oki Earthquake

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We obtained precise hypocenter distribution and the three dimensional seismic velocity structure in the rupture area of the 1968 Tokachi-Oki earthquake by a seismic tomographic inversion technique using data obtained by Long-term OBS observation in 2005 and the aftershock observation in 1995. The long-term observation was conducted for eight months using 18 LOBSs. The hypocenter distribution simultaneously determined with P and S wave velocity structure shows landward dipping planar shape. The planar distribution is thought to indicate that an interplate seismicity is dominant in the study region. The subducting oceanic crust and the slab mantle were well imaged as dipping layers with Vps of 7 and 8 km/s. The seismic velocity in the mantle wedge varies along the trench axis direction. Its velocity just above the rupture area of the 1968 earthquake seems to be larger than that of the surrounding area and takes its maximum value near the location of the large coseismic slip estimated by the local strong motion records of the 1968 earthquake. From the obtained focal depth distribution of the interplate earthquakes, we found that the strike and the dip of the plate boundary change at the northern limit of the rupture area of the 1968 earthquake. It perhaps suggests that the geometry of the plate boundary is one of important factors controlling the spatial extent of the coseismic rupture propagation.