

Three-dimensional seismic velocity structure around the Atotsugawa fault, central Japan, inferred from travel-time tomography

Junichi Nakajima[1]; Takaya Iwasaki[2]; Tomomi Okada[1]; Aitaro Kato[3]; Tetsuya Takeda[4]; Iidaka Takashi Japanese University Group of the Joint Seismic Observations at NKTZ[5]

[1] RCPEV, Graduate School of Sci., Tohoku Univ.; [2] ERI, Tokyo Univ.; [3] ERI, Univ. Tokyo; [4] NIED; [5] -

The Atotsugawa fault is known to be one of the most active faults in the Niigata-Kobe Tectonic Zone (NKTZ) (Sagiya et al., 2000). The fault is a strike-slip fault with a right lateral displacement and its strike is approximately N60E with almost vertical fault plane. Seismicity along the fault is active and shows a spatial variation. In the central part of the fault the seismicity is rather low compared to that in the western and eastern parts of the fault. The joint research project has started in 2004 to enhance our knowledge on the deep structure around the Atotsugawa fault, and 73 seismograph stations have been installed around the fault in the frame work of the project, which results in a dense seismograph network with a spatial separation of ~10 km.

We applied the tomographic method of Zhao et al. (1992) to arrival-time data recorded at temporal stations around the fault in addition to the JMA unified data. Horizontal grid nodes are spaced at intervals of 0.1 degrees, and vertical grid nodes are set at depths of 0, 5, 10, 15, 20, 30, and 40 km.

Obtained results show that the velocity structure along the Atotsugawa fault has a spatial variation. The central part of the fault where seismicity is low exhibits a relatively low velocity down to the depth of 15 km compared to the western and eastern parts of the fault, implying the spatial relationship between seismicity and velocity structure. A low- V_p , low- V_s , and slightly low- V_p/V_s area is imaged in the upper crust beneath active volcanoes located in both sides of the Atotsugawa fault. Deep low-frequency earthquakes tend to occur in areas with low V_p , low V_s , and high V_p/V_s . These results associated with volcanoes are similar to those observed in NE Japan.