

SCG063-02

Room:201B

Time:May 26 14:30-14:45

Precise seismic velocity structure beneath the Hokkaido corner: Arc-arc collision and the 1982 Urakawa-oki earthquake

Saeko Kita^{1*}, Akira Hasegawa¹, Junichi Nakajima¹, Tomomi Okada¹, Toru Matsuzawa¹, Kei Katsumata²

¹RCPEV, Tohoku University, ²Hokkaido University

Using data both from the nationwide Kiban seismic network and from a dense temporary seismic network covering the area of the Hokkaido corner [Katsumata et al., 2002], we precisely determined three-dimensional seismic velocity structure beneath this area to understand the collision process between the Kuril and NE Japan forearcs. Tomographic inversions were performed with smaller grid spacing than our previous study [Kita et al., 2010]. Inhomogeneous seismic velocity structure was more clearly imaged in the Hokkaido corner at depths of 0-120 km than the previous result. A northeastward-dipping high-velocity zone with a volume of 20 km x 90 km x 35km was detected at depths of 0-35 km. This high-velocity zone reaches near the surface at the Hidaka metamorphic belt. The highest velocity value in the high-V zone corresponds to those of the upper mantle material. The southern edge of the high-V zone is located just beneath the Horoman-peridotite. On the other hand, a broad low-velocity zone of P- and S- waves with a total volume of 80 km x 100 km x 50 km is distributed to the west of the Hidaka metamorphic belt at depths of 30-90km, having velocities of crust materials. This low-V zone consists of several layers of high and low velocities forming alternate layers, and is inclined toward the northeast at an angle of 40-60 degrees. One of the layer boundaries within the low-V zone corresponds to the main fault plane of the 1982 M7.1 Urakawa-oki earthquake. The hanging wall of the fault plane has anomalously high velocities, while the foot wall low velocities. A considerable number of earthquakes, including aftershocks of the 1982 Urakawa-oki earthquake, occur in this low-V zone at depths of 0-80 km (even at depths of the mantle wedge), whereas seismicity is very low in other areas. The present observation provides important information to deepen our understanding of the ongoing arc-arc collision process and earthquake generation mechanism in the Hokkaido corner.

Keywords: Hidaka collision zone (the arc-arc type collision zone), Seismic velocity structure, Seismicity, the 1982 Mj 7.1 Urakawa-Oki earthquake, Horiman Peridotite