

Mantle-upwelling in the backarc of Kyushu as inferred from seismic receiver function and tomography

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By using seismic tomography we have suggested the existence of low-velocity anomalies in the uppermost mantle of the backarc of Kyushu, southwestern Japan (Sadeghi et al., 2000). In their study a simultaneous inversion for three dimensional velocity structure and hypocentral parameters was used to determine the tomographic images of this area. Results of this tomographic inversion revealed two major zones of strong low velocity in the depth from 40 km to 100km near Goto-retto islands and Koshiki-jima islands, west off Kyushu.

Recently Murakoshi (2003) studied receiver functions of seismic waves by using data of 17 broadband seismic stations in and around Kyushu. We focused on the receiver function of FUK station, one of the 17 stations, in the southwestern part of Goto-retto islands. The data of teleseismic events of which magnitudes are greater than 6.0 in the epicentral distance from 30 to 60 degrees were selected. And we obtained 66 receiver functions with high signal-to-noise ratio for FUK station. The receiver functions of which seismic waves traveled from south show a clear PS converted phase with negative amplitude about 6 s after direct P wave. This phase suggests the existence of a clear upper surface of low-velocity zone at the depth of about 50 km. This low-velocity zone probably corresponds to the strong low-velocity anomaly near Goto-retto islands found by seismic tomography. This zone may represent partially melted upper mantle in the backarc of Kyushu. Such a partially melted upper mantle is supposed to be a mantle-upwelling beneath the backarc of Kyushu.

(References)

Sadeghi H., Suzuki S. and Takenaka H. 2000. Tomographic low-velocity anomalies in the uppermost mantle around the northeastern edge of Okinawa trough, the backarc of Kyushu. *Geophysical Research Letters* 27, 277-280.

Murakoshi T., 2003. Seismic structure of the crust and uppermost mantle beneath Kyushu as inferred from receiver function analysis, D.Sc. thesis, Kyushu University, Fukuoka, Japan.