

# Detection of the subducting slab beneath Matsushiro by a receiver function analysis

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The Chubu region (central districts) of Japan, located in the central part of Honshu Arc, is a junction between the northeast and southwest Japan arc, where lies the Fossa Magna. The structure of this region is complicated, where the Philippine Sea Plate is subducting beneath the Eurasian Plate from the south, and the Pacific Plate is subducting beneath the Philippine Sea Plate. The purpose of this study is imaging seismic structure up to the depth of slab around Matsushiro area by a receiver function analysis. The data used for receiver function are three-component broadband records of the teleseismic events, in the epicentral distance of 30-100 degrees, observed at Matsushiro station.

We use the broadband records collected by IRIS at Matsushiro (MAT) station, of which mb is more than 6.0, and which have good S/N for calculation of the radial receiver functions. We apply SVD filtering in frequency domain to remove noise from the receiver functions. SVD filter in the frequency domain can represent arrival time lag of converted waves depending on epicentral distance more faithfully than the filtering in the time domain. We then estimate S-wave velocity structure by applying a receiver function inversion with the Genetic Algorithm.

Our results are as follows: (1) It is found that there is a low-velocity layer in the depth range of 16 to 22km and the Moho is located around 42km in depth. (2) If seismic discontinuity is slanted, such as slab, the amplitude and arrival time of converted wave depends on the backazimuth. We analyzed converted waves based on this fact, hypocenter distribution, and records of a local deep earthquake occurring just below Matsushiro. As a result of inversion, it is estimated that the depth of the top of slab underneath Matsushiro is 184km, which is almost identical to the top of deep earthquake hypocenters beneath Matsushiro. (3) Low-velocity zone was not imaged on the top of the slab. This suggests no low-velocity zone on the top of the slab at that depth.