Estimation of Mono discontinuity by using converted wave in seismograms of intermediate earthquakes beneath the Kyushu district

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A detailed structure beneath Kyushu district, Japan, hasn't studied very well. In this study, Moho discontinuity beneath Kyushu district is estimated by the use of prominent S to P converted wave.

In the seismograms of intermediate-depth earthquakes a later phase appears between direct P and S-wave arrival observed at seismic stations in the Kyushu district. This phase is dominant in the vertical component seismogram. The apparent velocity of the phase is comparable to that of the direct P-wave and its particle motion is similar to that of the direct P-wave. These suggest that the later phase is S to P converted wave from at a layer interface. This interface can be interpreted as Moho discontinuity by taking into account the interval time between the direct S-wave and the converted wave (S-Sp time). Depth distribution of conversion interface is estimated by inverting the S-Sp times. S-Sp time is not strongly depended on the velocity structure beneath interface and the location of hypocenter. 278 seismic traces recorded at 63 stations for 117 earthquakes are used for analysis. It is assumed that the configuration of conversion interface is expressed by power series of latitude and longitude.

We could obtain depth distribution of Moho discontinuity. This contour has some characteristics as follows.

1. This contours of depth are increased toward northwest at the sea of western Shikoku.
2. This contours of depth have a tendency to increase gently from the sea to back bone range in the Kyushu district.
3. The contours of depth are nearly parallel to that of seismic zone of subducting Philippine Sea plate in the depth range from 30 to 40 km beneath Kyushu district.

These results indicate that subducting Philippine Sea plate has a relation to the shape of Moho discontinuity.