

Temporal Seismic Observation in Chinese Continent and Its Research Plan: Regional variation of 410km discontinuity around Japan

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We started the temporally installed broadband seismic observation in Chinese Continent. The stations of the observation are Bautou, Taiyuan, Taian and Nanjing. In these stations, we installed broadband seismometer CMG-3T and high-performance recording system. This project is carrying out by the Ocean Hemisphere Project under the collaboration with China Seismological Bureau.

To begin with, we analyzed the data of J-Array for detecting the regional variation of 410km discontinuity. From the travel times and amplitude ratio of the refracted P wave below 210km and one below 410km, the low velocity zone is possible above 410km. With the help of the data from the observation in China, we will be able to develop the above analysis.

We started the temporally installed broadband seismic observation in Chinese Continent. The purpose of this observation is to reveal the velocity structure in the upper and lower mantle beneath Japan and its surroundings. With the help of the widely and densely arranged seismographic network in Japanese Island, the data from temporal observation in China will become the powerful tool for seismological research on the velocity structure beneath Japan and its surroundings. In this paper, we propose a science plan to utilize the data of the observation and describe the preliminary result from the data that we have already had from the other project.

The stations of the observation are as follows: Bautou (BTO:36.211N,117.124E), Taiyuan (TAY:37.713N,112.434E), Taian(TAA:36.211N,117.124E) and Nanjing (NAJ:32.052N,110.018E). In these stations, we installed broadband seismometer CMG-3T (100sec type) and recording system (LS8000WD) with 24bits resolution AD converter. This project is carrying out by the Ocean Hemisphere Project under the collaboration with China Seismological Bureau.

To begin with, we started the data analysis for detecting the regional variation of 410km discontinuity using the data set of J-Array (seismological network in Japan Islands). We analyzed the waveform from 11 events occurred at Kuril, Ryukyu and Izu-Bonin island. The focal depths of those events are ranged from 60-230km and those magnitudes are 5.5 to 6.2. We focused on the travel times and amplitude ratios of P refracted waves whose deepest point is 210-410km in depth (P210r) and ones of 410-660km (410r), which are well observed with the distance of 12 to 15 degrees. Among all, the waveforms from the event occurred at Izu-Bonin have much localized features. The P waves, which pass below Shikoku sea basin, are abnormally slow, and those amplitudes of P210r are abnormally small comparing with those of P410r. From the above analysis, the low velocity and high attenuation zone is possible above 410km discontinuity beneath Shikoku sea basin. The above conclusion is inferred from the limited number of data, and has not much reliable.

Revenaugh and Sipkin(1994) pointed out that the low velocity zone is possible beneath Yellow Sea with depth of around 300-350km above 410km discontinuity from the analysis of multi-reflected ScS waves. Using data from our observation in China, we will be able to advance the same scheme and apply it to the region around Japan. We are expecting to get data and apply them to reveal the velocity structure beneath Shikoku sea basin and around Japan.