Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

SCG08-03 会場:105 時間:5 月 23 日 15:00-15:15

モンゴルの観測点により制約された中国東北部下のスタグナントスラブの欠如
Absence of the Stagnant Slab beneath Northeast China Constrained by a Seismic Station in Mongolia

竹内 希 [1*], NECESSArray Project Team[2]
Nozomu Takeuchi[1*], NECESSArray Project Team[2]

[1] 東京大学地震研究所, [2] 中国・米国・日本
[1]Earthquake Research Institute, University of Tokyo, [2]China, USA, and Japan

Most of previous seismic models suggest that the stagnant slabs are widely distributed in the north western Pacific region. However, after dense broadband seismic network, NECESSArray, was deployed in northeast China, such images are now drastically changing. One of the most interesting features is probably the absence of the stagnant slab beneath northeast China suggested by P delay time tomography (e.g., Obayashi et al., 2011, AGU Fall meeting, S24B-06). Formal resolution tests support the detectability, however, because the image was primarily constrained by teleseismic data, the vertical resolutions in the transition zone may not be sufficiently good to definitely conclude the absence. In this study, we test the absence by using independent dataset with higher vertical resolutions.

The station ULN of IRIS GSN is located at about 26-29 degrees from epicenters of aftershocks of 2011 Japan earthquake. The bottoming points of P are in and around the focused region, and the secondary P therefore have good vertical resolution to the transition zone structure there. These data were not utilized in the previous delay time tomography due to difficulties in travel time measurements of secondary phases.

We previously developed the method for measuring travel times of triplicated P and applied it to the P data observed with NECESSArray and F-net (2011, AGU Fall Meeting, S31E-2295). The method is based on waveform fitting approach, and Simulated Annealing (SA) is used in the optimization. In this study, we applied this method to triplicated P observed with ULN and nearby stations of IRIS GSN and CDSN. We analyzed 192 events in 2009-2011, and about two-thirds of them are aftershocks of Japan earthquake.

We combined the dataset obtained in this study with the previous dataset and conducted delay time tomography. To see which data constrain the absence of the stagnant slab, several models are obtained by using different subsets. We found that, if we use the triplicated and teleseismic data of NECESSArray, we can confirm the absence. If we use only the triplicated data of NECESSArray, the image becomes blurred. However, if we use the triplicated data of both NECESSArray and ULN, we can again confirm the absence. The results suggest that the absence is independently constrained by both teleseismic data of NECESSArray and the triplicated data of ULN.

キーワード: トモグラフィー, 内部構造, 中国
Keywords: tomography, Earth’s internal structure, China