Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)
©2013. Japan Geoscience Union. All Rights Reserved.

SCG08-04 会場:105 時間:5 月 23 日 15:15-15:30

表面波解析を用いた中国東北部の上部マントル構造
Anisotropic structure of the upper mantle beneath the northeastern China from surface wave analysis

一瀬 建日 [1*], 川勝 均 [1], 田中 聡 [2], Y. John Chen[3], Jieyuan NING[3], Stephen P Grand[4], Fenglin Niu[5], 大林 政行 [2], 宮川 幸治 [1], 出原 光暉 [6], 利根川 貴志 [2], 入谷 良平 [6]
Takehi Isse[1*], Hitoshi Kawakatsu[1], Satoru Tanaka[2], Y. John Chen[3], Jieyuan NING[3], Stephen P Grand[4], Fenglin Niu[5], Masayuki Obayashi[2], Koji MIYAKAWA[1], Koki Idehara[6], Takashi Tonegawa[2], Ryohei Iritani[6]

[1] 東京大学地震研究所, [2] 海洋研究開発機構　地球内部ダイナミクス領域, [3] 北京大学, [4]Univ. of Texas, [5]Rice University, [6] 東京大学
[1]ERI, Univ. of Tokyo, [2]Institute for Research on Earth Evolution, Japan Agency for Marine-Earth Science and Technology, [3]Peking University, [4]Univ. of Texas, [5]Rice University, [6]The univ. of Tokyo

In 2009-2011, large-scale high-density seismic array (NECESSArray) in northeast China consisted 120 broadband seismographs has been deployed. We use seismograms observed by these and other temporary observations (NECESSArray, Stagnant Slab Project and BBOBS observation) and permanent network observations in and around China (CB, CD, F-net, IC, II, IU, MY, OHP, RM, TM, TW) to investigate the anisotropic and isotropic three-dimensional shear wave velocity structures in the upper mantle by surface wave tomography technique.

We measured phase speeds of the fundamental and first three higher modes of Love and Rayleigh waves for the source-station pairs using a fully non-linear waveform inversion method by Yoshizawa and Kennett (2002). The measured multi-mode phase speeds are inverted to a 2-D shear wave phase speed structures using an inversion technique by Yoshizawa and Kennett (2004), which allows us to incorporate the effects of finite frequency as well as ray path deviation from the great-circle.

We inverted the multi-mode dispersion curves of Love and Rayleigh obtained by phase speed maps to the anisotropic shear wave velocity model. The reference 1-D model is based on PREM except for the crust for which we adopted the CRUST2.0 model.

We obtained a shear wave velocity structures beneath the northeastern China region. The inverted model has a good resolution in the upper 260 km for isotropic structures and in the upper 460 km for anisotropic structures. Obtained isotropic structure model shows that fast anomalies exist in the Songliao basin and slow anomalies exist in the volcanic region at depths shallower than 120km. Obtained radial anisotropic structure shows that Vsh is faster than Vsv in most of studied region at depths shallower than 150 km and that Vsv is faster than Vsh in two region where southeastern and southwestern part of the Songliao basin at depths deeper than 200km. When we assume that the fast axis of olivine is aligned with the flow direction and this is the cause of the seismic anisotropy, obtained anisotropic structure suggests that horizontal flow is existed at depths shallower than 150km and two vertical flows are existed in the deeper part.

キーワード: 表面波, トモグラフィー, 異方性構造, 上部マントル, 中国東北部
Keywords: surface wave, tomography, anisotropy, upper mantle, northeastern China