

Shear-wave splitting analysis with the dense array of the Joint Seismic Observations at NKTZ

Takashi Iidaka[1]; Yoshihiro Hiramatsu[2]; Iidaka Takashi Japanese University Group of the Joint Seismic Observations at NKTZ[3]

[1] ERI, Univ. of Tokyo; [2] Natural Sci., Kanazawa Univ.; [3] -

1. Introduction

The Niigata-Kobe Tectonic Zone (NKTZ) will be important to the accumulation mechanism of the stress and strain in Japan. It is very important to know the mechanism of the area. The cause of the NKTZ has been researched by many studies. A model with the heterogeneous upper mantle model was proposed. It is very important to know the seismic structure at the crust and upper mantle.

The cause of the NKTZ has been researched by many scientists. Several models have been proposed for the mechanism of the NKTZ. Different mechanisms are considered for the cause of the NKTZ. The source area of the cause of the NKTZ differs in each model. Three areas, which are upper-crust, lower-crust, and uppermost-mantle, are considered as the candidates for the cause of the NKTZ. It is very important to know the seismic structure at the crust and upper mantle to reveal the cause of the NKTZ.

In the Chubu region, seismic anisotropy was researched by Ando et al. (1983) and Hiramatsu et al. (1989). The results suggested that the fast polarization direction of east-west direction was obtained at the southern part. At the northern part, the shear-wave was polarized to the north-south direction. The seismic tomographic studies in the area showed that low velocity region was obtained at the mantle. The seismic structure of the area is expected to be heterogeneous.

In this study, seismic data obtained by the Japanese university joint seismic observations and Hi-net data. The source parameters which were obtained by USGS were used.

2. Data

The seismic stations of the Japanese university joint seismic observations and Hi-net data are used. The earthquakes occurred from 2004 to 2006 are used. The depths of the earthquakes are deeper than 250 km.

3. Analysis and Results

The large lateral variation was found on the polarization direction data. The results obtained in this study are consistent with those of previous studies. The polarization direction at the southern part of the research area is ENE-WSW direction. At the northern part of the research area, the NNE-SSW polarization direction is obtained. The maximum time differences between the polarized two phases at the two areas are around 1 sec.

The cause of the shear-wave splitting has been considered. Two models, which are the olivine alignment model and crack alignment model, have been proposed. The olivine alignment is considered to be caused by mantle flow. The crack alignment model is also acceptable as the cause of the anisotropic structure at the area. The spatial pattern of the polarization direction was compared with the configuration of the subducting Philippine Sea slab. The polarization direction data could be explained by the mantle flow caused by subducting Philippine Sea slab. However, the cause of anisotropic region with the heterogeneous structure was also plausible.