

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

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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.

In the Chubu region, seismic anisotropy was researched by Ando et al. (1983), Hirahara et al. (1998). 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 Jan.1, 2005 to Dec.31, 2005 are used.

3. Analysis and Results

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 east-west direction. At the northern part of the research area, the north-south 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. Our results were obtained by spatially high-dense seismic network. The detail studies with the seismic network will help us to know the anisotropic structure in the area. More research of the seismic anisotropy will reveal the cause of the anisotropic structure.