

Fine seismic structure around the Atotsugawa fault by the analysis of seismic experiment data

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1. Introduction

It is very important to predict the occurrence of inland earthquakes. We did not have much knowledge about the mechanism of inland earthquakes compared with that of inter-plate earthquakes because the cyclic interval of the inland earthquakes is about several hundred or several thousand years. Spatially high dense GPS array (GEONET) reveals a fine map of the strain rate distribution in Japan (e.g., Sagiya et al., 2000). A high strain rate zone, which was called the Niigata-Kobe Tectonic Zone (NKTZ), was found at the central part of Japan. To know the structure of NKTZ is important to understand the mechanism of stress and strain accumulations in the Japanese Islands. A large right-lateral fault, Atotsugawa fault, is located inside NKTZ. The area is one of the important fields to know the mechanism of the inland earthquakes, because a large right-lateral fault is located at the central part of the high strain rate zone. We conducted geophysical observations in this area. As the results of the research in this area, a low velocity area was detected in the lower crust beneath the Atotsugawa fault. A seismic experiment was conducted to reveal the seismic structure of the low velocity area beneath the Atotsugawa fault.

2. Data

A seismic experiment with seven explosive sources with charge size of 300kg - 500 kg and 1108 seismic stations was conducted around the Atotsugawa fault zone, central part of Japan. The refraction and reflection experiments have done with the profile line length of 170 km.

3. Analysis and Results

A clear later phase was found on the record section. The later phase was observed at the seismic stations which is located near the Atotsugawa fault. The phase appeared around 7 sec on the time section. The later phase is considered as the reflected wave at the boundary with a depth of about 20 km. The phase is observed at the seismic stations on the profile line with a lateral scale of 40 km. In this area, clear low-velocity zone was detected at the lower crust just beneath the Atotsugawa fault by the seismic tomography study. The boundary might be related to the low velocity zone. This result is very important to know the mechanism of the model that the low velocity zone is located at the lower crust beneath the active fault.