

A Trial for Active Monitoring of Inter-plate Coupling in Tokai region. -A Dense Array Measurement, Preliminary Results

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Introduction

We started a long-distance seismic measurement using ACROSS from the end of 2004 in Tokai region.

In the region we carried out the measurement, east Aichi and west Shizuoka prefectures, a seismic exploration was done in 2001. In the exploration, a reflected phase by a boundary between Eurasia and Philippine Sea plate was detected [Iidaka, 2003]. Yoshida et al. [2004] measured a seismic wave using the same ACROSS source and seismogram by Hi-net. They also reported that there detected several phases, which seem to be body waves and reflected phases by the plate boundary.

An aim of our research is to ensure that these phases are really reflected phases and also detect temporal changes in properties of these phases.

Measurement

The ACROSS source is continuously operated in Toki City, Gifu prefecture by Tono Geoscience center. The signal distributes in a frequency band from 10 to 20 Hz and repeats with an interval of 50 seconds. We can acquire discrete frequency responses in the frequency band. As the source changes the rotation direction once per hour between normal and reverse, we can synthesize responses in the receiver region to any vibration direction in the source region.

Receiver seismometers were deployed on a line between 40 and 70 km South East from the source. In the region, a strong reflected phase was reported by Iidaka [2003]. In the receiver array, we deployed a dense array, which consists of 12 seismometers and the length is 2 km. We will mainly report about a result of the array measurement. The each array element consists of 3 components seismometer L22D by MarkProducts, which has natural frequency of 2 Hz. We used LS-7000 by DataMark as data loggers. Power was supplied with lead acid batteries and solar battery panel.

Analysis

We can estimate noise level of the received signal in frequency domain using the signal level around the generated signal components. We stacked the received signal weighting inverse of the noise level and reduce noises from outsides.

We acquired transfer function with deconvolution of the stacked records by the generating signal spectra.

Results

As a preliminary result, in a transfer function stacked for 2 weeks, we detected P, S and other several phases. We will apply a array analysis to the records stacked for longer period. It is expected more detailed discussion about the phases and their changes.