

Study of phases for the estimation of the subsurface structure under Horai using ACROSS signal from Toki

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One of the aim of ACROSS is to monitor the temporal change of the plate boundary under Tokai region. It is also expected to help understand time-variant phenomena such as slow slip event and deep low frequency tremor. We observed the seismic signal generated by ACROSS source located at Tono Mine, JAEA (Toki city, Gifu prefecture) using a seismometer array deployed in Horai (Shinshiro city, Aichi prefecture) at about 55 km away from Toki city for 6 months from July to December in 2006. Data of a six-months long were Fourier transformed and were stacked in frequency domain to improve signal to noise ratio. Transfer functions were obtained by dividing the source signal of ACROSS. Inverse Fourier transform yields the transfer functions in the time domain. We applied semblance analysis to the transfer functions of the seismic array and searched for the combination of the incident angle, the azimuth, and the slowness that gives the maximum semblance value.

We reevaluated the data used by Soma (2007) which reported the result using the data obtained by a similar seismic array that was deployed from December, 2004 to September, 2005 and compared the result with this study.

As the result, we confirmed good coincidence of the transfer functions between 2005 and 2006, the stability of the ACROSS signal, and the repeatability of the array observation. Using semblance method, the azimuth, the incident angle and the travel time of each phase in P wave are obtained. The arrival direction of some phases in the ACROSS signal to the seismometer array shows difference from the direction of ACROSS source. Comparing the travel time of later phases obtained by the semblance analysis with the theoretical travel time estimated in Tsuruga et al., (2005), the phases around 13s to 14s is interpreted as the reflected waves from the discontinuity and the plate boundary.

In this presentation, the temporal change of S wave propagation and some phases remained uninterpreted in the previous studies are discussed in detail to interpret the subsurface structure under the seismometer array. We thank for Prof. Kunitomo of JAEA and those who participated in the observation in Horai about the data of ACROSS source.