

Estimation of surface wave group velocities beneath the Beppu bay, western Japan, using a dense broadband array

HAYASHIDA, Takumi^{1*} ; YOSHIMI, Masayuki² ; TOKUMARU, Tetsuyoshi³ ; SUGIYAMA, Takeshi⁴

¹IISEE, Building Research Institute, ²Geological Survey of Japan, AIST, ³Tokumaru Professional Engineer's Office, ⁴Free

S-wave velocity structure beneath the Beppu bay is evaluated with seismic interferometry, using newly observed ambient-noise data. We have already determined surface-wave group velocities beneath central Oita prefecture using the NIED Hi-net data (Hayashida and Yoshimi, 2014 SSJ Fall meeting). The results show importance of higher-density broadband seismic array observations to evaluate detailed spatial variation of deep subsurface structure beneath the bay. We have developed a dense seismic array consisting of 12 broadband stations around the bay area after late August 2014. Each station is equipped with a Hakusan DATAMARK LS-8800 data logger (24bit A/D, sampling at 100Hz) and a Nanometrics Trillium Compact seismometer (T=120s). The power spectral density functions of ambient noise have peaks at frequencies of 0.08Hz-0.1Hz, 0.15Hz-0.25Hz and around 0.5Hz among all stations. We used the continuous ambient-noise data to extract Green's functions between two receivers (66 station pairs) for vertical (Z-Z), horizontal (R-R, T-T) and vertical-horizontal (Z-R, Z-T) components in the frequency range of 0.05Hz-2Hz after the signal processing of Bensen et al. (2007). The stacked cross-correlation functions show distinct wave trains for every pair of stations. However, it is still difficult to estimate surface-wave group velocity dispersions in a wide range of frequency band due to low S/N ratios (<2) and the preliminary results suggest the need for continuous seismic observations.

Acknowledgements:

This research is conducted as a part of Comprehensive Research on the Beppu-Haneyama Fault Zone by the Ministry of Education, Culture, Sports, Science and Technology (MEXT).

Keywords: ambient noise, seismic interferometry, surface wave, group velocity, beppu sedimentary basin