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Application of Seismic Interferometry at the North of Miyagi Prefecture

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We recorded seismograms at the south of the source region of the 2003 Miyagiken Hokubu Earthquake in order to apply the seismic interferometry.
Data were recorded from 8th to 17th on September in 2009. The survey area is surrounded by the seismic survey lines by AIST in 2003, and in a southward direction of the Asahiyama Flexure. We considered that noise by both trains and motor vehicles is useful for the seismic interferometry, and we deployed the seismic line along the narrow zone between the JR Senseki Line and the National Route 45. The JR Senseki Line is electrified by DC. The direction of the seismic line is ENE-WSW, and the length is 2km. We installed basically the 10Hz geophones (SG-10) at intervals of 10m. We also installed 3-components geophones 100m apart from each other. We installed 3-components 2Hz geophones (L-22D) and 10Hz geophones (GS32CT), alternately. We used the distributed seismic recording system (DSS-12), and each acquisition unit is supplied from a rechargeable Li-ion battery.
We are going to compute cross-correlations between every channel. However, we preliminary computed auto-correlations for each channel because of the insufficient computer resources. Relatively good results were obtained from the records with motor vehicles on the National Route. However, cyclic and coherent dominant events were seen in the results obtained from the records with trains. The cyclic and coherent events can be caused by the joints in rails. In each record, we could see no clear events caused by the structure. Therefore, we applied the diversity stack for all records, and we could see a flexure that was the southward extension of the Asahiyama Flexure. The result is consistent with the results of the 2003 seismic reflection surveys. However, dominant several Hz wave caused poor spatial resolution.
In future, we are going to process and analyze; edit traces including train noises, compute cross-correlations, and so on.

Keywords: seismic interferometry