Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

SSS023-11 Room:IC Time:May 23 11:15-11:30

Estimation of Rayleigh wave group velocity in the 1891 Nobi earthquake fault system using seismic interferometry

Hiroaki Sato[1*], Masayuki Kuriyama[1], Yasuhira Aoyagi[1], Yoshiaki Shiba[1], Sadanori Higashi[1]

[1]CRIEPI

During the 1891 Nobi earthquake, it was well known that the successive rupture of some major active faults have occurred about 80 km long in the NE-SW direction. In order to investigate a triggering mechanism of successive rupture of several active faults, it is important to estimate seismic velocity structure in the fault area of this earthquake. In the previous study we have used seismic tomography to estimate velocity structure in the northern part of the 1891 Nobi earthquake fault area by the microearthquake observation. In this research we tried to estimate Rayleigh wave group velocity in the above area using seismic interferometery by a long-term continuous measurement of microtremors.

The three-month continuous measurements of microtremors are conducted at 19 sites in and around the 1891 Nobi earthquake fault system with a receiver spacing of from about 10 to 20 km. The data were processed with seismic interferometric procedure to retrieve Green's function between receivers. We are successful to extract Green's function from stacking of cross-correlation between the two measurements sites using over 30 days of data. The dispersive characteristics of Rayleigh wave were found in the vertical component of observed Green's function of the period range from 0.5 to 8 sec using multiple filter technique. The group velocities of Rayleigh wave in the northern part of the 1891 Nobi earthquake fault area were estimated from the group delay time of two station pairs. As a result, the group velocity between the receivers in the northwestern part of this area (along the Nukumi fault) is high in the period range from 1 to 3 sec and the same in the period range over 3 sec compared to the one in the southwestern part (along the Neodani and Ibigawa fault). In the station pairs across the step between the Nukumi and Neodani fault, the low group velocity is derived in the period range from 3 to 6 sec. These results are able to be well explained by the previous results from seismic tomography.

Keywords: the 1891 Nobi earthquake, Seismic interferometry, Microtremor, Group velocity, Active fault