

Improvement of a system for monitoring very-low-frequency earthquakes

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We have improved a system for detecting and locating regular and very-low-frequency earthquakes (VLFs) based on array-signal-processing technique. Using this system, we have analyzed filtered seismograms (pass band: 0.02-0.05 Hz) observed by high-sensitivity accelerometers (tiltmeters) in the approximately 700 NIED Hi-net and have revealed spatiotemporal distribution of VLFs in and around Japan [Asano et al, 2008]; however, critical error of event location have been found in the surrounding areas of the tiltmeter network due to ill-conditioned station coverage. Therefore we have tried to analyze not only tiltmeter data but also additional data observed at seven F-net and three temporary stations in the surroundings such as southern Kyushu and Ryukyu areas. We separated these ten stations into three arrays and applied semblance technique to the continuous seismograms observed during the periods of May. 26-27, 2015 and Feb. 12-14, 2017, when VLFs were located in Hyuga-nada, southeast off Kyushu, by the routine system only analyzing tiltmeter data. Estimated directions of coherent seismic waves at northern two arrays suggest that these VLFs were widely distributed from off Amami to Hyuga-nada. On the other hand, incident wave directions at southwestern array far from these VLFs were east for most of all VLFs probably due to guided wave along the Ryukyu trench. These present results show that data observed at the neighbor arrays not so far from the VLFs are useful to reject ill-conditioned VLF epicenters and can constrain them in the future.

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