

Spatiotemporal Distribution of Shallow Very Low Frequency Earthquakes along the Nankai Trough and the Ryukyu Trench

ASANO, Youichi^{1*} ; MATSUZAWA, Takanori¹ ; OBARA, Kazushige²

¹National Research Institute for Earth Science and Disaster Prevention, ²Earthquake Research Institute, The University of Tokyo

We have investigated spatiotemporal distribution of shallow very low frequency earthquakes (sVLFs) along the Nankai trough and the Ryukyu trench. Three component seismograms recorded at 40 broadband stations of the NIED F-net were analyzed by using waveform-correlation and back-projection techniques after processing a band-pass filter (0.02 to 0.05 Hz). Here we used known 6 sVLFs and 17 regular interplate earthquakes near the trench axis as template events. Time series of cross-correlation function (CC) at each station was calculated from continuous waveform data and triggered seismograms of template events. Assuming surface wave propagation, CCs are back-propagated onto possible origin times and horizontal locations. We obtained sVLF epicenters by performing a grid search in time and space domains to maximize the averaged CCs from all stations under the condition of high signal to noise ratios that was defined as amplitude ratios between two time windows before and after the surface wave arrivals from the epicenters. As the result of this analysis for the last decade, we detected infrequent activity of sVLF episodes at a few clusters adjacent to the locked zone related to the megathrust earthquakes along Nankai trough: in 2004 and 2009 of Kii peninsula, in 2003 and 2009 off cape Muroto, and in 2003 and 2010 off cape Ashizuri. On the other hand, sVLF episodes in Hyuga-nada and areas along the Ryukyu trench are frequent. Such a variation of seismicity of sVLFs revealed from this study based on the same detection capability may suggest the difference of the plate coupling in the seismogenic zone.

Keywords: Very Low Frequency Earthquakes, Nankai Trough, Ryukyu Trench