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Focal mechanisms of very low frequency earthquakes along the Ryukyu trench axis

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Focal mechanisms of very low frequency earthquakes (VLFs) along the Ryukyu trench were investigated using seismograms from BATS and F-Net. Seismograms recorded during 2007 with high signal-to-noise-ratio were selected and were band-path-filtered at 0.02-0.05 Hz. Afterwards, both local and teleseismic earthquakes were removed from these events using the hypocenter catalogs. Spectra of typical events in these earthquakes show peak frequencies between 0.06 to 0.1 Hz. Through this procedure, 600 events were selected and grouped into three main clusters: 1) Yonaguni-Ishigaki, 2) Okinawa Island, 3) Amami Island. The CMT solutions were obtained for these VLFs using the inversion technique by Nakano and Kumagai (2008). The locations and focal mechanisms were determined by a grid-search method where a minimum residual is searched within each area of latitude range of 5 degrees and longitude range of 5 degrees and a depth range 0 to 100 km. 51 events from the Ishigaki-Yonaguni group were well located with low residuals. However, events in Okinawa Island and Amami Island groups were not as well located because of they were small in terms of magnitude. Among the selected events, low angle thrust fault is dominant. Although some strike-slip and normal fault are included, their reliability is not so high. Based on the events herein studied, the distribution and depth of VLFs suggest that these events occurred mostly in the accretionary prism along the Ryukyu trench similar to those found in Central Honshu. This similarity with the Central Honshu events may suggest that the upper interface of Ryukyu trench is locked.

キーワード: subduction, very low frequency earthquake, Ryukyu trench, focal mechanism, broadband seismogram, source inversion

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