

# Long-Term Activity Changes of Very Low Frequency Earthquakes in the Ryukyu Trench

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Very-low frequency earthquakes (VLFs) have been occurring regularly along the Ryukyu Trench. Their activities are concentrated in the south of the Yaeyama Islands, off the south of Okinawa Island, and near Amami Island. The VLFs occur every two to three months in each region. A single activity lasts about 1 to 3 days. Although there are several clusters of activities between Miyako Island and Okinawa Island, the activity of the VLFs is low in this region. The long-term variation of the activity of VLFs in the plate interface reflects the temporal variation of the degree of strain accumulation and strain release in the plate interface. Therefore, I investigated the long-term changes in the activity of VLFs in each region. The data are based on the VLFs catalog obtained by the method denoted by Nakamura and Sunagawa (2015). The arrival time of maximum amplitude of the VLFE was picked from the vertical waveform with a bandpass filter of 0.02-0.05 Hz, and the epicenter was determined using the arrival time of the maximum amplitude at each seismic station. The VLFs whose magnitudes were 3.5 were used in the analysis. The used period is from 2002 to 2019.

As a result, the activity of the VLFE in the Yaeyama Islands has been gradually decreasing since 2002. In the Yaeyama Islands, a series of  $M_j$  7.0 (March 26, 2002) and  $M_j$  6.9 (March 31, 2002) inter-plate earthquakes occurred in 2002, and seismic activity with magnitudes of 6.0 or more temporarily increased in 2002. The changes in the regular earthquakes activity and VLFE activity would reflect the process in which the strain in the plate interface is temporarily partially released due to the change in the coupling rate at the plate interface in the southwestern part of the Ryukyu Trench.

On the other hand, in the vicinity of Okinawa Island, the activity of the VLFs has been rapidly increasing since 2015. On the other hand, there was no increase in activities around Amami-Oshima Island during this period. During this period, earthquake swarms occurred in the subducting slab near the trench axis of the central Ryukyu Trench. This suggests that the change of the activity of the VLFs and seismicity would reflect the release of the strain with the progress of the slow earthquake on the plate interface.

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