



Spatial distribution of non volcanic tremors offshore eastern Taiwan

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Non-volcanic tremor (NVT), originally identified in the subduction zone of the southwest Japan, have been well studied in the circum-Pacific subduction zones and the transform plate boundary in California. Most studies related NVT to the release of fluids, while some others associated them with slow-slip events, and can be triggered instantaneously by the surface waves of teleseismic events. Taiwan is located at a complex intersection of the Philippines Sea Plate and the Eurasian Plate. East of Taiwan, the Philippine Sea plate subducts northward beneath the Ryukyu arc. The major part of the island results from the strong convergence between the two plates and the convergent boundary is along the Longitudinal Valley. Moreover, an active strike-slip fault along the Taitung Canyon was reported in the offshore eastern Taiwan. In such complicate tectonic environments, NVT behavior could probably bring us more information about the interaction of all the geological components in the area.

In this study, we analyze the seismic signals recorded by the Ocean bottom Seismometer (OBS) deployed offshore eastern Taiwan in September 2009. TAMS (Tremor Active Monitor System) software was used to detect the presence of NVT. 200 tremor-like signals were obtained from the 3 weeks recording period. We use the SSA (Source-Scanning Algorithm) to map the possible distribution of the tremor. In total, 180 tremors were located around the eastern offshore Taiwan. The tremors are mainly distributed in two source areas: one is along the Taitung Canyon, and the other is sub-parallel to the Ryukyu Trench, probably along the plate interface. Many tremors are located at depth shallower than 5 km, which suggests a possible existence of a weak basal detachment along the sea bottom. Other tremors with larger depth may be related to the dehydration of the subducting sea plate as suggested by the former studies. Limited by the short recording period of the OBS experiment, we could not obtain any possible repeating interval and the spatial migration about the tremor occurrence. However, the presence of NVT offshore eastern Taiwan shown in our study still brings us valuable understanding about the undergoing tectonic processes in the marine area.