

Ocean bottom seismographic observation and similar earthquake detection in the northern part of the Nansei Islands

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The Ryukyu Trench subduction zone is seismically active region. In the northern part of the Nansei Islands, both seismic and aseismic events have occurred along the subducting plate interface. Spatial distribution of small local earthquakes in this region seems to show some seismic clusters and gaps. Short-term slow slip events and shallow low-frequency tremors have been also observed by recent onshore seismic and geodetic data. However, patterns of their slip behavior and spatiotemporal relationship between regular and slow earthquakes are less well understood because seismic stations are located only at the islands that are linearly arranged; at least 100 km away from the Ryukyu Trench. We have therefore conducted repeating long-term ocean bottom seismographic observation off the northern part of the Nansei Islands since 2014. First, we deployed three pop-up type ocean bottom seismometers (OBSs) in April 2014. Then, three more OBSs were added to the network in July 2015, and after that deployment and retrieval of OBSs at the same position have been repeatedly carried out every about one year. The station interval is about 40–60 km.

In this study, we focus on regular local earthquakes, particularly seismic clusters beneath the central part of the observation network. In order to obtain key properties of the clusters and to detect missing earthquakes, we apply a matched-filter technique to OBS continuous waveform data. As template event waveforms, we select events determined by Nansei-Toko Observatory for Earthquakes and Volcanoes, Kagoshima University. The hypocenters of the template events are relocated by merging manual pick data of P phases and S phases recorded on the OBSs with those on the onshore stations. As a preliminary result, we achieve detection of missing earthquakes using example template events and a threshold rule based on the median absolute deviation of the mean correlation coefficient. In this presentation, we further discuss the characteristics of waveform similarity of the OBS data.

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