

Seismic Activity in the central Tottori prefecture with an M6.6 earthquake on October 21, 2016 detected by the Matched Filter Method

*Shiro Ohmi¹

1. Earthquake Hazards Division, Disaster Prevention Research Institute, Kyoto University

Seismic activity in the central Tottori prefecture, southwest Japan was analyzed by using the Matched Filter Method (MFM). This swarm activity started with an M6.6 event on October 21, 2016. In this analysis, we implemented MFM as a pseudo-automatic hypocenter determination system that enables to locate earthquakes one by one. Our interest is if the MFM is a useful tool for immediate grasp of an ongoing intense seismic activity.

In the MFM analysis, selection of the template earthquakes is important since the spatial distance and magnitude difference among the template earthquakes affect the detectivity of earthquakes. For this purpose, we separately implemented the conventional event detection algorithm using STA/LTA (short term average of the ground motion / long term average of the ground motion) to detect possible template earthquake in order to configure a set of template earthquakes. We manually inspect the hypocenter of a possible candidate of a template event and then we inspect the succeeding event if it is also suitable for a template. We used the spatial distance and magnitude difference as the criteria to select a succeeding template. In the current analysis, if the spatial distance is greater than 2.5 km and magnitude difference is greater than 1.0 among existing templates, this event is selected as a new template. We repeated this procedure during 17 days from October 21 to November 7 to select a set of templates. When we obtained a new templates, all the continuous record in the test period are scanned by the new template to detect new earthquakes. We finally selected 37 template earthquakes in this manner in this test period.

During the test period of 17 days, about 7,000 earthquakes are detected and located with 37 templates. Comparison with manually inspected catalogue provided by JMA (Japan Meteorological Agency) indicates that the configuration of earthquake clusters well coincide with each other with slight differences and it was useful to understand the outline of the activity in the early stage. Although the manually inspected catalogue data is essential for the precise evaluation of a seismic activity, we suppose MFM is one of the powerful tools for an immediate grasp of the ongoing intense swarm activity.

Keywords: Central Tottori earthquake, Matched Filter Method, pseudo-automatic hypocenter locating system

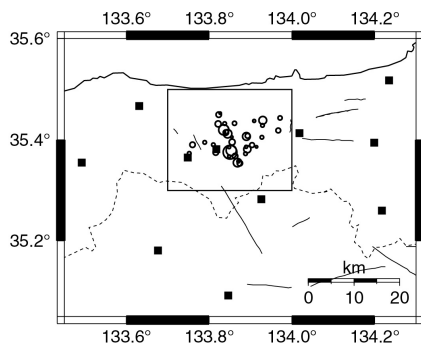


Fig.1

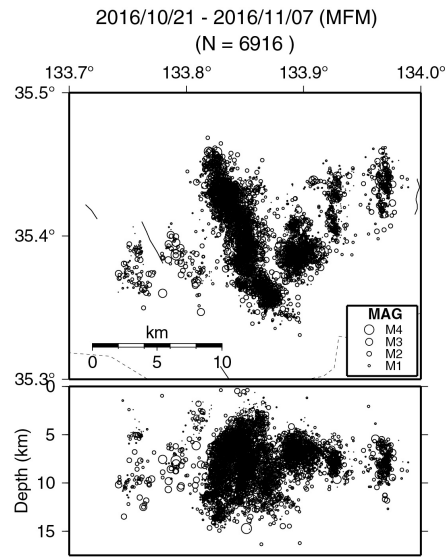


Fig.2

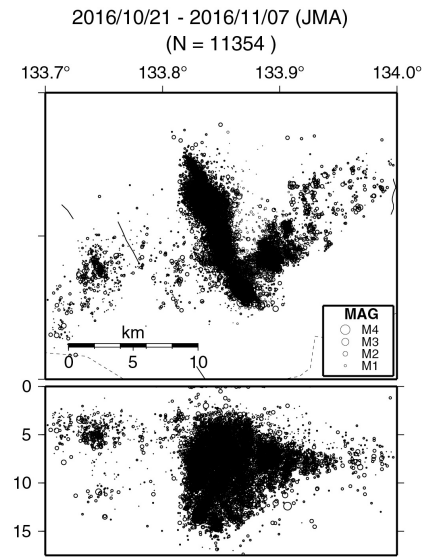


Fig.3