Seismic activities with regards to the eruptions of Kuchinoerabujima in 2014 and 2015 observed by V-net network

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Kuchinoerabujima, which is located about 12km west of Yakushima, is a volcanic island. Explosive eruptions occurred at Shindake in Kuchinerabujima in 2014 and 2015. It was reported that a new fissure was generated in the western part of the crater of Shindake in the eruption in 2014, according to Coordinating Committee for Prediction of Volcanic eruption in Japan. In addition to this phenomenon, it is also reported that seismic source time functions with regards to these eruptions are different between the eruptions in 2014 and 2015. The north-south component of the source time function was dominant in the eruption in 2015 although only the vertical component of source time function is dominant compared to other components (Matsuzawa: personal communication). To reveal the relationships between these phenomena and seismic activities, we determined the hypocenters and performed waveform analyses using the data-set by Japan Meteorological Agency (JMA) and National Research Institute for Earth Science and Disaster Prevention (NIED) in this study. We assumed half-space with Vp=2.5km/s as a velocity structure. The datasets are composed of 165 events from July 27, 2014 to August 3, 2014 (before the eruption in 2014) and 958 events from April 15, 2015 to June 4 in the eruption in 2015 (507 events before the eruption and 451 events after the eruption). It was found that the hypocenter distribution before the eruption in 2014 concentrated in the western part of Shindake and the hypocenter distribution before the eruption in 2015 tends to be distributed over north and south direction in the vicinity of Shindake. The locations of these hypocenters are thus consistent with the location of the fissure generated by the eruption in 2014 and the source time function with the dominant component of north and south direction estimated in the eruption in 2015. On the other hand, it was found that the direction of particle motion of events after the both eruptions tends to be consistent with that by both eruptions. Changes of the corner frequency of the events were not observed before and after the eruption, in both eruptions. From the hypocenter distribution before the eruption in 2015, it is thus implied that eruption products moved to the north and south direction, using an existing weak line generated by the events with the distribution of the north and south direction in the vicinity of the Shindake before the eruption in 2015.

Keywords: Kuchinoerabujima, hypocenter distribution, seismic source time function

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