

Ocean bottom seismic observation around erupting Nishinoshima and Chichijima, Ogasawara Islands, Japan

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Nishinoshima Island located in Ogasawara Islands started volcanic eruption in November 2013. Meteorological Research Institute carried out ocean bottom seismic observation from July to September 2015 to detect earthquakes associated with the eruption of Nishinoshima, and to improve hypocenter determination accuracy in the area of the Ogasawara Islands. Ocean Bottom Seismographs (OBSs) were installed at five sites around Nishinoshima, and seven sites around Chichijima Island. This study aims to clarify the results of earthquake hypocenter distribution and analyze them.

Around Chichijima area (July 15 to September 30, 2015)

(1) 223 hypocenters were determined, and these were distributed along the plate boundary of Hayes et al. (2012).

(2) These hypocenters were distributed like “double seismic planes (Double Seismic Zone)” in depth ranges of 90-180 km in the subducting Pacific slab. (Nakata et al., 2017)

(3) Magnitudes of determined hypocenters were distributed in M1.8-M5.0, and relatively large (M4.0-M5.0) earthquakes were distributed in west side of the observation network.

Around Nishinoshima area (September 1 to 3, 2015)

(1) 318 hypocenters were determined, and they were distributed at depth shallower than 5.0 km.

(2) Most of the hypocenters were identified at depth between 0 km and 3.0 km. This depth range corresponds to the area just above the magma chamber which Sano et al. (2016) suggested with temperature of 970-990 degrees at the depth of 3.0-6.0 km beneath Nishinoshima Island.

(3) Magnitudes of the determined hypocenters were distributed in M0.3-M1.2, and relatively large earthquakes were located in deeper area.

In addition to the above results, we report spectrum analysis of seismic records in detail.

Keywords: Nishinoshima, Ogasawara, Volcano, Earthquake