

2013 eruption of Nishinoshima volcano, Ogasawara islands, Japan

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Nishinoshima volcano is a basaltic to andesitic maritime volcano on the volcanic front of the Izu-Bonin arc. For the first time ever, the submarine eruption including movement of vents and development and disappearance of new islands happened off the southeastern coast of the Nishinoshima island in 1973. The eruption stopped in May 1974 and the Nishinoshima island and the new volcanic islands were joined by sand drift in June. Then geographic changes was continued by erosion and sand drift till 1990s.

The eruption column and new volcanic island were firstly discovered by the airplane of Japan Defensive Force on 20 Nov. 2013. Then Japan Coast Guard found the new volcanic island with violent phreatomagmatic eruption. The following day, 21 Nov. 2013, phreatomagmatic eruption had occurred and volcanic edifice was developing. The eruption style changed into the Strombolian-type and lava started to flow from the vent on the eastern flank of main edifice on 22 Nov. 2013. In succeeding days, lava emerged from the western vent and pyroclastic cone was built up in the large crater in the center of main edifice. The vent of the pyroclastic cone effused blue-white volcanic gas consistently and spatter occasionally. On 24 Dec. 2013, new vent started to produce eruption column at the north of the central vent. These vents are located on the 1973 vents.

The new volcanic island consists of lava flow and water depth around eruption center may be almost constant, so growth rate of the island and magma supply rate should be equal. The growth rate estimated from the air photo is almost constant, hence the magma supply rate may be kept constant.

It is unclear that when did this volcanic activity start. But high temperature anomaly and difference of normalized water-leaving radiance within sea water are shown at the southern sea area in the satellite images published by the Earth Observation Research Center on Nov. 7. The volcanic activity may start on or before Nov. 7.

Future volcanic scenarios are uncertain, but volcanism is still active and shows no sign of end of eruption as of early-February.

Keywords: Nishinoshima volcano, volcanic island, Izu-Ogasawara arc, phreatomagmatic eruption, Strombolian eruption, maritime volcano