

Abstract

The island of Nishinoshima, located ~940 km south of Tokyo, belongs to the volcanic front of the Izu-Bonin arc-trench system. The 2013–15 Nishinoshima eruptive episode began in November 2013 when a new island was created just south of the main island. The new island continued to spew large amounts of lava. After one month, lavas from the new island had merged with and covered much of the main island.

Since Nishinoshima Island is uninhabited, this eruption caused no damage. However, this eruptive episode is volcanologically interesting because it is the first reported eruption to maintain an effusion rate of 10^5 m³/d for around two years. Monitoring of the eruptive activity at Nishinoshima included observations from a research vessel and analyses of various remote-sensing datasets from multiple satellites.

We summarize observations and analytical results in six chapters of this technical report: (1) visual observations of eruptive activity, (2) plume activity recorded by optical-sensor satellites, (3) thermal activity recorded by geostationary meteorological satellites, (4) lava effusion and ground deformation recorded by the advanced land observing satellite (ALOS-2), (5) SO₂ emissions in volcanic plumes, and (6) seismicity recorded by ocean bottom seismometers. Temporal variations of these datasets have been synchronized. All observed activity decreased gradually from June to July 2015.

Results in this work indicate that a multidisciplinary approach facilitates eruption monitoring, even in the case of isolated volcanic islands such as Nishinoshima. Remote sensing observations and analyses proved to be especially effective.