

Growth and evolution of isolated volcanic island, Nishinoshima, Ogasawara

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The process of birth and growth of ocean islands is an interesting phenomenon in the field of geoscience in terms of the creation of new land and the creation of a place for new terrestrial life activities. Nishinoshima is a rare place on the earth that can trace the process of birth, formation and evolution of such ocean islands from various viewpoints of research fields. Meanwhile, since the eruption in the shallow sea can be a factor of maritime hazards, the establishment of investigation/observation method and risk assessment method is also an important subject. Nishinoshima is located in a place deserving to call as an isolated island, 130 km west of Chichijima, Ogasawara Islands. In November 2013, a new island was born by submarine eruption. It gradually covered the preexisted island and increased the land. A series of eruptive activities in Nishinoshima from 2013 to 2018 provided various valuable data on the birth of a new volcanic island and its growth process, and was also important as a place for practical investigation and observation of remote island volcanoes. The eruptive activity of Nishinoshima is divided into November 2013 - December 2015 (first stage), April to August 2017 (second stage), and July 2018 (third stage). Meanwhile, various surveys and observations were conducted to understand the activities of Nishinoshima. Immediately after the beginning of the eruption, the observation data from remote was the only information source, and based on analysis of high-resolution satellite images and direct observation from the airborne, the growth process of Nishinoshima was monitored, focusing on the changes in surface topography and morphology, area, volume, and discharge rate. After that, following the decline in activity at the end of 2015, comprehensive investigation of volcanic activity and biota was carried out in October 2016. In this survey, earth science and ecological scientists collaborated with each other to conduct a landing survey, in order to minimize the risk of bringing invasive species to new Nishinoshima, and lava samples were collected directly for the first time, and the seismometer and the microphone were also installed. In 2017 and 2018, Nishioshima became active again and grew larger, finally its activity ended at the end of July 2018. After 2016, surveys were conducted remotely utilizing drone and unmanned helicopter, taking images and movies of new lavas and craters, sampling eruptive products, installing and collecting loggers for ecological monitoring, magnetic survey and others were carried out, and the result enhancing our understanding of activities and evolution of Nishinoshima is being obtained. Such surveys and observations in Nishinoshima, where it is difficult to access and the perspective of conservation of primitive ecosystem is also necessary, may have common terms with surveys of extraterrestrial body surface. In this presentation, I will introduce the growth and evolution of Nishinoshima, the volcanic activity, and the methods and results of surveys carried out so far, while being conscious of the connection with planetary volcanology.

Keywords: volcanic island, Nishinoshima, remote observation, landing survey