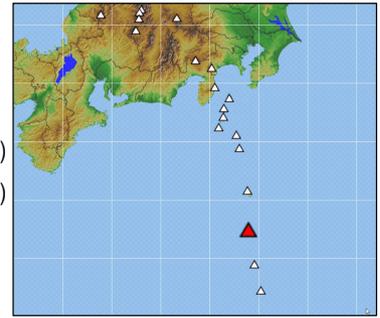


65. Aogashima

Continuously Monitored by JMA

Latitude: 32°27'30" N, Longitude: 139°45'33" E, Elevation: 423 m (Otonbu)
(Triangulation Point - Aogashima)



Overview of Aogashima taken from southeast side on November 18, 2011. Courtesy of the Japan Coast Guard.

Summary

Aogashima is a volcanic island measuring 3.5 km north by northwest to south by southeast, and 2.5 km west by southwest to east by northeast. It has a 15 km x 8 km edifice below sea level; a relative height amounts to 1,100 m above the sea floor. The relatively old Kurosaki volcano remains at the northern edge of the island, with the rest of the island being made up of the main stratovolcano. The main stratovolcano has a large crater, measuring 1.5 to 1.7 km diameter, and a small caldera (the Ikenosawa crater). The central cone, Maruyama pyroclastic cone, is located inside the center. The Kurosaki volcano and main stratovolcano are both mainly basalt, and contain a small amount of andesite.

During the later period of main stratovolcano activity (approximately 2,000 to 3,000 years ago), repeated phreatomagmatic explosions occurred, forming the Ikenosawa crater. The eruptions of 1780 to 1785 started with scoria fall to build the Maruyama pyroclastic cone inside the Ikenosawa crater; finally, an andesite lava flow filled the Ikenosawa crater, burying the Oike and Koike lakes which existed before the Tenmei eruption. The temperatures of fumarolic areas are currently high in the Ikenosawa crater, on the west side of Maruyama and directly below the crater wall, as well as near the northern edge of the island. The SiO₂ content is between 48.6 and 76.1 wt %.

Red Relief Image Map



Figure 65-1 Topography of Aogashima.

1:50,000 scale topographic map (Hachijojima) and digital map 50 m grid (elevation) published by the Geospatial Information Authority of Japan were used.

Submarine Topographic Map

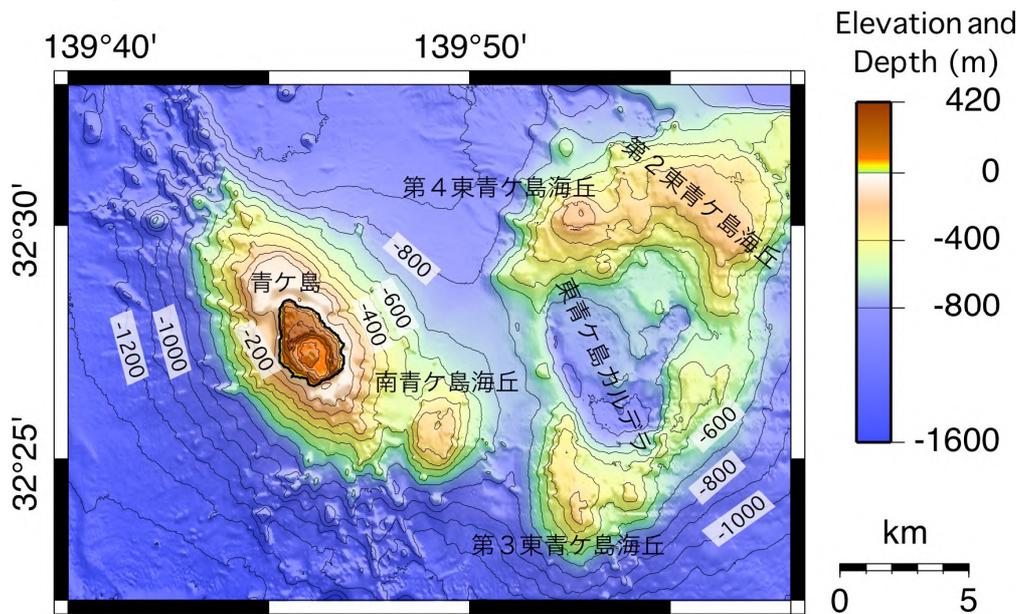


Figure 65-2 Submarine topographic map of the Aogashima area (Japan Coast Guard).

Geological Map

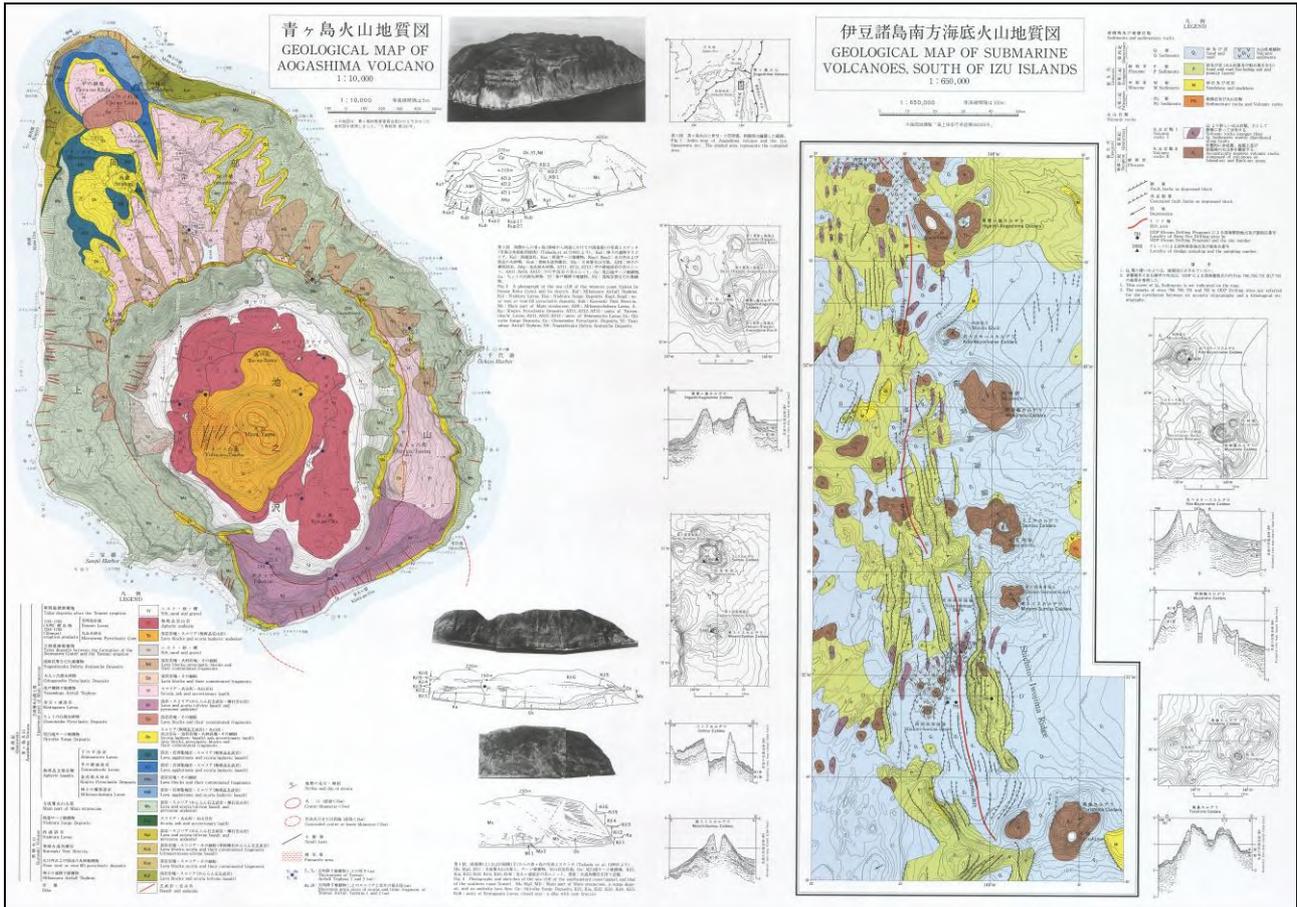


Figure 65-3 Geological map of Aogashima (Takada et al., 1994).

Chronology of Eruptions

▪ Volcanic Activity in the Past 10,000 Years

In the last 10,000 years, eruptive activity was confirmed at the main stratovolcano. Approximately 3,600 years ago fissure eruptions with phreatomagmatic explosions occurred on the northwestern flank. Then, between 2,400 and 3,000 years ago, lava flows filled the crater-shaped depression in the southeast of the island (the Kintagaura lava); next, explosive eruptions became dominant to deposit scoria falls on the northeastern slope of the island (the Yasundogo air-fall deposits). This was followed by a debris avalanche, ultimately forming the Ikenosawa crater.

Inside the Ikenosawa crater, air-fall scoria and lava flow were discharged by an eruption in the 18th century, forming the Maruyama pyroclastic cone (Tokyo Disaster Management Council, 1990).

Period	Area of Activity	Eruption Type	Main Phenomena / Volume of Magma
3.9←→3.7 ka	North of Aogashima, fissure crater running north by northwest to south by southeast	Magmatic eruption	Lava flow, tephra fall, pyroclastic surge. Magma eruption volume = 0.05 km ³ DRE.
3.7←→2.7 ka	Main stratovolcano summit	Phreatomagmatic eruption	Pyroclastic surge, tephra fall.
3.7←→2.7 ka	North by northwest of Aogashima	?	Pyroclastic material.
2.8←→2.4 ka	Southeast of Aogashima	Magmatic eruption	Lava flow and tephra fall. Ikenosawa crater formed. Magma eruption volume = 0.31 km ³ DRE. (VEI 4)
2.8 ka<	?	?	Pyroclastic material.
2.8 ka<	Summit area	(Collapse)	Debris avalanche. Occurred after Kintagaura lava and Yasundogo air-fall deposit eruptions.

* Volcanic periods, areas of activity, and eruption types taken from the Active Volcano Database of Japan, AIST (Kudo and Hoshizumi, 2006). All years are noted in calendar year, "ka" within the table indicates "1000 years ago", with the year 2000 set as 0 ka.

A←→B: Eruption events taking place at some point between year A and year B

A<: Eruption event before year A.

▪ Historical Activity

Year	Phenomenon	Activity Sequence, Damages, etc.
1652 (Joo 1)	Eruption?	Volcanic plume.
1670 to 1680 (Kanbun 10 to Enpo 8)	Eruption	The eruption occurred in the Ikenosawa crater (Oike). Fine volcanic sand emission from? crater (Oike) (continued for approximately 10 years).
1780 (An'ei 9)	Eruption	Earthquake swarms for approximately 1 week, starting on July 19. New crater formed on July 28, discharging a large volume of hot water. Increase in number of pits, rise of water level of lake, increase in water temperature. Plants withered and died.
1781 (Tenmei 1)	Eruption	The eruption occurred in the Ikenosawa crater (at Misonegasaki). Earthquakes began the day before the eruption. On June 2 volcanic ash was ejected from the crater floor, followed by hot water sprang out. Agricultural land damaged.
1783 (Tenmei 3)	Moderate: Magmatic eruption → (lahar)	Tephra fall, lahar. The eruptions occurred at multiple craters and the Maruyama pyroclastic cone in the Ikenosawa crater. Volcanic sand discharge on March 26. Earthquake on April 10, followed by formation of a crater on the crater floor Incandescent volcanic blocks up to roughly 2 m across were ejected, fell around the island. 61 houses were burned down, and 7 people were killed. On April 11 volcanic sand and mud were discharged. On April 15, volcanic flames and a black volcanic plume were observed, and projectile blocks buried the crater floor, forming two pyroclastic cones over 100 m high. Magma eruption volume = 0.006 km ³ DRE. (VEI 3)
1783 to 1785 (Tenmei 3 to 5)	Moderate: Magmatic eruption	Lava flow. The eruption occurred at the Maruyama pyroclastic cone. Magma eruption volume = 0.0025 km ³ DRE.
1785 (Tenmei 5)	Moderate: Magmatic eruption	Tenmei 5 eruption: Tephra fall → lava flow. The eruption occurred at the Maruyama pyroclastic cone. On April 18 an eruption began from the crater floor, producing a volcanic plume and ejecting incandescent blocks and mud. The eruption continued until roughly May. An estimated 130 to 140 of the 327 residents at the time were killed. The rest evacuated to Hachijojima. The island remained devastated for over 50 years afterwards. Magma eruption volume = 0.009 km ³ DRE. (VEI 3)
2012 (Heisei 24)	Discolored water	Aerial observation by the Japan Coast Guard on August 26 confirmed a circle of discolored light green water, roughly 900 m in diameter, in the sea southeast of the island (at a distance of approximately 1,300 m southeast of the southern tip of the island, at a depth of 63 m). The discolored water was not observed on September 21.

* Reference documents have been appended with reference to the Active Volcano Database of Japan, AIST (kudo and Hoshizumi, 2006) for volcanic periods, areas of activity, eruption types, and eruption events.

Whole Rock Chemical Composition

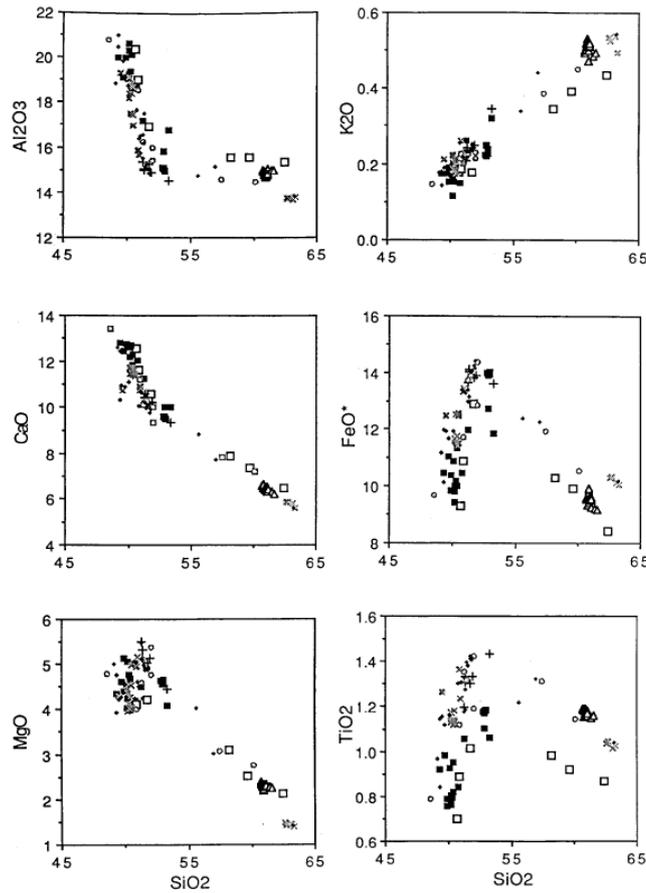


Figure 65-4 Aogashima volcano whole rock chemical composition (Takada et al., 1992).

○: Oshiraike surge deposits, +: Aphyric basalts, ■: Main part of main stratocone, Kurosaki volcano, △: Tenmei eruption deposits, ●: Yasundogo tephra, x: Kintagaura lava

Precursory Phenomena

Approximately 2 and half years before the major eruptions of the 18th century period of eruptive activity earthquake and fumarolic activity increased, as did water levels and temperatures in the caldera lake.

Recent Volcanic Activity

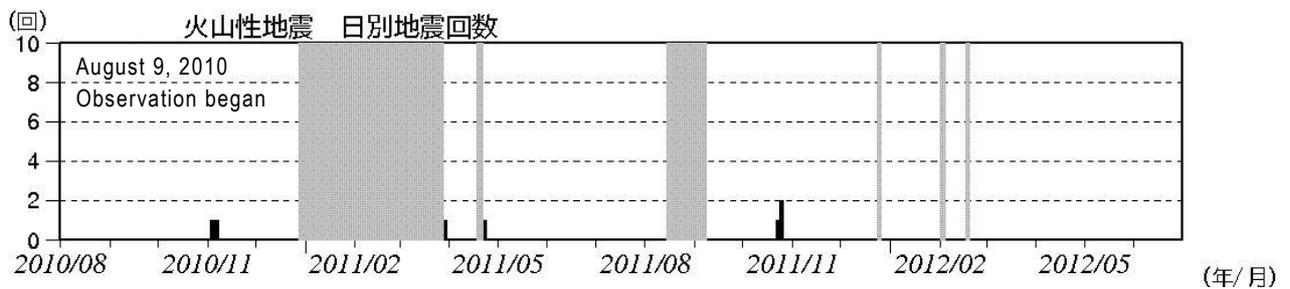


Figure 65-5 Number of earthquakes per day (August 1, 2010, to June 30, 2012).

Figures are missing for areas in gray due to equipment failures. Few earthquakes occurred, and volcanic activity was calm.

Information on Disaster Prevention

① Hazard Map

None

Social Circumstances

① Populations

- Island population: 177 (according to Tokyo statistics as of January 1, 2011)
- Residential area on the slope of the volcano, etc.: There is a village on the mountain flank of Aogashima. It is located 1.2km north from the center of the Ikenosawa crater.

② National Parks, Quasi-National Parks, Number of Climbers

Number of sightseers per year: Approximately 300 (according to 2010 Tokyo Hachijo Branch Office Jurisdiction Overview)

Number of mountain-climbers per year: Unknown

③ Facilities

- Port facilities
 - Sanpo Port
- Heliport

Monitoring Network

* Monitoring sites with multiple observation instruments are indicated by small black dots, and other symbols indicate types of monitoring.



1:50,000 scale topographic map (Hachijojima) published by the Geospatial Information Authority of Japan was used.

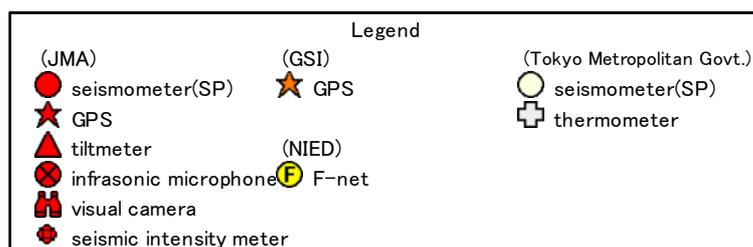


Figure 65-6 Monitoring network.

Bibliography

- Takada, A., et al. (1992) Geology of Aogashima Volcano, Izu Islands, Japan. Bull. Volcanol. Soc. Japan, **37**, 233-250.
 Takada, A., et al. (1994) Geological Maps of Aogashima Volcano and Submarine volcanoes, South of Izu Islands. Geol. Surv. Japan (in Japanese with English Abstract).

(Tsukui, M.)