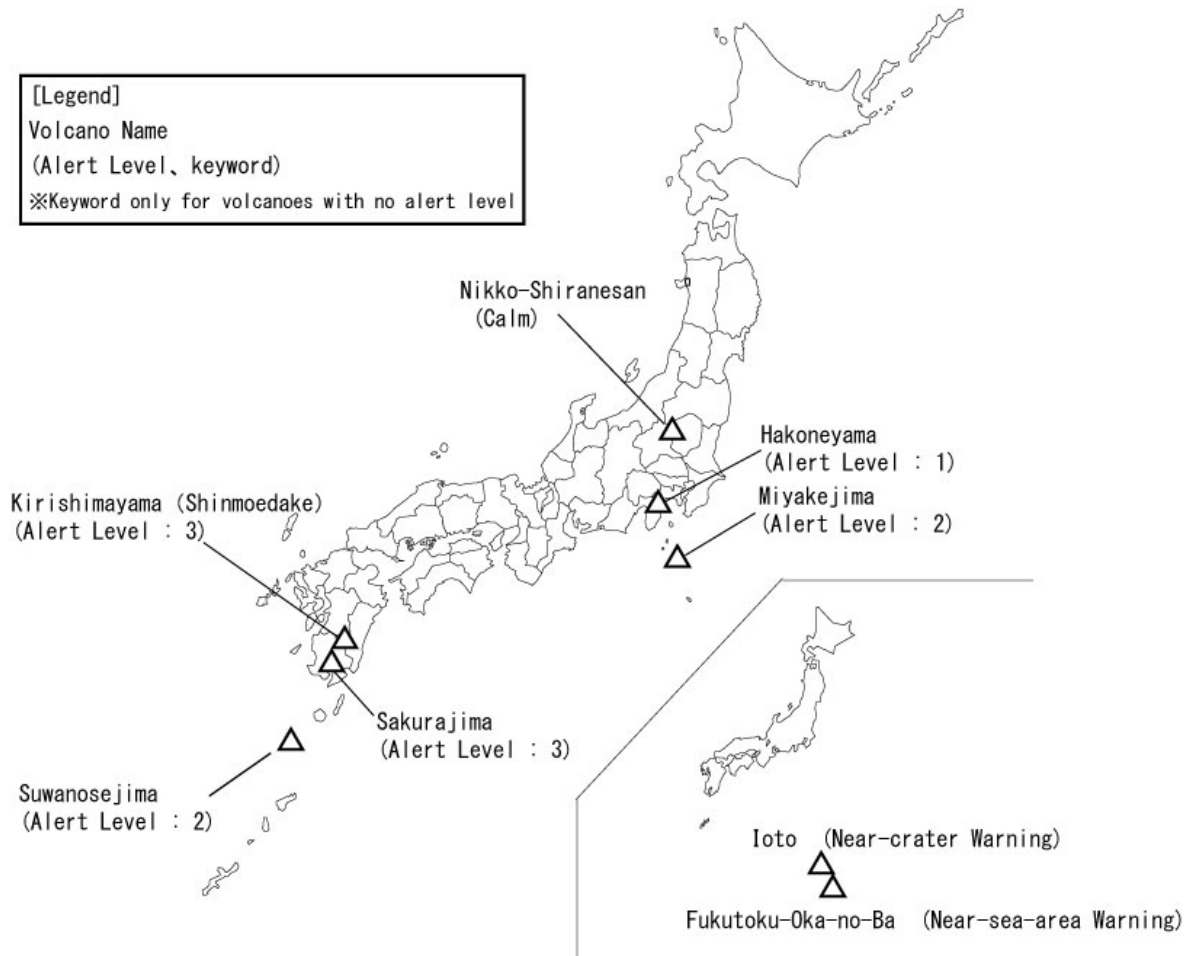


Monthly Volcanic Activity Report (February 2013)



Nikko-Shiranesan (Calm)

Volcanic seismicity near the summit of Nikko-Shiranesan remained at low levels during the reporting period. Meanwhile, seismicity in the area 5 - 10 kilometers north-northeast of the mountain became active on the afternoon of February 25th, when a magnitude 6.3 earthquake occurred at 16:23 JST with a hypocenter located 3 km below sea level and 10 kilometers north-northeast of the peak. Its maximum seismic intensity on the Japan Meteorological Agency (JMA) scale was 5+ in Nikko City (Tochigi Prefecture). Aftershocks with maximum seismic intensities between 1 and 4 on the JMA scale continued until February 28th. Seismic activity has declined since February 27th, and no volcanic tremors have been observed.

This movement was not accompanied by fumarolic activity or crustal deformation.

There were also no changes in the volcanic activity, or any signs of eruption affecting the area near the crater.

Hakoneyama (Alert Level: 1)

The number of shallow earthquakes near Mt. Komagatake to Sengokuhara had been fluctuating. Although it had increased temporarily on February 10th and 16th, seismic activity has remained at low levels from February 18th to March 6th. The results of volumetric strainmeter observation by JMA and tiltmeter observation by JMA and the Hot Spring Research Institute of Kanagawa Prefecture indicated a slight inflation of the volcano, which has slowed down since the middle of February. According to crustal deformation data obtained by the Geospatial Information Authority (GSI), some baselines around Hakoneyama have slightly extended since around the end of 2012.

Miyakejima (Alert Level: 2)

Gas-and-steam plumes rose to heights of approximately 100 – 300 m above the crater rim. According to field surveys on February 8th and 21st, the amount of sulfur dioxide (SO₂) flux was approx. 200 t/d and 400 t/d respectively (Fig. 1), indicating relatively lower emission of volcanic gas than usual. According to a report from Miyake Village, relatively high concentrations of SO₂ were occasionally recorded in inhabited areas.

An aerial observation was conducted in cooperation with Japan Ground Self-Defense Force (JGSDF) on February 20th. Infrared observation revealed that high-temperature areas remained around main crater located south wall of the summit crater, which was almost identical with the result of the previous survey in January 2010.

Geomagnetic observation revealed that there was no change in an inner-heat state beneath Miyakejima.

Volcanic seismicity has largely remained at low levels. Hypocenters were located just beneath the summit crater of Miyakejima as before. No tremors have been observed.

According to continuous GPS observation data, ground deformation indicating contraction in shallow parts of the mountain has continued since 2000, but has been gradually diminishing. Long-term extension of the baseline along the north-south section of Miyakejima has also been observed since 2006, indicating expansion in deeper parts.

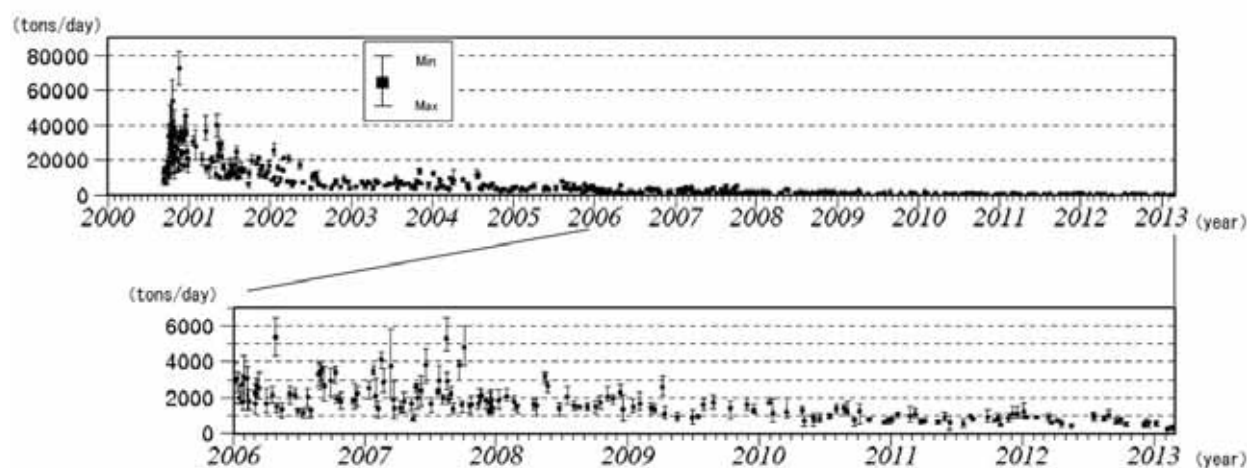


Fig. 1 SO₂ emission rate at Miyakejima.

Ioto (Near-crater Warning)

It is presumed that small phreatic eruption had occurred in the old crater located at the west of the island (so-called: Million Dollar Hole) from February 17th to 18th.

Volcanic activity of Ioto became temporarily active from late April to early May 2012. According to crustal deformation data obtained by GSI, rapid uplift was observed and followed by subsidence in that period and since then, ground deformation had slowed down to an almost static state. However, slight uplift has been observed again since around January 2013. The number of volcanic earthquakes was temporarily increased in several days during the reporting period.

Fukutoku-Oka-no-Ba (Near-sea-area Warning)

According to the past observation conducted by the Japan Coast Guard (JCG), Japan Maritime Self-Defense Force (JMSDF) and JMA, discoloration and floating objects have been frequently observed in the waters surrounding Fukutoku-Oka-no-Ba in recent years, which are considered to be caused by volcanic activity. The latest submarine eruption occurred on 3rd February 2010.

Kirishimayama (Shinmoedake)(Alert Level: 3)

No eruptions were observed at Shinmoedake in the reporting period (the last explosive eruption occurred on March 1st, 2011, while the last eruption of any kind was on September 7th of the same year). As before, the white-plume height was less than 200 m above the crater rim.

Volcanic seismicity remained at low levels, with 25 earthquakes in February (31 in January). 4 hypocenters were determined to be located at northeast of Shinmoedake, and most of other hypocenters were estimated to be just beneath the crater of Shinmoedake. No volcanic tremors have been observed since March 2012.

According to field survey on February 7th, no significant amount of the sulfur dioxide (SO₂) was detected (no detection during previous survey on January 24th).

According to regional deformation observations conducted by GSI, baseline extension caused by magma supply to a deeper chamber to the northwest of the crater has gradually slowed down to a static state since December 2011. However, baselines between Ebino and Makizono, as well as Makizono and Miyakonojo2 had shown a tendency to shorten slightly since May 2012, but have been in a static state since September of the same year.

An aerial observation was conducted in cooperation with JMSDF on February 13th (Photo 1). It revealed that there was no change in the shape of accumulated lava and status of fumaroles inside the crater compared with those in the previous survey. Several fumaroles were observed on the north-east and south side of accumulated lava in the crater. A tiny amount of white plume, which was no higher than the crater rim, rose mainly from east and north margin of the lava. And plural puddles were observed on the lava as in the previous survey on November 8th 2012. Infrared observations revealed no significant change in the temperature distribution, including comparatively high-temperature areas with fumaroles rising, as well as those along especially the northern and southern margin of the lava. In the crack of western slope, although no plume was observed, there was a relatively high-temperature area as in a previous survey.

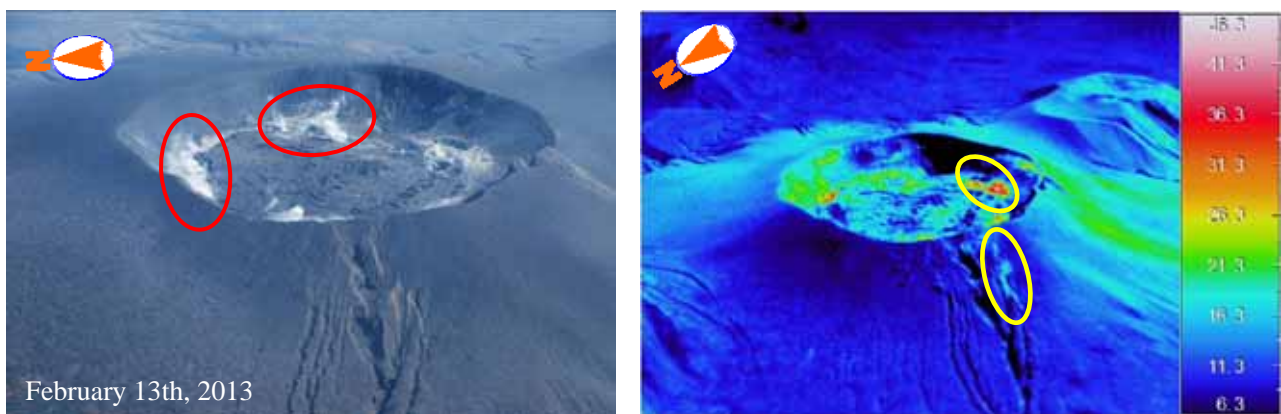


Photo 1. Aerial survey on February 13th. Courtesy of JMSDF.

Red circles indicate weak white-plumes. Yellow ones indicate relatively high-temperature areas.

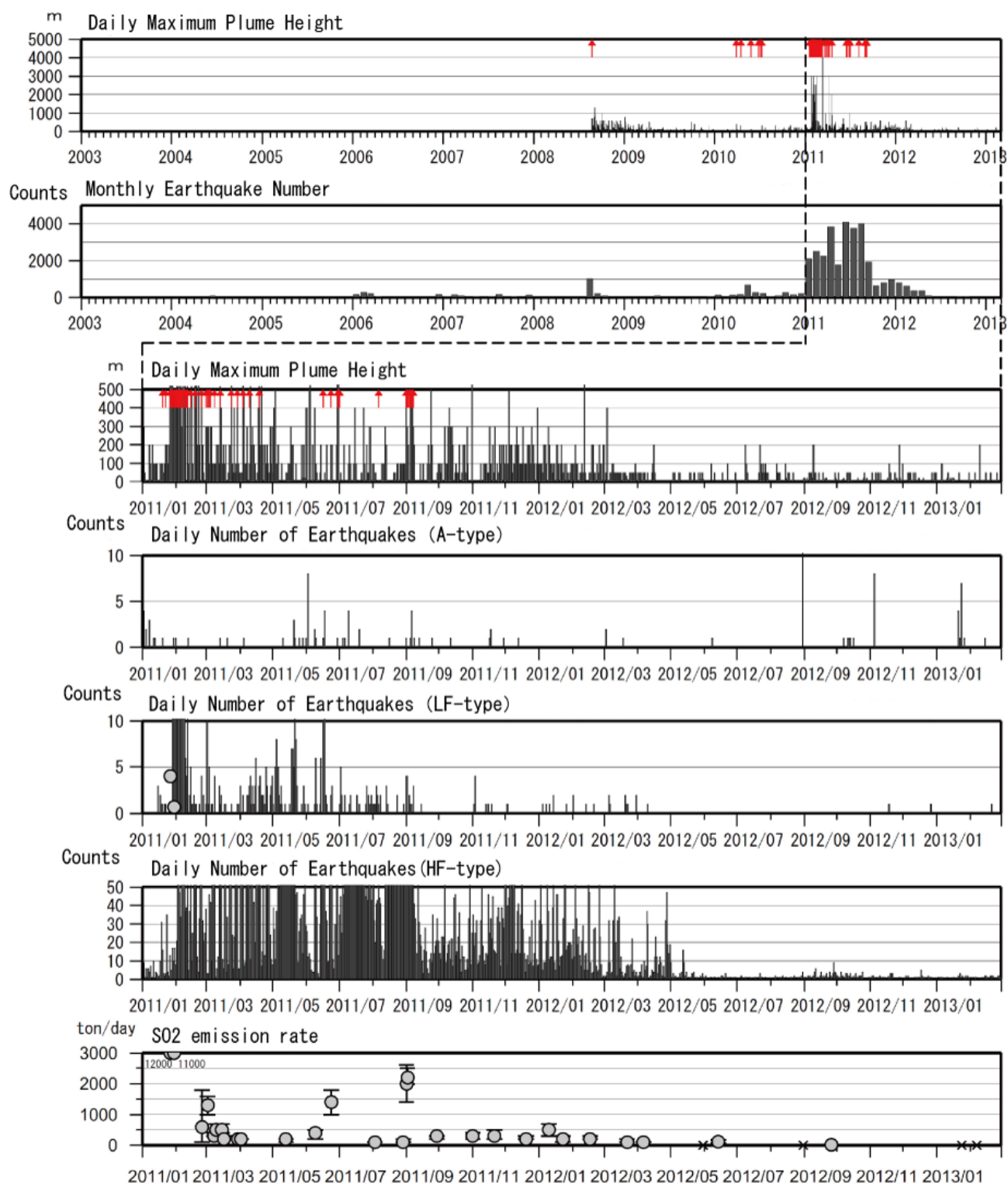


Fig. 2 Seismicity, plume activity and SO₂ emission rate at Shinmoedake from January 2003 to February 2013.

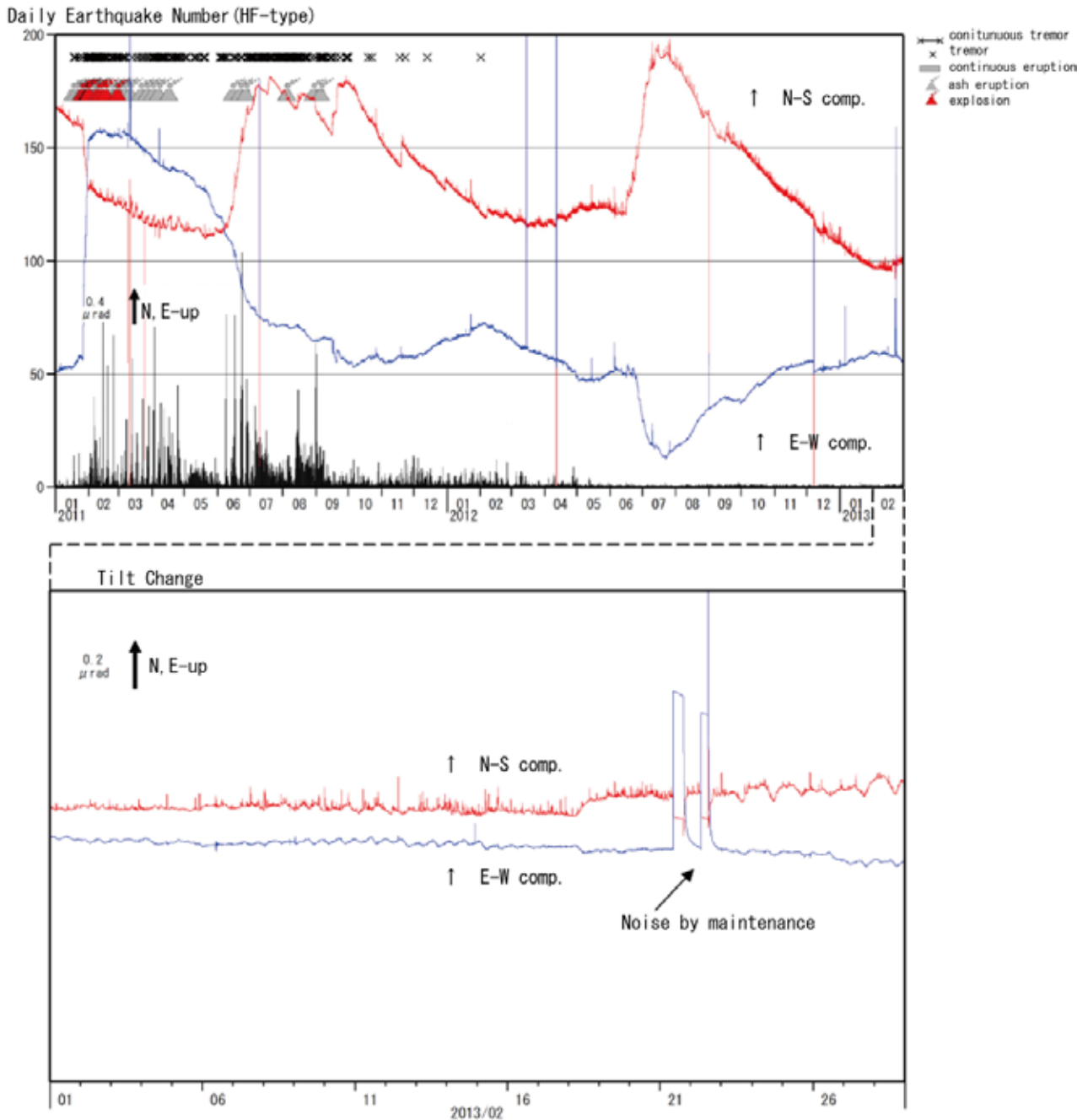


Fig. 3 Tiltmeter observation at Shinmoedake from January 2011 to February 2013.

Sakurajima (Alert Level: 3)

Eruption activity at the Showa crater has remained at high levels. During the reporting period, 132 eruptions were observed (124 in January), and 119 of them were explosive (96 in January), which remained at high levels. The explosive eruptions with ballistic rocks reaching third station (1,300 – 1,800 m from the Showa crater) occurred 5 times. Of them, the explosive eruption at 04:10 JST on February 23rd caused a very small pyroclastic flow for the first time since December 26th 2012, which flowed down about 400 m to the east. Clear volcanic glows in the Showa crater were sometimes recorded at night with high-sensitivity cameras. No eruption was observed at the Minamidake summit crater.

A total of 746 earthquakes occurred in February (1,058 in January), which remained at generally low levels. Hypocenters were located at a depth of 2 – 4 km below sea level just under Minamidake. The number of tremors accompanying eruptions amounted to 321 in February (230 in January) with a total duration of 87 h 07 m, which was much longer than that in January (11 h 42 m).

Field surveys to measure SO₂ flux were conducted on February 7th, 14th and 21st. The SO₂ flux was approx. 800 t/d – 1,900 t/d (approx. 1,700 t/d – 4,100 t/d in January), showing relatively high levels.

Regarding ground deformation of the mountain, subsidence had been observed since around August 2012, but has turned to a static state in January 2013, and then, uplift since February, according to observations made with a water-tube tiltmeter installed 2.5 km southeast of the Minamidake summit crater by Japan's Ministry of Land, Infrastructure, Transport and Tourism (MLIT). The results of continuous GPS measurement have shown that the baselines on Sakurajima Island had slightly extended since around September 2011, and then have slightly shorten since October 2012. As a result of deformation observations made by GSI, long-term extension of the baselines that traverse the Aira Caldera (in a closed-off section of Kagoshima Bay) has been observed, indicating expansion of the deeper magma chamber beneath the caldera.

A total of 24 g/m² (6 days) of volcanic ash have fallen on Kagoshima Local Meteorological Observatory (KLMO). The total amount of ashfall estimated from data provided by the Kagoshima prefectural government was about 0.4 million tons in January 2013.

An aerial observation conducted in cooperation with the JMSDF on February 13th revealed that gray-white plumes drifted south from the Showa crater. Whilst the detailed situation inside the Showa crater was not available due to the plume, no remarkable change was observed around the crater. Infrared observation also revealed high-temperature areas around emission place of plumes at the Showa crater (Photo 2). From the Minamidake summit crater, white plumes were rising. The detailed situation inside the crater was not available due to the plume.

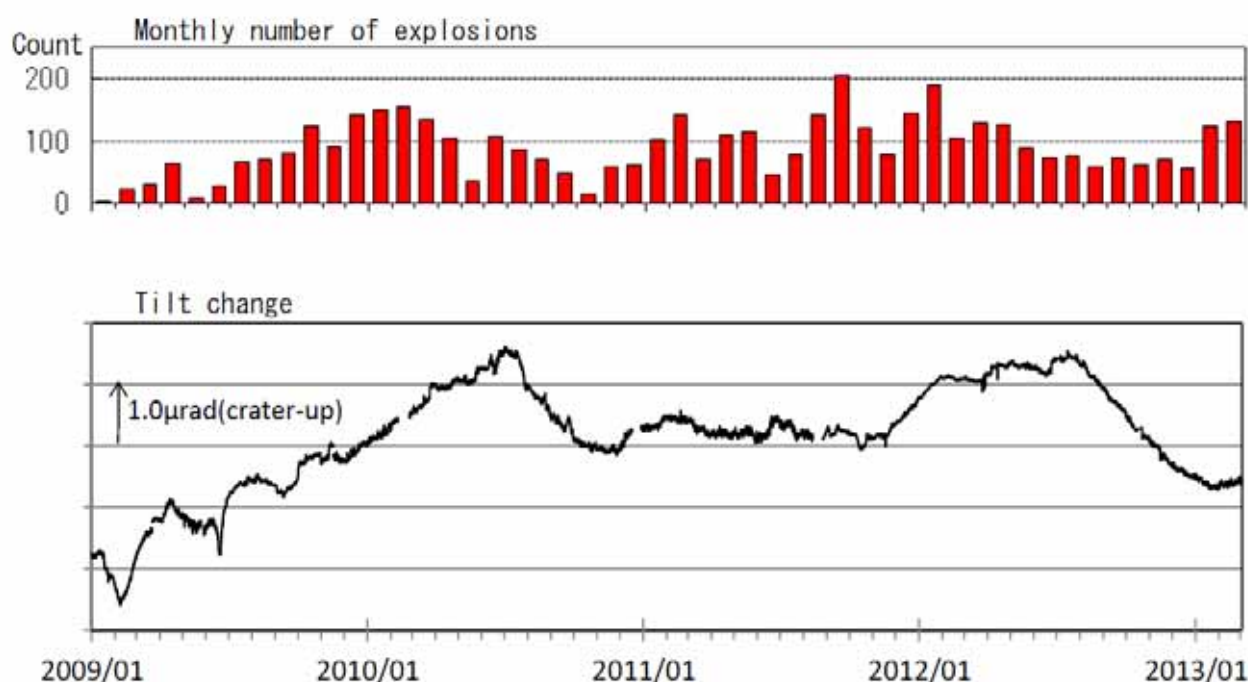


Fig. 4 Tilt change observed with a water-tube tiltmeter at Arimura Station from January 2009 to February 2013 with tidal response and eruptions eliminated. Upheavals of the summit side correspond to positive tilts. The red bars in figure denote monthly explosion frequencies at the Showa crater.

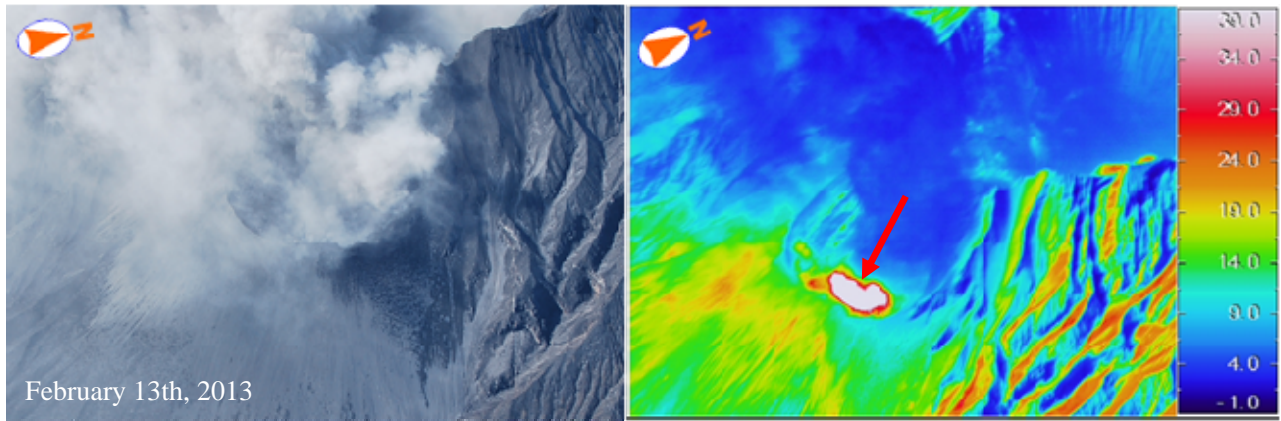


Photo 2. Aerial survey on February 13th. Courtesy of JMSDF.

Red arrow indicates high-temperature areas around emission place of plumes at the Showa crater.

Suwanosejima (Alert Level: 2)

Although no explosive eruptions occurred at the Otake crater in February, a very small eruption was observed there on February 3rd. As before, the plume height generally ranged from 200 to 300 m (max. 500 m) above the crater rim throughout most of the period. Weak volcanic glows in the crater were continually recorded at night with high-sensitivity cameras. According to the Toshima Village administration, a tiny amount of ashfall was observed at the settlement on the island about 4 km south-southwest of Otake on February 3rd.

The number of A-type earthquakes occurring near Suwanosejima was temporarily increased from February 19th to 24th. A seismic intensity of 3 on the JMA scale was recorded at Suwanosejima in relation to a magnitude-3.6 earthquake at 19:21 JST on February 19th. In addition, 10 earthquakes with seismic intensities of 1 or more on the JMA scale were observed during this period whilst seismicity has remained at low levels since February 25th. Those earthquakes caused no significant changes in surface phenomena or tiltmeter data. Seismic activity with hypocenters located just beneath the Otake crater has also remained at low levels. Volcanic tremors have occurred almost continuously since September 28th, 2012. The total tremor duration for February 2013 was 672 h (744 h in January).