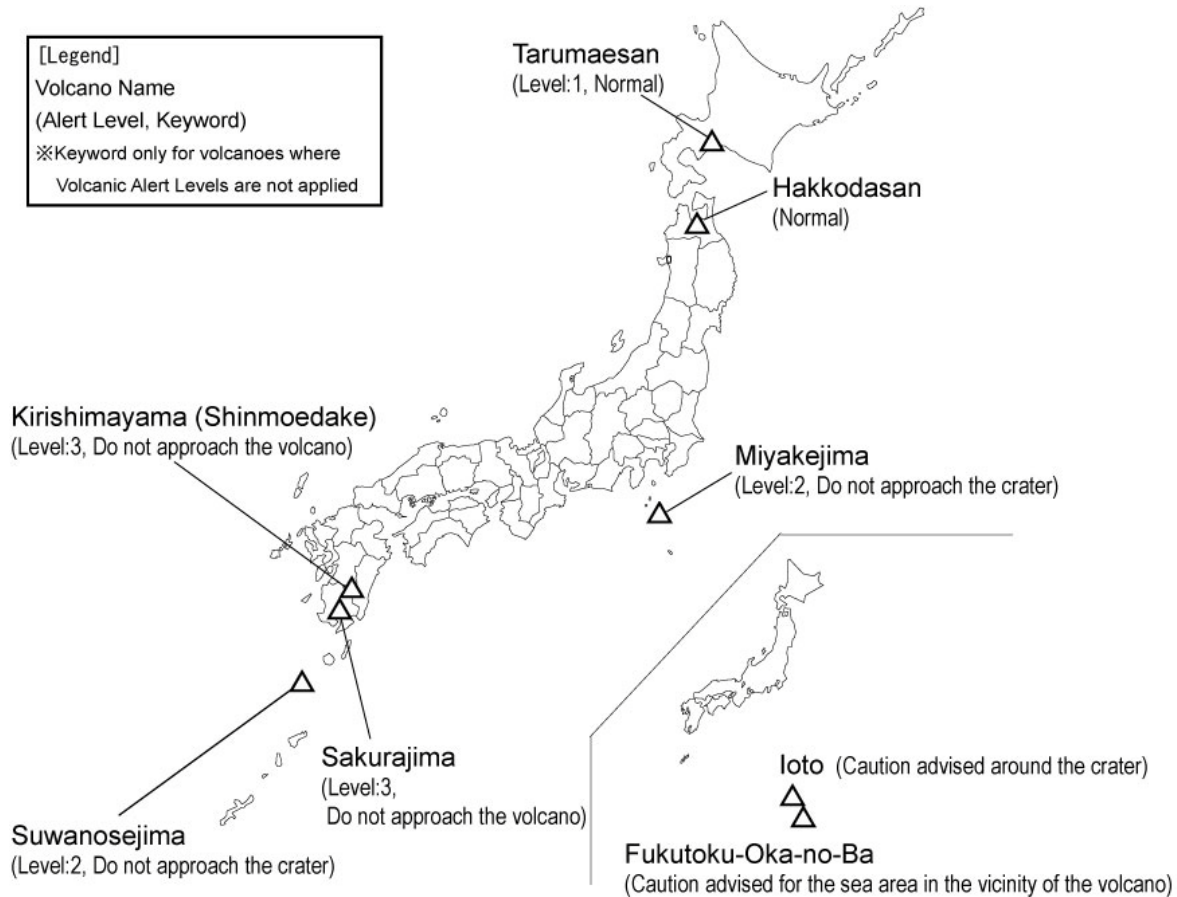


# Monthly Volcanic Activity Report (August 2013)

Japan Meteorological Agency



## Tarumaesan (Alert Level: 1)

Ground deformation indicating inflation at a depth of several kilometers below the volcano's western flank was observed in tiltmeter data from late June to early July. Seismic activity at a depth of 3 – 5 km under the western flank started in early July, immediately after the inflation. The seismicity became active from the middle of July, and then gradually declined in August. Meanwhile, the number of earthquakes just beneath the summit's lava dome temporarily increased from late June to early July, but has been at low levels since then. No volcanic tremors have been recorded. No remarkable change was observed in ground deformation data.

## Hakkodasan (Normal)

The number of earthquakes around Hakkodasan has been relatively large since the 2011 off the Pacific coast of Tohoku Earthquake (the 2011 Great East Japan Earthquake: March 11, 2011). Volcanic earthquakes in and around the summit have occurred sporadically since February 2013, and have been observed relatively frequently since late April.

A field survey conducted on August 7 and 8 along with aerial observation conducted in collaboration with the Aomori Prefectural Government on August 22 showed no remarkable anomaly on or around the summits of Akadake, Idodake and Odake. Fumaroles and high-temperature zones were observed around Jigoku-numa, echoing the results of a previous survey conducted in August 1994.

According to ground deformation observation around the volcano, small inflation has been perceived since February 2013 while no changes in surface phenomena such as fumaroles were observed.

### Miyakejima (Alert Level: 2)

The emission rate of volcanic gas has been on a long-term declining trend and remained relatively low since February 2013 (Fig. 1). According to a report from Miyake Village, relatively high concentrations of SO<sub>2</sub> were recorded only occasionally in inhabited areas.

Volcanic seismicity has largely remained at low levels. No volcanic 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.

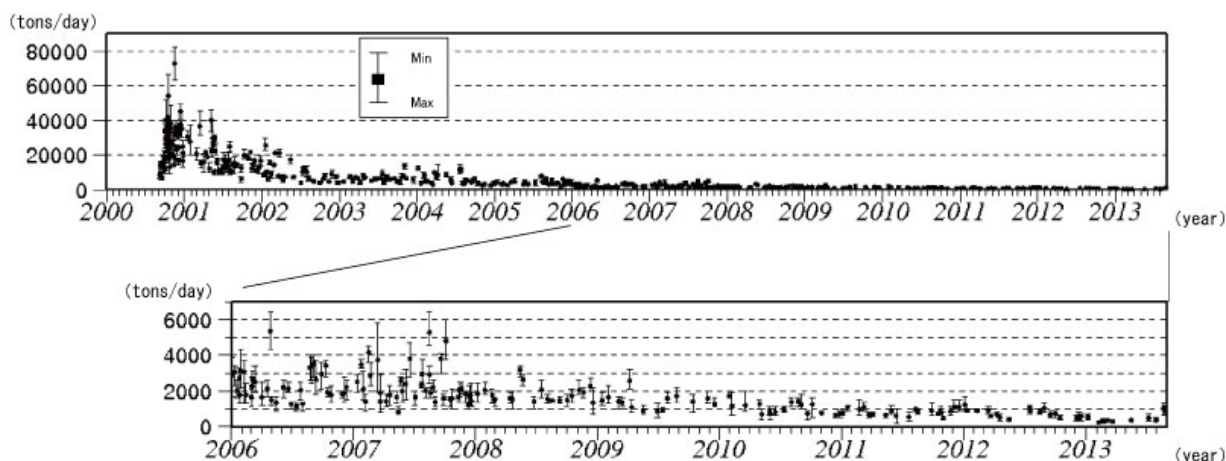


Fig. 1 SO<sub>2</sub> emission rate at Miyakejima.

### Ioto (Near-crater Warning)

Phreatic eruptions have occasionally occurred since early February 2012 at the Old-crater (known as Million Dollar Hole) located on the western part of the island. However, no eruptions were observed in August.

Volcanic seismicity has largely remained at low levels. No volcanic tremors have been observed. Geospatial Information Authority of Japan (GSI) ground deformation data show that the ground has been rising since around May 2013, after the subsidence, static state, and uplift sequence that virtually stopped in April 2013.

A field survey conducted in collaboration with the Japan Maritime Self-Defense Force (JMSDF) from August 20 to 23 showed no remarkable change in fumarolic or geothermal activity from the previous survey (January 22 to 25, 2013) except for an increased volume of hot water in the Asodai collapse pit. Aerial observation conducted in collaboration with JMSDF on August 21 revealed milky-white sea water discoloration to the northeast of Kitanoohana (located on the northern side of Ioto) (Photo 1). Further aerial observation conducted by JMSDF on August 28 and 30 also revealed sea water discoloration to the north of Kitanoohana.



Photo 1. Aerial survey on August 21. Courtesy of JMSDF.

Red circle indicates discolored sea water area to the northeast of Kitanoohana.

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

An aerial survey conducted in collaboration with JMSDF on August 21 showed faint sea water discoloration related to volcanic activity.

According to an aerial observation conducted by the Japan Coast Guard (JCG) on August 24, no discoloration related to volcanic activity or floating objects such as pumice were observed around the volcano.

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 February 3, 2010.

### **Kirishimayama (Shinmoedake)(Alert Level: 3)**

No eruptions were observed at Shinmoedake in the reporting period (the last explosive eruption occurred on March 1, 2011, while the last eruption of any kind was on September 7 of the same year).

No remarkable change was observed in plume activity. Volcanic seismicity remained at low levels. No volcanic tremors have been observed since March 2012. No remarkable change was observed from ground deformation observation data.

Supply of magma from deeper parts to the magma chamber located several kilometers northwest of the crater has stopped. However, a large amount of lava has accumulated in the crater. Based on this information, the possibility of small eruptions cannot be ruled out even now.

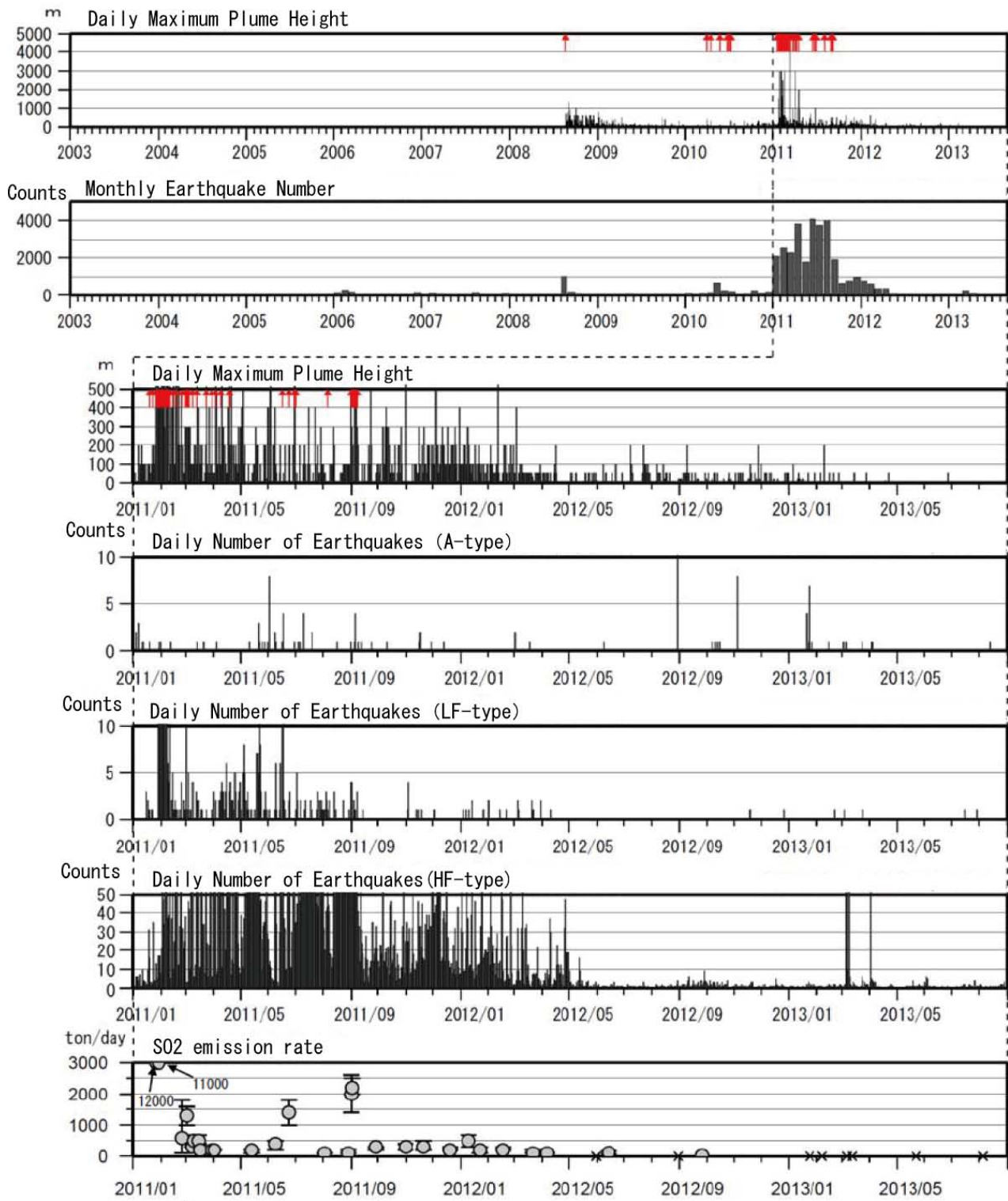


Fig. 2 Seismicity, plume activity and SO<sub>2</sub> emission rate at Shinmoedake from January 2003 to August 2013.

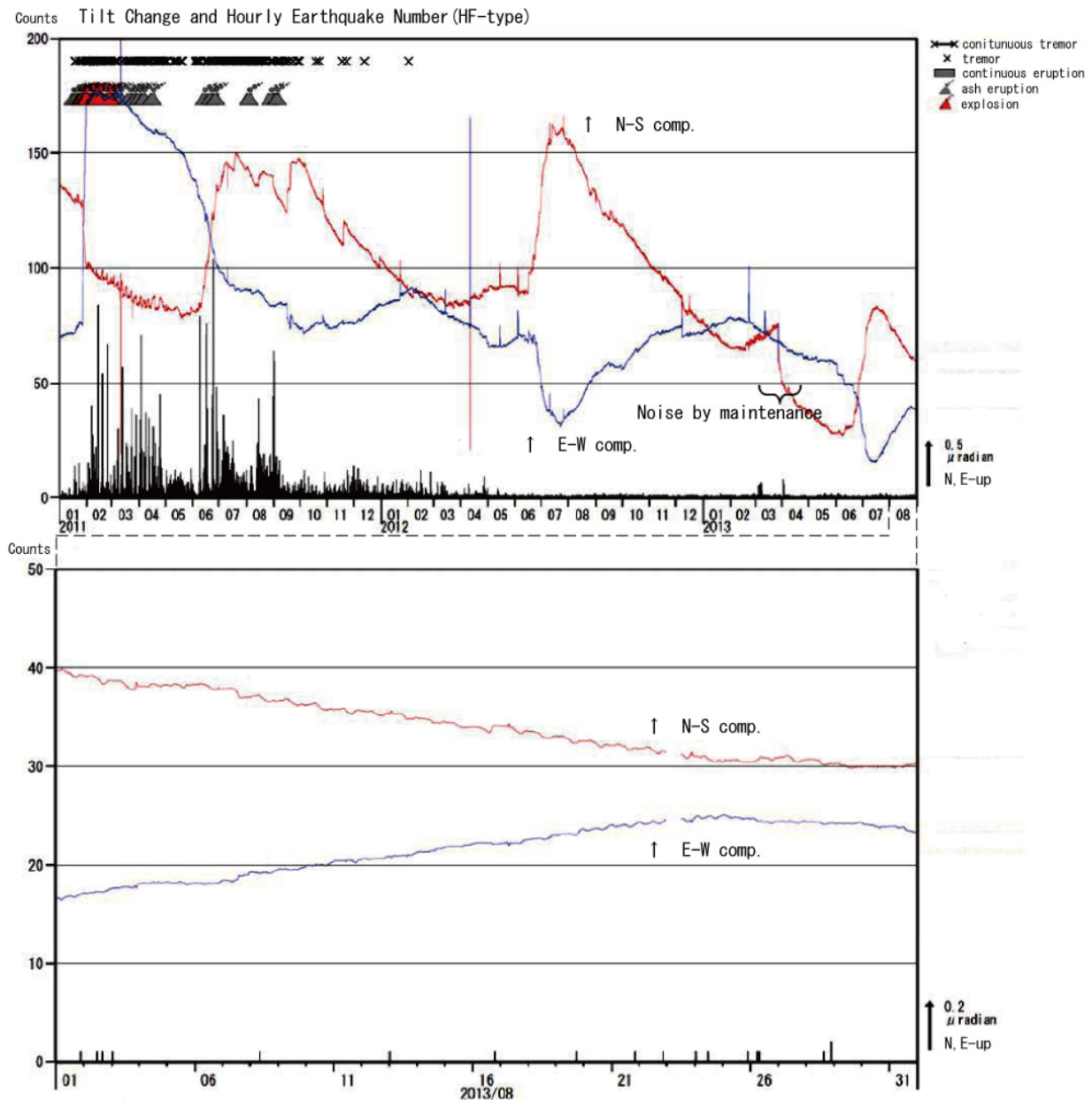


Fig. 3 Tiltmeter observation at Shinmoedake from January 2011 to August 2013.

### Sakurajima (Alert Level: 3)

Eruption activity including explosive ones at the Showa crater has remained at high levels. During this reporting period, 144 eruptions were observed and 118 of them were explosive. In conjunction with an explosive eruption at 16:31 (JST) on August 18, a large plume rose to 5,000 m above the crater rim and drifted to northwestward (Photo 2). Ashfall was observed over a wide area from Kagoshima City to Koshikijima Island (part of Satumasendai City) in amount large enough to cause suspension of public transportation in Kagoshima City. The eruption produced a small pyroclastic flow that flowed about 1 km southeast from the Showa crater. In conjunction with a further explosive eruption at 09:27 (JST) on August 29, a large plume rose to 3,000 m above the crater rim and drifted east-northeastward. Volcanic ash fell on an area from Sakurajima Island to Miyazaki City, and lapilli with a diameter of 1 cm fell on the Kurokamicho area of Kagoshima City (about 4 km east of the Showa crater). A relatively large plume was emitted in conjunction with another explosive eruption at 11:00 (JST) on September 4, and rose to 2,800 m above the crater rim. The plume drifted southward on strongish winds, and lapilli with diameters of up to 4 cm fell on an area from Furusatocho to Arimuracho in Kagoshima City (about 3 km south of the Showa crater), breaking the windows of more than ten cars and causing other damage. Small



lapilli with a diameter of 5 mm were found around Tarumizu City Hall (about 10 km south-southeast of the Showa crater). 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.

While volcanic seismicity remained at low levels in August, volcanic tremors accompanied the eruptions. A field survey to measure  $\text{SO}_2$  flux was conducted on August 19. The  $\text{SO}_2$  flux was around 1,400 t/d showing relatively high levels. The results of continuous GPS measurement have shown the tendency of slight inflation in Sakurajima Island since around February 2013. Deformation observations in some baselines across the Aira Caldera (in a closed-off section of Kagoshima Bay) made by GSI indicate an expansion in the deeper part of the Aira Caldera. Ashfall on Kagoshima Local Meteorological Observatory (KLMO) amounted to  $59 \text{ g/m}^2$ . The total amount of ashfall estimated from data provided by the Kagoshima prefectural government was about 0.7 million tons in July 2013.



Photo 2. Explosive eruption at the Showa crater observed at 16:31 on August 18

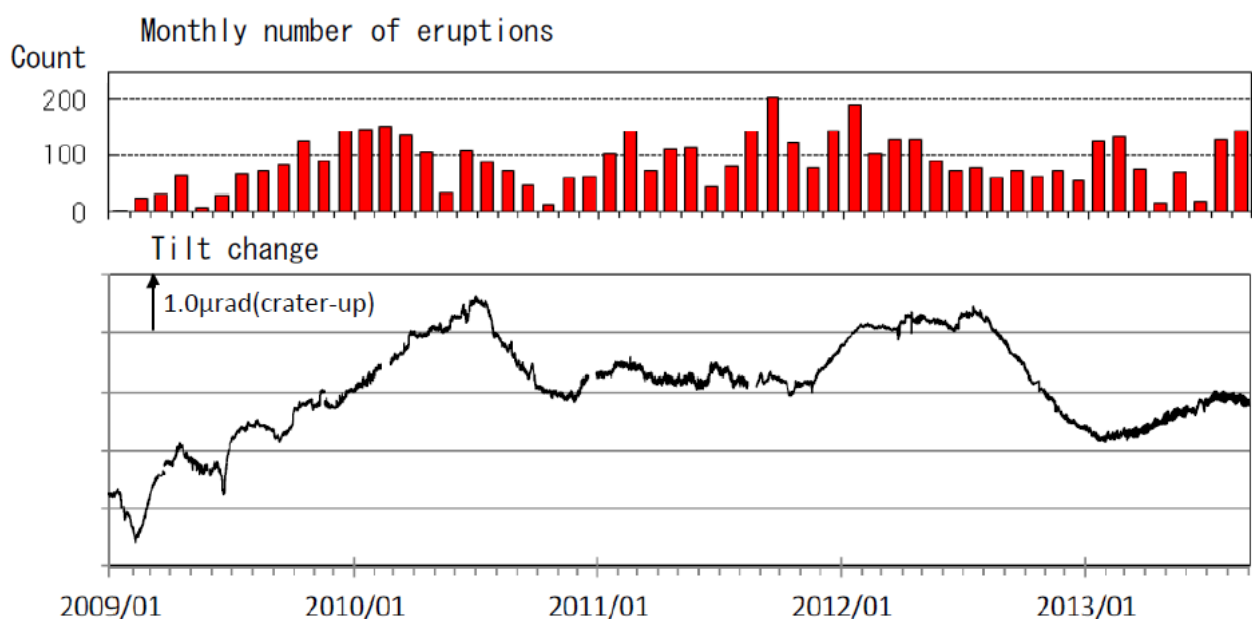


Fig. 4 Tilt change observed with a water-tube tiltmeter at Arimura Station from January 2009 to August 2013 with tidal response and eruptions eliminated. Upheavals of the summit side correspond to positive tilts. The red bars in figure denote monthly eruption frequencies at the Showa crater.

**Suwanosejima (Alert Level: 2)**

Eruption activity has remained at high levels. An eruption occurred at the Otake crater at 19:04 (JST) on August 25, and intermittent explosive eruptions have occurred since August 26. During this reporting period, 16 explosive eruptions were observed. The height of the grayish white plume accompanying these eruptions generally ranged from 500 to 800 m above the crater rim, and 1,500 m at the maximum. Weak volcanic glows in the crater were sometimes recorded at night with high-sensitivity camera.

Volcanic tremors occurred almost continuously from August 2 to 4 and from August 11 to 14, and have occurred continuously since August 25.