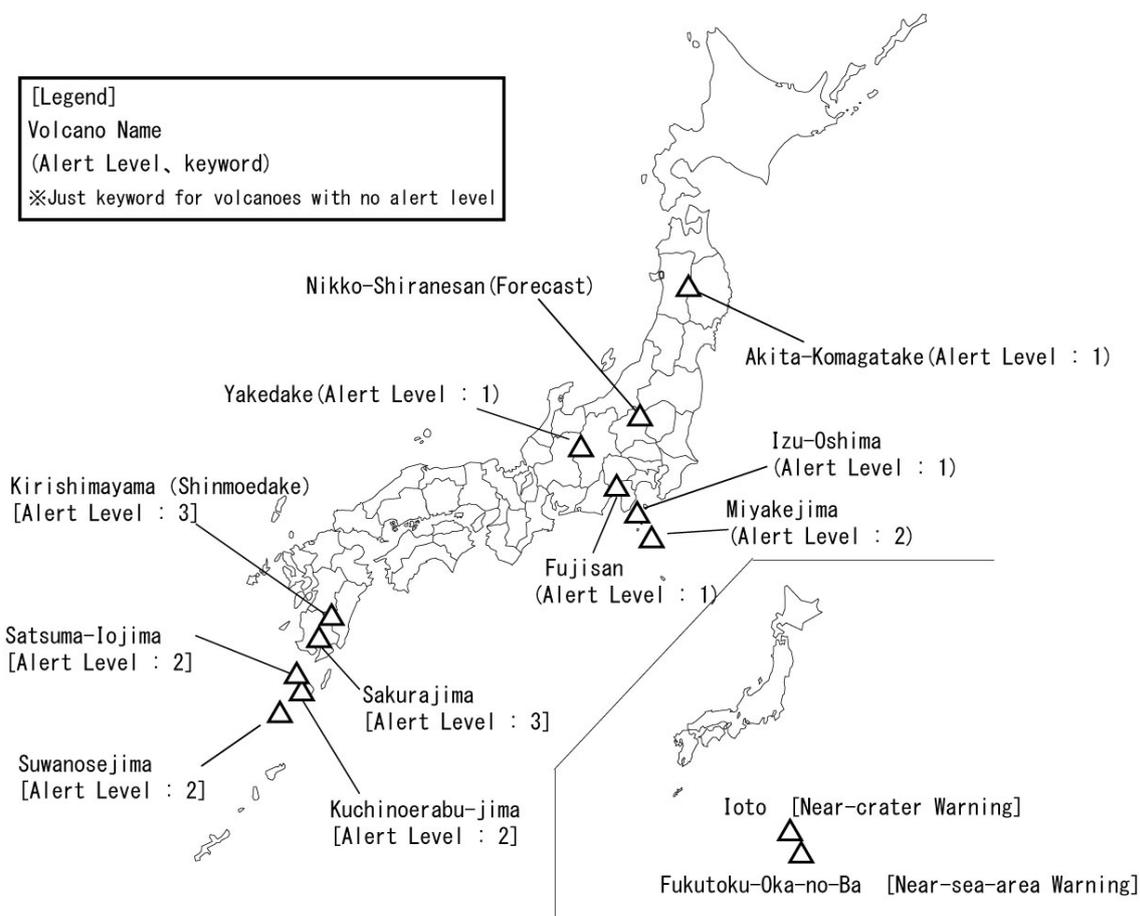


# Monthly Volcanic Activity Report (December, 2011)

Japan Meteorological Agency



## Akita-Komagatake [ Alert Level : 1 ]

A temporary fume with a height of 50m was observed on 14 December by a camera at North of Medake's summit.

Aerial observations were conducted in cooperation with JGSDF (Japan Ground Self Defense Force) on 13 December. Snow melting areas were recognized corresponding to geothermal areas we have found until October 2011. New geothermal area was not found.

An M2.6 earthquake on 27 December at 12:34 occurred at about 2km W of Medake, whose maximum JMA seismic intensity was 1 in Senboku-city, Akita Pref. The seismicity around the area had temporarily increased, but turned to static state. No phenomenon indicating volcanic activity was observed accompanied with this seismicity.

No volcanic tremor was observed.

## Nikko-Shiranesan [Forecast]

After "The 2011 off the Pacific coast of Tohoku Earthquake" on 11 March, increased seismicity at a depth of about 5 kilometers of W and NW foot, and 5-10 kilometers of E and SE foot of Mt. Nikko-Shiranesan was gradually getting lowered. No felt-earthquake with seismic intensity of 1 in JMA scale was observed. No volcanic tremor was observed.

## Yakedake [ Alert Level : 1 ]

Just after "The 2011 off the Pacific coast of Tohoku Earthquake" on 11 March, seismicity had become higher in the shallow parts beneath the summit and at NW foot of Mt. Yakedake, however it has turned to the background level.

No volcanic tremor or low-frequency earthquake was observed.

### **Fujisan[ Alert Level : 1]**

After the M6.4 earthquake occurred at the south of the summit on 15 March at 22:31, many earthquakes following the main shock occurred in the area extended to right below the summit from the main shock. Seismicity has been becoming at a lower level. An M1.7 earthquake occurred at around S of the summit on 2 December at 10:29. Maximum seismic intensity of 1 in JMA scale was observed in Fuji-city, Shizuoka Pref. Number of deep low-frequency earthquakes at a depth of around 15km remained small. No volcanic tremor or low-frequency earthquake in the shallow parts was observed.

No other anomaly data was detected at shallower part.

### **Izu-Oshima[ Alert Level : 1]**

Although landwide contraction has been detected since January 2011 by GPS and strainmeter observation, some baselines have tuned to inflation state since October. GPS network of GSI (Geospatial Information Authority of Japan) has also indicated the volcano inflation.

Very low fumes were sometimes observed by a camera at NW of summit. Based on a field survey on 20 December, no remarkable change in surface phenomena was observed.

Seismicity has remained at a low level.

### **Miyakejima [Alert Level : 2]**

Gas-and-steam plumes rose to a height of 100-300m above the crater rim.

According to field surveys on 5 and 19 December, the sulfur-dioxide flux was 1,100 t/d (cf. 500 t/d and 800 t/d on 1 and 24 November, respectively; Fig.1). According to the report from Miyake village, high concentrations of SO<sub>2</sub> were sometimes recorded in some inhabited areas.

Seismicity has stayed at a low level. Hypocenters were located just beneath the summit crater of Miyakejima. No volcanic tremor was observed.

There was no geomagnetic change reflecting inner heat state beneath Miyakejima.

According to GPS observation, ground deformation indicating contraction of shallow parts of mountain has continued.

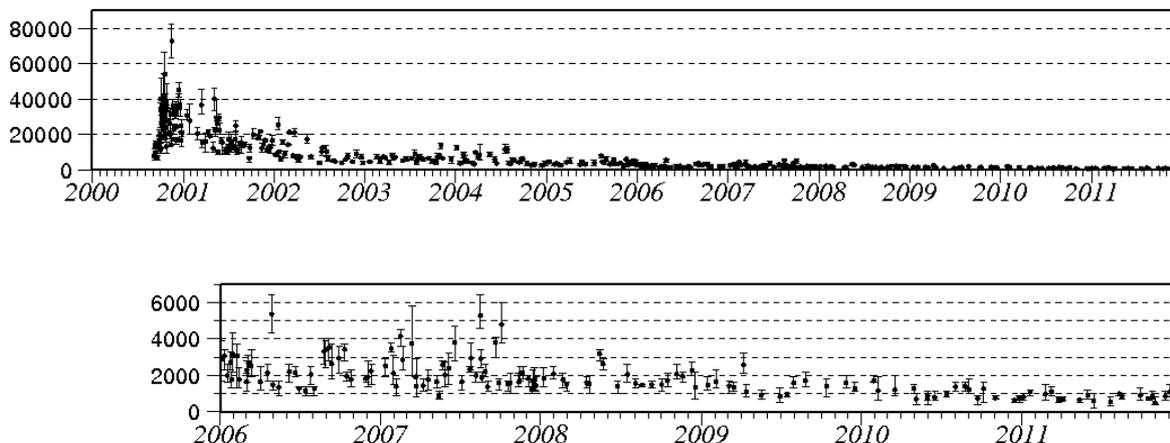


Fig.1 Emission rate of SO<sub>2</sub> at Miyakejima.

### **Ioto [Near-crater Warning]**

Seismicity in shallow parts in Ioto has remained at a high level since February 2011.

According to a GPS observation by GSI, landwide upheaval that was first observed in August 2006 had slowed down since middle of November to December 2010, but has been on the increase since late January 2011. This increase has slowed down since late December 2011. Recently southward displacement has been remarkably seen in the south end.

### **Fukutoku-Oka-no-Ba [Near-sea-area Warning]**

According to the information from the JCG (Japan Coast Guard), JMSDF (Japan Maritime Self-Defense Force), and JMA, discolored water has been frequently observed around Fukutoku-Okano-Ba in recent years.

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

No eruption(\*) was observed in the reporting period at Shinmoedake. White plume height was approximately 100m on average (maximum; 500m) above the crater rim.

Aerial observations were conducted in cooperation with JASDF (Japan Air Self-Defense Force) on 9 and 13

December and with JMSDF on 21 December. They revealed that the diameter of lava accumulated inside the crater remained about 600m and that white plume rose up from the E and N margin of lava, as same as the result of the previous survey. A white plume was observed on 9 December, rising up several meters high from a crack of the western slope formed by an eruption on August 2008. However it wasn't detected during the observations on 13 and 21 December (Photo 1).

Infrared observation revealed no significant change in the temperature distribution of the surface of lava and revealed comparatively high-temperature area at the margin of lava. There was a relatively high temperature area at a part of the crack of the western slope.

Seismicity remained at a relatively high level. Seismic events occurred 966 times in December (cf.800 times in November). Most hypocenters were located at a depth of 0-2km in the shallow parts of Shinmoedake as previous ones.

Small amplitude volcanic tremors occurred, whose duration is 1 minute in total in December(cf. 1 minute in November ).

GPS measurements by GSI revealed magma supply to deeper magma chamber at around several kilometers NW of the crater. The extension of some baselines is gradually slowing down. There was no remarkable tilt change related to volcanic activity by tiltmeters.

According to a field survey on 20 December, the sulfur-dioxide flux was 200 t/d (cf. 300t/d; on 21 November; Fig.1).

(\*) Explosion at Shinmoedake is defined as the one which accompanies air shock more than 20 Pa with explosive earthquake.

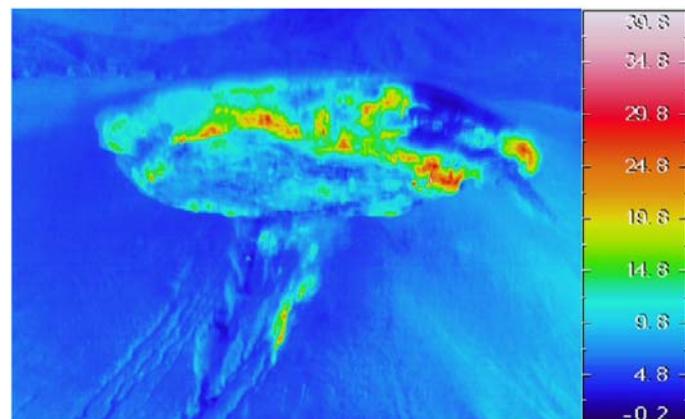
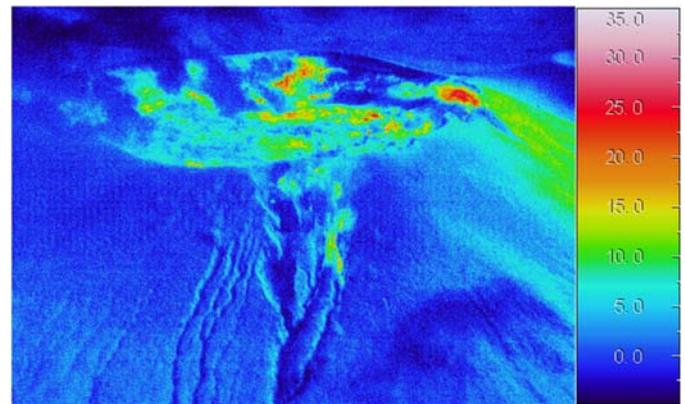
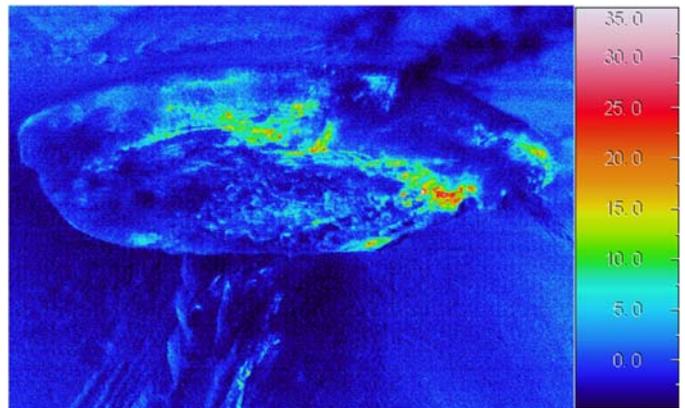
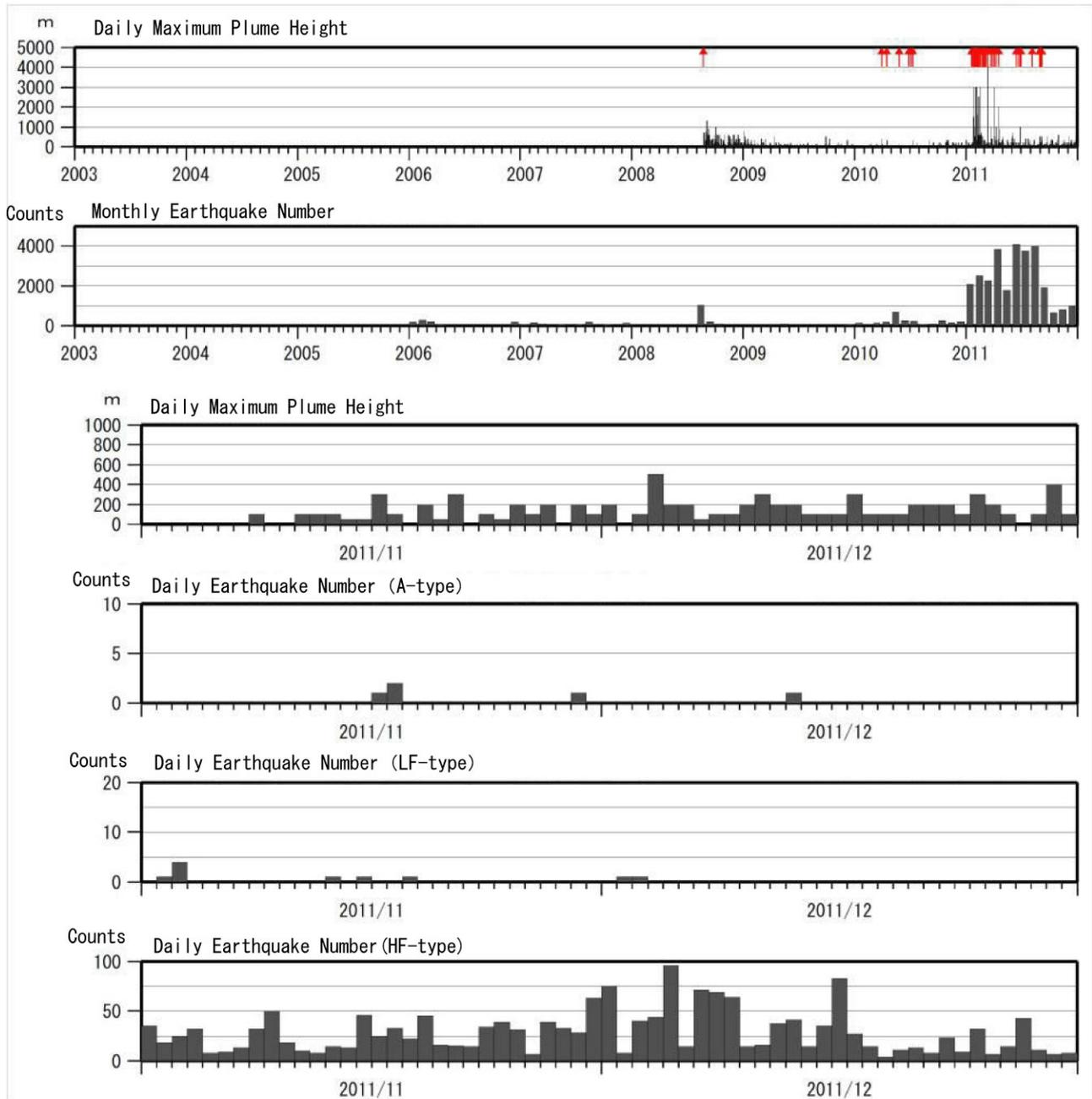


Photo.1 Aerial survey on 9, 13 and 21 on December. Courtesy of JASDF and JMSDF.



※ The notation “↑” stands for eruptions.

Fig 2. Seismicity and plume activity at Shinmoedake from 2003 to November 2011.

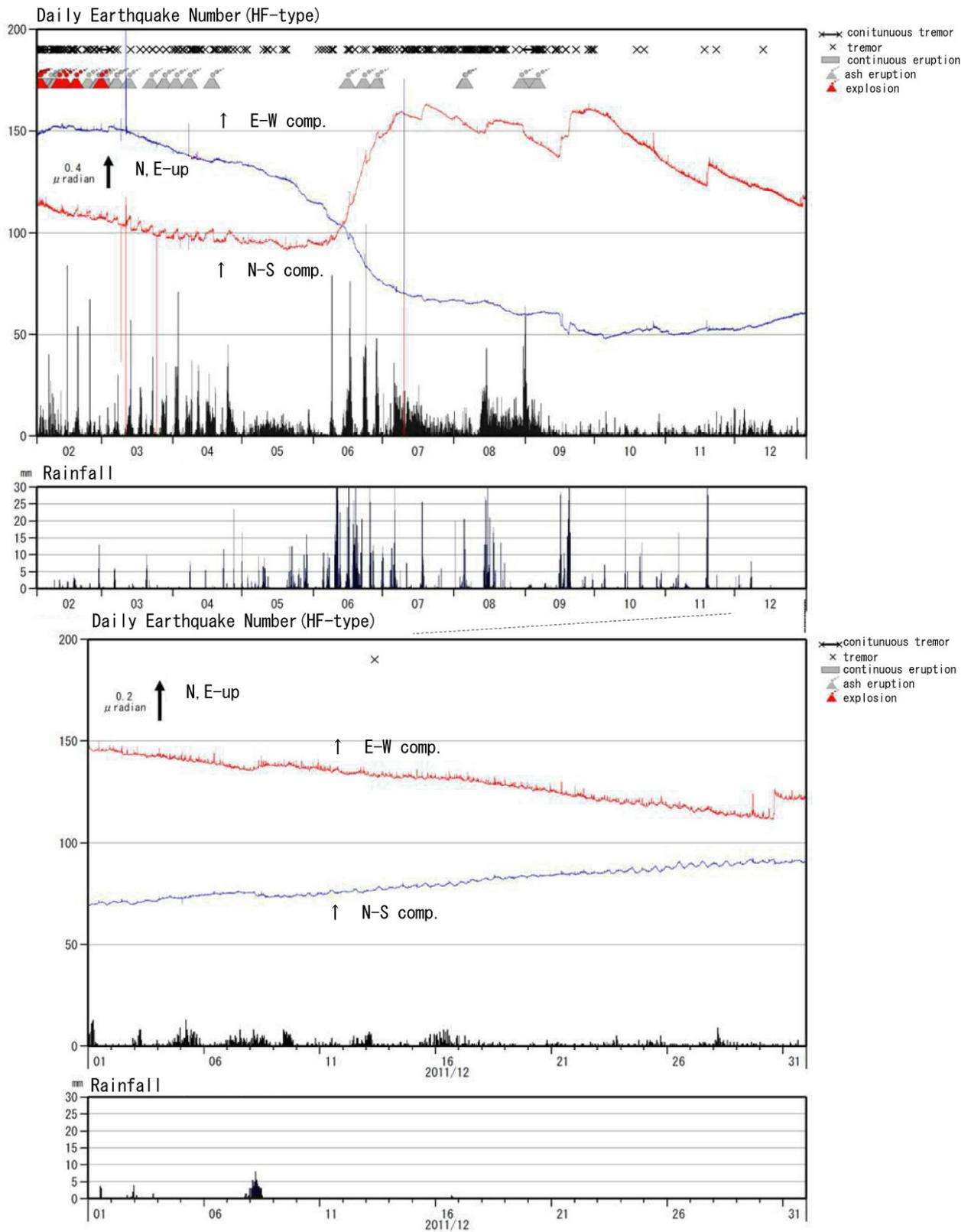


Fig.3 Tilt observation at Shinmoedake from 2003 to November 2011.

### Sakurajima[Alert Level : 3]

Number of eruptions including explosive ones at Showa-crater has remained large. In this period, eruptions observed 145 times (cf. 78 in November), 125 cases of which were explosive ones (cf. 57 in November). Ballistics reached areas about 1300-1800m away from the Showa-crater 7times. The maximum plume height reached to 2,200m above the crater. No pyroclastic flow was observed.

Volcanic glows were sometimes observed clearly at night with a high-sensitivity camera.

At Minamidake summit crater, very small eruptions have been observed from 11 to 13 on December since 13 February 2011.

Volcanic seismicity has remained at a relatively low level, although temporarily increased (55 times on 9 December, 66 times on 14 December and 50 times on 18 December). Earthquakes occurred 856 times (cf. 471 times in November). Hypocenters were located at a depth of approximately 3 km below Minamidake.

Number of tremors accompanying eruption was 692 in December (cf. 328 in November). Duration of them was 57h47m in total in December (cf. 36h21m; November), which was longer than in the previous month.

According to field surveys on 14 and 26 December, sulfur-dioxide flux was 1,800-2,900 t/d on average (cf. 1,200-3,200 t/d in November).

The slightly extension of mountain have been continuing since November by water-tube tiltmeter of MLIT (Ministry of Land, Infrastructure, Transportation and Tourism) installed at 2.5km SE of Minamidake summit crater. It seems that volume of magma supply under Sakurajima is increasing. According to GPS measurement, slight contraction inside Sakurajima Island observed since the beginning of 2011 has turned to extension since September. According to GPS measurement by GSI, long term extension of the baselines that traverse the Aira-Caldera (at closed-off section of Kagoshima bay) has been observed.

The volume of ashfall was up to 38g/m<sup>2</sup> December (5 days ) at Kagoshima Local Meteorological Observatory. Total volume of ashfall analyzed by observation data in Kagoshima Pref was 360,000 ton in November, which decreased compared with 500,000 ton in October. Total volume of ashfall in 2011 by November was 4,020,000 ton (cf. 5,120,000 ton in 2010), which was a half as much as those in 1980-1990.

Aerial observations were conducted in cooperation with JMSDF on 21 and with MLIT on 27. Through these observations, hot fume was confirmed but the bottom of the Showa crater was not seen. No remarkable change was observed in the figure of the crater. Infrared observation showed the relevant high thermal area around the crater as same as the previous observations.

At Minamidake summit crater, no apparent change was observed. Fumarolic area in the crater remained hot.

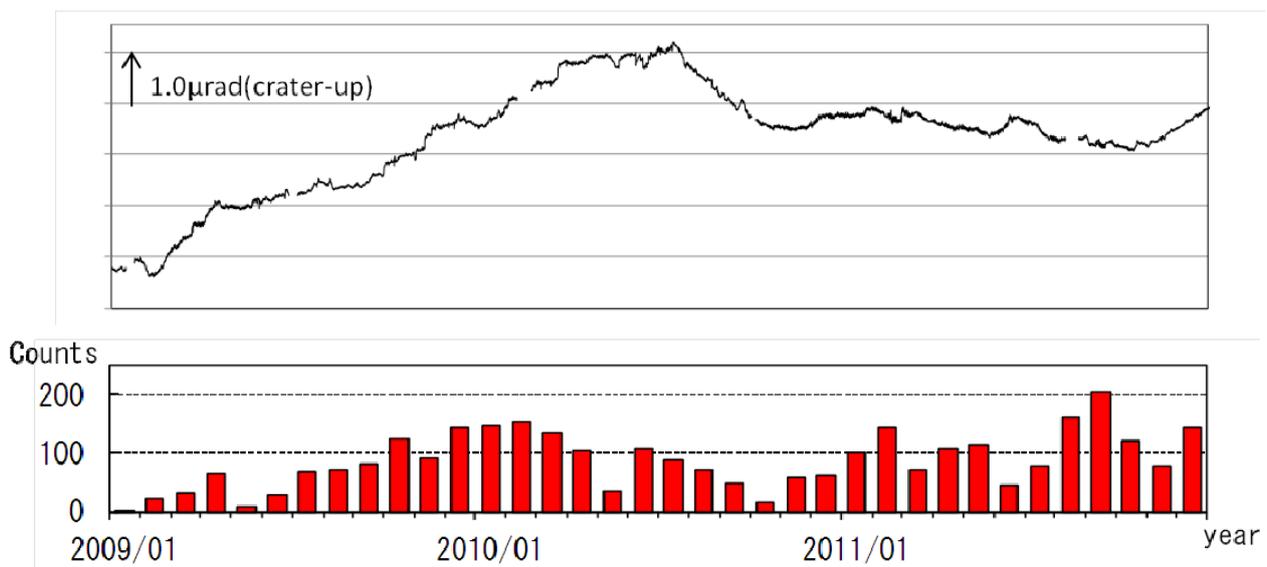


Fig 4. Tilt change observed by water-tube tiltmeter at station Arimura from January 2009 to December 2011, eliminated tidal response and eruptions. Upheavals of the summit side correspond to positive tilts. In the bottom figure, red bars denote monthly frequencies of explosions of the Showa-Crater.

### **Satsuma-Iojima [Alert Level : 2]**

Plume activity at Iodake summit crater remained relatively high level. A white plume rose up to 300m above the crater rim in this period.

According to aerial observation conducted in cooperation with JMSDF on 19, no change was observed compared with December 2010. Infrared observation detected no particular change. Discolored water which seems to be caused by volcanic activity has been observed around sea coast.

Seismic activity remained at the background level. Seismic events occurred 167 times (cf. 159 times in November 2011).

No tremor was observed (cf. 0 in November).

### **Kuchinoerabu-jima [Alert Level : 2]**

Seismicity remained at a relatively high level. Seismic events occurred 480 times in December (cf.44 times in November). Most hypocenters were located in the shallow parts of Shindake.

Volcanic Tremors had occurred sometimes until 9 December, after that no tremor has been observed. Total duration time was 26 minutes in December (cf. 1 hour and 4 minutes in November ).

White plume height remained below 300m.

According to a field survey from 4 to 7 in December, infrared images showed no significant change compared with May 2011.

Aerial observations were conducted in cooperation with JMSDF on 19 December. They revealed that a white fume rose up to 100m above crater rim and flowed to NE. Sublimated sulfur was observed around a fumarole at south crater.

Infrared observation showed no significant change in the temperature distribution of the surface and revealed comparatively high-temperature area at the fumaroles in crater. There was relatively high temperature area at a part of crack of southern slope. At Furudake, a white fume rose up to 20m from the bottom of crater.

According to a field survey on 9 December, the sulfur-dioxide flux was 200 t/d, which was as much as that in December 2008.

Through the continuous GPS measurements, a baseline across Shindake has been extended since September 2010, but its changing ratio was slowing down since September 2011.

Repeated GPS measurements from 4 to 8 December revealed inflation in the shallow part of Shindake, compared with September 2010.

### **Suwanosejima [Alert Level : 2]**

No explosive eruption occurred. Maximum plume height was 400m above the crater rim in this period.

Weak volcanic glows were sometimes observed at the crater in the night by a high-sensitivity camera.

Aerial observations were conducted in cooperation with JMSDF on 19 December. They revealed high temperature area at the center of Otake crater.

Seismic activity remained at a low level. No volcanic tremor was observed. Duration of tremors in November was 28h30m in total.