Volcanic activity of Sakurajima volcano, South Kyushu, Japan

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Volcanoes in Kyushu

110 volcanoes in Japan

Sakurajima
Unzen
Aso
Satsuma-Iwojima
Kuchinoerabujima
Nakanoshima
Suwanosejima

Japan Sea
Russia
Japan
Korea
Pacific Ocean
2011 Eruption at Shin-moedake of Kirishima Volcano Complex

Mr. Shimousuki, Kagoshima International Aviation

Sub-plinian eruption on January 26, 2011

Deflation due to sub-plinian eruption on January 26, 2011

Lava dome

Slope distance change

inflation

Quick turn to inflation
Historical eruption of Sakurajima

1914

1779

1471-

76

Submarine eruption in 1780

Kitadake

Minamidake

Showa crater

AD 0
# Historical eruptions

<table>
<thead>
<tr>
<th></th>
<th>Bunmei eruption</th>
<th>An’ei eruption</th>
<th>Taisho eruption</th>
<th>Showa eruption</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vent location</strong></td>
<td>NE-SW</td>
<td>N-S</td>
<td>E-W</td>
<td>E</td>
</tr>
<tr>
<td><strong>Volume of lava (km(^3))</strong></td>
<td>0.5</td>
<td>1.7</td>
<td>1.34</td>
<td>0.18</td>
</tr>
<tr>
<td><strong>Volume of tephra (km(^3))</strong></td>
<td>0.7</td>
<td>0.4</td>
<td>0.52</td>
<td>0.02</td>
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<tr>
<td><strong>Plume height</strong></td>
<td>unknown</td>
<td>12,000m</td>
<td>8,000m</td>
<td>2,000m</td>
</tr>
<tr>
<td><strong>Casualties</strong></td>
<td>many</td>
<td>163</td>
<td>58</td>
<td>1</td>
</tr>
</tbody>
</table>

VEI 5
Eruptive activity of Sakurajima

Minamidake crater

Showa crater

Annual number of explosion

Annual weight of volcanic ash (million ton)

No measurement before 1977
Increase in eruptive activity

The first explosion on February 3, 2008

April 9, 2009 Pyroclastic flow

Explosion at Minamidake October 3, 2009

Increase in eruptivity

Cumulative number

Monthly number of explosion

JMA
Enlargement of Showa crater

Jan 2006
Minamidake

Before eruptive activity

Sep 2011
Minamidake

350m
700m

May 2007
Minamidake

Showa

Showa

Sep 2011
Showa

Sep 2011
Minamidake

350m
700m

May 2007
Minamidake

Showa

Showa
Magma supply system of Sakurajima

1974-1992 (Vulcanian eruption)

Magma discharge

Since 1993 (Less eruptivity)

Magma accumulation

Supply rate
1x10^7 m³/year

Eruptive activity at Showa crater has not decreased magma in the reservoir yet.
Location of VT earthquakes

1997-2010 (N=548)

Magma reservoir
Aseismic zone

Jan 12, 1914 M7.1

2010/7

5km

Depth (km)

Depth (km)

2012/2/21

2010/7

M 0 1 2
Long-term vertical displacement

1914 eruption
- 1914 eruption
- 1.34 km³

1946 eruption
- 1946 eruption
- 0.18 km³

1955

Volcanic ash (200 million tons) ejected from 1974 to 1992

Violent explosivity of Minamidake

Inflation since 1993

Aira caldera

1914 eruption

1946 eruption

28 years

30 years?

31 years
Recent inflation of Sakurajima measured by GPS

Minamidake

Showa crater

Horizontal displacement (m)

FUTG-ARIG (N-S)

KURG-SVOG (E-W)

Volcanic ash

Number of explosion


0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14

0 40 80 120 160 200 240

0 40 80 120 160 200 240

FUTG SVOG KURG ARIG

爆発回数

桜島横山町-黒神町 ( 東西)

京都大学防災研究所

GPS連続観測による水平地盤変動

水平変動 (m)

有村町-桜島二俣町 ( 南北)

火山灰量
Ballistics

- Sakurajima
- Minamidake
- Showa crater

3.5km
2km
South foot, Jul 21, 1985
Influence of volcanic ash fall
Thickness of ash fall deposit by 1914 eruption

Many mud flows occurred after the 1914 eruption

Range of ash fall

Mud flow (Minamidake eruption)

(Omori, 1916)
Dispersion of volcanic ash from Sakurajima volcano in 1914

(Omori, 1916)

Airports:
- Fukuoka
- Kagoshima
- Itami
- Kansai
- Nagoya
- Haneda
- Narita