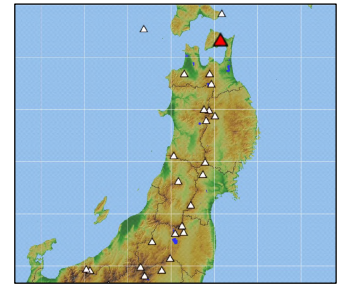


21. Osorezan

Latitude: 41°16'43" N, Longitude: 141°07'12" E, Elevation: 878 m (Kamafuseyama)
(Triangulation Point)



Lake Usoriyama, taken from southwest side on November 8, 2004 by the Japan Meteorological Agency

Summary

Osorezan is a stratovolcano composed of rhyolite, dacite, and andesite. It has a caldera approximately 3 km in diameter, surrounded by a somma composed of small volcanoes and lava domes, such as Asahinadake, Maruyama, and Ozukushiyama. Activity at Osorezan can be broadly divided into the stage from approximately 1,460,000 to approximately 680,000 years ago, when the somma was formed, and the stage from approximately 480,000 years ago, which consisted of pyroclastic flows and air-fall pyroclastic material discharges, centered in the caldera area (Kobayashi et al., 2011). A group of pyroclastic cones and lava domes (Tsurugiyama, etc.), which formed by approximately 80,000 years ago, is located in the northern interior of the caldera (Arakawa et al., 2008). The volcano has many fumes and hot springs near Lake Usoriyama (Lake Osorezan). The SiO₂ content of the andesite and dacite is between 58.0 and 64.8 wt %. Analysis results for rhyolite have not been reported.

Red Relief Image Map

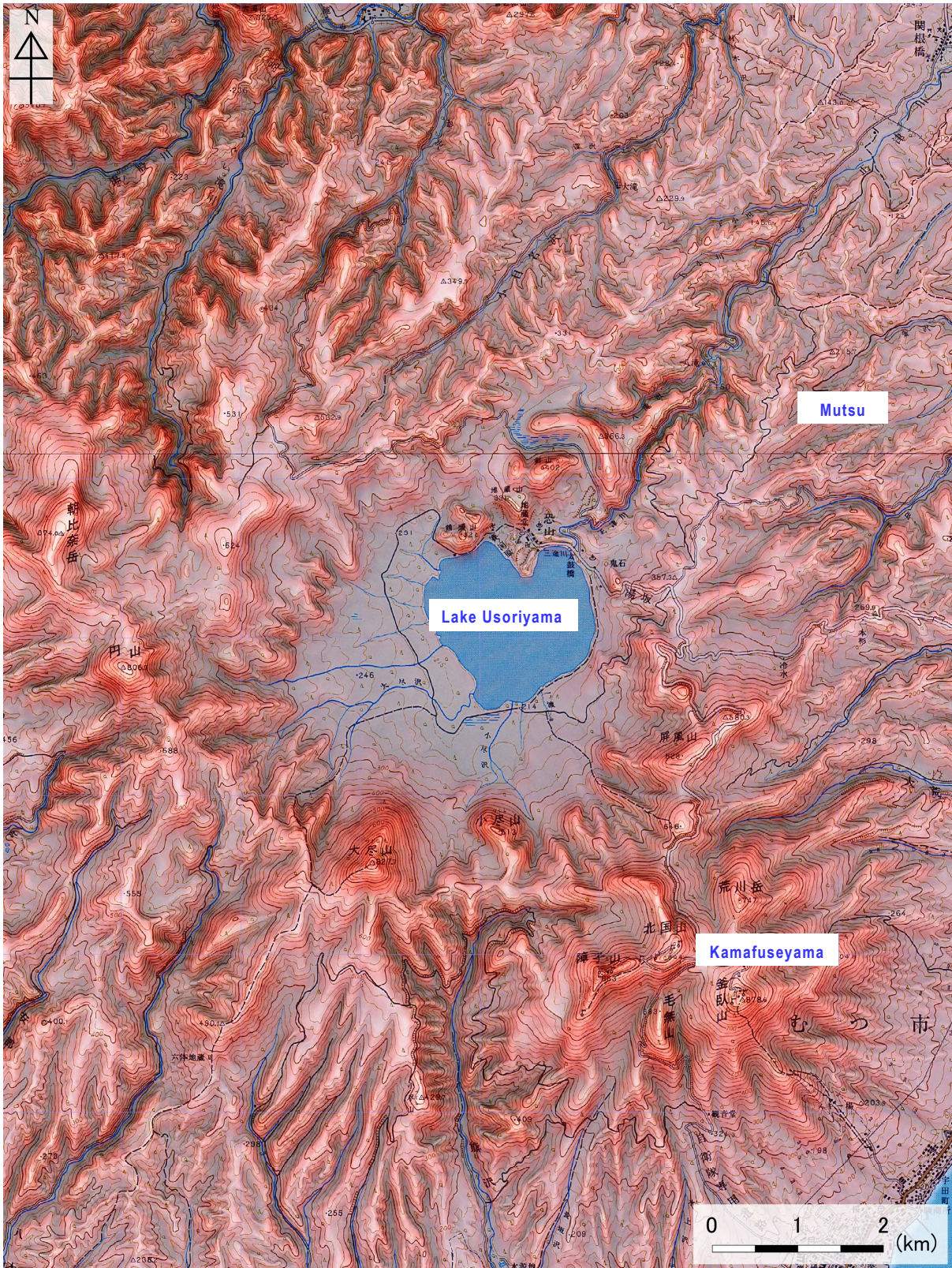


Figure 21-1 Topography of Osorezan.

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

Chronology of Eruptions

▪ Volcanic Activity in the Past 10,000 Years

No deposits indicating activity in the past 10,000 years have been discovered (Aoki, 1990; Kuwabara and Yamazaki, 2001).

However, a large amount of geothermal and fumarolic activity is confirmed, and there is a possibility that very small phreatic eruptions occurred. The last eruption that can be confirmed from the volcano's deposits was a phreatic one which occurred approximately 20,000 years ago (the Onishi tephra) (Arakawa et al., 2008).

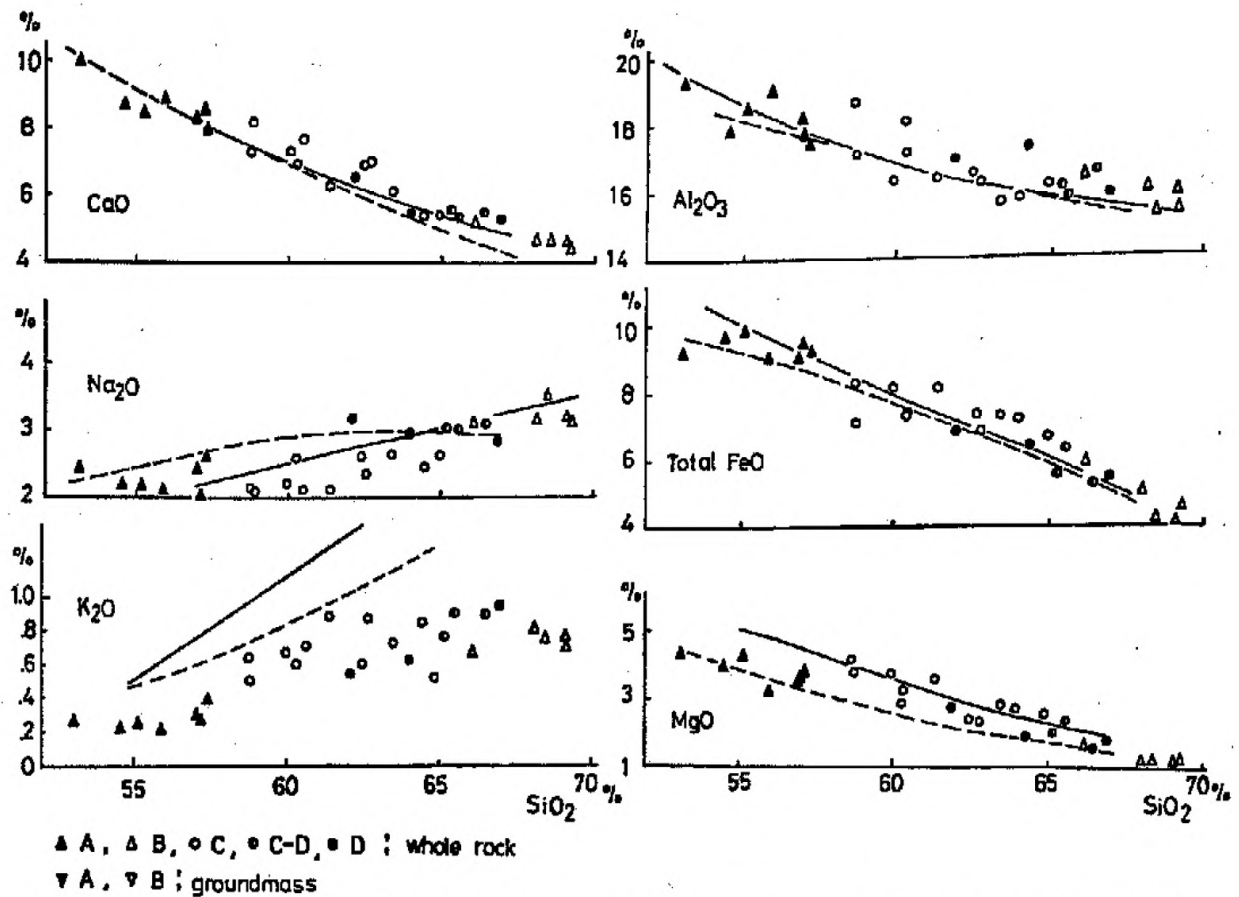
Volume 5 of the "Tohoku Ryokodan", published in January, 1789 (Tenmei 9) states that "a fire appeared again, burning fiercely", which is a strong indicator that fumes were emitted intermittently (Hayashi 2009).

▪ Historical Activity

Year	Phenomenon	Activity Sequence, Damages, etc.
1993 (Heisei 5)	Earthquake swarm	February 5 to 11. On February 5, an earthquake with a seismic intensity of 2 in JMA scale occurred at the weather station, approximately 10 km west of the summit.

Reference documents have been appended with reference to the catalog of eruptive events during the last 10,000 years in Japan, database of Japanese active volcanoes, and AIST (Kudo and Hoshizumi, 2006) for eruptive period, area of activity and eruption type.

Whole Rock Chemical Composition



凡例：

A：釜臥山，B：障子山。

C：主活動期，C-D：主活動期の一部（屏風山）と主活動期の末期（正津川軽石流）。

D：後カルデラ活動期。

実線：那須火山帯紫そ輝石質岩系の平均。

破線：那須火山帯ピジョン輝石質岩系の平均。

Figure 21-2 Whole rock chemical composition of Osorezan (Togashi, 1977).

Year - Cumulative Magma Volume

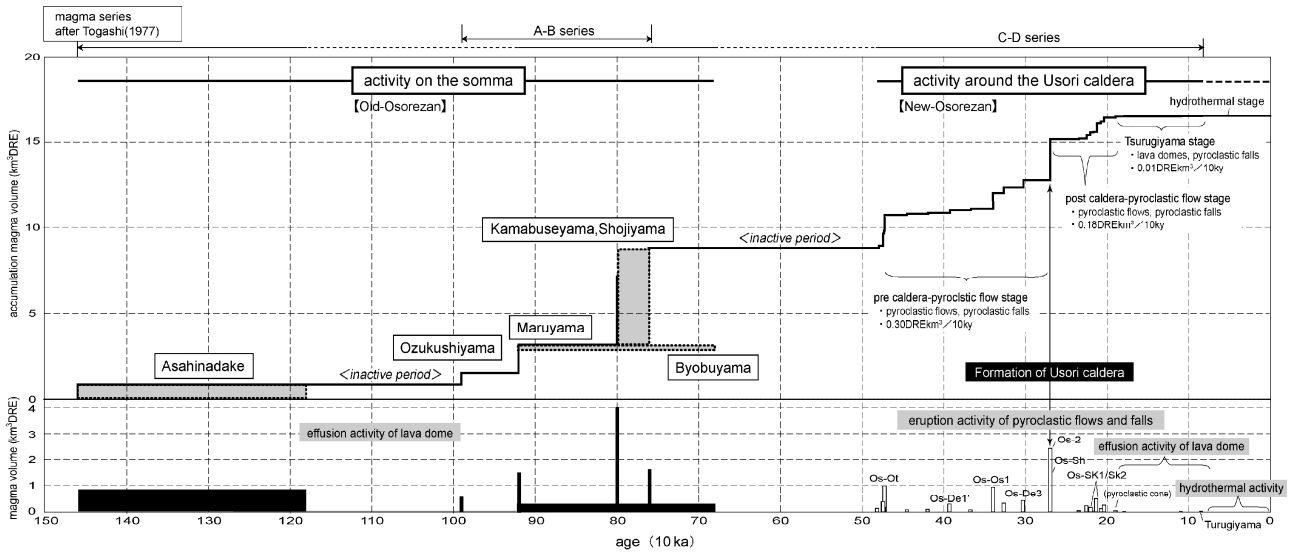


Figure 21-3 Year - cumulative magma volume of Osorezan (modified from Kobayashi and Mizukami (2012)).

Recent Volcanic Activity

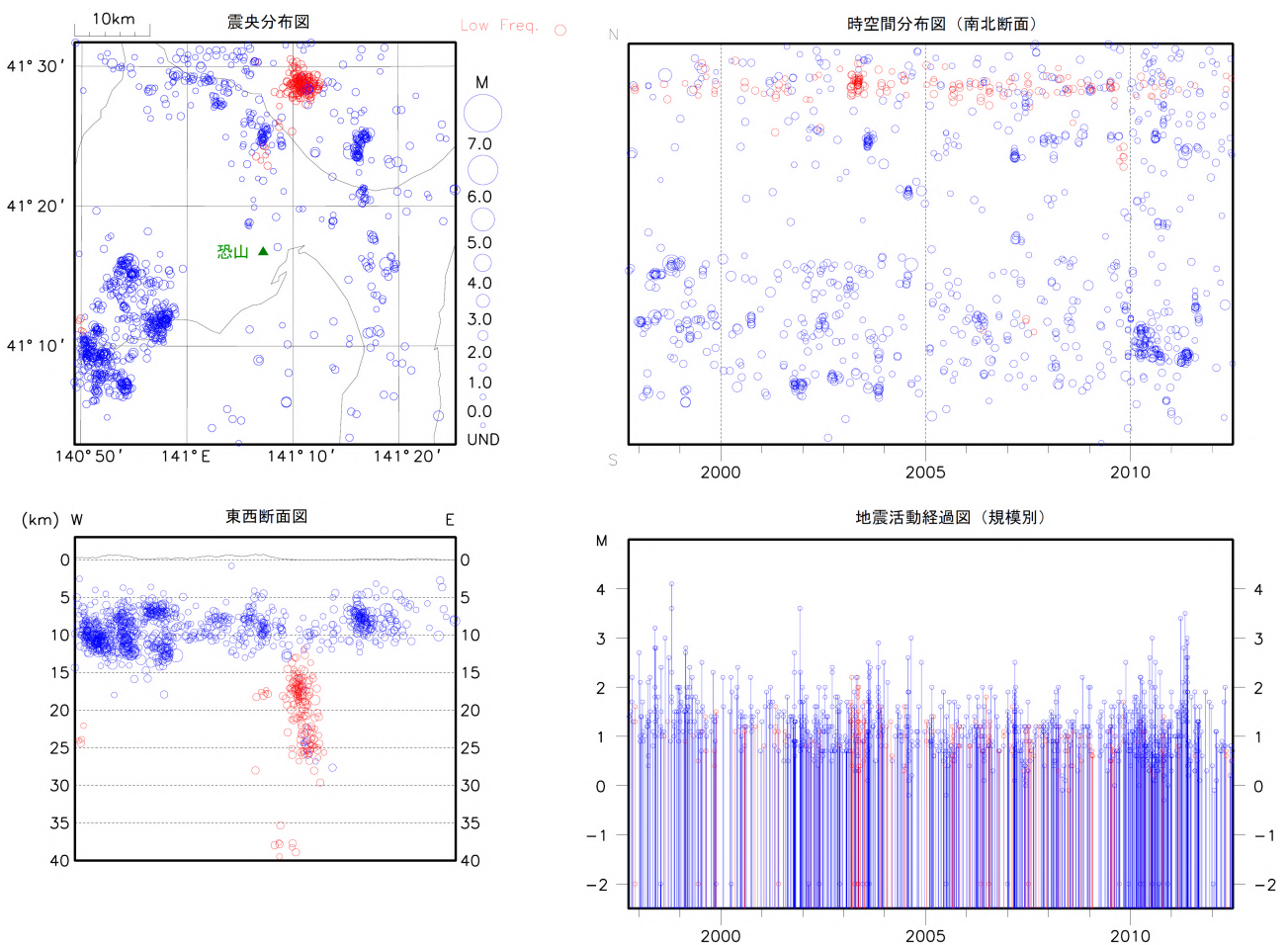


Figure 21-4 Shallow VT seismic activity (blue circles) and deep low-frequency seismic activity (red circles) observed by a regional seismometer network (October 1, 1997, to June 30, 2012). Epicenter distribution (upper left), space-time plot (N-S cross-section) (upper right), E-W cross-section (lower left) and magnitude-time diagram (lower right).

Information on Disaster Prevention

① Hazard Map

None

Social Circumstances

① Populations

Mutsu City: 63,870 (as of October 1, 2011)

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

- Shimokita Peninsula Quasi-National Park
- Number of sightseers: 348,000 per year (according to Aomori Prefecture sightseeing statistics from 2009)
- Number of Osorezan mountain-climbers (including Osorezan Bodaiji visitors): 260,703 (according to Mutsu City statistics from 2009)

③ Facilities

None

Monitoring Network

Wide Area

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



1:200,000 scale regional maps (Hakodate, Shiriyazaki, Aomori and Noheji) published by the Geospatial Information Authority of Japan were used.

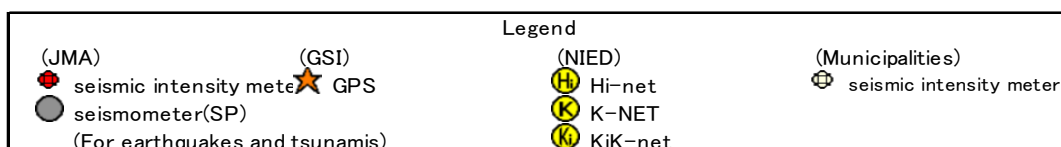


Figure 21-5 Regional monitoring network.

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