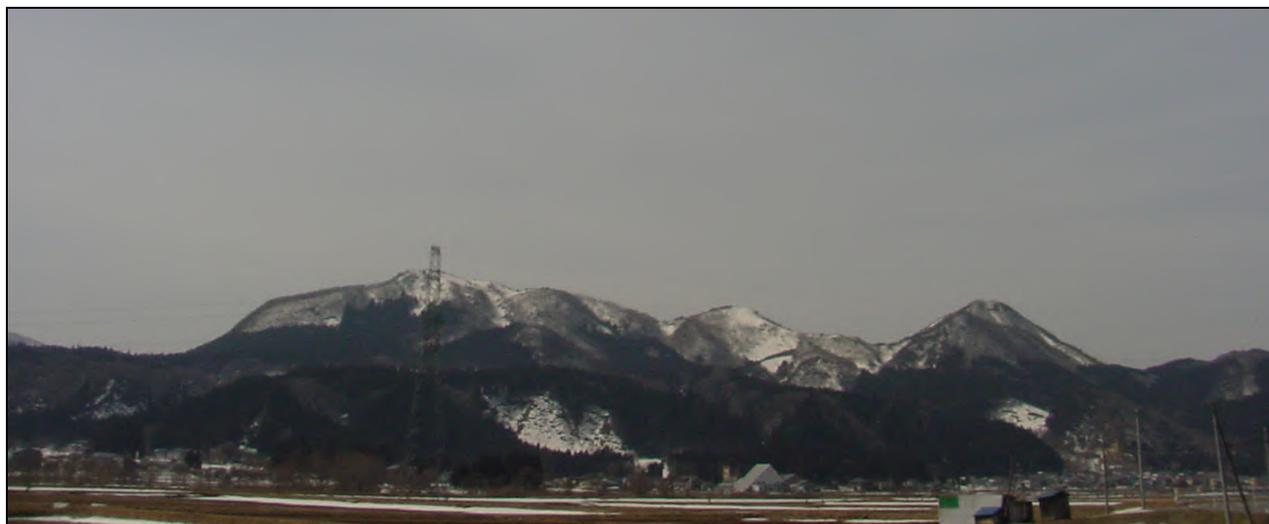


## 31. Naruko

Latitude: 38°43'44" N, Longitude: 140°44'04" E, Elevation: 470 m (Ogadake)  
(Triangulation Point - Ogadake)



Overview of Naruko. Photo taken from the east side on December, 2001 by the Japan Meteorological Agency.

### Summary

Naruko is located in the northwest of Miyagi Prefecture. It has a caldera which is roughly 7 km in diameter whose topography is not clearly defined, and which has a group of lava domes at its center. Four dacite lava domes form one group and enclose an acidic crater lake, Katanuma, measuring 400 m in diameter. Active fumes exist at both the inside and outside of Katanuma, as well as on the walls of the lava dome to its west (elevation of 396m above sea level). The SiO<sub>2</sub> content is between 68.3 and 72.9 wt %.

Many crater topologies with diameters between 100 and 400 m are found on the lava domes. It has been deduced that a group of lava domes was formed during the post-caldera period, and that explosive activity resulted in their partial destruction. The lava domes and lake deposits are covered in with tephra, and the Katanuma-Uehara tephra (from approximately 18,000 years ago), which is spread over a comparatively wide area, is considered to have been involved in the formation of Katanuma.

It is also known as Narugo.

### Red Relief Image Map

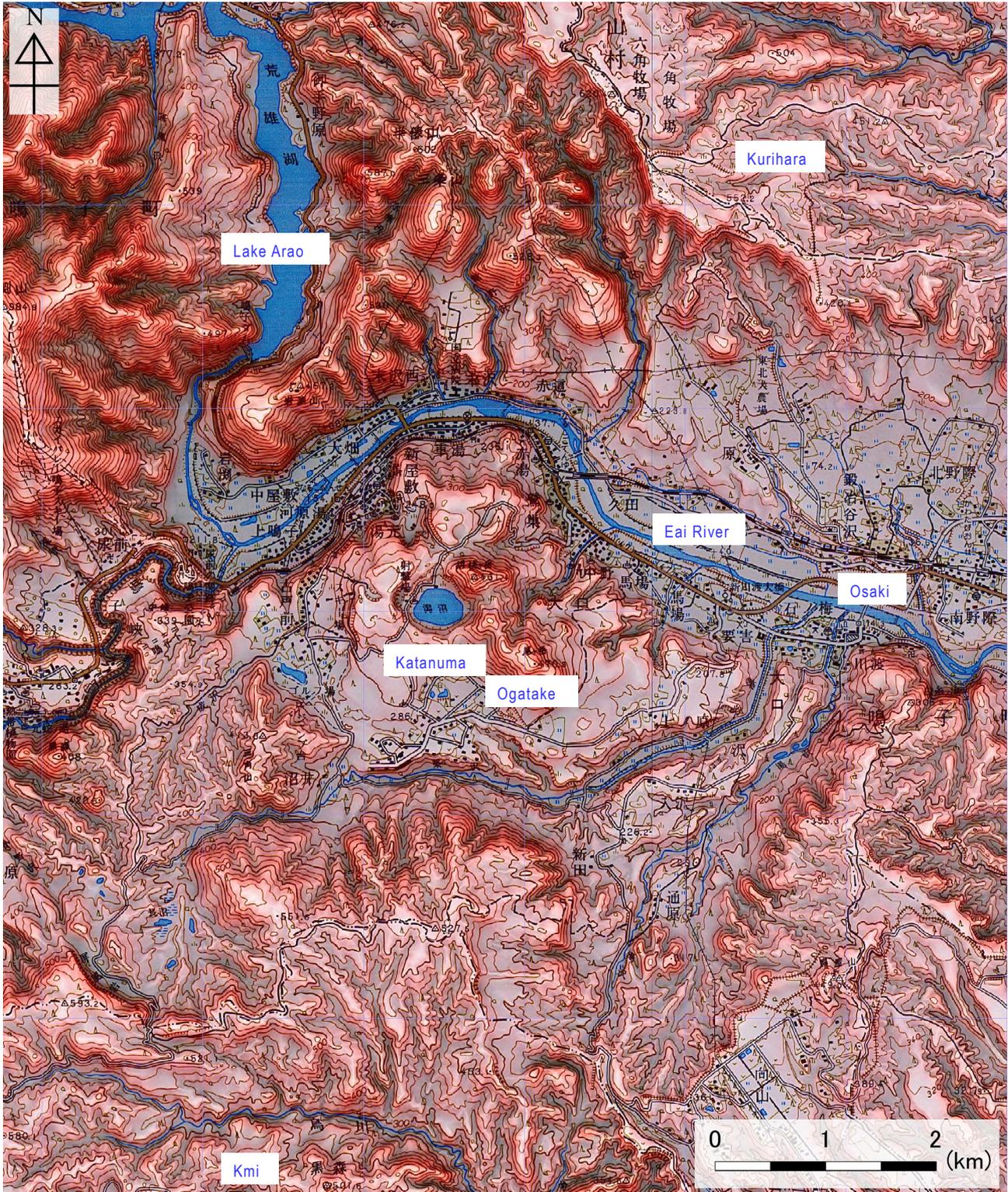


Figure 31-1 Topography of Naruko.

1:50,000 scale topographic maps (Naruko and Iwagasaki) 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

The tree trunks found in the sand gravel strata directly below the lava of the dome in the west of Katanuma have been dated, and the results indicate that eruption began approximately 11,800 years ago. Volcanic ash, which originates from the Naruko volcano, is distributed through the humus at the foot of the volcano, and based on dating analysis of the bottom-most humus, it is considered to have come from approximately 5,400 years ago or later (Omoto, 1993). Geothermal activity after the formation of the lava domes caused a phreatic eruption about 2,000-3000 years ago.

Period	Area of Activity	Eruption Type	Main Phenomena / Volume of Magma
6.4ka>	Katanuma area?		Tephra fall.
3.4ka<	Katanuma area?	Phreatic eruption	Tephra fall.
3.4←→3.3ka	Katanuma area	Phreatic eruption	Tephra fall.
2.8ka<	Katanuma area	Phreatic eruption	Tephra fall.

\* 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. All years are noted in calendar years. "ka" within the table indicates "1000 years ago", with the year 2000 set as 0 ka.

A←→B: Eruption events taking place at some point between year A and year B.

A>: Eruptive event after year A.

A<: Eruptive event before year A.

### ▪ Historical Activity

Year	Eruption Type	Main Phenomena
837 (Jowa 4)	Phreatic eruption	May. The eruptive activity occurred in the Katanuma area.

\* 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.

## Recent Volcanic Activity

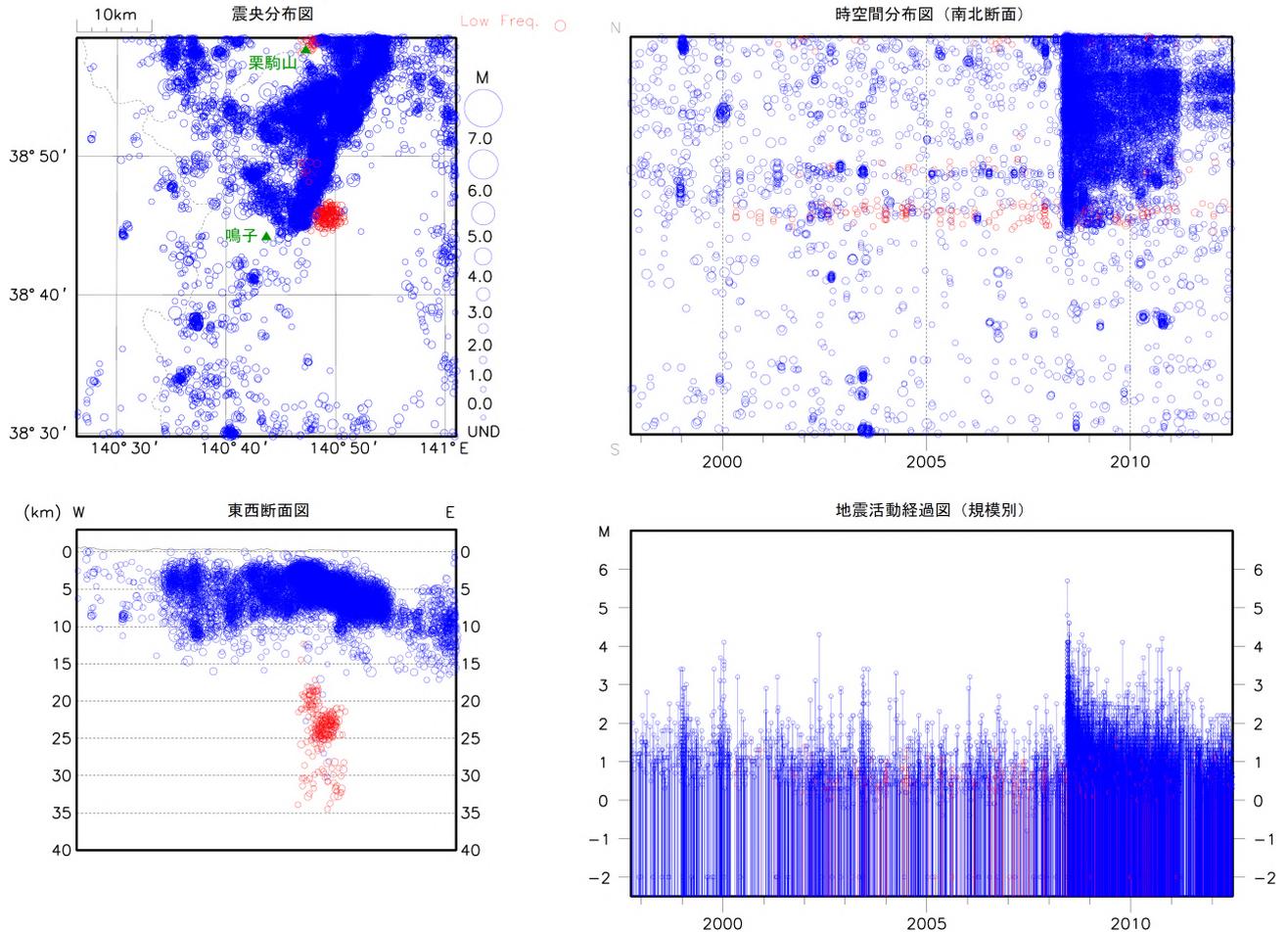


Figure 31-2 Activity of shallow VT earthquakes (blue circles) and deep low-frequency earthquakes (red circles) observed by aregional seismometer network (October 1, 1997, to June 30, 2012). Epicenter distribution (upper left), space-time plot (N-S cross-section) (upper right), E-W cross-section (lower left) and magnitude-time diagram (lower right). Small earthquakes were not detected for a period from March 11, 2011, due to a high level of aftershock activity following the 2011 off the Pacific coast of Tohoku Earthquake (M9.0). Few earthquakes occurred directly below the volcanic body. The seismic activity is high in nearby areas. To the north, at the Onikobe caldera, earthquake swarms occur repeatedly. To the northeast, the 2008 Iwate-Miyagi Earthquake (M7.2) occurred on June 14, 2008.

## Information on Disaster Prevention

### ① Hazard Map

None

## Social Circumstances

### ① Populations

- Osaki Naruko Onsen area: 7,521 (as of April 1, 2011)

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

- Kurikoma Quasi-National Park Naruko

Number of sightseers per year: 1,152,300 (number of visitors to Naruko Onsen, according to 2010 Miyagi Prefecture sightseeing statistic summary)

### ③ Facilities

None

## Monitoring Network

See Kurikomayama

## Bibliography

Omoto, K. (1993) Quaternary Res., **32**, 227-229 (in Japanese with English Abstract).

(Ueki, S.)