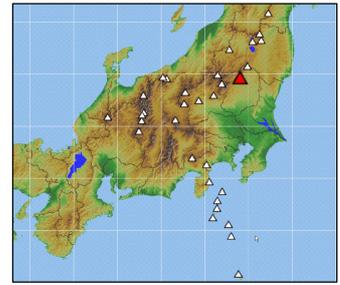


## 40. Takaharayama

Latitude: 36°54'00" N, Longitude: 139°46'36" E, Elevation: 1,795 m  
(Shakagatake)

(Triangulation Point - Takaharayama)

Latitude: 36°57'12" N, Longitude: 139°47'19" E, Elevation: 1,184 m  
(Fujiyama) (Triangulation Point)



Overview of Takaharayama taken from southeast side on December 15, 2011 by the Japan Meteorological Agency

### Summary

Takaharayama is a stratovolcano composed mainly of basaltic andesite, andesite, and dacite, located in the north of Tochigi Prefecture. The ejecta are distributed over an area measuring approximately 15 km east-west and 15 km north-south, and with a total volume of approximately 55 km<sup>3</sup>. Takaharayama is made up of a caldera (Shiobara volcano) with its central cones (Myojindake, Maekuroyama) to the north, and a conical volcano (the Shakagadake volcano) to the south. The Shakagadake volcano is composed of peaks such as Shakagatake, Nishihiradake, Keichoizan, and Kengamine (Ikeshima and Aoki, 1962; Inoue et al., 1994). A fissure zone which extends from the west-northwest to the east-southeast, is located at the northern foot of Maekuroyama, as well as accompanying monogenetic volcanoes. Volcanic activity began approximately 500,000 years ago, and the main activity had stopped by approximately 10,000 years ago (Inoue et al., 1994; Suzuki, 1993). This was followed by a long period of dormancy, but approximately 6,500 years ago a fissure eruption occurred on the north side, and the Fujiyama lava dome was formed on top of the fissure crater (Okuno et al., 1997; Takashima, 1999). The SiO<sub>2</sub> is between 51.0 and 69.0 wt %.

Photos



Fumarolic area at Shinyu Onsen (area in red rectangle in figure below) on February 22, 2006 taken by the Japan Meteorological Agency



Fumarolic area at Shinyu Onsen (area in red rectangle in figure below) on February 22, 2006 taken by the Japan Meteorological Agency

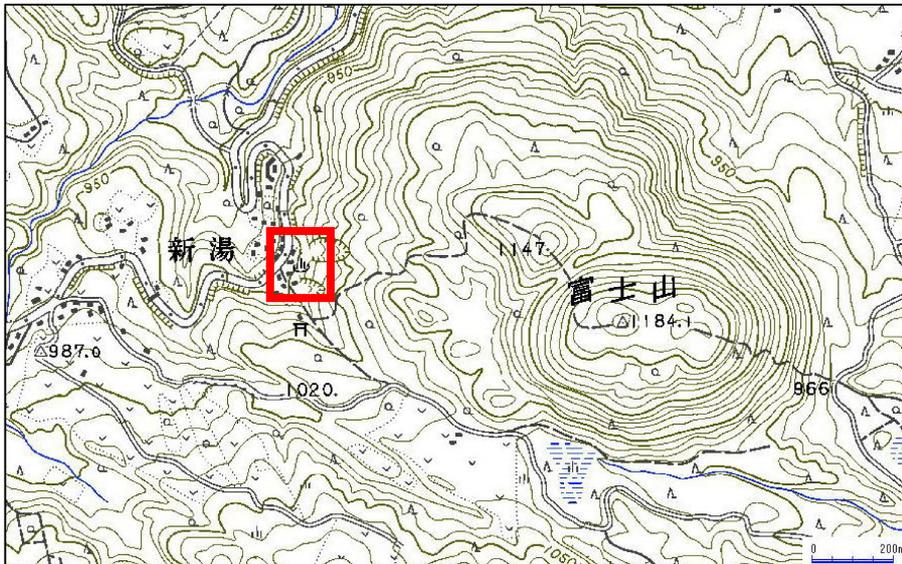


Figure 40-1 Topography around the Takaharayama fumarolic area.

The 1:25,000 Scale Topographic Map (Shiobara) published by the Geospatial Information Authority of Japan was used to create this map.

Red Relief Image Map

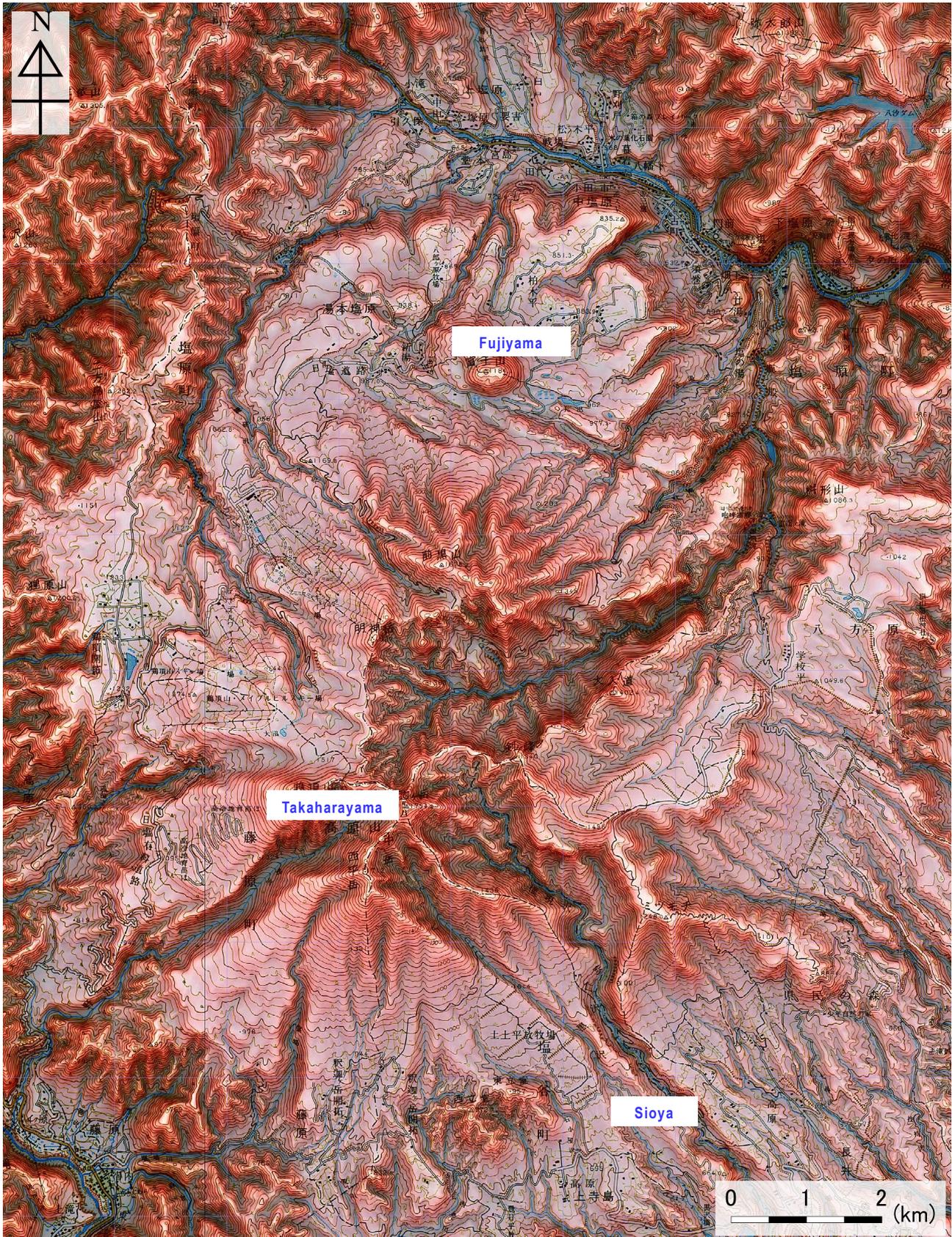


Figure 40-2 Topography of Takaharayama.

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

## Chronology of Eruptions

### ▪ Volcanic Activity in the Past 10,000 Years

Volcanic activity within the past 10,000 years includes the phreatic explosion and tephra fall at the north foot of the volcano approximately 6,500 years ago (Takaharu-Uenohara tephra), and followed by lava dome (Fujiyama lava dome) formation. (Okuno et al., 1997; Takashima, 1999).

Period	Area of Activity	Eruption Type	Main Phenomena / Volume of Magma
6.5 ka	Part of the Yumoto Shiobara fissure zone	Phreatic eruption → magmatic eruption	Takaharu-Fujiyama eruption: Tephra fall → Lava dome and cryptodome. Magma eruption volume = 0.17 km <sup>3</sup> DRE. (VEI 4)

\* 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.

### ▪ Historical Activity

There are no records of eruptions within the historical era, but fumarolic activity occurs in Shinyu, near Fujiyama.

Earthquake swarms also occurred in February, 1979, and from 1981 to 1982.

Year	Phenomenon	Activity Sequence, Damages, etc.
1979 (Showa 54)	Earthquake	February. Micro-earthquake swarms.
1981 to 1982 (Showa 56 to 57)	Earthquake	December to January. Micro-earthquake swarms. On December 22 an earthquake measuring 4 on the JMA scale of seismic intensity struck Shiobara, causing slight damage

\* 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

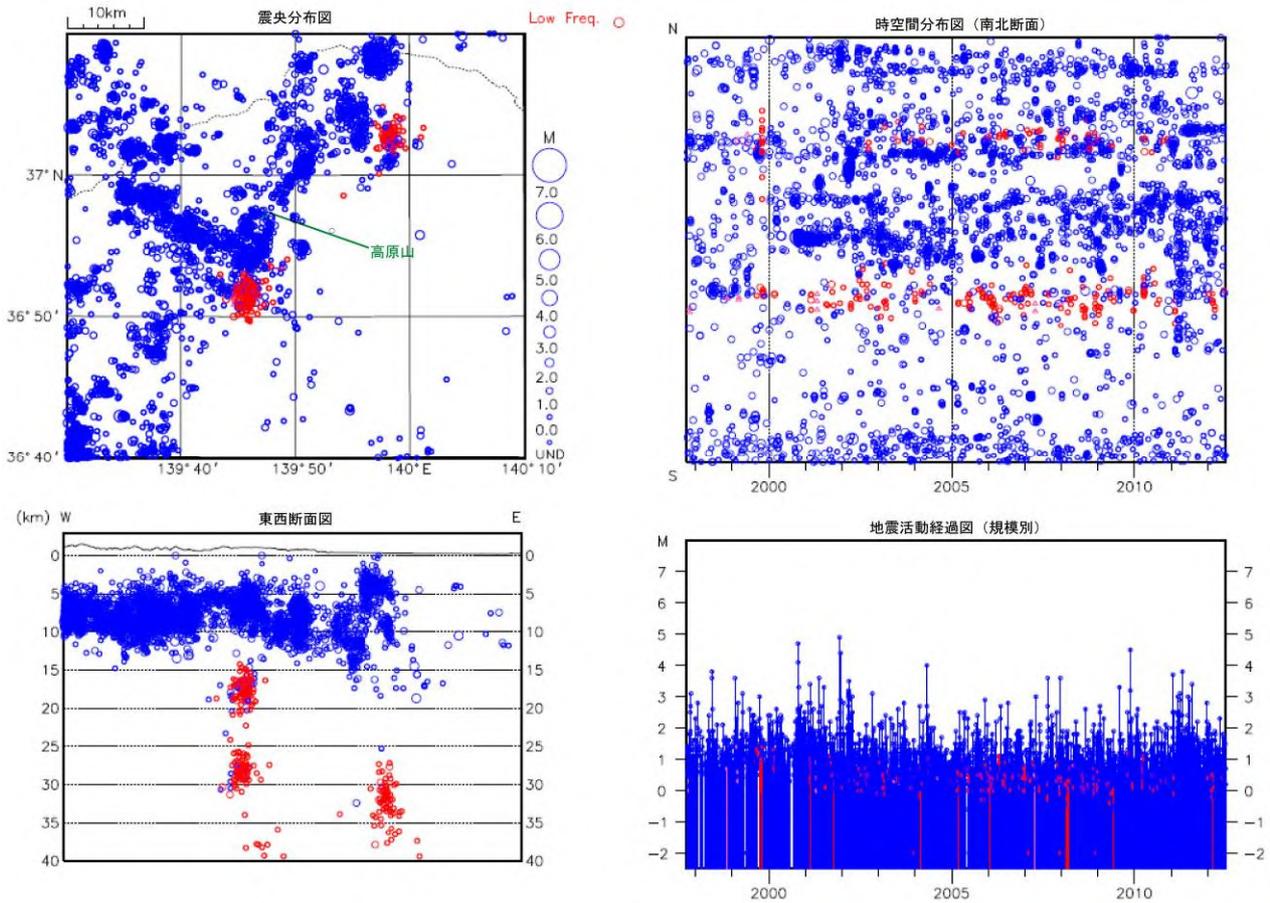


Figure 40-3 Shallow VT seismic activity (blue circles) and deep low-frequency seismic activity (red circles) observed by a regional seismometer network (October 1, 1997, to June 30, 2012). Epicenter distribution (upper left), space-time plot (N-S cross-section) (upper right), E-W cross-section (lower left) and magnitude-time diagram (by scale) (lower right).

## Information on Disaster Prevention

### ① Hazard Map

None

## Social Circumstances

### ① Populations

- Nikko City: 89,594 (as of October, 2010 - Tochigi Prefecture)
- Nasushiobara City: 117,347 (as of October, 2010 - Tochigi Prefecture)
- Yaita City: 34,998 (as of October, 2010 - Tochigi Prefecture)
- Shioya Town: 12,599 (as of October, 2010 - Tochigi Prefecture)

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

- Nikko National Park

There are 4 cities/towns at the foot of Takaharayama, making it difficult to estimate the number of mountain-climbers.

### ③ Facilities

- Yunishi River Dam Construction Office

# Monitoring Maps

## 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 map (Nikko) published by the Geospatial Information Authority of Japan was used.

Legend			
(JMA)	(GS1)	(NIED)	(Municipalities)
● seismic intensity meter	★ GPS	● Hi-net	● seismic intensity meter
● seismometer(SP)		● K-NET	
(For earthquakes and tsunamis)		● KIK-net	

Figure 40-4 Regional monitoring network.

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