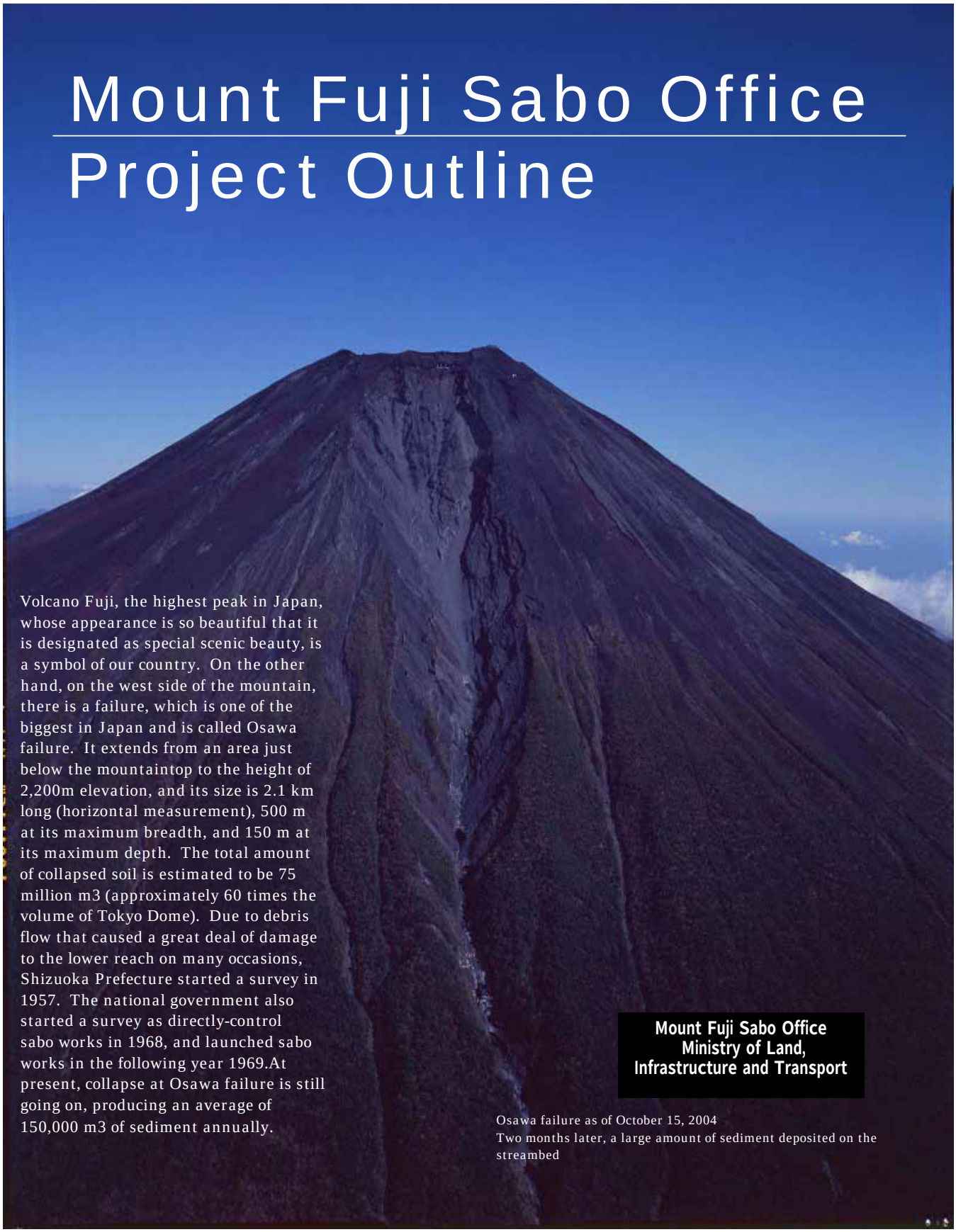
Mount Fuji Sabo Office
Project Outline



Volcano Fuji, the highest peak in Japan, whose appearance is so beautiful that it is designated as special scenic beauty, is a symbol of our country. On the other hand, on the west side of the mountain, there is a failure, which is one of the biggest in Japan and is called Osawa failure. It extends from an area just below the mountaintop to the height of 2,200m elevation, and its size is 2.1 km long (horizontal measurement), 500 m at its maximum breadth, and 150 m at its maximum depth. The total amount of collapsed soil is estimated to be 75 million m3 (approximately 60 times the volume of Tokyo Dome). Due to debris flow that caused a great deal of damage to the lower reach on many occasions, Shizuoka Prefecture started a survey in 1957. The national government also started a survey as directly-control sabo works in 1968, and launched sabo works in the following year 1969.At present, collapse at Osawa failure is still going on, producing an average of 150,000 m3 of sediment annually.

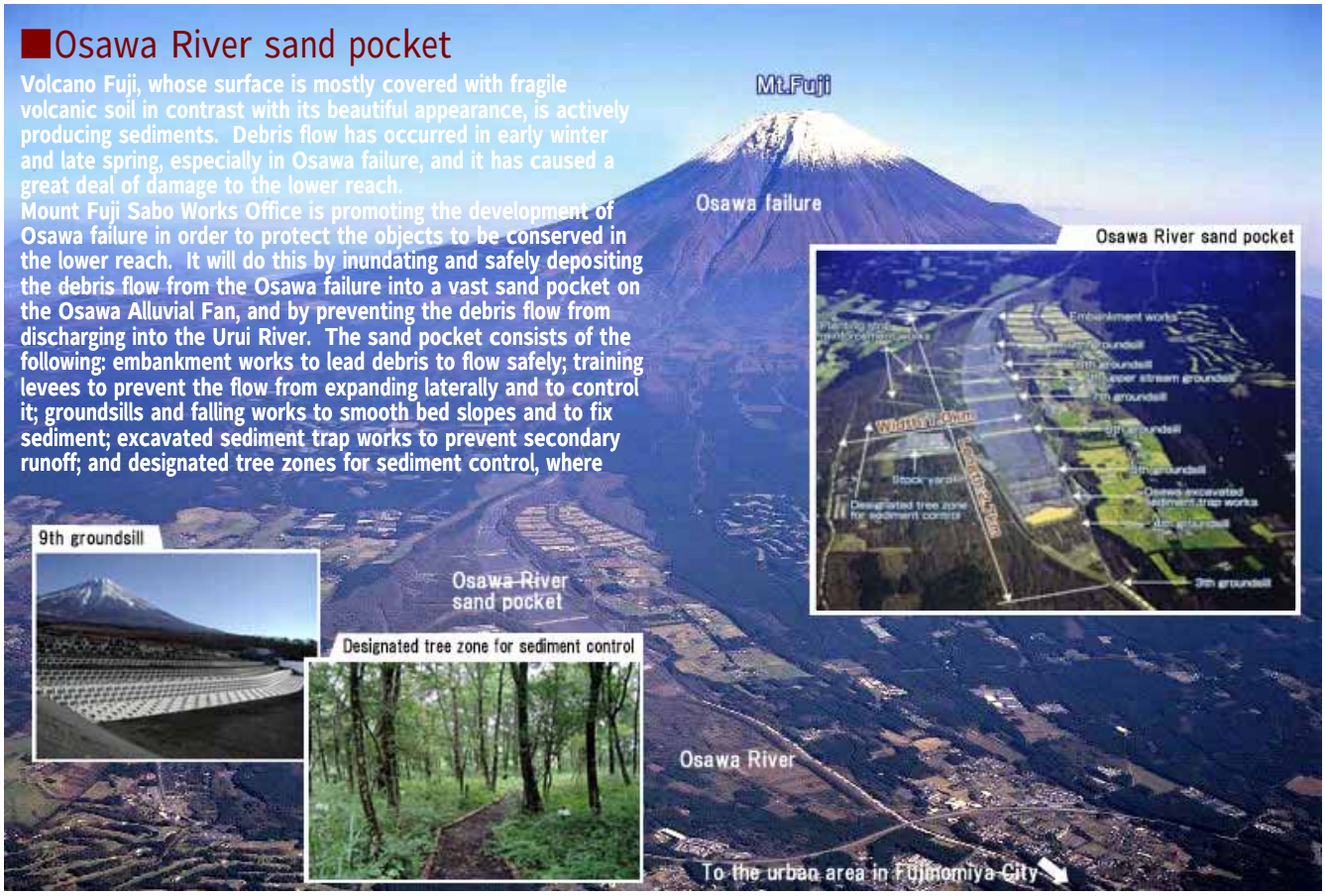
Mount Fuji Sabo Office
Ministry of Land, Infrastructure and Transport

Osawa failure as of October 15, 2004
Two months later, a large amount of sediment deposited on the streambed

Main Facilities at Fuji Sabo Site

Osawa River sand pocket

Volcano Fuji, whose surface is mostly covered with fragile volcanic soil in contrast with its beautiful appearance, is actively producing sediments. Debris flow has occurred in early winter and late spring, especially in Osawa failure, and it has caused a great deal of damage to the lower reach.
Mount Fuji Sabo Works Office is promoting the development of Osawa failure in order to protect the objects to be conserved in the lower reach. It will do this by inundating and safely depositing the debris flow from the Osawa failure into a vast sand pocket on the Osawa Alluvial Fan, and by preventing the debris flow from discharging into the Urui River. The sand pocket consists of the following: embankment works to lead debris to flow safely; training levees to prevent the flow from expanding laterally and to control it; groundsills and falling works to smooth bed slopes and to fix sediment; excavated sediment trap works to prevent secondary runoff; and designated tree zones for sediment control, where



Stream preservation works

The conventional channel works aimed at straightening the river channel and fixing the watercourse in order to prevent the inundation and lengthwise and crosswise erosion in the river. The stream preservation works, which are being conducted at present, adopt construction methods friendly to natural landscapes and environment. They try not to change mountain streams as much as possible by preserving the original river channel and reinforcing only where necessary on riverbeds and riverbanks.

Okubosawa stream preservation works

Yumisawa excavated sediment trap

Excavated sediment trap works

The torrent of Mt. Fuji are narrow and shallow, therefore this facility was established to empty accumulation areas and to stop sediment and debris flow. This facility establishs works at Inokubo River, Osawa River, Ashidori River, Kazamatsuri River, and Yumisawa River. When sediment have accumulated, stones are removed.

Stream preservation works

While preventing erosion of the riverbed and valley walls caused by debris flows, this dam temporarily holds sediment so that an excessive amount does not flow out. It sends away the sediment with a small to medium water flow, thus having a regulatory effect.

1st Bompu Sabo dam

2st Sudo sabo dam

Measures for the Valley Head of the Osawa Failure

■Valley head investigation works

Osawa failure at the valley head, where large-scale failure occurs, is a source of debris flow. Because of its high altitude, civil engineering works to reduce discharged sediment at Osawa failure have a lot of problems which make it hard to start full-fledged construction. These problems include technical problems such as construction techniques and means of material transportation, and problems from the environment and landscape. Therefore, trial construction works have been conducted in the canyon area at 2,100 meter elevation, which leads to Osawa failure at the valley head. Investigation works started in 1982, and so far over 30 kinds of monitored trial construction works have been conducted, such as low groundsill type dam construction works, embankment protection works, slope foundation works, and rockfall prevention net (rock-net) installment works.

Concrete placement by helicopter

■Environmentally-friendly material delivery system

Since material delivery at the valley head depends on a helicopter, delivery schedules are affected by weather and the conveyance volume is limited. For the purpose of establishing technologies for material delivery other than by a helicopter, we have started experiments toward the practical use of the "Hybrid
Fuji HEART System".
In this system, a freight car is designed to go up steep slopes at 30 degrees and deliver three tons of materials safely and certainly. In addition, it is an environmentally-friendly system, adopting elevated rack rails (laying rails 1.5m high on the ground surface), which have less impact on animals' migration and vegetation.

Completion image of the
"Hybrid Fuji HEART System (tentative name)"

Yui landslide control project

The Yui landslide, which is located in Yui Town, Ihara-gun, Shizuoka Prefecture, has been known as one of the rough spots for transport. In the print "Yui" from the collection titled "Fifty-three Stations of the Tokaido Road", Hiroshige Utagawa described Satta Pass, which is sandwiched between a precipitous terrain and Suruga Bay.
It has long been a key junction of transport, and it also has many records of sediment-related disasters, including landslides. At present, important traffic routes connecting the east and west of Japan including the main artilleries of Japan (JR Tokaido Line, Route 1, Tomei Expressway) are concentrated in this area. Efforts for the landslide control project directly supervised by the central government have been made, in view of the possibility that massive landslides might be caused by downpours or an earthquake in the Tokai region.

"Yui" from the "Fifty-three Stationsof the Tokaido Road" by Hiroshige Utagawa
(published by Hoeido)
Source: Tokaido Hiroshige Art Museum (Yui Town)

Yui landslide

Mt. Fuji seen from the present Satta Pass and the project targeted area
(JR Tokaido Line, Route 1, Tomei Expressway)

Debris flow is stopped!!

Since the start of sediment control works directly supervised by the central government, sediment-related disasters in the lower reach have been prevented. Debris flow from the Osawa River, Kurinokisawa River, Kazamatsuri River, etc. and sediment brought by slush avalanche have been trapped at sand pockets, sabo dams, and excavated sediment trap works in the Osawa River.Although debris flow occurred in November, 2000 and December, 2004, sabo facilities prevented disasters.

Sedimentation condition of debris flow at the 9th groundsill of the Osawa sand pocket(November 28, 1991)

Huge boulders brought to the Osawa sand pocket by debris flow (November 21, 2000)

Debris flow on November 21, 2000 (Source: Chunichi Shimbun and Shizuoka Shimbun)

Debris flow on December 5, 2004 (Source: Shizuoka Shimbun)

Effective use of soil produced by construction

Sand deposit on a sand pocket may flow out to a lower reach when the next debris flow occurs. So, it is removed by debris exclude works so that it might not cause a disaster. After it is sieved and crushed, sediment is used efficiently as filling for roads, parks, and housing land developments, and beach nourishment soil.

The removal of rocks and sifting out of pebbles from deposited sediment

Use as beach nourishment soil

Monitoring System

In order to protect the region from debris flow in the Osawa River and torrents at the southwest base of the mountain, we set up rain gauges, stream surveillance cameras and wire sensors for real-time monitoring. We are also considering the establishment of a volcanic monitoring system by closed-circuit television cameras as a measure against volcanic disaster.

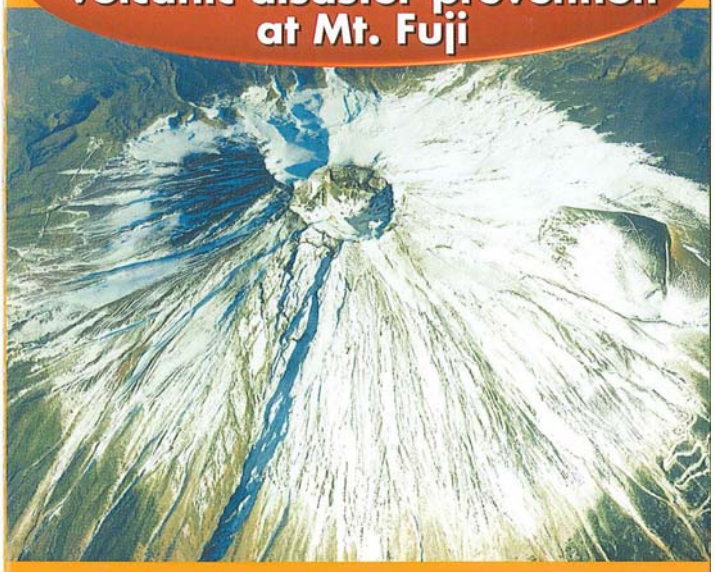
Picture of debris flow taken by a monitoring cameraon November 21, 2000

Centralized monitoring system at Disaster Management Room (at Mount Fuji Sabo Office)

Volcanic sediment control investigation

Mt. Fuji had volcanic eruptions even after the Younger Fuji Volcano was formed about 10,000 years ago, and volcanic activities have been periodically observed from the beginning of recorded history. Though it has been silent for about 300 years after the last eruption in 1707, known as the Hoei Eruption, it is predicted that a volcanic eruption would cause serious damage.
Mt. Fuji Sabo Works Office is looking at ways of drafting a Mt. Fuji volcanic sabo plan (including a strategy for placement of sabo facilities), developing a system to observe Volcano Fuji, cooperating with related organizations, and making a real-time hazard map in order to prevent sediment-related disasters by volcanic activities of Mt. Fuji.

Bits of knowledge about volcanic disaster-prevention at Mt. Fuji



Mt. Fuji erupted about 300 years ago in the Edo Period (Hoei Eruption). Since then it has lain dormant, but it is an active volcano under which magma still stays active.
If an eruption should occur, what kind of phenomena will occur, and how wide an area will they affect? What kind of counter-measures is Mt. Fuji Sabo Office considering? We give answers to these questions in this leaflet.

A picture showing the Hoei Eruption

This picture shows a pillar of fire rising from the crater. You can clearly see the trace of the crater on the right side of the photo above.

Material owned by: Mr. Hiroshi Tsuchiya in Numazu City
Material presented by: History and Culture Information Center of Shizuoka Prefectural Central Library

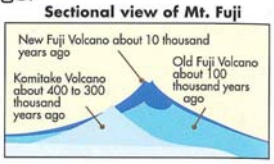
Major volcanic activities of Mt. Fuji in history

Year	Type of activity	Records in ancient documents (extract)
781	Eruption	Ash fell over the base of the mountain, and leaves died. (Shokunihongi)
800 to 802	Enryaku Eruption	Crushed rocks blocked up the Ashigara Road, so the Hakone Road was opened. (Nihongiryaku)
864 to 866	Jogan Eruption	Lava streams flowed into Lake Motosu and Senoumi. (Nihon Sandai Jitsuroku)
937	Eruption	Lava streams filled up an unknown lake. (Nihongiryaku and other documents)
999	Eruption	Eruption (Honchoseiki)
1020	Fumarolic activity and volcanic glow	Fumes rose from the top of the mountain, and flames were seen at night. (Sarashina Nikki)
1033	Eruption	Lava streams reached the base of the mountain. (Nihongiryaku)
1083	Eruption	Explosive eruption (Fusoryakuki and other documents)
1435	Eruption	Flames were seen at Mt. Fuji. (Oudaiki)
1511	Eruption	Abnormal booming was heard near Lake Kawaguchi, and the Kamaiwa rock burned. (Myohojiki)
1704	Booming	Mt. Fuji boomed for 4 days starting from 35 days after the Genroku Kanto Earthquake. (Taisenjiis document)
1707	Hoei Eruption	Explosive eruptions continued for 2 weeks starting from 49 days after the Hoei Tokai Earthquake. (Many historical sources)

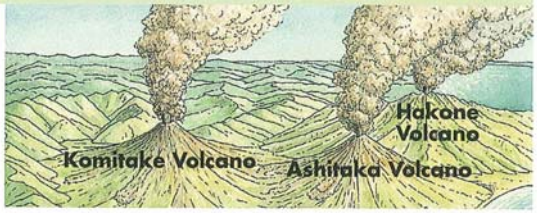
History of Mt. Fuji

Mt. Fuji is designated as a part of Fuji-Hakone-Izu National Park. Its beautiful conical shape has attracted many people since ancient times. Its broad base gives us a lot of blessings. However, Mt. Fuji was generated through repeated eruptions since early times. That is to say, the blessings and disasters of a volcano are inevitably linked.

Sectional view of Mt. Fuji

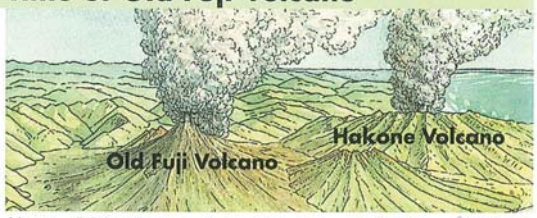


1 Time of Komitake Volcano



About 400 to 300 thousand years ago, the "Komitake Volcano" was born on the north side of the present Mt. Fuji. The top of the volcano was positioned near the present Komitake Shrine at the fifth station of the Fuji Yoshida Climbing Route.

2 Time of Old Fuji Volcano



About 100 thousand years ago, explosive eruptions repeatedly occurred on the mountainside of Komitake Volcano. At least five collapses of the mountain body occurred, and the "Old Fuji Volcano" appeared.

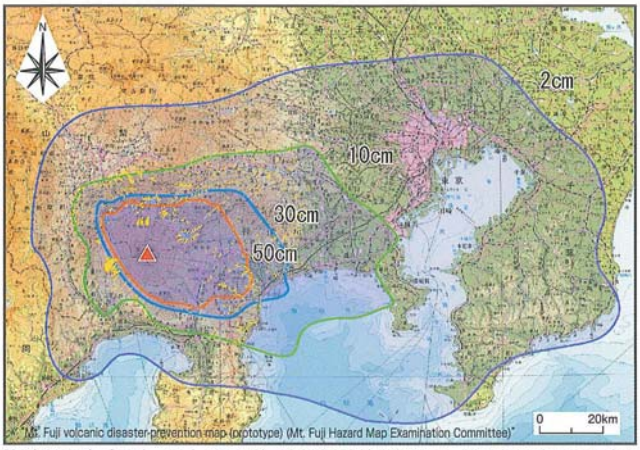
3 Time of New Fuji Volcano

About 10 thousand years ago, the "New Fuji Volcano" erupted, spouted a great volume of lava, covering the Kofuji Volcano, and grew to the shape of the current Mt. Fuji.

Mt. Fuji volcanic disaster-prevention map

Based on the past phenomena and some case examples of recent disasters at other volcanoes, the Mt. Fuji Hazard Map Examination Committee has made public the "Mt. Fuji volcanic disaster-prevention map (prototype)."

The map becomes the basis for wide-area disaster prevention measures, and is partially shown below. Using this prototype, the local governments around Mt. Fuji build their own detailed volcano disaster-prevention maps and distribute them to residents.
We recommend you to study the volcano disaster-prevention map of your area in advance to check, "Where are dangerous areas?" and "Where are safe areas?"



Estimated depth and spread of ash fall when a large-scale eruption occurs and generates volcanic ash and pumice stones

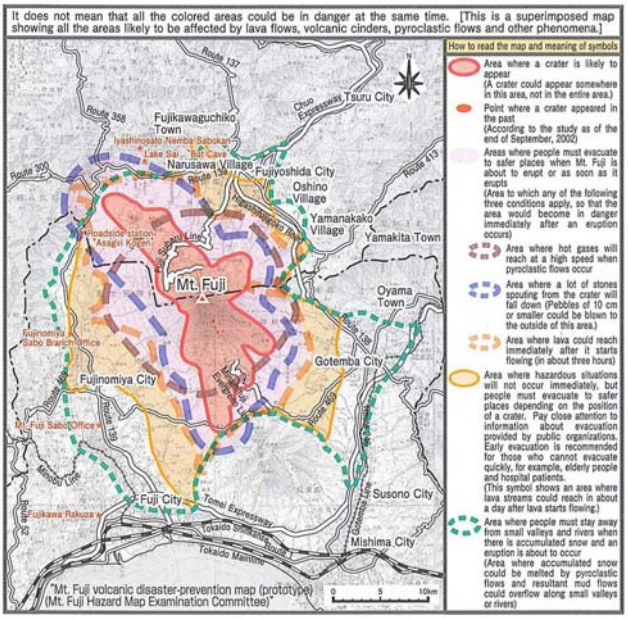
Shown above is the estimated depth and spread of volcanic ash in case of an eruption of Mt. Fuji. Note that the depth and spread of ash fall vary depending on the scale of eruption and wind direction, and ash fall can spread to the outside of the range shown above. When Hoei Eruption occurred in 1707, volcanic ash spread far and wide. Hakuseki Arai, one of the scholars of the time, recorded the situation, "A big earthquake also occurred at Edo. We hear thundering roar, and see volcanic ash covering the ground and turning grass and trees white. It is dark even in the daytime due to ash fall. I cannot read books without turning on a light."

How to read the map

Ash fall and accumulation area

- 50 cm or more
- 30 to 50 cm
- 10 to 30 cm
- 2 to 10 cm

Debris flow spread area



This is a superimposed map, showing the areas where craters could appear and the areas that lava streams, volcanic cinders, pyroclastic flows and other phenomena could affect in the vicinity of Mt. Fuji.
It is difficult to pinpoint the exact location of a crater before an eruption occurs, but it is estimated that a crater could appear somewhere in the areas shown above.
It is also estimated that, if an eruption occurs, it could affect the areas shown above, depending on the position of the crater.
(This does not mean that all the estimated areas will be affected.)