

23-25 August 2023

Hakone (箱根)

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The 2nd International Association of Geochemistry (IAGC) Conference
Water-Rock Interaction WRI-17
Applied Isotope Geochemistry **AIG-14**
in SENDAI 2023

Fuji-Hakone field excursion

Overview

Being the highest mountain in Japan (3776 m), Mt. Fuji (富士) is the most famous and symbolic mountain in Japan. It is an active stratovolcano that last erupted during 1707-1708. Mt. Hakone (箱根) is another active volcano next to Mt. Fuji, and is characterized by a volcanic caldera and intense hydrothermal activities, and is one of the most popular Onsen (hot spring) destination near Tokyo. We will visit the Hoei crater, the volcanic crater of the 1707-1708 Hoei eruption of Mt. Fuji. You will enjoy traditional Japanese style Onsen-ryokan (hotel with hot spring) at Hakone, visit the Owakudani fumarole, and enjoy volcanic excursion around Hakone. Near Odawara (小田原), you can also visit some historic castles. *Please check physical requirements in page 6.*



Fuji (富士)



Schedule

Meeting: Odawara JR Station or Hotel (TBD), 15:00, 23rd Aug.
Dismissal: Odawara JR Station, 15:00, 25th Aug.

Day 1 (23rd Wed.) Stay at Odawara
Meeting at Odawara. Optional tour to Odawara castle.

Day 2 (24th Thu.) Fuji volcano excursion
Stop 1 Fujinomiya Trail 5th Station (2400 m height)
Trekking to Hoei Crater (~3 hours)
Stop 2 Tarobo Outcrop
Stop 3 (optional) Komakado Kazaana (Lava cave)
Staying at Onsen Ryokan (hot spring hotel) at Hakone

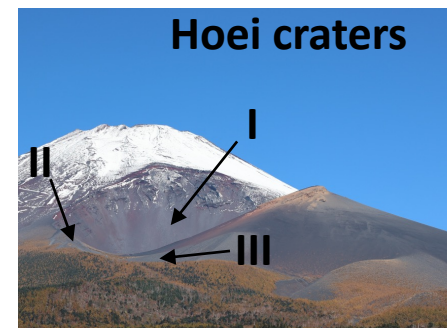
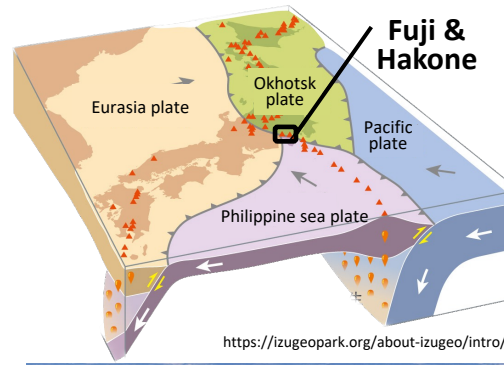
Day 3 (25th Fri.) Hakone volcano excursion
Stop 4 Owakudani fumarole
Stop 5 Nagao mountain ridge (view of Caldera Lake and Landslides)
Stop 6 Yamabushi mountain ridge (view of Caldera and Lava Domes)
Stop 7 Daikan mountain (view of Caldera and Lava Domes)
Stop 8 Ishigakiyama castle ruin

*Schedule above may change due to weather conditions.



Fuji volcano

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Geological overview of Fuji volcano

Mt. Fuji is the largest active volcanoes in Japan onland standing at a very unique point along the boundary of several plates in view of plate-tectonics. It is a young stratovolcano (<100ka) grew up on some older ones, Komitake and pre-Komitake volcanoes (>100ka; mostly the same as neighbors). Mt. Fuji is characterized by basaltic magma through most of its life, but is also famous for its variety in eruption styles. Although whole eruption history is yet to be understood, the recent activity from 10 ka is classified into several stages, duration of each stage with some thousand years, in terms of vent locality and eruption type. Recent stage (<2.2 ka) is dominated by effusive flank eruptions every some decades in average. But it has been quiet more than 300 years since 1707-08 when highly explosive Hiei eruption occurred near the summit that accompanied rare dacitic magma.

Stop 1 Hiei crater

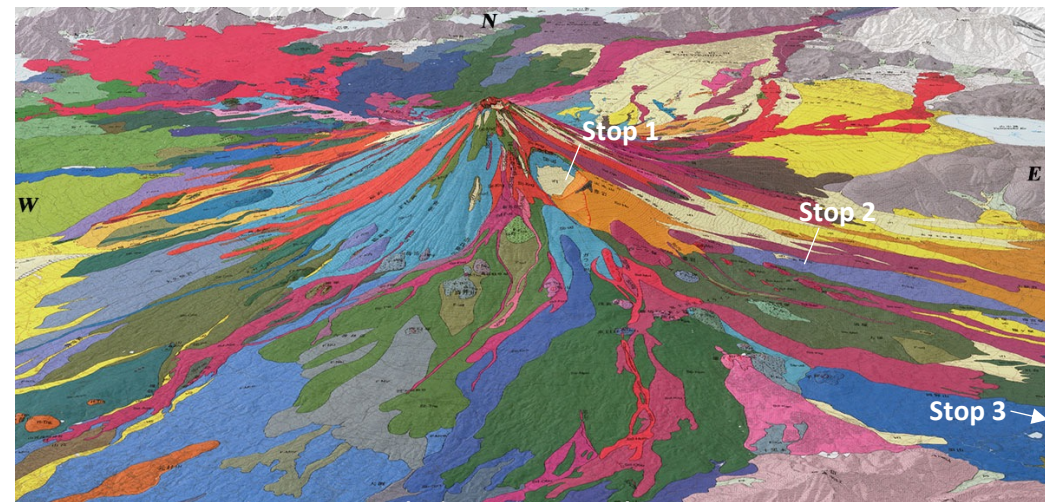
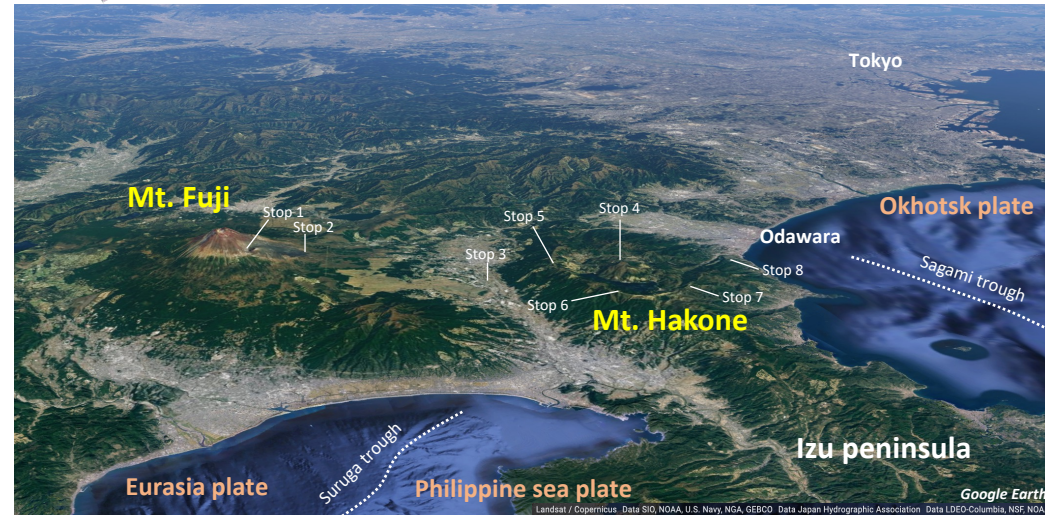
The Hiei eruption occurred on the Southeastern side of Mt. Fuji. The three craters are formed sequentially from Crater III to I. Crater I is the largest one (~1km in diameter), which is also larger than the summit crater.

Stop 2 Tarobo outcrop

Tarobo(太郎坊) is a 5th step on one of the trails up to the summit of Mt. Fuji. There used to be a finest outcrop to investigate airfall deposits from several thousand years up to the Hiei eruption, which are now largely buried by slash avalanches in early 2000's. You can see the Hiei deposit ~3-4m thick here with sequential SiO2 decrease in composition upwards.

Stop 3 (optional) Komakado Kazaana (Lava cave)

Komakado kaza-ana is a lava cave formed within the Mishima lava flow that erupted probably from the summit crater of Mt. Fuji about 10,000 years ago. The total length of the cave is 243 m. You can observe various flow structure of basaltic lava flow inside the cave.



Geological map of Fuji volcano (2nd ed., AIST, 2016)

https://gbank.gsj.jp/volcano/Act_Vol/fujisan/map/eng/volcmap_bv3-e.html



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Hakone volcano

Geological overview of Hakone volcano

Mt. Hakone has a caldera with a diameter of 10 km, which is not particularly large in Japan, but exists close to plate boundaries, so active faults extend into the caldera, Tanna(丹那) fault from the south and Hirayama(平山) Fault from the north. Its volcanic activity started 400 ka, and the largest eruption ejected several dozen km³ of tephra. Tephra deposited several dozen m in the Tokyo area due to prevailing westerlies with that of Fuji volcano.

Stop 4 Owakudani(大涌谷) fumarole

Owakudani was once called the Valley of Hell, because of toxic volcanic gases. Here, you can see traces of the latest activity of the Hakone volcano. The latest Magmatic activity occurred 3 ka, when Mt. Kamiyama collapsed and Owakudani formed. Its debris avalanche blocked the Hyakawa(早川) river and formed Lake Ashinoko(芦ノ湖). The latest phreatic eruption occurred at here in 2015.

Stop 5 Nagao(長尾) mountain ridge

Nagao mountain ridge is located on the somma of Hakone volcano and the best viewpoint of Mt. Kamiyama, Mt. Kanmurigatake and Owakudani. The fan-shaped landform is the depositional form of debris avalanche from horseshoe shaped crater of Mt. Kamiyama.(see photo on page 2)

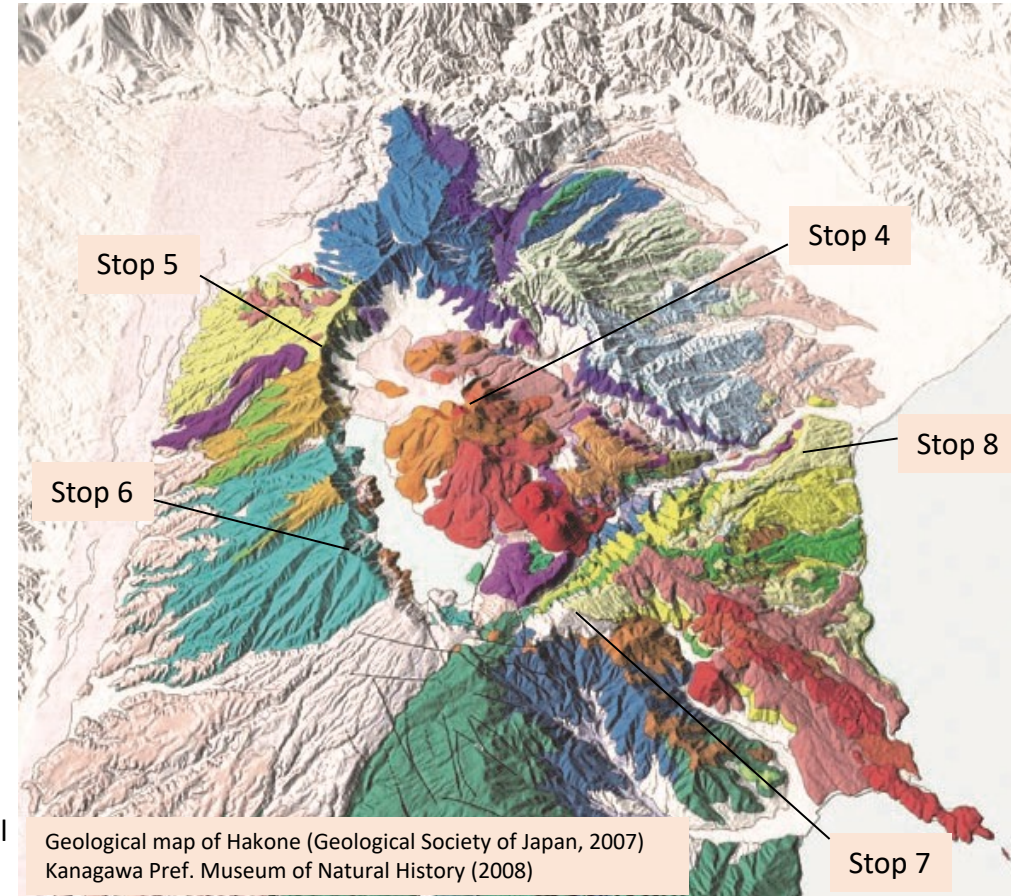
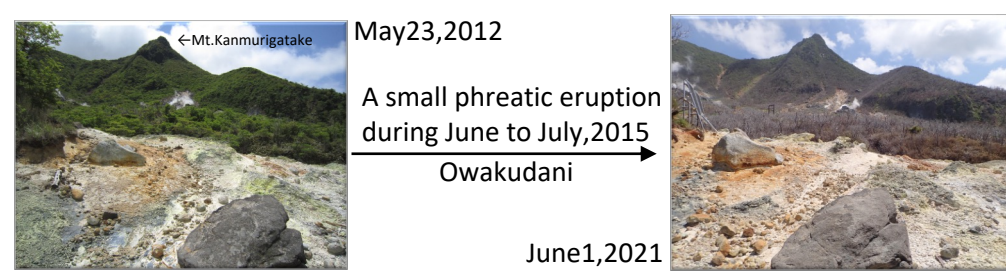
Stop 6 Yamabushi(山伏) mountain ridge

Stop 7 Daikan mountain(大観山)

These stops are also on the somma of Hakone volcano and viewpoints of central cones and Lake Ashinoko. Central cones consist thick lava flows and lava domes.

Stop 8 Ishigakiyama(石垣山) castle ruin

Ishigakiyama castle was built in 1590 to capture Odawara castle. Odawara castle was surrendered and later rebuilt to become the current Odawara castle, while Ishigakiyama castle remains as it was at the time. There were several big earthquake, but many parts have not collapsed.



Physical requirements for the excursion

Capable for 2-3 hours of mountain trekking*. Healthy lung**.

* The excursion at Hoen crater (Stop 1) involves high altitude (2400 m) and 2-3 hours of mountain trekking. People may stay at local visitor center instead of trekking.

** The air at Owakudani (Stop 4) contains ppm-level H₂S and SO₂ that is safe for healthy individuals, but would be not recommended for individuals with lung problems.