

Volcano Watch — Submarine eruptions—the damp side of Hawaiian volcanism

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A few months ago, this column carried an account of a submarine eruption near Tonga in August that produced substantial rafts of pumice. As the pumice drifted across the south Pacific, photographs taken by astonished yacht owners circled the world on the internet.



Kavachi, Solomon Islands in early 1960. U.S. Geological Survey photo.

(Public domain.)

witness to a far more unusual sight. A column of "smoke," several kilometers high, rose from a patch of steaming, turbulent water about 90 km (55 mi) northeast of Necker Island. The disturbed area was about 1.5 km (1 mi) across and included several thousand square meters (yards) of pumice. By the next day, the pumice had disappeared, apparently having become waterlogged and sunk. The disturbed area was still apparent, however, as the source of long swells that extended almost to Kaua'i.

On the basis of these reports, Gordon Macdonald, then director of the Hawaiian Volcano Observatory, was convinced that a submarine eruption had occurred. He was less certain about a second event, reported less than a year later.

On May 22, 1956, the crew of a Navy plane observed a patch of discolored water containing a brownish-yellow material in the channel between Kaua'i and O'ahu. At low altitude, the crew could smell a sulfurous odor, but the water was calm, and there was no steam. By the next day, the floating material had formed a narrow streak several kilometers long, and two dead whales were spotted in the area. A fishing boat captain reported seeing what he thought were cinders floating in the water, but he threw them back after examining them. By the 24th, a boat sent to investigate could find nothing. Later in the week, a few fragments of pumice were found at two beaches on the north side of O'ahu.

Macdonald noted in his report of this event that several episodes of discolored water in Hawaiian waters had turned out to be caused by algal blooms, and that this might be another such case. However, he still leaned toward a submarine eruption as the most likely explanation.

The only undisputed submarine-eruption sighting of the last two centuries was also the closest to home for those of us on the Big Island. On February 14, 1877, Mauna Loa erupted at its summit caldera. After several days, the summit activity subsided, but on February 24, a one-day eruption occurred from a vent beneath Kealakekua Bay. Witnesses reported columns of steam and volcanic gas, turbulent water, and blocks of incandescent lava that rose to the surface, floated briefly, then sank as they cooled.

In short, Hawai'i, while certainly a prime location for submarine eruptions, has gotten off lightly. As our November column noted, if the shallow submarine portions of Kīlauea or Mauna Loa's rift zones were to erupt, ash-laden steam explosions could make life more exciting for local mariners.

By mid-September, the pumice began washing up on beaches in Fiji, 700 km (440 mi) to the northwest. In Fiji, the pumice was no longer viewed as a curiosity, but as a minor disaster. Pumice rafts drifted in and out of harbors with the changing winds and invaded streams at high tide. Boaters observed popcorn-sized pumice in the top layer of the raft, with pieces as large as footballs suspended below the surface. In some areas, villagers were unable to fish or travel by boat because pumice-choked waters clogged cooling systems in outboard engines.

Has anything similar ever happened in Hawai'i? Three submarine eruptions have been reported in Hawaiian waters in the last 130 years, though none produced much pumice.

On August 20, 1955, passengers nearing the end of the long flight from Tokyo to Honolulu looked out the windows, hoping for their first glimpse of the islands and, instead, were

Volcano Activity Update

This past week, activity levels at the summit of Kīlauea Volcano have remained at background levels. The number of earthquakes located in the summit area is low (usually less than 10 per day are large enough to locate).

Eruptive activity at Puʻu ʻŌʻo continues. On clear nights, glow is visible from several vents within the crater. Lava is fed through the PKK lava tube from its source on the southwest flank of Puʻu ʻŌʻo to the ocean. About 1 kilometer south of Puʻu ʻŌʻo, the Campout flow branches off from the PKK tube. The PKK and Campout tubes feed two widely separated ocean entries, at East Laeʻapuki and East Kaʻiliʻili, respectively. Both entries are located inside Hawaii Volcanoes National Park.

A third entry, fed by an offshoot of the Campout flow, has been active since December 26. It is located at Kamokuna, about midway between the two older entries. In the last week, intermittent breakouts from the Campout tube have continued on the slope of Pulama pali and on the coastal plain near Kamokuna. A new breakout from the main PKK tube has been advancing down the pali in the past 2 weeks, more than a kilometer west of the Campout tube. The terminus was at the 200-ft elevation on January 31.

Access to the sea cliff near the ocean entries is closed, due to significant hazards. The surrounding area, however, is open. If you visit the eruption site, check with the rangers for current updates, and remember to carry lots of water when venturing out onto the flow field.

Two earthquakes offshore of Hawaiʻi Island were reported felt within the past week. A magnitude-3.6 earthquake at 5:33 p.m. H.s.t. on Tuesday, January 30, was located 42 km (26 miles) southwest of Honaunau at a depth of 39 km (24 miles). A magnitude-3.4 earthquake at 6:20 p.m. on Wednesday, January 31, occurred 13 km (8 miles) west of Kawaihae at a depth of 12 km (8 miles).

Mauna Loa is not erupting. During the past week, earthquake activity remained low beneath the volcano's summit (one earthquake was located). Extension of distances between locations spanning the summit, indicating inflation, continues at slow rates.



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