

BACKGROUND INFORMATION

Overview of Kīlauea summit and East Rift Zone eruptions

Kīlauea, one of five volcanoes on the Island of Hawai‘i, has been erupting nearly continuously for more than 3 decades, and is currently active at two locations: Summit and East Rift Zone.

Kīlauea Summit (Halema‘uma‘u) Eruption

The summit eruption began on March 19, 2008, when a small explosive event opened a vent in the east wall of Halema‘uma‘u Crater. This vent opened below the Halema‘uma‘u visitor overlook, an area that has been closed to the public since early 2008 due to ongoing impacts of significant volcanic hazards. More information about the first five years of this eruption is available in an online USGS Fact Sheet at: <http://pubs.usgs.gov/fs/2013/3116/>

Today, the active summit vent is an elliptical crater (unofficially called the Overlook crater or vent), approximately 215 m (705 ft) by 165 m (540 ft) in size as of May 2015, inset within the eastern floor of Halema‘uma‘u Crater. A circulating lava lake within the vent has fluctuated dramatically, with its level varying from about 200 m (655 ft) below the vent rim (e.g., in January 2010) to overflowing the vent rim (e.g., in April 2015). These lava lake level fluctuations are in response to changes in summit pressurization, with the lake generally dropping during deflation and rising during inflation.

For much of 2014 and early 2015, the lava lake level had typically been between 30 m (100 ft) and 60 m (200 ft) below the vent rim (the floor of Halema‘uma‘u Crater). But on April 21, 2015, the lava lake began rising in response to summit inflation, and by April 28, the lava lake had risen to the point of overflowing the vent rim—spilling lava onto the floor of Halema‘uma‘u Crater for the first time since the summit vent opened in 2008.

Occasional collapses along the walls of the vent or Halema‘uma‘u Crater result in rocks falling into the lava lake, which triggers explosions from the lake surface. Some of these explosions have been large enough to throw substantial amounts of spatter (fragments of molten lava) more than 1 m (3 ft) in size on to the rim of Halema‘uma‘u Crater above the lake. These explosions pose a significant hazard to this area, and are one reason it remains closed.

The summit vent releases copious amounts of volcanic gas. The ambient sulfur dioxide (SO₂) concentrations near the vent vary greatly, but are persistently higher than 50 ppm (upper limit of the detector) within the plume. The gas plume rising from the vent also carries Pele's hair, Pele's tears, tiny hollow spherules, and finer ash-sized tephra from the circulating lava lake. Most tephra is deposited near the vent, but finer particles can be carried by wind several kilometers (1-2 miles) before dropping from the plume.

Kīlauea East Rift Zone (Pu‘u ‘Ō‘ō) Eruption

The East Rift Zone eruption began in January 1983 with high lava fountains that built a cinder-and-spatter cone, later named Pu‘u ‘Ō‘ō. Subsequent activity included continuous lava effusion from vents on Pu‘u ‘Ō‘ō or within a few kilometers east or west of Pu‘u ‘Ō‘ō. Most of the lava flows erupted from these vents have advanced down the south flank of Kīlauea, often reaching the ocean. In early 2013, lava flows began advancing to the northeast of Pu‘u ‘Ō‘ō.

A new vent that opened on the northeast flank of Pu‘u ‘Ō‘ō on June 27, 2014, sent a lava flow northeastward toward the outskirts of Pāhoā, a town in the Puna District of the Island of Hawai‘i. This lava flow persisted until early March 2015, when all activity near Pāhoā ceased.

Since March 2015, widespread breakouts have been active closer to and northeast of Pu‘u ‘Ō‘ō, well upslope from any infrastructure.

More information about the first 30 years of Kīlauea's East Rift Zone eruption is available in an online USGS Fact Sheet at <http://pubs.usgs.gov/fs/2012/3127/>.