



Geological activity around the Kilauea volcano in Hawaii includes several fissures that have opened and begun oozing lava.

GEOLOGY

Hawaii volcano holds clues to other eruptions

Scientists scramble to analyse data from steam explosion at Kilauea.

BY SARA REARDON

After weeks of unleashing earthquakes and lava flows that have forced thousands of people to evacuate their homes, Hawaii's Kilauea volcano finally blew its top last week. Because Kilauea is one of the best-monitored volcanoes in the world, scientists hope that data from the event will help them to better predict when similar volcanoes are about to erupt.

"We'll be working on this set of data for our careers," says Michael Poland, a geophysicist at the US Geological Survey (USGS) Cascades Volcano Observatory in Vancouver, Washington.

The USGS says that the eruption began at 4:15 a.m. local time on 17 May, when the volcano sent a plume of ash and steam more than 9,100 metres into the air.

The many instruments on and around Kilauea were watching. The volcano bristles with equipment that continuously measures signs of geological activity, such as ground movement, lava chemistry and seismic vibrations.

The first hint of an impending eruption came with a series of earthquakes on 3 May. Soon after, fissures opened up in the ground as far as 40 kilometres away from the volcano's rim — oozing lava that forced about 2,000 people to evacuate. The openings also depressurized

the network of underground channels beneath Kilauea, including its lava chamber. As a result, the lava level within the volcano's crater quickly dropped by more than 30 metres. It was, Poland says, "like someone pulled the plug in a bathtub".

That caused the walls of the volcano to begin crumbling into the crater, creating a layer of rock atop the surface of the remaining lava. And once the surface of the still-draining lava dropped below the water table, water began to seep into the crater, creating steam and pressure beneath the freshly formed rock cap.

Scientists at the USGS's nearby Hawaiian Volcano Observatory suspected that a steam explosion was imminent: in 1924, the same pattern of oozing fissures around Kilauea had heralded a series of explosions. The researchers were proved right on 17 May, when the pressure that built up in the crater sent debris and ash flying. But Poland says that steam explosions are hard to anticipate.

The hope this time, he adds, is that the extensive instrumentation on Kilauea and data collected from the latest eruption will allow scientists to develop better markers for predicting when a steam explosion is imminent.

For now, scientists in Hawaii and around the world are watching Kilauea and waiting to see what else the volcano will do. "This has so far been playing out how USGS said it would," says Janine Krippner, a volcanologist at Concord University in Athens, West

Virginia. "That itself is incredible."

Kilauea probably isn't done erupting yet, if the 1924 event is a guide: it went on for more than 2 weeks and caused more than 50 steam explosions. Hawaii's state volcanologist, Bruce Houghton, says that the current event seems to be a type of complex eruption that occurs only once every 50 to 80 years.

The recent activity has prompted the state of Hawaii to order the evacuation of several areas near Kilauea, protecting residents from the greatest eruption danger — flying rocks. But ash could still present a problem for people with respiratory problems, and officials are monitoring the wind and weather patterns to predict where it will go. Other hazards include plumes of sulfur dioxide and a toxic haze that forms when lava reaches the ocean, as it did on 19 May.

Houghton says that it may be hard to know when it is safe for people to return to evacuated areas. In the 1960s, an eruption at Kilauea stopped for a year and a half before the volcano resumed spewing ash. "It takes quite a long time to be certain things are completely over," he says. "The past record suggests it might go for months or years."

Kilauea's latest eruption "is an exciting event but it's coming at a cost", Poland says, noting that homes have been destroyed and tourism is suffering. "We as the scientific community feel we owe it to the people being impacted to get it right and learn as much as we can," he says. ■