



Research News

Cascading events led to 2018 Kilauea volcanic eruption, providing forecast clues

Eruption triggered by rapid change after a decade-long buildup of pressure



The fissure 8 lava fountain and lava channel during the 2018 Kilauea eruption.

[Credit and Larger Version \(/discoveries/disc_images.jsp?cntn_id=301734&org=NSF\)](#)

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The 2018 eruption of Kilauea volcano was one of the largest volcanic events in Hawaii in the last 200 years. The eruption was triggered by a relatively small and rapid change in the volcano after a decade-long buildup of pressure in the upper parts of the volcano, according to a [U.S. National Science Foundation](https://www.nsf.gov/awardsearch/showAward?AWD_ID=1829188&HistoricalAwards=false) [-funded study](https://www.nsf.gov/awardsearch/showAward?AWD_ID=1829188&HistoricalAwards=false) published in *Nature Communications* ([/cgi-bin/good-bye?https://www.nature.com/articles/s41467-020-19190-1](https://www.nature.com/articles/s41467-020-19190-1)) by scientists at the [University of Hawaii at Manoa](https://www.soest.hawaii.edu/soestwp/announce/news/cascading-events-led-to-2018-kilauea-volcanic-eruption-providing-clues-for-forecasting/) ([/cgi-bin/good-bye?https://www.soest.hawaii.edu/soestwp/announce/news/cascading-events-led-to-2018-kilauea-volcanic-eruption-providing-clues-for-forecasting/](https://www.soest.hawaii.edu/soestwp/announce/news/cascading-events-led-to-2018-kilauea-volcanic-eruption-providing-clues-for-forecasting/)) and the U.S. Geological Survey.

Using data from before and during the 2018 eruptions at the summit and flank, the researchers reconstructed geologic events.

"The data suggest that a backup in the magma plumbing system at the long-lived Puu Oo eruption site caused widespread pressurization in the volcano, driving magma into the lower flank," said Matthew Patrick, a geologist at the USGS and lead author of the study.

The eruption evolved and its impact expanded as a sequence of cascading events allowed relatively minor changes at Puu Oo to cause major destruction and historic changes across the volcano.

A cascading series of events of this type was not considered the most likely outcome in the weeks prior to the onset of the eruption.

"This form of tunnel vision, which gives less attention to the least likely outcomes, is a bias that can be overcome by considering the broader, longer history of the volcano," said Bruce Houghton, the Hawaii state volcanologist, a geoscientist at UH Manoa, and study co-author. "For Kilauea, this consists of widening the scope to consider the types of behavior seen in the first half of the 20th century and perhaps earlier."

Hawaii absorbed a significant amount of the economic and social cost of the 2018 eruption and likely will do so again as Kilauea and Mauna Loa continue to erupt, suggested Houghton. Studies like this, which probe the more subtle influences of the behavior of these volcanoes, are targeted at reducing the costs, human and physical, of the next eruptions.

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