

Volcano Forecast? Crystals Could Predict Eruptions

By Kacey Deamer, Staff Writer | June 30, 2016 10:45am ET

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The 1980 eruption of Mount St. Helens in Washington state was one of the largest eruptions to occur in the U.S. since the nation was founded.

Credit: Robert Kimmel/United States Geological Survey

The 1980 eruption of Mount Saint Helens may have been signaled by crystals moving in the magma beneath the Washington state volcano, years before it blew its top, scientists have found.

Mount St. Helens' eruption on May 18, 1980, was one of the most destructive volcanic eruptions in U.S. history. With an eruption column — the cloud of volcanic ash emitted during an explosive eruption — that measured 80,000 feet (24 kilometers) and that deposited ash in 11 states, the eruption caused damages estimated to cost \$1.1 billion, according to the International Trade Commission. The eruption killed more than 57 people and destroyed more than 200 homes, [according to the U.S. Geological Survey](#) (USGS).

The new findings could help predict when the volcano will blow again and could be applied to other volcanoes, the researchers said, adding that their method will work on only some volcanoes. [[The 11 Biggest Volcanic Eruptions in History](#)]

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Reading crystals

For the new research, Jon Blundy, a professor of earth sciences at the University of Bristol in the United Kingdom, and his colleagues analyzed [crystals that formed in the magma under Mount St. Helens](#). This magma shot from the volcano as lava in 1980. As magma rises toward the surface, some of it solidifies into crystals due to cooling and a process called decompression in which lowered pressure causes water to separate from the solids.

The crystals in erupted volcanic rocks have concentric layers, like [rings of a tree](#), Blundy said. Each layer has a distinct chemical composition reflective of the conditions in which its crystals grew.

"In other words, they can show where they were formed and the pressure and temperature conditions at the time of formation," Blundy [said in a statement](#). "If you can read the record preserved in the zoned crystals, you can learn where and when molten magma has moved under the volcano. Rapid upwards movement of magma at depths of several kilometers is a pretty good indication that something significant is happening."

The researchers found that in the three years preceding the 1980 eruption, significant movement of magma under Mount St. Helens carried crystals from 7.5 miles (12 km) below the volcano to a depth of around 2.5 miles (4 km).

Predicting eruptions

In order to "read" magma crystals, researchers must have a lot of information about a volcano, which is surely the case for Mount St. Helens. Since its eruption, this mountain has become one of the most studied [volcanoes](#) in the world, Blundy said. Scientists know, from high-temperature experiments, how Mount St. Helens' crystal composition responds to changes in pressure and temperature.

This isn't as clear at other, less well-studied volcanoes, Blundy told Live Science.

The researchers said they hope to apply the monitoring of crystal records to other well-studied volcanoes, such as Uturuncu in Bolivia, [Mount Pinatubo](#) in the Philippines and Bezymianny in Russia. In addition, the scientists will look into how crystal monitoring could be applied to prediction models and potential [warning systems](#).

The [research](#) was presented at the [Goldschmidt Conference](#) on geochemistry on June 30 in Yokohama, Japan, and has yet to be published in a scientific journal.

Original article on [Live Science](#).

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Kacey Deamer is a journalist for Live Science, covering planet earth and innovation. She has previously reported for Mother Jones, the Reporter's Committee for Freedom of the Press, Neon Tommy and more. After completing her undergraduate degree in Journalism and Environmental studies at Ithaca College, Kacey pursued her master's in Specialized Journalism: Climate Change at USC Annenberg. Follow Kacey on [Twitter](#).

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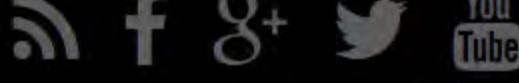
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