

Visiting Yellowstone could be a blast, but you don't want this kind

By National Geographic, adapted by Newsela staff

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If the supervolcano underneath Yellowstone erupts again, it could roar back to life with far less advance warning time than previously thought.

Researchers at Arizona State University analyzed minerals in fossilized ash from the most recent mega-eruption. They think the supervolcano last woke up after two floods of fresh magma flowed into the reservoir below the caldera, a volcanic depression 40 miles wide that now cradles most of the national park.

About 630,000 years ago, a powerful eruption shook the region. It spewed forth 240 cubic miles worth of rock and ash and created the Yellowstone caldera.

In an unsettling twist, the analyzed minerals revealed that the critical changes in temperature and composition built up in a matter of decades. Until now, geologists had thought it would take centuries for the supervolcano to make that transition.

Reservoir Has Greatly Expanded

A 2013 study, for instance, showed that the magma reservoir that feeds the supervolcano is about 2 1/2 times larger than previous estimates. Scientists also think the reservoir is drained after every monster blast, and they believed, accordingly, that it would take a long time to refill. Based on the new study, however, it seems the magma can rapidly refresh — making the volcano potentially explosive in what would be the blink of an eye in geologic time.

"It's shocking how little time is required to take a volcanic system from being quiet and sitting there to the edge of an eruption," Hannah Shamloo told the New York Times. She is a co-author of the study.

Still, Yellowstone is one of the best monitored volcanoes in the world, notes Michael Poland, the current scientist-in-charge of the Yellowstone Volcano Observatory for the U.S. Geological Survey. Sensors and satellites of different types are always looking for changes, and right now, the supervolcano does not seem to pose a threat.

"We see interesting things all the time ... but we haven't seen anything that would lead us to believe that the sort of magmatic event described by the researchers is happening," says Poland, adding that the research overall is "somewhat preliminary, but quite tantalizing."

Yellowstone National Park covers parts of three states: Wyoming, Montana and Idaho.

The new finding adds to a number of surprises scientists have uncovered over the last few years as they have studied the supervolcano.

Geothermal Action Shapes Yellowstone

Today, Yellowstone National Park owes much of its rich geologic beauty to its violent past. Wonders like the Old Faithful geyser and the Grand Prismatic Spring are products of geothermal activity still seething below the park. That activity is driven in turn by the vast magma plume that feeds the supervolcano.

The long-ago eruption left behind the Lava Creek Tuff, the ash deposit that Shamloo and her fellow ASU scientist Christy Till used for their work. They presented the results of their study in August at a volcanology meeting in Oregon. The pair also presented an earlier version of their study at a 2016 meeting of the American Geophysical Union.

Based on fossil deposits like this one, scientists think the supervolcano has seen at least two other eruptions on this scale in the past 2 million years or so. Lucky for us, the supervolcano has been largely quiet since before the first people arrived in the Americas. While a handful of smaller belches and quakes have periodically filled the caldera with lava and ash, the last one happened about 70,000 years ago.

In 2011, scientists revealed that the ground above the magma chamber bulged by up to 10 inches in a span of about seven years.

Magma Plume Forces Ground To Swell

"It's an extraordinary uplift because it covers such a large area and the rates are so high," the University of Utah's Bob Smith told National Geographic at the time. He is an expert in Yellowstone volcanism.

The swelling magma reservoir responsible for the uplift was too deep to create fears of immediate doom, Smith said. Instead the caldera's gentle "breathing" offered valuable insights into the supervolcano's behavior.

In 2012, another team reported that at least one of the past super-eruptions may have really been two events. Their report hints that such large-scale events may be more common than thought.

Yet, almost everyone who studies Yellowstone's slumbering supervolcano says that right now, we have no way of knowing when the next big blast will happen. For its part, the U.S. Geological Survey puts the rough yearly odds of another massive Yellowstone blast at 1 in 730,000 — about the same chance as a catastrophic asteroid collision.

1. What does the author want you to learn from this article?

2. Summarize the article: