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Growth Spurt at a Bolivian Volcano Is Fertile Ground for Study

By JEAN FRIEDMAN-RUDOVSKY | Published: February 13, 2012



UTURUNCU VOLCANO, Bolivia — The broad hill at the base of Uturuncu is unassuming. Its gentle arc fades naturally into the Andean landscape.

But the 43-mile-long stretch of rocky soil is now an object of international scientific fascination. Satellite measurements show that the hill has been rising more than half an inch a year for almost 20 years, suggesting that the volcano, which last erupted more than 300,000 years ago, is steadily inflating.

“The size and longevity of the uplift is unprecedented,” said Shanaka de Silva, a geologist at Oregon State University who has been studying Uturuncu since 2006.

Taken together with other new research, he continued, the inflation means “we could be witnessing the development of a new supervolcano.”

Such a volcano could produce an eruption of ash, rock and pumice 1,000 times the strength of the 1980 eruption of Mount St. Helens in Washington State, the worst volcanic event in modern American history, and 10,000 times that of the Icelandic eruptions in 2010 that paralyzed global air traffic for weeks.

Luckily, while the planet has 30 to 40 supervolcanoes — 10 of them potentially active — supereruptions occur only every 100,000 years or so. The last one, that of the Toba Volcano in Sumatra about 74,000 years ago, is thought to have spewed enough ash to cause a 6-to-10-year “volcanic winter,” a 1,000-year global cooling period and a loss of life so vast that it may have changed the course of human evolution.

“We see no evidence for an imminent supervolcanic eruption anywhere on earth,” said Jacob B. Lowenstern, a research geologist and geochemist with the United States Geological Survey, who specializes in one of the best-known of the world’s supervolcanoes — Yellowstone, in Wyoming.

About Uturuncu, he said that while “its rise over 20 years is certainly significant,” there wasn’t enough evidence to call it a supervolcano in the making.

Other researchers agree. But they say Uturuncu’s steady inflation makes it fertile ground for study. “It’s like a tumor growing within the earth,” Dr. de Silva said, “and we have to understand whether it is benign or malignant.”

In 2009, with funds from the United States’ National Science Foundation, an international team of seismologists, geologists, geophysicists and other experts and students formed a project called Plutons to study Uturuncu and Lazufre, a volcano on the border of Chile and Argentina. (The project’s name is an acronym for the volcanoes and the researchers’ institutions.)

Uturuncu was already considered potentially active. Eighteen thousand feet up its slopes (it peaks at 19,711 feet above sea level), small holes in the ground called fumaroles leak scorching sulfur gases. These may date 10,000 years and are evidence of a heat source close to the surface.

Also telling is the white soil near the summit (from a distance it looks deceptively like snow) that results from thermal changes below.

Martyn Unsworth, a geophysicist at the University of Alberta in Canada and a member of the Plutons team, studied data from 20 days of fieldwork in November using magnetotellurics, a remote radio-wave-sensing method similar to CT scanning in the human body. The findings suggested a zone of low electrical resistance far below the surface “that is likely a magma chamber,” he said.

University of Alaska geophysicists note a region where sound waves travel more slowly than normal, a characteristic of partly molten rock. And Noah J. Finnegan, a geomorphologist at the University of California, Santa Cruz, has concluded that the magma chamber is growing by one cubic meter (35 cubic feet) per second, though its total volume is not known.

Uturuncu is nestled in one of the planet’s largest supervolcanic regions, which has six supervolcanoes across Bolivia, Chile and Argentina. Though it was long thought to be separate from those supervolcanoes, new Plutons findings reveal that magma from Uturuncu’s last eruption is more similar to the supervolcanoes’ than to that of the region’s more common volcanoes.

For Mayel Sunagua, a Bolivian government geologist and member of the Plutons team, this is an exciting time — “the first broad international effort dedicated to investigating our volcanoes.” Bolivia has 198 recognized volcanoes; 18 are considered potentially active. The country’s last volcanic eruption was 10,000 years ago.

The flurry of activity here does lead some to wonder: Why focus on a potential hazard perhaps tens of thousands of years away, when other volcanic dangers are much more imminent?

“I ask myself that same question,” Dr. Unsworth acknowledged. But he added that the research would broaden scientists’ knowledge about volcanoes in general.

Dr. de Silva agrees. With its odd bulge and its other unusual signals, Uturuncu has an appealing air of mystery, he said — and besides, “it’s kind of fun.”

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