Researchers uncover 'stirring' secrets of deadly supervolcanoes

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Researchers from The University of British Columbia and McGill University have simulated in the lab the process that can turn ordinary volcanic eruptions into so-called “supervolcanoes.”

The study was conducted by Ben Kennedy and Mark Jellinek of UBC’s Dept. of Earth and Ocean Sciences, and John Stix of McGill’s Dept. of Earth and Planetary Sciences. Their results are published this week in the journal *Nature Geoscience*.

Supervolcanoes are orders of magnitude greater than any volcanic eruption in historic times. They are capable of causing long-lasting change to weather, threatening the extinction of species, and covering huge areas with lava and ash.

Using volcanic models made of Plexiglas filled with corn syrup, the researchers simulated how magma in a volcano’s magma chamber might behave if the roof of the chamber caved in during an eruption.

“The magma was being stirred by the roof falling into the magma chamber,” says Stix. “This causes lots of complicated flow effects that are unique to a supervolcano eruption.”

“There is currently no way to predict a supervolcano eruption,” says Kennedy, a post-doctoral fellow at UBC and lead author on the paper. “But this new information explains for the first time what happens inside a magma chamber as the roof caves in, and provides insights that could

be useful when making hazard maps of such an eruption."

The eruption of Mount Tambora in Indonesia in 1815 – the only known supervolcano eruption in modern history – was 10 times more powerful than Krakatoa and more than 100 times more powerful than Vesuvius or Mount St. Helens. It caused more than 100,000 deaths in Indonesia alone, and blew a column of ash about 70 kilometres into the atmosphere. The resulting disruptions of the planet's climate led 1816 to be christened "the year without summer."

"And this was a small supervolcano," says Stix. "A really big one could create the equivalent of a global nuclear winter. There would be devastation for many hundreds of kilometres near the eruption and there would be would be global crop failures because of the ash falling from the sky, and even more important, because of the rapid cooling of the climate."

There are potential supervolcano sites all over the world, most famously under Yellowstone National Park in Wyoming, the setting of the 2005 BBC/ Discovery Channel docudrama Supervolcano, which imagined an almost-total collapse of the world economy following an eruption.

Source: University of British Columbia