

Ancient Tsunami Was Nearly As Tall As The Eiffel Tower, Scientists Say

The sudden collapse of a volcano likely triggered the monstrous tsunami more than 70,000 years ago.



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SATELLITE IMAGE FROM NASA Scientists think that the volcano Fogo's eastern slope crashed into the sea, leaving behind the giant scar pictured here and triggering a mega-tsunami.

When [surfers have taken on](#) nearly 100-foot-tall waves, they've faced the challenge of a lifetime. But those waves are pipsqueaks compared to an ancient mega-tsunami that scientists say was almost as tall as the Eiffel Tower.

An international team of scientists has found evidence that an approximately 800-foot-tall tsunami was generated when the eastern slope of the Cape Verde islands' Fogo volcano, off the coast of West Africa, collapsed into the sea some 73,000 years ago.

The colossal wave traveled more than 30 miles from Fogo to the nearby island of Santiago, where it pushed around huge boulders like pebbles, according to research published Friday in the journal [Science Advances](#).

And, theoretically, such an event could happen again.

"This is something that may happen in any volcano that is tall, steep, unstable and active enough to be prone to a collapse," Dr. Ricardo Ramalho, an adjunct scientist at Columbia University's [Lamont-Doherty Earth Observatory](#) in Palisades, New York, and lead author of the research, told The Huffington Post in an email.

"Volcanic flank collapses and their ensuing mega-tsunamis -- like the one of Fogo -- are what we scientists call 'very low frequency, very high impact events,'" he said. "Due to their very low frequency, we estimate that the probability for them to happen again is very small, but they may and will happen nevertheless."



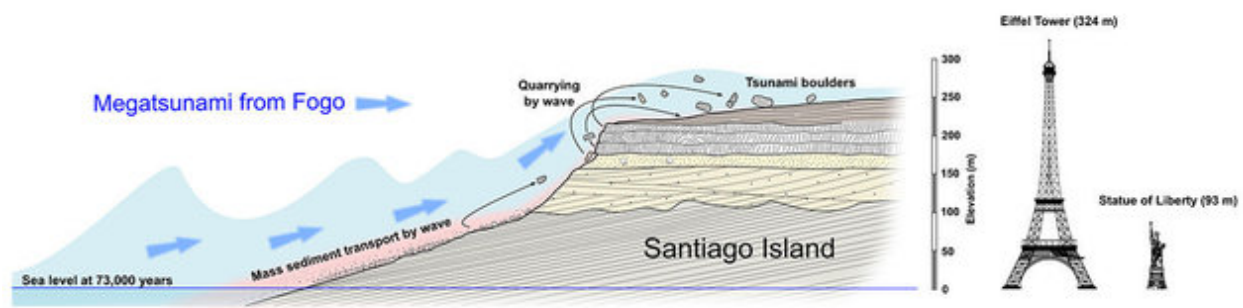
RICARDO RAMALHO The wave generated by Fogo's collapse may have swept boulders like this one up from the shoreline into Santiago Island's highlands. Here, a researcher chisels out a sample of rock to establish the date of the tsunami wave.

The researchers found [evidence for the ancient mega-tsunami](#) when they noticed delivery truck-sized boulders of basalt and limestone sitting in Santiago Island's highlands. The boulders were as much as 2,000 feet inland but showed signs of having originated from cliff faces below where they were discovered, suggesting they had been moved by a tsunami.

The researchers calculated the energy it would take to move the boulders in order to estimate the size of the tsunami, and they examined the surface of the boulders to determine when the bizarre boulders were deposited on Santiago Island.

"First, they all came out about the same age, indicating that they all were deposited as part of the same event and secondly, the date (when they got stranded) matches the timing of the flank collapse," Dr. Gisela Winckler, a [geochemist at the Lamont-Doherty Earth Observatory](#) and co-author of the research, wrote in an email. "When we got the dates, it became clear that we can link volcano collapse to the mega-tsunamis deposits. I was intrigued by that match."

The researchers concluded that a mega-tsunami must have ripped the rocks from the cliff faces and pushed them up to their present location.



RICARDO RAMALHO When the 800-foot-tall tsunami reached Santiago Island, boulders and other debris likely were ripped from the shoreline and hurled upward hundreds of feet.

Scientists have long known that landslides coming off of volcanoes can generate tsunamis in nearby waters. But some argue that such landslides occur in stages, which would create several smaller tsunamis, rather than all at once, which would result in one gargantuan mega-tsunami as the study suggests.

"This research is important because it confirms that volcanic flank collapses may happen catastrophically and trigger massive tsunamis with devastating near-source effects,"

Ramalho said. "This study reinforces the idea that we need to take this into account when we assess the hazard potential of oceanic volcanoes."

Some scientists think more research is needed to determine the behavior of giant waves that may be generated by a volcanic collapse, as well as how to adequately monitor the chances that such a tsunami-causing collapse might happen.

"Since we've never seen such an event happen on an ocean island, we don't have practical experience with [how the collapse will manifest itself](#)," Dr. Michael Poland, a [geophysicist at the U.S. Geological Survey](#) in Vancouver, Washington, who was not involved in the study, told Nature.

Winckler agrees there is more work to be done.

"More generally, better understanding events such as the Fogo mega-tsunami is a step towards understanding how the Earth works and potential risks," she wrote. "There is still many things we don't understand well, for example, the mechanics and physics of the flank collapse itself."

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