

Science News

from research organizations

Sea levels influence eruptions on volcanic island

The rise and fall of sea levels influence the likelihood of volcanic eruptions on the Greek island of Santorini

Date: August 2, 2021

Source: Oxford Brookes University

Summary: The rise and fall of sea levels influence the likelihood of volcanic eruptions on the Greek island of Santorini, new research has discovered. Analyzing the timings of eruptions over hundreds of thousands of years, the researchers found that a 40 meter fall in sea level is a crucial point beyond which eruptions are more likely to occur. The findings could have implications for millions of people living on volcanic islands around the world.

Share: [!\[\]\(faf942dc3e59ce8eb64b4ac481eca7e0_img.jpg\)](#) [!\[\]\(f6b0299e0b5e4340e509b71914970da0_img.jpg\)](#) [!\[\]\(b5153706f6ea2fc2c42e8803b6804d18_img.jpg\)](#) [!\[\]\(2b8adb27d8c9518333278b6317e2d8a2_img.jpg\)](#) [!\[\]\(a190466037967efc7087885259e58e7a_img.jpg\)](#)

FULL STORY

The rise and fall of sea levels influence the likelihood of volcanic eruptions on the Greek island of Santorini, new research led by Oxford Brookes University has discovered. Analysing the timings of eruptions over hundreds of thousands of years, the researchers found that a 40 metre fall in sea level is a crucial point beyond which eruptions are more likely to occur. The findings could have implications for millions of people living on volcanic islands around the world.

Santorini -- cliffs reveal history of eruptions

The research on the popular tourist destination was led by Dr Christopher Satow, Senior Lecturer in Physical Geography at Oxford Brookes.

He says there are clues about past volcanic activity on Santorini in the layers of rock on the cliff face encircling the inner part of the island: "A huge eruption 3,600 years ago caused the centre of what was then a conical island to sink into the sea, revealing an extraordinarily detailed history of over 200 volcanic eruptions preserved within the remaining circle of cliffs.

"Comparing this eruption history to a sea level record allowed us to show for the first time that the sea level has had an important role in determining the timing of eruptions at Santorini, and probably at many other island volcanoes around the world.

"The mechanism is quite simple: falling sea levels remove mass from the Earth's crust and the crust fractures as a result. These fractures allow magma to rise and feed eruptions at the surface."

The researchers say that eruptions at hundreds of other volcanic islands around the world may also have been influenced by fluctuations in sea level. Dr Satow added: "Just as when you pull a plug out of the bath, the water level drops everywhere throughout the bath at the same time; in a similar way, sea level changes occur at the same time everywhere across the globe."

Volcanic eruptions and climate change

Volcanic eruptions can change the climate, for example the eruption of the Philippines' Mt. Pinatubo in 1992 resulted in a fall in global temperature of 0.5°C.

But Dr Satow says the climate also impacts on volcanic activity: "What is less well known is that on long timescales, the climate can also affect volcanoes. As ice sheets retreated across volcanic landscapes after the last ice age, the removal of mass changed the stress conditions in the Earth's crust, allowing the fractures which feed volcanic eruptions to form more easily.

"As these ice sheets melted the global sea level rose rapidly, by around 100 meters, adding a significant mass to the crust around many volcanic islands which, in theory, should alter their eruptive activity."

Dr Satow concludes: "57% of the world's volcanoes are islands or are coastal, and are often home to large populations. Further vital research is needed to fully understand the effects of changing sea level on these volcanoes and the risks they pose to their populations."

Dr Satow collaborated with researchers from Royal Holloway University of London, Keele University, the University of Oxford, Uppsala University in Sweden, the University of Portsmouth and the University of Leicester.

MAKE A DIFFERENCE: SPONSORED OPPORTUNITY

Story Source:

Materials provided by **Oxford Brookes University**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Chris Satow, Agust Gudmundsson, Ralf Gertisser, Christopher Bronk Ramsey, Mohsen Bazargan, David M. Pyle, Sabine Wulf, Andrew J. Miles, Mark Hardiman. **Eruptive activity of the Santorini Volcano controlled by sea-level rise and fall.** *Nature Geoscience*, 2021; DOI: 10.1038/s41561-021-00783-4
-

Cite This Page:

MLA

APA

Chicago

Oxford Brookes University. "Sea levels influence eruptions on volcanic island: The rise and fall of sea levels influence the likelihood of volcanic eruptions on the Greek island of Santorini." ScienceDaily. ScienceDaily, 2 August 2021. <www.sciencedaily.com/releases/2021/08/210802115019.htm>.

RELATED STORIES

Reawakened Geyser Does Not Foretell Yellowstone Volcanic Eruptions

Jan. 4, 2021 — Geyser eruptions, like volcanic eruptions, are a mystery, so the reactivation of Steamboat Geyser in Yellowstone in 2018 provided an opportunity to explore why geysers turn off and on, and what ...

Uplifting of Columbia River Basalts Opens Window on How Region Was Sculpted

July 17, 2020 — Information drawn from analyses of oxygen and hydrogen isotopes of materials from exposed Columbia River basalts has provided insights about how magma from volcanic eruptions millions of years ago ...

New Volcanic Eruption Forecasting Technique

Sep. 10, 2019 — Volcanic eruptions and their ash clouds pose a significant hazard to population centers and air travel, especially those that show few to no signs of unrest beforehand. Geologists are now using a ...

Grand Challenges to Better Prepare for Volcanic Eruptions

Apr. 19, 2017 — Despite broad understanding of volcanoes, our ability to predict the timing, duration, type, size, and consequences of volcanic eruptions is limited, says a new report. To improve eruption ...

FROM AROUND THE WEB

ScienceDaily shares links with sites in the TrendMD network and earns revenue from third-party advertisers, where indicated.

Free Subscriptions

Get the latest science news with ScienceDaily's free email newsletters, updated daily and weekly. Or view hourly updated newsfeeds in your RSS reader:

 Email Newsletters

 RSS Feeds

Follow Us

Keep up to date with the latest news from ScienceDaily via social networks:

 Facebook

 Twitter

 LinkedIn

Have Feedback?

Tell us what you think of ScienceDaily -- we welcome both positive and negative comments. Have any problems using the site? Questions?

 Leave Feedback

 Contact Us

[About This Site](#) | [Staff](#) | [Reviews](#) | [Contribute](#) | [Advertise](#) | [Privacy Policy](#) | [Editorial Policy](#) | [Terms of Use](#)

Copyright 2021 ScienceDaily or by other parties, where indicated. All rights controlled by their respective owners. Content on this website is for information only. It is not intended to provide medical or other professional advice. Views expressed here do not necessarily reflect those of ScienceDaily, its staff, its contributors, or its partners.

Financial support for ScienceDaily comes from advertisements and referral programs, where indicated.

— [CCPA: Do Not Sell My Information](#) — — [GDPR: Privacy Settings](#) —