

TONGA



Satellite images show the Tonga volcano last year and then just days before the blast as the volcanic activity increased. Photos: Maxar Technologies

Eruption 'needs further monitoring for climate change'

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The huge volcanic eruption to hit the Pacific island nation of Tonga on the weekend may not have been big enough to affect global climate but volcanic eruptions are an underestimated natural cause of climate variability, scientists have said.

The massive underwater eruption on Saturday is believed to be the biggest the world has witnessed in three decades, cutting communications with the nation and sending large tsunami waves across the Pacific.

Wei Ke, an associate professor on atmospheric science at the Chinese Academy of Sciences, said the Tonga eruption was not large enough to affect the global climate, but its changes still required further monitoring.

"A volcanic eruption is a very important factor in climate change and some experts believe it is one of the ultimate factors affecting climate change," Wei said, adding that in some cases, it could lead to an extreme drop in temperature, "resulting in a series of social impacts".

Scientists have long known that large volcanic eruptions can reduce global surface temperature for years after the event.

Volcanoes send sulphur dioxide (SO₂) into a layer of the atmosphere known as the stratosphere where it combines with water to form sulphuric acid aerosols.

This creates a haze layer of tiny droplets that reflects incoming solar radiation, causing a cooling of the Earth's surface.

These aerosols can stay in the stratosphere for up to three years, moved around by winds and causing significant cooling worldwide, according to the US National Centre for Atmospheric Research.

For instance, the Mount Pinatubo eruption in the Philippines in 1991 ejected about 15 million tonnes of SO₂ into the stratosphere and resulted in a 0.6 degree Celsius drop in global temperature over the following 15 months.

The Hunga Tonga eruption on Saturday was much smaller, ejecting an estimated 400,000 tonnes of SO₂ mass – not enough to

change the global climate, scientists said.

"The Tongan eruption had a column that penetrated well into the stratosphere, so its aerosol will be long lived," Thomas Aubry, a geophysicist at the University of Cambridge, said.

"However, to date, it injected 'only' 0.4Tg [400,000 tonnes] of sulphur dioxide into the atmosphere, which is not enough to result in significant surface cooling for this individual eruption.

"Unless further eruptive activity occurs, we should not detect significant surface cooling. At present, hazards related to ash fallout are really the number one concern."

Indonesia's Mount Tambora eruption in 1815 was the largest

volcanic explosion in recorded history – larger even than the more famous eruption of Krakatoa, also in Indonesia, in 1883 – and it affected the world's climate for a number of years, with 1816 becoming known in Europe and North America as "the year without a summer". In the northern hemisphere, crops failed and livestock died, resulting in widespread famine.

However, an Earth scientist from Hong Kong said the impact of volcanic eruptions had been underestimated.

"Volcanic eruptions are an underestimated natural cause of climate variability including severe weather events such as floods and droughts," said Wyss Yim, honorary professor at the University of Hong Kong.

"It is also a major contributor of atmospheric carbon dioxide. Tsunami are of course much feared in coastal lowlands."

In a study published in 2018, Yim said that debris from Mexico's El Chichon volcano eruption in 1982 entered the stratosphere, resulting in the second wettest year in Hong Kong since records began in 1884, caused by the predominance of onshore wind during the year.

He also found that volcanic eruptions were responsible for the long-lasting 2014-16 El Niño-Southern Oscillation, a climate phenomenon including El Niño, La Niña and a neutral phase.



Volcanic ash covers rooftops and vegetation on Tonga. Photo: AP

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