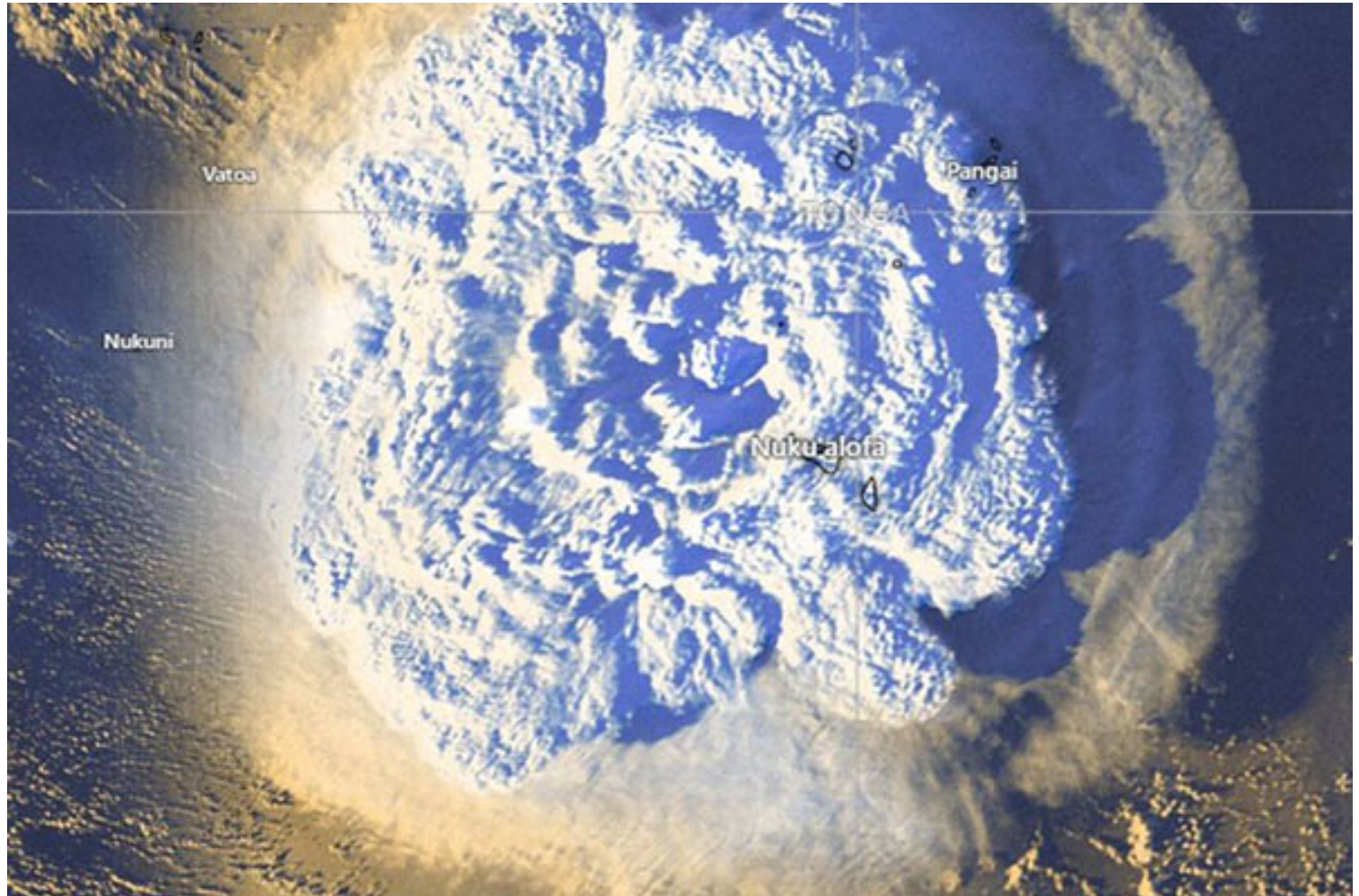


Why the volcanic eruption in Tonga was so violent

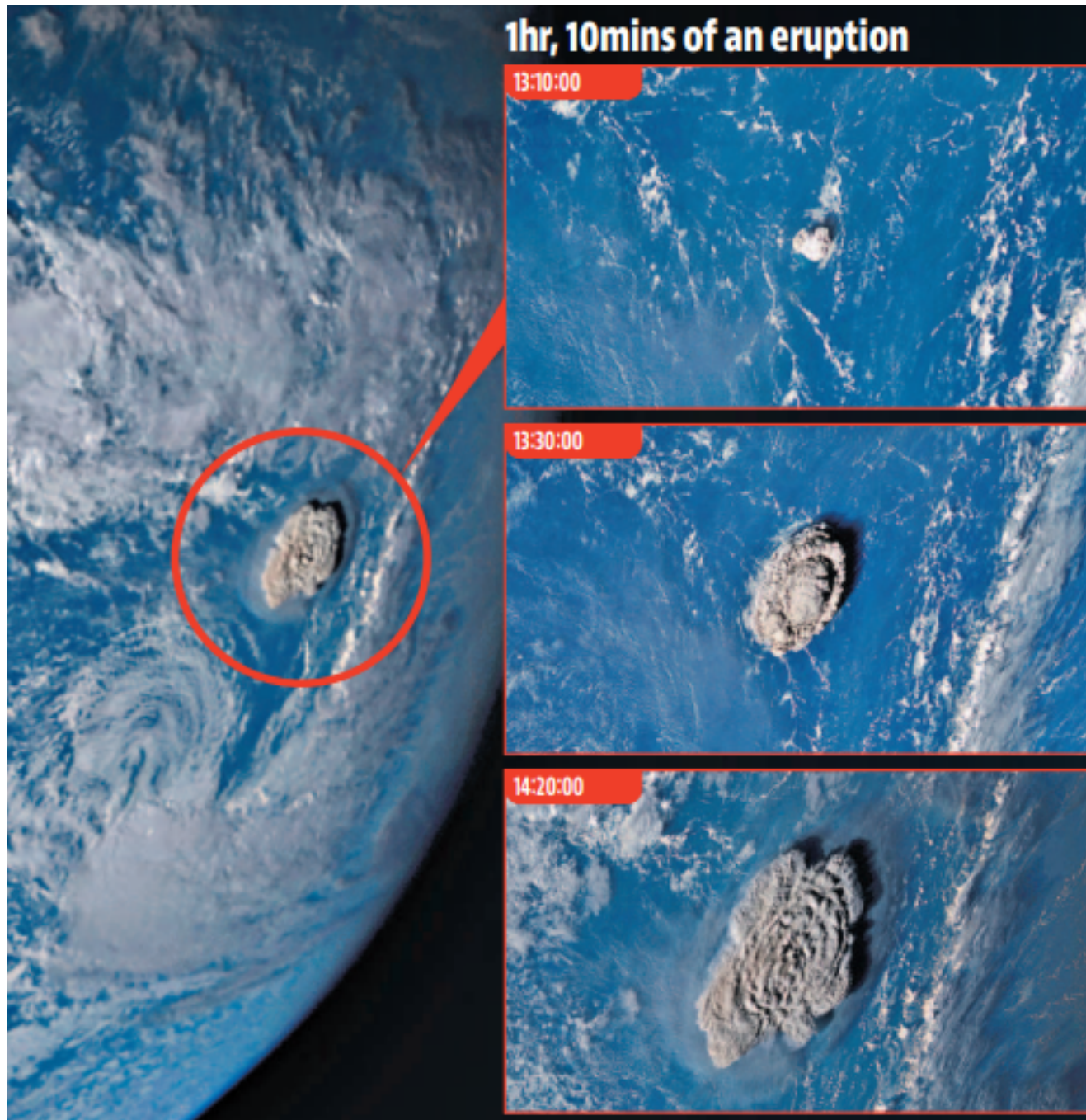
By IASToppers | 2022-01-17 17:30:00



Why the volcanic eruption in Tonga was so violent?

Recently, an undersea volcano named **Hunga-Tonga-Hunga-Ha'apai** erupted near Tonga, causing tsunamis to hit Hawaii, Japan, and Tonga's largest island, Tongatapu.

- This volcano has **erupted regularly** over the past few decades.



[Ref: Hindustan Times]

Location of Tonga

- The kingdom of Tonga is an **archipelago south of Samoa**.
- Tonga is **tiny island nation** comprising of 150 islands, some of them being uninhabited.
- It is located **northeast of New Zealand in the Pacific Ocean**.
- It consists of two small uninhabited islands, Hunga-Ha'apai and Hunga-Tonga.



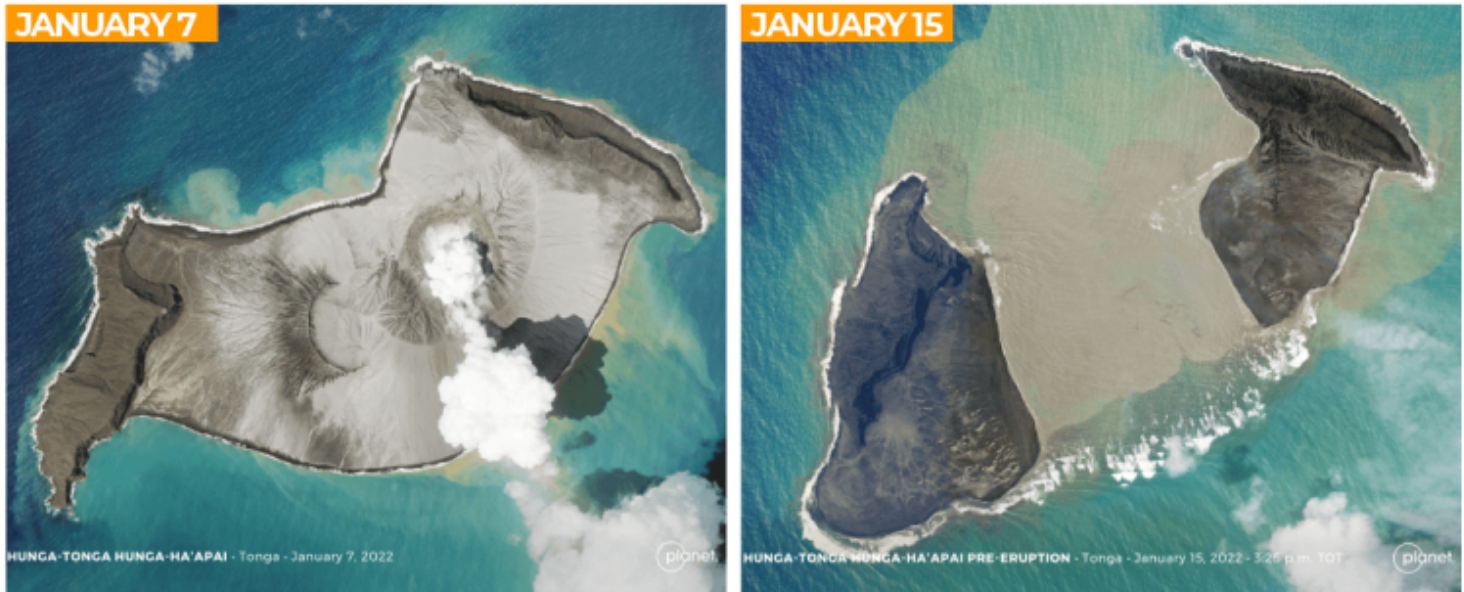
[Ref: ResearchGate]

What is an undersea volcano?

TONGA

Hunga Tonga–Hunga Ha‘apai eruption

Before and after satellite images show a plume of smoke rising from the underwater volcano days before its eruption on January 15.



The underwater volcano days before its eruption
Planet Labs PBC/via REUTERS

The underwater volcano two hours before its eruption
Planet Labs PBC/via REUTERS



[Ref: Aljazeera]

- An **undersea or submarine volcano** is located below the ocean surface and mostly erupts under water.
 - Three-quarters of all volcanic activity on Earth actually occurs underwater.
- They are **located near the Earth's tectonic plates**.
 - Submarine volcanoes are most common where tectonic plates move towards or away from each other.
- Undersea volcanic activities give rise to **seamounts**.

- Seamounts are underwater mountains that are **formed on the ocean floor** but do not reach the water surface.
- An underwater volcano is usually **believed not to be explosive** since the magma is supposed to be cooled down by the cool water.
 - However, when magma is blasted out of the ground full of volcanic gas, it does not provide a layer of insulation to allow the outer surface of the magma to cool.
- There are **two types of sound** generated by submarine eruptions:
 - One created by the **slow release** and bursting of large lava bubbles.
 - The other one is created by **quick explosions** of gas bubbles.

How do volcanic eruption cause tsunamis?

- Violent volcanic eruptions represent **impulsive disturbances**, which can **displace a great volume of water** and generate destructive tsunami waves in the immediate source area.
- According to this mechanism, **waves may be generated** by the sudden displacement of water caused by a volcanic explosion.



HOW DO VOLCANIC ERUPTIONS

GENERATE TSUNAMIS?



1

ORIGINAL SUMMIT
OF VOLCANO

2

VOLCANO COLLAPSES

3

MAGMA BODY IS
UNROOFED

4

LATERAL BLAST

5

FAST-MOVING
DEBRIS AVALANCHE
CRASHES INTO SEA

6

TSUNAMI FORMS

7

WAVE TRAVELS
OUT TO DISTANT
COASTLINES

Source:

Geoscience
Australia

[Ref: The Hindu]