

WHERE DO VOLCANOES ORIGINATE FROM?

Map of the Global Distribution of Volcanoes



The distribution of volcanoes over the Earth's surface is linked to the movement of the lithospheric plates that make up the outer shell of our planet.

Volcanoes are formed at:

- **Convergent margins:** as lithospheric plates approach each other, the subducting plate melts at great depths, under extreme conditions of pressure and temperature. The molten material (magma), which is lighter than the surrounding rock, rises to the surface, giving rise to volcanoes.
- **Divergent margins:** when the lithospheric plates move away from each other, a trench is created between them, from which new magma is constantly gushing out, building elongated submarine volcanic mountain ridges, the so-called 'mid-ocean ridges'

A small proportion of volcanoes also occurs in areas far from the lithospheric plate boundaries, known as **hot spots**.

THE ANATOMY OF A VOLCANO

Volcanoes are openings, or vents where lava, tephra (small rocks), and steam erupt onto Earth's surface.

The main parts of a volcano are:

- 1: Crater** A circular, funnel-shaped depression, up to 1 km in diameter, produced by volcanic processes, through which gases, tephra and lava are ejected.
- 2: Lava** Molten rock that has been erupted onto the surface of the Earth and maintains its integrity as a fluid or viscous mass.
- 3: Magma** Hot, molten rock containing dissolved volatiles and suspended crystals beneath the surface of the Earth which is generated in the mantle.
- 4: Conduit** An almost vertical cylindrical pipe connecting the crater to the magma chamber.
- 5: Magma Chamber** The reservoir of volcanic material (magma) beneath the central conduit.

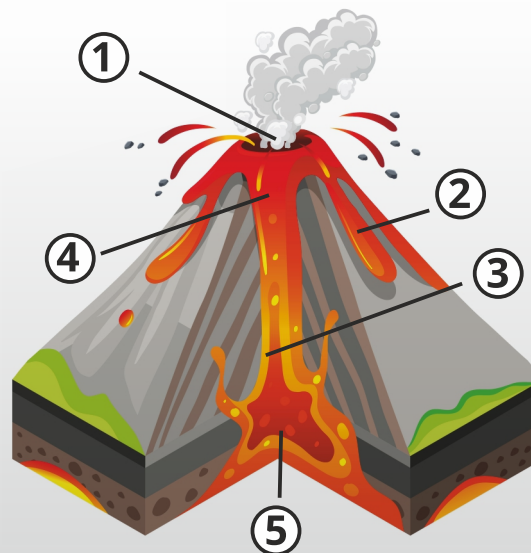


Diagram depicting the main parts of a volcano
Designed by brgfx / Freepik

A **Caldera** is a large circular or oval depression that is formed by the collapse of the volcanic edifice.



EGU GEOSCIENCE DAY 2023

20 OCTOBER 2023

PARALLEL EVENTS

2 VOLCANOES IN 2 ISLANDS IN 1 DAY

01

SANTORINI

Bellonio Cultural Center,
Fira.

02

NISYROS

Zosimopouleio Theater,
Mandraki.

Laboratory of Physical Geography, NKUA
Municipality of Santorini
Municipality of Nisyros
UNESCO Associated Schools Network (ASPnet), Greece
CityLab (STEM education)

STARTING TIME: 9:00 GREECE TIME (08:00 CEST)



SANTORINI VOLCANIC COMPLEX

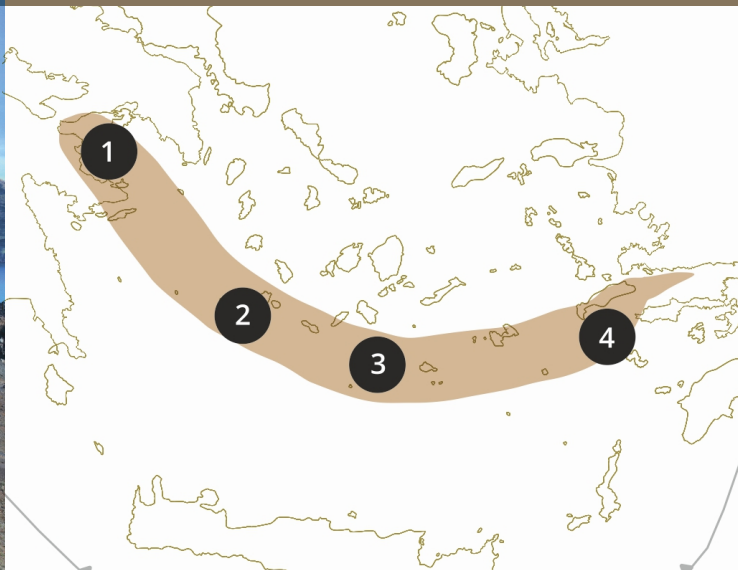


The volcanic complex of Santorini occupies the central part of the Hellenic Volcanic Arc. The volcanic activity started in the Christiana area, southwest of Santorini island, about 1.2 million years ago.

Since then, numerous volcanic centres have been created, the eruptions of which have reshaped the geomorphology of the volcanic field. In the last 360,000 years, volcanic activity in Santorini has been manifested by 12 successive strong eruptions. The Late Bronze Age or "Minoan" eruption (1613 - 1620 BC) is one of the largest ever documented in the world and is considered responsible for the formation of the current caldera.

The intensity of this explosion resulted in the burial of the prehistoric city of Akrotiri and is thought to have contributed to the decline of the Minoan civilization that flourished on the island of Crete. Later, less intense eruptions gradually created the islands of Palea & Nea Kameni in the centre of the flooded caldera. Kolumbo submarine volcano is located 7 km northeast of Santorini and is the most active volcano in the Eastern Mediterranean (www.santory.gr).

THE HELLENIC VOLCANIC ARC



The active Hellenic Volcanic Arc extends in the broader area of the South Aegean, from the Saronic Gulf to the Dodecanese islands. It is the product of the subduction of the African Lithospheric Plate beneath Eurasian's one.

As the African Plate subducts, it causes crustal thinning in the overlying Eurasian Plate. Thus, the magma finds ways to escape to the surface, giving rise to a series of volcanoes.

The Hellenic Volcanic Arc consists of both terrestrial and submarine volcanoes with the main volcanic centres being:

1) Sousaki - Methana, 2) Milos - Antimilos, 3) Christiana - Santorini - Kolumbo and 4) Kos - Giali - Nisyros, over the last 4.7 million years.



Did you know... The Hellenic Volcanic Arc hosts the largest caldera and hydrothermal crater in the world?

NISYROS VOLCANIC COMPLEX



About 160,000 years ago, volcanic activity started in the offshore South - East Aegean area between Kos and Tilos. Six eruptive cycles, each one with unique characteristics, finally formed Nisyros as it appears today.

Initially, the volcanic activity started underwater and slowly built up Nisyros in its early form. Gradually, as the eruptions increased in intensity, Nisyros evolved into a complex volcano that rose above the Aegean sea surface during the composite stratovolcano phase and was surrounded by many secondary volcanic centres.

Two violent eruptions followed which significantly deformed the volcanic structure, forming the caldera. The subsequent lava outflow within it formed lava domes that filled the interior to the west. Today, volcanism in Nisyros is manifested through intense hydrothermal activity. In fact, this activity produced a series of craters, the largest of which, Stefanos, is considered the largest of its kind in the world! Astonishing hydrothermal craters, massive volcanic domes, lava flows and perfectly preserved pillow lavas are just some of the countless geosites you can find on Nisyros.