Volcano eruption

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Why is in news? Iceland volcano eruption: What are volcanoes and why is the island so volcanically active?

Lava flows from a volcano in Iceland were slowing down on December 20, although new vents could open at short notice, according to the Icelandic Meteorological Office.

The volcano, which is known as **Fagradalsfjall** and located **on the Reykjanes peninsula in southwest Iceland**, erupted on December 18 after weeks of intense earthquakes and tremors.

This is the third time that the Fagradalsfjall volcano has erupted in the past two years. It had been **dormant for over 6,000 years but became active in March 2021**.

Notably, **Iceland is one of the most volcanically active regions** on the planet. It witnesses an eruption every four to five years. However, since 2021 the frequency has spiked to almost one eruption per year.

Volcanoes:

According to the **US Geological Survey**: "Volcanoes are openings, or vents where lava, tephra (small rocks), and steam erupt onto the Earth's surface."

Volcanoes can be on **land and in theocean**. They are formed when material significantly hotter than its surroundings is erupted onto the surface of the Earth.

The material could be **liquid rock** (known as "**magma**", when it's underground and "**lava**" when it breaks through the surface), **ash, and/or gases**.

The rise of magma can take place in **three different ways**, according to NASA.

When tectonic plates — massive, irregularly shaped slabs of solid rock that carry both continents and oceans and are constantly in motion — **move away from each other**. The magma rises up to fill in the space. When this happens underwater volcanoes can form.

When the **plates move towards each other**. When this happens, part of Earth's crust can be forced deep into its interior. The high heat and pressure cause the crust to melt and rise as magma.

How **magma rises at the hotspots** — hot areas inside of the Earth, where magma gets heated up. As magma gets warmer, it becomes less dense, leading to its rise.

Most of the world's volcanoes are found around the **edges of tectonic plates, both on land and in the oceans**.

Different kinds of volcanoes:

According to the **British Geological Survey**, the type of volcano **depends on the viscosity of the magma**, the **amount of gas in the magma**, the **composition of the magma**, and the **way the magma reaches the surface**.

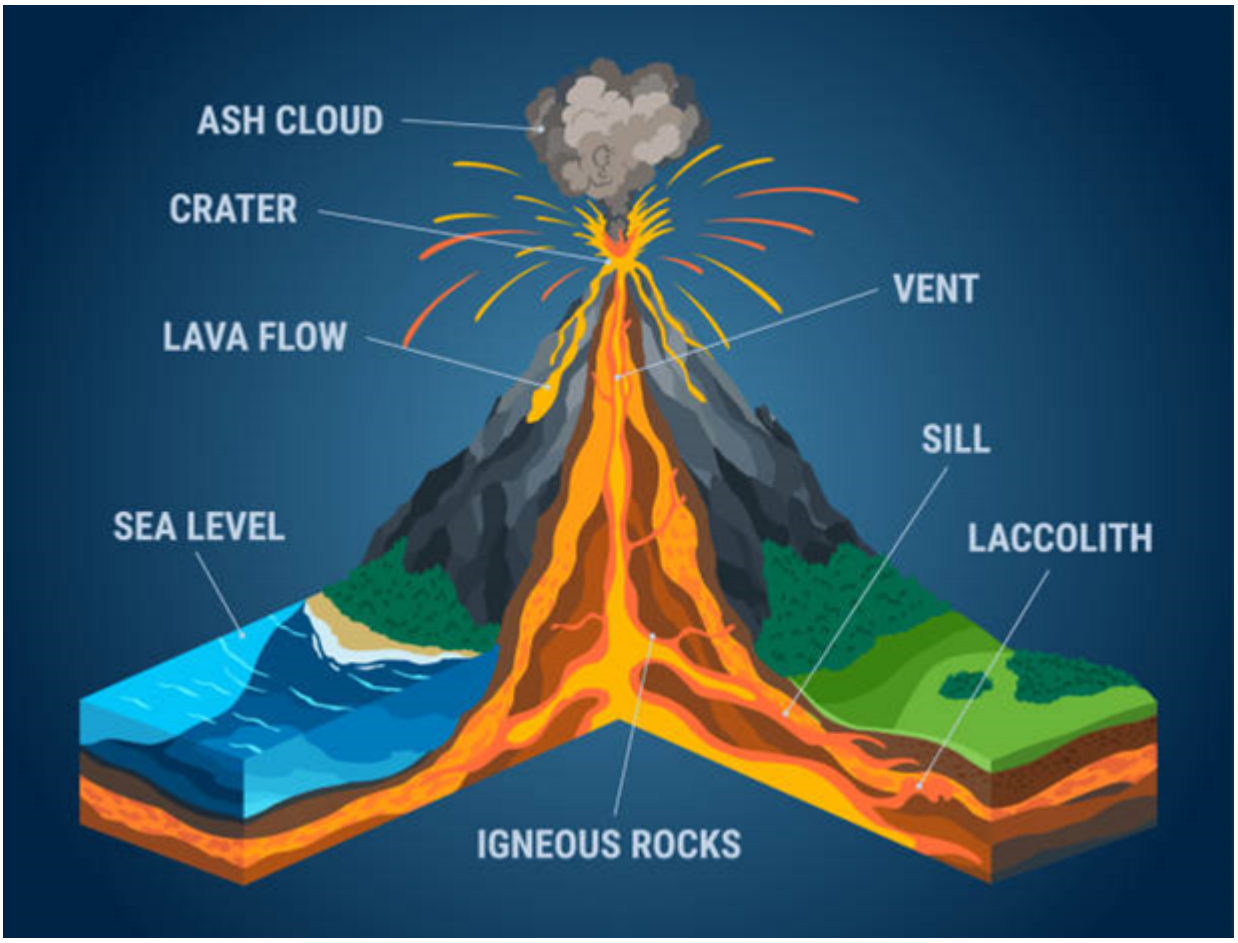
Shield Volcanoes:

These kinds of volcanoes are **the largest of other volcanoes** that are presently active on the surface of the Earth.

These kinds of volcanoes are **made up of basalt**.

They will become explosive in case water goes inside the vent. Else these volcanoes are being characterized by low explosivity.

The lava that moves upside down does so in a fountain form and emanates the cone at the vent's top before developing into a cinder cone.



Composite Volcanoes:

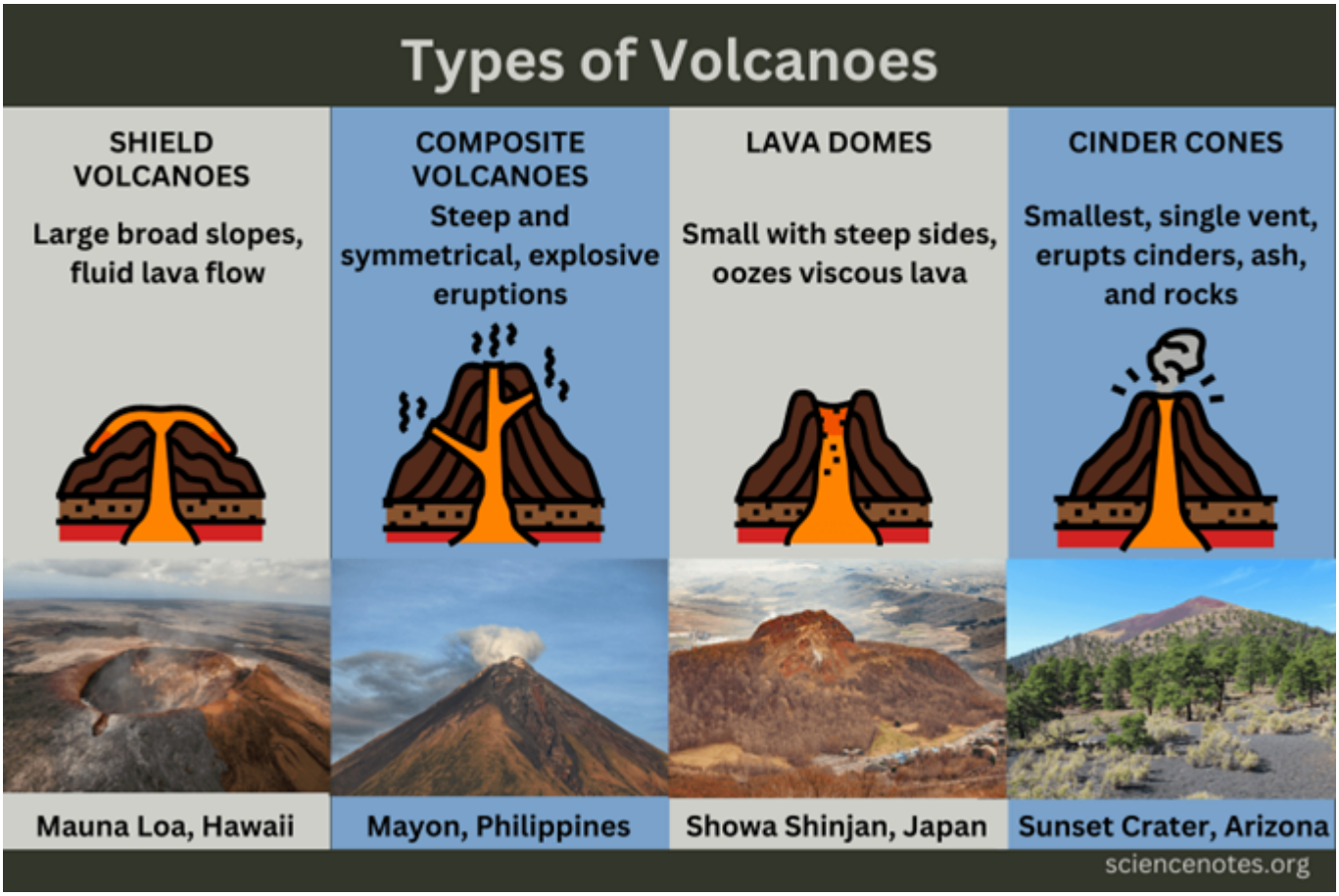
Composite Volcanoes occur due to the outbreaks of **cooler and more viscous lavas than basalt**.

The occurrence of these volcanoes is mainly explosive eruptions.

A **huge amount of pyroclastic material and ashes** easily gets wiped away with lava.

The material is collected near the vent openings which in turn results in the creation of layers.

Mayon Volcano, Philippines; Mount Fuji, Japan, etc. are the major composite volcanoes in the world that erupted in the past.



Caldera:

Calderas are considered as the **most explosive volcanoes** that exist on this planet.

On eruption, they are likely to collapse on themselves instead of creating a structure. The collapsed depressions are known as calderas.

Flood Basalt Provinces:

Flood Basalt Province volcanoes discharge fluid lava that easily travels long distances.

Many regions across the globe are covered by thick basalt lava flows.

Mid-Ocean Ridge Volcanoes:

These kinds of volcanoes mostly erupt in the oceanic areas.

There exists a system of mid-ocean ridges that stretches to more than 70000 kilometres across the ocean basins.

The central region of this ridge registers the maximum eruptions regularly.

Major Volcanoes in India:

Barren Island is located in the Andaman Sea, which witnesses **Barren Volcanoes**, the **only confirmed active volcano in South Asia**. The first volcano was witnessed in 1787 and till now, these volcanoes have occurred more than ten times and the **most recent occurred in 2017**.

Baratang Island is located in the Andaman Islands. **Ranchiwalas Island is another name** for this Island and this island is the **only one that has mud volcanoes** in India. These mud volcanoes have erupted infrequently, and the

last one observed in the past was in the year 2005. The volcano which **occurred in 2005** is expected to be linked with the 2004 Indian Ocean earthquake.

Dhinodhar Hills are present close to Nani Aral village, in Nakhatrana Taluka, Kutch District, Gujarat. Dhinodhar Hill is one of the popular tourist and pilgrimage spots that has **inactive volcanoes** rising to an elevation of close to 400 meters.

Causes of Volcanic eruption:

On land, volcanoes form when one tectonic plate moves under another. Usually a thin, heavy oceanic plate subducts, or moves under, a thicker continental plate. When this happens, the ocean plate sinks into the mantle.

Water trapped in the rocks in this plate gets squeezed out. This causes some of the rocks to melt. The melted rock, or magma, is lighter than the surrounding rock and rises up. This magma collects in magma chambers, but it is still miles below the surface.

When enough magma builds up in the magma chamber, it forces its way up to the surface and erupts, often causing volcanic eruptions.

In the ocean, volcanoes erupt along cracks that are opened in the ocean floor by the spreading of two plates called amid-ocean ridge

Magma from Earth's upper mantle rises up to fill these cracks. As the lava cools, it forms new crust on the edges of the cracks. These mid-ocean ridges are actually long chains of underwater volcanoes that circle the planet like the seams on a baseball.

About 80 to 90 percent of all volcanic eruptions occur where the plates spread apart

Effects of Volcanism:

Volcanism can be a greatly damaging natural disaster. The damage is caused by advancing lava which engulfs whole cities. Habitats and landscapes are destroyed by lava flows.

Showers of cinders and bombs can cause damage to life.

Violent earthquakes associated with volcanic activity and mud flows of volcanic ash saturated by heavy rain can bury nearby places.

Sometimes ash can precipitate under the influence of rain and completely cover the surrounding regions.

Health concerns after a volcaniceruption include infectious disease, respiratory illness, burns, injuries from falls, and vehicle accidents related to the slippery, hazy conditions caused by ash.

Further effects are the deterioration of water quality, fewer periods of rain, crop damages, and the destruction of vegetation.

In coastal areas, seismic sea waves called tsunamis are an additional danger which are generated by submarine earth faults where volcanism is active.

Why is Iceland so volcanically active?

Iceland sits **on the Mid-Atlantic Ridge** (part of the longest mountain range in the world) in the North Atlantic Ocean, where the Eurasian and North American plates are moving apart a few centimetres every year.

The UK’s Meteorological Office said: “This produces volcanic rift zones, regions where the Earth’s crust is being pulled apart and fractured, and here molten rock, or magma, rises up, and some reaches the surface and erupts as lava and/or ash.”

The island **sits over a hot zone** (or hotspot, as mentioned before), which leads to enhanced volcanic activity in the region.