



Cold Lava

Source: [BBC](#)

Why in News?

Recently, a cold lava erupted at **Mt. Kanlaon Natural Park** in the [Philippines](#) has sent rivers of **cold lava, or “lahar”**, flowing through a village miles away from the summit on the Negros Island.

What is Cold Lava?

▪ About:

- Cold lava, known as **lahar in Indonesian**, is a phenomenon where rain mixes with volcanic materials like **ash, sand, and pebbles**, forming a concrete-like substance.
- Lahar primarily **travels along river valleys** and can reach **extremely high speeds** of up to **75-80 kilometers per hour** or even faster.
- Its flow can be **either hot or cold**, depending on its source and origin, and is primarily associated with [stratovolcanoes](#).
 - **Stratovolcanoes** are also called composite volcanoes because of their stratified layers of deposits that form the **flanks of the volcano**.
- Cold lava is considered more **destructive and deadlier**, due to its **high density, abrasive nature, and ability** to cause significant damage to structures and infrastructure.

▪ Formation:

- It can occur without **volcanic eruptions**, often triggered by **heavy rainfall or landslides** on the slopes of volcanoes covered in loose volcanic material.
- Volcanic eruptions themselves can generate lahars by [melting snow](#) and ice present on the volcano or through **pyroclastic flows** that mix with water.
 - Eruptions often generate **scorching hot clouds of gas** and debris known as pyroclastic flows.
- **Lake breakout** floods caused by volcanic landslides can also transform into lahars as they erode and incorporate more **debris and water**, significantly increasing their volume and destructive potential.

What is the Difference Between Cold Lava and Normal Lava?

- **Temperature Variation:** Normal lava is extremely hot molten rock, while lahars are not molten and can vary greatly in temperature.
- **Mixtures:** **Lava consists solely of molten rock**, whereas **lahars are a mixture of water and volcanic debris** like ash, rocks, and sand.
 - The composition of lahars, being a dense slurry rather than pure molten rock, allows them to flow faster and further from the volcanic source.
- **Impact:** Lahars can be **more destructive and deadlier compared to regular lava flows** because they can affect and devastate a **much larger area due to their fluid, flowing nature** and ability to incorporate more debris as they travel.
 - This mobility and incorporation of extra material gives lahars the potential to increase massively in volume, compounding their destructive force.

Magma vs Lava

- Magma is the term used to denote the [molten rocks](#) and related materials **seen inside the earth**. A weaker zone of the mantle called the [asthenosphere](#), usually is the source of [magma](#).
- **Lava is nothing but the magma above the earth's surface**. Once this magma comes out to the earth's surface through the vent of a volcano, it is called the [Lava](#).

Mud Volcano

- A **mud volcano** or **mud dome** is a landform created by the eruption of mud or slurries, water and gases.
- Mud volcanoes are not **true igneous volcanoes** as they do not produce lava and are not necessarily driven by **magmatic activity**.
- Mud volcanoes may range in size from merely **1 or 2 meters high** and **1 or 2 meters wide**, to 700 meters high and 10 kilometers wide.

VOLCANOES

A volcano is a vent or a fissure in the crust from which lava (molten rock), ash, gases, rock fragments erupt from a magma chamber below the surface

Types: On basis of -

- **Periodicity of Eruption:**
 - **Active volcano:** Recently Erupted
 - **Dormant Volcano:** Potential for eruption, no imminent signs
 - **Extinct:** No recent eruptions, low possibility in future
- **Nature of Eruption:**
 - **Hawaiian:** Calmest types (low gaseous content)
 - **Strombolian:** Formation of large gas bubbles in magma
 - **Vulcanian:** More explosive
 - **Plinian eruptions:** Magma's volatile gases rise via a narrow conduit
 - **Icelandic:** Often build lava plateaus
- **Shape of Volcanoes:**
 - **Shield volcanoes:** Composed of basaltic lava, low slope
 - **Cone volcanoes (Cinder Cones):** Most abundant
 - **Composite cones (stratovolcanoes):** Formed by layers of diverse materials.

Volcanic Features:

- **Extrusive :**
 - **Crater:** Cone-shaped vent for magma
 - **Caldera:** Large, crater-like depression
 - **Volcanic Plateaus:** Levelled areas from fissure eruptions
- **Intrusive:**
 - **Batholiths:** Central core of a volcanic mountain.
 - **Dyke:** Vertical intrusion cutting across country rock bedding.
 - **Sills:** Tabular intrusions along sedimentary bedding.
 - **Laccoliths:** Magma injection along horizontal sedimentary bedding.
- **Minor:**
 - **Geysers:** Underground water above 100°C, powered by magma, results in powerful eruptions with steam and diluted minerals.
 - **Hot Springs:** Heated water flows quietly along fault zones

Distribution of Volcanoes:

- Subduction zones (Circum Pacific Belt)
- Divergence zones (Mid Atlantic Ridge)
- Intra-plate oceanic volcanism (Hawaiian chain)
- Mid-continental belt and volcanoes in Mediterranean region

Volcanoes in India:

- No volcanoes in Himalayas
- Barren Island (Only active volcano)

Products of Volcanic Eruption:

- **Gases:** H, C, O, S, N, CH₄, NH₃
- **Solid:** Pyroclastic materials
- **Liquid:** Lava

Diagram Labels: Volcanic Bombs, Crater, Main Vent, Secondary Vent, Lava Flow, Pipe, Magma Chamber

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UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q. Consider the following statements: (2018)

1. The Barren Island volcano is an active volcano located in the Indian territory.
2. Barren Island lies about 140 km east of Great Nicobar.
3. The last time the Barren Island volcano erupted was in 1991 and it has remained inactive since then.

Which of the statements given above is/are correct?

- (a) 1 only
(b) 2 and 3

- (c) 3 only
(d) 1 and 3

Ans: (a)

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