

VOLCANOES AND VOLCANIC PRODUCTS

Primary Effects of Volcanism

Lava Flows

- Lava flows are common in Hawaiian or Shield volcanoes, the least explosive.
- Although lava flows have been known to travel as fast as 64 km/hr, most are slower.
- Lava flows are most damaging to property, they destroy anything in their path.
- Control of lava flows has been attempted with limited success by bombing flow fronts to attempt to divert the flow, and by spraying with water to cool the flow.

Violent Eruptions and Pyroclastic Activity

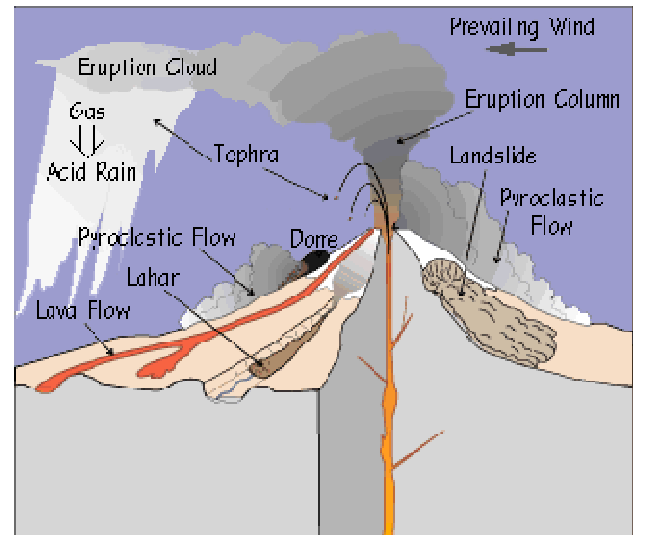
- Pyroclastic activity is one of the most dangerous aspects of volcanism.
- Hot pyroclastic flows cause death by suffocation and burning.
- Lateral blasts knock down anything in their path.
- Ash falls can cause the collapse of roofs and can affect areas far from the eruption.
- Ash falls destroy vegetation, including crops, and can kill livestock.
- Ash falls can cause loss of agricultural activity for years after an eruption.

Poisonous Gas Emissions

- Hydrogen Sulfide (H₂S), and volcanoes emit gases that are often poisonous to living organisms. Among these poisonous gases are Hydrogen Chloride (HCl) and Carbon Dioxide (CO₂).
- The gases can kill organisms by direct ingestion, or by absorption onto plants followed by ingestion by organisms.
- In 1984, CO₂ gas escaping from the bottom of Lake Monoun, a crater lake in the African country of Cameroon, killed 37 people.

Atmospheric Effects

- Since large quantities of ash and volcanic gases can be injected into the atmosphere, volcanism can have a short-term effect on climate.
- Volcanic ash can cause reflection of solar radiation, and thus can cause the temperatures to be cooler for several years after a large eruption.
- Volcanic gases like SO₂ also reflect solar radiation. Pinatubo caused a lowering of average temperature by about 1°C for two years following the eruption.
- Volcanic gases like CO₂ are greenhouse gases which help keep heat in the atmosphere.



Secondary effects of Volcanism

Mudflows (Lahars)

- Volcanoes can emit voluminous quantities of loose, unconsolidated tephra. Such loose deposits are subject to rapid removal if they are exposed to a source of water.
- The source of water can be derived by melting of snow or ice during the eruption, emptying of crater lakes during an eruption, or rainfall that takes place any time.
- Mudflows are a mixture of water and sediment, they move rapidly down slope along existing stream valleys.
- They have properties that vary between thick water and wet concrete, and can remove anything in their paths like bridges, highways, houses, etc.
- On November 13, 1985 a mudflow generated by a small eruption on Nevado del Ruiz volcano in Columbia flowed down slope and devastated the town of Armero, 50 km east of the volcano and built on prior mudflow deposits. 23,000 people died in the mudflow that engulfed the town.

Tsunami

- Debris avalanche events, landslides, caldera collapse events, and pyroclastic flows may generate tsunami.
- During the 1883 eruption of Krakatau volcano, several tsunami were generated by pyroclastic flows entering the sea and by collapse accompanying caldera formation. The tsunami killed about 36,400 people.