Essay On Volcanoes

Outline of Essay:

Introduction

Volcanoes are geological features that contain magma, molten rock, and gas that have accumulated in an underground chamber beneath the surface of Earth or other planets. When these materials are forcefully expelled from the volcano they form a large range of landforms such as lava flows, ash clouds, cinder cones, and pyroclastic deposits. Volcanic activity can also cause earthquakes, tsunamis, and even climate change.

Occurrence of Volcanoes

Volcanoes occur on or near the boundaries of tectonic plates. When two plates move away from each other, the molten rock rises and forms a volcano. On the contrary, when two plates come together they push against one another and form mountains and volcanoes. There are nearly 1500 active volcanoes located around the world, mostly along the Ring of Fire.

Types of Volcanoes

Volcanoes are classified based on the type of material they expel during the eruption. There are three main categories: cinder cones, shields, and composite volcanoes.

Cinder Cone Volcanoes: These are the most common type of volcanoes and they form when bits of molten rock called cinders, ashes, pumice, and lava fragments accumulate around a central vent to form a steep-sided cone.

Shield Volcanoes: Unlike cinder cones, shield volcanoes are much bigger and they have very gentle slopes due to the type of lava that is expelled. Shield volcanoes are composed of basaltic lava which flows easily, creating large shields.

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Composite Volcanoes: These are a combination of both cinder cone and shield volcanoes and they form when layers of both types of lava accumulate around a central vent.

Causes and Formation of Volcanoes

Volcanoes are formed when the Earth's crust is weakened by the molten material found beneath it. This molten material is then released through a vent in the Earth's surface, usually along fault lines or weak spots in the crust. When pressure builds up and the molten material is forced out of its chamber, an eruption takes place.

Volcanic Eruption and Volcanic Landforms

Volcanoes erupt violently when the chamber is filled with gas, ash, and other materials. During an eruption, these substances can be propelled up to several miles into the air in the form of lava, pyroclastic material, and ash clouds. Depending on the type of volcano and the materials expelled, different landforms are created. These include lava flows, cinder cones, and pyroclastic deposits.

Lava Flows are created when molten lava is expelled from the volcano and flows down its slopes. Cinder Cones are formed when bits of melted rock accumulate around a central vent to form steep-sided cones. Pyroclastic Deposits are deposits of fragmented, ash and other material that is expelled during an eruption.

Stratovolcanoes are composite volcanoes made up of layers of both cinder cones and lava flows. Submarine volcanoes form beneath the surface of the ocean and they can expel materials such as hot water, steam, and gas.

Fissure Vents are cracks in the Earth's surface that can expel lava, gas, and ash.

Types of volcanic eruptions

Volcanic eruptions can be classified into three main types:

Explosive eruptions are characterized by the rapid release of gas, ash, and other materials from the volcano. These eruptions can cause widespread destruction as they can propel material up to several miles in the air.

Effusive eruptions are much less violent than explosive eruptions and they involve the steady flow of lava from the volcano. Submarine eruptions occur beneath the surface of the ocean and they expel materials such as hot water, steam, and gas.

Volcanic Products

Volcanoes can expel a variety of materials during an eruption. These include lava, gas, ash, and pyroclastic material. Lava is molten rock that is released from the volcano in the form of rivers or flows.

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Gas is composed of sulfur dioxide and other gaseous compounds which form clouds when expelled from the volcano. Ash is composed of bits of rock and other materials that are blasted into the atmosphere during an eruption. Pyroclastic material is a combination of lava, ash, and gas that forms clouds or flows when expelled from the volcano.

Impacts and Hazards Associated with Volcanoes

Volcanic eruptions can have severe impacts on the environment and human lives. The most dangerous effects of an eruption include lahars, lava flows, ash falls, and pyroclastic flows. Eruptions cause destruction to infrastructure, displacement of populations, disruption of economic activities, disruption of transportation routes, and contamination of water supplies. Additionally, volcanic eruptions can cause earthquakes, tsunamis, and even climate change in the form of cooling temperatures due to ash clouds blocking out the sun's rays.

Lahars are mudflows that are caused by the melting of snow and ice during an eruption. They can be extremely destructive, with up to 10 times the strength of concrete.

Lava flows destroy everything in their path as they slowly move down the sides of the volcano. Ash fall is when ash particles are ejected from the volcano, land on the ground, and cause respiratory problems when inhaled.

Pyroclastic flows are clouds of hot ash, pumice, and rock fragments that move very quickly down the sides of a volcano and destroy everything in its path.

Eruptions can destroy buildings, roads, and other infrastructure. Volcanic eruptions can force people to leave their homes due to the danger posed by the eruption.

Volcanic eruptions can disrupt economic activities in the surrounding areas due to ash falls, lahars, and other effects. Volcanic eruptions can also disrupt transportation routes as roads and airports may be closed due to ash fall or lava flows. Volcanic eruptions can contaminate water supplies which can make them unsafe for human consumption.

Earthquakes are caused by the movement of molten material beneath the Earth's surface which can cause immense damage to buildings and infrastructure. Tsunamis are another hazard associated with volcanoes, as they are triggered when large amounts of water movement due to an earthquake or eruption.

Volcanic eruptions can also cause climate change by blocking out the sun's rays and cooling temperatures due to ash clouds in the atmosphere.

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Some Famous Volcanoes In the World

Some famous volcanoes in the world include Mount St. Helens, Krakatoa, and Vesuvius.

Mount St. Helens is an active stratovolcano located in southwestern Washington, USA which erupted in May 1980.

Krakatoa is a volcanic island located between the islands of Java and Sumatra in Indonesia which exploded with huge force in 1883. Vesuvius is an active stratovolcano located on the Gulf of Naples in Italy which famously erupted and buried the ancient Roman city of Pompeii in 79 AD.

Measures and Preparation for Facing Volcanoes

To prepare for volcanic eruptions, people should be aware of the risks and dangers associated with volcanic activity. People living in areas near volcanoes should have evacuation plans ready in case of a potential eruption. Governments should issue warnings when an eruption is likely and provide support to those affected by the eruption.

People should also take necessary precautions to protect property and infrastructure in the event of an eruption. This includes building structures that are resistant to lava flows and ash fall, sealing windows and doors with plastic sheets or tape to prevent ash from entering buildings, and wearing protective masks while outdoors. Additionally, people should also be aware of other hazards associated with eruptions such as earthquakes, tsunamis, and lahars, as these can cause immense damage.

FAQs

What is a volcano made of?

A volcano is made of molten rock, called magma, which is located beneath the Earth's surface.

How do volcanoes erupt?

Volcanoes erupt when the pressure of molten material beneath the Earth's surface becomes too great and is released in an explosive eruption.

What are the effects of volcanic eruptions?

Volcanic eruptions can destroy buildings and infrastructure, disruption of transportation routes, and contamination of water supplies. Additionally, they can cause earthquakes, tsunamis, and climate change.