Expert Group Text

"Volcano"

Most mountains and islands rise and crumble over millions of years. But a volcanic island or mountain can appear in weeks. It can disappear again in an explosive minute. On May 18, 1980, the eruption of Mount St. Helens, in Washington State, destroyed a side of the mountain. It also killed 57 people.

Volcanoes can cause other problems as well. On April 14, 2010, a volcanic eruption in Iceland sent tons of ash into the air. Such ash can cause airplane engines to fail. Airports across Europe had to be shut down for several days to prevent accidents.

How Volcanoes Are Formed

Volcanoes mark places where lava and hot gases erupt through Earth's crust. The heat that drives this action arises deep in Earth. Our planet was once entirely molten, or melted. Its core is still that way. Scientists estimate its temperature to be around 7,300°F (4,000°C).

This heat drives magma, or melted rock, toward the surface. It collects in underground pools known as magma chambers. When magma meets groundwater, it produces steam. Steam and other hot gases force the magma up through cracks in the rock. It erupts through openings called vents. Once magma reaches the surface, it is called lava. Together with ash and blasted rock, the lava cools to form a volcano.

Types of Volcanoes

Most volcanoes are cone shaped. The tallest reach over 20,000 feet (6,000 meters). Others form mounds that are only about 100 feet (30 meters) high. Typically, a volcano has a depression at its peak. This depression surrounds the main vent. Geologists use the term "crater" for vent depressions that are a mile or less in diameter. They use the term "caldera" for larger depressions. Some calderas form when the ground collapses into a magma chamber.

Geologists know of four types of volcanoes. They are composite volcanoes, shield volcanoes, cinder cones, and ash-flow calderas.

Kinds of Volcanic Eruptions

Scientists classify volcanoes by how often they erupt. By definition, an active volcano has erupted in the last 10,000 years. Some active volcanoes erupt constantly. Dormant volcanoes are ones that have remained inactive for longer periods. But they may still reawaken. Extinct volcanoes have not erupted in tens of thousands of years. Scientists doubt that such volcanoes will ever erupt again.

There are many different types of volcanic eruptions. They are named after volcanoes or volcanic regions.

Products of a Volcano

Volcanoes produce a huge amount of material. This material includes lava, ash, and steam. Lava flows out of vents as red-hot, melted rock. Its temperature registers around 2,000°F (1,100°C). As lava cools, its crust turns silvery blue.

The most powerful eruptions spew out ash, or dust-size fragments of magma. Puffs of ash may reach many miles high. Ash can also flow across the ground at hundreds of miles per hour. In wet or rainy areas, mudflows may follow eruptions.

Volcanoes produce enormous amounts of heat and gas. Most of it escapes into the air. But pockets remain underground. These can power hot springs and geysers.

Volcanic eruptions also spew rocks. Some of this rock forms underground from cooled magma. Geologists call it igneous rock. Rock pieces form above ground when eruptions blast lava into chunks. Geologists call these pieces pyroclastics. This means "fire-broken" in Greek.

Where Volcanoes Occur

Geologists find extinct volcanoes in almost every region of the world. But active volcanoes occur primarily around the edges of continents. The science of plate tectonics helps explain why. Earth's crust consists of several huge plates. As these plates move, they collide. During a collision, one plate dives beneath another. Deep in Earth, the rocks in the lower plate melt. The melted rocks rise again, forming volcanoes.

The continents around the Pacific Ocean sit on plates. They press against the plates that underlie the Pacific. As a result, volcanoes rim the Pacific Ocean. This arc is called the Ring of Fire.

Volcanoes also occur where new crust rises to push plates apart. Such volcanoes form a long ridge on the bottom of the Atlantic Ocean. Iceland is part of this Mid-Atlantic Ridge.

Some volcanoes rise in the middle of tectonic plates. They appear to rise over mysterious hot spots. Beneath each spot is a column of rising magma. Earth's crust moves over the spot. Over millions of years, this movement produces a line of volcanoes. The Hawaiian Islands are an example of this process.

Although we know where to find volcanoes, predicting when they will erupt is not an exact science. Geologists continue to study volcanoes to understand them better.