

Volcanoes: Help or Hindrance?



Volcanic eruptions can range from violent to mild. All kinds of eruptions have effects that can be both harmful and beneficial to people and the environment.

Volcanoes Can Be Destructive

When volcanoes erupt, they often spew molten rock and fragments of rock over the ground and into the air. Fine fragments of rock, called ash, are usually ejected during very violent eruptions. Ash can affect people hundreds of kilometers away from an eruption. In 1980, in Spokane, Washington, it was dark at noon as a result of the ash cloud from the Mt. St. Helens' eruption more than 300 kilometers away. Closer to the mountain, several people died from suffocation by the ash cloud from the initial blast. Volcanic ash can also contaminate water supplies, cause electrical storms, and collapse roofs.

Sometimes a volcano explodes sideways, shooting out ash and large pieces of rock that travel at very high speeds for several kilometers. These explosions can cause death by suffocation and knock down entire forests within seconds. Rivers of molten rock or hot fragments of rock from such eruptions can instantly ignite fires for great distances.

An erupting volcano can also be accompanied by earthquakes, flash floods, rockfalls, and mudflows. Floods occur when rivers are dammed by trees felled during an eruption or by molten rock moving across a river. Mudflows are powerful rivers of mud that form when debris from a volcanic eruption moves into a stream or river. Mudflows can move faster than people can run, and bridges in the path of these flows can be destroyed instantly. One kind of mudflow, called a lahar, happens when rain falls through clouds of ash or when rivers become choked with falling volcanic debris. During the eruption of Mt. St. Helens in 1980, lahars destroyed more than 200 homes, more than 300 kilometers of roads, and 220 kilometers of river channel.



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In 1989, the Wahaula Visitor Center in Hawaii was engulfed by a hot lava flow and burst into flames. All attempts to save the center were useless.

A volcanic eruption can also cause a tsunami. A tsunami is a large sea wave usually brought on by underwater earthquakes, but volcanoes can cause tsunamis, too. The collapse of an island during a volcanic eruption or the dumping of heavy loads of volcanic debris into the ocean can create massive waves. The 1883 eruption of Krakatoa, a volcanic island in Indonesia between Sumatra and Java, unleashed a tsunami that swept the coasts of Sumatra and Java and drowned more than 36,000 people.

Severe weather-related events often accompany volcanic activity. These include lightning, thunderstorms, and whirlwinds (including tornadoes). In addition, the heat caused by a volcanic eruption can melt snow and glaciers, which can lead to flooding and landslides. Ash clouds from an erupting volcano can temporarily affect the weather in cities that are hundreds or even thousands of kilometers away. For example, the 1883 eruption of Krakatoa released 20 cubic kilometers of volcanic dust into the air. The dust rose so high that it reached the stratosphere.

Within 13 days, it had encircled the globe and blocked sunlight from entering the atmosphere. For months, sunsets were strange-colored. Average daily temperatures around the world dropped an estimated 0.5 oC during 1884. It took 5 years for all of the volcanic dust to settle to the ground.

In 1815, another Indonesian volcano, Tambora, erupted even more powerfully. It blasted about 150 cubic kilometers of volcanic debris high into the atmosphere. The dust blocked so much sunlight that crops failed to grow around the world, and 1816 became known as "the year without a summer." Again, it took several years before the effects of this eruption passed.

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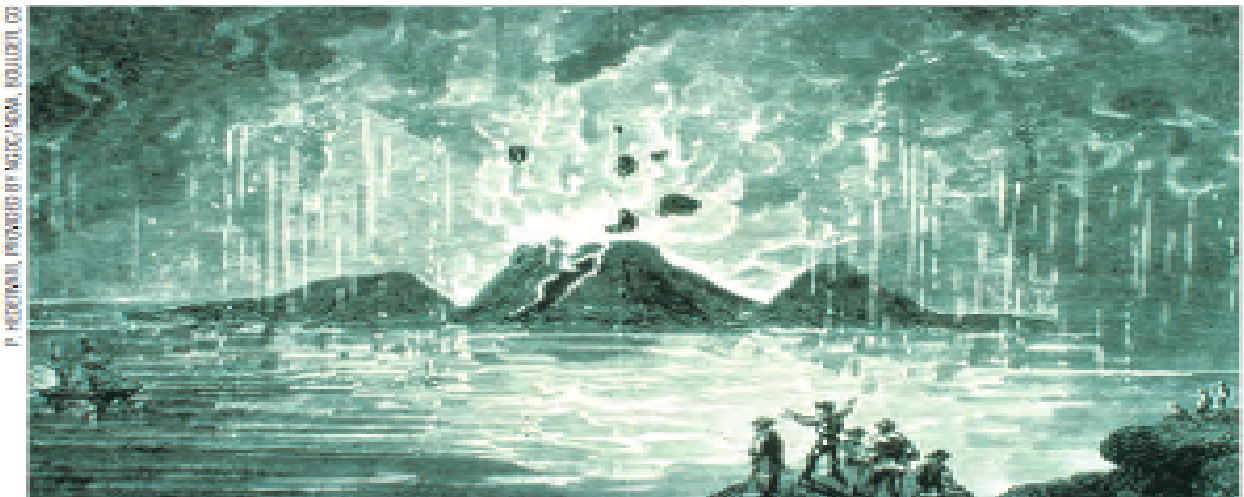


After the eruption of Mt. St. Helens, this home was damaged by a volcanic mudflow along the South Fork Toutle River in Washington state.

Volcanoes Can Be Constructive

Not all the materials that come out of volcanoes are harmful. Many volcanic areas have permanent hot springs that are beautiful to look at and provide recreation for residents and tourists. In addition, people can tap the geothermal energy of hot springs to heat their homes directly or to produce electricity. Icelanders, for example, use geothermal energy to heat their homes, buildings, and swimming pools. Iceland has a very short growing season. But greenhouses heated by geothermal energy provide Icelanders with vegetables, tropical fruit, and flowers year-round. Some people living in Arctic regions also heat their homes and greenhouses with water from hot springs. The hot water flows through pipes in their houses, warming the air. Geothermal steam is used to generate electricity in places such as Italy, New Zealand, the United States, Mexico, Japan, and Russia.

Volcanoes provide a wealth of natural products. Basalt, which forms from cooled lava and makes up much of the seafloor, is a raw material for cleaning agents, and it has many chemical and industrial uses. Volcanic ash enriches the soil with mineral nutrients. Minerals in molten rock are a major world source of nickel, chromium, platinum, and several other important elements. Obsidian, or "volcanic glass," is an ideal material for fine stone work because it breaks with a typical curved fracture when struck with a sharp blow.



This old engraving shows the 1866 eruption of Nea Kameni, Santorini, in Greece. A giant volcanic explosion and sudden sinking of the island's center beneath the sea in 1650 s.c. caused a huge tsunami.

Beautiful arrowheads of obsidian have been found in Ohio from the Hopewell culture, which flourished 1500 to 2300 years ago.

Volcanoes also create beautiful landscapes. Without volcanic activity, there would be none of the spectacular fissures that dot the Hawaiian landscape or the majestic peaks of the Cascade Range, such as Mt. Rainier.

Most people think of catastrophic events as violent natural hazards that create human and environmental risks. But as we have just seen, there is another side of the story. Catastrophic events can also be constructive forces on the earth. Volcanoes affect the composition of our oceans and atmosphere. Floods create sandy beaches along riverbanks. And earthquakes, as well as volcanoes, create and shape the mountains and islands that people enjoy. □



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Most geysers are hot springs that erupt fountains of scalding water and steam.