

Volcanoes

A volcano is a weak spot in the crust where magma has come to the surface.

Magma is the molten mixture of rock-forming substances, gases, and water from the mantle.

Magma that has reached the surface is called lava.

After lava has cooled, it forms solid rock.

Lava released during volcanic activity builds up Earth's surface.

I. Volcanoes and Plate Boundaries

A. There are about 600 active volcanoes on land.

Many more lie beneath the sea, where it is difficult for scientists to observe & map them.

B. Volcanoes occur in belts that extend across continents & oceans.

1. Ring of Fire: A major belt of volcanoes that rims the Pacific Ocean.

2. Volcanic belts form along the boundaries of Earth's plates.

C. Diverging Boundaries

1. When huge pieces of crust diverge, the crust often fractures allowing magma to reach the surface.

a. Volcanoes can form along mid-ocean ridges: long, underwater mountain ranges that have a rift valley down their center; lava pours out of cracks in the ocean floor gradually building new mountains.

b. Volcanoes can also form along diverging plate boundaries on land.

D. Converging Boundaries

1. Volcanoes can form where 2 oceanic plates collide or where an oceanic plate collides with a continental plate.

a. Through subduction, the older, denser plate sinks beneath a deep-ocean trench into the mantle

- b. Some of the rock above the subducting plate melts & forms magma; because the magma is less dense than the surrounding rock, it rises toward the surface; eventually, the magma breaks through the ocean floor, creating volcanoes.
- c. island arc: a string of islands formed by the volcanoes along a deep-ocean trench.

E. Hot Spot Volcanoes

1. A hot spot is an area where magma from deep within the mantle melts through the crust above it.

2. A volcano forms above a hot spot when magma erupts through the crust & reaches the surface.

3. A hot spot in the ocean floor can gradually form a series of volcanic mountains.

a. The Hawaiian Islands formed one by one over millions of years as the Pacific plate drifted over a hot spot.

4. Hot spots can also form under continents.

a. Yellowstone National park in Wyoming marks a hotspot under the North American plate.