AWESOME FORCES OF NATURE

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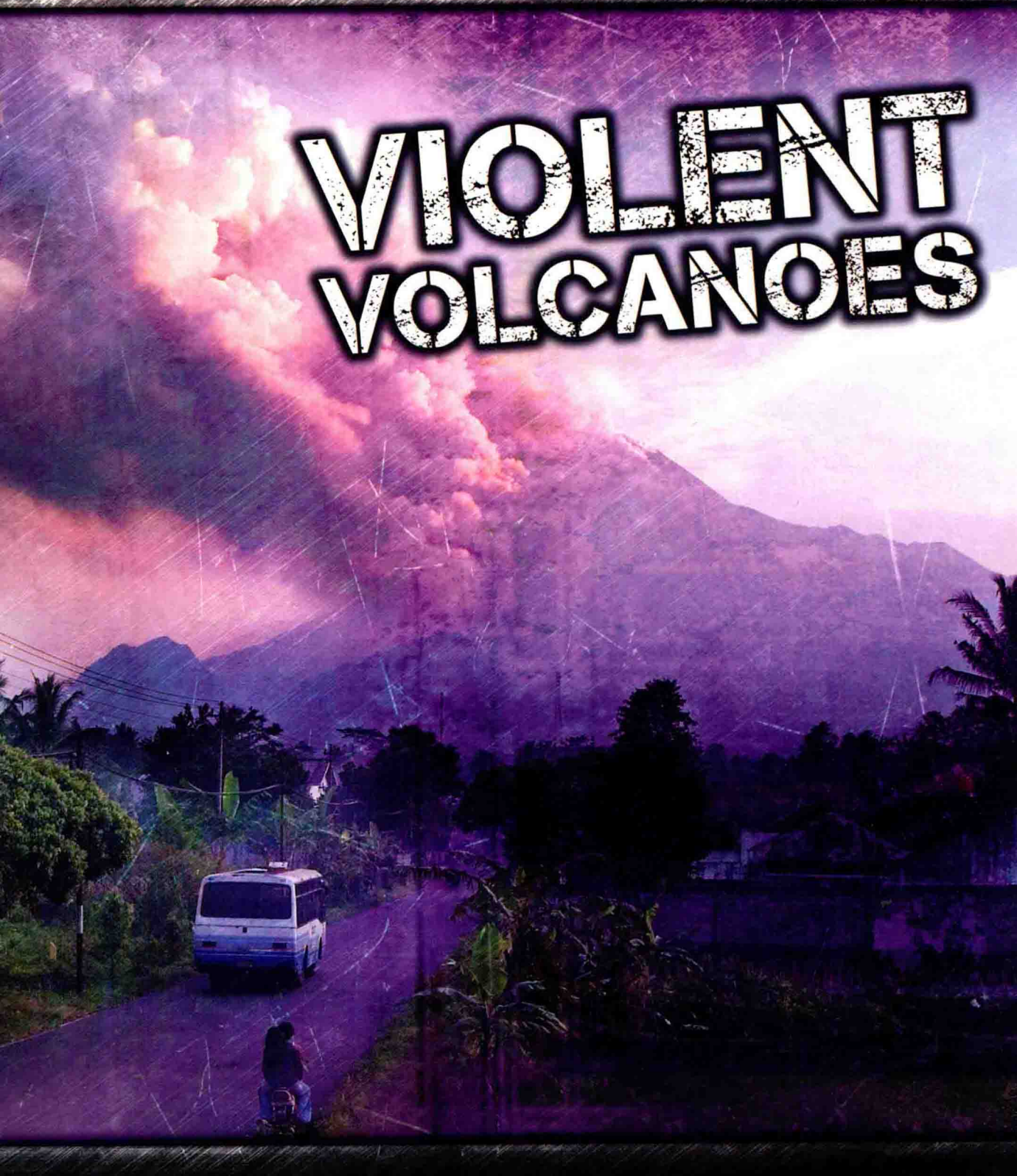
VIOLENT VOLCANOES



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VIOLENT VOLCANOES

Revised and updated

Louise and Richard Spilsbury

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What is a volcano?

A volcano is a hole in the Earth's surface. The hole reaches down into a pool of hot, liquid rock below. Most of the time, a volcano is silent and still. However, it can also suddenly **erupt**. When it erupts, boiling rock from inside the Earth spurts out of the opening. This **lava** may spill out like bubbling treacle, or it may shoot into the air at high speed. Some volcanoes give off clouds of **ash** and gas as well.

Incredible power

Most of the volcanic eruptions that happen are small, but some can cause terrible destruction. They can damage buildings, injure, and kill people. A large, violent, volcanic eruption can destroy all life for kilometres around.

Why are they called volcanoes?

The Romans named a volcanic island 'Vulcano', after their god of fire, Vulcan. Gradually the name came to mean all volcanoes.

This is red-hot lava pouring out of the Soufrière Hills volcano, on the Caribbean island of Montserrat, in January 1997.

Over millions of years, ash and lava from eruptions can build up to form mountains like Mount Etna in Italy.

Volcanoes can completely change the way the land around them looks. They can blast away patches of ground and create new areas, such as hills or slopes. Some volcanoes shoot so much ash into the sky that they change the weather in an area for months on end.

Volcanic mountains

Most volcanoes are shaped like mountains. This is because the lava sets hard when it cools down in the air. Over time volcanoes may erupt many times. This slowly builds the volcano up into a mountain that is shaped like a cone.

VOLCANO FACTS

1. Between 50 and 70 volcanoes erupt every year across the world.
2. More than a million people have been killed by volcanic eruptions in the last 2000 years.
3. There are more than 1000 volcanoes on land that could erupt at some time in the future.
4. **Molten** rock inside the volcano is called **magma**. When it erupts it is called lava.

What causes volcanoes?

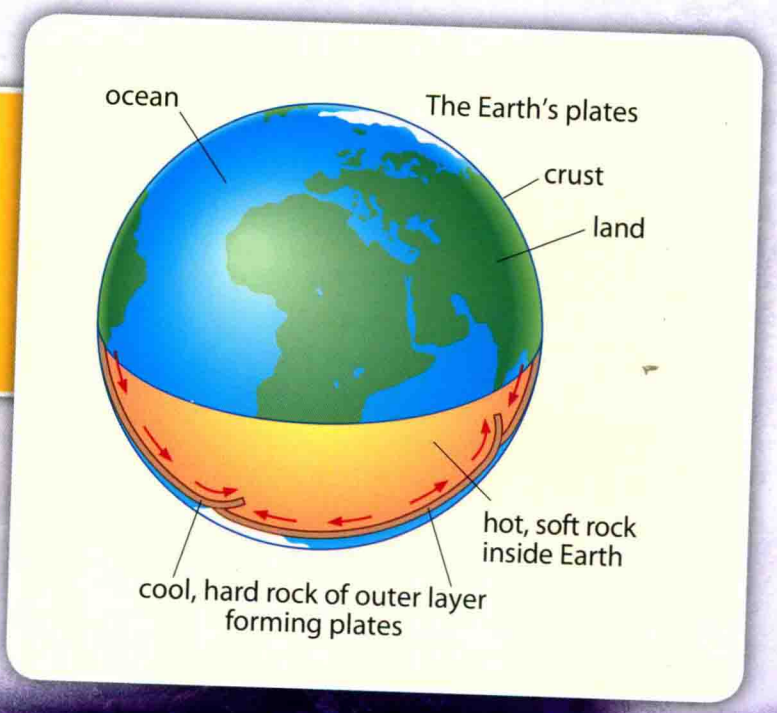
Volcanoes are places where the red-hot **magma** from deep inside the Earth reaches the surface. To understand how this happens, you need to know a bit about how our planet is made.

What is the Earth like?

If you think of the Earth as a giant egg, we live on the shell, the outer surface. This outer layer is called the **crust**. Although the crust feels deep and solid to us, it is really quite thin compared to the size of the planet. Beneath this hard, cool surface lies hot, liquid rock.

This magma moves, rising and sinking very slowly. Long ago these movements made cracks in rock beneath the Earth's crust. This rock is actually split into seven huge pieces and several smaller pieces called **plates**. The crust and plates form the land we live on and the floor of the oceans. Although we cannot feel them moving, the plates are floating on the hot, liquid rock beneath them.

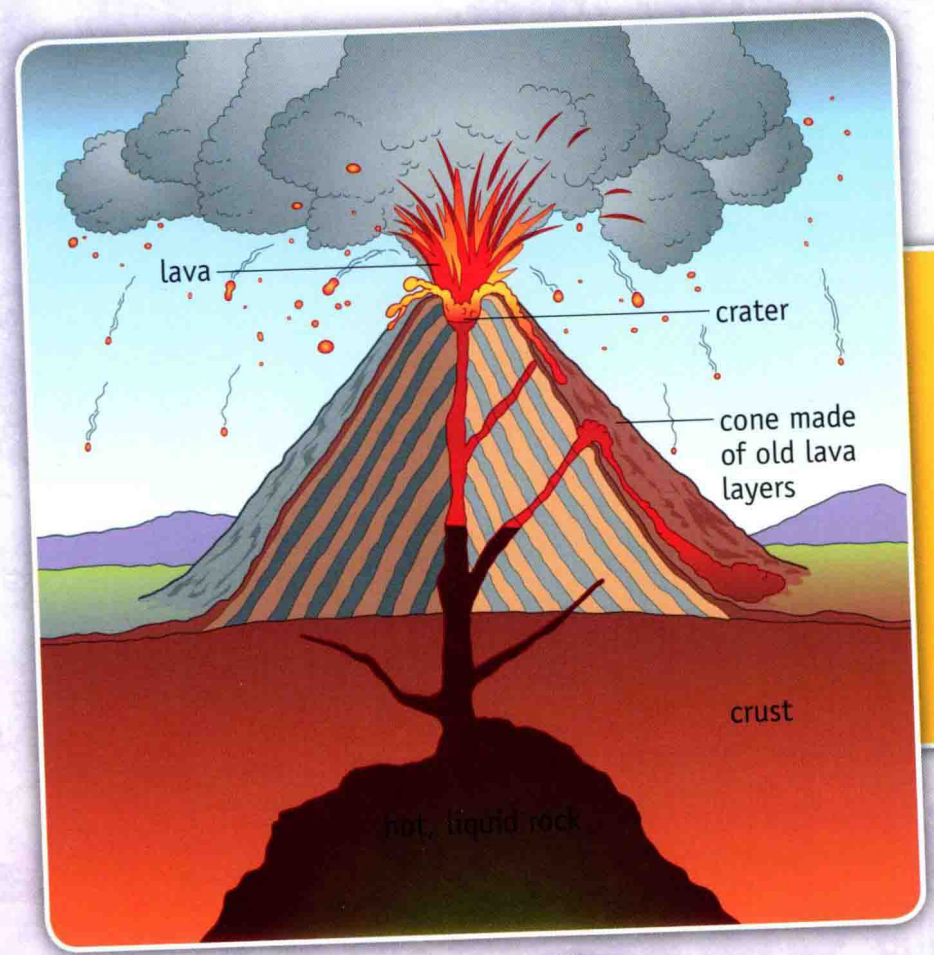
The Earth's surface is made up of enormous plates of rock. They fit together like the panels on a football.



How does a volcano form?

Volcanoes form when some of the hot, liquid rock squeezes through gaps between the plates. The magma forces its way up. As it rises, it melts rock that gets in its way, making a tunnel all the way through the crust.

Near the top, it gets stuck. More and more hot rock rises. Over many years, the amount of hot rock pushing on the crust gradually builds up. Suddenly there is so much that it bursts through the crust – the volcano **erupts**. It is rather like the way that a bottle of fizzy drink suddenly sprays out when you open the lid after shaking it.



This picture shows you how a volcano works. Hot liquid rock pushes up from below the surface of the Earth to the top. The top of the volcano is called the **crater**. The sides are called the **cone**.

Volcano's on land

After an **eruption**, **lava** cools down and sets into hard rock. **Ash** settles on the ground like grey snow. A volcano may erupt several times. Each time, it gets a bit taller as more lava sets and more ash settles. When lava is very thick it runs downhill slowly. This makes a mountain with steep sides. When lava is thin it runs down fast and spreads out more. This kind of lava forms a wider, flatter mountain.

Ash pours from Mount Parìcutin in Mexico in 1950. The volcano erupted for nine years, from 1943 until 1952. When it was finished, only one building in the village of San Juan, Mexico remained standing.

Volcanoes in the sea

Most volcanoes actually happen underwater, on the **ocean floor**. They erupt and grow just as they do on land. Each time these volcanoes erupt, they grow a little larger. Some underwater volcanoes grow so tall that their tips stick out above the water. They form islands in the sea. In some places, a whole line of undersea volcanoes has created a chain of islands.

Hot spots

Some volcanoes form far away from the edges of the Earth's **plates.** These volcanoes form over points in the Earth called **hot spots**. These are places in the Earth's surface where the liquid rock is so hot that it pierces a hole through a weak point in the **crust**.

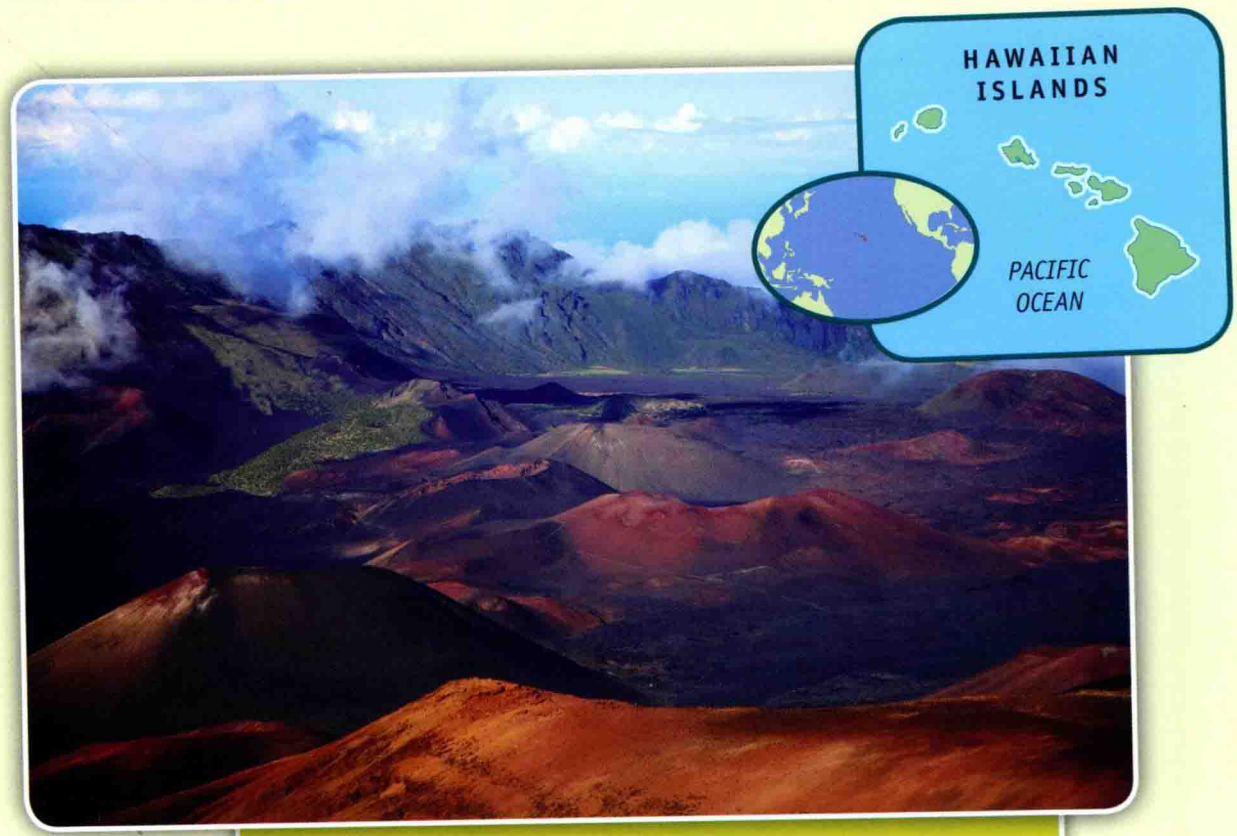
This is a picture of the volcano caldera that has grown above water on Isabela Island in the Galapagos Islands. It is an example of an underwater volcano that has grown so tall that it sticks out above the water.

CASE STUDY

Hawaiian islands

The islands of Hawaii are actually the tips of underwater volcanoes. These volcanoes have built up over many thousands of years to become huge mountains. They are so tall that they show above the water as islands.

Each volcano is formed from **lava** that bubbled up from the same **hot spot** in the Earth's **crust**. The hot spot stays in the same place all the time. However, the floor of the Pacific Ocean is part of a **plate** that is moving very slowly. As one volcano moves away from the hot spot it dies. Then a new one begins to form above the hot spot. This has created a string of volcanoes, like beads on a necklace. One, Mauna Kea, in Hawaii, measures over 9500 metres from the **ocean floor** to its peak. It is taller than Mount Everest!



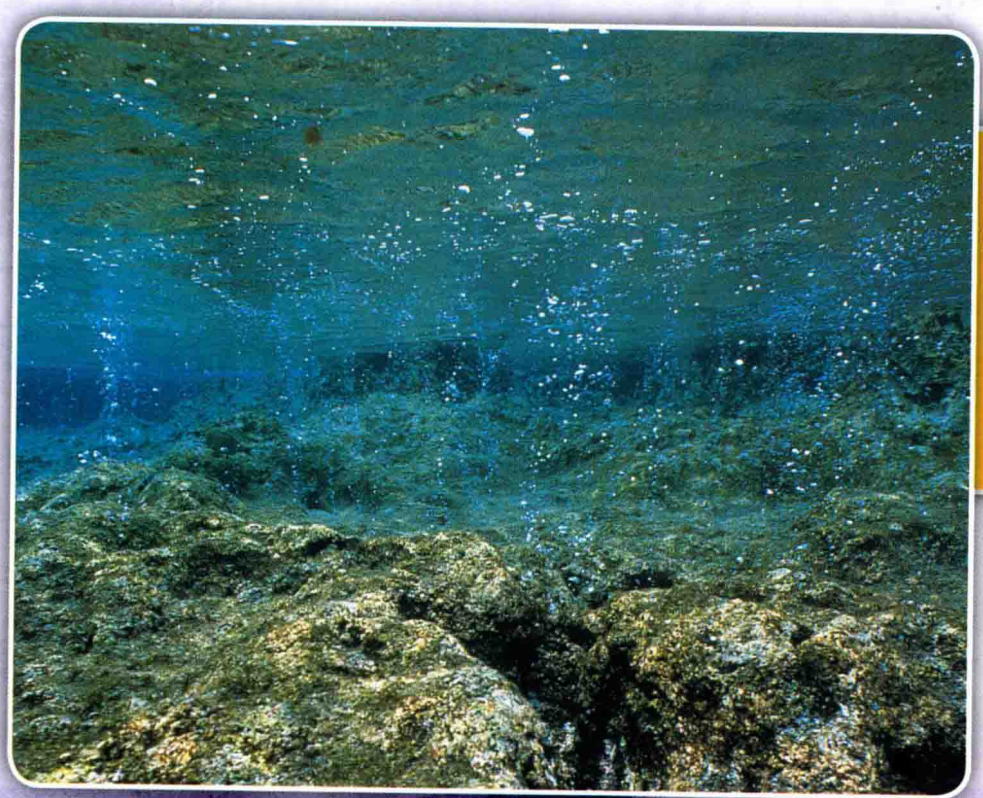
This aerial photograph of an Hawaiian island was taken from an aeroplane. The islands are actually the tops of giant volcanic mountains that begin deep beneath the ocean.

Where do volcanoes happen?

There are lots of volcanoes all over the Earth, on land and on the ocean floor. Most volcanoes are deep under the sea. This is partly because the crust that forms the ocean floor is thinner than the crust that forms the land we live on. The hot, bubbling rock can rise up through the thin ocean floor more easily.

Where plates meet

More volcanoes happen on the ocean floor because that is where the edges of the world's plates meet. Most volcanoes happen where plates meet because this is where the hot liquid rock from inside the Earth can break through and rise to the surface.



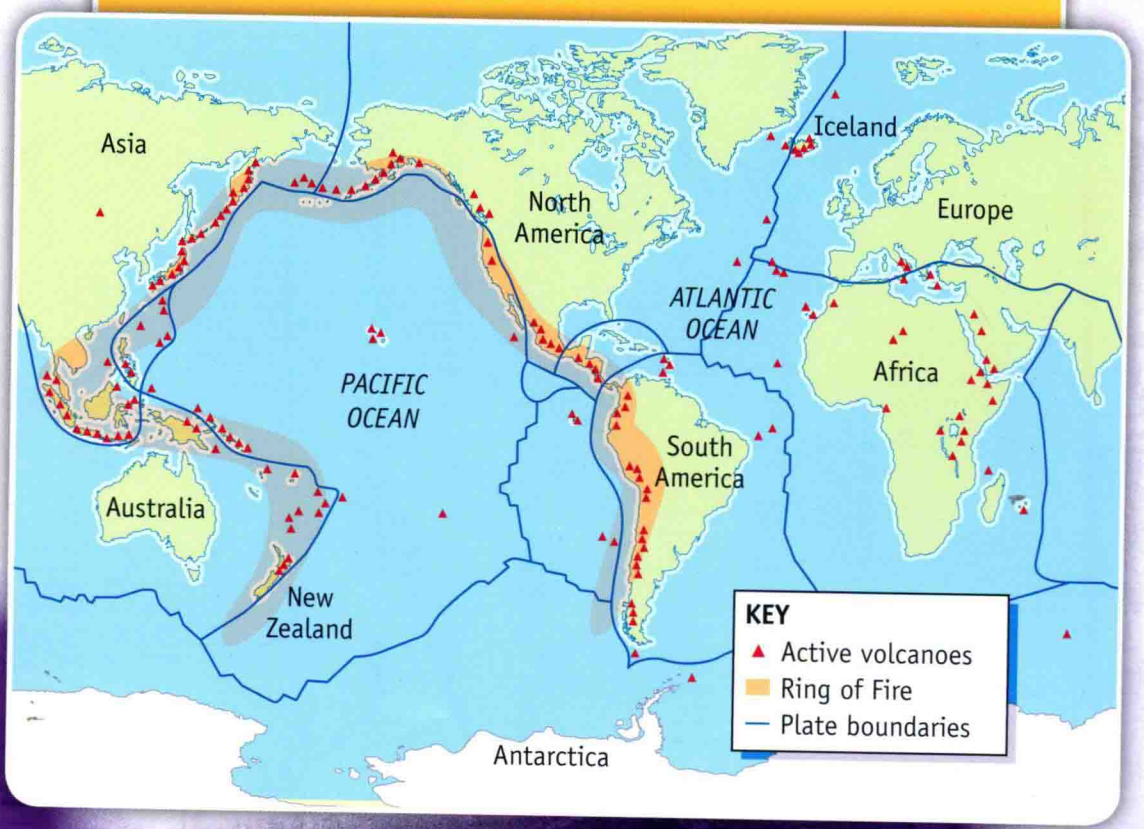
This photo shows volcanic bubbles emerging from the top of a reef under the ocean.

Ring of Fire

More than half of the world's volcanoes are found around the edges of the Pacific Ocean where **plates** meet. This is also where most of the world's **earthquakes** happen. This area is called the 'Ring of Fire' because so many fiery, volcanic explosions happen there.

However, volcanoes do not only happen where plates meet. Volcanoes can also sometimes occur in the middle of plates. There are also volcanoes in places where plates are slowly pulling apart, such as Surtsey near Iceland.

This map shows you where the active volcanoes of the world today are located. You can see that most of them lie around the Ring of Fire in the Pacific Ocean. They affect countries such as Japan, Indonesia, and many other islands.



When do volcanoes erupt?

Small volcanoes **erupt** more often than big volcanoes. This is because it takes a very long time for a large amount of liquid rock to build up to cause a big volcanic eruption. Some smaller volcanoes may have a gentle eruption every few months. However, there is no way of telling exactly when a volcano will erupt.

What are active and dormant volcanoes?

Across the world there are more than 1000 **active** volcanoes. This means that they have erupted within the last 2500 years and may erupt again soon. **Dormant** volcanoes are those that have not erupted for a very long time. Sometimes volcanoes remain dormant for many years but then erupt suddenly.

This is Mauna Loa in Hawaii. It usually erupts every 3 or 4 years. Sometimes it can erupt again after just a few months or remain dormant for as long as 25 years.