

Expert Group Text

"Earthquake"

The ground cracks open. Roads and bridges buckle and break apart, and buildings collapse. Throughout history, people have known the terror of great earthquakes.

Thousands of earthquakes occur on our planet each year. Many are so small that people can barely feel them. The largest cause deadly damage. They destroy property. They set off massive landslides. Some trigger devastating waves called tsunamis.

What causes these terrible events? A Japanese legend blamed the movement of a giant underground catfish. The ancient Chinese believed they were caused by a huge tortoise. And about 2,300 years ago, the Greek philosopher Aristotle said that underground winds shook Earth.

Today we know that earthquakes are natural events. They occur as part of the geological processes that form Earth's mountains, oceans, valleys, and plains. In learning about earthquakes, scientists have learned much about Earth itself.

Causes of Earthquakes

Seismologists are scientists who study the motion of Earth's crust. They now know that earthquakes result from forces deep inside our planet. There, heated rocky material is flexible. It moves slowly and steadily.

But near Earth's surface the rocky material cools into a crust. Earth's crust is formed of plates made of this material. The plates are brittle and cannot move easily. The slow movement of material deep in the interior builds up. It pushes on the brittle rocks near the surface.

Earth's plates move only a few inches every year. No one feels this movement except where the plates rub together or stretch apart. The slow movements create great pressure. This causes huge areas of rock to break and slip.

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During this violent fracture, some rock dives into Earth's interior. Other rock thrusts upward. These movements result in an earthquake.

Often a break in Earth's surface occurs at a fault. A fault is where two blocks of rock have previously moved past each other and created a break.

Measuring Earthquakes

Scientists use instruments called seismometers to measure the distance the ground moves during an earthquake. This tells them how strong the seismic waves are. There are thousands of seismometers in use all over the world.

Seismometers create records called seismograms. These records show how powerful an earthquake is. By looking at several seismograms, scientists can also figure out the source of the earthquake. This source is called the epicenter.

Frequency

Earthquakes occur thousands of times each year. Small earthquakes happen much more often than large ones. With each decrease of one magnitude, there are about ten times more earthquakes. For example, each year there are about 1,000 earthquakes of magnitude 5 or greater. But there are 10,000 of magnitude 4 or greater.

Predicting Earthquakes

Experts are learning how changes in Earth's crust may provide warnings of possible earthquakes. These warning signs include underground movements and changes in water levels. Still, earthquakes are impossible to predict.

Because of this, engineers have learned how to build quake-resistant buildings and bridges. And emergency teams hold practice exercises to keep their rescue drills fresh should a quake strike.

We cannot control earthquakes. But we can learn to live with them.