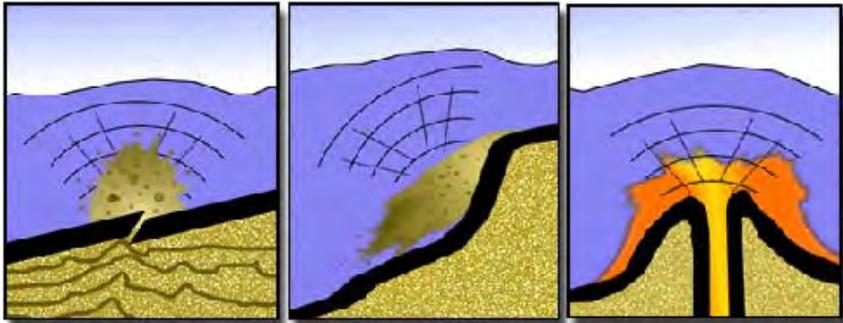


## Earthquakes and Tsunamis

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Tsunami waves can be generated by



Great earthquakes

Landslides

Volcanic eruptions

NOAA

Great earthquakes trigger tsunamis

Tsunamis are generated during great earthquakes by the seafloor either rising or falling along a fault line deep in the ocean. The movement of the seafloor may be as little as 1 meter (3 feet). The seafloor movement causes the entire column of water above to rise or drop triggering tsunamis.

When the fault line is close to populated areas the time between the earthquake and the arrival of the first tsunami on the seashore can be only a matter of minutes. People living in low-lying areas are especially vulnerable to being swept away by tsunamis.

Landslides trigger tsunamis

Local landslides and submarine landslides can trigger tsunamis. Most tsunamis are local events that travel only along the coastlines before they dissipate.

Both the 1960 Chilean Earthquake and the 1964 Great Alaskan Earthquake triggered local tsunamis that swept ashore killing an unknown total of people. The highest wave ever recorded was a local tsunami at Lituya Bay, Alaska.

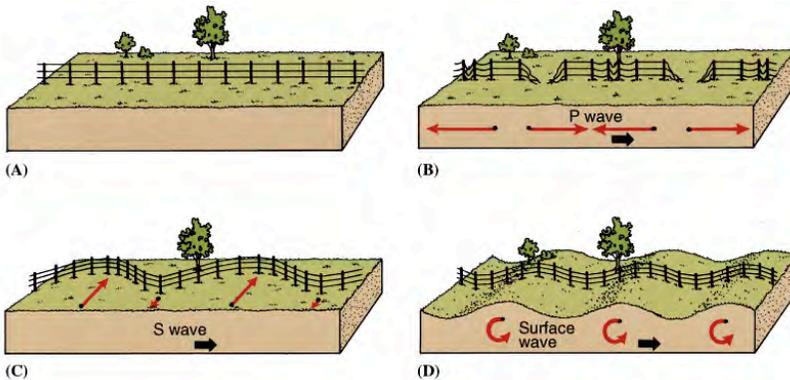
## Earthquakes and Tsunamis

Volcanic eruptions trigger tsunamis

The 1883 eruption of Krakatoa generated tsunamis that killed over 36,000 people. It was one of the worst volcanic disasters in recorded history.

## Earthquake Waves

Earthquake waves are produced when rocks in the crust break due to pressure as crustal plates move in different directions. Elastic energy is stored in rocks as crustal plates collide, separate, or slip past one another.



USGS

The breaking rocks release the energy stored in the rocks as seismic waves. The breaking and realignment of the rocks generates earthquake waves that travel away from the **focus** of the earthquake in all directions until they dissipate. Some great earthquakes are so powerful they cause the Earth to vibrate like the ringing of a bell.

The focus of an earthquake is where the rocks along a fault first break apart (rupture). The epicenter is the point on the surface of the Earth directly above the focus. The distance to the focus of an earthquake and its epicenter is measured by the arrival time of P waves recorded by seismographs at different reporting stations.

## Earthquakes and Tsunamis

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Every earthquake produces seismic waves. Seismic waves is the term used by seismologist instead of earthquake waves. All earthquake waves are energy waves released by rocks when they break.

There are four types of seismic waves produced by earthquakes: P waves, S waves, Love waves and Rayleigh waves.

## Earthquake Faults

### Normal Fault

Normal faults develop in areas where the land is becoming thinner and stretching as forces within the Earth pulls the land apart.

Tension in the crust increases until the rocks break. One block of land slips downward in relation to the other block of land. A fault plane separates the fault blocks.



### Normal fault

A normal fault will have a hanging wall and a footwall. The term footwall is derived from miners finding mineral deposits where inactive faults have been “filled in” with mineral deposits at their feet.

The hanging wall is the side of the fault above the fault plane where the ore deposit is located and weathered out of the rocks.

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