

Earthquake Facts



The largest recorded earthquake in the United States was a magnitude 9.2 that struck Prince William Sound, Alaska on Good Friday, March 28, 1964 UTC.

The largest recorded earthquake in the world was a magnitude 9.5 in Chile on May 22, 1960.

The earliest reported earthquake in California was felt in 1769 by the exploring expedition of Gaspar de Portola while the group was camping about 30 miles southeast of Los Angeles.

Before electronics allowed recordings of large earthquakes, scientists built large spring-pendulum seismometers in an attempt to record the long-period motion produced by such quakes. The largest one weighed about 15 tons. There is a medium-sized one three stories high in Mexico City that is still in operation.

The average rate of motion across the San Andreas Fault Zone during the past 3 million years is 2 inches per year. This is about the same rate at which your fingernails grow. Assuming this rate continues, scientists project that Los Angeles and San Francisco will be adjacent to one another in approximately 15 million years.

The East African Rift System is a 31-37 mile wide zone of active volcanics and faulting that extends north-south in eastern Africa for more than 1864 miles from Ethiopia in the north to Zambezi in the south. It is a rare example of an active continental rift zone, where a continental plate is attempting to split into two plates which are moving away from one another.



The first "pendulum seismoscope" to measure the shaking of the ground during an earthquake was developed in 1751, and it wasn't until 1855 that faults were recognized as the source of earthquakes.

Moonquakes ("earthquakes" on the moon) do occur, but they happen less frequently and have smaller magnitudes than earthquakes on the Earth. It appears they are related to the tidal stresses associated with the varying distance between the Earth and Moon. They also occur at great depth, about halfway between the surface and the center of the moon.

Although both are sea waves, a tsunami and a tidal wave are two different unrelated phenomena. A tidal wave is a shallow water wave caused by the gravitational interactions between the Sun, Moon, and Earth. A tsunami is a sea wave caused by an underwater earthquake or landslide (usually triggered by an earthquake) displacing the ocean water.

The world's greatest land mountain range is the Himalaya-Karakoram. It contains 96 of the world's 109 peaks of over 24,000 ft. The longest range is the Andes of South America which is 4700 miles in length. Both were created by the movement of tectonic plates.

It is estimated that there are 500,000 detectable earthquakes in the world each year. 100,000 of those can be felt, and 100 of them cause damage. It is thought that more damage was done by the resulting fire after the 1906 San Francisco earthquake than by the earthquake itself.

Each year the southern California area has about 10,000 earthquakes. Most of them are so small that they are not felt. Only several hundred are greater than magnitude 3.0, and only about 15-20 are greater than magnitude 4.0. If there is a large earthquake, however, the aftershock sequence will produce many more earthquakes of all magnitudes for many months.



The magnitude of an earthquake is a measured value of the earthquake size. The magnitude is the same no matter where you are, or how strong or weak the shaking was in various locations. The intensity of an earthquake is a measure of the shaking created by the earthquake, and this value does vary with location.

The swimming pool at the University of Arizona in Tucson lost water from sloshing (seiche) caused by the 1985 M8.1 Michoacan, Mexico earthquake 1240 miles away.

The Wasatch Range, with its outstanding ski areas, runs North-South through Utah, and like all mountain ranges it was produced by a series of earthquakes. The 240-mile-long Wasatch Fault is made up of several segments, each capable of producing up to a M7.5 earthquake. During the past 6,000 years, there has been a M6.5+ about once every 350 years, and it has been about 350 years since the last powerful earthquake, which was on the Nephi segment.

There is no such thing as “earthquake weather”. Statistically, there is an equal distribution of earthquakes in cold weather, hot weather, rainy weather, etc. Furthermore, there is no physical way that the weather could affect the forces several miles beneath the surface of the earth. The changes in barometric pressure in the atmosphere are very small compared to the forces in the crust, and the effect of the barometric pressure does not reach beneath the soil.

From 1975-1995 there were only four states that did not have any earthquakes. They were: Florida, Iowa, North Dakota, and Wisconsin.

The core of the earth was the first internal structural element to be identified. In 1906 R.D. Oldham discovered it from his studies of earthquake records. The inner core is solid, and the outer core is liquid and so does not transmit the shear wave energy released during an earthquake.

Earthquakes occur in the central portion of the United States too! Some very powerful earthquakes occurred along the New Madrid fault in the Mississippi Valley in 1811-1812. Because of the crustal structure in the Central US which efficiently propagates seismic energy, shaking from earthquakes in this part of the country are felt at a much greater distance from the epicenters than similar size quakes in the Western US.

When the Chilean earthquake occurred in 1960, seismographs recorded seismic waves that traveled all around the Earth. These seismic waves shook the entire earth for several days! This phenomenon is called the free oscillation of the Earth.

The San Andreas fault is NOT a single, continuous fault, but rather is actually a fault zone made up of many segments. Movement may occur along any of the many fault segments along the zone at any time. The San Andreas fault system is more than 800 miles long, and in some spots is as much as 10 miles deep.

The world's deadliest recorded earthquake occurred in 1556 in central China. It struck a region where most people lived in caves carved from soft rock. These dwellings collapsed during the earthquake, killing an estimated 830,000 people. In 1976 another deadly earthquake struck in Tangshan, China, where more than 250,000 people were killed.



Florida and North Dakota have the smallest number of earthquakes in the United States.

It was recognized as early as 350 BC by the Greek scientist Aristotle that soft ground shakes more than hard rock in an earthquake.

Alaska is the most earthquake-prone state and one of the most seismically active regions in the world. Alaska experiences a magnitude 7 earthquake almost every year, and a magnitude 8 or greater earthquake on average every 14 years.

The deepest earthquakes typically occur at plate boundaries where the Earth's crust is being subducted into the Earth's mantle. These occur as deep as 400 miles below the surface.



In 1663 the European settlers experienced their first earthquake in America.

The majority of the earthquakes and volcanic eruptions occur along plate boundaries such as the boundary between the Pacific Plate and the North American plate. One of the most active plate boundaries where earthquakes and eruptions are frequent, for example, is around the massive Pacific Plate commonly referred to as the Pacific Ring of Fire.

The earliest recorded evidence of an earthquake has been traced back to 1831 BC in the Shandong province of China, but there is a fairly complete record starting in 780 BC during the Zhou Dynasty in China.

The cause of earthquakes was stated correctly in 1760 by British engineer John Michell, one of the first fathers of seismology, in a memoir where he wrote that earthquakes and the waves of energy that they make are caused by “shifting masses of rock miles below the surface”.

Human beings can detect sounds in the frequency range 20-10,000 Hertz. If a P wave refracts out of the rock surface into the air, and it has a frequency in the audible range, it will be heard as a rumble. Most earthquake waves have a frequency of less than 20 Hz, so the waves themselves are usually not heard. Most of the rumbling noise heard during an earthquake is the building and its contents moving.

Most earthquakes occur at depths of less than 50 miles from the Earth’s surface.

The interior of Antarctica has icequakes which, although they are much smaller, are perhaps more frequent than earthquakes in Antarctica. The icequakes are similar to earthquakes, but occur within the ice sheet itself instead of the land underneath the ice. Some of our polar observers have told us they can hear the icequakes and see them on the South Pole seismograph station, but they are much too small to be seen on enough stations to obtain a location.