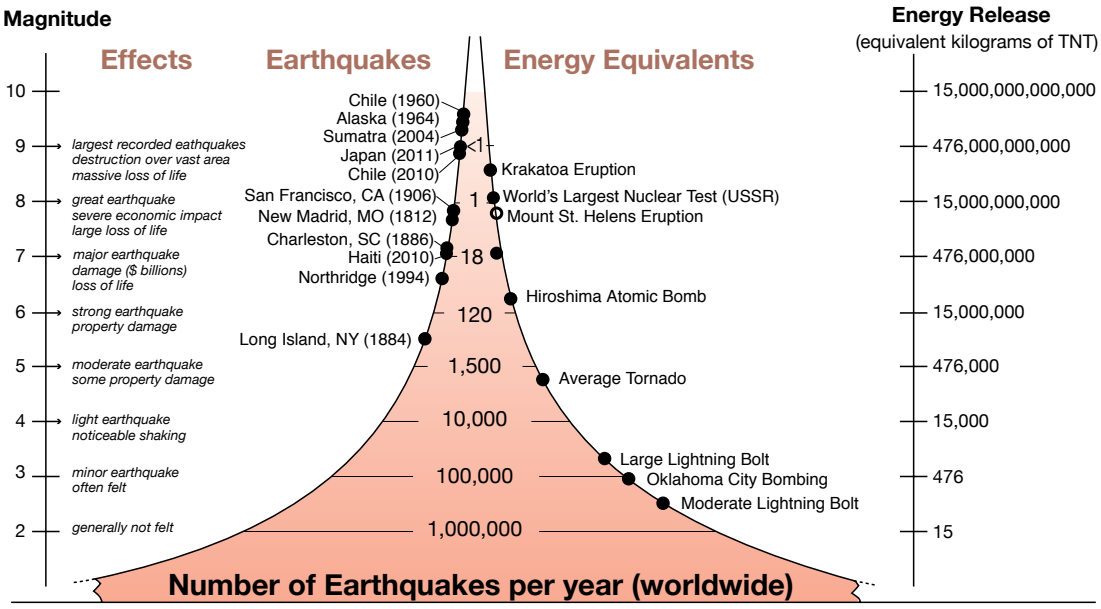
How Often Do Earthquakes Occur?

Earthquakes are always happening somewhere.

Magnitude 2 and smaller earthquakes occur several hundred times a day world wide. Major earthquakes, greater than magnitude 7, happen more than once per month. "Great earthquakes", magnitude 8 and higher, occur about once a year.



The left side of the figure above describes the effects of an earthquake by magnitude. The larger the number, the bigger the earthquake. Significant earthquakes are noted on the left side of the shaded tower. The shaded area indicates how many earthquakes of each magnitude occur every year. The events on the right side of the tower show equivalent energy release.

The 2010 earthquake in Haiti, for example, was magnitude 7.0. Earthquakes this size occur about 20 times each year worldwide. Although the Haiti earthquake is considered moderate in size, it caused unprecedented devastation due to poor building material and construction techniques resulting in estimates of $11 billion to reconstruct. The earthquake released the energy equivalent to 476 million kilograms of explosive, about 100 times the amount of energy that was released by the atomic bomb that destroyed the city of Hiroshima during World War II.

The largest recorded earthquake was the Great Chilean Earthquake of May 22, 1960 which had a magnitude of 9.5. The great earthquake in 2004 in Sumatra, Indonesia measuring magnitude 9.1 produced tsunamis that caused widespread disaster in 14 countries. A magnitude 9.0 earthquake in Japan in 2011 also caused large tsunamis. All three were mega-thrust earthquakes on subduction-zone boundaries that, in a period of minutes, released centuries of accumulated strain and caused rebound in the overlying plates. Because great earthquakes release so much energy, the five largest earthquakes are responsible for half of the total energy released by all earthquakes in the last century.

Has earthquake activity been increasing?

There has definitely been an increase in the number of earthquakes that can be *detected and located* due to a more-than 10-fold increase in the number of seismic stations world wide over the past century. This doesn't mean that the annual average number of earthquakes has increased. In fact, earthquakes of magnitude 7.0 and greater have remained relatively constant since record keeping began.

Although the average number of large earthquakes per year is fairly constant, they can occur in clusters. However, that does not imply that earthquakes that are distant in location, but close in time, are causally related. The NEIC locates about 12,000–14,000 earthquakes each year. Those records are reflected in the graph above.

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IRIS is a university research consortium dedicated to monitoring the Earth and exploring its interior through the collection and distribution of geophysical data.

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