

LOGS APPLICATIONS-- RICHTER SCALE –

A seismograph measures ground movement during an earthquake. That movement is normally reported using the Richter scale which was developed in 1935 by Charles F. Richter as a device for comparing the sizes of earthquakes. The magnitude is a base-10 logarithmic scale obtained by calculating the logarithm of the amplitude of waves measured by a seismograph.

A moderate earthquake may measure 5.3 on the Richter scale, and a strong earthquake may measure 6.3. The largest earthquake ever recorded was a magnitude 9.5 in Chile on May 22, 1960. A small change in the Richter number indicates a large change in the severity of the earthquake. In fact, an earthquake 6.3 in magnitude is 10 times as powerful as a 5.3 earthquake, and a 7.3 earthquake is 100 times as powerful as a 5.3 earthquake. In general, an increase of t units on the Richter scale indicates an earthquake 10^t times as strong.

On December 16, 1811, an earthquake occurred near New Madrid, Missouri, that temporarily reversed the course of the Mississippi River. This was actually one of a series of earthquakes in the area, one of which is estimated to have had a Richter magnitude of 8.8. The area was sparsely populated at the time, and there were thought to be few fatalities. On October 17, 1989, a calamitous earthquake measuring 7.1 on the Richter scale occurred in the San Francisco Bay area. The earthquake killed 67 and injured over 3000.

1. How much more powerful was the New Madrid quake than the 1989 S.F. quake?
2. If an earthquake 1000 times as powerful as the 1989 S.F. quake occurred, what would its Richter scale measurement be?
3. On Dec. 26, 2004, an earthquake 80 times as powerful as the S.F. quake struck the Indian Ocean near Indonesia. It caused a tsunami that resulted in the deaths of hundreds of thousands. What was the Richter scale reading for this quake?
4. In 1964 an earthquake measuring 8.4 on the Richter scale occurred in Alaska. How did the power of the New Madrid earthquake compare with the Alaska earthquake?
5. In 1952 an earthquake occurred in Russia that was 4 times as powerful as the Alaska quake. What was the Richter scale reading for the Russian earthquake?
6. The largest recorded earthquake centered in Idaho measured 7.2 on the Richter scale. The largest recorded earthquake centered in Arizona measured 5.6 on the Richter scale. How did the power of the Idaho earthquake compare with that of the Arizona quake?
7. The largest recorded earthquake in Montana was 3.16 times as powerful as the Idaho earthquake. What was the Richter scale reading for the Montana earthquake?