

# A New Madrid Fault earthquake could damage Tulsa

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The earthquake that shook California this past Sunday reminds us how that state is prone to quakes, but what about here in the Midwest?

In 1811 and 1812, there were very severe earthquakes that hit the Midwest that did a great deal of damage.

Most have heard of the so-called "ring-of-fire" that encompasses the perimeter of the Pacific Ocean. The Earth's crust is broken into tectonic "plates" that scientists believe were caused by the expansion of the earth's core breaking the crust into pieces. These break lines, or faults, are characterized by frequent and severe earthquakes. Volcanoes dot the perimeter of the plate, hence the name "ring-of-fire."

The New Madrid Fault is a different kind of fault, because it is in the middle of a tectonic plate, and extends nearly 10 miles deep into the earth's crust. Scientists believe this type of fault was caused by the same expansion of the earth's core, but for some reason it did not have the strength to completely break the plate.

The New Madrid Fault lies roughly along a line between St. Louis and Memphis and produces major earthquakes about every 200 to 600 years. It produces numerous minor earthquakes every year, but many are too small to be noticed.

It is believed that the reason this area produces so many quakes is due to a glacier that came down from the north and stopped in central Illinois several thousand years ago. The tremendous weight of the glacier pressed the earth's crust down hundreds of miles beyond the glacier's edge, similar to pushing your finger onto a balloon. After the glacier receded, the earth's crust slowly began to rebound, causing frequent earthquakes.

On December 16th, 1811, a major earthquake hit the area of New Madrid, Missouri, then hit again with nearly the same intensity the following January and February.

The vibrations rang church bells as far away as Boston. It was felt as far north as Canada and as far west as Oklahoma.

In the New Madrid area it changed the course of the Mississippi River, caused land in some areas to fall 20 feet, and was responsible for the creation of Reelfoot Lake in Kentucky. Many buildings, especially unreinforced masonry structures, were damaged or destroyed within a 250-kilometer radius. Some eyewitnesses said that the land actually rippled like a wave.

The earthquake was so severe that it was felt in 27 states, a 2 1/2-million-square-kilometer area. By contrast, the 1906 San Francisco earthquake was only felt over about 150,000 square kilometers.

The difference is the type of subsoil characteristics of each area. In San Francisco, the area is mostly solid rock. In the Midwest, it is mostly sand and loose soil. Solid rock confines the vibrations by absorbing the energy waves, but the energy waves flow very easily through loose soil.

That brings us to Oklahoma. Why should we be concerned when we don't seem to be prone to earthquakes, or at least we thought so until the earthquakes we have experienced over the past few years? Fracking is most certainly not the cause.

The truth is that we are. Oklahoma has its own set of earthquake faults. In fact, one of them, the Meers Fault, can be seen from the air near Lawton. It produced an earthquake estimated at 7.0 on the Richter scale approximately 1,600 years ago.

Earthquakes occur all over the state, but the greatest concentrations are just west and south of Oklahoma City.

The largest quake recorded on instruments was a Richter 5.2 in El Reno in 1952. Two of the larger earthquakes on record were centered somewhere between Broken Arrow and Tulsa, a 3.9 that occurred in 1915 and a 4.0 in 1956. We are not likely to sustain much damage in Oklahoma from our own earthquake faults. Damage does not generally occur until the earthquake exceeds a 4.0, and that is very rare here.

However, the New Madrid Fault should be of some concern to us. Energy waves from a major earthquake could easily reach us, producing minor damage. Whenever it does hit, the cities of St. Louis and Memphis will see massive damage. Some estimates state that 60 percent of Memphis will be completely destroyed because they have paid little attention to constructing their buildings to survive a major earthquake.

There are as many opinions as there are scientists about when the really big one will hit the New Madrid again, perhaps as high as an 8.0 or higher. Most scientists agree that a quake of 6.0 is likely to occur within the next 35-40 years. Some experts placed the probability at 50 percent that it would hit by the year 2000, and still place a 90 percent chance by 2040.

Will we be ready for the big one?

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