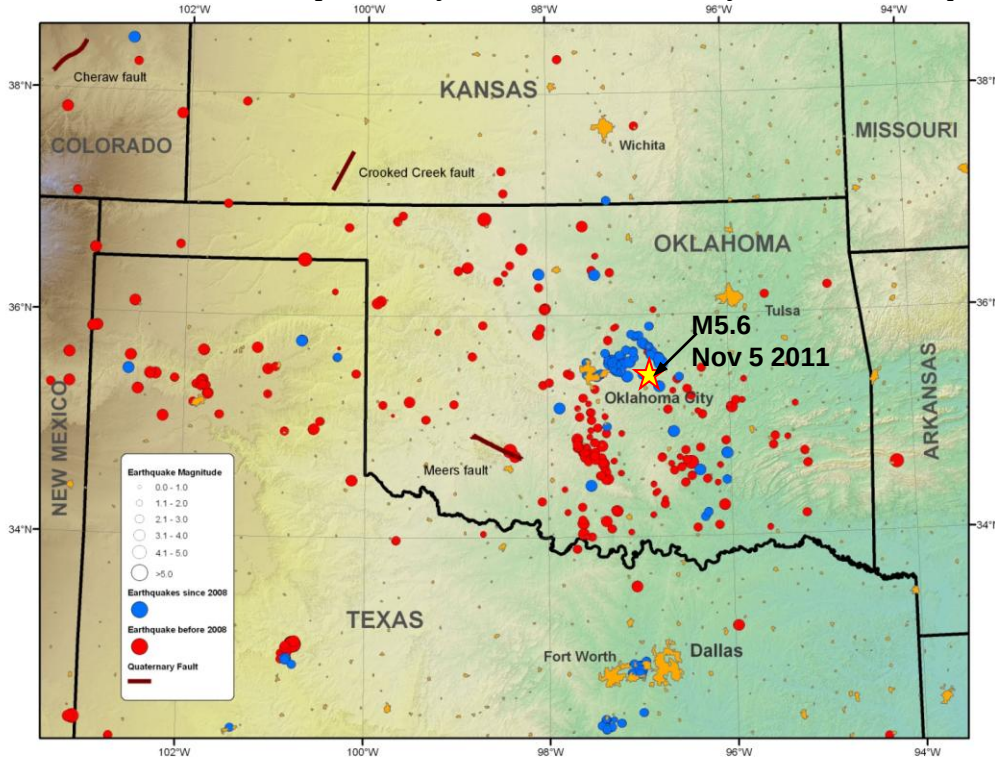


Earthquakes in Oklahoma

The magnitude 4.7 and 5.6 earthquakes that occurred on November 5, 2011, were situated in a region located about 50 km east of Oklahoma City, Oklahoma. Earthquakes are not unusual in Oklahoma, but they often are too small to be felt. From 1972-2008 about 2-6 earthquakes a year were recorded by the USGS National Earthquake Information Center; these earthquakes were scattered broadly across the east-central part of the state. In 2008 the rate of earthquakes began to rise, with over a dozen earthquakes occurring in the region east-northeast of Oklahoma City and southwest of Tulsa, Oklahoma. In 2009 the rate of seismicity continued to climb, with nearly 50 earthquakes recorded--many big enough to be felt. In 2010 this activity continued. The shallow magnitude 4.7 and 5.6 earthquakes of November 5, 2011, are the largest events recorded during this period of increased seismicity. Additionally, the M5.6 quake is the largest quake to hit Oklahoma in modern times.

There have been dozens of aftershocks recorded following the November 5, 2011 magnitude 5.6 earthquake and its magnitude 4.7 foreshock that occurred on the same day. These aftershocks will continue for weeks and potentially months but will likely decrease in frequency.



This is not an unusual amount of aftershock activity for a magnitude 4.7 to 5.6 earthquake sequence. There is always a small possibility of an earthquake of larger magnitude following any earthquake, but the occurrence of the magnitude 5.6 earthquake, and the increase in activity in recent years does not necessarily indicate that a larger more damaging earthquake will occur.

Seismicity in the Oklahoma region since 1973. Events shown in red pre-date January 1, 2008, while events in blue post-date this time. Star shows the epicenter of the 5 November 2011 magnitude 5.6 earthquake. The locations of known Quaternary or younger faults are shown as red lines.

Faults in Oklahoma

In general, it is very difficult to correlate earthquakes to specific faults in the region and in eastern North America. The earthquake sequence that started yesterday occurred close to where a magnitude 4.1 earthquake occurred on February 27, 2010. From the location of the earthquake and the focal mechanism it is possible that this earthquake occurred on the Wilzetta fault.

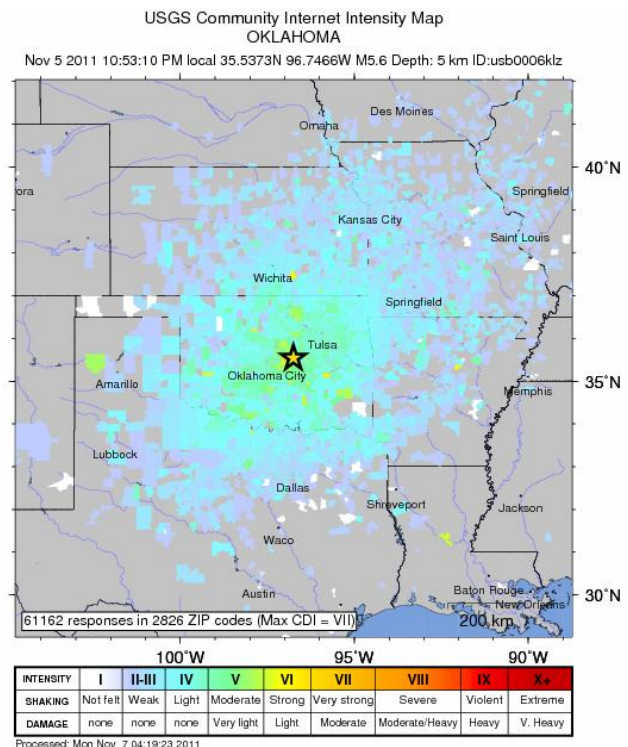
Faults in Oklahoma

The Wilzetta fault is one of a series of small faults formed in the Pennsylvanian Epoch (approx. 300 million year ago) during the intraplate deformation known as the Ancestral Rocky Mountains mountain-building episode (orogeny). The relationship between the recent earthquakes and this older structure is still unknown and requires further investigation.

The Meers fault located in south-central Oklahoma, about 100 km southwest of Oklahoma City, is the only fault identified in the state with evidence of surface-rupturing earthquakes in the last 3000 years (prior to historical settlement of the region). Paleoseismology studies have identified a temporal clustering of a least three earthquakes on this fault, two of which are dated (1200-2900 years before present) and the third is believed to be older in age. An earthquake of magnitude 5.6 like the one that occurred yesterday east of Oklahoma City, are considered to be capable of striking at irregular intervals anywhere in eastern North America.

M5.6 felt from St. Louis to Lubbock

Earthquakes east of the Rocky Mountains, although less frequent than in the West, are typically felt over a much broader region. East of the Rockies, an earthquake can be felt over an area as much as ten times larger than a similar magnitude earthquake on the west coast. A magnitude 5.5 eastern U.S. earthquake usually can be felt as far as 500 km (300 mi) from where it occurred, and sometimes causes damage as far away as 40 km (25 mi). According to felt reports submitted to the USGS' *Did You Feel It?* Website (shown at right) (<http://earthquake.usgs.gov/earthquakes/dyfi/>), yesterday's magnitude 5.6 was clearly felt from St. Louis, Missouri, to southwest of Dallas, Texas, an epicentral distance of about 500 km. Nearly 60,000 individuals from the south-central U.S. have reported their observations on this website.



Ongoing Earthquake Monitoring

The Oklahoma Geological Survey (OGS) has deployed several portable seismograph stations after the M4.7 on November 5, 2011, to facilitate improved detection and location of earthquakes; the OGS will deploy more stations in the next few days. This work is being done in partnership with the USGS, and builds on earlier cooperative efforts with OGS in the past two years to expand seismic monitoring in the region.

For More Information See:

Oklahoma Geological Survey and Leonard Geophysical Observatory: <http://www.okgeosurvey1.gov/>

U.S. Geological Survey Earthquake Hazards Program: <http://earthquake.usgs.gov>

Earthquakes near Oklahoma City, November 6, 2011
Center for Earthquake Research and Information, University of Memphis

