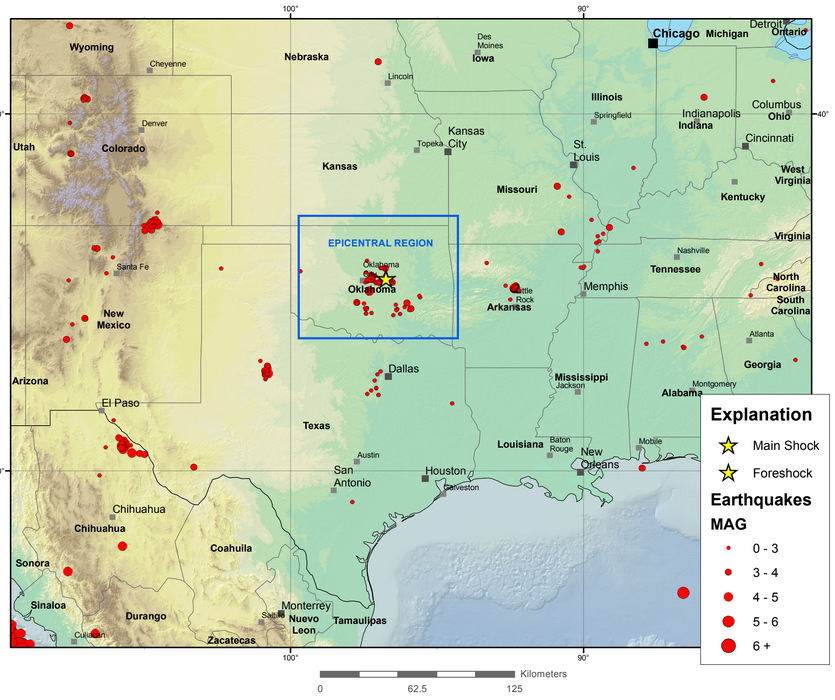
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

EARTHQUAKE SUMMARY MAP

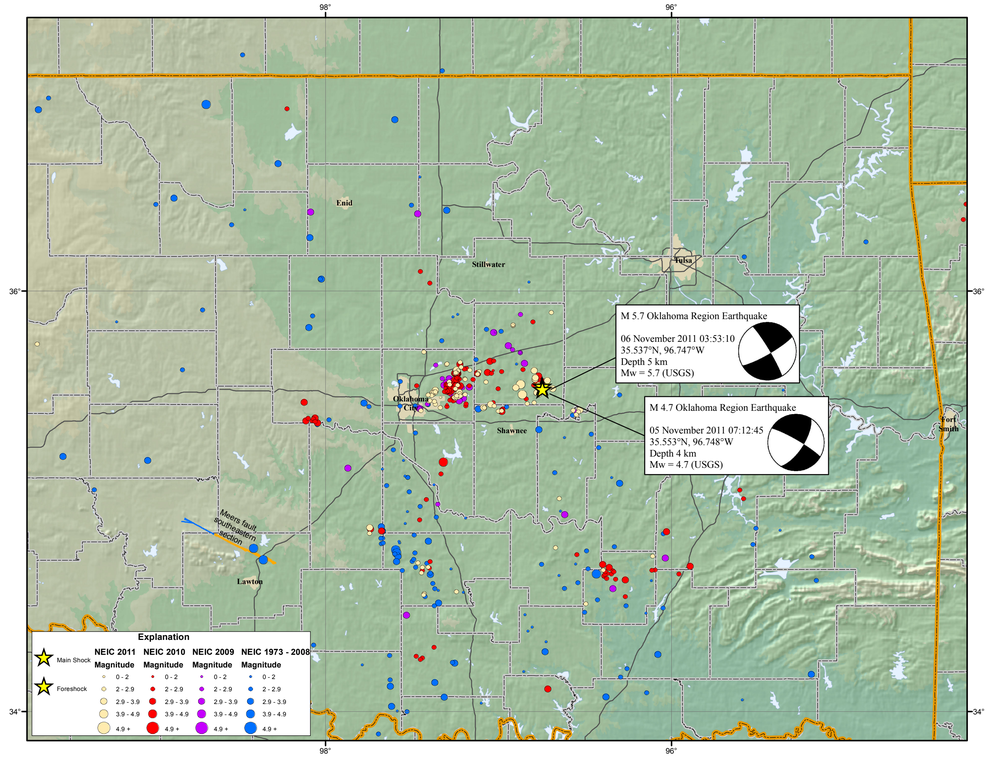
M 5.7 Oklahoma Earthquake of 06 November 2011

Prepared in cooperation with the Global Seismographic Network

Tectonic Setting



Epicentral Region



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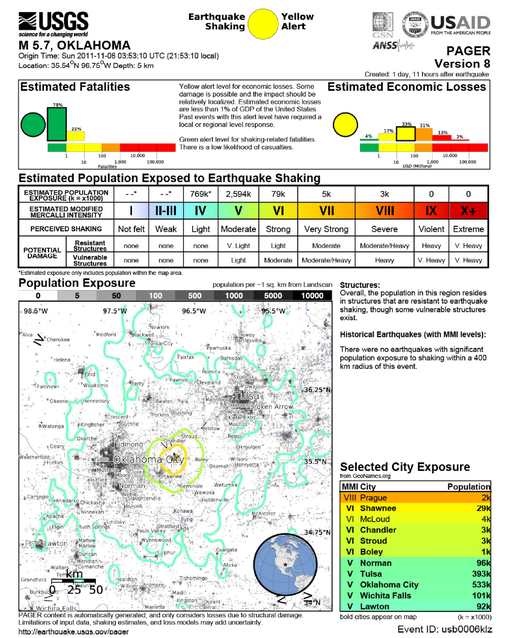
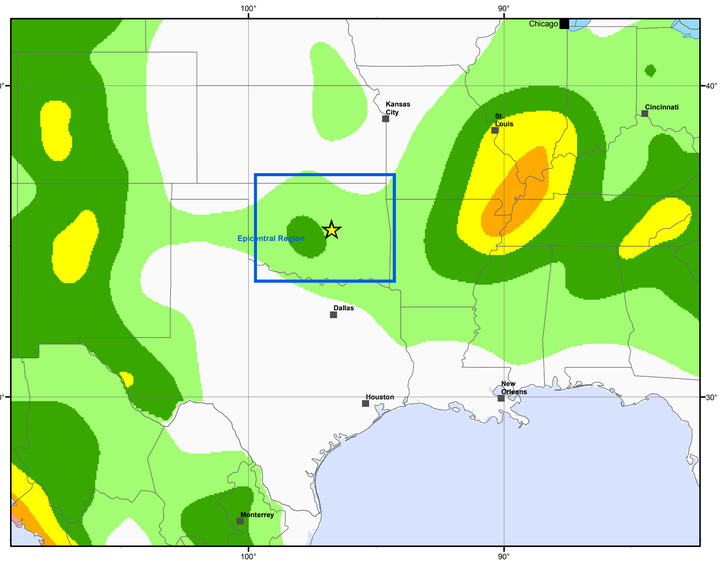


Seismic Hazard



Seismic hazard is expressed as peak ground acceleration (PGA) on firm rock, in meters/sec², expected to be exceeded in a 50-yr period with a probability of 10 percent.

TECTONIC SUMMARY

The magnitude 4.7 and 5.7 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 magnitude 4.7 and 5.7 earthquakes of November 5, 2011, are the largest events recorded during this period of increased seismicity. Additionally, the M5.7 quake is the largest quake to hit Oklahoma in modern times.

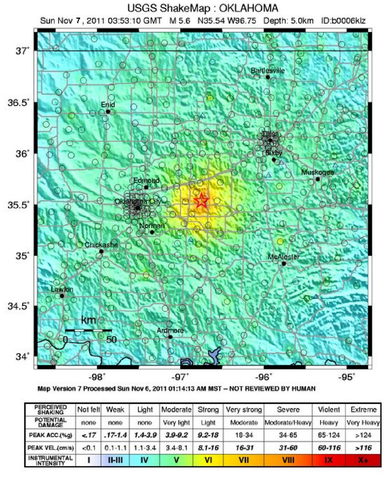
There have been dozens of aftershocks recorded following the shallow November 5, 2011 magnitude 5.7 earthquake and its magnitude 4.7 foreshock that occurred on the same day. These aftershocks will continue for weeks and potentially months but will likely decrease in frequency. This is not an unusual amount of aftershock activity for a magnitude 4.7 to 5.7 earthquake sequence. There is always a small possibility of an earthquake of larger magnitude following any earthquake, but the occurrence of the magnitude 5.7 earthquake, and the increase in activity in recent years does not necessarily indicate that a larger more damaging earthquake will occur.

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. 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 believed to be capable of striking anywhere in eastern North America at irregular intervals. 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 4.0 eastern U.S. earthquake typically can be felt at many places as far as 100 km (60 mi) from where it occurred, and it infrequently causes damage near its source. 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, yesterday's magnitude 5.6 was clearly felt from St. Louis, Missouri, to southwest of Dallas, Texas, an epicentral distance of about 500 km. More than 60,000 individuals from 14 states have reported their observations on this website.

Working together the USGS, Oklahoma Geological Survey (OGS) and the University of Oklahoma School of Geology and Geophysics have deployed about 35 portable seismograph stations after the M4.7 foreshock and the M5.7 mainshock to facilitate improved detection and location of earthquakes. These portable stations will remain deployed in their current configuration for several weeks to a few months. 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.

ShakeMap



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

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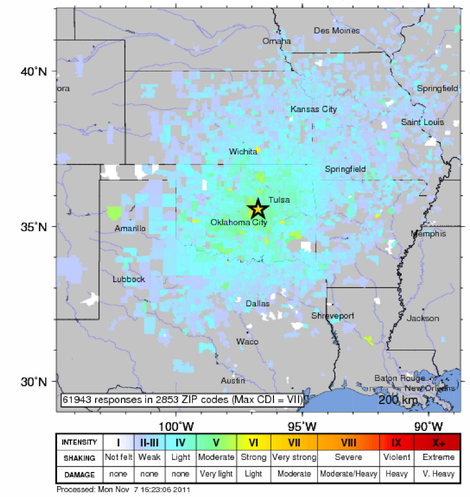

INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+
SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy

Processed: Mon Nov 7 15:23:06 2011

DATA SOURCES

EARTHQUAKES AND SEISMIC HAZARD
AGS, Arkansas Geological Survey
CERI, Center for Earthquake Research and Information
USGS/NEIC, National Earthquake Information Center

BASE MAP
NIMA and ESRI, Digital Chart of the World
USGS, EROS Data Center
TOPO!, National Geographic
ESRI Online

DISCLAIMER

Base map data, such as place names and political boundaries, are the best available but may not be current or may contain inaccuracies and therefore should not be regarded as having official significance.

Map prepared by U.S. Geological Survey
National Earthquake Information Center
07 November 2011
Map not approved for release by Director USGS