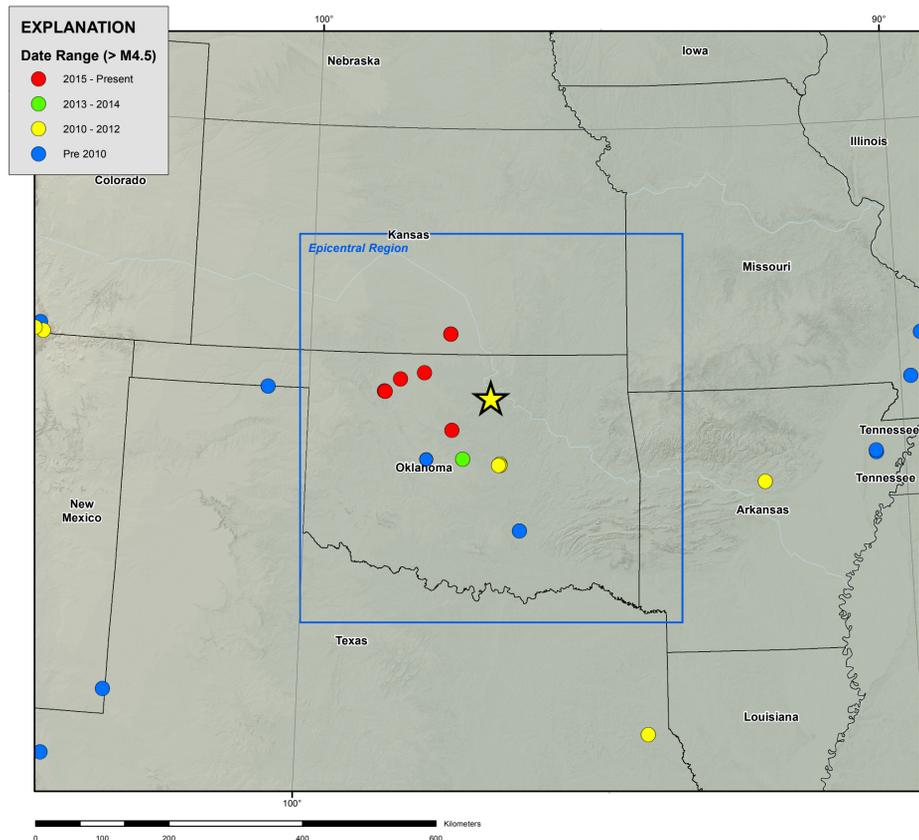


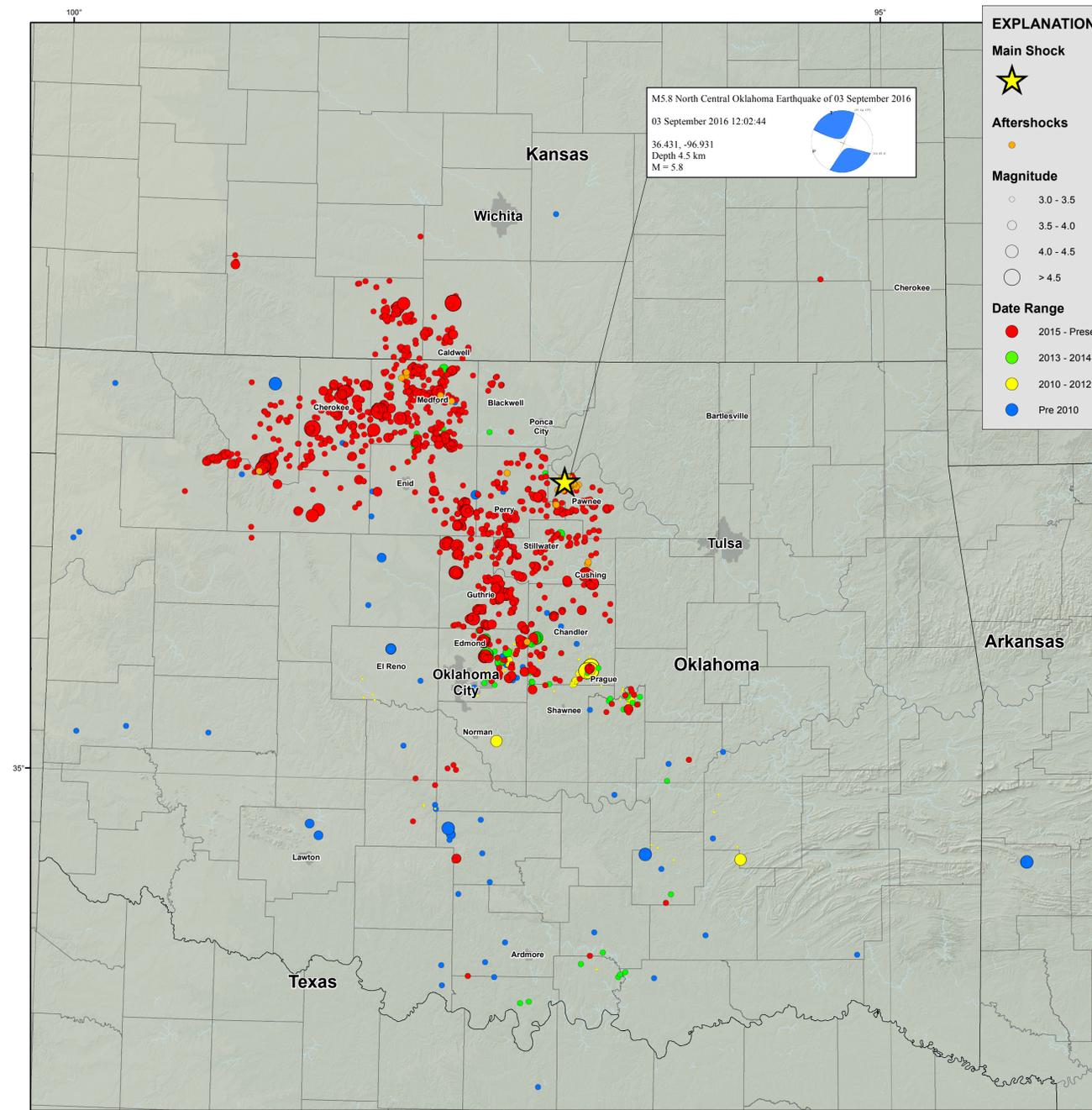
M5.8 North Central Oklahoma Earthquake of 03 September 2016



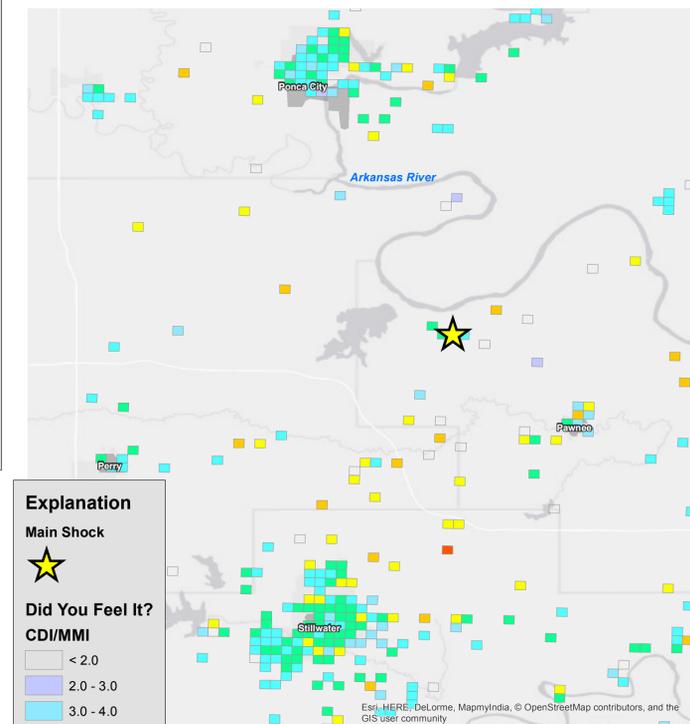
Significant Historical Earthquakes



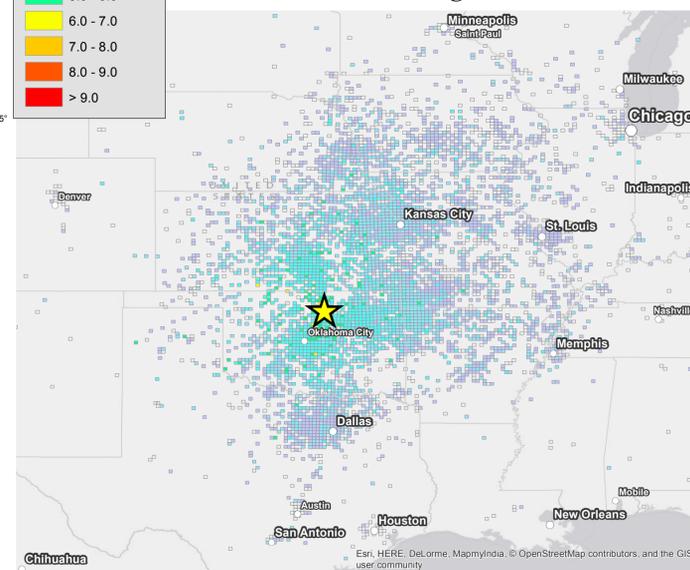
Epicentral Region



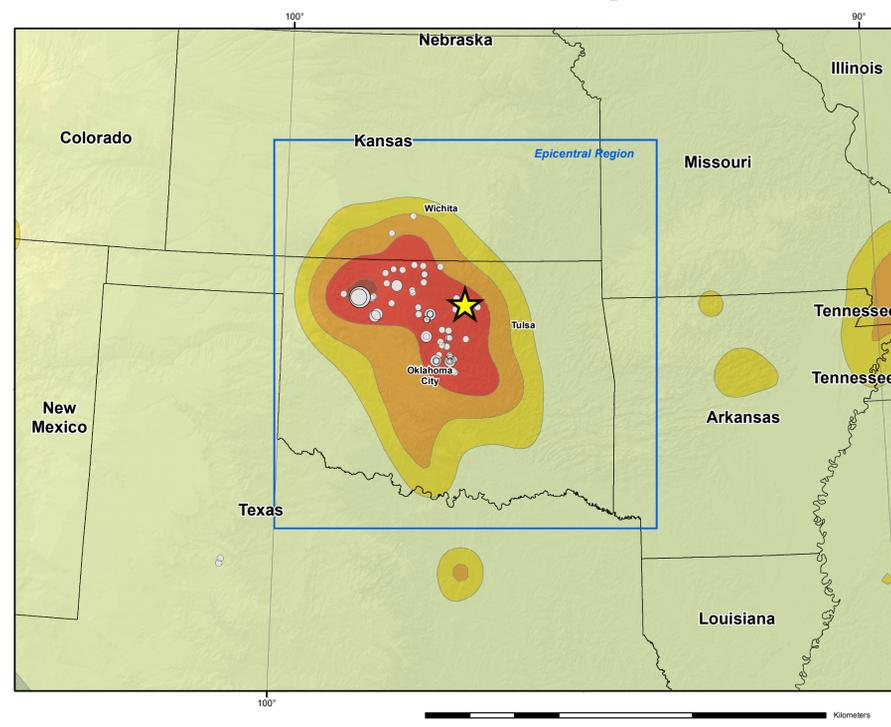
Did You Feel It? - Local



Did You Feel It? - Regional



Seismic Hazard and 2016 Earthquakes



TECTONIC SUMMARY

The September 3, 2016 M 5.8 Oklahoma earthquake occurred as the result of shallow strike-slip faulting about 15 km northwest of the town of Pawnee. The earthquake occurred within the interior of the North America plate, far from any plate boundaries. The preliminary focal mechanism solution for the earthquake indicates rupture occurred on either a left-lateral fault striking east-southeast, or on a right lateral fault striking north-northeast, with the mainshock location aligns with a major regional SW-NE trending fault. In general, it is very difficult to correlate earthquakes to specific faults in the region and identification of the fault responsible for this event will require further study and fieldwork.

The magnitude 5.8 earthquake near Pawnee, OK, on Sept. 3, 2016 will continue to produce aftershocks. Residents in that area can expect to continue feeling earthquakes and there is the possibility of additional earthquakes capable of doing damage. As of 7PM CDT on September 4, 2016: There is a 12% chance of an aftershock of magnitude 5 or greater within the next month, and that likelihood increases to 29% if the time window is extended to include the next year. The expected numbers of aftershocks with magnitudes of 3 or greater are between 5 and 25 within the next month and between 15 and 55 during the next year. This forecast is based on patterns of past aftershocks sequences and data on the current aftershock sequence. The forecast does not include the possibility of nearby earthquakes that are not aftershocks.

Prior to the September 3, 2016 earthquake, the surrounding region of Oklahoma and Kansas has hosted close to 80 other M 4 or larger events over the preceding decade. Two of these were larger than M 5: a M 5.7 earthquake in November 2011, near Prague, Oklahoma, and a M 5.1 in February 2016 near Fairview, Oklahoma. The Prague earthquake resulted in 2 injuries, and over a dozen homes destroyed; it was felt in 17 states. The Fairview event was also broadly felt but did not cause significant damage. In the immediate vicinity of the September 3 event, a M 3.2 earthquake occurred on September 1, 2016, just to the southwest. Within an hour of the September 3 M 5.8 earthquake, 4 aftershocks have been located, the largest being a M 3.6 event 56 minutes after the mainshock. 3 of the 4 aftershocks align on the NW-SE left-lateral plane of the focal mechanism solution.

Locations across the central and eastern United States (CEUS) have been experiencing a rapid increase in the number of induced earthquakes over the past 7 years. Since 2009 rates in some areas, such as Oklahoma, have increased by more than an order of magnitude. Scientific studies have linked the majority of this increased activity to wastewater injection in several locations. However, other mechanisms such as fluid withdrawal, enhanced oil recovery, or hydraulic fracturing processes can also result in induced earthquakes. In addition, regions with frequent induced earthquakes may also be subject to damaging earthquakes that would have occurred independently of human activity. Making a strong scientific case for a causative link between a particular human activity and a particular sequence of earthquakes typically involves special studies devoted specifically to the question. Such investigations usually address the process by which the suspected triggering activity might have significantly altered stresses in the bedrock at the earthquake source, and they commonly address the ways in which the characteristics of the suspected human triggered earthquakes differ from the characteristics of natural earthquakes in the region.

DATA SOURCES

EARTHQUAKES AND SEISMIC HAZARD
USGS, National Earthquake Information Center
NOAA, National Geophysical Data Center
IASPEI, Centennial Catalog (1900 - 1999) and
extensions (Engdahl and Villaseñor, 2002)
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Ju, C., D.J. Wald, and D.V. Helmberger, Source description
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BASE MAP
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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 updated by U.S. Geological Survey National
Earthquake Information Center
13 October 2016
http://earthquake.usgs.gov/
Map not approved for release by Director USGS