Geology; Researchers from Southern Methodist University Describe Findings in Geology (Tracking Induced Seismicity In the Fort Worth Basin: a Summary of the 2008-2018 North Texas Earthquake Study Catalog)

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2019 AUG 23 (NewsRx) -- By a News Reporter-Staff News Editor at Science Letter -- Current study results on Geology have been published. According to news originating from Dallas, United States, by NewsRx correspondents, research stated, "Since 2008, earthquake sequences within the Fort Worth basin (FWB), north Texas, have been linked to wastewater disposal activities related to unconventional shale-gas production. The North Texas Earthquake Study (NTXES) catalog (2008-2018), described and included herein, uses a combination of local and regional seismic networks to track significant seismic sequences in the basin."

Financial supporters for this research include U.S. Geological Survey (USGS) Earthquake Hazards Program, Texas Seismic Network (TexNet) program at the Bureau of Economic Geology, University of Texas.

Our news journalists obtained a quote from the research from Southern Methodist University, "The FWB earthquakes occur along discrete faults that are relatively far apart (>30 km), allowing for more detailed study of individual sequence development. The three largest sequences (magnitude 3.6+) are monitored by local seismic networks (<15 km epicentral distances), whereas basinwide seismicity outside these three sequences is monitored using regional distance stations. A regional 1D velocity model for the FWB reflects basinwide well log, receiver function, and regional crustal structure studies and is modified for the larger individual earthquake sequences using local well-log and geology data. Here, we present an m(b-Lg) relationship appropriate for Texas and a basin-specific M-L relationship, both calculated using attenuation curves developed with the NTXES catalog. Analysis of the catalog reveals that the earthquakes generally occur within the Precambrian basement formation along steeply dipping normal faults, and although overall seismicity rates have decreased since 2016, new faults have become active. Between 2006 and 2018, more than 2 billion barrels of fluids were injected into the Ellenburger formation within the FWB. We observe strong spatial and temporal correlations between the earthquake locations and wastewater disposal well locations and injection volumes, implying that fluid injection activities may be the main driving force of seismicity in the basin."

According to the news editors, the research concluded: "In addition, we observe seismicity occurring at greater distances from injection wells (>10 km) over time, implying that far-field stress changes associated with fluid injection activities may be an important component to understanding the seismic hazard of induced seismicity sequences."

For more information on this research see: Tracking Induced Seismicity In the Fort Worth Basin: a Summary of the 2008-2018 North Texas Earthquake Study Catalog. Bulletin of the Seismological Society of America, 2019;109(4):1203-1216. Bulletin of the Seismological Society of America can be contacted at: Seismological Soc Amer, 400 Evelyn Ave, Suite 201, Albany, CA 94706-1375, USA.

The news correspondents report that additional information may be obtained from H.R. DeShon, Southern Methodist University, Huffington Dept Earth Sci, Pob 750395, Dallas, TX 75275, United States. Additional authors for this research include L. Quinones, S. Jeong, O. Sufri, K.B. Kwong, P. Ogwari and M.M. Holt.

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