

PROGRAM UPDATE — October through December 2018

These quarterly reports provide information on the TexNet seismic monitoring program. The information is intended to be a high-level summary of this complex project and is written for a broad audience with an interest in seismicity monitoring and research in Texas.

Network Installation and Operations

- In response to the $M_L 4.4$ earthquake event in Panhandle Texas on October 20th, TexNet deployed four stations in the epicentral area in order to monitor the seismic activity and provide more accurate locations. One of the stations is deployed outside the Northeastern corner of the PANTEX facility so to be able to collect ground motion data that are valuable to the nuclear facility. Two new portable stations are deployed in Midland Basin (collaboration with UH), two in Delaware Basin and one in Eagle Ford Play. Also, one station is relocated in Snyder. In collaboration with UTIG we deployed twenty-one new temporary stations in the Eagle Ford play to be able to provide constrained locations and hypo central depths as well as better active fault mapping. Finally, we have demobilized FW08 from Johnson County.
- The Bureau is tracking the number of unique users that visit the TexNet Earthquake Catalog. The number of visits per month for October, November, and December was 1,284, 1,019, and 1,166, respectively.

Synopsis of October-December 2018 Seismicity in Texas

- TexNet provided locations for 720 earthquakes, 80% of which occurred in the Delaware Basin region. The remainder occurred west of Midland, north of Snyder, in the DFW area, north of Amarillo, in Timpson, and southeast of San Antonio. Of these 720 events, 695 earthquakes are finalized and 25, all $<M_L 1.5$, are provisionally located. Thirty-eight of the events were $\geq M_L 2.5$ and therefore in the realm of potentially being felt.
- In the Fort Worth Basin, the SMU North Texas earthquake catalog reported a total of 49 events from October-December 2018. Most events located along the Venus, northeast Johnson County, source zone. The 47 earthquakes had magnitudes ranging from $M -0.6$ to $M 1.2$. One earthquake in the Irving area ($M 1.6$ on 23 November) and one event in the Arlington area ($M 1.2$ on 16 October) occurred. Rates across the basin continue to decrease through late 2018.

Publication, Presentations, Partnership, and Outreach

- The 4Q2018 Technical Advisory Committee (TAC) meeting occurred December 4, 2018. Minutes can be download here: http://www.beg.utexas.edu/files/cisr/docs/TAC_Minutes_12_04_%202018.pdf
- The following scientific journal and conference papers were published by TexNet researchers:
DeShon, H. R., Hayward, C. T., Ogwari, P.O., Quinones, L., Sufri, O, Stump, B., and Magnani, M. B., 2018, Summary of the North Texas Earthquake Study Seismic Networks, 2013-2018, Seismological Research Letters, doi.org/10.1785/0220180269.
Ogwari, P. O., DeShon, H. R., and Hornbach, M. J., 2018, The Dallas-Fort-Worth Airport Earthquake Sequence: Seismicity Beyond Injection Period, Journal of Geophysical Research, 123, 553-563, doi:10.1002/2017JB015003.

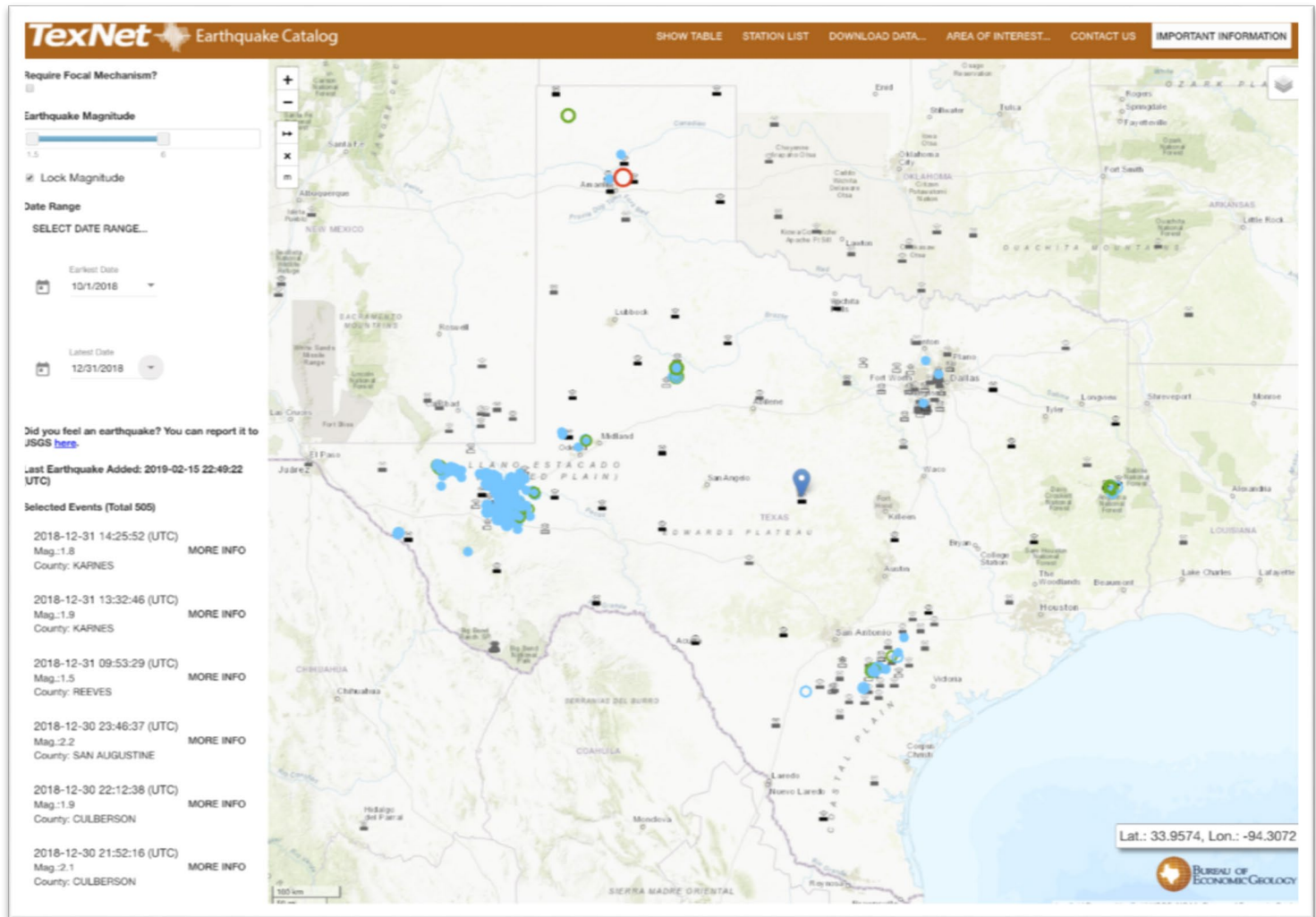
Yust, M. B., Cox, B. R., Cheng, T., 2018, Epistemic Uncertainty in Vs Profiles and Vs30 Values Derived from Joint Consideration of Surface Wave and H/V Data at the FW07 TexNet Station, Geotechnical Earthquake Engineering and Soil Dynamics V.

Savvaidis, A., Rathje, E., Cox, B., Zalachoris, G., Tiwari, A., Yust, M., and Young, B., Site Characterization of TexNet Seismic Stations Using Different Geophysical Approaches, GEESDV 2018.

Georgios Zalachoris and Ellen M. Rathje (2019) Ground Motion Model for Small-to-Moderate Earthquakes in Texas, Oklahoma, and Kansas. Earthquake Spectra: February 2019, Vol. 35, No. 1, pp. 1-20.

Quinones, L. A., DeShon, H. R., Magnani, M. B., and Frohlich, C., 2018, Stress Orientations in the Fort Worth Basin, Texas, Determined from Earthquake Focal Mechanisms, Bulletin Seismological Society of America 108, no. 3A, 1124-1132, doi: 10.1785/0120170337.

Chen, R., Xue, X., Yao, C., Datta-Gupta, A., King, M. J., Hennings, P., & Dommissse, R., 2018, Coupled Fluid Flow and Geomechanical Modeling of Seismicity in the Azle Area North Texas, SPE 191623 Presented at the 2018 Annual Technical Conference, Dallas, TX.



[TexNet Earthquake Catalog](#) for October-December, 2018 containing 505 $M_L \geq 1.5$ events.