



GEOGULF2021

A U S T I N
October 27–29, 2021



Probabilistic Identification of Seismicity Triggered by Hydraulic Fracturing in the Eagle Ford

I. Grigoratos and A. Savvaidis

ABSTRACT

In this study, we are examining the elevated seismicity rates in the Eagle Ford and their previously reported relation to hydraulic fracturing (HF) operations. Our analysis hindcasts seismicity rates after 2017 on a 5 km grid using daily HF data, and compares them against the null hypothesis of pure tectonic loading. This, we explicitly consider the possibility of finding purely coincidental correlation between the observed seismicity and random yet realistic HF data. In the end, each block is assigned a p-value between 0 and 1, indicating our statistical confidence on whether the seismicity and injection data indicate a causal relationship. The approach followed here has been previously successfully applied in both Oklahoma and West Texas. The employed framework provides a robust alternative to the spatio-temporal association filters (SAFs) traditionally used to link specific HF well with nearby earthquakes, by taking into account not only the timing and distance of the observed seismicity, but also the injection rates. To demonstrate that, we compare our results with those by Fasola et al. (2019), who relied on SAFs.

NOTES
