

Seismicity Site Characterization for Geo-Energy Related Projects

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Abstract

Since 2009 there has been an increase of seismicity in the State of Texas. Part of the seismicity is related to oil and gas operations, but there is interest from the industry and the Texas RRC to monitor additional geo-energy related projects (e.g., geothermal, CCUS) due to concerns of human induced seismicity. Currently the number of $M \geq 2.5$ earthquakes in Texas has increased from 91 in 2017 to 764 in 2022.

In order to be proactive and be able to mitigate any risk related to human operations, it is eminent to provide a seismicity site characterization before any actions and have a seismicity monitoring and response plan. Such a plan should include, geophysical and geological data analysis, ground motion and deformation monitoring, a seismicity causal analysis and a hazard assessment.

Based on seismic and aseismic slip practices and evaluation of subsurface and operational data we have developed a workflow incorporating site characterization and risk assessment, for an area of interest prior, during and after geo-energy related subsurface operations. Our approach is also based on the data availability and provide the type of information (including spatial resolution) and validation we can have of our results depending if a poor or a reach dataset is available.