

Induced Seismicity connections: from hydraulic fracturing to knowledge gaps, regulations, and mitigation strategy

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Our goal is to analyze qualitatively interconnections within the wider context of induced seismicity, as a prime tool to locate fault zones and to provide indications on the hydraulics of discontinuities.

First, we deepen our knowledge on hydraulic fracturing, which has been conducted in oil-gas reservoirs for improving the production since its first commercial usage in the '50s, and it is likely to be intensified soon within the European context. Even though the economical benefit is evident, this technique nevertheless lacks certainty. Our study wants also to list and analyze all the potential uncertainties in hydraulic fracturing, in order to minimize its environmental footprint.

Second, hydraulic fracturing needs to be accurately monitored, in order to understand the potential patterns in space and time of induced seismicity. This, in connection with baseline studies conducted before the stimulation, may help discriminate natural from man-made effects. We analyze practical implications related to deformation processes and already proposed mechanisms. Our attention will be focused on the knowledge gaps, reviewing currently available published contributions.

Finally, hydraulic fracturing needs to be properly regulated by traffic light protocols and we briefly discuss current regulations in selected countries.

With our study, we aim to develop a positive discussion in order to understand the current situation and address properly, in the near future, the most significant issues in induced seismicity.