ID de Contribution: **17** Type: **Poster**

Seismic Risk Assessment Through Multisource Data Integration: Insights from Northern Morocco

mercredi 27 mars 2024 13:39 (1 minute)

My thesis topic deals with integrating multisource data to improve seismic risk assessment in northern Morocco, located on the active tectonic plate boundary between Africa and Eurasia. The main objective is to further estimate the seismic hazard in the region and provide a comprehensive background for urban planning to mitigate seismic risk. My research is based on seismic analysis, space geodesy (GNSS and InSAR techniques), and field observations. Through the application of statistical methods and waveform analysis, seismic data processing enables seismic event patterns to be determined. Simultaneously, space geodesy monitors ground movements by integrating ground-based GNSS measurements and satellite-based InSAR data. In addition, field surveys, including geological studies and fault mapping, offer a valuable contribution to our overall understanding of fault behavior and seismic activity. Yet, preliminary findings with Gutenberg-Richter law illuminate seismic event occurrence frequencies in a frame time of 100 years. On the other hand, field observations have been carried out in the region and allowed to characterize neotectonic activity and stress orientation. Ultimately, this study sets the stage for further research efforts aimed at deepening understanding and building resilience towards earthquake risk reduction. However, it's important to note that data availability is a critical key, nevertheless challenges related to interpretation uncertainties and modeling limitations. which can limit the scope and accuracy in the region.

Keywords: Seismic analysis; Space Geodesy; field observation; Earthquake hazard, Northern Morocco.

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Classification de Session: Pitch Session

Classification de thématique: Methods: Data Analysis