Combining updated structural and geophysical data into Seismotectonic Zonation Models for PSHA of SE France

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Résumé

South-East France undergoes a low to moderate seismic activity related to slow crustal deformations. Nonetheless, about 10 Mw 5 and 1 Mw 6 earthquakes are recorded per century in the area. In this framework, defining earthquake recurrence models which characterise the location, magnitude and frequency of seismic events in time is essential for assessing seismic hazards.
This region has been one of the most densely instrumented in France for over 20 years with seismic and GNSS networks, hence, presenting a notable resolution of geophysical observations. The aim of this study is to constrain earthquake recurrence models which exploit the up-to-date geophysical and geological data with a culminating objective of PSHA (Probabilistic Seismic Hazard Assessment) for SE France. Here we focus on building "Seismotectonic Zonation models" (SZMs) which characterize zones for homogeneous earthquake recurrences after structural geology, seismicity, seismotectonics and geodesy. Our objective is to integrate the updated and redundant geophysical data of the region in SZMs and innovatively introduce the influence of surface deformation estimations from seismotectonics, GNSS and InSAR.
We build three independent SZMs based on structural geology, seismicity and deformation, respectively. We present a methodology where the parameters observed are quantitatively contrasted amongst zones, allowing for an evaluation of the seismotectonic homogeneity. This procedure intends to rigorously qualify the decided location of zone limits. Ultimately, we propose a compound model which combines the high confidence zone limits of the previous three models.

Mots-Clés: Aléa sismique, Modèle source, Zonage Sismotectonique, Sud est de la France

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