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PHEBUS, a Python package for the probabilistic seismic Hazard Estimation through Bayesian Update of Source models

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We propose a methodology for the selection and/or aggregation of probabilistic seismic hazard analysis (PSHA) models, which uses Bayes's theory by optimally exploiting all available observations, in this case, the seismic and accelerometric databases. When compared to the actual method of calculation, the proposed approach, simpler to implement, allows a significant reduction in computation time, and more exhaustive use of the data.

We implement the proposed methodology to select the seismotectonic zoning model, consisting of a subdivision of the national territory into regions that are assumed homogeneous in terms of seismicity, amongst a list of models proposed in the literature. Computation of Bayes factors allows comparing the adjustment performances of each model, in relation to a given seismic catalog. We provide a short description of the resulting PHEBUS Python package structure and illustrate its application to the French context.

Keywords

probabilistic seismic hazad analysis, Bayesian model averaging, importance sampling

Special/invited session

SFdS session

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