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Probabilistic Seismic Hazard Assessment in Stable Continental Regions and associated uncertainty drivers. The example of the new PSHA model of Germany.

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Often it is neither obvious nor transparent how PSHA responds to changes in its inputs and which inputs or working hypotheses are controlling epistemic uncertainties. This issue is critical in Stable Continental Regions (SCRs) where the paradigms underlying seismicity models are still under discussion. The new Probabilistic Seismic Hazard Assessment of Germany provides a unique opportunity to explore the drivers of epistemic uncertainties and the impact of different seismicity and ground-motions models on seismic hazard assessment results. This PSHA model (Grünthal et al., 2017) is based on a comprehensive involvement of all accessible uncertainties in models and parameters (to a degree that is usually applied rather to site specific analyses). The model consists of a logic tree with 4040 end branches and the results are supplied as the mean, the median and the 84^{th} percentile of the various branches. We will analyse percentiles and their ratios which quantify the model epistemic uncertainties and discuss the dependency of the final results on input choices. Indeed, the logic tree takes into account the latest paradigms of SCR seismicity models: large earthquakes may occur in areas where no earthquakes have been observed yet and far from known faults or past seismic events (large area source branches) but the model also takes into account the fact that earthquakes may be clustered (smoothed seismicity model branches). These various working hypotheses produce a significant regional dependency of epistemic uncertainties. We finally will show that future efforts for improving the hazard model can also benefit from the application of recently developed methods for evaluating the hazard sensitivity. The availability of computationally efficient sensitivity analysis techniques allows for the focus to be placed primarily upon the input models whose variability is mostly controlling the overall hazard assessment.

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