



## **Accounting for Epistemic Uncertainty in PSHA: Logic Tree and Ensemble Model**

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The logic tree scheme is the probabilistic framework that has been widely used in the last decades to take into account epistemic uncertainties in probabilistic seismic hazard analysis (PSHA). Notwithstanding the vital importance for PSHA to incorporate properly the epistemic uncertainties, we argue that the use of the logic tree in a PSHA context has conceptual and practical drawbacks. Despite some of these drawbacks have been reported in the past, a careful evaluation of their impact on PSHA is still lacking. This is the goal of the present work. In brief, we show that i) PSHA practice does not meet the assumptions that stand behind the logic tree scheme; ii) the output of a logic tree is often misinterpreted and/or misleading, e.g., the use of percentiles (median included) in a logic tree scheme raises theoretical difficulties from a probabilistic point of view; iii) in case the assumptions that stand behind a logic tree are actually met, this leads to several problems in testing any PSHA model. We suggest a different strategy – based on ensemble modeling – to account for epistemic uncertainties in a more proper probabilistic framework. Finally, we show that in many PSHA practical applications, the logic tree is improperly applied to build sound ensemble models.