A Bayesian Procedure for Probabilistic Tsunami Hazard Assessment

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We implement a Bayesian procedure for the Probability Tsunami Hazard Assessment (PTHA). The approach is general and modular incorporating all significant information relevant for the hazard assessment, such as theoretical and empirical background, analytical or numerical models, instrumental and historical data. The procedure provides the a posteriori probability distribution that integrates the a priori probability distribution based on the physical knowledge of the process, and the likelihood based on the historical data. Also, the method deals with aleatory and epistemic uncertainties incorporating in a formal way all sources of relevant uncertainty, from the tsunami generation process to the wave propagation and impact on the coasts. The modular structure of the procedure is flexible and easy to modify and/or update as long as new models and/or information are available. Finally, the procedure is applied to an hypothetical region, Neverland, to clarify the PTHA evaluation in a realistic case.