

EGU24-6676, updated on 23 Jan 2025

<https://doi.org/10.5194/egusphere-egu24-6676>

EGU General Assembly 2024

© Author(s) 2025. This work is distributed under the Creative Commons Attribution 4.0 License.



A “cookbook” for probabilistic tsunami hazard and risk assessment

Mathilde Sørensen¹, Jörn Behrens², Fatemeh Jalayer³, Finn Løvholt⁴, Stefano Lorito⁵, Jacopo Selva⁶, Mario Salgado⁷, and Irina Rafliana⁸

¹University of Bergen, Dept. of Earth Science, Bergen, Norway (mathilde.sorensen@uib.no)

²Universität Hamburg, Department of Mathematics, Hamburg, Germany (joern.behrens@uni-hamburg.de)

³University College London, London, United Kingdom (f.jalayer@ucl.ac.uk)

⁴Norwegian Geotechnical Institute, Oslo, Norway (Finn.Lovholt@ngi.no)

⁵National Institute of Geophysics and Volcanology, Roma, Italy (stefano.lorito@ingv.it)

⁶University of Naples Federico II, Naples, Italy (jacopo.selva@unina.it)

⁷International Center for Numerical Methods in Engineering, Barcelona, Spain (mario.sal.gal@gmail.com)

⁸German Institute of Development and Sustainability, Bonn, Germany (irina.rafliana@idos-research.de)

Probabilistic tsunami hazard and risk assessment methods (abbreviated PTHA and PTR, respectively) have evolved quickly over the past 10 to 15 years. Given this rapidly evolving landscape, there is a need to establish best practices for PTHA and PTR to improve reliability, comparability and reproducibility of studies applying such methods. The recently concluded Cost Action CA18109 AGITHAR (2019-2023) intended to improve the scientific foundation for PTHA and PTR. To materialize the networking activities into guidelines and best practices, more than 50 tsunami scientists have joined forces to develop a so-called *cookbook* providing recommendations and workflows for both PTHA and PTR. The cookbook will give an overview of existing methods, unify the descriptions of named workflows, make best practices examples available to a wider community, and provide background information to various stakeholder groups. We employ the analogy of a cookbook, because successful PTHA/PTR workflows can be described by essential building blocks (*ingredients*) combined in specific ways (*recipes*) to serve the purpose of the analysis of actual application fields. In that regard, we first introduce the main *ingredients* in seven chapters describing e.g. source models, tsunami models, vulnerability, exposure, as well as risk communication, and then present a series of *recipes* (25 in total) providing examples of how the ingredients can be combined in a workflow leading to a meaningful PTHA or PTR. The cookbook can be used and read in different ways. On the one hand, and again in analogy to a usual cookbook, readers may browse through recipes, and access the ingredients chapters following the corresponding list of ingredients. The recipes all follow a similar organizational structure, so they can be accessed easily. On the other hand, the book can be read consecutively, starting with the study of ingredients, following the general workflow of PTHA and PTR. By this, scholars will learn in a structured way how to build corresponding hazard and risk assessments. Finally, for the more experienced readers, the book may serve as a reference to the current state-of-the-art in this multidisciplinary research area. In this presentation, we will introduce the key ingredients described in the cookbook, as well as selected recipes. We will then

summarize the main recommendations for future PTHA/PTRA studies, as provided in the book. The book is expected to be published in Autumn 2024.