



## Advancing User-Friendly Tsunami Hazard Mapping: MATLAB-based Applications for FUNWAVE modelling

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Following the 2022 Hunga Tonga - Hunga Ha'apai tsunami, there is a renewed interest in assessing tsunami hazards related to tsunamis triggered by landslides, volcanic eruptions, and atmospheric disturbances. This increased interest suggests an expanding cohort of researchers delving into the assessment of tsunami hazards through numerical modelling. However, mastering a numerical model involving tasks such as input file preparation, simulation execution, and output data generation poses a challenge for inexperienced users. The learning process often demands a substantial time investment, potentially causing workflow delays that may prevent researchers from promptly initiating result analysis. To address this challenge, we introduce standalone applications designed to optimize the efficiency of both tsunami model preparation and post-processing stages. We present two MATLAB-based user-friendly applications designed to efficiently generate input files and output tsunami hazard maps. The applications were designed to align with the required input and expected output files of the Fully Nonlinear Boussinesq Wave (FUNWAVE) model. FUNWAVE is a well-established open-source model that has been extensively validated through analytical solutions and experimental investigations. It also offers options to set up initial conditions, such as landslides and meteotsunamis. To facilitate its useability, the applications incorporate tool tips and context menus that provide a comprehensive guide for users. Within the input-generator application, visual warnings pre-empt potential errors in tsunami simulations. Meanwhile, the output map generator application not only facilitates the creation of maps, but also offers users the convenience of converting these maps into raster files, animations, KML, or shapefiles. This versatility ensures compatibility with various programming and Geographic Information System (GIS) platforms. We tested the functionality of the applications using the benchmark examples from the FUNWAVE model. Through the development of these applications, we aim to advance tsunami modelling research by enhancing technological accessibility, hence reducing the complexity, especially for individuals new to tsunami modelling.