



## **Numerical modelling of tsunamis with non-linear shallow water equations and Boussinesq type models for simplified coastal areas.**

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This work is part of the GITEWS (German Indian Ocean Tsunami Early Warning System) project, responsible for the description of tsunamis in near-shore zones and on the coast (run-up). The evolution of the tsunami wave can be described by the Boussinesq equations, which in comparison to non-linear shallow water equations consider frequency dispersion effects. Due to high computational demands Boussinesq models are often applied in near-shore areas only, or are substituted by models using the non-linear shallow water equations altogether. With a set of well defined numerical experiments we test the validity of such a substitution or the importance of the Boussinesq approach. For that, test cases are constructed by simplifications of bathymetries and coastal geometries, typical for Indonesian coastal waters. To assess the significance of the Boussinesq description further off-shore, the test areas are extended to include the continental shelf and slope. All simulations are carried out with models from DHI. For the analysis we consider the transformations of the wave along the propagation paths up to the coast as well as arrival times and subsequent run-up heights. In addition, a comparison of different test cases is made separately within each model type to evaluate and formalize the influence of the bathymetric and geometric features on the run-up.