The Impact of Eddy and Roughness Coefficients in Tsunami Modeling

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Within the German-Indonesian Tsunami Early Warning System (GITEWS) project the German Research Centre Geesthacht (GKSS) and DHI-WASY investigated the impact of tsunamis in densely populated coastal areas of Indonesia.

By performing hundreds of numerical simulations in three highly resolved ($\sim$10 m) priority areas, namely Kuta (Bali), Padang (West-Sumatra), and Cilacap (southern coast of Java), we established a scenario data base for the preparation of hazard and risk maps.

In preparation for this work we examined the dependency of tsunami modeling results on eddy coefficients and Manning's roughness coefficients. The hydrodynamical models MIKE 21 HD and MIKE 21 BW were applied in 11 artificial set-ups with linearized bathymetries. By varying the coefficients over a large range of physically relevant values we found the impact on tsunami wave heights and run-up heights.

For the scenario simulations we used MIKE 21 FM. We shortly present a method of preparing very detailed roughness maps (Manning coefficients assigned to 43 land-use classes) and show comparisons of simulations using this differentiated roughness information with simulations using constant values, the later a widely used approach.