



Current status of TsunAWI contributions to the Indonesia Tsunami Early Warning System (InaTEWS) with a comparison of the modeling approaches and the resulting warning products

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The Indonesia Tsunami Early Warning System delivers simulated tsunami forecasts in two different ways: either matching scenario(s) from a pre-computed database or running on-the-fly tsunami simulation. Recently, the database has been extended considerably taking into account additional source regions not covered in earlier stages of the system. In this contribution, we present the current status of the data base coverage as well as a study investigating the warning products obtained by the two modeling approaches.

The pre-computed tsunami scenarios are based on the finite element model TsunAWI that employs a triangular mesh with resolution ranging from 20km in deep ocean to 300m in coastal areas and to as much as 50m in some highly resolved areas. TsunAWI solves the nonlinear shallow water equations and contains a wetting-drying inundation scheme. The on-the-fly propagation model easyWave solves the linear shallow water equations on a regular finite-difference grid with a resolution of about 1 km and utilizes several simple options to estimate coastal impact. This model is used for forecasting after a tsunami has been generated in an area not covered by the database or after a moment tensor solution shows an earthquake focal mechanism not present in the database. Since warning products like estimated wave height (EWH) and estimated time of arrival (ETA) along the coast are based on modeling results, it is crucial to compare the resulting forecasted warning levels obtained by the two approaches. Resolutions and numerical settings of both models are quite different, therefore variations in the resulting outputs are to be expected; nevertheless, the extent of differences in warning levels should not be too large for identical sources. In the present study, we systematically investigate differences in resulting warning products along InaTEWS forecast points facing the Sunda arc. Whereas the finite-element mesh of TsunAWI covers the coast up to a terrain height of 50m and warning products have been pre-calculated directly in the forecast points, easyWave offers several options for their approximation including projections from offshore grid points or vertical wall. Differences and potential reasons for variations of warning products like the role of bathymetry resolution as well as the general approach for the assessment of EWH and ETA for different modeling frameworks are discussed.