Rapid inundation estimates using coastal amplification laws in the Western Mediterranean basin

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Tsunami modeling tools in the French tsunami Warning Center operational context provide rapidly derived warning levels with a dimensionless variable at basin scale. A new forecast method based on coastal amplification laws has been tested to estimate the tsunami onshore height along the French Mediterranean coastlines. This fast prediction tool provides tsunami height distribution along the shoreline, calculated from the numerical simulation of the deep ocean tsunami amplitude and using a transfer function derived from the Green's law. Due to a lack of tsunami observations in the western Mediterranean basin, coastal amplification parameters are here defined regarding high resolution nested grids simulations. The preliminary results for several French Mediterranean test sites on the basis historical and synthetic sources show a good agreement with the time-consuming high resolution modeling: the linear approximation is obtained within 1 minute in general and provides estimates within a factor of 2 in amplitude, although the resonance effects in harbors and bays are not reproduced. The extrapolation by empirical laws does not allow us to consider local amplification close to shore other than bathymetric effects. A way to compute the theoretical run-up should be explored. However, this method is well suited for a fast first estimate of the coastal tsunami threat forecast.