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Nonlinear interaction tsunami and tidal waves

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In support of the Tsunami Early Warning System for the Indian Ocean, a high-resolution finite element model (TsunAWI) has been developed for simulations of wave propagation.
A typical tsunami wave is much shorter than tidal waves, so that they are usually neglected in tsunami modelling. However, in coastal areas with strong tidal activity, dynamic nonlinear interaction of tidal and tsunami waves can amplify the magnitude of inundation. The effect can come from the nonlinearity of the momentum equation and from the difference in the water level depth in the presence of tides. To study this effect, water level change due to tides is included in the general scheme. Estimates of possible effect of tides on the amplitude and phase of tsunami waves are presented.