Model 1 - GloBouss

GloBouss is a depth averaged model based on the standard Boussinesq equations, including higher order dispersion terms, Coriolis terms, and numerical hydrostatic correction terms (Pedersen and Løvholt 2008; Løvholt et al., 2008; Løvholt et al., 2010). The numerical formulation is based on a staggered Arakawa C-grid computational stencil, solved iteratively employing an ADI method. GloBouss is formulated in both Cartesian and geographical coordinates. GloBouss is mainly a tsunami propagation model designed for simulating the tsunami propagation in the open ocean, and lacks features such as drying and wetting, and therefore cannot be used to compute inundation. Tsunami sources are handled either through hot start conditions by giving the surface elevation and depth averaged velocity fields as input, or by a series of sources and sinks through the temporal derivative of the depth. To accommodate non-hydrostatic effects due to time dependent depth perturbations of short horizontal scales, the tsunami generation is also coupled to a depth dependent full potential filter based on Kajiura (1963). For submarine landslide tsunamis, the full potential filter integrates and adds the response water surface response due to the landslide as a function of time.

Model 2 - BoussClaw

BoussClaw is a new hybrid Boussinesq type model of similar mold as Funwave-TVD and Coulwave-TVD, but with a different Boussinesq formulation. In particular, the dispersion term is simpler and not fully nonlinear, as robustness is given priority over high formal order. It is an extension of GeoClaw (Clawpack Development Team, 2016), and solves the Boussinesq-type equations by Schäffer and Madsen (1995), modified into conservative form. The BoussClaw model employ a finite volume technique for the NLSW part of the equations and a finite difference discretization in fractional steps for the additional terms such as dispersion terms, of both standard and higher order. BoussClaw is an operational tsunami model that incorporates drying wetting formulations which allow for computation of dry land inundation, as well as Manning type friction terms. During inundation and near shore, the dispersive terms are omitted, and the model is switched to NLSW. Tsunami sources are handled either through hot start conditions by giving the surface elevation and depth averaged velocity fields as input, or by modifying the bathymetry in the momentum equation for each time step. To accommodate non-hydrostatic effects due during tsunami generation from a time dependent source such as a landslide, modifications to the bathymetry is necessary.

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