# Wave breaking closures on weakly dispersive Boussinesq-type models. Towards a stable hybrid modeling

José Daniel Galaz, Maria Kazolea and Antoine Rousseau

Wave breaking closures are mandatory in the usage of numerical models which are based on asymptotic pdes that describe free surface flows, like weakly nonlinear Boussinesq type (BT) models. BT models are obtained under the hypothesis of ideal and most often irrotational flow and can not account for the transformation process taking place in breaking regions. At large scale the main consequence of wave breaking is a strong energy dissipation. Several attempts, with different pros and cons, have been derived the last thirty years in order to simulate the phenomenon. One of the most used our days is the so-called hybrid technique in which the dispersive terms are deactivated in breaking regions permitting the nonlinear shallow water equation to model a breaker as a shock. Through this discontinuity, mass and momentum are conserved while total energy is dissipated thus modelling the energy dissipation due to breaking. We will present an overview of the existing wave breaking closures for the weakly nonlinear Boussinesq type models and we will go beyond them by trying to investigate if the derivation of a stable hybrid model is visible using the domain decomposition method and appropriate boundary conditions.