

A wave-breaking model for the Depth-Semi-Averaged equations: some preliminary results

Matteo Antuono¹, Alessia Lucarelli¹, Claudio Lugni¹, Maurizio Brocchini²

1. CNR-INM (Istituto di Ingegneria del Mare), Roma, (Italy)

2. Dipartimento di Ingegneria Civile, Edile e Architettura, Università Politecnica delle Marche (Italy)

A novel model for the description of the wave breaking process and the subsequent generation and evolution of the vorticity is defined for a particular non-hydrostatic scheme, namely the Depth-Semi-Averaged model of Antuono et al. [1]. Such a model is based on the use of mollified differential operators inside the vorticity equation, following an approach which is similar in spirit to that used in the context of the Smoothed Particle Hydrodynamics. The breaking conditions and the expression for the vorticity injection at the free surface are adapted from the work of Veeramony [2] and Veeramony and Svendsen [3] while a proper closure for the turbulent cinematic viscosity is proposed.

Some preliminary test cases are shown by using the experimental data from Lucarelli et al. [4] for a spilling breaking event. These suggest that the proposed model is accurate and reliable and that it is suited for the description of the main features of the wave breaking at spatial and time scales typical of the coastal models.

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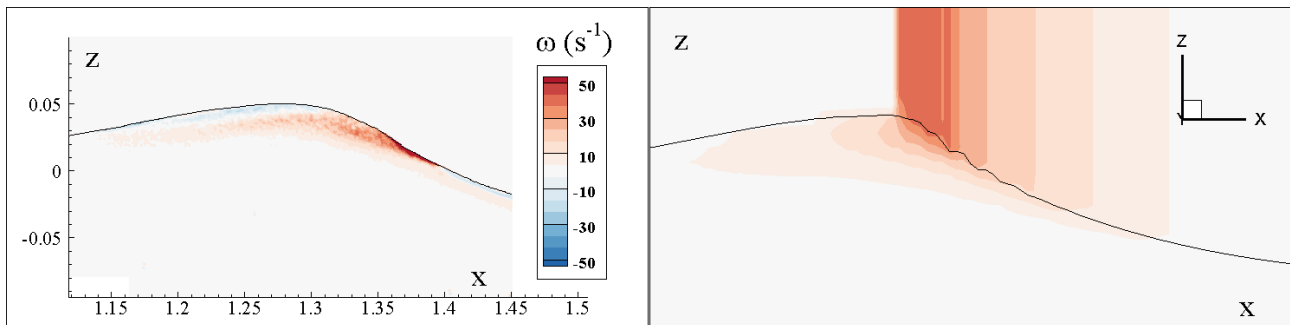


Figure 1. Vorticity distribution after a spilling breaking event. Left: measurement from Lucarelli et al. [4]. Right: the proposed numerical model.

References

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