Applicability of source generation (SG) and absorption technology in a highly reflective condition

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We propose a Source Generation (SG) term, implemented in the DualSPHysics code, on the basis of which the resulting motion is controlled by generating waves over a buffer area where a kernel operator is applied. Two different group of numerical simulations were run to identify the most suitable setting of the parameters that govern the general behaviour of SG. Each group required several simulations in order to find out which parameters are significant for the correct design.

The first group were executed using an Absorption Layer (AL) at the end of the tank. To avoid the mass drift that affects the Stokes' theory a numerical procedure was implemented. In the second group the absorption layer was removed and highly reflective conditions were set. Using different settings of the weighting function and dimensions of the controlled domain, it is shown that the proposed SG generates waves, absorbing the reflected waves at the same time, even in the presence of an inclined slope, mimicking a beach, instead of a vertical wall.

Finally, SG performance is tested using Swash simulation (Coupling) for generating the velocity field as input. In order to prove that overtopping flow characteristics and wave forces are modelled correctly, SG-SWASH is applied to a case study and the numerical data are compared with the experimental one.
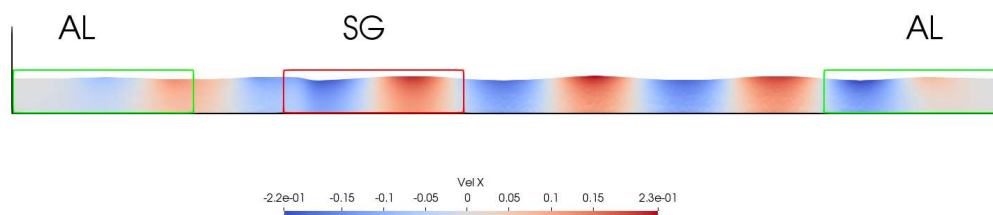
Numerical model generation skills of SG

References:

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