



## **Wave and hydrodynamics modelling in coastal areas with open-source solver: influence of the coupling mechanisms**

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Wave propagation with the open-source suite TELEMAC is modelled by means of a finite-element type approach. The module TOMAWAC solves a simplified equation for the spectroangular density of wave action and is coupled to TELEMAC2D and 3D, solving the Navier-Stokes equations. Coastal areas and the harbor of Bari in the Puglia region (south of Italy) are implemented. The physical processes modelled comprise (i) energy source/dissipation processes (wind driven interactions with atmosphere, dissipation through wave breaking / whitecapping / wave-blocking due to strong opposing currents, bottom friction induced dissipation), (ii) non-linear energy transfer conservative processes (resonant quadruplet interactions, triad interactions), and (iii) wave propagation-related processes due to the wave group / current velocity, depth-/current-induced. Preliminary results show the effect of the wave- and current- related processes: the simulations reproduce different extreme wave scenarios and the coupling modelling leads to an increase in wave disturbance inside the port.