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Numerical modelling of coastal processes at the small scale and morphological changes behind a headland structure.

Alessandro Salera (1,2,3), Pablo Tassi (1,2), Angelo Leopardi (3) & Pablo Santoro (4)

(1) Electricité de France (EDF R&D), LNHE, Chatou, France

(2) Saint-Venant Hydraulics Laboratory, Université Paris-Est (EDF, ENPC, Cerema), Chatou, France

(3) University of Cassino and Southern Lazio, Italy

(4) University of Republic, Montevideo, Uruguay

Over the last years, some advances have been done from experiences and numerical models regarding the evaluation of the longshore transport for large-scale (regional) coastal applications. Nevertheless, at the small scale (e.g. ports, breakwaters, water intakes, etc.) a large number of questions remain unanswered for problems concerning the complex interactions among currents, waves and sediment transport.

The main objective of this work is to reproduce experimental observations oriented to evaluate morphodynamics changes behind headland structures by means of a set of coupled 2DH numerical models.

On the basis of the laboratory experiences of Gravens and Wang (2007), the following tasks are performed: (i) construction of currents and wave models and testing of different flow scenarios; (ii) verification of the combined waves and currents effects; (iii) analysis of morphodynamics changes and (iv) comparison of numerical results against classical semi-analytical formulae from the literature, and then against experimental observations.

The proposed modelling framework is the open-source Telemac-Mascaret modelling system (waves module is Artemis, currents module is Telemac2D and sediment transport / bed evolution module is Sisyphé).

References

Gravens M.B. & Wang P. (2007) *Data Report: Laboratory Testing of Longshore Sand Transport by Waves and Currents; Morphology Change behind Headland Structures*. Coastal and Hydraulics Laboratory, US Army Engineer Research and Dev. Center.