Modelling morphological evolution in the surrounding area of a groyne: preliminary results

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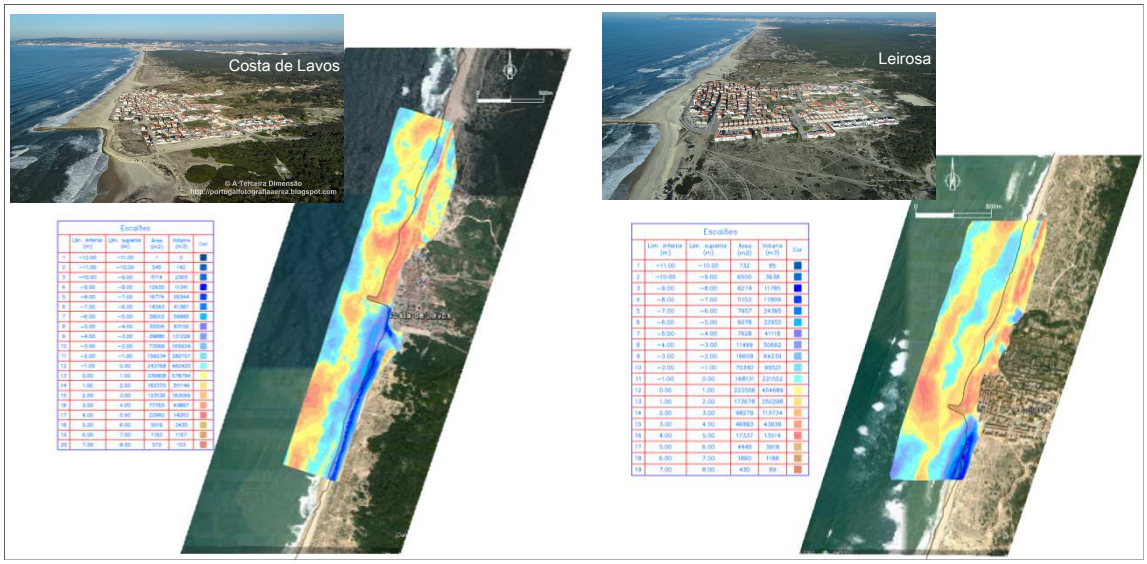
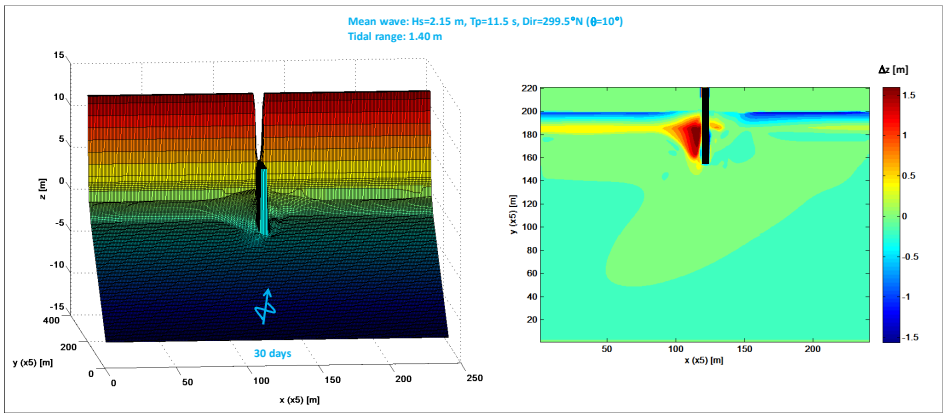


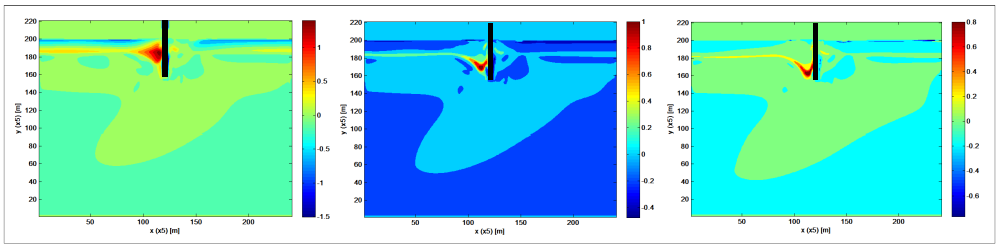
Morphological evolution, between 1975 and 2011, at Costa de Lavos (left) and Leirosa (right) maritime frontages (where the black line is the MSL in 2011).



Numerical morphology after 30 days (left) and numerical morphological evolution during 30 days (right).

Abstract

2D area morphological coastal models are certainly essential to analyse and predict the hydro-sedimentologic processes induced by the presence of coastal structures. In the case of groynes, commonly known processes are i) the increase of sediment transport due to streamline contraction around the tip of the groyne, ii) the loss of sediment towards offshore due to upwave rip flushes (deflection of the longshore current) caused by the blocking of the groyne and iii) the development of 2DH circulation currents and induced sediment fluxes at the lee side of the groyne due to alongshore gradients in wave setup. In this study, a model of this type was applied to a coastal area south of Mondego inlet. The results indicate that the model is capable of reproducing the morphodynamics that evolves from a uniform bathymetry to the bathymetry observed in the surrounding area of an existent groyne under typical wave conditions.



Numerical morphological evolution (Δz) during: the first 10 days (left), the second 10 days (middle) and the last 10 days (right).