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EXPERIMENTAL STUDY OF THE BEHAVIOUR OF A SANDY BED UNDER THE ACTION OF WAVES

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As a consequence of the forces exerted by the near bed flow over a sandy bed presence of small bedforms, called ripples, is a common feature in coastal waters outside the breaking zone. Due to the varying structure of the sea flow, ripples present a dynamical behaviour searching for the equilibrium with the hydrodynamics of the system. This evolution can be measured in terms of changes of the bedforms geometry, i.e. ripple height (h) and length (l), and parameterized as bed roughness, which magnitude and variation will, in turn, influence the near-bed flow and to which numerical models are extremely sensitive.

At the moment, technological limitations make the acquisition of accurate field data allowing a reliable validation of existing models difficult. On the other hand, no data is available that is representative of energetic wave conditions.

In this research, bed evolution has been studied thanks to a full scale simulation of shallow water waves over a sandy bed. Two grainsizes, D50=0.35 and D50=0.21 mm, have been tested. Mean and maximum values of measured ripple length and height generated under significant wave heights ranging from 0.3 to 1.8 m, are compared with values obtained from two widely used empirical models: Nielsen (1981) and Grant and Madsen (1982).

Measured mean values have been found to remain fairly invariant for both ripple height and length whereas maximum values behave differently depending on the wave conditions and grainsize. This results disagree with the behaviour predicted by the empirical models.

The unsuitability of these models makes more in deepth investigation of the parameters considered and the search for alternative formulation for bedform geometry necessary.