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Long wave runup on random beaches

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The estimation of the maximum wave sunup height is a problem of practical importance. Most of the analytical and numerical studies are limited to a constant slope plain shore and to the classical Nonlinear Shallow Water (NSW) equations. However, in nature the shore is characterized by some roughness. In order to take into account the effects of the bottom rugosity various ad-hoc friction terms are usually used. In this paper we study the effect of the roughness of the bottom on the maximum runup height. A stochastic model is proposed to describe the bottom irregularity and its effect is quantified using Monte-Carlo simulations. For the discretization of the NSW equations we employ modern finite volume schemes. Moreover, the results of the random bottom model are compared with the more conventional approaches.

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