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Maritime structures and freak waves

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Recently it has been reported some damages in maritime structures, particularly breakwaters at different locations of our coast. In a few cases the severe wave climate can explain such damages according to the well known distributions for extreme waves. In other cases this explanation is not so easy to make because the average weather conditions were not extreme and therefore the idea of the apparition of freak or rogue waves could be taken into consideration. From a practical point of view I am going to use here the stochastic approach of Lopatoukhin and Boukhanovsky.

According to these authors the main difference between extreme and freak waves could be formulated in the sense of considering extreme waves as an one-dimensional process whereas freak waves are multi-dimensional (conditional probability, i.e. maximum height greater than 3 times the significant height, crest greater than 0.65h. and also conditions for wave steepness)

All the generating mechanisms for the formation of freak waves can be present on shallow water(Onorato, Osborne et al., Pelinovsky et al.): Modulation of amplitude, modulation of frequency, caustics, currents, etc., and the main aim is to determine the most probable in each case. In order to do this the procedure will consist of hindcasting the wave climate. In the present work studies of interaction with the structure, reflection and run-up have being taken into account.