



Statistics of long wave runup on a plane beach, based on the data from the Large Wave Flume (GWK), Hannover, Germany

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A series of experiments at the 300 m length and 3.5 m depth Large Wave Flume (GWK), Hannover, Germany is conducted to study the statistics of long wave runup on a plane beach. Major goal of this experimental study is to test the applicability of the theoretical model based on rigorous solutions of the nonlinear shallow-water equations for waves on a sloping beach. According to the theory, the extreme values of the runup displacement and velocity of the moving shoreline, and consequently statistical distributions of extreme runup characteristics can be found from the associated linear theory. In particular, if an incident wave field is represented by a narrow-band Gaussian process, extreme runup characteristics can be described by the Rayleigh distribution even for strongly nonlinear waves. It is shown that the distribution function of the extreme runup characteristics can be approximated by the Rayleigh curve in the wide range of wave amplitudes and spectra even if an incident wave field is represented by a non-Gaussian process.