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Variation of statistical parameters of random wave groups along a large wave tank

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Evolution of unidirectional random wave groups generated by a wavemaker in a 300 m long wave tank is investigated within three series of experiments for different values of the nonlinear parameter . Spatial evolution of numerous statistical wave field parameters is studied. It is demonstrated that the statistical characteristics depend on the local width of frequency spectrum and deviate from the Gaussian statistics: the probability of extremely large (the so-called freak) waves is the highest when the local spectral width attains maximum. It is also found that the distribution model of the 3rd order random wave field of Tayfun and Fedele (2007) provides an appropriate description of the observed phenomena.

Tayfun, M.A., and Fedele, F. 2007 Wave height distributions and nonlinear effects. Ocean Eng., 34, 1631-1649.