

Abstract Submitted  
for the OSS19 Meeting of  
The American Physical Society

**Study on the Process of Irregular Ocean Wave Generation Using Physical and Computational Analysis** HAJIN KIM, Korean Minjok Leadership Academy, HENRY H. KANG, University of Illinois Urbana-Champaign — In the oceanography and ocean engineering study, various idealized spectra is used to obtain the wave properties such as wave amplitude and frequency. The actual ocean wave motion analysis is not so simple when the turbulence in the wind generate random fluctuations at the sea surface. More delicate and comprehensive numerical and computational studies are needed to perform the study of the marine waves. The wind creates small wavelets and these short waves continue to grow to become big waves. The waves finally deform their shape with low frequencies and low energy. In this study, two-parameter wave spectral formulation, dispersion relation and spectral density functions were used to find wave amplitude and to show the process of wave generation. Considering the wave equation with a random phase angle, this research focused on the prediction of the wind-generated irregular waves since the wave elevation in the random fluctuations presents a stochastic behavior. Various wind speeds as input data were tested to find relevant wave amplitudes. Wave amplitudes of fully developed wind-generated seas in the North Atlantic Ocean were obtained using linear theory, which employs superposition of a large number of monochromatic waves.

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No Company Provided

Date submitted: 17 Mar 2019

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