

Nonlinear evolution of broadband surface waves

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Abstract:

A fully nonlinear surface wave model based on a pseudo-spectral method is adopted to study the nonlinear evolution of broadband surface waves and its numerical solutions are validated with laboratory experiments. The modified nonlinear Schrodinger (MNLS) equation is also studied to examine its capability to predict the evolution of broadband wave spectrum. For oceanic applications, energy dissipation due to wave breaking and wind forcing are parameterized and incorporated into the fully nonlinear model, and their effects on the evolution of wave spectrum are investigated numerically. Joint work with Arnaud Goulet (NJIT), Matt Malej (NJIT), Marc Perlin (UMichigan), Zhigang Tian (KAIST).