

Abstract

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On the Linear and Nonlinear Interaction between Wind and Wave

Linear and nonlinear wind-wave interactions are analyzed using wavelet linear coherence and wavelet bicoherence respectively. A field record of simultaneously measured wind speed and wave height during a mistral event is divided into five segments; the computations of the wavelet linear coherence and wavelet bicoherence are conducted for the whole record and for all divided segments. In computing wavelet bicoherence, we consider both sum and difference rules of frequencies in order to have a complete picture of the phase coupling between wind speed and wave height. The results show that dividing the windwave record into segments gives the ability of exploring the detailed linear and nonlinear wind-wave interactions through the use of wavelet linear coherence and wavelet bicoherence.