

Abstract Submitted
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Measurements of wind-waves under transient wind conditions.

LEV SHEMER, ANDREY ZAVADSKY, Tel-Aviv University — Wind forcing in nature is always unsteady, resulting in a complicated evolution pattern that involves numerous time and space scales. In the present work, wind waves in a laboratory wind-wave flume are studied under unsteady forcing. The variation of the surface elevation is measured by capacitance wave gauges, while the components of the instantaneous surface slope in across-wind and along-wind directions are determined by a regular or scanning laser slope gauge. The locations of the wave gauge and of the laser slope gauge are separated by few centimeters in across-wind direction. Instantaneous wind velocity was recorded simultaneously using Pitot tube. Measurements are performed at a number of fetches and for different patterns of wind velocity variation. For each case, at least 100 independent realizations were recorded for a given wind velocity variation pattern. The accumulated data sets allow calculating ensemble-averaged values of the measured parameters. Significant differences between the evolution patterns of the surface elevation and of the slope components were found. Wavelet analysis was applied to determine dominant wave frequency of the surface elevation and of the slope variation at each instant. Corresponding ensemble-averaged values acquired by different sensors were computed and compared. Analysis of the measured ensemble-averaged quantities at different fetches makes it possible to identify different stages in the wind-wave evolution and to estimate the appropriate time and length scales.

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