

Abstract Submitted
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On similarity of wind-waves spectral shapes in laboratory and in ocean LEV SHEMER, ANDREY ZAVADSKY, DAN LIBERZON, Tel-Aviv University — Wind-wave field evolving in a compact laboratory facility that consists of a wind tunnel capable of generating wind speed that may exceed 15 m/s atop of a 5 m long wave tank is studied. Surface elevation measurements were carried out at numerous positions along the test section and at different mean wind flow rates. For each experimental condition, the accumulated records were long enough to contain at least $O(10^4)$ dominant waves; the wave power spectra computed from the recorded time series cover up to 5 decades. Similarity of the spectral shapes in the vicinity of the peak frequency f_p obtained at various fetches and wind conditions was observed. This similarity manifests itself when normalized frequency deviation from the peak value is introduced. Detailed comparison is carried out of spectra obtained in the present measurements at all fetches and wind conditions, to the similarly normalized JONSWAP spectrum that represents field experiments. When estimating spectral tail behavior, care was taken to consider frequencies exceeding about $3.5f_p$ to alleviate the effect of bound waves. The spectral tails dependence on frequency follows the power law f^{-n} ; the values of n being in the range $3 < n < 4$, depending on wave age. It thus can be concluded that the spectra of wind-waves in a small facility exhibit significant similarities to those obtained in field studies at much larger scales, as well as to theoretical estimates.

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