



Analysis of wind waves and storms on the Black Sea

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Wind-induced waves on the Black Sea are studied using the third-generation SWAN spectral wave model. NCEP/NCAR reanalysis wind fields for the period between 1948 and 2010 with a frequency of 6 hours are used as forcing input. Such physical processes as quadruplet interactions, whitecapping, triads, bottom friction, depth-induced breaking and diffraction are considered. A 5x5 km horizontal grid is used. The output of the model contains data about significant wave heights, wave propagation direction, wave length and period and wave energy transfer. The frequency of the output data is 3 hours. Calculations are carried out continuously for every year. The modeling results are used to obtain statistical climatic information about the wind-induced waves and storms on the Black Sea. The number of storms, their size and duration both for the whole period and for each month are calculated. Areas of the strongest and most frequent storm waves are identified. Climatic variability of storms during the past 60 years is assessed. Synoptic situations for extreme storm events are analyzed by decomposing atmospheric pressure fields into the empirical orthogonal functions. The results of simulation are compared with instrumental measurements.

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