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Wind induced variability of hydrological parameters in the coastal zone of the Southern Baltic Sea - numerical study

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Abstract

The wind - produced variability of temperature, salinity and velocity in the coastal zone of the southern Baltic Sea have been investigated with the help of a three - dimensional σ - coordinate baroclinic model. Model was based on the Princeton Ocean Model code of Mellor (1993) known as POM. The main intention of this study is to reproduce changeability of the hydrological conditions as a response of a stratified sea waters to an onset of a model atmospheric forcing of three successive storms. Winds from 8 directions and with a constant speed over the Baltic during each storms were considered.

Presentation of results is limited to the area along the Polish coasts of the Baltic Sea, where complicated bottom topography essentially influences water movements. Numerical model runs show that winds can play important role in the water exchange between coastal region and open sea, generating intense fluctuations of hydrological parameters. The winds from SE, E and NE form conditions to occur coastal upwelling that is frequently observed in the coastal area along the Polish Baltic coast (Bychkova and Victorov 1987, Bychkova *et al.* 1988, Urbański 1993).

The results calculated by use of the POM code are in agreement with the results obtained with help of z -level model (Krauss and Brüggge 1991) and from studies in the Great Lakes and in other upwelling areas (Bennet 1974, Krauss 1979, Fennel 1986).