WIND FIELD FEATURES IMPACT ON THE SPECIES DIFFUSION IN THE ATMOSPHERIC BOUNDARY LAYER

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The model of the atmospheric pollutants propagation is developed. It is based on the numerical solution of the semi-empiric equation of the turbulent diffusion in the atmosphere. The model allows the species fields modeling from non-stationary and arbitrary distributed sources. There are two possibilities of the vertical profiles of wind fields and turbulent diffusion coefficients description. The first one is based on the relations of the similarity theories (using stability categories of the atmospheric boundary layer). The second approach takes into consideration the results of systematic analysis of the vertical profiles of the wind speed and temperature structure function measured by acoustic locator (sodar) "ECHO-1D". This three-components locator is set on the roof of the Faculty of Physics building. The measurements have been carried out in different seasons.

The analysis of the measured wind field vertical profiles is carried out with the help of decomposition of a stochastic variability (speed, direction and intensity of small-scale fluctuations) on the orthogonal functions of several types (including EOFs). It is shown that there are three main components representative for the studied wind fields. The basic (or mean) state is described by the first orthogonal function, the shape of the main "oscillations" is characterized by several first EOFs and non-correlated variability is presented by a residual dispersion.