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AIR-SEA/LAKE INTERACTION OF A SHALLOW AND COASTAL ZONE

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Due to the smaller scales of the presently used models, which are meant for weather forecast and climate research, it is necessary to parameterize the evaporation as well as the heat and energy exchange, even for coastal zone of seas and small lakes. These are often shallow and covered with the rushed waves so the usual bulk equations for air water exchange are not valid.

We have accomplished special experimental and theoretical research of the energy-mass exchange process on shallow waters, which permitted to account the influence of the basin depth on the evaporation and heat exchange intensity in a final form. Data have been

obtained from deep water basins, as well as from shallow, at an open sea, as well as in its coastal zone. A new parameterization model of evaporation and friction velocity from shallow water surfaces under different wind velocities was done.

Results of model and measurements of the energy/mass exchange intensity of small shallow lake (LITFASS-experiments) was comparison. The validation of this model with the eddy covariance measurements of the LITFASS-98 and LITFASS-2003 experiments showed good results for the wind sector, with good fetch conditions and a water surface in the footprint area. Therefore, one may use the model presented for calculating the evaporation of lakes, where a standard data set of wind velocity, air and water temperature, and air moisture is available.

In should be also regarded that in a coastal zone the air flux is transformed and it brings to the additional calculation difficulties for the intensity of the energy-mass exchange there. There are numerous experimental and theoretical research for this zone, including the thorough study at the internal boundary layer (IBL) structure. Though, as before, the quantitative magnitudes estimations of turbulent fluxes at this point differ a lot (up to 100%) by various authors.

Based on the own experimental data of the basin depth influence on the water/atmosphere interaction intensity there has been developed a balance model for calculation of the energy/mass exchange intensity in a coastal zone. A balance model in combination with the empirical dependence for calculation of the energy/mass exchange intensity in a coastal zone allows to calculate the momentum, heat and humidity fluxes values at different distances from a shore.