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On the possible FLake model ecological applications

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Abstract

To describe the processes in water ecosystems a simple one-dimensional ecological model was developed on the base of the thermohydrodynamical model FLake (http//lakemodel.net). New model, termed FlakeEco, represents an "ideological twin" of the FLake model. By the same way as the FLake model, it is based on the self-similar representation of the vertical distribution of the variable under study and has the same numerical scheme of solution. In the case of the FLakeEco the model variables are as follows,

- dissolved oxygen;
- nutrients (phosphorus);
- phytoplankton primary production;
- phyto- and zooplankton biomass;
- mass fluxes within the water column and across the free surface and water-sediments boundary.

The FlakeEco model assimilates the FLake outputs (water temperature, upper mixed layer thickness, heat fluxes across the water column boundaries, ice thickness and duration of ice period, stress velocity at the water surface) as the input information to perform the temporal and spatial dynamics of variables mentioned above.

Some results from the FLakeEco model applications are presented and future trends of the model development are briefly discussed.