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Operational use of lake models: FLake and LAKE2.0. Initialization, comparison, simulation results

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Alqueva reservoir located in southeast of Portugal is the largest artificial lake in Western Europe. It was filled only in 2004 and now it is essential to study how did it affect the regional environment and local weather regime. To fulfill this, in present work we used Meso-NH atmospheric model and two lake models: FLake, a bulk two-layer physical model for prediction of vertical temperature structure and mixing conditions in lakes, and physical and chemical multilayer model LAKE2.0 for dynamics of temperature, carbon dioxide, methane, and oxygen. Both lake models were initialized and run using data obtained during the field campaign on the reservoir. FLake model coupled to Meso-NH was used in simulation of lake water temperature and heat fluxes, which results were applied to trace the breeze effects of the lake. LAKE2.0 was used in standalone version to assess the water quality due to its ability to simulate lake biochemistry. Initialization of the models, their validation, preliminary results, and aspects of operational usage are shown.