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Groundwater level simulations using a mesoscale hydrological model SWIM

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Integrated water resources management based on the profound understanding of the hydrological cycle may be a suitable tool for alleviating the upcoming water resource crisis. The application of the physically based distributed hydrological models is a significant tool for studies of hydrological behavior of river basins under the change of natural condition and.
The SWIM (Soil and Water Integrated Model) is physically based hydrological models that could be used for impact studies. It is a continuous-time model which works on a daily step and integrates hydrology, vegetation, erosion and nutrients (N-nitrogen and P-phosphorus) at the river basin scale. Its hydrological module is based on the water balance equation, taking into account precipitation, evapotranspiration, percolation, surface runoff and subsurface runoff for the soil column subdivided into several layers. The catchment is spatially subdivided into hydrotops (or hydrologically similar response units) by GIS.
The aim of this study was to examine the ability of this type of the model to simulate the course of the groundwater level in the mesoscale catchment in the Czech Republic. The weekly values of the groundwater table height were compared to the simulated ones at several uniformly distributed locations. In one particular site, the results were also discussed in the context of the soil moisture content. It was found that in the warm period of the year the model is able to simulate satisfactorily both the course of groundwater and soil moisture. Nevertheless, in the winter season the rate of percolation is probably underestimated as the simulated groundwater height is lower than observed and at the same time the soil moisture content is overestimated.

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