IWRM2018-96
8th International Water Resources Management Conference of ICWRS
© Author(s) 2017. CC Attribution 4.0 License.

Distributed Source Pollutant Transport Module Based on BTOPMC: A case study of the Laixi River basin in the Sichuan province of southwest China

Hongbo Zhang (1), Tianqi Ao (2), Maksym Gusyev (3), Hiroshi Ishidaira (4), Jun Magome (4), and Kuniyoshi Takeuchi (4)

(1) kunming University of Science and Technology, Faculty of Electric Power Engineering, Department of hydraulic engineering, China (zhbkmu@gmail.com), (2) College of Water Resources and Hydropower, Sichuan University, Chengdu, China (aotianqi@scu.edu.cn), (3) International Centre for Water Hazard and Risk Management (ICHARM), Public Works Research Institute(PWRI), Tsukuba, Japan (gusyev@icharm.org), (4) International Research Center for River Basin Environment, University of Yamanashi, Kofu, Japan (ishi@yamanashi.ac.jp, magome@yamanashi.ac.jp, takeuchi@yamanashi.ac.jp)

Nitrogen and phosphorus concentrations in Chinese river catchments are contributed by agricultural non-point and industrial point sources causing deterioration of river water quality and degradation of ecosystem functioning for a long distances downstream. To evaluate these impacts, a distributed pollutant transport module was developed on the basis of BTOPMC (Block-Wise Use of TOPMODEL with Muskingum-Cunge Method), a grid-based distributed hydrological model, using the water flow routing process of BTOPMC as the carrier of pollutant transport due a direct runoff. The pollutant flux at each grid is simulated based on mass balance of pollutants within the grid and surface water transport of these pollutants occurs between grids in the direction of the water flow on daily time steps. The model was tested in the study area of the Lu county area situated in the Laixi River basin in the Sichuan province of southwest China. The simulated concentrations of nitrogen and phosphorus are compared with the available monthly data at several water quality stations. These results demonstrate a greater pollutant concentration in the beginning of high flow period indicating the main mechanism of pollution transport. From these preliminary results, we suggest that the distributed pollutant transport model can reflect the characteristics of the pollutant transport and reach the expected target.

Keywords

Pollutant transport; Non point source pollution; BTOPMC; Distributed hydrological model; Muskingum-Cunge Method; Modeling