Desalination and Water Treatment
www.deswater.com

(2022) 238–248

doi: 10.5004/dwt.2022.28728

Application of improved multi-coupling model based on LH-OAT method in water environment simulation

Jianbo Pan[a], Wenjuan Zhang[b], Zhihui Liu[c], Xinping Shi[c], Zhanrui Chen[c,*]

[a]*School of Water Conservancy, North China University of Water Resources and Electric Power, Zhengzhou 450046, China*
[b]*Liaoyuan City Longshan District Agriculture and Forestry Work Station, Liaoyuan 136200, China*
[c]*Huizhou Hydroelectric Construction Engineering Co., Ltd., Huizhou 516003, China, email: czrhzsw@163.com (Z. Chen)*

Received 8 November 2021; Accepted 18 July 2022

ABSTRACT

Throughout this study, the LH-OAT method has been employed to optimize the parameters of the multi-coupling model, together with the improved multi-coupling model, to predict the pollution load scale of the Luxi River Basin in planning year. The conclusion is as follows: Applying the output of HEC-RAS coupling SWAT model, the loosely integrated multi-coupling model established can thoroughly simulate the water cycle in the basin. The average error between the calculated and the measured values of Yujiantan section flow, NH_3–N concentration, and TP concentration is respectively 7.00%, 13.85%, and 20.50%. In planning year, the forecast data of inflow pollution load in Luxi River basin demonstrates that the pollution load of NH_3–N point source into the river is 5,310.8 t/a, and that of non-point source into the river is 645.7 t/a, totaling 5,956.5 t/a; The corresponding data for TP is 531.1 and 89.1 t/a, totaling 620.2 t/a. The predicted spatial distribution of NH_3–N and TP non-point sources can afford solid support for water environment management in the basin.

Keywords: Multi-coupling model; LH-OAT method; Water environment; Prediction

* Corresponding author.