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Sensitivity Analysis of Parameters in Water Quality Models and Water Environment Management

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Author(s)

Dongjun Liu, Zhihong Zou

ABSTRACT

The impacts of changes of various parameters and stochastic factors on water quality models were studied. The impact of deviation of the degradation coefficient on the model results was investigated. The degradation coefficient was decomposed into the exact part and the deviation part, and the relationship between the errors of the water quality model results and the deviation of the degradation coefficient was derived. The impact of changes in the initial concentration on the model results was discussed. A linear relationship between the initial concentration changes and errors in the model results was obtained, and relevant recommendations to the water quality management were made based on the results. The impacts of stochastic factors in the water environment on the water quality model were analyzed. A variety of random factors which may affect the water quality conditions were attributed to one stochastic factor and it was further assumed to be the white noise. The solutions to the water quality model including the stochastic process were obtained by solving the stochastic differential equation. Simulation results showed that the decay trend of the concentration of the solute would not be changed, and that the results would fluctuate around the expectation centered at each corresponding displacement x

KEYWORDS

Water Quality Model; Reclaimed Water; Sensitivity Analysis; Degradation Coefficient; Stochastic Factors

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