



Comparison of numerical schemes for improved prediction model of fecal indicator bacteria in a riverine system

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ABSTRACT

Different numerical schemes for the fate and transport models of fecal indicator bacteria (FIB) were used to predict the concentration of FIB in a creek, which were then compared to a steady state model (QUAL2E). *Escherichia coli* (EC) and enterococci bacteria (ENT) were selected as representative FIB to compare the model performance under different flow and weather conditions in the Gwangju Creek in Korea. The results revealed that model accuracy of the forward time centered space (FTCS) scheme is the highest compared to the upstream, Dufort-Frankel, Crank-Nicolson methods and steady state model (QUAL2E) under dry weather conditions. In wet weather conditions, however, the upstream scheme shows the best performance among the five models. The upstream scheme thus represented a potential method for predicting the fate and transport of FIB originating from nonpoint sources during the rainy season. This study demonstrates that prediction results could vary in response to different numerical schemes and that the amount of discrepancy between the observed and predicted results can be quite significant. We expect that this study could be applied to the water quality forecasting system as a real time management in near future.

Keywords: Fate and transport model; Advection dispersion reaction; Numerical schemes; Fecal indicator bacteria; Nonpoint sources; Meteorological conditions

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