VERIFICATION OF A DYNAMIC STREAM WATER QUALITY MODEL

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Abstract

The implementation of the EU Water Framework Directive requires supporting tools for the integrated water resources management. Computer models are powerful tools to forecast the consequences of all impacts on the ecological system.

For the catchment area of the River Spree a long term steady state water quality model with time steps of one month has been developed (Schlaeger et al., 2003). To reduce time scaling effects a dynamic water quality model is used for months with tansient curves for the quality parameters. Both models are coupled and combined in a nested way. To understand the motivation to deal with long terms of several decades on the one hand and short water resources management processes on the other hand, the environmental background of the River Spree is described.

The full paper focuses on the verification of the unsteady water quality module. After introducing the mathematical basics, three examples for verification are shown. First of all a dynamic concentration within a steady state hydraulic system is analysed. Parameters like numerical dispersion, time step length, computation time and failures in mass balance are discussed. The same parameters are investigated in a second example with transient flow and a dynamic concentration. Finally the Cockburn test case with combined advection and dispersion solute transport is used to compare the results from the numerical model with analytical calculations.

The test cases allow some conclusions concerning the choice on time and space step size. The authors suggest preliminary tests to identify adequate ranges for the numerical parameters.

REFERENCES

Schlaeger F.; Schonlau H. & Köngeter J. (2003): An integrated water resources management approach for the River Spree and its catchment, in: Water Science & Technology, Vol. 47(7–8), pp. 191–199, ISSN 0273-1223.