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SINUDYM – an event-based water quality model for ungauged catchments

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Water quality assessment of surface flow especially in ungauged catchments requires a proper tool. In this paper, the development, testing and application of the SINUDYM (Simplified Nutrient Dynamics Model) model to cope with practical issues (e.g. limited data, error propagation) in a robust way is presented. A simplified model structure and limited model parameters are the most appealing features of the model. With the model, event-based water balance and nutrient transport as well as relevant water quality parameters of the river system can be simulated. All model components are coupled and controlled within one file for use as an operational tool. Here, the Geomorphology Instantaneous Unit Hydrograph (GIUH), a simplified process erosion and sedimentation component, the loading function and the river routing from different existing modeling systems had been adopted and linked together. Furthermore, an add-in Monte – Carlo simulation tool is implemented providing an uncertainty analysis tool for the users. SINUDYM was, among others, applied successfully within a joint German-Vietnamese research project to simulate nutrient dynamics at a small catchment scale during flood events in southern Vietnam. The success of the developed model has proven the importance of selecting suitable model components and a model complexity being adapted to the data availability. For application to catchments with a poor database or to ungauged catchments, only the dominant processes of the nutrient transport should be captured in the model, whereas minor processes may be neglected or treated in a less complex manner.

Key words: SINUDYM, water quality model, nutrient transport, ungauged catchment, uncertainty analysis, Vietnam.