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Prediction of Saturated Hydraulic Conductivity Dynamics in an Iowan Agriculture Watershed

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Abstract : In this study, a physically-based, modelling framework was developed to predict saturated hydraulic conductivity (KSAT) dynamics in the Clear Creek Watershed (CCW), Iowa. The modelling framework integrated selected pedotransfer functions and watershed models with geospatial tools. A number of pedotransfer functions and agricultural watershed models were examined to select the appropriate models that represent the study site conditions. Models selection was based on statistical measures of the models' errors compared to the KSAT field measurements conducted in the CCW under different soil, climate and land use conditions. The study has shown that the predictions of the combined pedotransfer function of Rosetta and the Water Erosion Prediction Project (WEPP) provided the best agreement to the measured KSAT values in the CCW compared to the other tested models. Therefore, Rosetta and WEPP were integrated with the Geographic Information System (GIS) tools for visualization of the data in forms of geospatial maps and prediction of KSAT variability in CCW due to the seasonal changes in climate and land use activities.

Keywords : saturated hydraulic conductivity, pedotransfer functions, watershed models, geospatial tools
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