Calibration of APEX-Paddy Model using Experimental Field Data

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Abstract

The Agricultural Policy/Environmental eXtender (APEX) models have been developed for assessing agricultural management efforts and their effects on soil and water at the field scale as well as more complex multi-subarea landscapes, whole farms, and watersheds. National Academy of Agricultural Sciences, Wanju, Korea, has modified a key component of APEX application, named APEX-Paddy for simulating water quality with considering appropriate paddy management practices, such as puddling and flood irrigation management. Calibration and validation are an anticipated step before any model application. Simple techniques are essential to assess whether or not a parameter should be adjusted for calibration. However, very few study has been done to evaluate the ability of APEX-Paddy to simulate the impact of multiple management scenarios on nutrients loss. In this study, the observation data from experimental fields at Iksan in South Kora was used in calibration and evaluation process during 2013-2015. The APEX auto- calibration tool (APEX-CUTE) was used for model calibration and sensitivity analysis. Four quantitative statistics, the coefficient of determination (R^2),Nash-Sutcliffe(NSE),percentbias(PBIAS)androotmeansquareerror(RMSE)were used in model evaluation. In this study, the hydrological process of the modified model, APEX-Paddy, is being calibrated and tested in predicting runoff discharge rate and nutrient yield. Field-scale calibration and validation processes are described with an emphasis on essential calibration parameters and direction regarding logical sequences of calibration steps. This study helps to understand the calibration and validation way is further provided for applications of APEX-Paddy at the field scales.

Keywords : APEX-Paddy, water quality, modeling, calibration, and validation

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