MODCLARK MODEL: IMPROVEMENT AND APPLICATION

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ABSTRACT

This research is an investigation of a spatially distributed unit hydrograph model. The ModClark model (Peters and Easton, 1997) is an adaptation of Clark's unit hydrograph technique to accommodate gridded NEXRAD precipitation data. In this study, two features were added to the ModClark model: a spatially distributed loss model and a spatially distributed velocity field. A new formula to calculate the spatially distributed velocity field was derived. Maps of spatially distributed runoff curve numbers for Kansas and Oklahoma were developed. The improved ModClark model was applied to 25 storm events on six watersheds. The calibration results are excellent. Two global parameters, the time of concentration and the storage coefficient, were calibrated for each event. Based on the calibration results, two equations to estimate the time of concentration and the storage coefficient were developed. This model and the equations for the two parameters were applied to simulate four storm events on two watersheds. The results are satisfactory.

KEYWORDS: Unit Hydrograph, ModClark Model, GIS, NEXRAD, Spatial Distributed