

## **An integrated distributed watershed model with channel network for rainfall–runoff simulation**

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**Abstract** An integrated distributed watershed model with channel network for rainfall–runoff simulation is presented. Interception is estimated by an exponential model based on leaf area index (LAI). The Green-Ampt Mein Larson (GAML) model is used for the estimation of infiltration in the watershed. For runoff estimation, diffusion wave equations are solved using the finite element method (FEM), together with application of the channel network concept. Interflow is simulated using the FEM-based model. A geographic information system (GIS) was used to prepare the input data required for the distributed model. The developed channel network based distributed model was applied to Peacheater Creek watershed, USA. The model performed well on some validation events, but not on all of them. The problems may be due to topographic complexities, or to differences in the characteristics between the calibration storms and those in the validation data set. The developed model has to be further verified for watersheds at different geographic locations for better validation.

**Key words** channel network; diffusion wave model; event-based runoff; finite element method; GIS; interception; interflow; GAML infiltration model; watershed