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Mixing the Green-Ampt model and Curve Number method as an empirical tool for rainfall excess estimation in small ungauged catchments.

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The Soil Conservation Service - Curve Number (SCS-CN) method is a popular rainfall-runoff model that is widely used to estimate direct runoff from small and ungauged basins. The SCS-CN is a simple and valuable approach to estimate the total stream-flow volume generated by a storm rainfall, but it was developed to be used with daily rainfall data. To overcome this drawback, we propose to include the Green-Ampt (GA) infiltration model into a mixed procedure, which is referred to as CN4GA (Curve Number for Green-Ampt), aiming to distribute in time the information provided by the SCS-CN method so as to provide estimation of sub-daily incremental rainfall excess. For a given storm, the computed SCS-CN total net rainfall amount is used to calibrate the soil hydraulic conductivity parameter of the Green-Ampt model. The proposed procedure was evaluated by analyzing 100 rainfall-runoff events observed in four small catchments of varying size. CN4GA appears an encouraging tool for predicting the net rainfall peak and duration values and has shown, at least for the test cases considered in this study, a better agreement with observed hydrographs than that of the classic SCS-CN method.