Presenting the Mathematical Model to Determine Retention in the Watersheds

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Abstract : This paper based on the principle concepts of SCS-CN model, a new mathematical model for computation of retention potential (S) presented. In the mathematical model, not only precipitation-runoff concepts in SCS-CN model are precisely represented in a mathematical form, but also new concepts, called "maximum retention" and "total retention" is introduced, and concepts of potential retention capacity, maximum retention, and total retention have been separated from each other. In the proposed model, actual retention (F), maximum actual retention (Fmax), total retention (S), maximum retention (Smax), and potential retention (Sp), for the first time clearly defined, so that Sp is not variable, but a function of morphological characteristics of the watershed. Indeed, based on the mathematical relation of the conceptual curve of SCS-CN model, the proposed model provides a new method for the computation of actual retention in watershed and it simply determined runoff based on. In the corresponding relations, in addition to Precipitation (P), Initial retention (Ia), cumulative values of actual retention capacity (F), total retention (S), runoff (Q), antecedent moisture (M), potential retention (Sp), total retention (S), we introduced Fmax and Fmin referring to maximum and minimum actual retention, respectively. As well as, ksh is a coefficient which depends on morphological characteristics of the watershed. Advantages of the modified version versus the original model include a better precision, higher performance, easier calibration and speed computing.

Keywords : model, mathematical, retention, watershed, SCS

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