An Objective Procedure for Drainage Network Recognition

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The estimate of model's parameters is a central feature for the application of rainfall runoff models. The applicability of a GIUH-based network response model is conditioned by the identification of the proper drainage network. Among the various filtering criteria that can be found in the literature for channel recognition from digital elevation models, the one using contributing area slope shows interesting features. Nevertheless, the area-slope criterion has been poorly applied, mainly because of the difficulties in objectively defining the appropriate threshold values. In this work, a structured approach to assess the area-slope threshold value is proposed within the hydrologic applications perspective. The resulting channel network is then used as input to a semi-distributed, event-based rainfall-runoff model able to describe severe rainfall events in small, steep basins. This model accounts for network and hillslope contributions to the total dispersion in the routing process, a key factor in determining the main features of the hydrologic response. In a geomorphologically homogeneous region, the set of model parameters shows interesting invariance properties with respect to storm and basin characteristics.