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Hillslope and Channel Routing Processes in Flood Formation

GIORGIO ROTH[1], FRANCESCA GIANNONI[2], ROBERTO RUDARI[1]

[1] *CIMA - Universities of Genoa and Basilicata*

[2] *CMIRL - Agenzia Regionale per la Protezione dell Ambiente Ligure*

The identification of channel initiation points is central to geomorphology and hydrology. The Geomorphologic Instantaneous Unit Hydrograph (GIUH) concept is extensively used to describe surface water transport phenomena in small catchments. Recent works pointed out the relative importance, in specific environments, of three different sources of dispersion in characterizing the hydrologic response function through the GIUH application: geomorphologic, kinematic and hydrodynamic. The present work shows that, accounting for a correct representation of geomorphologic and kinematic dispersions – only due to the differences between hillslope and channel routing process – is sufficient to determine the main features of the hydrologic response in small steep catchments. An objective procedure for the calibration of the geomorphologic filter used to distinguish between hillslope and channel paths is applied to identify the drainage network for several catchments. Different case studies are presented.