Emphasis On Drainage Morphology And Spatial Variability In Hydrologic Simulations: The DRiFt Model.

F. Giannoni[a], G. Roth[b] and R. Rudari[a].
(CIMA - Centro di Ricerca in Monitoraggio Ambientale, University of Genova,
Via Cadorna 7, 17100 Savona, Italy; +39 019 230271, fax. +39 019 862612,
DIAM - Dipartimento di Ingegneria Ambientale, University of Genova,
Via Montallegro 1, 16146 Genova, Italy, +39 010 3532432
e-mail: giorgio@diam.unige.it)
[a] Ph. D. Student
[b] Professor

Abstract. DRiFt (Discharge River Forecast), a semi-distributed event model on a geomorphologic approach, is presented. This model is centered on a proficient description of the drainage system in its essential parts: hillslopes and channel networks are addressed with two kinematic scales, which determine the base of the geomorphologic response of the basin. A threshold expression based on drained area and local slope, able to furnish a non-uniform drainage density throughout the basin, is used to identify channel initiation. Model's parameters calibration - carried out using different intense rainfall events in varied sizes basins - had leaded to identify a unique set of parameters in the whole region where this model is applied. This invariance has been proved to be essential for the application of the model as a link between rainfall and flood frequency analyses, i.e. to settle the local index value, used to makes dimensional the discharge growth curve in each site. This is usually a critical point: in gauged sites the time series average is sometimes sufficient, while in non-gauged sites the estimation of the index value could be carried out by coupling rainfall regional statistics with DRiFt model. Because of the great site sensitivity of the discharge variable, information about the drainage basin should be introduced: this hydrological model uses a distributed description of topography and soil characteristics satisfying this need.
This approach solves the tricky problem of finding out a correlation among the discharge index value and some physical characteristics of non-gauged sites and it is proved to correctly reproduce the statistics of gauged ones. This constitutes a fair validation test for the model itself.