



Spatial analysis of rainfall variation using variogram model parameters of X-band radar images in a small mountainous catchment

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The present study deals the rainfall spatial variability of a small mountainous catchment, which includes the spatial distribution and variability of convective and stratiform events. This work focuses on the precipitation events with hydrological response in Venero-Claro Basin (Avila, Spain). In this basin of 15 square kilometers, flood events of different magnitudes have been often registered. Therefore, any improvement in understanding rainfall characteristics in the area can be of special importance in rainfall estimation and hence to calibrate and validate hydrological models. These enhancements imply more objectivity of risk studies and more predictive and preventive capacity.

To separate events by origin it has been used the dimensionless index defined by Monjo (2015), according to the relative temporal distribution of maximum intensities. The main advantages of this method are that it does not require thresholds, so it can be applied for each rain gauge. The geostatistical variogram tool is used to quantify the spatial characteristics of both kinds of events. Hourly rainfall accumulations over the area are computed with observations from one of the 5 existing X-band radar in Spain and 7 rain gauges located in the zone. For each hour the rainfall variogram model has been fitted with the aid of the X-band radar images.

Valuable information is extracted from the stratiform and convective ensembles of variogram models. The variogram model parameters are analyzed to determine characteristics of spatial continuity that differentiates stratiform and convective events, and quartiles of sills and ranges in both ensembles are compared.