

Heavy precipitation events in the Cevennes-Vivarais region, France: analysis of precipitation maxima and of the within-catchment rainfall variability over a range of spatial and temporal scales.

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A high-resolution (1 hour, 1 km²) rainfall reanalysis has been produced for the 2007-2014 period using radar and raingauge data through geostatistical estimation methods (ordinary kriging for the raingauge data, kriging with external drift for the merging of radar and raingauge data). A first part of the proposed work is aimed at characterizing the distribution of maximum rainfall values as well as the areal and temporal reduction factors (ARF, DRF) over a range of spatial and temporal scales relevant for flash-flood prediction in that region. Such statistics are important both for engineering applications and rainfall modelling studies. In a second part, normalized indices of rainfall variability within a catchment (in terms of rain volume location - upstream vs downstream - and concentration) are computed for a sample of head catchments with surfaces in the range of 5 to 500 km². In addition to the expected surface dependence of these statistics, this work allows us to identify specific rain events and catchments for which the within-catchment rainfall variability is likely to significantly impact the hydrological response. For both studies, the comparison of the OK and KED rain products allows us to assess the added value of radar data with respect to the raingauge network.