We have addressed the variability of precipitation at different spatial and temporal scales via the study of the areal reduction factors (ARF) of precipitations. Our objective was to improve our knowledge of event-based ARF, and possibly to try and assess statistical ARF for hydrological prediction purposes. The temporal scale considered covers the range of durations usually addressed when working with flood-triggering rainfalls on ungauged catchments in France i.e. from 1 hour to 72 hours. The spatial scale covers the range of sizes of these catchments, i.e. from 25 km² to 900 km².

We have led our study on an event basis thanks to the observation of recent rainfall events monitored by a radar network at the hourly time-step over the French Mediterranean area. We have examined if the event-based ARF follow a general law which could be extrapolated for a statistical use. Such a law would ease the estimation of the quantiles of catchment rainfall using maps of rainfall quantiles provided at the spatial resolution of 1 km² over France by the SHYREG method (Arnaud, et al., 2008) which implements a regionalized stochastic hourly rainfall generation model. A better knowledge of the statistical ARF of precipitation should help us to better assess the statistical ARF of discharge (D-ARF). This D-ARF is needed, in the SHYREG method, to calculate the runoff estimate at the outlet of any catchment, for a given return period and duration, knowing the specific runoff estimates for the same return period and duration, on each 1-km² of France.