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# MEDUSA: MEthodology for the Definition of the Uncertainty associated to event ScenArios

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In order to quantify the uncertainty associated to flood events scenarios we need a complete toolset for the management of uncertainties at each level of the hydrometeorological forecasting chain. This toolset should eventually aim to evaluating predictive cumulative distribution functions (PCDF) of ground effects for flood forecasting. Here we present an application of the MEDUSA methodology developed in recent years at CIMA for mountanious environments and experimentally used by the Italian Civil protection Agency. The chain includes a stochastic component and is based on a sequence that links numerical weather prediction models, meteorological ensemble prediction systems, stochastic rainfall downscaling procedures and rainfall-runoff models. The most innovative application does not concentrates on single targeted prediction sates but considers the extension of results to regions with homogeneous hydrological response to extreme events, in order to strengthen the robustness of the PCDF evaluations.

In this work we test the methodology on case studies in the Mediterranean area by using LAMI (Limited Area Model Italy) forecasts, the recently introduced downscaling procedure RainFARM, and the semi-distributed rainfall-runoff model DriFt. In particular we present an example of the application of the methodology to small scale mountainous basins.