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An ensemble approach for spatial interpolation of precipitation fields

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Hydrometeorological hazard management requires to rely on reliable statistical rainfall estimations. Ensemble rainfall estimation procedures allow for characterizing the uncertainty associated with interpolation process by providing an estimate of uncertainties in the precipitation field. Here we discuss a technique that generates an estimate of the interpolated field with associated uncertainty derived from the importance sampling of an ensemble of precipitation fields where individual members can be considered as different possible realizations of the same constrained precipitation field. Constraining may be given from point raingauges only with known prior error statistics or both point data and maps.

To evaluate the performances of the algorithm we test it on a dataset of surrogate raingauges measurements extracted from rainfall events measured by the C-POL radar of Mt. Settepani (Liguria, Italy) and we verify its performance in terms of standard probabilistic scores compared to more common interpolation techniques such as kriging.