The use of NWP forecasts to improve an ensemble nowcasting technique

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Quantitative Precipitation Nowcasting (QPN) is one of the main different applications of radar observations. The most widely used algorithm is Lagrangian extrapolation. It shows skill in specifying the timing and location of the precipitation over short time periods, but shows low skill when using past precipitation trends to predict changes in precipitation intensity. On the other hand, Numerical Weather Prediction (NWP) models have roof skill at predicting the precise timing an location of precipitation although it provides useful information about the intensity trends. It is therefore appropriate to use this additional information provided by NWP to improve QPN.

SBMcast (Berenguer et al., 2011) is an ensemble nowcasting algorithm based on Lagrangian extrapolation of recent radar observations. It generates a set of future rainfall scenarios (ensemble members) compatible with the observations and preserving the spatial and temporal structure of the rainfall field according to the String of Beads model. This study proposes an alternative methodology to add additional information provided by high-resolution NWP with the objective to constrain the spread of the precipitation ensembles generated with SBMcast.

Conventional scores have been used to compare the original and the new configurations of SBMcast with two reference algorithms: deterministic Lagrangian extrapolation, and the probabilistic “Local Lagrangian” technique [the one that demonstrated the best skill, among those analyzed by Germann and Zawadzki (2004)]. The results have been obtained for a set of rainfall episodes in the vicinity of Barcelona, Catalonia (Spain) using the observations of the Catalan Weather Service radar network.

References

Berenguer, M., D. Sempere-Torres, and G. Pegram, 2011: SBMcast-An ensemble nowcasting technique to assess the uncertainty in rainfall forecasts by Lagrangian extrapolation. Journal of Hydrology, 404, 226-240.

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