Clustering ensemble forecasts for hydrological applications

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Limited area Ensemble Prediction System (LEPS) forecasts are based on evolving, with a high resolution non hydrostatic model, a few selected representative members of an Ensemble Prediction System (EPS): In order to construct probabilistic forecast products it is often suggested to weight each LEPS member with the numerosity of the corresponding EPS cluster.

On the other hand clusters defined at a synoptic scale need not translate into suitable clusters at small scales. This makes it not obvious that this strategy will succeed when the small scales play a crucial role, such as in the construction of hydrological forecast products.

Here we explore and discuss this issue by examining distributions of total rainfall volumes predicted by the EPS system at different scales in space and in time. We illustrate how clustering based on synoptic fields at a large scale does not lead to corresponding clusters in terms of this variable. In some applications the resulting clusters are not significantly distinguishable from a random selection.