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Physical controls on the scale-dependence of ensemble streamflow forecast dispersion

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Abstract. The accuracy of ensemble streamflow forecasts (ESFs) is
impacted by the propagation of uncertainty associated with quanti
precipitation forecasts (QPFs) through the physical processes occu
the basin. In this study, we consider consistent ESFs (i.e., observa
and ensemble members are equally likely) and we study the effect
area (*A*) and antecedent rainfall (AR) on the ESF dispersion, a metr
flood forecast skill. Results from a set of numerical experiments ind
that: (i) for small basins ($\lesssim$180 km^2), ESF dispersion is mainly domi
the runoff generation process and does not depend on the basin s
(ii) for larger areas, ESF dispersion decreases with *A* according to a
linear relation due to the decreasing variability of ensemble QPFs a
possibly, to the channel routing process. In addition, we found tha
regardless the basin size, the ESF dispersion decreases as AR incr
and that the influence of AR is larger for basins with fast response
Physical controls (land cover, soil texture and morphometric featur
the analyzed basin response confirm these interpretations.

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