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Configuration tests for an EnKF system over the Western Mediterranean for extreme weather events

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The incursion of current forecasting systems into the realm of the kilometric scales, which explicitly resolves convective dynamics, opens new questions regarding the most relevant and influential sources of uncertainty to be accounted for in ensemble forecasting systems. We use an Ensemble Kalman Filter system to sample the space of uncertainties in the initial conditions by assimilating multiple sources of observations (in-situ and remote sensing). The system is intended to improve the forecasts of extreme weather events in the western Mediterranean such as heavy rainfall, strong winds, large hail or tornadic events. We initialize the data assimilation cycles with the ECMWF global EPS forecasts and generate diversity in the forecasting ensemble with multiple physical parameterization configurations.
In this work we discuss the results of a collection of tests performed to assess the quality of the probabilistic forecasts produced by the configurations under study. In particular, the influence of the initialization strategy, the ensemble size, the physical parameterizations, and the assimilation process in the forecast of extreme phenomena is investigated. Results are presented in terms of the probability of severe convection and heavy precipitation.