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Observation Impact in a Convective-Scale Localized Ensemble Transform Kalman Filter

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In operational weather forecasting, knowledge about the impact of different observations is crucial to refine the observing and data assimilation system. However, assessing this quantity by direct computation (data denial experiments) is usually not feasible because of its high computational cost. This has motivated the derivation of approximated forms of observation impact. While methods that rely on the adjoint model have had quite some success, they are not always practical to implement. As an alternative, an ensemble-based algorithm has recently been suggested [1, 2]. This has now been implemented for the future limited-area ensemble system of Deutscher Wetterdienst (DWD). The peculiarities for an application on this scale include a strongly non-linear behavior and a typically small localization length. While the former can be expected to be skillfully treated by the ensemble algorithm, the latter imposes constraints for a reasonable choice of lead time. This talk shows the feasibility and distinctive features of the method for a convective-scale setup, presents examples from a pre-operational application at Deutscher Wetterdienst, and discusses the sensitivity to lead time, localization and verification norm.

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[2] Junjie Liu and Eugenia Kalnay. Estimating observation impact without adjoint model in an ensemble Kalman filter. Quarterly Journal of the Royal Meteorological Society, 134(634):1327–1335, 2008.