

P13 Impact of atmospheric data assimilation on the prediction of shallow and deep convective clouds near the SGP site during HI-SCALE.

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The Community Gridpoint Statistical Interpolation (GSI) system is used to assimilate atmospheric data in coupling with the Weather Research and Forecasting (WRF) model. In addition to operational surface, upper air, and satellite data, the meteorological measurements collected during the Holistic Interactions of Shallow Clouds, Aerosols, and Land-Ecosystems (HI-SCALE) field campaign and at the ARM Southern Great Plains (SGP) site are assimilated to optimize the regional analysis. The impact of data assimilation on simulated shallow and deep convective clouds is quantified. The three-dimensional variational assimilation (3DVar) and ensemble-variational (3DEnVar) hybrid schemes implemented in GSI are employed as the core of assimilation, providing choices of background errors. For all assimilation experiments, a spin-up forecast is conducted within four nested WRF domains before the assimilation, helping generate fine-scale feature through nonlinear interactions. Cycling of data assimilation then proceeds at 6-hour intervals for one day. The assimilated experiments are compared with forecasts without data assimilation and evaluated quantitatively with observed meteorological data. Experiments are performed with and without ARM data, to assess the value of the SGP megasite and HI-SCALE measurements. Overall, data assimilation has positive impact on both the analyses and predictions. In the future, we anticipate data assimilation as a tool to reduce the uncertainties associated with initial conditions, so that we can focus on issues associated with model parameterizations.