

## Challenges for convective-scale data assimilation

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While convection-permitting (km-scale) regional models have led to significant improvements in the forecast of convective precipitation and orographic effects, the associated data assimilation systems for estimating the model initial state lag far behind global data assimilation systems. Most regional data assimilation systems still do not use cloud-affected satellite data although these provide the first area-wide signal of convection. Radar observations are often assimilated using a simple latent heat nudging approach instead of assimilating the full 3D reflectance information.

The talk summarized major challenges for convective-scale data assimilation, which are (1) the estimation of model errors and covariances, (2) efficient and accurate observation forward operators, (3) observation operator non-linearity and non-Gaussian error distributions and (4) systematic errors in the model representation of hydrometeors and orographic effects. Furthermore, the talk will show recent and ongoing research to address and overcome these challenges.