

Improved Initialization and Prediction of Clouds in Numerical Weather Prediction

Thomas Auligné^a, Gael Descombes^b, and Francois Vandenberghe^b

^a *National Center for Atmospheric Research, Boulder, Colorado, USA, auligne@ucar.edu,*

^b *National Center for Atmospheric Research, Boulder, Colorado, USA.*

The initialization of cloud parameters is one of the next frontiers for improving short-term prediction skills in numerical weather prediction models. We will present the latest developments in building a capability to accurately initialize cloud microphysical parameters based on satellite observations. Retrieved cloud optical properties and also all-sky satellite radiances from multiple infrared and microwave sensors are assimilated in the Weather Research and Forecasting (WRF) numerical model. The prototype uses a hybrid ensemble/variational data assimilation system with an augmented control variable for clouds, flow-dependent multivariate background errors and specific developments to address non-linearities in the observation operator and non-Gaussian error distributions related to cloud parameters. The impact of the cloud initialization on subsequent forecasts will be demonstrated.