ATS/CIRA Colloquium

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Visiting ATS from NCAR

Analysis and Prediction of Clouds using Satellite All-Sky Radiances: Lessons Learned and Perspectives

Hosted by Chris O'Dell

Friday, October 24, 2014

ATS room 101; Discussion will begin at 11:15am
Refreshments will be served at 10:45am in the weather lab

The initialization of cloud parameters is one of the main frontiers for improving short-term prediction skills in numerical weather prediction (NWP) models. We will present the latest developments at the National Center for Atmospheric Research (NCAR) in building a capability to accurately initialize cloud parameters based on all-sky satellite observations assimilated in the Weather Research and Forecasting (WRF) numerical model. Two approaches have been considered:

1) a nowcasting system with a simplified cloud fraction. The analysis is designed to closely fit radiance observations and the NWP model dynamically transports clouds without involving the physics. This method is computationally efficient and useful for short-term forecast since it does not suffer from the typical imbalances often associated with model re-initializations.

2) a multivariate analysis including the microphysics parameters. It relies on a hybrid ensemble/variational data assimilation system with an augmented control variable for clouds. Specific developments to address non-linearities in the observation operator and non-Gaussian error distributions will be presented. We will also introduce original algorithms to correct for position errors and estimate the analysis error within the variational data assimilation system.

The current analysis shows a sustained impact on cloud forecast, yet there are still many challenges data assimilation will need to address to optimize the use of satellite all-sky observations.

Link to colloquium videos and announcement page: http://www.atmos.colostate.edu/dept/colloquia.php