MMM SEMINAR SERIES

Toward unified convection-allowing analysis and forecast systems over large domains

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Large-domain, convection-allowing forecasts have traditionally been initialized by interpolating analyses from convection-parameterizing models onto high-resolution model grids. While this approach has had some success, convection-allowing forecasts may be improved if they are initialized from convection-allowing *analyses* possessing the same resolution as the forecasts they initialize.

This presentation describes several large-domain (3200 x 2460 km^2), continuously cycling, convection-allowing analysis systems with 4-km horizontal grid spacing that subsequently initialized 36-hr, 4-km WRF model forecasts. The analysis systems employed either a three-dimensional variational (3DVAR) algorithm or a "hybrid" variational-ensemble data assimilation (DA) algorithm, which primarily differ regarding the background error covariances (BECs). Specifically, hybrid DA incorporates flow-dependent BECs representing "errors of the day" while 3DVAR DA does not.

Objective verification statistics illustrate clear benefits of initializing 4-km forecasts from true 4-km 3DVAR and hybrid analyses, rather than from downscaled 20-km 3DVAR and hybrid analyses. However, all hybrid-initialized forecasts, including those initialized from downscaled 20-km hybrid analyses, were more skillful than forecasts initialized from 4-km 3DVAR analyses, suggesting that analysis method (i.e., hybrid vs. 3DVAR) contributes more to forecast quality than analysis resolution.

In addition to describing these results, this presentation discusses how the findings apply to initialization of next-generation convection-allowing ensemble prediction systems.

This seminar will be webcast live at:
http://www.fin.ucar.edu/it/mms/fl-live.htm

Recorded seminar link can be viewed here:
https://www.mmm.ucar.edu/events/seminars

Wednesday, 02 March 2016, 11:00 AM
Refreshments 10:45 AM
NCAR-Foothills Laboratory
3450 Mitchell Lane
Bldg. 2 Main Auditorium, Room 1022