Evaluation of background error models for JEDI-based data assimilation with GFS and GEOS.

Daniel Holdaway*[1], Benjamin Ménétrier[1,2], and Catherine Thomas[3]

[1]Joint Center for Satellite Data Assimilation – 3300 MITCHELL LANE, BOULDER, CO, 80301, United States

[2]Institut de recherche en informatique de Toulouse – Centre National de la Recherche Scientifique : UMR5505 – 118 Route de Narbonne, F-31062 Toulouse Cedex 9, France

[3]NOAA National Centers for Environmental Prediction – 5830 University Research Court, College Park, MD 20740, United States

Abstract

The Joint Center for Satellite Data Assimilation's (JCSDA's) Joint Effort for Data assimilation Integration (JEDI) will be used to initialize future versions of NOAA's Global Forecast System (GFS) and NASA's Goddard Earth Observing System (GEOS). FV3-JEDI will form the interface between the atmospheric component of these models and the JEDI system, performing data assimilation with JEDI algorithms directly on the cubed-sphere grid. One of the difficulties when developing any data assimilation system is in constructing a suitable background error model, and using the native grid introduces a number of novel challenges. In this presentation we will discuss the work that is being done at the JCSDA to construct the background error model for GFS and GEOS. The work utilizes the infrastructure that the JCSDA has put in place for enabling use of a range of background error models with any grid. We will show some scientific evaluation for the various flavors of static background error model, including different balance operators and covariance models. We will also demonstrate the use of the models for producing a stand-alone analysis. Localization of ensemble covariance in JEDI can be done with fixed length scales or dynamic length scales diagnosed from an ensemble. We will show some comparison of these approaches for GFS and GEOS and discuss the tuning of both localization and static background errors.

Keywords: JEDI, GFS, GEOS, FV3, background error, localization, balance

*Speaker