

Data Assimilation for the Unified Forecast System: Plans for GFS Version 16 and Progress of JEDI

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Following the successful implementation of version 15 of the NCEP Global Forecast System (GFS) and transition to the Finite Volume on the Cubed Sphere (FV3) dynamic core, work is underway toward the next suite of data assimilation upgrades to be included as part of version 16. Version 16 will continue to utilize a hybrid 4D-EnVar solver based on the Gridpoint Statistical Interpolation (GSI), doubling the number of vertical layers in the model and raising the model top to approximately 80km. Additionally, many science changes are under final development and testing for the data assimilation component of the package. Some of the proposed changes include replacement of the Ensemble Serial Filter (EnSRF) with the Local Ensemble Transform Kalman Filter (LETKF) for the ensemble perturbation update, 4D incremental analysis update (IAU), improvements to the inline near sea surface temperature (NSST) analysis, use of inter-channel correlated observation errors for satellite radiances, and semi-coupled land updates as forced by observed precipitation. Additional changes will be incorporated to account for the new model layer specification, including normal mode initialization, changes to stratospheric humidity increments, satellite channel selection and bias correction. This presentation will provide details regarding some of the components that have been finalized for inclusion as part of GFSv16. Results from low resolution prototypes as well as full-resolution pre-implementation testing will be discussed. Finally, a brief overview and update on the progress of the Unified Forecast System (UFS) and Joint Effort for Data assimilation Integration (JEDI) project will be provided.