

Progress and plans for the use of radiance data in the NCEP global and regional data assimilation systems

John Derber¹, Xu Li², Yanqiu Zhu², Emily Liu³, Russ Treadon¹, Rahul Mahajan², Daryl Kleist¹, Catherine Thomas², Paul van Delst², and Andrew Collard²

¹NOAA/NCEP/EMC ²MSG@NOAA/NCEP/EMC ³SRG@NOAA/NCEP/EMC



11th May 2016 Global Model Upgrade

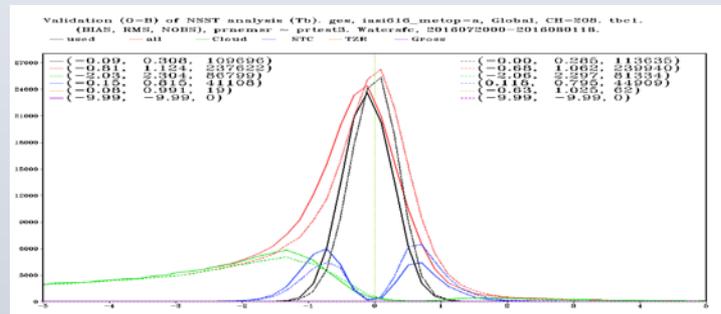
- Upgrade the 3D Hybrid Ensemble-Variational to 4D Hybrid Ensemble-Variational Data Assimilation
- Assimilate all-sky AMSU-A Radiances
- Assimilate AVHRR winds and monitor VIIRS winds
- Update Community Radiative Transfer Model (CRTM) to v2.2.1 with bug fixes in wind direction, use of FAST Microwave Emissivity Models (FASTEM-6 and FASTEM-X) reflection correction for cloudy situations
- Improve bias correction for aircraft.

19th July 2017 Global Model Upgrade

- Implement Near Sea-Surface Temperature (NSST) Analysis.
- Implement CrIS full resolution data assimilation capability.
- Implement readiness for GOES-16, JPSS-2 and COSMIC-2 data assimilation capability.
- Extend ATOVS Retransmission Services (RARS) and Direct Broadcast Network (DBNet) capability.
- Upgrade land surface type specification in Community Radiative Transfer Model (CRTM).
- Update data monitoring for Megha-Tropiques SAPHIR and Global Precipitation Measurement (GPM) Microwave Imager (GMI) radiances.
- Assimilate VIIRS Atmospheric Motion Vectors and implement log-normal wind quality control for AMVs.
- Assimilate GOES clear-air water vapor winds.
- Assimilate additional GPSRO observations.
- Upgrade data assimilation monitoring package.

Future Development

- Extension of all-sky microwave to ATMS (Poster 5p.02 by Yanqiu Zhu)
- All-sky infrared assimilation (Poster 5p.03 by Li Bi)
- Cloud-cleared radiances for infrared observations (Poster 9p.09 by Haixia Liu)
- Correlated observation errors (Poster 12p.04 by Kristin Bathmann)
- Assimilation of JPSS radiances (Poster 9p.02 by Jim Jung and Poster 4p.01 by Andrew Collard)
- Extension of the use of hyperspectral infrared water vapor channels
- Assimilation of Saphir and GMI
- Assimilation of OMPS-N retrievals.
- Upgrade to GFDL microphysics with an increased number of hydrometeor types.
- Improved stochastic physics, scale dependent localisation, lagged and shifted ensembles.



NSST Analysis improves background fit to surface sensitive observations, including IASI channel 208.