



# An Update on NRL Atmospheric Data Assimilation Activities

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NAVGEN v1.1

NAVGEN v1.2

NAVGEN v1.2.1

Mar2013 Jun2013 Sep2013 Dec2013 Mar2014 Jun2014 Sep2014

GNSS-RO TPD

ATMS Assimilation

IASI Water Vapor

GNSS-RO Observation Error

Ozone Assimilation Capability

SSMIS F19 Assimilation

BUFR Radiosonde

Radiosonde data are now being transmitted BUFR messages. This may contain additional information, but also has produced many encoding errors.

GNSS-RO TPD

Note how GNSS-RO TPD better handled fit between 8 - 35km. The other obvious change was raising the assimilation ceiling to 60km.

ATMS Assimilation

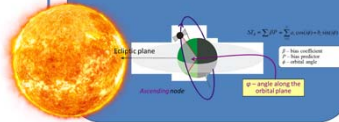
Radgrams

Zonal Innovation

ATMS radgrams and zonal means of innovation over 30 days shows consistent behavior with that of other microwave sounders.

The UAS channels from SSMIS are going to be activated using a new bias predictor based on orbit angle.

SSMIS UAS Orbit Angle Predictor

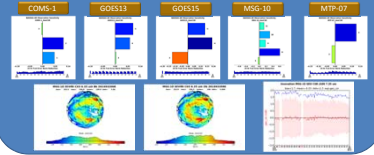


CrIS Assimilation

CrIS assimilation has been prepared and is undergoing operational testing with promotion scheduled by end of 2015.

GeoCSR assimilation has been prepared and is undergoing operational testing with promotion scheduled by end of 2015. Himawari-8 data is currently being evaluated.

GeoCSR Assimilation



IASI Water Vapor

When the IASI water vapor channels were added fit to radiosonde and water vapor channels in the microwave were shown to both improve.

Correlated Ob Error

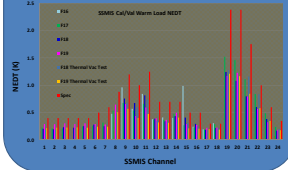
Correlated observation error is being prepared for ATMS, and the hyperspectral IR: AIRS, IASI and CrIS.

GNSS-RO Error

Additional tropospheric quality control was applied for GNSS-RO observations. Also the error model used was updated and now has a latitudinal dependence.

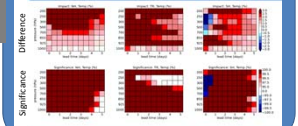
The SSMIS from DMSP-F19 was added in Dec2014 and has shown good radiometric performance within specification.

SSMIS DMSP F19



Hybrid DA

An ensemble of 80 members is being used to create and background error estimate which can be blended with the current static model, creating a dynamic background error. This is the main addition for the NAVGEN v1.4 release.



BUFR Radiosonde

CrIS Assimilation

GeoCSR Assimilation

SSMIS UAS

Correlated Error

Hybrid-DA

Ozone Assimilation

The ability to assimilate Ozone profiles from DMSP and SBUV2 was added. However, due to missing photochemistry in the stratosphere this remains inactive.

Sep2014 Dec2014 Mar2015 Jun2015 Sep2015 Dec2015 Mar2016

NAVGEN v1.3

NAVGEN v1.3.1

NAVGEN v1.4

NAVGEN - Navy Global Environmental Model  
NAVDAS-AR - NRL Atmospheric Data Assimilation System - Accelerated Representer  
SSMIS-UAS - Special Sensor Microwave Imager/Sounder - Upper Atmospheric Sounder  
GNSS-RO TPD - Global Navigation Satellite System - Radio Occultation Tangent Point Drift  
GeoCSR - Geostationary Clear-Sky Radiance