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

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1 NOAA/NCEP/EMC 2 IMSG @ NOAA/NCEP/EMC 3 SRG @ NOAA/NCEP/EMC 4 NOAA/NESDIS/STAR

Current use of satellite radiance data
Monitoring web site - http://www.emc.ncep.noaa.gov/gmb/gdas/

Global

all thinned to 145km

GOES-15 Boulder
Channels 1-15
SEVIRI
Channels 1-15
NOAA-15
Channels 1-10, 12-13, 15
NOAA-18
Channels 1-8, 10-13, 15
NOAA-19
Channels 1-7, 9-13, 15
METOP-A
Channels 1-6, 8-13, 15
METOP-B
Channels 1-13, 15
AQUA
Channels 6, 8-13
AMSU-B/MHS
NOAA-18
Channels 1-5
NOAA-19
Channels 1-5
METOP-A
Channels 1-5
METOP-B
Channels 1-5
HIRS
METOP-A
Channels 2-15
AIRS
AQUA
120 Channels
IASI
METOP-A
165 Channels
CrIS
SNPP
84 Channels

Added in August 2013 Upgrade

Regional

AMSU-A
NOAA-15
Channels 1-10, 12-13, 15
NOAA-18
Channels 1-8, 10-13, 15
NOAA-19
Channels 1-7, 9-13, 15
METOP-A
Channels 1-6, 8-13, 15
Aqua
Channels 6-8, 13
Thinned to 60km
AMSU-B/MHS
NOAA-18
Channels 1-5
METOP-A
Channels 1-5
Thinned to 60km
HIRS
METOP-A
Channels 2-15
Thinned to 120km
AIRS
AQUA
148 Channels
Thinned to 120km

Global Model Summer 2014 Upgrade

IASI
MetOp-B 165 Channels
SSMIS
F17 1-3, 5-7, 24
F18 1-7, 24
Enhanced bias correction (talk 10.02 by Y. Zhu)

CRTM Upgrade to v2.1.3 (FASTEM-5).
QC improvements to AMSU-A

Ongoing NCEP/JCSDA satellite data assimilation developments

Assimilation of cloudy radiances
Various IR and MW approaches
(e.g. Cloud Cleared Radiances poster 9p.02 by H. Liu)
Improved use of IASI/AIRS/CrIS moisture channels
Radiance based SST analysis (includes diurnal cycle)
4D-Ensemble-Var

SSMIS bias correction and assimilation

Bias correction predictors used are:

<table>
<thead>
<tr>
<th>const offset</th>
<th>zero angle</th>
<th>cloud liquid water</th>
<th>lapse rate</th>
<th>lapse rate square</th>
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<tbody>
<tr>
<td>q1</td>
<td>q2</td>
<td>q3</td>
<td>q4</td>
<td>q5</td>
</tr>
</tbody>
</table>

Node is +1 if ascending, -1 if descending

Application of NWP Bias Correction for SSMIS F18

15 Jan to 30 Mar 2012 (60Z cycles only)

SSMIS bias correction and assimilation