Use of radiances in the operational global assimilation system at Météo-France

Florence Rabier
Élisabeth Gérard
Thibaut Montmerle
Delphine Lacroix
Operational events

- End 2002
  - AMSUA raw radiances

- End 2003
  - HIRS

- End 2004
  - AMSUB
  - EARS

- March 2005
  - AMSUA AQUA
Assimilation of AMSUB data

<table>
<thead>
<tr>
<th>Conditions for use</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>9 &lt; scan position &lt; 82</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sea</td>
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<td>✓</td>
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<tr>
<td>Land orog&lt;1500m/1000m for channels 3/4</td>
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<td>Ts &gt; 278 K and</td>
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<td>ob-fg</td>
<td>ch 2 &lt; 5 K</td>
<td>✓</td>
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In a similar way as for AMSUA & HIRS data:

- Scan and air-mass bias correction
- 250 km horizontal thinning
Mean TCWV increments and analysis difference

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<th>Sea</th>
<th>Land</th>
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</thead>
<tbody>
<tr>
<td>Globe</td>
<td>1.0</td>
<td>0.4</td>
<td><strong>2.5</strong></td>
</tr>
<tr>
<td>N. Hem</td>
<td>0.8</td>
<td>-0.0</td>
<td>2.0</td>
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<tr>
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<td>0.2</td>
<td>3.0</td>
</tr>
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…To be compared to impact of HIRS data (with / without HIRS)

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Zonal mean analysis difference

Stronger Hadley cell
Spring scores wrt radiosondes (17 Mar – 3 Apr 2004)

Red: degradation from AMSUB
Green: improvement from AMSUB

RMS, std dev. and bias errors (without minus with AMSUB data) for geopotential [m] as a function of forecast and vertical ranges

RMS         Std dev.         Bias

Northern Hemisphere

Southern Hemisphere

Tropics
Assimilation of AMSUB data - Conclusion

- Increase of humidity over land
- Better balance between first guess and analysis
- Positive impact on forecast scores
EARS data

(Eumetsat ATOVS Retransmission Service)

Goal: ATOVS data available for short cut-off times and in regional applications

Data:
• Levels 1a and 1c radiances
  AMSU-A, AMSU-B et HIRS

Received at CMS with EUMETCAST,
Orbits reconstructed with no redundant data from level 1a

Percentage of AMSU-A data received in 30 min
« EARS-Lannion » data

Produced since February 2004

Level 1c radiances calibrated by CMS from level 1a radiances (EARS and locally received at Lannion).
Number of additional data assimilated

AMSU-B for 2005/05/10 12Z, Cut-off time: 1h50

Global data

EARS data
Number of additional data assimilated

2004/05/01 0Z

Cut-off times:
1h50
8h10
EARS data assimilation experiments

- **Processing**
  identical to global radiances, same bias correction

- **Forecast impact**
  slightly positive over Europe

Geopotential scores wrt Radiosondes

(2 weeks)
AIRS data assimilation experiments

**Data used**

64 channels, data over sea, clear pixels

**Preliminary results**

very slightly positive

250hPa wind scores wrt Radiosondes
(2 weeks)
Outlook

- AIRS
- Work on surface emissivity for AMSU and AIRS
  (posters by Hua and Karbou)
- Meteosat CSR
- MODIS winds
- SSMI (/S)
- Retuning of satellite radiance errors