Current Status of EUMETSAT Operational Winds

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Content of talk:

Current spacecraft status and planned configurations
Current status of EUMETSAT winds
Major evolutions since last IWWS
  LEO AMVs
  ASCAT winds
  GEO AMVs
Introduction of major changes
  Example RTM
Reprocessing activities
Conclusions
 EPS Operations Planning

• 2010:
  – Approach to Metop-A EOL operations to be agreed
  – Operational debris warning service from NOAA / USAF expected to be activated
  – Ops Prep for Metop-B to be performed.

• 2011:
  – Antarctic Data Acquisition Demonstration Service (McMurdo) to improve data timeliness (9 out of 14 orbits)
  – Validation of combined Metop-A/B operations

• 2012:
  – Metop-B launch, commissioning and routine ops start

• 2014:
  – ADA Operational Service Start (all orbits)
LEO Spacecraft Operations

**Metop-A with instruments generally in very good health**

Channel 7 on AMSU-A exhibits out of spec noise

Small spectral anomaly noted on IASI ground-processing affecting in particular detector 2 (for certain wavelengths up to 0.5 K bias). Cause identified (uncorrected Gibbs effect), improved PPF under development by CNES.

**Metop-B launch planned for 2012**

Parallel operations of Metop-A and -B foreseen until end of commission of Metop-C!

Final decision/configuration depends on instrument health

**Metop ADA extraction service to start 2011, full service 2014**
**Metop-A Status**

- **DHSA**: Redundant CCU I/O Board. Further investigation of I/O Board planned following a possible future PLSOL outage.
  - Incident raised on ULFAR reception of unidentified command packet header
- **HRPT**: B unit in restricted operation
- **AMSU A1**: Noise on Channel 7 exceeding specification
- **GOME-2**: Throughput testing performed August and September 2009.
- **IASI**: patch uploaded to allow autonomous recovery on certain SEUs (September 2009.)
- **A-DCS**: frequency complaints under investigation
- **In-plane manoeuvre** planned December 2009.
Polar winds status

Support to MODIS wind dissemination on-going

Metop AVHRR winds

=> see Greg’s talk

Taster =>
**Metop ASCAT winds**

- EUMETSAT derives sigma 0’s
- OSI SAF derives winds
- Service availability and quality is HIGH
- Improved orbit normalisation
  - Improved sigma-0’s
  - Reduced requirements for frozen orbit => fuel savings!
- Note: Fast extract service for Northern hemisphere is operational!

**Oceansat-2**

- Discussion are ongoing with ISRO to secure NRT global data
- Coordinated effort with NOAA
- Potential scenario includes data acquisition in Svalbard, L1 processing at EUMETSAT, and wind derivation by OSI SAF
• EARS-ASCAT L2 products coverage from the X-Band Fast-Extract System:

KNMI perform L2 processing of EARS-ASCAT products (wind speed and direction over the oceans at 12.5 and 25 km resolution).

EARS Geographical Coverage: Current (24%)

- Gilmore Creek
- Edmonton
- Monterey
- Kangerlussuaq
- Gander
- Wallops Svalbard
- Lannion
- Athens
- Maspalomas
EARS Geographical Coverage: Planned (32 %)

By Adding: Moscow • Muscat • La Reunion
**MET-9** at 0° → Prime mission. A Safe Mode in August 2009 (after the one in April 2009) due to a Single Event Upset (SEU) on the on board computer.

**MET-8** at 9.5°E → Backup to Met-9 and RSS. No significant in-orbit anomalies to report. The S/C is beyond its specified lifetime (i.e. 7 years). Successful NS inclination manoeuvre in Oct 09.

**MET-7** at 57.5°E → IODC service. No new in-orbit anomalies to report. A few tests to define a new S/C configuration are planned to support the IODC DCP mission during eclipse.

**MET-6** at 67.5°E → IODC DCP and backup to Met-7. No new in-orbit anomalies. A re-orbiting date for Met-6 is under definition (worst case → Autumn 2010).
Space billiards!

- Met-8 drift start
- Met-9 drift start
- Met-10 drift start
- Met-7 start of RSS
- Met-9 drift stop/RSS start
- Met-9 drift stop
- Met-8 RSS stop/FES start
- Met-8 drift stop
- Met-6 in a graveyard orbit
- No IODC DCPs in eclipse
- MSG-3 Comm
- MSG-4 Comm
- MSG-3 Launch
- MSG-4 Launch
<table>
<thead>
<tr>
<th>Product</th>
<th>Satellite</th>
<th>Region</th>
<th>Bulletin header</th>
<th>Product times</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Sky Water Vapour Winds</td>
<td>Meteosat-7</td>
<td>IODC</td>
<td>IXCN01-IXCN03 IXCS01-IXCS03</td>
<td>Every 1.5 h 00:00,01:30...</td>
</tr>
<tr>
<td>Expanded Low Res Winds</td>
<td>Meteosat-7</td>
<td>IODC</td>
<td>IXCN05-IXCN11 IXCS05-IXCS11</td>
<td>Every 1.5 h 00:00,01:30...</td>
</tr>
<tr>
<td>High Res Water Vapour Winds</td>
<td>Meteosat-7</td>
<td>IODC</td>
<td>IXCN13-IXCN22 IXCS13-IXCS22</td>
<td>Every 1.5 h 00:00,01:30...</td>
</tr>
<tr>
<td>High Resolution Visible Winds</td>
<td>Meteosat-7</td>
<td>IODC</td>
<td>IXCN24-IXCN29 IXCS24-IXCS29</td>
<td>Every 1.5 h 00:00,01:30...</td>
</tr>
<tr>
<td>Atmospheric Motion Vectors</td>
<td>Meteosat-9</td>
<td>Africa/Europe</td>
<td>IUVA01-IUVA89 IUVD01-IUVD89 IUVE01-IUVE89 IUVH01-IUVH89 IUVI01-IUVI89 IUVL01-IUVL89</td>
<td>Hourly 00:45,01:45...</td>
</tr>
<tr>
<td>RSS AMVs</td>
<td>Meteosat-8</td>
<td>Europe</td>
<td></td>
<td>Every 20 mins 00:20,00:40...</td>
</tr>
</tbody>
</table>
Upcoming MPEF Changes

MSG MPEF transition to new hardware spring 2010
  From HP to SUN, hence major undertaking, now on the last stretch

New release strategy (both MTP and MSG)
  No more incremental releases, major releases 2-3 times a year (a’la ECMWF)

MTP Cross-calibration with MSG
  To resolve outstanding MTP calibration issues, tests on-going

Long term (2011/12)
  Transition from real-time processing to batch processing
  ⇒ Simpler maintenance
  ⇒ Simpler validation
  ⇒ Small impact on timeliness (minutes)
Changes to AMVs in the near future

Small increase in processing area

\[65^\circ \Rightarrow 67.5^\circ\]

After new hardware \(\Rightarrow\) planned Q2/2010

Increase forecast levels for RTM & height assignment

Implementation Q4 2010

Operational Q1 2011

For rapid scan issues see Manuel’s talk

For improvements in methodologies see Regis’ talk
The RTM Change (+ surface emissivity maps)

Change from SYNSATRAD to RTTOV

Motivation

- Significant improvements in RTTOV since the start of MPEF operations
- Savings in processor time (particularly required for iterative retrievals)
- Synergies between data producer and users

Issues

- RTMs are at the core of the MPEFs
- All products are affected
- Direct impact on AMV height assignment
- Indirect impact via cloud detection
## RTTOV Product Validation: AMV product, Daily Stats

<table>
<thead>
<tr>
<th>All AMV's</th>
<th>AQC</th>
<th>AMV's QI &gt; 80%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TOT</td>
<td>HGH</td>
</tr>
<tr>
<td><strong>WV 6.2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPE-B</td>
<td>11113</td>
<td>9057</td>
</tr>
<tr>
<td>Diff</td>
<td>-40</td>
<td>-326</td>
</tr>
<tr>
<td>% of OPE</td>
<td>-0.4</td>
<td>-3.6</td>
</tr>
<tr>
<td><strong>WV 7.3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPE-B</td>
<td>11710</td>
<td>5142</td>
</tr>
<tr>
<td>Diff</td>
<td>-38</td>
<td>-4</td>
</tr>
<tr>
<td>% of OPE</td>
<td>-0.3</td>
<td>-0.1</td>
</tr>
<tr>
<td><strong>IR 10.8</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPE-B</td>
<td>10254</td>
<td>4629</td>
</tr>
<tr>
<td>Diff</td>
<td>29</td>
<td>58</td>
</tr>
<tr>
<td>% of OPE</td>
<td>0.3</td>
<td>1.3</td>
</tr>
<tr>
<td><strong>VIS 0.8</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPE-B</td>
<td>5916</td>
<td>3077</td>
</tr>
<tr>
<td>Diff</td>
<td>-5</td>
<td>21</td>
</tr>
<tr>
<td>% of OPE</td>
<td>-0.1</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>HRV</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPE-B</td>
<td>14439</td>
<td>8362</td>
</tr>
<tr>
<td>Diff</td>
<td>-25</td>
<td>16</td>
</tr>
<tr>
<td>% of OPE</td>
<td>-0.2</td>
<td>0.2</td>
</tr>
</tbody>
</table>
RTTOV Product Validation: AMV product

10.8 AMV’s, QI > 80, % diff.

- High, >80, % Diff. to OPE
- Med, >80, % Diff. to OPE
- Low, >80, % Diff. to OPE

Emissivity Maps
MOD-JBG
Changes in height assignment as noted by ECMWF
More by Iliana

SYNSATRAD
Tendency to shift AMVs higher

RTTOV
What can we improve

Decoupling of product processing dependencies

The AMVs are complicated enough!

Also applicable to scene and cloud analysis

- Independent SCE/CLA for AMVs or
- Added information to SCE/CLA output such that follow-on processes can tailor the results
- And again, see Greg’s talk!

And how do we validate the impact of changes??

=> See Arthur’s talk and join the special session!
Upcoming reprocessing activities

MSG L1.5 reprocessing to be concluded end 2010/early 2011 (Radiance definition change was introduced in May 2008 see previous IWWS processings)
⇒Followed by MSG MPEF reprocessing in 2011
MTP reprocessing requires improved calibration
⇒Is L1.5 reprocessing required for improved eclipse effect detection?
ASCAT reprocessing after the next calibration campaign
  Improved calibration
  Improved orbit normalisation
## Current users in Europe
From 2008 Customer Satisfaction Survey

<table>
<thead>
<tr>
<th></th>
<th>In Use</th>
<th>Planned</th>
<th>In use</th>
<th>Planned</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMV</td>
<td>10</td>
<td>8</td>
<td>Austria (ZAMG), Denmark, ECMWF, France, Germany (DWD), Greece, Hungary, Italy, Norway, United Kingdom</td>
<td>Bulgaria, Estonia, Finland, Iceland, Ireland, Slovenia, Spain</td>
</tr>
<tr>
<td>ELW IODC</td>
<td>2</td>
<td>3</td>
<td>ECMWF United Kingdom</td>
<td>France, Hungary, Greece</td>
</tr>
<tr>
<td>HWW IODC</td>
<td>2</td>
<td>3</td>
<td>ECMWF United Kingdom</td>
<td>France, Hungary, Greece</td>
</tr>
<tr>
<td>WVW</td>
<td>0</td>
<td>9</td>
<td></td>
<td>Bulgaria, Estonia, Finland, France, Greece, Hungary, Slovenia, Spain</td>
</tr>
</tbody>
</table>
## Current users outside Europe

From 2008 Customer Satisfaction Survey (only 9 replies)

<table>
<thead>
<tr>
<th>In Use or planned</th>
<th>Non-NMS users</th>
<th>NMSs</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMV</td>
<td>6+3 Algeria, Gambia, Malawi, Marocco, Niger,</td>
<td>JMA, Environment Canada, FNMOC USA (NWS)</td>
</tr>
<tr>
<td>ELW IODC</td>
<td>1+2 Morocco</td>
<td>JMA+ 1 Research Institute</td>
</tr>
<tr>
<td>HWW IODC</td>
<td>4+1 Algeria, Malawi, Marocco, Niger</td>
<td>JMA</td>
</tr>
<tr>
<td>WVW</td>
<td>5 Algeria, Malawi, Marocco, Niger</td>
<td>USA (NWS)</td>
</tr>
</tbody>
</table>
Conclusions:

Thank you

Anything else?