ASCAT services status

Julia Figa-Saldaña
Acknowledgments

ASCAT teams at:

**EUMETSAT**: Craig Anderson, Hans Bonekamp, Leonid Butenko, Colin Duff, Jens Lerch, Christelle Ponsard, Arthur de Smet, Julian Wilson

**TU-Wien**: Zoltan Bartalis, Stephan Hassenauer, Vahid Naeimi, Wolfgang Wagner

**KNMI**: Maria Belmonte, Ad Stoffelen, Anton Verhoef, Jeroen Verspeek, Jur Vogelzang

**Met.no**: Lars-Anders Breivik, Steinar Eastwood, Thomas Lavergne

OVWST Meeting, 18-20 May 2010, Barcelona
Outline

Services overview
Instrument
Processing
Re-processing
Archiving and Dissemination
Outreach

News and developments since Boulder 2009
Current areas of work and future plans
## ASCAT products – where do I find what

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>EUMETCast</th>
<th>NOAA</th>
<th>GTS</th>
<th>FTP</th>
<th>EUM Archive</th>
<th>Other archive</th>
</tr>
</thead>
<tbody>
<tr>
<td>s0</td>
<td>swath grid 25 (12.5) km</td>
<td>EPS native, BUFR</td>
<td>EPS native</td>
<td>BUFR</td>
<td>-</td>
<td>EPS native/HDF5 (ground station dumps)</td>
<td>-</td>
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<tr>
<td>s0</td>
<td>Full resolution, 256 samples along each of 6 beams</td>
<td>EPS native</td>
<td>EPS native</td>
<td>-</td>
<td>-</td>
<td>EPS native/HDF5 (ground station dumps)</td>
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<tr>
<td>s0 + wind</td>
<td>swath grid 25 (12.5) km</td>
<td>BUFR</td>
<td>-</td>
<td>BUFR</td>
<td>BUFR</td>
<td>BUFR (orbits from/to ascending crossing)</td>
<td>BUFR (KNMI)</td>
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<tr>
<td>wind</td>
<td>swath grid 25 (12.5) km</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>netCDF</td>
<td>netCDF (orbits from/to ascending crossing)</td>
<td>netCDF (orbits from/to ascending crossing) (KNMI, PODAAC)</td>
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<tr>
<td>soil moist.</td>
<td>swath grid 25 (12.5) km</td>
<td>BUFR</td>
<td>-</td>
<td>BUFR</td>
<td>-</td>
<td>EPS native/HDF5 (ground station dumps)</td>
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<tr>
<td>s0 + wind + soil moist.</td>
<td>swath grid 25 (12.5) km</td>
<td>BUFR</td>
<td>-</td>
<td>BUFR</td>
<td>-</td>
<td>BUFR (orbits from/to ascending crossing)</td>
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</table>

**Gridded products (multi-mission SSM/I + ASCAT+ AMSR-E)**

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<th>Other archive</th>
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</thead>
<tbody>
<tr>
<td>Sea ice edge, type</td>
<td>PolSter grids 10 km</td>
<td>GRIB</td>
<td>-</td>
<td>-</td>
<td>GRIB, HDF netCDF</td>
<td>GRIB</td>
<td>GRIB, HDF, netCDF (Met.no)</td>
</tr>
<tr>
<td>Sea ice drift</td>
<td>PolSter grids 62.5 km</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>netCDF</td>
<td>-</td>
<td>netCDF (Met.no)</td>
</tr>
</tbody>
</table>
All functional and trending indicators are fine. All instrument components still have full redundancy.

Power consumption very stable, drops are traced to instrument switch-off events or other payload events affecting the temperature in the environment of the ASCAT (i.e., IASI heater refuse anomalies)

On 18/02/10, spontaneous ASCAT switch-off over North polar area – 6 hours measurement interruption

- Internal unit temperature
- Antenna temperature
- Voltages

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Last tuning of the calibration on 09/12/08 as a reference to start adapting the existing ERS-based Level 2 models (winds, soil moisture and ice) to ASCAT data.

Implementation of dynamic (orbit-based) Power-to-s0 normalisation on 10/09/09 and start of non-frozen eccentricity orbit phase on 17/09/09.

New transponder calibration campaign 08/03 - 06/05.
Impact of implementation of dynamic normalisation

Our observed impact of the dynamic vs. static normalisation factors was of about 0.005 dB

Manoeuvre produced a jump of 0.002 dB and started their expected oscillation, of the same order of magnitude

But ocean calibration reports a sudden bias of near 0.1 dB for the mid left beam, coinciding with the events above. So far we have not found the root cause of this sudden calibration change.
Sigma0 current issues

sigma0 spatial averaging implementation error for the 12.5 km product

\[ W_x = \alpha_x + (1-\alpha_x)\cos\left(\frac{\pi x}{L_x}\right) \]

\[ W_y = \alpha_y + (1-\alpha_y)\cos\left(\frac{\pi y}{L_y}\right) \]
Sigma0 current issues

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\[ W_x = \alpha_x + (1 - \alpha_x) \cos \left( \frac{\pi x}{L_x} \right) \]

\[ W_y = \alpha_y + (1 - \alpha_y) \cos \left( \frac{\pi y}{L_y} \right) \]
ERS/ASCAT $\sigma_0$ cross-calibration – incidence angle dependent bias

Use of ERS-based geophysical models requires $\sigma_0$ bias corrections

- **Red** – $\sigma_0$ bias correction derived for continuity of ocean winds record
- **Blue** – alternative $\sigma_0$ bias correction achieving a better consistency of soil moisture record

The red curve is currently used for the retrieval of both ASCAT L2 operational products

ERS-ASCAT backscatter and soil moisture comparisons - first results, June 2009

Courtesy of IPF TU-Wien (http://www.ipf.tuwien.ac.at/radar/ascat_ers_intercomparison.pdf)
Development of ASCAT-based C-band wind GMF

On-going evaluation of spatial resolution issues

ASCAT coastal product – demonstration service available for evaluation in near real time
New soil moisture parameter database, based on an ASCAT-only soil moisture time series was just delivered
Sea ice

Sea ice edge and type
Daily maps every 6 h, on a 10 km polar stereographic grid
Bayesian approach combining SSM/I and ASCAT data to obtain an optimal estimation, its probability and uncertainty

Sea ice drift
Ice motion vectors with time span of 48 h, on a 62.5 km polar stereographic grid
Advanced cross-correlation method on pairs of satellite images from SSM/I, AMSR-E and ASCAT
Phase 1 of ASCAT sigma0 and soil moisture reprocessing completed and delivered on 07/12/09

http://www.eumetsat.int/Home/Main/News/OperationalNews/715844?l=en

Consistent data records of ASCAT Sigma0 and soil moisture since June 2007 until present (impact of the mid left beam calibration change in Sept 2009 to be determined)

Winds not reprocessed, because they are consistent from beginning of mission

Phase 2 reprocessing planned for sigma0, winds and soil moisture back to January 2007. When sigma0 calibration confirmed by second transponder campaign and new ASCAT-based GMFs available for winds and soil moisture
All ASCAT wind products now available in all EUMETCast beams

ASCAT soil moisture now available in EUMETCast Europe and Africa

EARS ASCAT winds are now available on the GTS

ASCAT winds **netCDF products** now available in near real time (ftp), EUMETSAT archive and PODAAC
EUMETSAT and NOAA co-organised a training workshop on the use of scatterometer and altimeter wind and wave data in marine forecasting – see poster.
Looking at wind trends – what is the scatterometer point of view?

- Jason-1: Slope = 5.158 cm.s⁻¹/yr
- ECWMF: Slope = 5.889 cm.s⁻¹/yr
- Envisat: Slope = 1.638 cm.s⁻¹/yr
- NCEP: Slope = 2.997 cm.s⁻¹/yr

Trends of 80-m wind speed from NCEP/DOE (19/9-2006)

-0.6 to 0.6 m/s/10yr

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Useful links

ASCAT Products guide
http://www.eumetsat.int/Home/Main/Publications/Technical_and_Scientific_Documentation/EPS_Product_Guides/index.htm

EUMETSAT User Services
www.eumetsat.int

Contact directly the ASCAT team
ascat_calval@eumetsat.int

Ocean and Sea Ice SAF page
www.osi-saf.org

The scatterometer page at KNMI
www.knmi.nl/scatterometer

The scatterometer soil moisture at TUWien
http://www.ipf.tuwien.ac.at/radar/

The sea ice team at Met.no
http://saf.met.no/

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Back-up slides
EARS winds

Addition of AHRPT data to the coverage
Addition of soil moisture values

Current coverage
Coverage of individual AHRPT stations

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<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Maneuver Description</th>
<th>Agency</th>
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</thead>
<tbody>
<tr>
<td>2006/10/21</td>
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<tr>
<td>2006/10/22</td>
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<td>IP GEO double IP, performed by ESOC</td>
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<td>2006/10/22</td>
<td>07:20:35</td>
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<td>2006/11/02</td>
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<td>2007/07/12</td>
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<tr>
<td>2008/01/31</td>
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<td>2008/04/09</td>
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<td>2009/01/22</td>
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<td>2009/12/10</td>
<td>15:31:21</td>
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Product definition
Level 2: Surface soil moisture index (%) in orbit geometry, tailored for NWP assimilation
(Level 3 value-added products are also planned in partnership with the H-SAF)

Service status
Operational since 10/12/08, a tuning of the retrieval for the left beam was introduced at the end of 04/09 Reprocessed data set available covering 2007-2008 available

Next steps
Cross-calibration with ERS scatterometer and removal of s0 bias corrections will be addressed
Data feed from global data dump: 14 Metop dumps/day. Last 30 minutes of ASCAT extracted for further L1b + L2 processing.

Timeliness: 40-45 min for data over equator, 15 minutes from sensing for data over high latitudes!

Service operational since 14/12/08 and EARS SCAT demonstration service runs in parallel.

On going work to adapt the current system to dynamic poser-to-sigma0 normalisation, to process available AHRPT data, and to produce L2 soil moisture as well.
Where can you receive EUMETCast data today?

Multi-service dissemination system based on standard Digital Video Broadcast (DVB) technology. It uses commercial telecommunication geostationary satellites to multicast files (data and products) to a wide user community.

Part of a bigger picture: GEONETCast
http://www.eumetsat.int/Home/Main/What_We_Do/Technical_Cooperations/GEONETCast/index.htm

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