ERS-2 Scatterometer Aft Beam anomaly

Presented by

Giovanna De Chiara
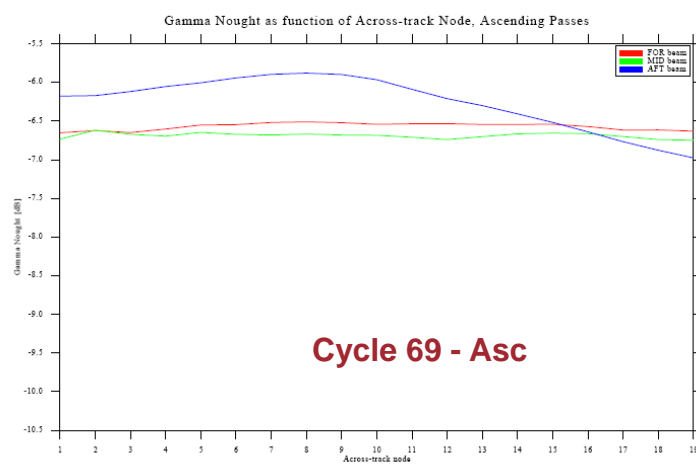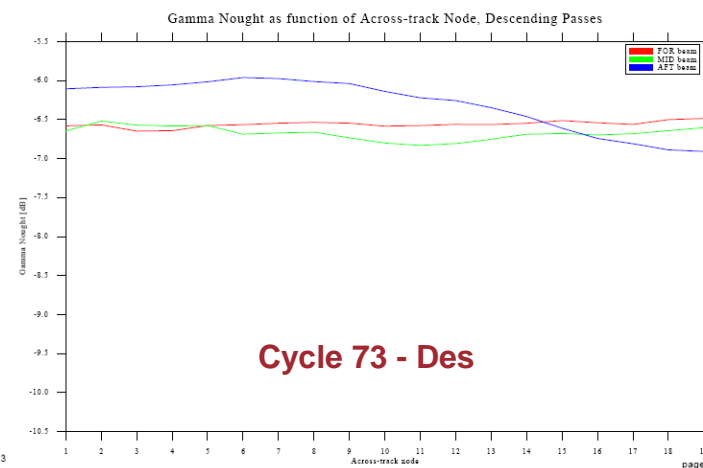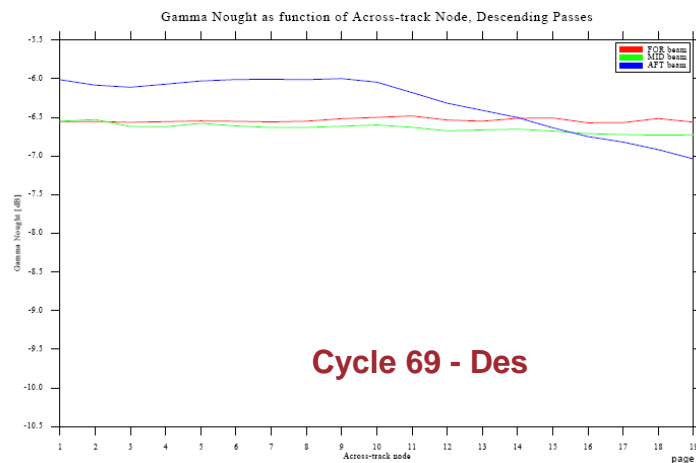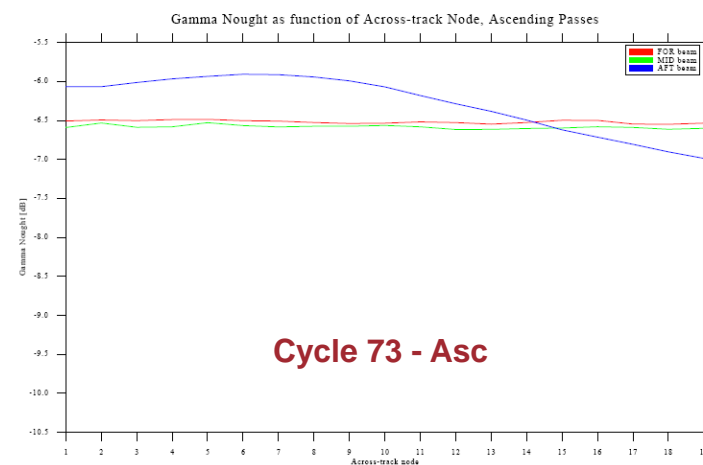**Serco/ECMWF**

Anomaly Detection

- During the QC of ASPS products an anomaly was highlighted for cycles 69 to 74

- From the analysis of the Gamma nought profile a degraded profile was seen for the Aft beam

$$\gamma^0 = \frac{\sigma^0}{\cos\theta}$$

Radiometric Stability Monitoring

Gamma Nought as function of Across-track Node, Ascending Passes

Cycle 69 - Asc

Cycle 73 - Asc

Gamma Nought as function of Across-track Node, Descending Passes

Cycle 69 - Des
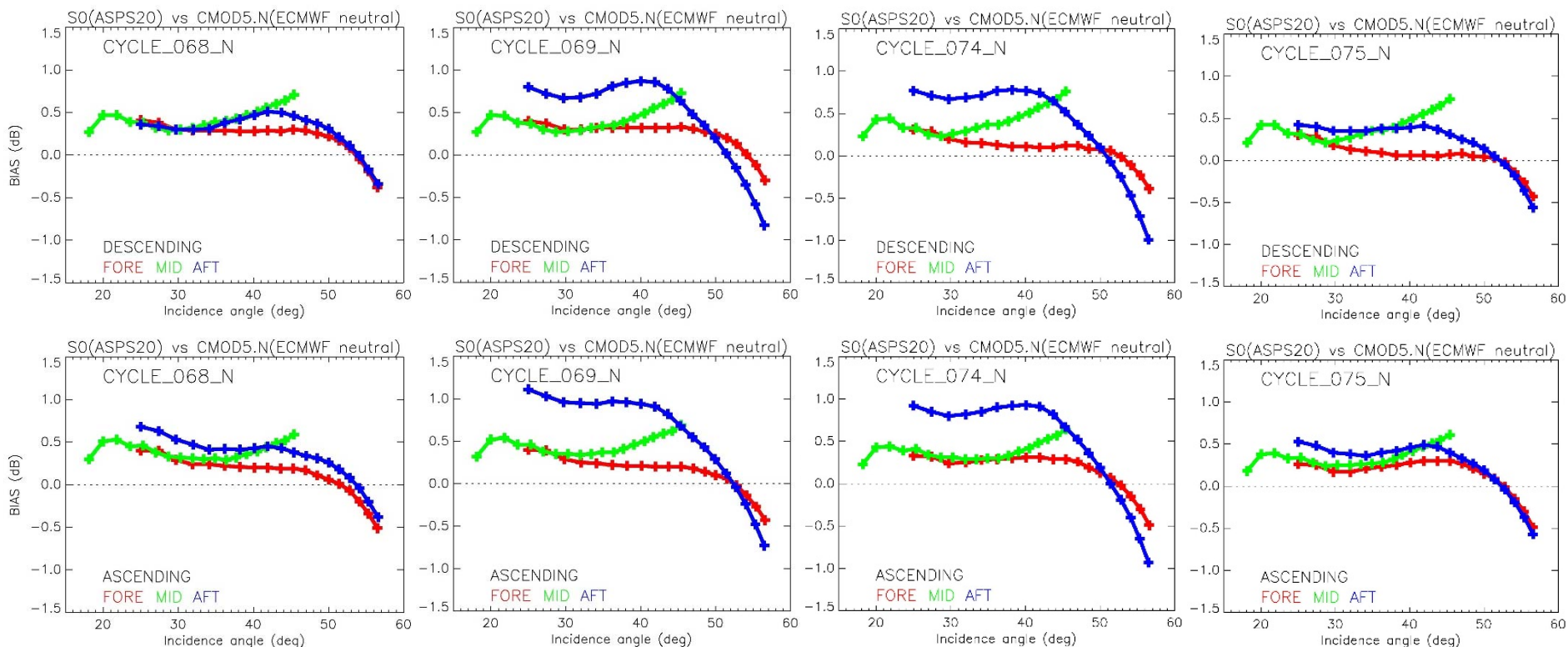
Cycle 73 - Des

The degradation was already noticed in the periodic cyclic report generated after the end of each ERS-2 Scatterometer Cycle but never explained
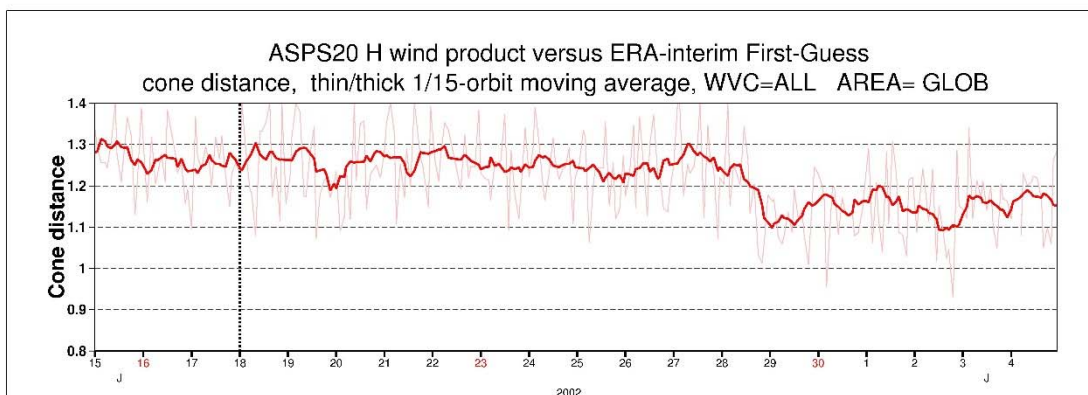
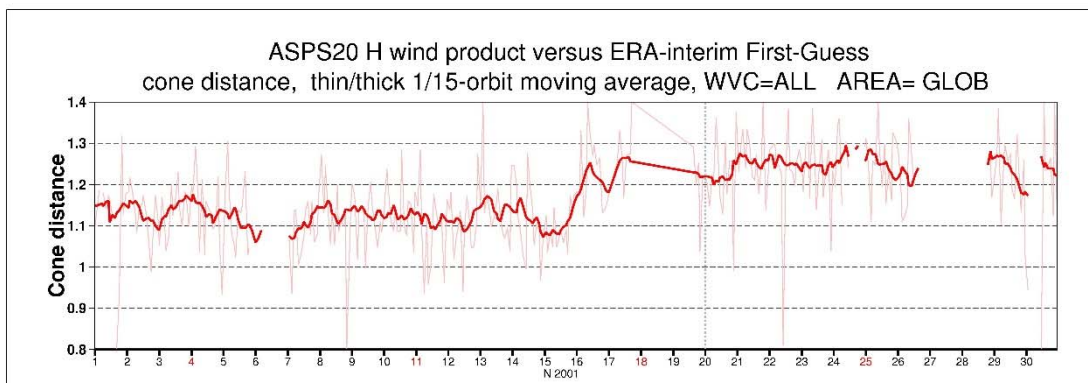**Cycle 72**
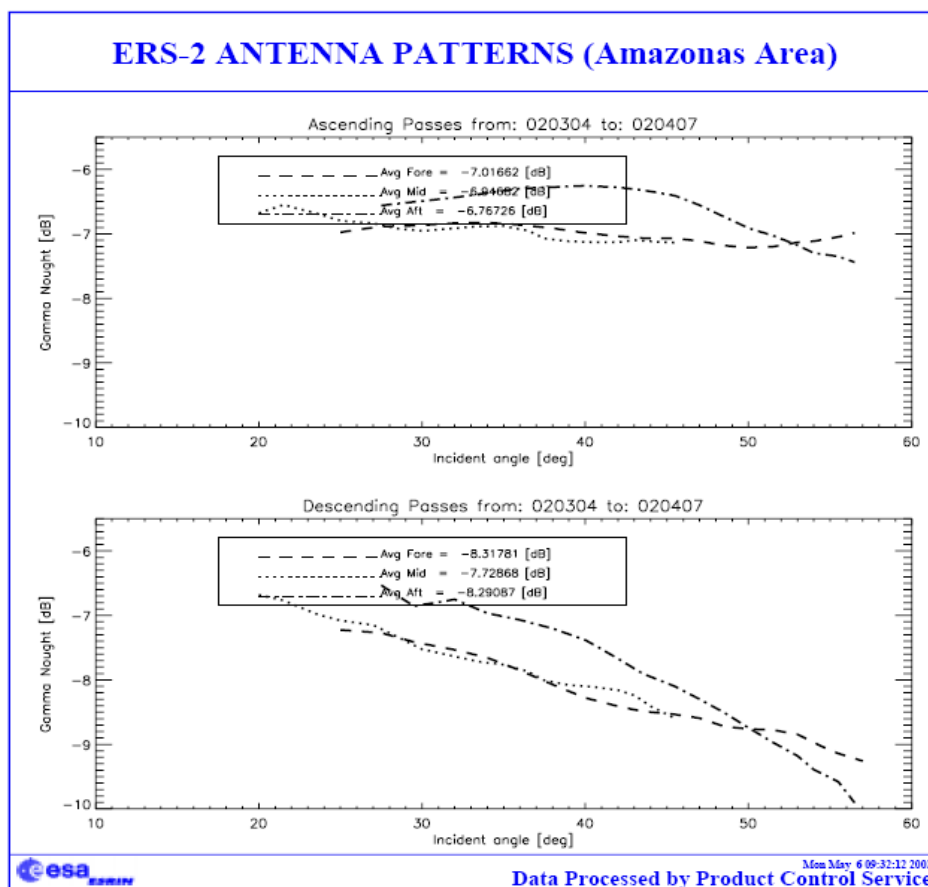
Ocean calibration method: comparison of ASPS backscatter triplets with backscatter simulated from ECMWF neutral winds subjected to CMOD5.N

[H. Hersbach]

ECMWF analysis of the starting and ending date of the anomaly based on the residual of the wind inversion (CMOD model cone distance)
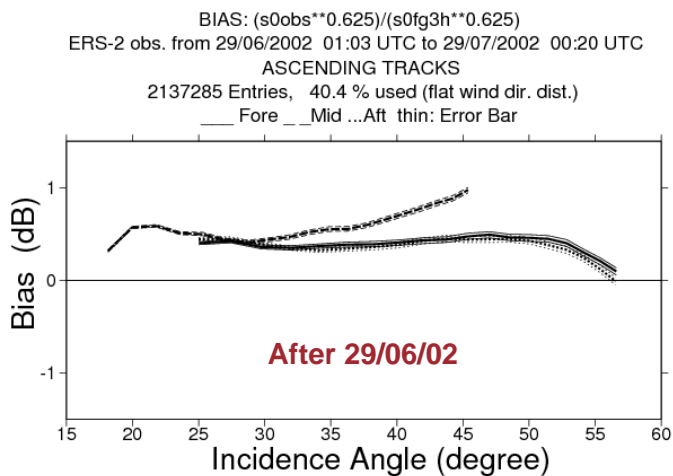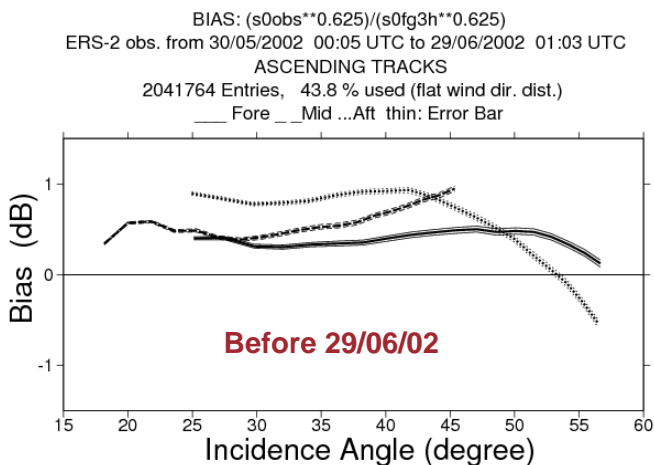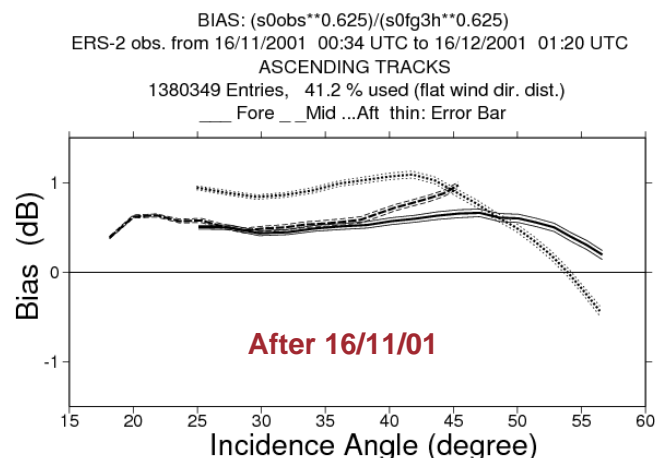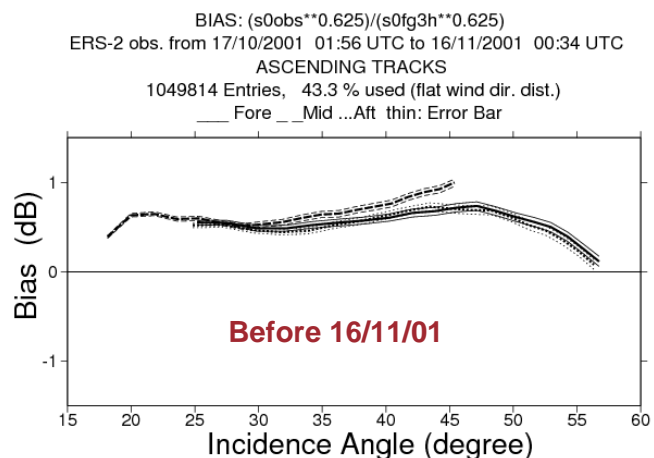

[H. Hersbach]

The anomaly started on *16th November 2001* and lasted until *28th June 2002*.

scirocco
scatterometer instrument
competence centre

Ocean Calibration over 30-day periods before and after the initial and ending date of the anomaly

BIAS: (s0obs**0.625)/(s0fg3h**0.625)
ERS-2 obs. from 17/10/2001 01:56 UTC to 16/11/2001 00:34 UTC
ASCENDING TRACKS
1049814 Entries,   43.3 % used (flat wind dir. dist.)
___ Fore _ _Mid ...Aft thin: Error Bar

Before 16/11/01

BIAS: (s0obs**0.625)/(s0fg3h**0.625)
ERS-2 obs. from 16/11/2001 00:34 UTC to 16/12/2001 01:20 UTC
ASCENDING TRACKS
1380349 Entries,   41.2 % used (flat wind dir. dist.)
___ Fore _ _Mid ...Aft thin: Error Bar

After 16/11/01

BIAS: (s0obs**0.625)/(s0fg3h**0.625)
ERS-2 obs. from 30/05/2002 00:05 UTC to 29/06/2002 01:03 UTC
ASCENDING TRACKS
2041764 Entries,   43.8 % used (flat wind dir. dist.)
___ Fore _ _Mid ...Aft thin: Error Bar

Before 29/06/02

BIAS: (s0obs**0.625)/(s0fg3h**0.625)
ERS-2 obs. from 29/06/2002 01:03 UTC to 29/07/2002 00:20 UTC
ASCENDING TRACKS
2137285 Entries,   40.4 % used (flat wind dir. dist.)
___ Fore _ _Mid ...Aft thin: Error Bar

After 29/06/02

[H. Hersbach]

serco ECMWF TU WIEN GEO Koninklijk Nederlands Meteorologisch Instituut Ministerie van Verkeer en Waterstaat

Investigations Performed - Serco

Checks of events or processing/ground segments/flight segment modification occurred or performed during this period:

1) instrument anomalies (from CR)

2) Flight segment events (with ESOC) regarding look-up tables and doppler compensation tables
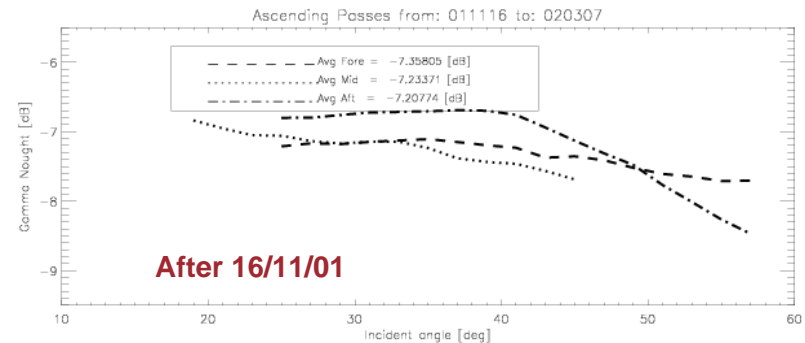
3) yaw evolution anomalies

No particular events found!

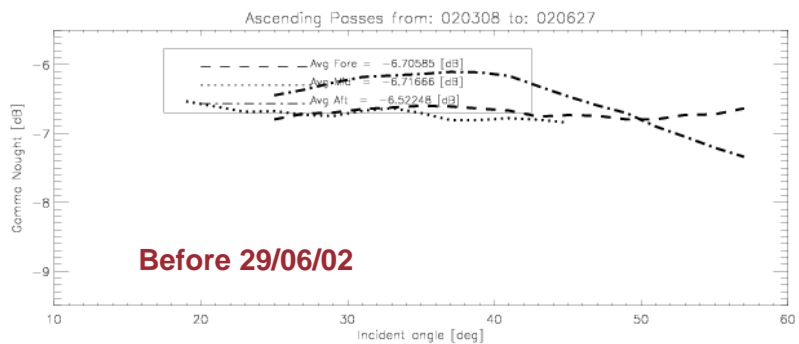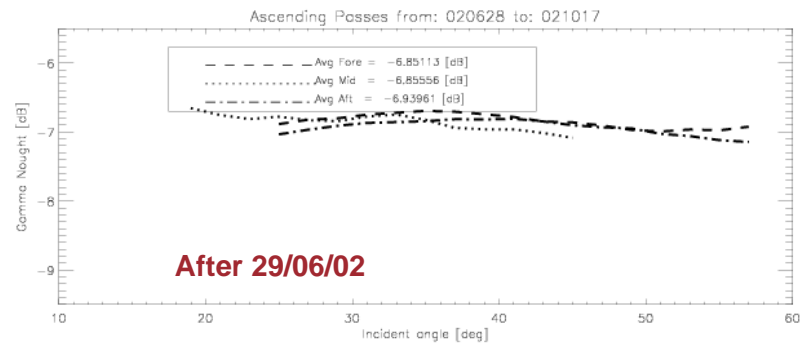Gamma ought profile over 112 days before and after the starting and ending date
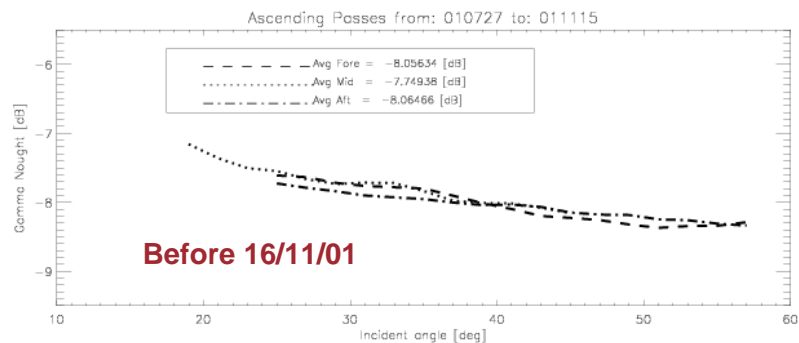
Assimilation of C-band Scatterometer wind data:

1) Sigma nought bias correction

2) Wind inversion using CMOD5.N

3) Wind speed bias correction

Operational products: Sigma nought bias correction and wind speed bias correction computed each time there is an operational change of the instrument calibration

Reprocessed products: Sigma nought bias correction and wind speed bias correction computed usually once and better to be done over an homogenous dataset

A change in the Mid Left beam (0.1 dB) was observed from September 2009 (unknown reasons). It was corrected in operations in August 2011.

For the reprocessing campaign, EUMETSAT decided to compensate for this change to have an homogenous dataset.