DOCUMENT

Lake Huron, USA, on 15th July 2011 (image courtesy of ESA)

MERIS 104TH CYCLIC REPORT

24th June 2011 – 24th July 2011

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1. INTRODUCTION

The MERIS Cyclic Report (CR) is distributed by ESRIN- SPPA (Sensor Performance Products and Algorithms) to keep the MERIS Community informed of any modification regarding the processor, updates of auxiliary products, behavioural anomalies of the instrument, data acquisition and processing, and the status of the Calibration, Validation, and Quality Control activities.

The CR collects the inputs coming from different groups involved in MERIS data exploitation:

- ESRIN- Product Control Facility (PCF)
- Quality Working Group (QWG)
- MERIS Validation Team (MVT)
- Brockmann Consult (BC)
- ACRI-ST
- ARGANS Ltd
- Laboratoire d'Océanographie de Villefranche (LOV)
- Centre National d'Études Spatiales (CNES)
- Frei Universitat Berlin (FUB)
- Laboratoire Interdisciplinaire en Sciences de l'Environnement (LISE)

The main objective of the Cyclic Report is to provide the user community with useful information regarding the performance of the instrument, the data production chain and the results of calibration activities and validation campaigns. The Cyclic Report is produced at the end of each ENVISAT Cycle, which following the E2010+ Orbit manoeuvre during October 2010, represents 431 orbits (approximately 30 days).

1.1 Acronyms and abbreviations

ADF	Auxiliary Data File
ADS	Auxiliary Data Server
AOC	Attitude and Orbit Control (ARTEMIS)
APC	Antenna Pointing Controller (ARTEMIS)
ARTEMIS	The Advanced Relay and TEchnology MISsion satellite
ARF	Archiving Facility (PDS)
CNES	Centre National d'Études Spatiales
CTI	Configuration Table Interface
CR	Cyclic Report
DAC	Diffuser Ageing Calibration
DMOP	Detailed Mission Operation Plan
DOY	Day Of Year
DS	Data Server
DSD	Data Set Descriptor
EDAC	Error Detection and Correction
ESRIN	European Space Research INstitute
FOV	Field Of View
FR	Full Resolution
FUB	Freie Universitat Berlin
GS	Ground Segment
IAT	Interactive Analysis Tool
IDL	Interactive Data Language
IECF	Instrument Engineering and Calibration Facilities
IPF	Instrument Processing Facilities (PDS)
INV	Inventory Facilities (PDS)
JRC	Joint Research Centre
LAN	Local Area Network
LISE	Laboratoire Interdisciplinaire en Sciences de l'Environnement
LOV	Laboratoire d'Océanographie de Villefranche-sur-Mer
LUT	Look Up Table
MERIS	Medium Resolution Image Spectrometer
MPH	Main Product Header
OP	Operational Phase of ENVISAT
OCL	Offset Control Loop
OCM	Orbit Control Manoeuvre
PAC	Processing and Archiving Centre (PDS)
PDCC	Payload Data Control Centre (PDS)
PDHS	Payload Data Handling Station (PDS)
PDS	Payload Data Segment
PEP	Payload Exploitation Plan
QC	Quality Control

QWG	Quality Control Working Group
QUARC	Quality Analysis and Reporting Computer
RGC	Radiometric Gain Calibration
RR	Reduced Resolution
SEU	Single Event Upset
SPH	Specific Product Header
SQADS	Summary Quality ADS
VEU	Video Electronic Unit
WV1	Wavelength Type 1 Calibration
WV2	Wavelength Type 2 Calibration
YSM	Yaw Steering Mode

2. SUMMARY

Cycle #104 began on 24th June (DOY 175) and ended on 24th July (DOY 205). Details about the Cycle can be found in Table 1 below:

Cycle number	**#104**
Start time	24th June 2011, 22:02:42
Stop time	24th July 2011, 22:03:07
Start orbit	48722
Stop orbit	49152

Table 1 – Cyclic Characteristics

3. PROCESSOR VERSION AND PROCESSOR CONFIGURATION

3.1 MERIS Processor Release

During Cycle #104, there were no changes to the MERIS processor configuration

IPF Version	Validity	Reference Documents
5.06	17th June 2010, 09:40 UTC Orbit # 43377 →	1. ENVISAT Product Specification [Iss_5_Rev_B] 2. MERIS Input/output Data Definition [Iss_7_Rev_3a] 3. MERIS Level 1b Detailed Processing Model [Iss_7_Rev_0a] 4. MERIS Level 2b Detailed Processing Model [Iss_7_Rev_2a]

Table 2 – MERIS Processor Parameters – version 5.06

- **Auxiliary data files (ADF)**

Product description	Product name	Comment
Level 1 AUX Files		
Instrument Characterization Data	MER_INS	No change
Processing Level 1 Control Parameters data	MER_CP1	No change
Radiometric Calibration data	MER_RAC	No change
Digital Roughness Model	MER_DRM	No change
Digital Elevation Model	AUX_DEM	No change
Land Surface Map	AUX_LSM	No change
Attitude data file	AUX_ATT	No change
Level 2 AUX Files		
Aerosol Climatology data	MER_AER	No change
Atmosphere Parameter data	MER_ATP	No change
Cloud Measurement Parameters data	MER_CMP	No change
Processing Level-2 Control Parameters data	MER_CP2	No change
Land Aerosols Parameters data	MER_LAP	No change
Land Vegetation Index parameters data	MER_LVI	No change
Ocean Aerosols Parameters data	MER_OAP	No change
Ocean I parameters data	MER_OC1	No change
Ocean II parameters data	MER_OC2	No change
Surface Confidence Map	MER_SCM	No change
Water Vapour Parameters	MER_WVP	No change

Table 3 – Auxiliary Data Files in use for Cycle #104

Note: The other files not included in the list change every time (e.g. ECMWF).

3.2 Level 1/Level 2 Configuration (SciHiO2)

The current operational ADF files, used in the processing from Level 0 data to Level 1b or Level 2 products, are listed in the following tables (Tables 4 & 5).

- **Level 1 ADF configuration:**

Product name	Start Validity
AUX_ATT_AXVIEC20020924_131534_20020703_120000_20781231_235959	03/07/2002
AUX_DEM_AXVIEC20031201_000000_20031201_000000_20200101_000000	01/12/2003
AUX_LSM_AXVIEC20080218_104630_20020101_000000_20200101_000000	18/02/2008
MER_CP1_AXVIEC20050607_065745_20020321_193100_20120321_193100	21/03/2002
MER_DRM_AXVIEC20020122_083343_20020101_000000_20200101_000000	01/01/2002
MER_INS_AXVIEC20050708_134312_20050101_000000_20150101_000000	01/01/2005
MER_RAC_AXVIEC20061009_084736_20061009_220000_20161009_220000	09/10/2006

Table 4 – MERIS Level 1 Auxiliary Data Files

- **Level 2 ADF configuration:**

Product name	Start Validity
MER_AER_AXVIEC20040407_174356_20020321_193100_20120321_193100	21/03/2002
MER_ATP_AXVIEC20050628_123340_20021224_121445_20121224_121445	24/12/2002
MER_CMP_AXVIEC20040407_180835_20021224_121445_20121224_121445	24/12/2002
MER_CP2_AXVIEC20050704_065814_20021224_121445_20121224_121445	24/12/2002
MER_LAP_AXVIEC20050628_124246_20020321_193100_20120321_193100	21/03/2002
MER_LVI_AXVIEC20050704_145357_20020321_193100_20120321_193100	21/03/2002
MER_OAP_AXVIEC20050704_145633_20020321_193100_20120321_193100	21/03/2002
MER_OC1_AXVIEC20050704_145802_20020321_193100_20120321_193100	21/03/2002
MER_OC2_AXVIEC20050628_123950_20020321_193100_20120321_193100	21/03/2002
MER_SCM_AXVIEC20030620_120000_20020321_193100_20200101_000000	21/03/2002
MER_WVP_AXVIEC20040407_181941_20020321_193100_20120321_193100	21/03/2002

Table 5 – MERIS Level 2 Auxiliary Data Files

3.3 Configuration Table Interface (CTI)

No new CTIs were disseminated during Cycle #104.

3.4 Level 1/ Level 2 RR or FR products

No format changes or algorithm modifications regarding MERIS RR and FR products were implemented into the operational processor during Cycle #104.

REMINDER:

In the middle of Cycle #47, some format changes or algorithm modifications regarding MERIS RR and FR products were implemented during the operational processor upgrade from v4.10 to 5.02.

The data changes decided within the Data Quality Working Group (QWG) are listed below:

- New Chlorophyll 1 polynomial characterisation from LOV (Laboratoire d'Océanologie de Villefranche – France)
- Chlorophyll 1 validity range set to [0.01,30.], no PCD raise when out of range
- Troposphere-free MAR99 replaces BLUE-⟨=1.5 (from previous BOMEM runs)
- Gothic R Look Up Table from LOV (Laboratoire d'Océanologie de Villefranche – France)
- Chlorophyll 2 conversion factors from GKSS (revised with latest Neural Network delivery)
- Yellow Substance coding offset and scaling factor changes (linear to log scale, same range)
- Chlorophyll coding range changes ([-2,2] in log10 scale instead of [-3,3] previously)
- Whitecaps threshold set to 10 $m.s^{-1}$
- New Case 2 Neural Network from GKSS (with and without linear reflectances as input)
- White scatterer threshold set to 4.8
- MTCI threshold on B13-B8 difference set to 0.05, on B10-B8 to 1e-6 (numerical purpose only), ceiling for B8 set to 0.3, floor for B9 to 0.1
- Preliminary version of LARS Look Up Tables from Hygeos

For further details concerning the changes, please refer to the documentation available at:
http://earth.esa.int/pcs/envisat/meris/documentation/MERIS_IPF_evolution.pdf

4. PDS STATUS

The statistics resulting from the query to the PDS inventory facility (INV) for the MERIS products availability are presented in the following paragraphs.

4.1 MERIS Level 0 products availability

Table 6 shows the statistics regarding the RR L0 availability (compared to the planned production). The format of Table 6 and Figure 1 reflects the aggregated data for the 5 weeks of the reporting period. Week 1 starts 24th June, 22:02:42 (orbit 48722). Week 5 ends 24th July, 22:03:07 (orbit 49152).

Week	MER_RR_0P%	
	Inventoried	Missing
1	98.60	1.40
2	98.62	1.38
3	98.64	1.36
4	98.60	1.40
5	100.0	0.00

Table 6 – Reduced Resolution Level 0 products percentage availability

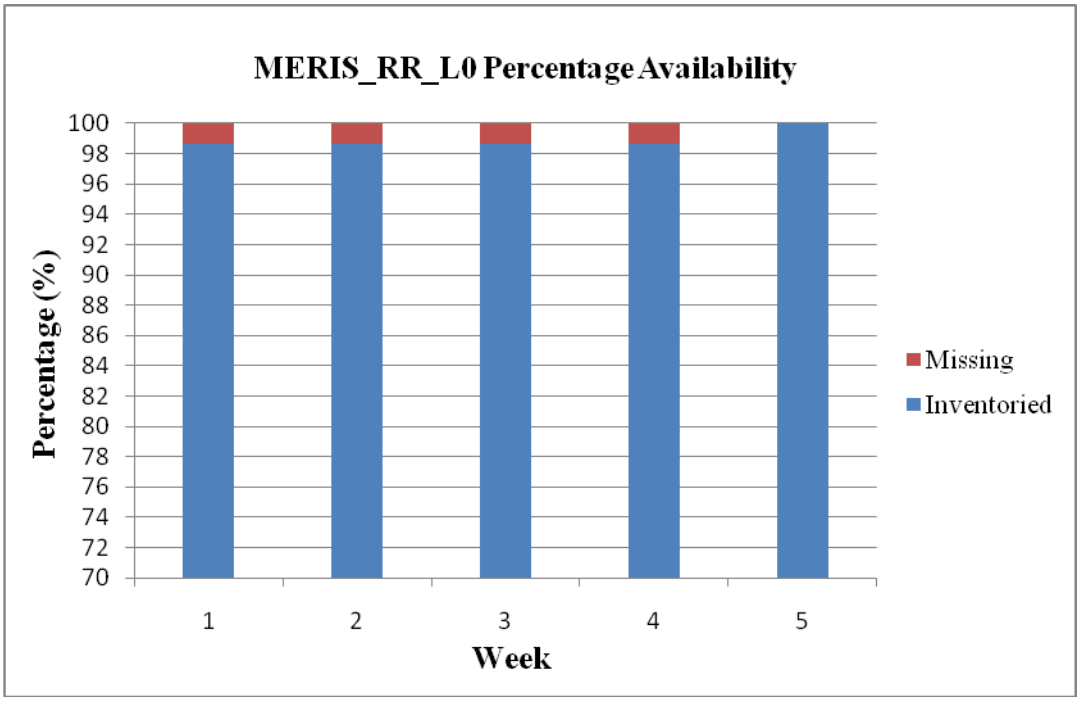


Figure 1 – MER_RR__0P generated/missing by the ground segment during Cycle #104

Table 7 shows the statistics regarding the FR L0 availability (compared to the planned production). The format of Table 7 and Figure 2 reflects the aggregated data for the 5 weeks of the reporting period. Week 1 starts 24th June, 22:02:42 (orbit 48722). Week 5 ends 24th July, 22:03:07 (orbit 49152).

Week	MER_FR_0P%	
	Inventoried	Missing
1	100	0
2	100	0
3	100	0
4	100	0
5	100	0

Table 7 – Full Resolution Level 0 products percentage availability

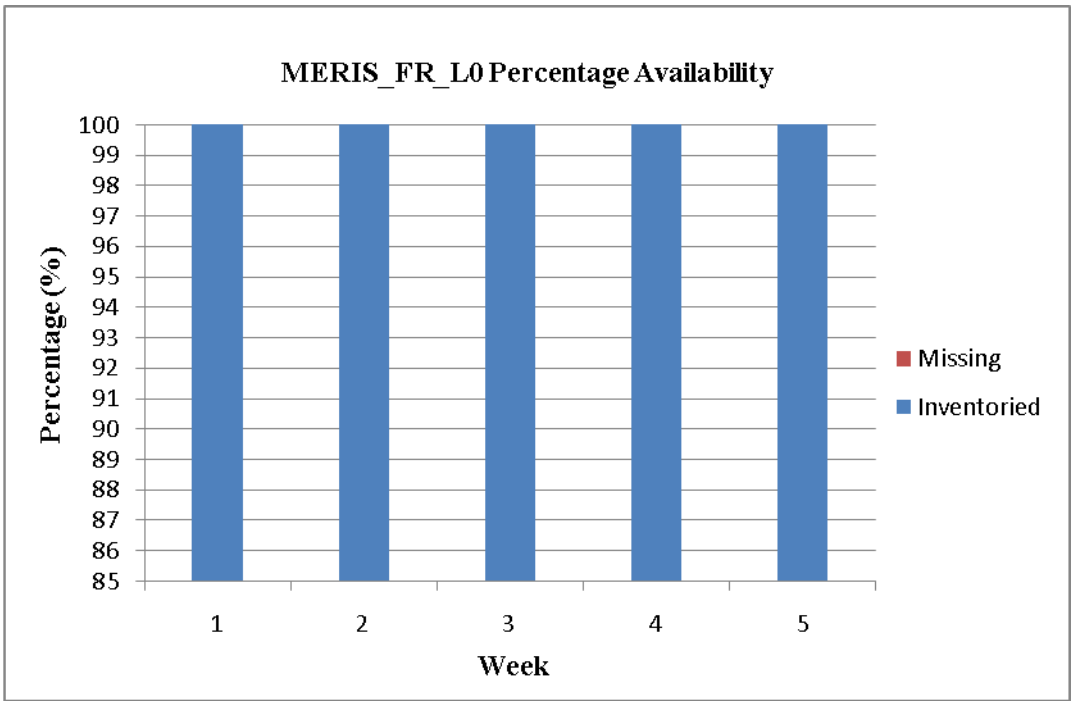


Figure 2 – MER_FR__0P generated/missing by the ground segment during Cycle #104

4.2 MERIS FR acquisitions

The Figure below shows the MERIS Full Resolution global coverage for the reporting period. This is the predicted Background Regional Mission (BRM) image and is subject to change due to conflicts with user planning requests, satellite resource availability and service interruption.

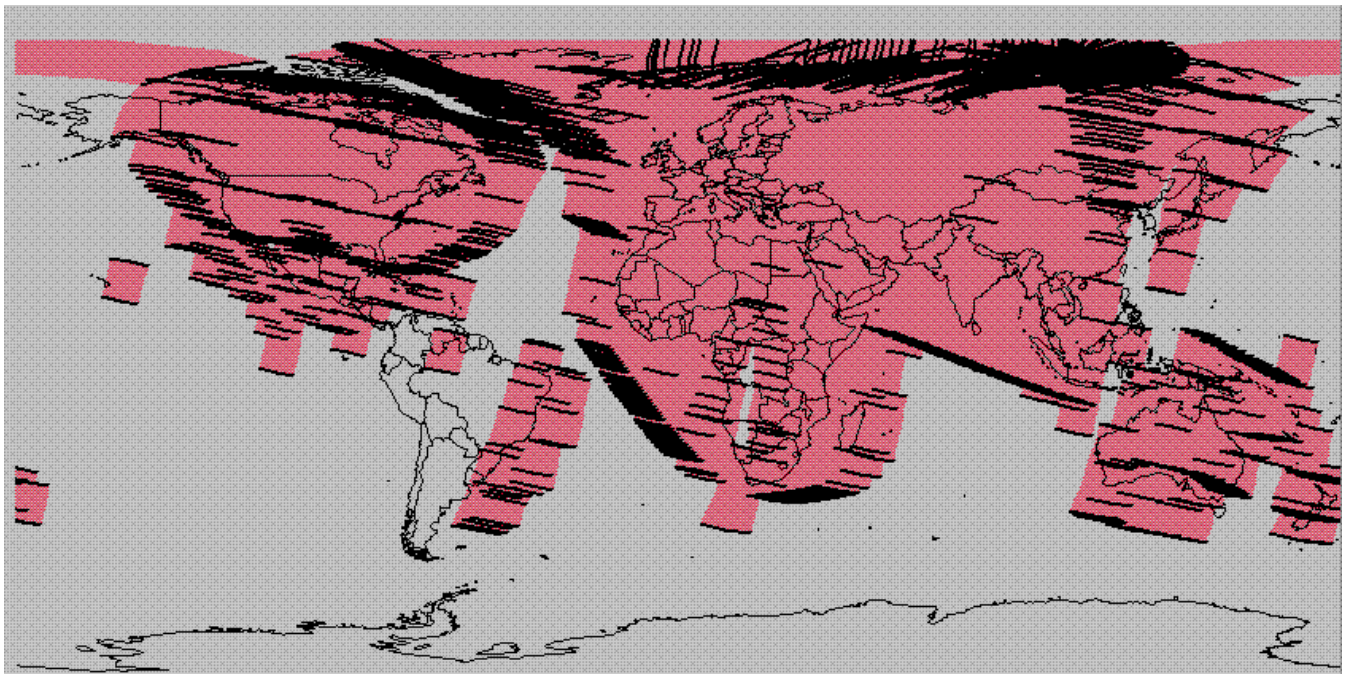


Figure 3 - MERIS Full Resolution BRM – Cycle #104

4.3 MER_CA__0P Products

During the Reporting Period, the following Calibration campaigns were successfully completed:

- A Diffuser Ageing Calibration was successfully executed on Monday 4th July (DOY 185) during Orbits #48859-48860.
- A Wavelength Type-1 Calibration was successfully executed on Monday 4th July (DOY 185) during Orbits #48861-48862.
- A Radiometric Calibration was successfully executed on Monday 18th July (DOY 199) during Orbit #49061.

With the following calibration file:
MPL_CAL_MEVRGT20101022_080316_00000000_00000007_20101027_001433_20781231_235959.N1

5. INSTRUMENT/DATA UNAVAILABILITY

5.1 Instrument Unavailability

Table 8 (below) sets out the total number of EDAC-corrected Single Event Upsets (SEU) for Cycle #104. The entries in **bold** are SEU outside the SAA:

	Date/Time	Lon.	Lat.
1	2011.175.01.53.15	53.40° W	23.36° S
2	2011.175.01.54.35	54.55° E	18.61° S
3	2011.176.01.17.29	45.06° W	19.91° S
4	2011.176.12.22.48	39.31° W	29.57° S
5	2011.176.13.59.10	60.98° W	15.81° S
6	2011.177.00.40.24	35.57° W	21.14° S
7	2011.179.22.49.16	3.7772° W	38.8519° S
8	2011.180.02.09.32	53.6659° W	39.5585° S
9	2011.180.02.10.14	54.4443° W	37.0897° S
10	2011.180.02.11.19	55.5764° W	33.2606° S
11	2011.181.01.28.45	38.8048° W	53.7361° S
12	2011.181.12.37.06	38.5583° W	6.1777° S
13	2011.182.00.55.23	34.4775° W	41.9858° S
14	2011.182.12.00.58	29.8419° W	8.3105° S
15	2011.183.02.02.42	54.3699° W	28.5097° S
16	2011.183.12.59.51	42.0736° W	8.1971° N
17	2011.183.13.02.03	43.8060° W	0.3343° N
18	2011.183.13.02.55	44.4854° W	2.7629° S
19	2011.184.01.22.06	41.0890° W	42.1824° S
20	2011.184.03.01.39	65.2903° W	44.5828° S
21	**2011.184.05.07.16**	**113.9402° W**	**45.6482° N**
22	**2011.185.09.40.44**	**145.4732° E**	**77.1823° N**
23	2011.186.01.51.00	50.1468° W	34.6782° S
24	2011.187.13.55.10	56.8297° W	1.8590° N
25	**2011.188.04.37.37**	**107.5653° E**	**70.7297° N**
26	2011.188.11.39.16	23.4168° W	1.9460° S
27	2011.189.01.40.50	47.4208° W	35.4095° S
28	2011.190.13.43.21	52.8553° W	8.4920° N
29	2011.191.13.05.44	42.9572° W	11.6539° N
30	2011.191.13.10.57	47.0742° W	6.9860° S
31	**2011.192.01.58.22**	**74.2008° W**	**62.0231° N**
32	2011.192.12.32.48	36.7684° W	1.9191° S
33	2011.193.00.55.21	36.9424° W	31.1289° S
34	2011.194.12.58.14	42.3994° W	2.8564° N
35	2011.194.13.03.48	46.8373° W	17.0191° S

36	2011.194.14.38.54	67.7971° W	1.3081° N
37	2011.195.12.23.43	34.9478° W	5.0597° S
38	2011.196.02.23.21	57.1115° W	39.1556° S
39	2011.197.01.45.05	46.0688° W	44.5521° S
40	2011.198.02.52.21	66.1289° W	31.2681° S
41	**2011.198.21.54.02**	**153.5850° W**	**69.2131° N**
42	2011.199.11.33.34	20.5324° W	7.2822° N
43	2011.199.13.19.01	49.7055° W	11.3531° S
44	2011.200.14.22.43	65.7341° W	12.0641° S
45	2011.200.14.23.58	66.7563° W	16.5218° S
46	2011.200.16.01.04	89.2921° W	5.3402° S
47	**2011.201.03.50.12**	**88.8661° E**	**32.0395° S**
48	2011.202.13.06.57	45.5258° W	3.8485° S
49	2011.203.12.30.49	36.8081° W	5.9906° S
50	2011.204.02.30.17	58.8736° W	38.8189° S
51	2011.204.13.35.46	53.8296° W	11.1667° S
52	2011.205.11.14.19	16.0463° W	4.8483° N
53	2011.205.12.57.51	43.6964° W	6.9420° S

Table 8 – EDAC-corrected Single Event Upsets (SEU) for Cycle #104

5.2 Data Unavailability

The following data unavailability occurrences have been reported during Cycle #104:

Flight segment anomalies:-

- On Friday 1st July (DOY 182) at 06:16:40z and 11:24:51z, a complete ARTEMIS service failed and one service partially failed due to ARTEMIS AOC mode being changed in order to manage the moon eclipse manually. Nominal operations resumed at 10:19:46z and 11:47:28z respectively.
- On Friday 8th July (DOY 189) at 08:53:00z, ARTEMIS encountered a level 1 failure and the APC entered in a Recovery mode due to a wrong APC table loaded. Nominal operations resumed at 09:07:00z
- On Sunday 24th July (DOY 205) at 21:38:27z, ARTEMIS triggered a Level1/A spurious anomaly, which disconnected the APC from the bus. Nominal operations resumed at 22:24:58z

Ground segment anomalies:-

- None

6. CALIBRATION AND INSTRUMENT CHARACTERIZATION

6.1 Calibration

6.1.1 Radiometric Calibration

Cycle #104 radiometric calibrations are detailed in Subsection 4.3.

6.1.2 Spectral Calibration

Cycle #104 spectral calibrations (Wavelength Type 1 or 2) are detailed in Subsection 4.3.

6.1.3 Geolocation

The accuracy specification for MERIS geolocation is 2000 metres, with an operational goal of 150 metres. The 290 metre (nadir) bands 2, 5, 8 are used to estimate the absolute accuracy of geolocation.

This analysis shows significant improvements since launch, with one major upgrade, which occurred in 2003 DOY (Day of Year) 343. The update of the star tracker has been performed in order to reduce the systematic offset and improve orientation parameters. Global absolute geolocation error (North and South hemispheres) for the three consecutive periods can be summarized as follows:

(I) Initially, after the launch, according to results related to the 2002 period, the geolocation accuracy is in the order of ±135 metres along-track and ±207 metres across-track. The RMS absolute geolocation error stays within the range of **251.24** ± **81** metres.

(II) The 2003 period is characterised by a degradation of the absolute geolocation accuracy where error is around ±209 metres along-track and ±295 metres across-track. For this period, the RMS absolute geolocation error stays within the range of 368.39 ± 67 metres.

(III) After the update, 2004 period, MERIS geolocation is achieving the goal of 300 metres with accuracy of ± 132 metres along-track and ± 165 metres across-track. The RMS absolute geolocation error remains within the range of **212** ± **22** metres.

When correcting products from the systematic offset (centred results), for the 2004 period the RMS absolute geolocation error stays within the range of **166** ± **18** metres. The amount of products located on northern hemisphere is much larger than the one from the Southern hemisphere. Comparison between the two sets of results is not trivial. For the 2004 period, this study demonstrated the temporal stability of the absolute geolocation. More results are now needed to confirm this trend.
For more details, refer to the Gael Consultant (Fr) report available on the ESA website:
http://earth.esa.int/pcs/envisat/meris/reports/

6.1.4 Video Electronic Unit Temperature Analysis

During one of the operation modes of MERIS (Stabilization mode), a thermal regulation of the VEU is performed. This is carried out in order to both stabilise its temperature and to reach optimum performance levels, thereby ensuring a smooth and safe transition towards Observation and Calibration modes.

During observation, in order to meet the image quality requirements, the VEU temperature has to remain in the operationally acceptable temperature range of -10°/+50°. Furthermore, to ensure optimum performance levels of the instrument, the variation in VEU maximum and minimum temperature values should not differ more or less than 10°C ($^{+/-}$10°C) from the previous radiometric calibration.

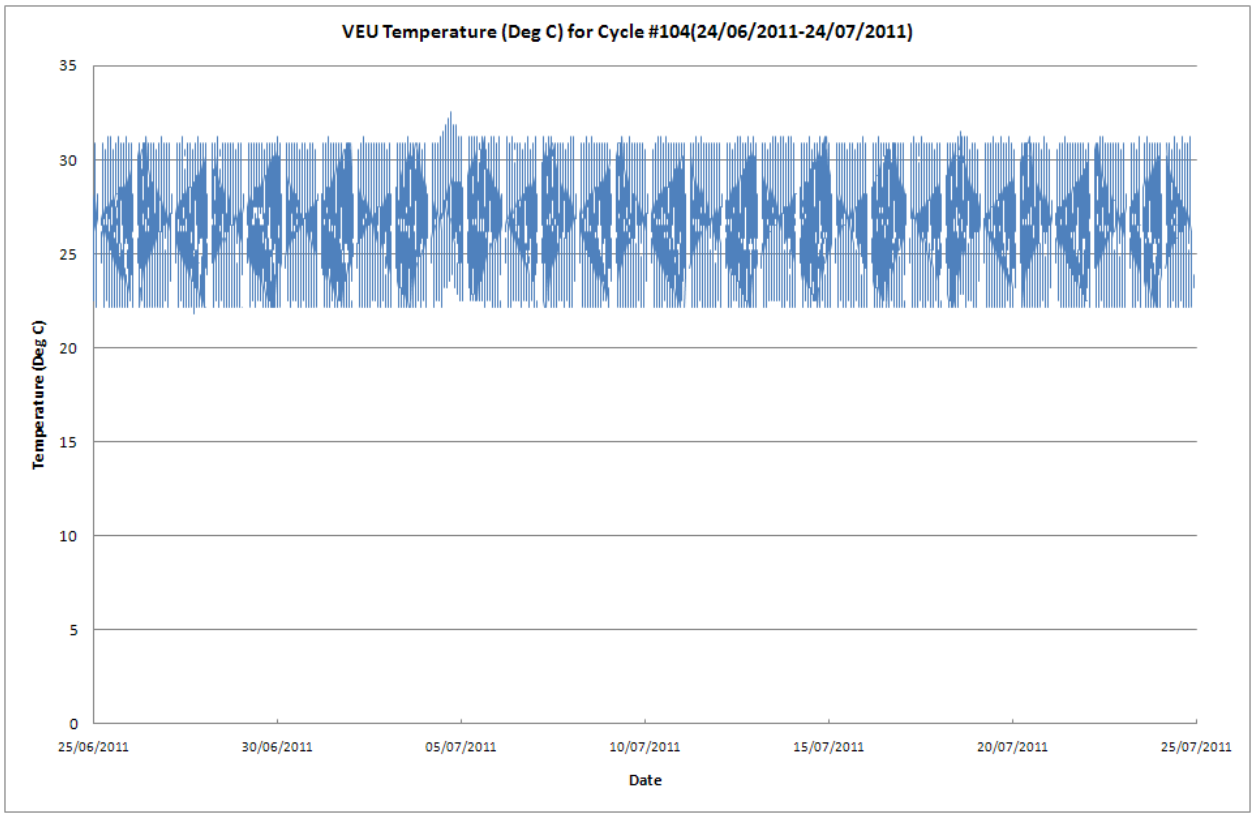


Figure 4 – VEU Temperature during Cycle #104

6.1.5 Vicarious calibration results

For absolute calibration of MERIS by vicarious methods, METRIC2.0 tools are used to perform data extraction and spatial compression from MERIS Level1b products over specified sites following site type-specific radiometric and geographic criteria. The child L1b products are ordered systematically on the basis of sites definition and mission analysis. Because the list of sites can be over-dimensioned and vary with season, it has a validity period of 3 months. Each L1b child product is submitted to METRIC with the correct version of auxiliary files MER_INS_AX and MER_CP1_AX used during its generation, and a dedicated resource file which stores all parameters necessary for data filtering (cloud and aerosol screening, distance from coast etc.). METRIC generates one file for each selected site

pertaining to the following categories, according to the potential use of the data in the calibration processing: Rayleigh, Glitter, Desert, Snow, and Buoy. Output files have HDF format.

A map showing Calibration Sites used is given in Figure 5:

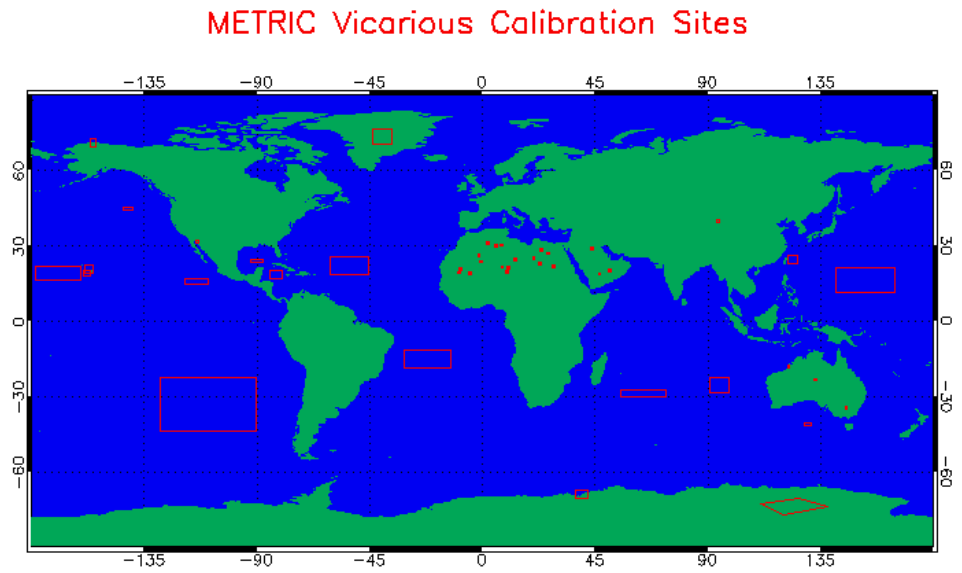


Figure 5 – Map of METRIC Calibration Sites

During Cycle #104, METRIC has generated the following results for specific sites:

Sites	# Number of METRIC output	# Submitted child L1b
Desert	61	29
Glitter	36	36
Rayleigh	No Data	2
Snow	47	47
Buoy	43	33

Table 9 – METRIC Table for Cycle #104

Please note, METRIC data were unavailable at the time of the writing of this report.

Corresponding presentations can be found at:
http://envisat.esa.int/workshops/mavt_2006/MAVT-2006-0303_CTinel.pdf
http://envisat.esa.int/workshops/mavt_2006/MAVT-2006-0304_CTinel.pdf

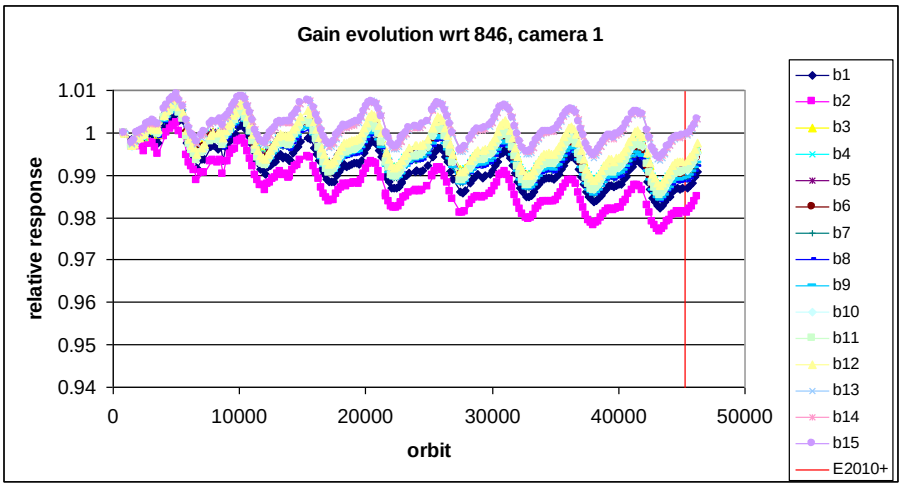
Note: in the same Workshop, other results of vicarious calibration for MERIS, not based on METRIC extraction, were also presented.

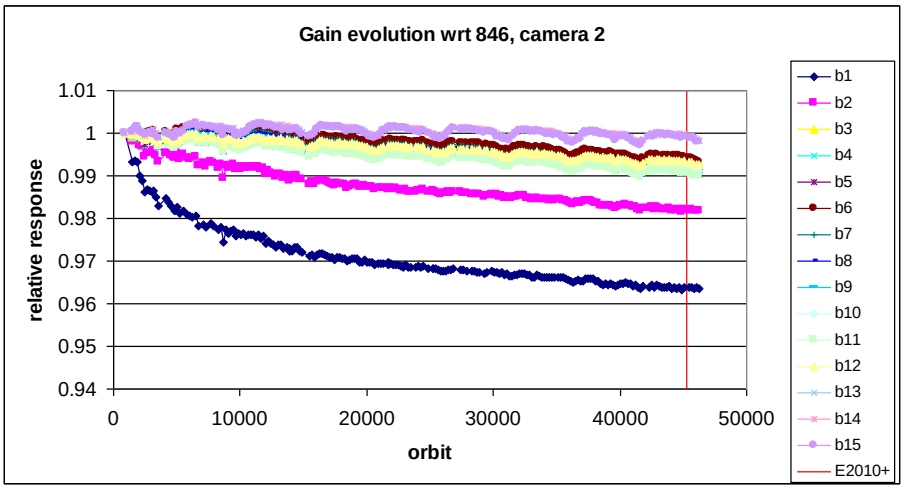
6.2 Instrument Characterization

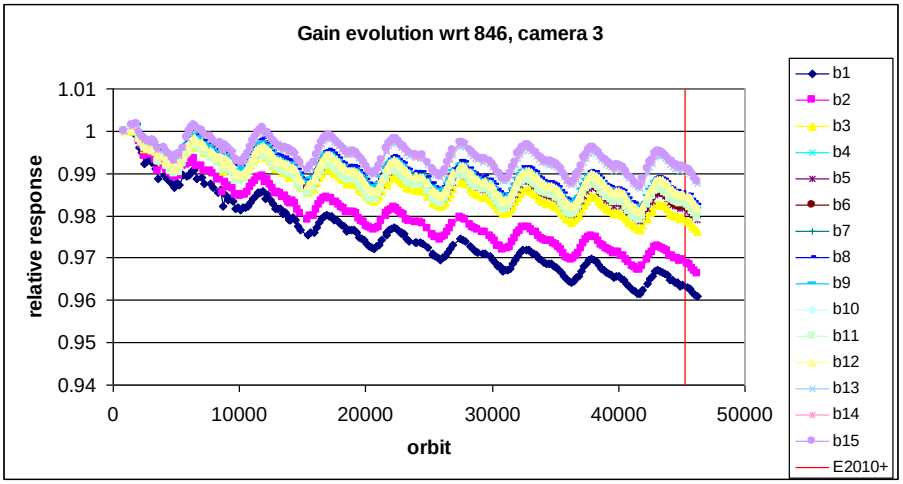
6.2.1 Instrument degradation

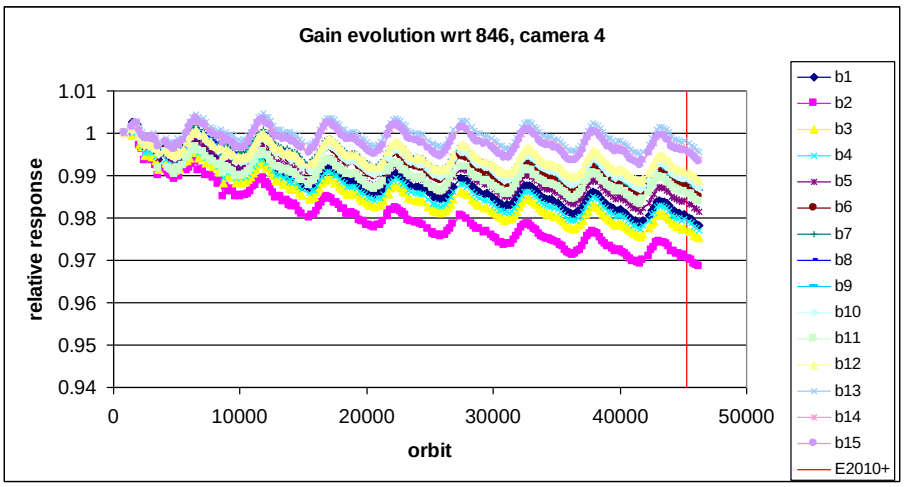
The mean per camera degradation (diffuser ageing corrected) for each camera analysis highlights:

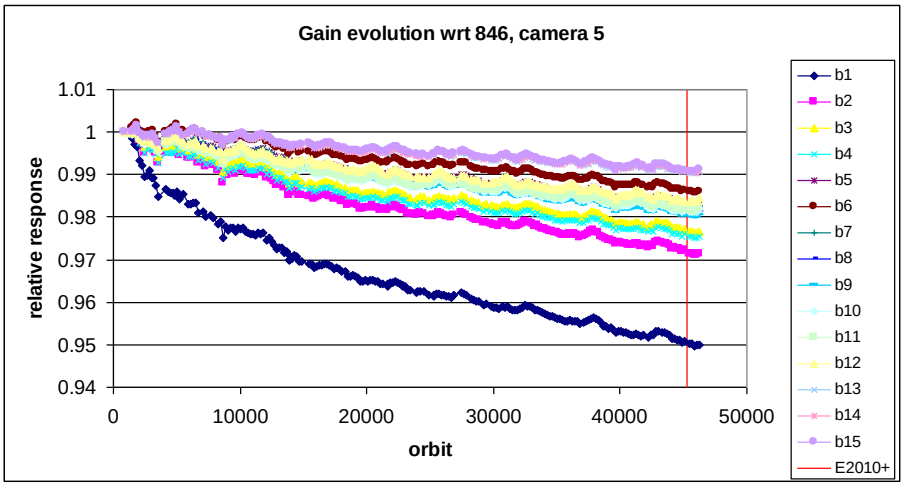
1. Instrument response continues to degrade exponentially (up to approximately 5%), and is both wavelength and camera dependent
2. There is no significant degradation caused by the E2010+ Orbit change (see red vertical line on plots)







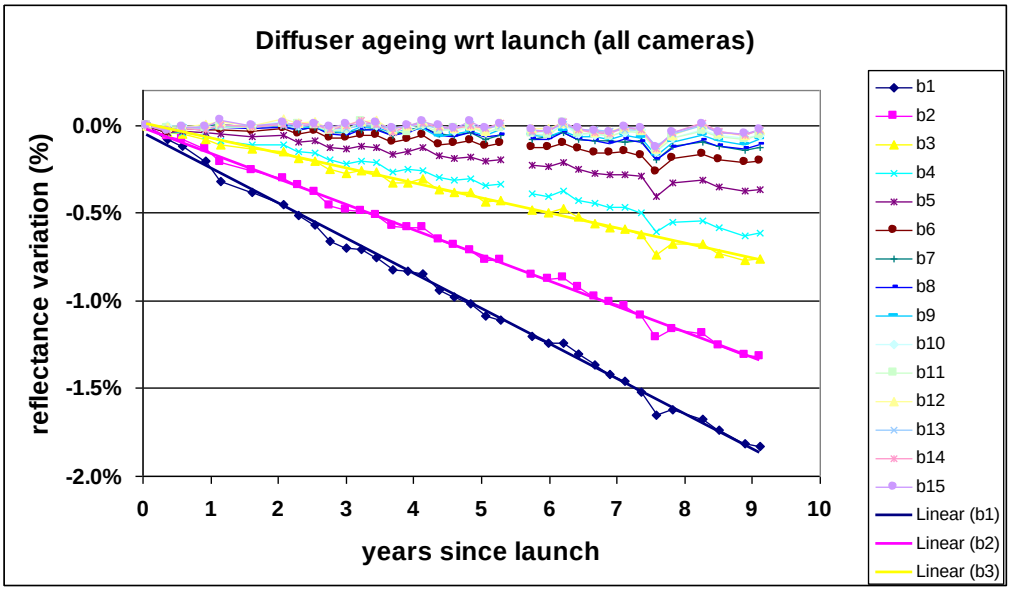


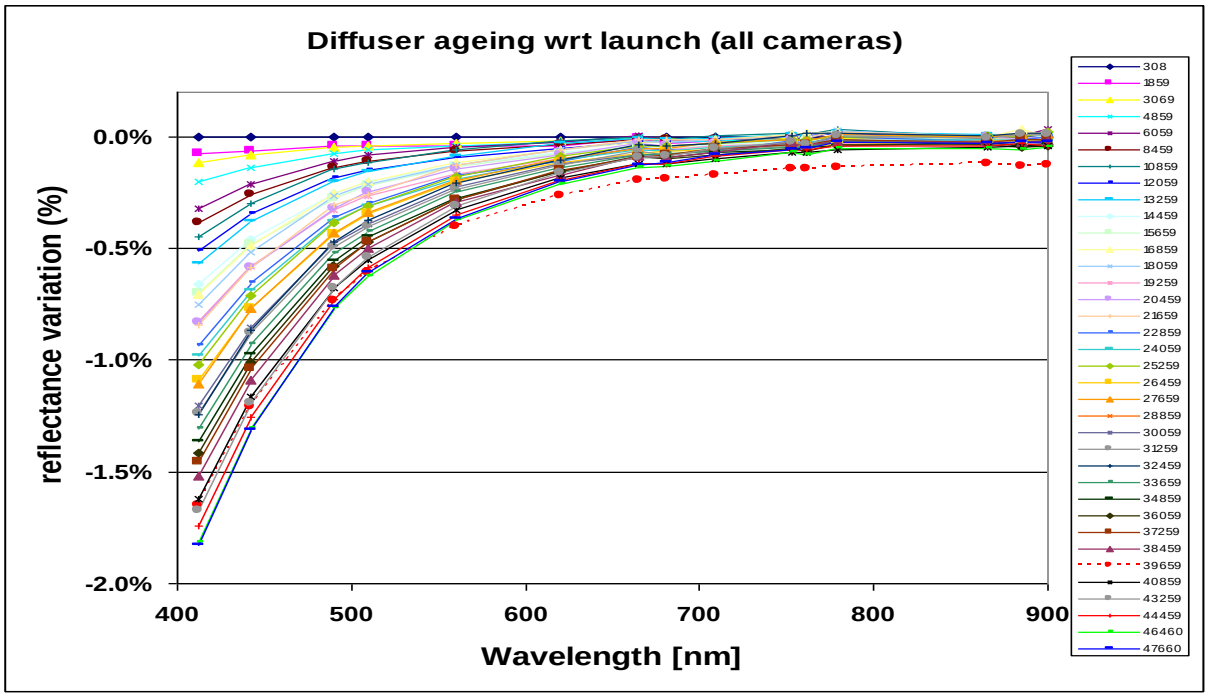


6.2.2 Diffuser ageing

Diffuser Ageing is monitored as the evolution with time of Diffuser 1 to Diffuser 2 (D1/D2). It shows a fairly linear trend over time with small variations correlated to yearly cycles. The linear fit is used operationally to correct Diffuser 1.

Please note, due to geometry uncertainties during the E2010+ Orbit change, anomalous spikes can be seen in the diffuser ageing trend (year 7.5 in the first image, and the anomalous red dotted line in the second). This is not believed to indicate a severe ageing anomaly as all post-Orbital change acquisitions follow the pre-Orbital change trend.





6.2.3 Smile Effect

No new results to be shown for Cycle #104. For the most recent updates, refer to Cyclic Report #23 that can be found on the above-mentioned MERIS website.

6.2.4 Spectral evolution from erbium measurements

Analysis of the complete set of spectral calibration data from the Erbium doped diffuser confirms:

1. Stability of the absolute wavelength for cameras 1, 3 and 5; although small possibility Camera 3 has a slight negative shift.

2. Slight increase over time of the wavelength observed by a given CCD row for camera 2 and 4 (about 0.12 nm for camera 2 and 0.20 nm for camera 4). The curve trend seems however to go towards stabilisation.

3. Shifts are wavelength independent

4. Anomalous spikes acquired around Orbit 45000 are likely due to a geometry uncertainty during E2010+ Orbit change manoeuvre. All post-E2010+ data are fully in line with pre-E2010+ trends.

Figure 6 (below) shows the evolution of the spectral calibration of MERIS around 408 nm and 520 nm with respect to Orbit #650.

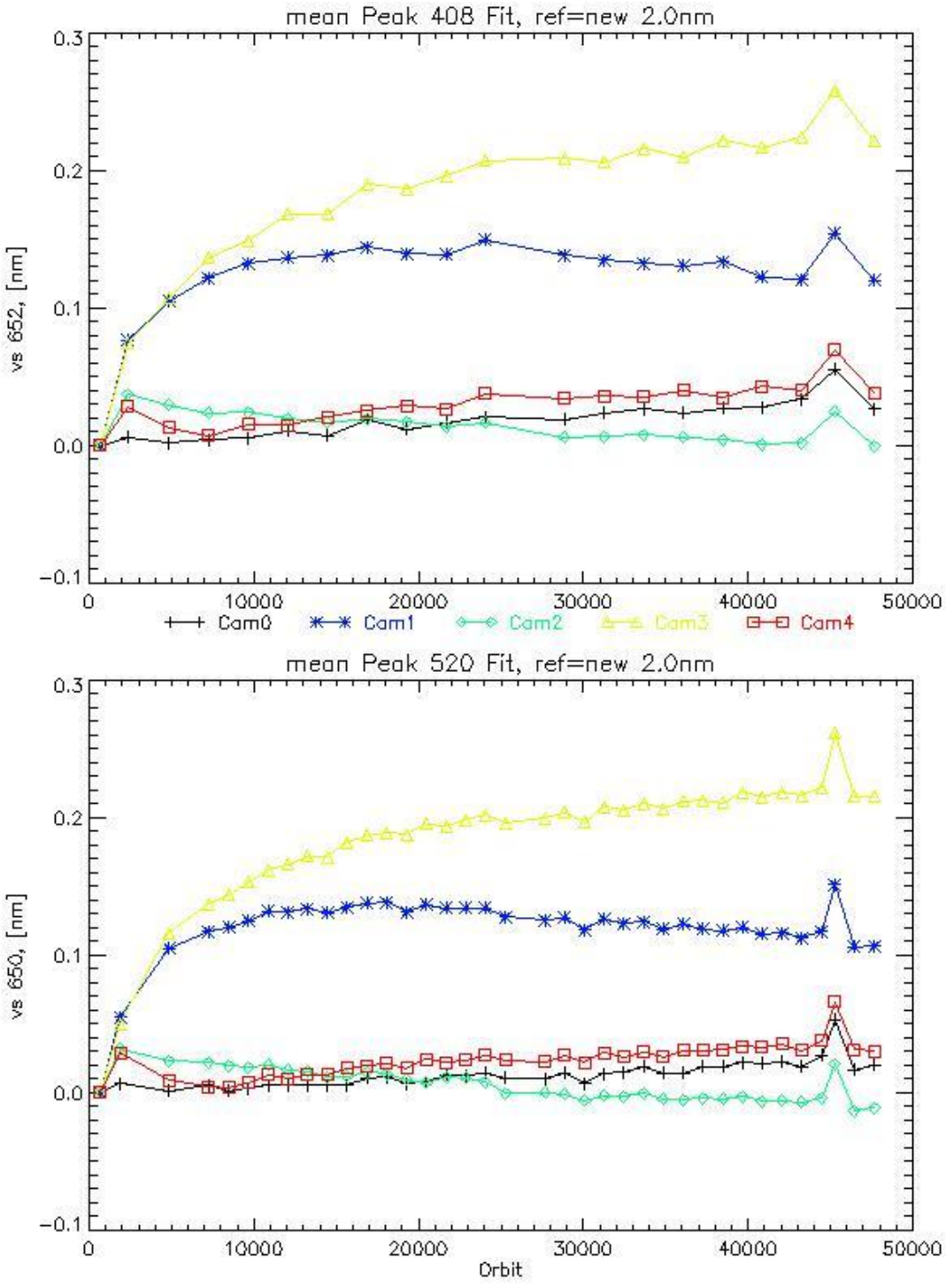


Figure 6 – Evolution of the spectral calibration of MERIS around 408 nm (top) and 520 nm (bottom) with respect to Orbit #650

7. DATA QUALITY CONTROL

7.1 MERIS products Quality Status

The current IPF is version 5.06, and it has been operational since 17th June 2010.

The full evolution path can be found on Page 9 of the following document:

http://earth.esa.int/pcs/envisat/meris/documentation/MERIS_IPF_evolution.pdf

7.2 Anomalies and Software Problem Reporting (SPR)

Blank records have been identified in some MERIS products rejected by visual inspections using the AMALFI system. These black lines crossing the track are a nominal behaviour of the processor, which replaces missing or corrupted Instrument Source Packets (ISPs) with blank data to preserve the geographical consistency of the scene.

8. FIRST 2003 MERIS ARCHIVE REPROCESSING

Information concerning the 1st reprocessing of the 2003 MERIS data archive done spring 2004 can be found on the MERIS website:

http://earth.esa.int/pcs/envisat/meris/documentation/First_2003_MERIS_Reprocessing.pdf

The document explains also how to access the reprocessed data.

9. SECOND 2005 MERIS ARCHIVE REPROCESSING

Following the recommendations of the Data Quality Working Group and the Science Advisory Group, improvements to MERIS processing resulted in version 7.4 of the off-line processor MEGS. It is currently being used for a complete reprocessing of the MERIS Reduced Resolution data archive. The corresponding time period extends from June 2002 to June 2005. 2003 and 2004 data will be made available through the MERCI (MERIS Catalogue and Inventory) service by the end of year 2005. For further information see:

http://envisat.esa.int/services/catalogues.html

10. THIRD MERIS REPROCESSING

A number of significant improvements provided by the MERIS QWG have been implemented in the 3rd MERIS Reprocessing dataset; the reprocessing of all Reduced Resolution products has been completed using MEGS 8.0 ACRI-ST and information can be found here and on the PCS website. The operational version of the MEGS 8.0, known as the IPF, is currently being validated.

11. MERIS PROCESSOR EVOLUTION

A detailed description of the MERIS IPF evolution since March 2002 until present, in terms of data format changes and algorithm modifications, can be found on the MERIS website:

http://earth.esa.int/pcs/envisat/meris/documentation/MERIS_IPF_evolution.pdf.

12. VALIDATION ACTIVITIES AND RESULTS

The presentations given at the MAVT-2006 held at ESA ESRIN, Frascati, Italy, from the 20th to the 24th of March 2006 are now available at the following address:

http://envisat.esa.int/workshops/mavt_2006/

13. HOW TO GET MERIS DATA

Information concerning the different ways to access the MERIS data can be found on the MERIS website:

http://earth.esa.int/pcs/envisat/meris/documentation/Access_to_MERIS_data.pdf

14. GENERAL INFORMATION

1. The European Space Agency organised a joint MERIS and (A)ATSR user workshop, held at ESRIN, Frascati, Italy, on 26th to the 30th of September 2005. All information about the objectives of the workshop as well as the participants' presentations can be found on ESA's official page:

   http://envisat.esa.int/workshops/meris_aatsr2005/

2. The European Space Agency organised the second working meeting on MERIS and (A)ATSR Calibration and Geophysical Validation (MAVT-2006) in ESRIN, Frascati, Italy, from the 20th to the 24th of March 2006. All information about the objectives of the workshop as well as the participants' presentations can be found on ESA's official pages:

   http://envisat.esa.int/workshops/mavt_2006/

3. The European Space Agency organised a second joint MERIS and (A)ATSR user workshop, held at ESRIN, Frascati, Italy, from the 22nd to the 26th of September 2008. All information about the objectives of the workshop can be found on ESA's official page:

   http://earth.esa.int/meris_aatsr_2008/