MERIS CYCLIC REPORT 37TH

02ND MAY – 06TH JUNE 2005

25 May 2005 – The image acquired by MERIS shows the Anatahan Volcano eruption.
The length of the visible smoke plume stretches more than 800 kilometres.

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1 INTRODUCTION

The MERIS Cyclic Report is distributed by ESRIN-PCF (Product Control Facility) to keep the MERIS Community informed of any modification regarding the processor, updates of auxiliary products, anomalies of the instrument behavior, data acquisition and processing, and finally the status of the calibration, validation, and quality control activities.
The Cyclic Report collects the inputs coming from different groups involved in MERIS data exploitation:

- ESRIN- Product Control Facility (PCF)
- Quality Working Group (QWG)
- MERIS/AATSR validation team (MAVT)
- Brockmann Consult (BC)
- ACRI-st
- 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 users community with useful information regarding the instrument performances, the data production chain, the results of calibration activities and validation campaigns, at the end of each ENVISAT cycle, which represents 501 orbits, about 35 days.

1.1 Acronyms and abbreviations

ADF	Auxiliary Data File
ADS	Auxiliary Data Server
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
DS	Data Server
DSD	Data Set Descriptor
EDAC	Error Detection And Correction
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
MERIS	Medium Resolution Image Spectrometer
MPH	Main Product Header
OP	Operational Phase of ENVISAT
OCL	Offset Control Loop
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
WV1	Wavelength type 1 calibration
WV2	Wavelength type 2 calibration

2 SUMMARY

Cycle #37 starts on the 02nd of May 2005 and stops on the 06th of June 2005.

- No auxiliary files were disseminated during the cycle.
- Four Radiometric calibrations (two Gain and two Diffuser Ageing ones) as well as four Spectral Wavelength calibrations have been successfully during the reporting period.
- One Data unavailability has occurred during the reporting period.

Details about the start and stop of the cycle can be found in the table below.

Cycle number	**37**
Start time	02 May 2005, 21:59:29
Stop time	06 June 2005, 21:59:29
Start orbit	16588
Stop orbit	17088

3 PROCESSOR VERSION AND PROCESSING CONFIGURATION

3.1 MERIS Processor Release

IPF version 4.10 is the operational processor at the MERIS processing centers (stations and PACs). The reference documents for the operational processor are listed below:

1. ENVISAT Product Specification	Iss_4_Rev_A	PO-RS-MDA-GS-2009
2. MERIS Input/Output Data Definition	Iss_6_Rev_1a_010914	PO-TN-MEL-Gs-0003
3. MERIS Level 1b Detailed Processing Model	Iss_6_Rev_1a_010914	PO-TN-MEL-GS-0002
4. MERIS Level 2b Detailed Processing Model	Iss_6_Rev_1a_010914	PO-TN-MEL-GS-0006

Issues 6.1a consist in issue 6.1 augmented/corrected by change pages issued as 6.1a

3.2 Auxiliary data files (ADF)

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

Note: The other files not included into the list change every time (ECMWF, orbit).

3.3 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. Note that no new auxiliary files were disseminated during Cycle #37.

- Level 1 ADF configuration:

Product name	Start Validity
MER_INS_AXVIEC20030620_120000_20020321_193100_20121008_190821	21/03/02
MER_CP1_AXVIEC20030620_120000_20020429_040000_20120920_173421	29/04/02
MER_RAC_AXVIEC20030620_120000_20021224_121445_20121224_121445	24/12/03
MER_DRM_AXVIEC20020122_083343_20020101_000000_20200101_000000	01/03/02
AUX_DEM_AXVIEC20020123_121901_20020101_000000_20200101_000000	01/03/02
AUX_LSM_AXVIEC20020123_141228_20020101_000000_20200101_000000	01/03/02
AUX_ATT_AXVIEC20020924_131534_20020703_120000_20781231_235959	03/07/02

- Level 2 ADF configuration:

Product name	Start Validity
MER_AER_AXVIEC20030620_120000_20020321_193100_20200101_000000	21/03/02
MER_ATP_AXVIEC20030620_120000_20021224_121445_20121224_121445	24/12/02
MER_CMP_AXVIEC20030620_120000_20021224_121445_20120321_193100	24/12/02
MER_CP2_AXVIEC20031120_104149_20021224_121445_20121224_121445	24/12/02
MER_LAP_AXVIEC20030715_151450_20020321_193100_20120321_193100	21/03/02
MER_LVI_AXVIEC20030620_120000_20020321_193100_20130224_164916	21/03/02
MER_OAP_AXVIEC20030620_120001_20020321_193100_20120321_193100	21/03/02
MER_OC1_AXVIEC20030620_120000_20020321_193100_20120321_193100	21/03/02
MER_OC2_AXVIEC20030620_120000_20020321_193100_20120624_174339	21/03/02
MER_WVP_AXVIEC20030620_120000_20020321_193100_20120321_193100	21/03/02
MER_SCM_AXVIEC20030620_120000_20020321_193100_20110725_103844	21/03/02

3.4 Configuration Table Interface (CTI)

No new CTI disseminated during cycle # 37.

3.5 Level 1/ Level 2 RR or FR products

During cycle #37 no format changes or algorithm modifications regarding MERIS RR and FR products were implemented into the operational processor.

A new product type has been introduced with IPF version 4.10: the Full Swath product (4481 pixels per line). The Full Swath format includes new FR Level 1b, Level 2 and Browse products; however the ordering is not yet possible since the Full Swath operations are not yet defined.

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.

4.1 MERIS Level 0 products availability

Table below shows the statistics regarding the RR L0 availability (compared to the planned production).

Week	MER_RR__0P %	
	Inventoried	Missing
From 02/05 to 09/05	99.41	0.59
From 09/05 to 16/05	100.00	0.00
From 16/05 to 23/05	97.95	2.05
From 23/05 to 30/05	99.84	0.16
From 30/05 to 06/06	99.62	0.38

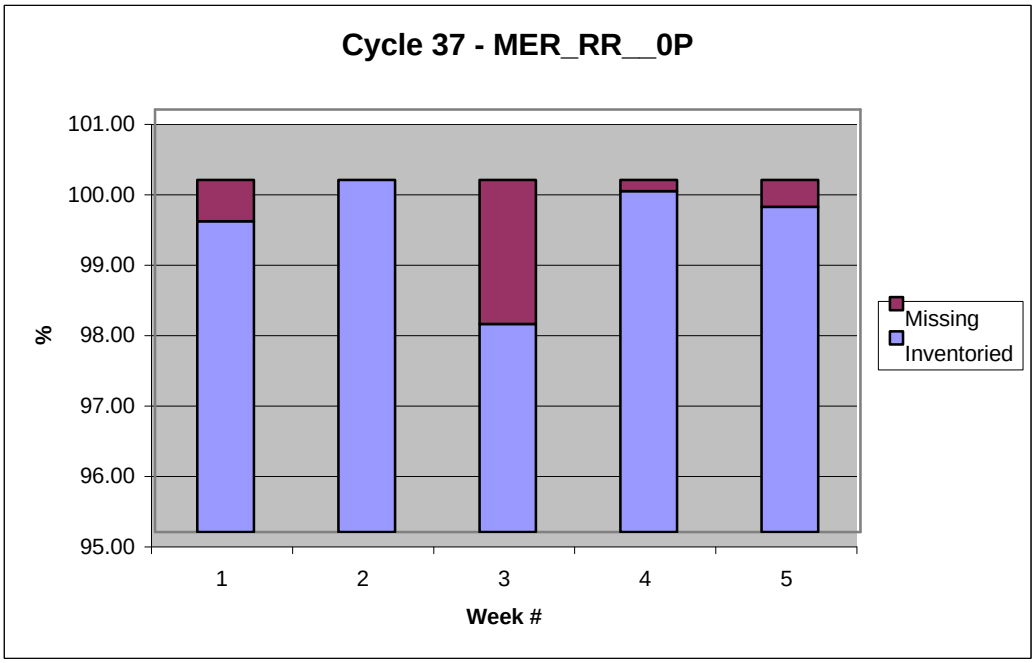


Figure 1 - MER_RR__0P generated/missing by the ground segment during cycle #37

The number of RR Level 0 products acquired during the cycle is about 99.36 % of the planned ones.

The table below shows the statistics regarding the FR L0 availability (compared to the planned production).

Week	MER_FR__0P %	
	Inventoried	Missing
From 02/05 to 09/05	98.59	1.41
From 09/05 to 16/05	99.67	0.33
From 16/05 to 23/05	98.01	1.99
From 23/05 to 30/05	99.77	0.23
From 30/05 to 06/06	99.09	0.91

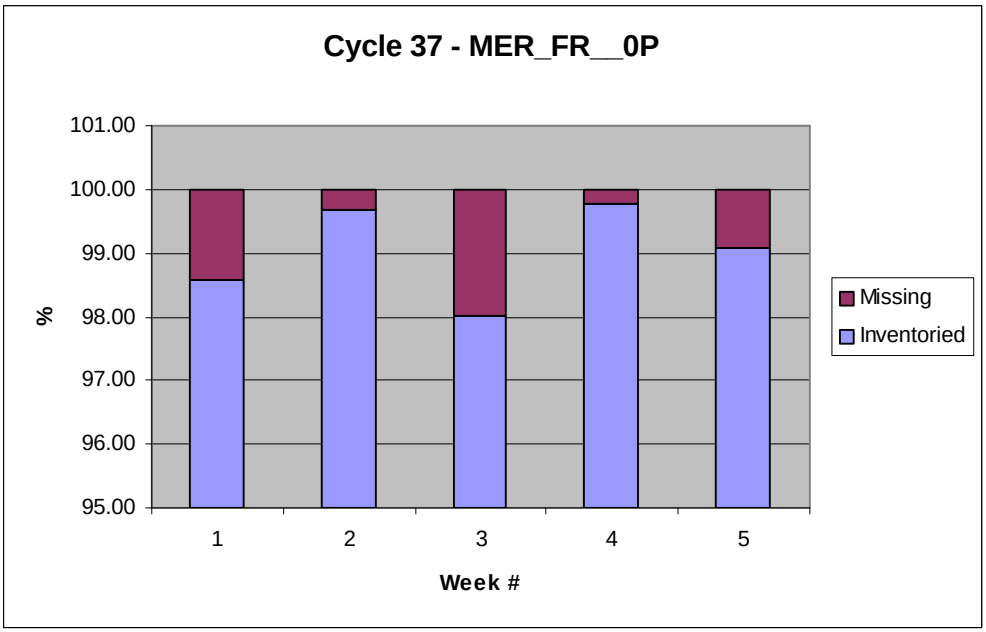
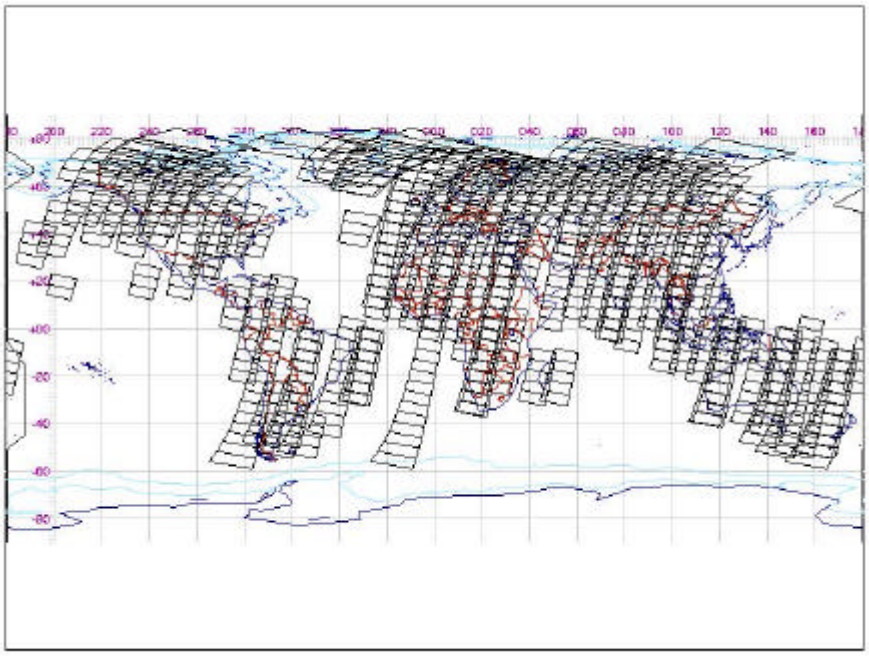


Figure 2 - MER_FR__0P generated/missing by the ground segment during cycle #37

The number of FR Level 0 products generated during the cycle is about 99.03 % of the planned ones.

4.2 MERIS FR acquisitions

The global coverage of the MERIS FR products acquired during cycle #37 is presented in the following. For each coverage map, the acquisition time per orbit with respect to the orbit number is plotted. To optimize the visualization the FR acquisitions are plotted every five days.



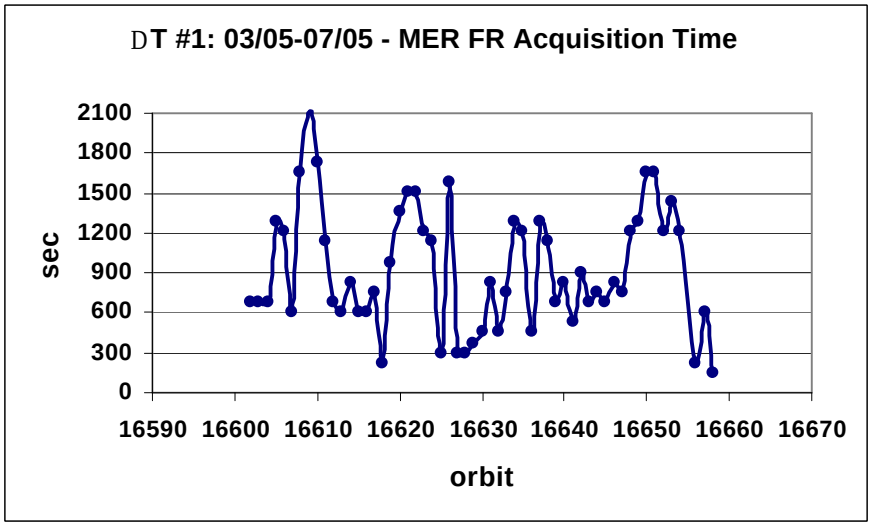
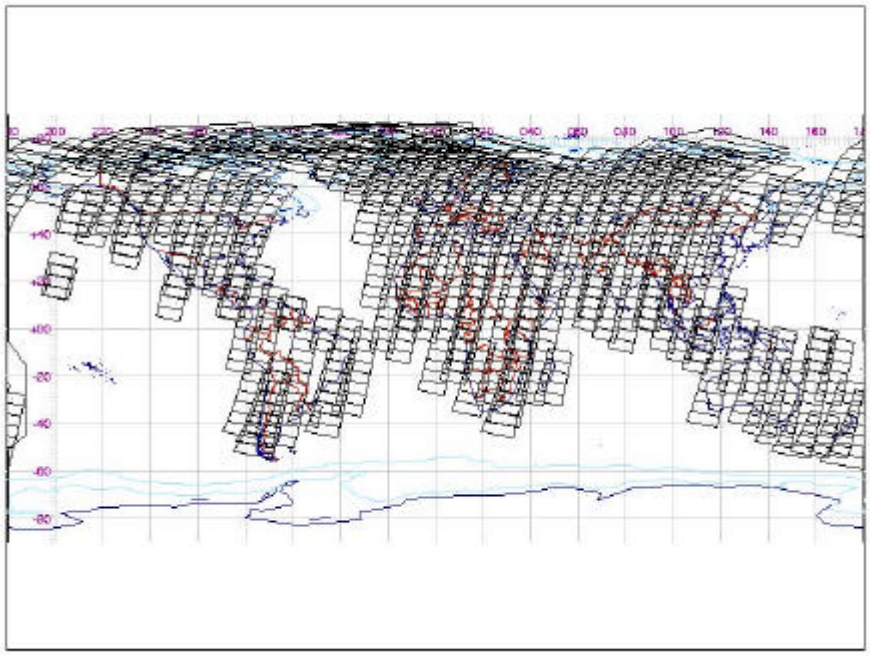


Figure 3 – Top: MERIS FR Global Coverage Map for period 03/05 -07/05
Bottom: MERIS FR Acquisition time segments



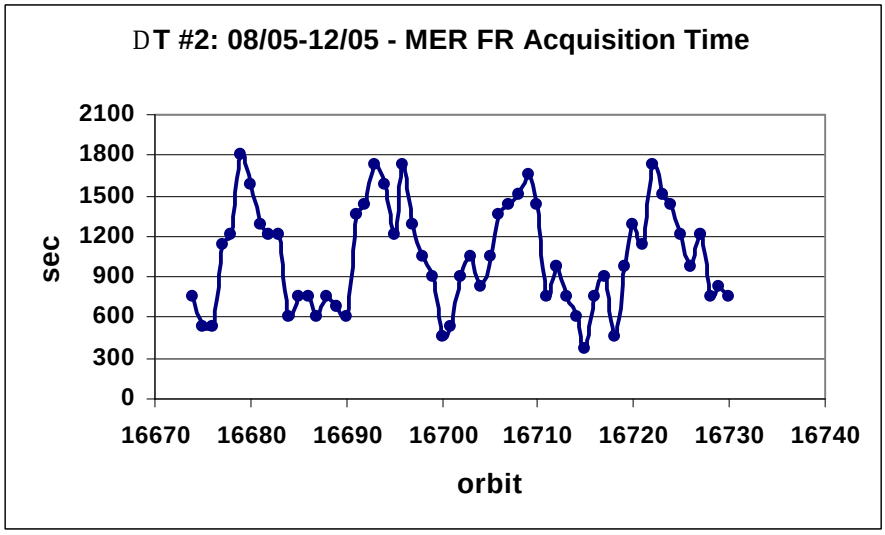
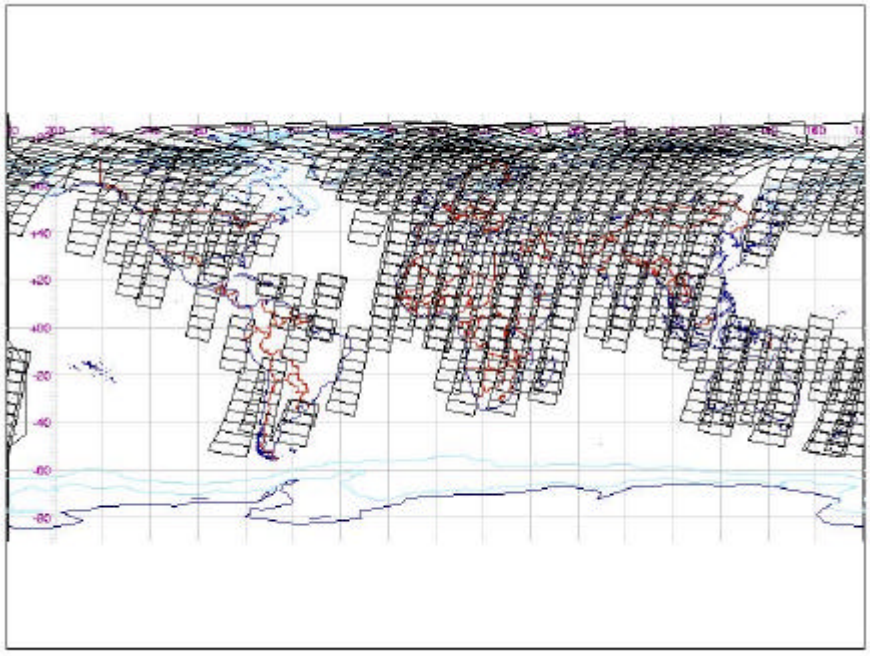


Figure 4 – Top: MERIS FR Global Coverage Map for period 08/05 – 12/05
Bottom: MERIS FR Acquisition time segments



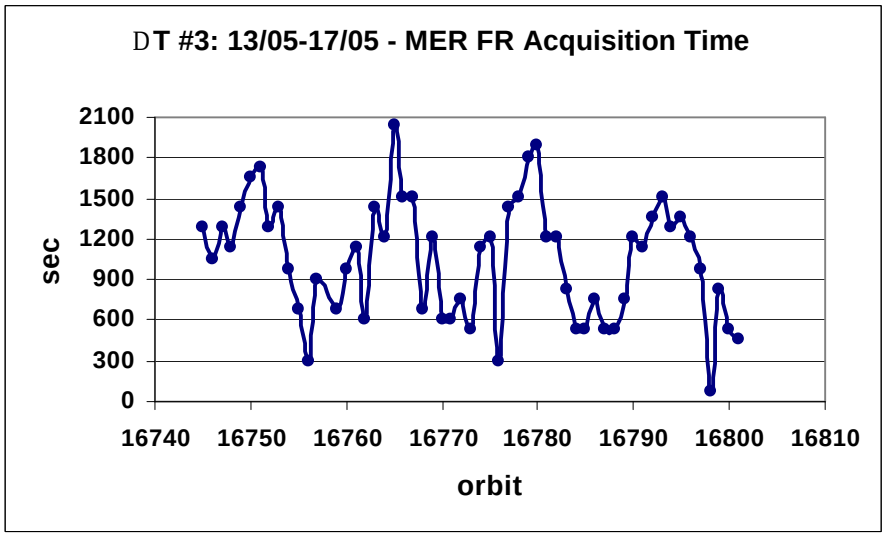
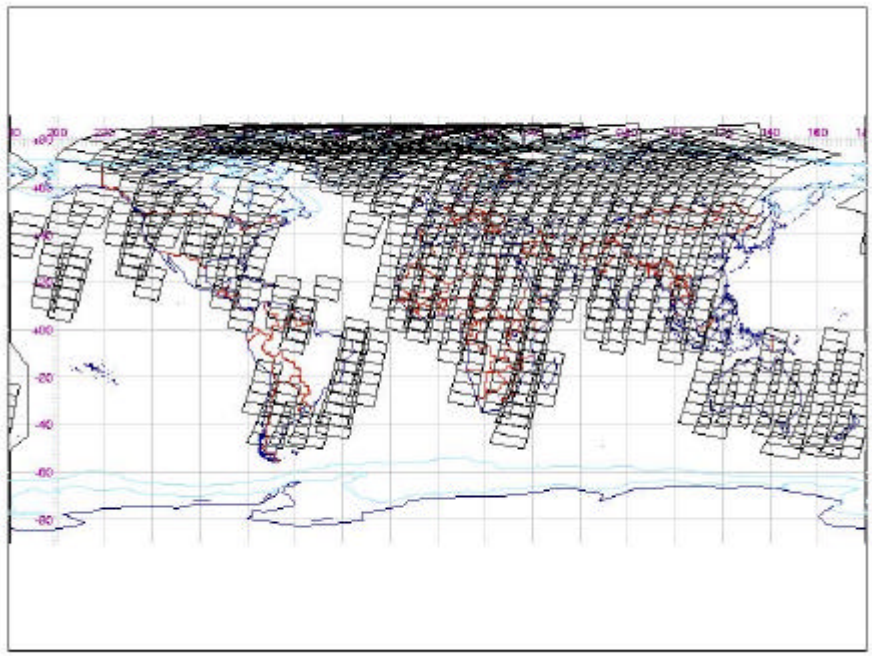


Figure 5 – Top: MERIS FR Global Coverage Map for period 13/05 – 17/05
Bottom: MERIS FR Acquisition time segments



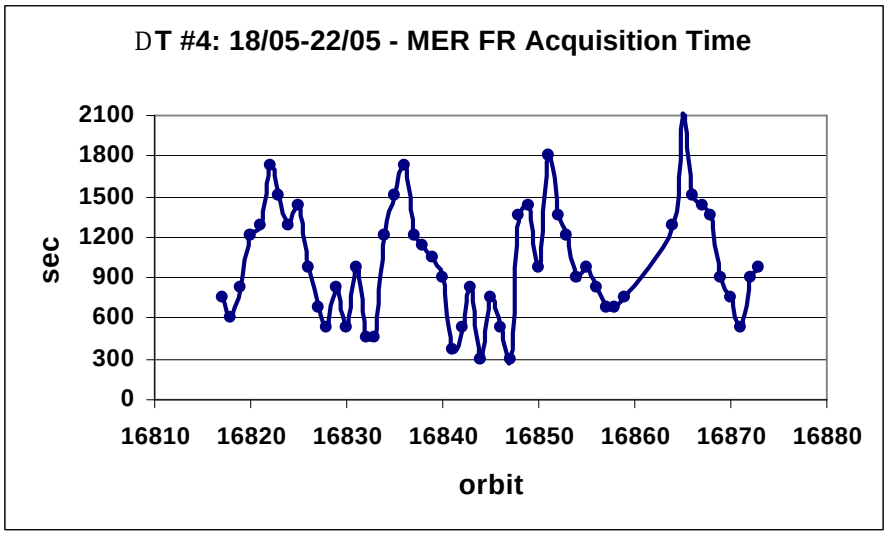
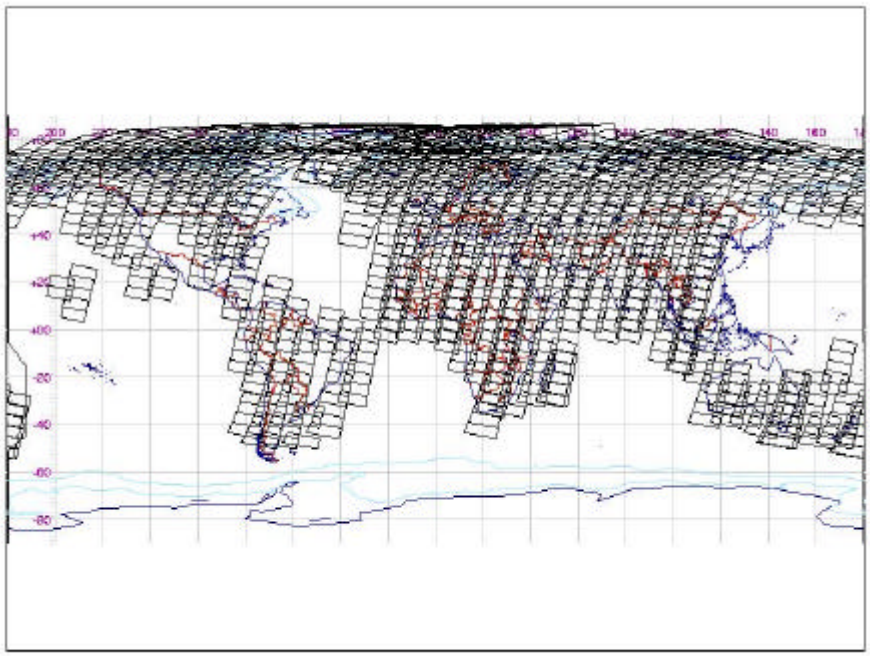


Figure 6 – Top: MERIS FR Global Coverage Map for period 18/05 – 22/05
Bottom: MERIS FR Acquisition time segments



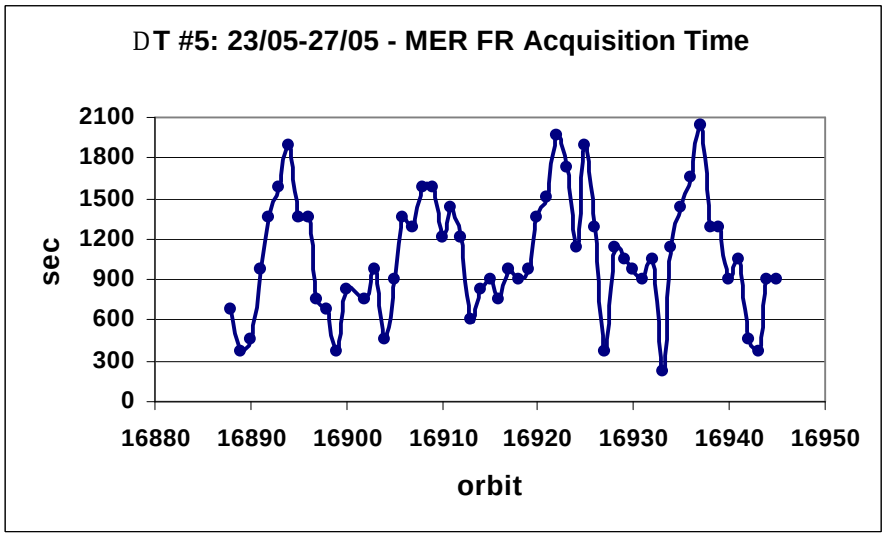
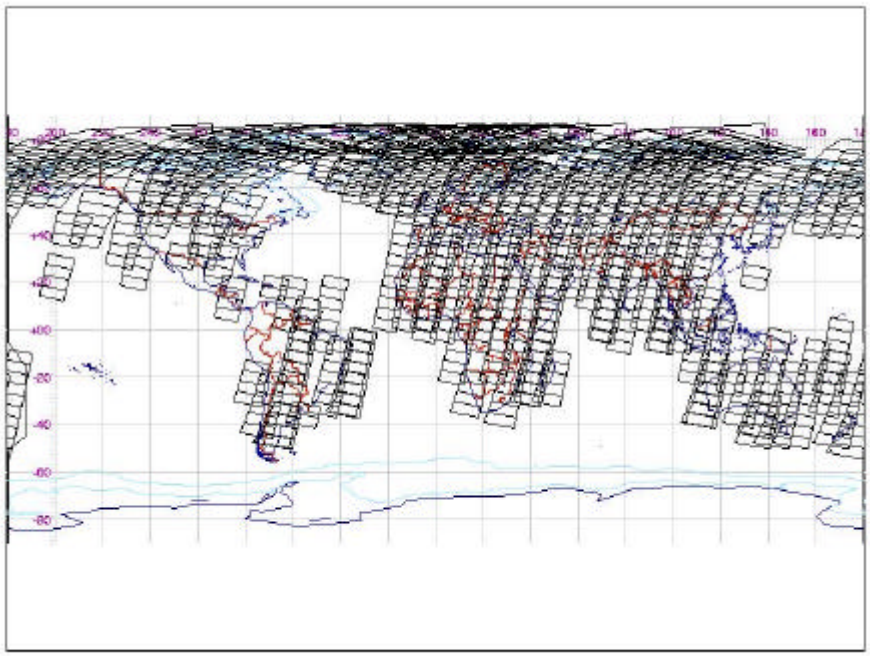


Figure 7 – Top: MERIS FR Global Coverage Map for period 23/05 – 27/05
Bottom: MERIS FR Acquisition time segments



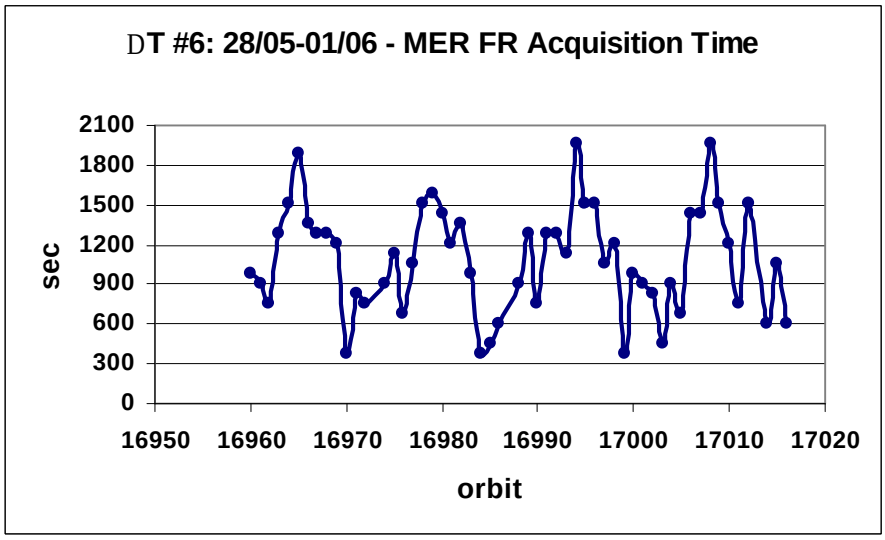
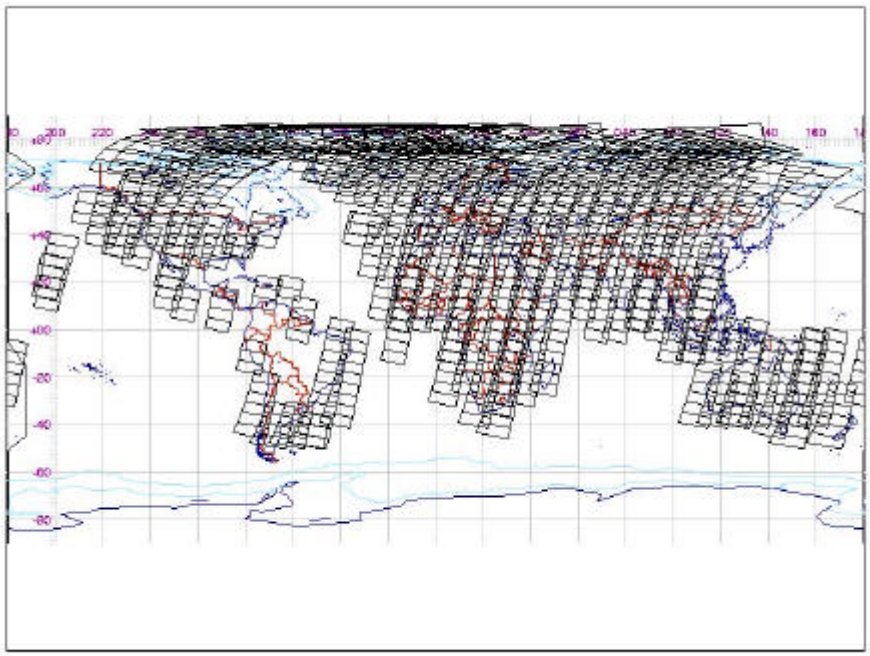


Figure 8 – Top: MERIS FR Global Coverage Map for period 28/05 – 01/06
Bottom: MERIS FR Acquisition time segments



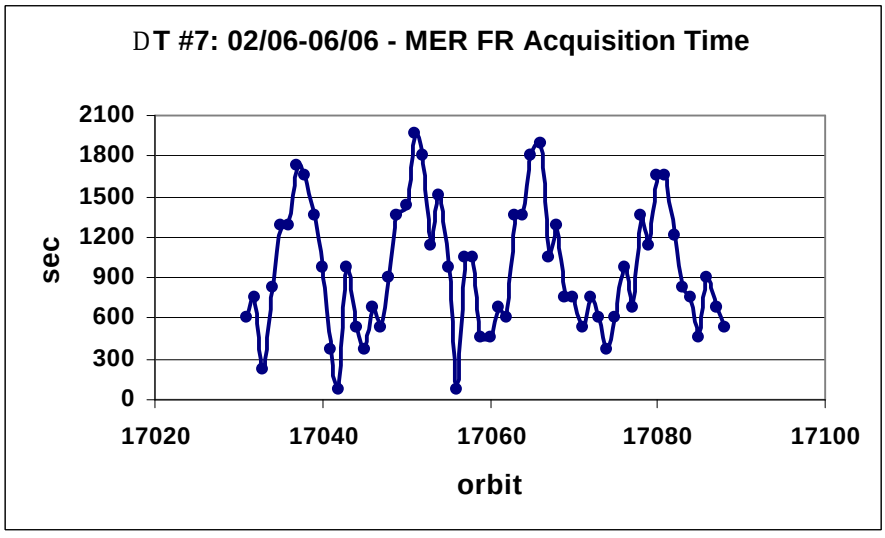


Figure 9 – Top: MERIS FR Global Coverage Map for period 02/06 – 06/06
Bottom: MERIS FR Acquisition time segments

During cycle # 37 the mean time per orbit dedicated to FR acquisitions is 13.82 min.

4.3 MER_CA__0P Products

During Cycle #37 three different type of routine radiometric calibrations have been planned, two DAC diffuser ageing (one orbit each), one WV2 wavelength 2 (four orbits) and two RGC radiometric gain (one orbit each). All the calibrations were successfully executed on the 07th, 21st, and 22nd of May and 04th of June, in orbits respectively 16858, 16859, 16860, 16861, 16862, 16863, 16660 and 17060.

The list of calibration files produced is reported below:

MER_CA__0PNPDE20050507_234933_000001792037_00073_16660_0059.N1	RGC
MER_CA__0PNPDK20050521_194708_000001792037_00271_16858_0120.N1	DAC
MER_CA__0PNPDE20050521_212744_000001792037_00272_16859_0062.N1	DAC
MER_CA__0PNPDE20050521_230817_000001802037_00273_16860_0063.N1	WV2
MER_CA__0PNPDE20050522_004852_000001792037_00274_16861_0064.N1	WV2
MER_CA__0PNPDE20050522_022928_000001792037_00275_16862_0065.N1	WV2
MER_CA__0PNPDE20050522_041004_000001792037_00276_16863_0066.N1	WV2
MER_CA__0PNPDE20050604_222724_000001792037_00473_17060_0087.N1	RGC

5 INSTRUMENT/DATA UNAVAILABILITY

5.1 Instrument Unavailability

No instrument unavailability was communicated by ESOC during cycle #37.
In the reporting period, 40 EDAC-corrected SEU occurred.

5.2 Data Unavailability

Two data unavailability were observed for cycle #37:

- On 4th of May 2005, the second processor of MERIS (SDPSS) spuriously switched to PAUSE mode due to a SEU starting from 06:31z until 06:57z, end of the normal acquisition in DIR&AVG mode.
- The Spectral WV2 type calibrations requires MERIS in Stabilization Mode during Region 1. Therefore no data acquisition should be included in the PEP from orbits #16860 to #16863.

6 CALIBRATION AND INSTRUMENT CHARACTERIZATION

6.1 Calibration

6.1.1 Radiometric calibration

During Cycle #37 three routine radiometric calibrations (DAC and RGC), were successfully executed on the 07th and 21st of May and 04th of June. For more details see section 4.3.

6.1.2 Spectral calibration

During Cycle #37, one Erbium routine calibration (WV2) was performed on the 21st and 22nd of May. For more details see section 4.3.

6.1.3 Geolocation

The accuracy specification for MERIS geolocation is 2000 m, with an operational goal of 150 m.
The 290 m (nadir) bands 2, 5, 8 are used to estimate the absolute geolocation accuracy.
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 to reduce the systematic offset and improve orientation parameters. Global absolute geolocation error (North and South hemispheres) for the three consecutives periods can be summarized as follow:

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

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

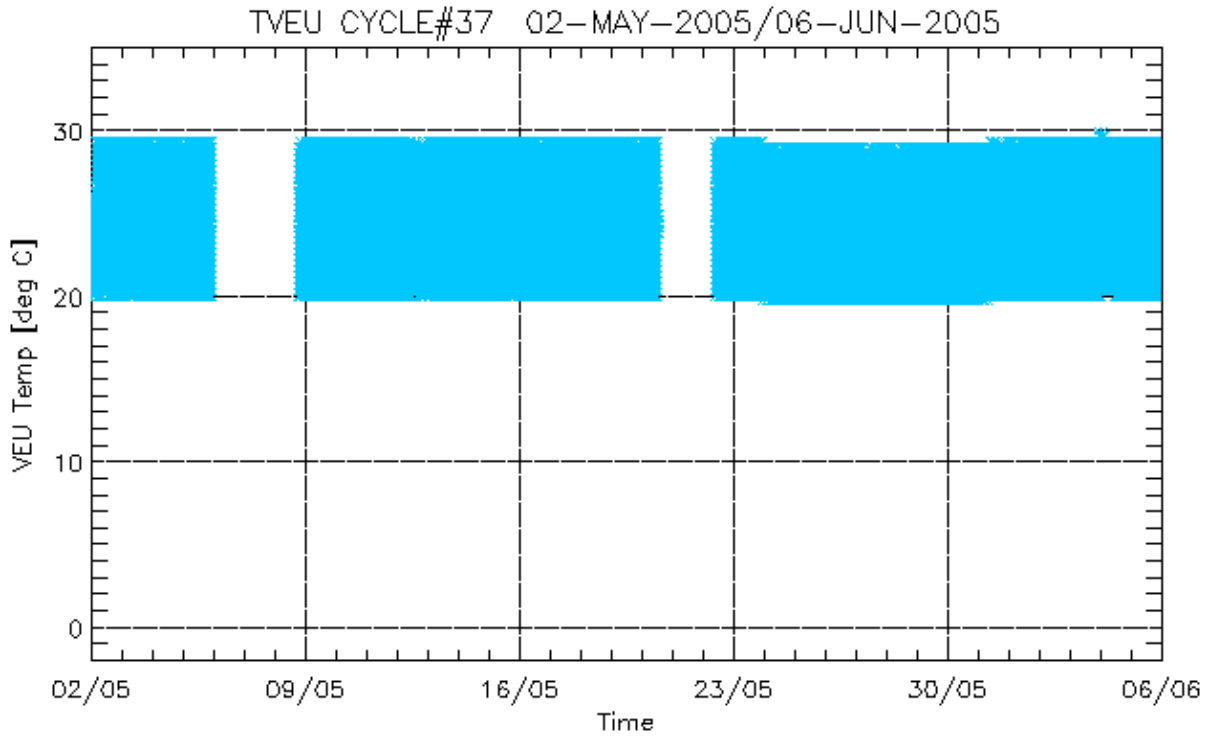
(III) After the update, 2004 period, MERIS geolocation is achieving the goal of 300 m with accuracy of ± 132 m along-track and ± 165 m across-track. The RMS absolute geolocation error remains within the range of **212 ± 22** m.

When correcting products from the systematic offset (centered results), for 2004 period the RMS absolute geolocation error stays within the range of **166 ± 18** m. Products collection 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 VEU Temperature Analysis

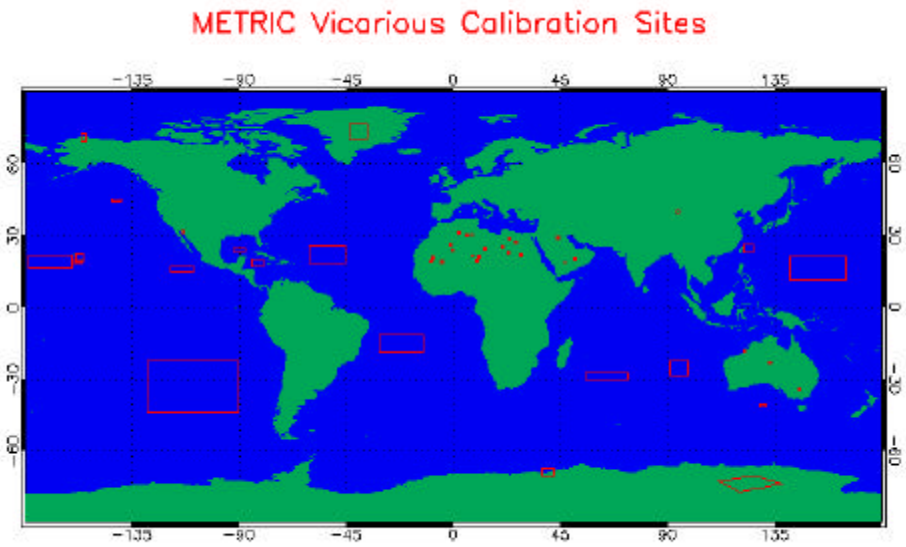
During one of the operation modes of MERIS, Stabilization mode, a thermal regulation of VEU (Video Electronic Unit) unit is performed in order to stabilize its temperature to reach full performances and insure a safe transition towards Observation and Calibration modes.
During observation, the VEU Temperature has to remain in the operational acceptance temperature range -10°/+50° in order to meet the image quality requirements. The VEU temperature should be maximum +/- 10°C different from the last radiometric calibration for optimum performance.

During cycle #37 the VEU temperature does not show any anomalous behavior, being into the nominal operating temperature range apart from lack of data from FOCC occurred during the cycle.



6.1.5 Vicarious calibration results

For absolute calibration of MERIS by vicarious methods, METRIC2.0 tools is 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 where are stored all parameters necessary for data filtering (cloud and aerosol screening, distance from coast…). 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.
During cycle #24 new overpass tables have been regenerated for all sites of interest updating the relative orbits inside the cycle. The site map is shown in the following picture:



For a comparison between MERIS data and in situ measurements of natural targets, performed by CNES, refer to Cyclic Report #17. The report can be found on the ESA website:
http://earth.esa.int/pcs/envisat/meris/reports/cyclic/

6.2 Instrument Characterization

6.2.1 Instrument degradation

No new results to be shown for cycle #37. For the last updates, refer to Cyclic Report #26 that can be found on the MERIS website:
http://earth.esa.int/pcs/envisat/meris/reports/cyclic/

6.2.2 Diffuser ageing

No new results to be shown for cycle #37. For the last updates, refer to Cyclic Report #36 that can be found on the above-mentioned MERIS website.

6.2.3 Smile Effect

No new results to be shown for cycle #37. For the last updates, refer to Cyclic Report #23 that can be found on the above-mentioned MERIS website.

6.2.4 Spectral evolution from erbium measurements

No new results to be shown for cycle #37. Please refer to Cyclic Report #23 that can be found on the above-mentioned MERIS webpage.

7 DATA QUALITY CONTROL

7.1 MERIS products quality status

IPF version 4.10 did not have any impact on the MERIS products quality but on the Level 2 processing time; moreover some minor bugs related to the FR production and specifically to the water vapor product have been fixed (for details see Par. #6.2 of Cyclic Report #32).

7.2 Anomalies and Software Problem Reporting (SPR)

1. Blank records have been identified in some MERIS FR products rejected by visual inspections using the AMALFI system. An Anomaly Report has been opened and the problem is still under investigation.

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 get the reprocessed data.

9 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.

10 VALIDATION ACTIVITIES AND RESULTS

Refer to the Cyclic Report #33 to find out the validation activity regarding the MERIS atmospheric products presented by FUB during the QWG held on December 2004.

11 WATER VAPOUR AND BROWSE MAPS

Water Vapour data, retrieved from MER_LRC_2P products, have been used to generate global coverage maps for each day of the cycle. Maps are available on the ESA website:

http://earth.esa.int/pcs/envisat/meris/maps/watervapour/

MERIS tracks for each day of the cycle have been plotted using Browse products. Maps are available on the ESA website:

http://earth.esa.int/pcs/envisat/meris/maps/browse/

12 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

13 GENERAL INFORMATION

1. Next Data Quality Working Group (QWG) meeting will take place on 16/17 June in the LOV (Laboratoire d'Oceanologie de Villefranche) premises, Villefranche-sur-mer, France.

2. The European Space Agency is organizing a joint MERIS and (A)ATSR workshop that will be held at ESRIN, Frascati, Italy, **26-30 September 2005**. All information about the participation and objectives of the workshop can be found on the ESA's official page:
   http://envisat.esa.int/workshops/meris_aatsr2005/