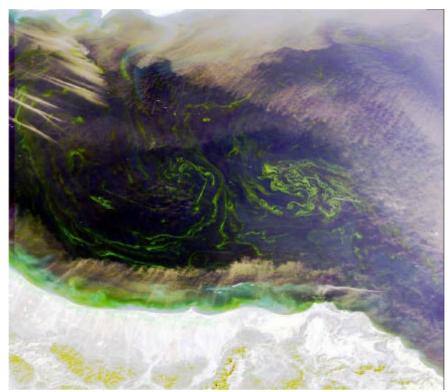


MERIS CYCLIC REPORT 44^{TH} 02^{ND} January 2006– 06^{TH} February 2006



07 January 2006 – MERIS Full Resolution scene showing an algal bloom in the Gulf of Oman

prepared by/préparé par DPQC MERIS Team and QWG

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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 #44 starts on the 02nd of January 2006 and stops on the 06th of February 2006.

- No auxiliary files were disseminated during the reporting period.
- Three calibrations Radiometric Gain, Diffuser Ageing and Wavelength spectral type 1) have been successfully executed
- No Instrument unavailability has occurred during the reporting period.
- One data unavailability have occurred during the reporting period.

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

Cycle number	43
Start time	02 January 2006, 21:59:29
Stop time	06 February 2006, 21:59:29
Start orbit	20095
Stop orbit	20595

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_010	914 PO-TN-MEL-Gs-0003
3. MERIS Level 1b Detailed Processing Model	Iss_6_Rev_1a_010	914 PO-TN-MEL-GS-0002
4. MERIS Level 2b Detailed Processing Model	Iss_6_Rev_1a_010	914 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 Surface Map	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

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

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 #44.



• 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

3.4 Configuration Table Interface (CTI)

No new CTI disseminated during cycle #44.

3.5 Level 1/ Level 2 RR or FR products

During cycle #44 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_RR0P %	
	Inventoried	Missing
From 02/01 to 09/01	100.00	0.00
From 09/01 to 16/01	97.25	2.75
From 06/01 to 23/01	100	0
From 23/01 to 30/01	98.98	0.83
From 30/01 to 06/02	100	0

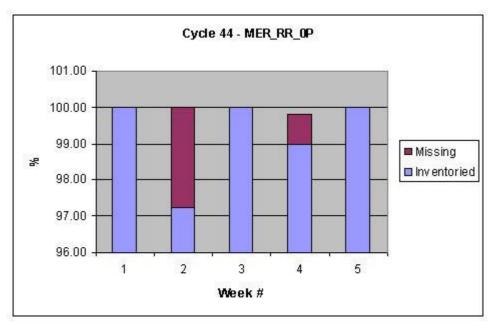


Figure 1 - MER_RR__0P generated/missing by the ground segment during cycle #44

The number of RR Level 0 products acquired during the cycle is about 99.06 % of the planned ones.



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

Week	MER_FR0P %	
	Inventoried	Missing
From 02/01 to 09/01	98.70	0.76
From 09/01 to 16/01	96.22	3.08
From 06/01 to 23/01	99.10	0.90
From 23/01 to 30/01	92.50	7.09
From 30/01 to 06/02	91.61	8.38

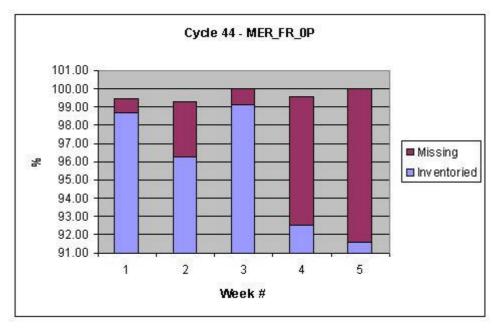


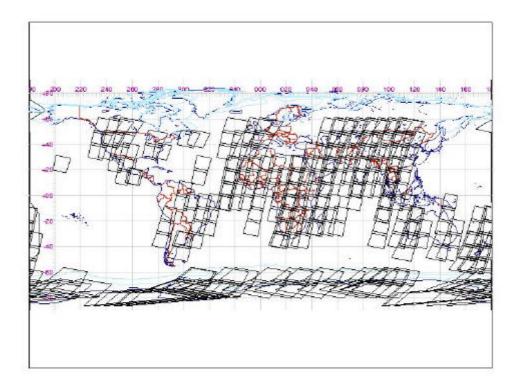
Figure 2 - MER_FR__0P generated/missing by the ground segment during cycle #44

The number of FR Level 0 products generated during the cycle is about 95.63 % of the planned ones.

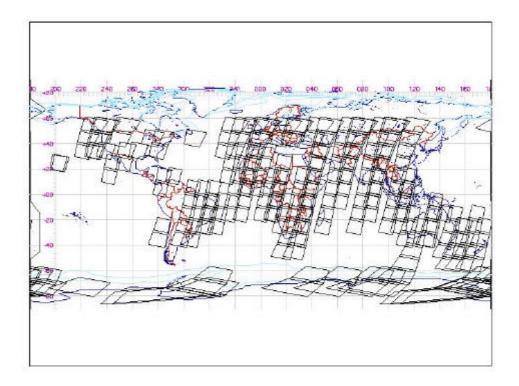
4.2 MERIS FR acquisitions

The pictures below show the MERIS Full Resolution global coverage for the reporting period. As specified for this type of MERIS products, all lands and coastal areas are covered by MERIS FR acquisitions. Due to technical issues, the last week pictures are not available.





Figure~3-MERIS~FULL~RESOLUTION~LEVEL~0~ACQUISITIONS~-PART~#1-03/01/2006-07/01/2006



Figure~4-MERIS~FULL~RESOLUTION~LEVEL~0~ACQUISITIONS-PART~#2-08/01/2006-12/01/2006



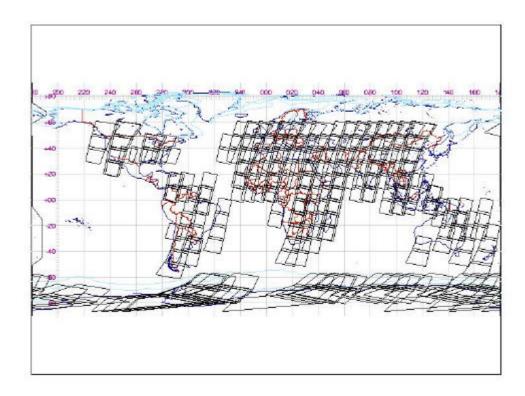
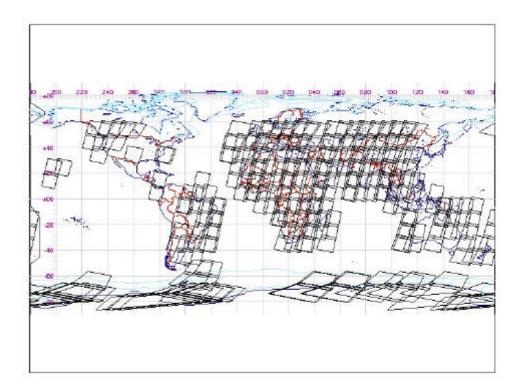


Figure 5 - MERIS FULL RESOLUTION LEVEL 0 ACQUISITIONS - PART #3 - 13/01/2006 - 17/01/2006



 $Figure\ 6-MERIS\ FULL\ RESOLUTION\ LEVEL\ 0\ ACQUISITIONS-PART\ \#4-18/01/2006-22/01/2006$



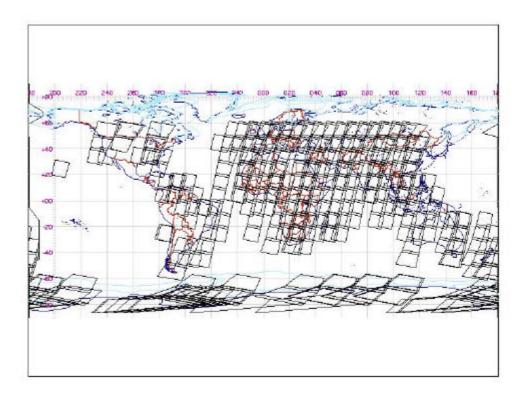


Figure 7 - MERIS FULL RESOLUTION LEVEL 0 ACQUISITIONS - PART #5 - 23/01/2006 - 27/01/2006

4.3 MER_CA_0P Products

During Cycle #44 three different type of routine calibrations have been planned, one RGC radiometric gain (one orbit), one DAC diffuser ageing (two orbits) and one WV1 wavelength type 1 (two orbits). All the calibrations were successfully executed on the 14th and 28th of January, in orbits respectively 20260, 20458, 20459, 20460 and 20461.

The list of calibration files is reported below:

MER_CA0PNPDK20060114_115704_000001792044_00166_20260_0000.N1	RGC
MER_CA0PNPDK20060128_075436_000001792044_00364_20458_0003.N1	DAC
MER_CA0PNPDK20060128_093512_000001792044_00365_20459_0004.N1	DAC
MER_CA0PNPDK20060128_111545_000001792044_00366_20460_0005.N1	WV1
MER_CA0PNPDK20060128_125620_000001792044_00367_20461_0006.N1	WV1

5 INSTRUMENT/DATA UNAVAILABILITY

5.1 Instrument Unavailability

No instrument unavailability to be communicated for cycle #44. In the reporting period, 56 EDAC-corrected SEU occurred.



5.2 Data Unavailability

Two data unavailability to be communicated for cycle #44.

- On 10th of January 2006, the second processor of MERIS (SDPSS) spuriously switched to PAUSE mode due to a SEU starting from 07:13:31z until 07:20:27z, end of the normal acquisition in DIR&AVG mode. Approximately 07 minutes of data have been lost during this unexpected event.
- The Spectral WV1 type calibrations requires MERIS in Stabilization Mode during Region 1. Therefore no data acquisition should be included in the PEP from orbits #20460 to #20461.

6 CALIBRATION AND INSTRUMENT CHARACTERIZATION

6.1 Calibration

6.1.1 Radiometric calibration

During Cycle #44 two radiometric calibrations (RGC and DAC type), were successfully executed on the 14th and 28th of January. For more details see section 4.3.

6.1.2 Spectral calibration

One Erbium calibration type WV1was performed during Cycle #44, on 28th of November. 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:

- 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.
- 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 \pm 132 m along-track and \pm 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 $-10^{\circ}/+50^{\circ}$ in order to meet the image quality requirements. The VEU temperature should be maximum $+/-10^{\circ}$ C different from the last radiometric calibration for optimum performance.

During cycle #44 the VEU temperature does not show any anomalous behavior, being into the nominal operating temperature range.

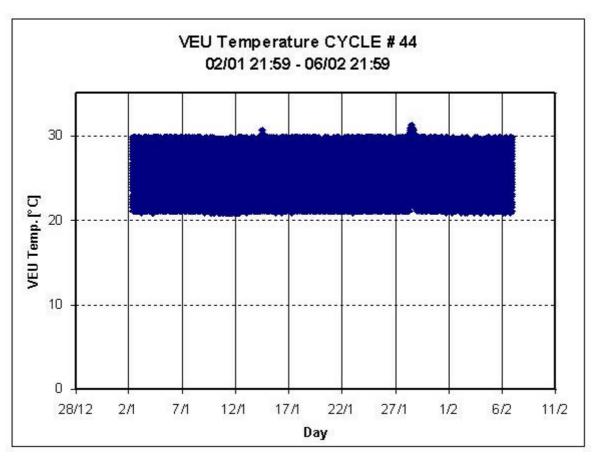


Figure 8 - VEU Temperature during cycle #44

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:

METRIC Vicarious Calibration Sites

Figure 9 - METRIC calibration site map

Based on the second reprocessing dataset (see section 9), the entire METRIC sites Child products will be generated to be processed with the last version of the METRIC tool (2.0).

This reprocessing has started in the current of December 2005 in ACRI premises, and will concern the data starting from the ENVISAT launch to present. The METRIC v2.0 tool has been delivered to ESRIN where it will be used in operational mode after the IPF upgrade to the last version of the processing chains (MERISv5.1)

6.2 Instrument Characterization

6.2.1 Instrument degradation

No new results to be shown for cycle #44. 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

A brief summary of Diffuser Ageing evolution since the first MERIS acquisition is shown by the plot series below. The diffuser ageing has been estimated computing the differences between Diffuser 1 and



Diffuser 2 with respect to a reference orbit (#1859) acquired in the first period of MERIS life (July 2002).

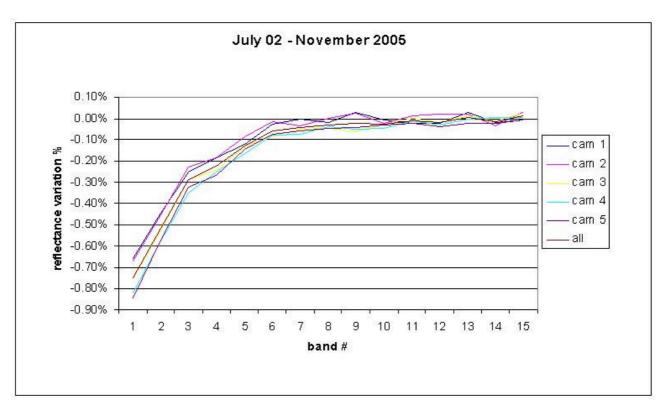


Figure 10 - Variation observed comparing Diffuser 2 vs. Diffuser 1 reflectances spectra per camera



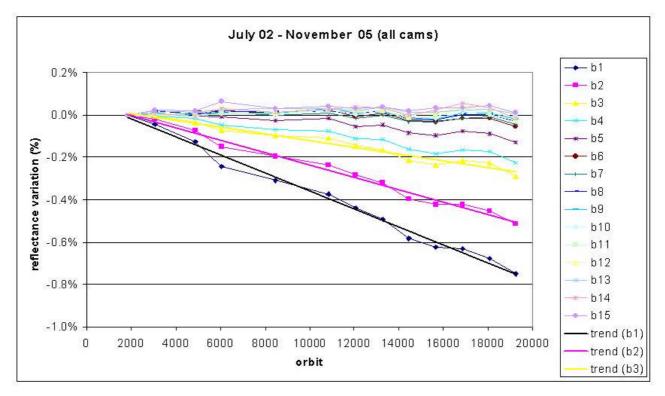


Figure 11 - Variation observed comparing Diffuser 2 vs. Diffuser 1 reflectances per MERIS spectral bands

The degradation of diffusers seems to mainly affect the blue region of spectrum, while for higher wavelengths the degradation is less than 0.5 % after nearly three years of flight.

6.2.3 Smile Effect

No new results to be shown for cycle #44. 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 #44. 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 SECOND 2005 MERIS ARCHIVE REPROCESSING

Following the recommendations of the Data Quality Working Group and the Science Advisory Group, improvements of the MERIS processing resulted in the version 7.4 of the off-line processor MEGS. It is currently being used for a complete re-processing 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 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.

11 VALIDATION ACTIVITIES AND RESULTS

No new results to be presented. Please refer to the previous cyclic reports for further information on the Validation activities.

12 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/

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 has organized a joint MERIS and (A)ATSR workshop, held at ESRIN, Frascati, Italy, on 26-30 September 2005. All information about the objectives of the workshop as well as the participants presentations can be found on the ESA's official page:

http://envisat.esa.int/workshops/meris aatsr2005/

- 2. Next Data Quality Working Group (QWG) meeting will take place in March 2006 in the ACRI-ST premises Sophia Antipolis, France.
- 3. MERIS and AATSR Calibration and Geophysical Validation (MAVT-2006), 20-24 March 2006 The European Space Agency is organizing a second working meeting on MERIS and AATSR Calibration and Geophysical Validation (MAVT-2006). The working meeting will be held in ESRIN (near Rome) from 20 to 24 March 2006. This meeting is primarily intended for the participants of the MERIS and AATSR Validation Program. During the MAVT-2006 scientists and other users will present the latest results from their ongoing validation activities. The presentations at the working meeting will be given by invited speakers. During an open poster session participants can present their individual validation results.

 All information about the objectives of the workshop as well as the participants presentations can be found on the ESA's official page:

http://www.congrex.nl/06M07