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ENVISAT

CYCLIC ALTIMETRY REPORT

CYCLE 16

QUALITY ASSESSMENT REPORT

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1 INTRODUCTION

This documents aims at reporting on the performances of the EnviSat Radar Altimeter, Microwave Radiometer and DORIS sensors, on the corresponding data product quality from the Level 0 data up to the Level 2 Fast Delivery products, as well as on the main events occurred during cycle 16.

This reports covers the period from the 28th April to 2nd June 2003.

2 DISTRIBUTION LIST

This report is available in PDF format at the Internet address http://earth.esa.int/pcs/envisat

3 ACRONYMS

ADF	Auxiliary Data File
AGC	Automatic Gain Control
CMA	Centre Multi-missions Altimètre (F-PAC)
DORIS	Doppler Orbitography and Radiopositioning Integrated by Satellite
DSR	Data Set Record
ERS	European Remote Sensing satellite
ESRIN	European Space Research Institute
ESOC	European Space Operations Centre
F-PAC	Envisat French Processing and Archiving Facility
FD	Fast Delivery products
GS	Ground Segment
GTS	Global Telecommunication System
HTL	Height Tracking Loop
ICU	Instrument Control Unit
IECF	Instrument Engineering Calibration Facility
IF	Intermediate Frequency
IPF	Instrument Processing Facility
LUT	Look Up Table
MPH	Main Product Header
MSS	Mean Sea Surface
MWR	MicroWave Radiometer
PCS	ESA/ESRIN ERS Products Control Service
PCF	ESA/ESRIN EnviSat Product Control Facility
PDS	Envisat Payload Data Segment
PMC	Payload Main Computer
PTR	Point Target Response
RA-2	EnviSat Radar Altimeter bi-frequency
SEU	Single Event
SFCM	Stellar Fine Control Mode

SPH	Specific Product header
SPSA	Signal Processing Sub-Assembly
TM	Telemetry
TRP	Transponder
USO	Ultra Stable Oscillator

4 REFERENCE DOCUMENTS

[R – 1] F-PAC MONTHLY REPORT, SALP-RP-M-OP-14842-CN
[R – 2] ENVISAT Microwave Radiometer Assessment Report, , http://earth.esa.int/pcs/envisat
[R – 3] Envisat RA-2 IF Mask weird behaviour: Investigation Report
[R – 4] New IF mask Auxiliary file validation
[R – 5] Instrument Performance Evaluation and Analysis Summary, PO-TR-ALS-RA-0042
[R – 6] Instrument Corrections Applied on RA-2 Level 1b products, Paper presented at the ENVISAT Calibration workshop in September 2002
[R – 7] ENVISAT Phase E Cal/Val Acquisition Plan, ENVI-SPPA-EOPG-TN-03-0008
[R – 8] RA-2 S-Band Anomaly Investigation, PO-TN-ESA-RA-1331
[R – 9] RA-2 Performance Results, ENVISAT Calibration Review
[R – 10] ECMWF Report on ENVISAT RA- 2, Report on ENVISAT Radar Altimeter - 2 (RA- 2), Wind/ Wave Product with Height Information (RA2_ WWV_ 2P), http://earth.esa.int/pcs/envisat
[R - 11] ENVISAT/MWR: 36.5 GHz Channel Drift Status, CLS.DOS/NT/03.695, March 10,2003
[R – 12] Envisat GDR Quality Assessment Report, SALP-RP-P2-EX-21121-CLS012

5 GENERAL QUALITY ASSESSMENT

5.1 Instruments status

The RA-2 instrument has been working nominally despite the three known anomalies occurred at the level of the ICU. For what regards the Microwave and the SPSA part of the instrument, no new anomaly has happened during this cycle. On the other hand the two known causes of malfunctioning are still present. In particular we refer to the so-called S-Band anomaly and the IF mask weird behavior described respectively in [R – 8] and [R – 3].

MWR sensor assessment report: refer to [R – 2].

DORIS sensor assessment report: refer to [R – 1].

5.2 Cycle quality

The summary of the RA-2 data products availability for this cycle is given in Table 1.

Week	Start Orbit	Stop Orbit	Tot unavailability	L0 unavailability	L1b unavailability	Average unavailability	L0 unavailability	L1b unavailability

			(s)	(s)	(s)	percentage	percentage	percentage
1	6067	6167.2	34211.06	500.549	478.963	94.34339	94.26063	94.12511
2	6167.2	6267.4	126641.2	488.455	1838.752	79.06055	78.97978	78.61115
3	6267.4	6367.6	121130.7	3437.669	27076.08	79.97175	79.40335	75.34921
4	6367.6	6467.8	67.632	13329	31720.24	99.98882	97.78495	94.58209
5	6467.8	6568	72.136	427631.2	445318.9	99.98807	29.2819	26.18841

Table 1: RA-2 L0 and L1b Data products availability summary for cycle 16

5.3 Orbit quality

The orbit is maintained within the +/- 1km ground track. However, note that the Western side of the ground track dead-band has been violated starting from 17 April 2003. The violation lasted until the 10th of May (with a maximum excursion of ca. 600m) and it mostly concerned low latitudes, being 30 degree latitude on descending passes the most affected region. An SFCM single burn manoeuvre was successfully performed on the 14th May 2003, as planned.

On the 20th of May a single burn OCM out-of-plane orbit inclination maintenance manoeuvre was executed as planned, using thruster pair 7&9.

5.4 Ground Segment Processing Chain Status

5.4.1 IPF PROCESSING CHAIN

IPF S/W version: The current IPF processing chain is version 4.54
IPF anomalies: No anomalies discovered during this cycle

A further upgrade is foreseen for mid-June/beginning of July 2003

5.4.2 F-PAC PROCESSING CHAIN

F-PAC SW version: The current F-PAC processing chain is version 6.0
F-PAC anomalies: anomalies are detailed in the applicable F-PAC Monthly Report as given in [R - 1].

5.4.3 AUXILIARY DATA FILE

Hereafter are listed the Auxiliary Data Files (ADF) nominally used within the IPF ground processing for cycle 16.

```
RA2_CHD_AXVIEC20030402_094243_20030407_000000_20200101_000000
RA2_CON_AXVIEC20020606_164228_20020101_000000_20200101_000000
RA2_CST_AXVIEC20020621_135858_20020101_000000_20200101_000000
RA2_DIP_AXVIEC20020122_134206_20020101_000000_20200101_000000
```

```
RA2_GEO_AXVIEC20020314_093428_20020101_000000_20200101_000000
RA2_ICT_AXVIEC20020709_131546_20020101_000000_20200101_000000
RA2_IFA_AXVIEC20020313_174755_20020101_000000_20200101_000000
RA2_IFB_AXVIEC20020313_174959_20020101_000000_20200101_000000
RA2_IFF_AXVIEC20021023_085202_20020101_000000_20100101_000000
RA2_IOC_AXVIEC20020122_141121_20020101_000000_20200101_000000
RA2_MET_AXVIEC20020204_073357_20020101_000000_20200101_000000
RA2_MSS_AXVIEC20021023_141823_20020101_000000_20200101_000000
RA2_OT1_AXVIEC20020313_173134_20020101_000000_20200101_000000
RA2_OT2_AXVIEC20020313_173944_20020101_000000_20200101_000000
RA2_SET_AXVIEC20020122_150917_20020101_000000_20200101_000000
RA2_SL1_AXVIEC20030131_100228_20020101_000000_20200101_000000
RA2_SL2_AXVIEC20030131_101757_20020101_000000_20200101_000000
RA2_SOI_AXVIEC20021023_140434_20020621_000000_20200101_000000
RA2_SSB_AXVIEC20020122_160151_20020101_000000_20200101_000000
RA2_TLD_AXVIEC20020313_175443_20020101_000000_20200101_000000
RA2_USO_AXVIEC20020122_162920_20020101_000000_20200101_000000
```

No specific ADF change has been performed during cycle 16; the most recent change has been performed to the RA-2 Characterization file (RA2_CHD_AX) during cycle 15, uploaded in the ground processing on April the 7th together with the new IPF version 4.54 (change in the RA2_CHD_AX ADF done to decrease the RA-2 Ku Backscattering coefficient by 3.5 dB to align it with the ERS-2 one, as recommended by the RA-2 and MWR CCVT).

The RA2_POL_AX, RA2_PLA_AX, and the RA2_SOL_AX ADFs have been regularly updated.

5.4.4 PLANNED UPGRADES

An upgrade of the IPF processing chain is planned to be performed mid-June/beginning of July 2003.
The new IPF release version shall contain the following upgrades:

1. Change in the AGC evaluation for both Ku and S-band in the Level1b processor.
2. Level 2 Neural Network algorithm for the computation of the MWR Wet Tropospheric, Water Vapor and Liquid Water Content.
3. Refinement in Level2 Ice2 Retracker Algorithm.
4. ADF updates:
    a. Level 1 ADF: New IF mask ADF
    b. Level 2 ADF: Rain Flag, SSB, CLS01 MSS, Tides GOT002 and FES02, as recommended by the RA-2 and MWR CCVT.

Upgrades 2, 3 and 4 should nominally be part of the next F-PAC CMA processing chain upgrade, planned for July 2003. Still to be confirmed.

6 ENVISAT PAYLOAD STATUS

6.1 Altimeter Events

The Radar Altimeter 2 was unavailable, during cycle 16, in the time ranges reported in Table 2.

Start	Stop	Start Orbit	Stop Orbit	Reason
24-Apr-2003 13:20:09	25-Apr-2003 09:15:36	6004	6016	RA-2 Switch down due to multiple SEU
05-May-2003 12:30:17	06-May-2003 10:01:10	6161	6174	RA-2 to Reset-Wait due to known SEU
11-May-2003 11:06:33	12-May-2003 10:14:35	6246	6260	RA-2 to Suspend due to TM Format Error
18-May-2003 06:25:17	19-May-2003 15:59:28	6343	6364	All Payload switched off due to PMC SW upgrade

Table 2: RA-2 Unavailable periods

6.1.1 RA-2 INSTRUMENT PLANNING

The RA-2 instrument planning has been performed according to [R – 7], as follows:

- IF Calibration Mode according the nominal operational acquisition scheme: 100 seconds of data per day over Himalayas region
- Preset Loop Output mode for Austrian Range transponders
- Individual Echoes background planning: transmission of one Data Block of Individual Echoes data each 8 MDSRs continuously.

6.2 MWR Events

The MWR was unavailable, during cycle 16, in the time ranges reported in Table 3.

Start	Stop	Start Orbit	Stop Orbit	Reason
18-May-2003 06:25:24	19-May-2003 14:45:40	6343	6363	All Payload switched off due to PMC SW upgrade

Table 3: MWR Unavailable periods

6.3 DORIS Events

The MWR was unavailable, during cycle 16, in the time ranges reported in Table 4.

Start	Stop	Start Orbit	Stop Orbit	Reason
18-May-2003 06:25:25	19-May-2003 13:21:28	6343	6362	All Payload switched off due to PMC SW upgrade

Table 4: DORIS unavailable periods

7 INSTRUMENT PERFORMANCES

7.1 RA-2 Calibration performances

7.1.1 IF FILTER SHAPE

During cycle 16 the IF Calibration Mode still shows the weird behavior described in [R – 3]. This problem is present since the beginning of the mission but it was discovered only at Commissioning Phase concluded.

In Figure 1 all the IF masks retrieved by averaging the 100 seconds of data acquired daily during cycle 16 are plotted in the left panel. The on-ground measured IF mask (ref [R – 5]) is also plotted in that panel with a red dashed line. In the right panel the difference of each of the calculated IF masks is respect to the on-ground measured one is reported. It appears clearly that some of the IF masks are very similar to the reference one while some other are completely different.

In Figure 2 the evolution of the IF mask quality parameters evaluated as in [R – 5] is reported. It can be observed that the difference respect to the on-ground reference varies between about 0.07 dB for good IF masks and about 0.3 dB for weird IF masks. Also the residual noise is higher for weird masks while the accuracy remains constant over the whole cycle. The variability of the Average Difference and the Residual Noise does not seem to follow any kind of pattern.

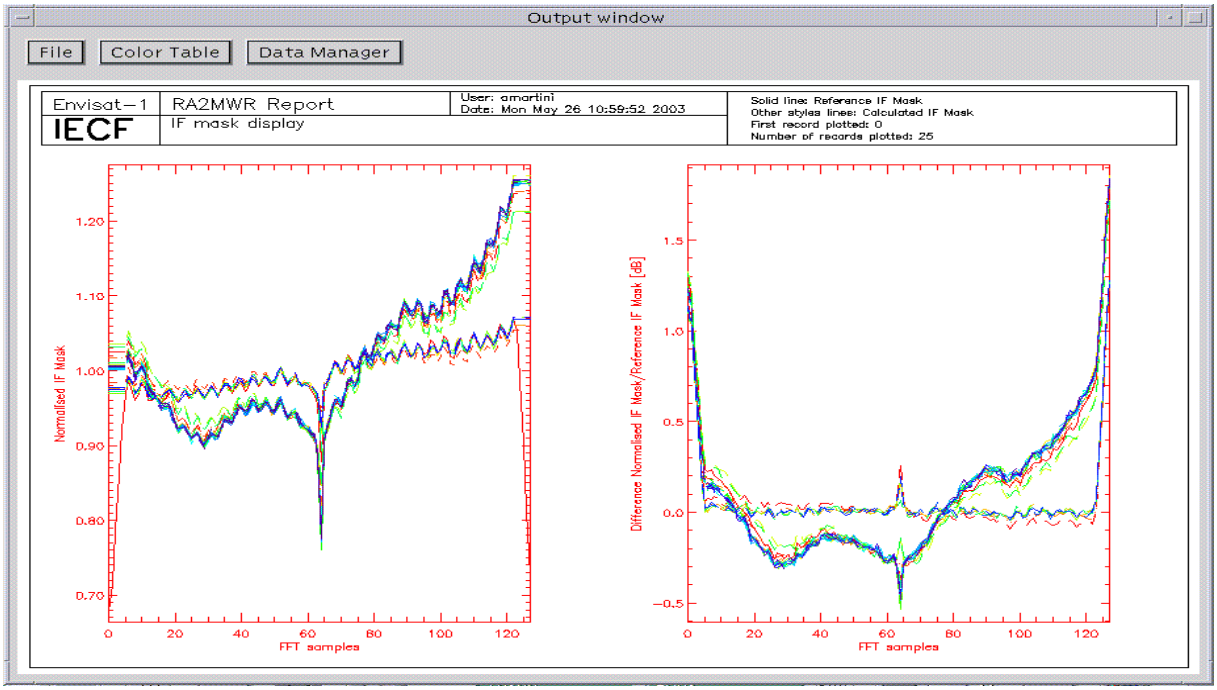

Figure 1: All IF mask retrieved daily during cycle 16 plotted together with the on-ground reference.

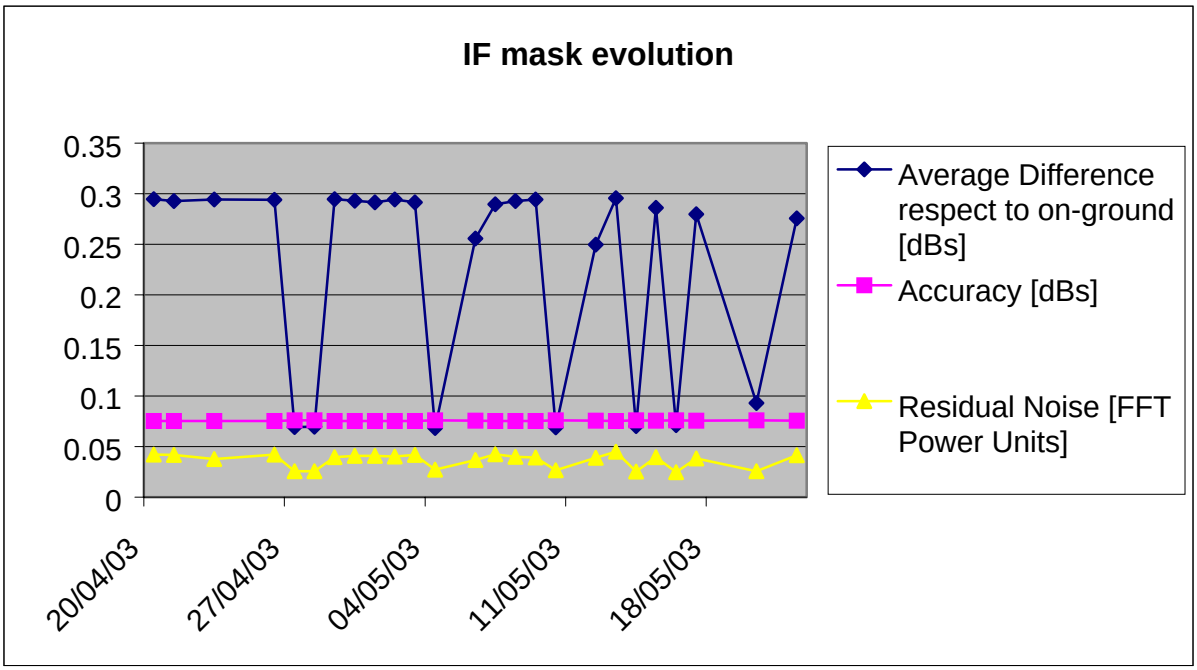

Figure 2: Evolution of the IF mask related parameters for IF masks retrieved daily during cycle 16

7.1.2 USO

In Figure 3 the USO clock period trend retrieved during cycle 16 is reported. In order to make the variability visible, the difference of the actual USO clock period respect to the nominal one has been plotted.

The reported difference of the USO clock period respect to the nominal one is of the order of 5*10^-4 picoseconds and no trend can be detected in this scale. On the other hand, a big variation can be noticed around the 20th of May; this is correlated to the instrument switch-off occurred between May the 18th and the 19th.

Worthwhile to be said is that an auxiliary file is actually present in the ground segment to correct for the USO clock period differences respect to the nominal one. A new auxiliary file will be generated only when the difference will be of at least 1 picosecond (this is the resolution of the value recorded in the auxiliary file).

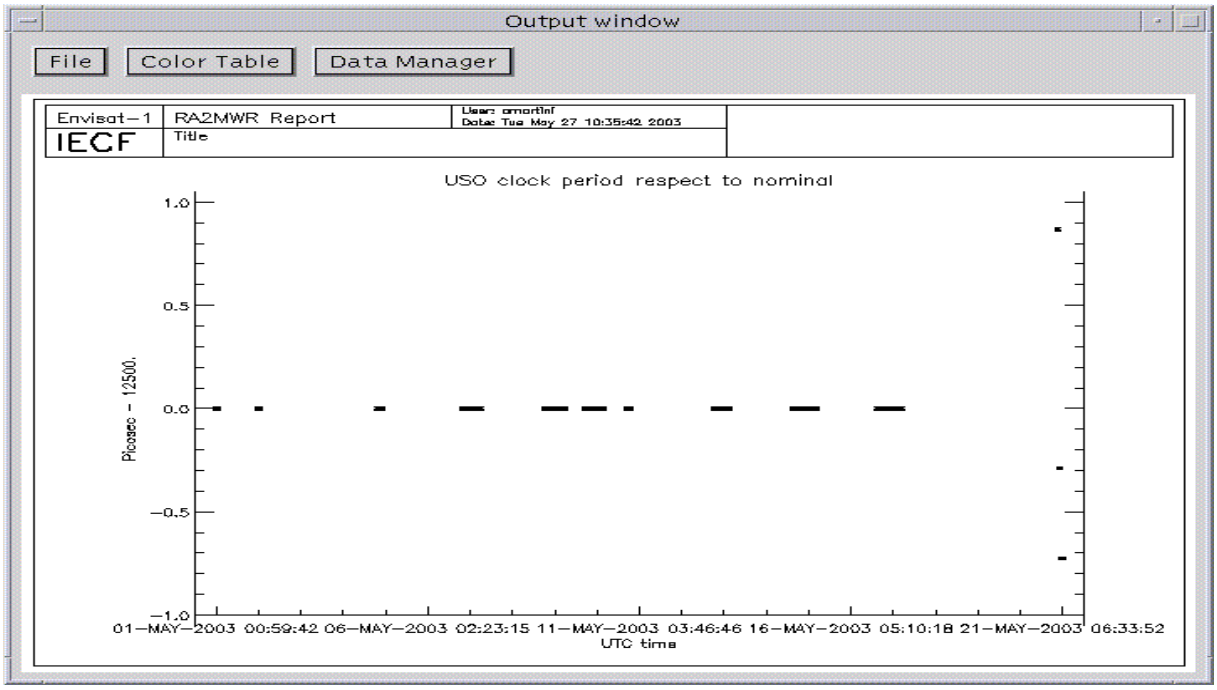

Figure 3: USO clock period trend for cycle 16

7.1.3 TRACKING CAPABILITY

In Figure 4 and Figure 5 the Chirp ID is plotted respectively for ascending and descending passes of cycle 16. The MDSRs acquired with 320MHz bandwidth are plotted in light grey (Chirp ID equal to 0), the ones acquired with 80MHz bandwidth are plotted in violet (Chirp ID equal to 1) and the ones acquired with the 20MH bandwidth are plotted in dark green (Chirp ID equal to 2).

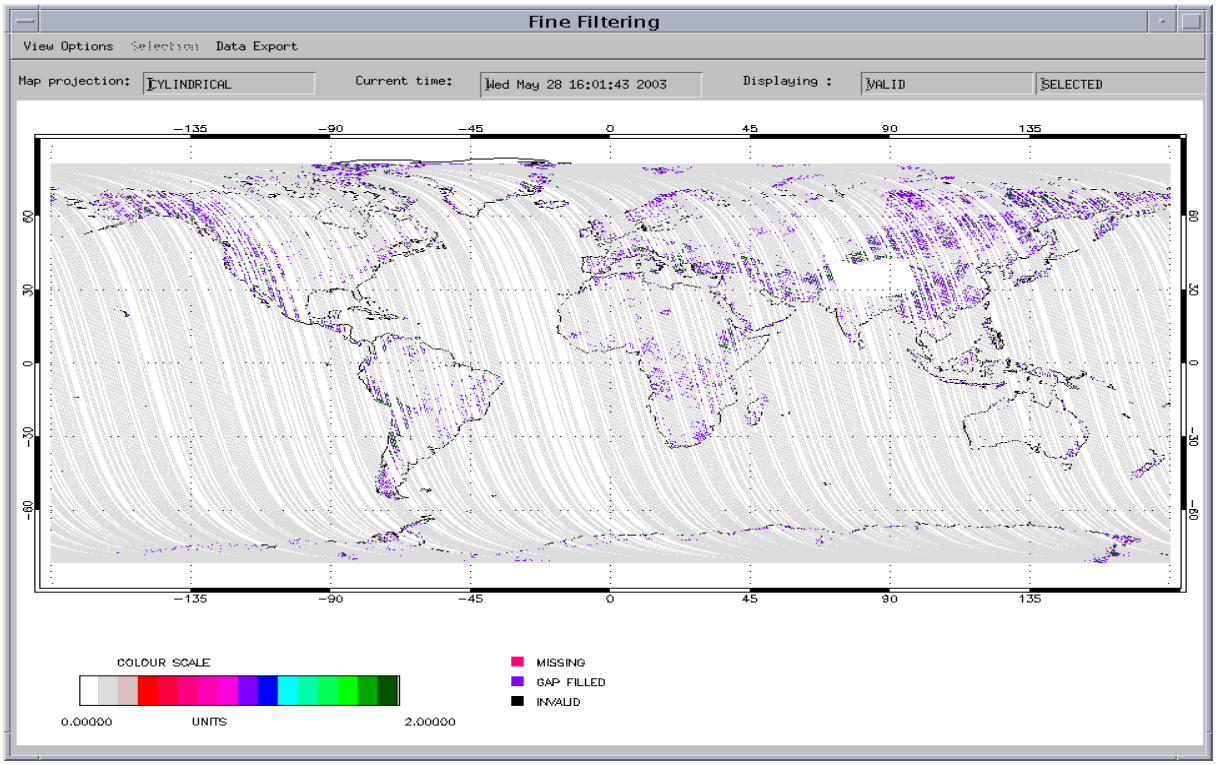

Figure 4: RA-2 Chirp ID for ascending passes during cycle 16

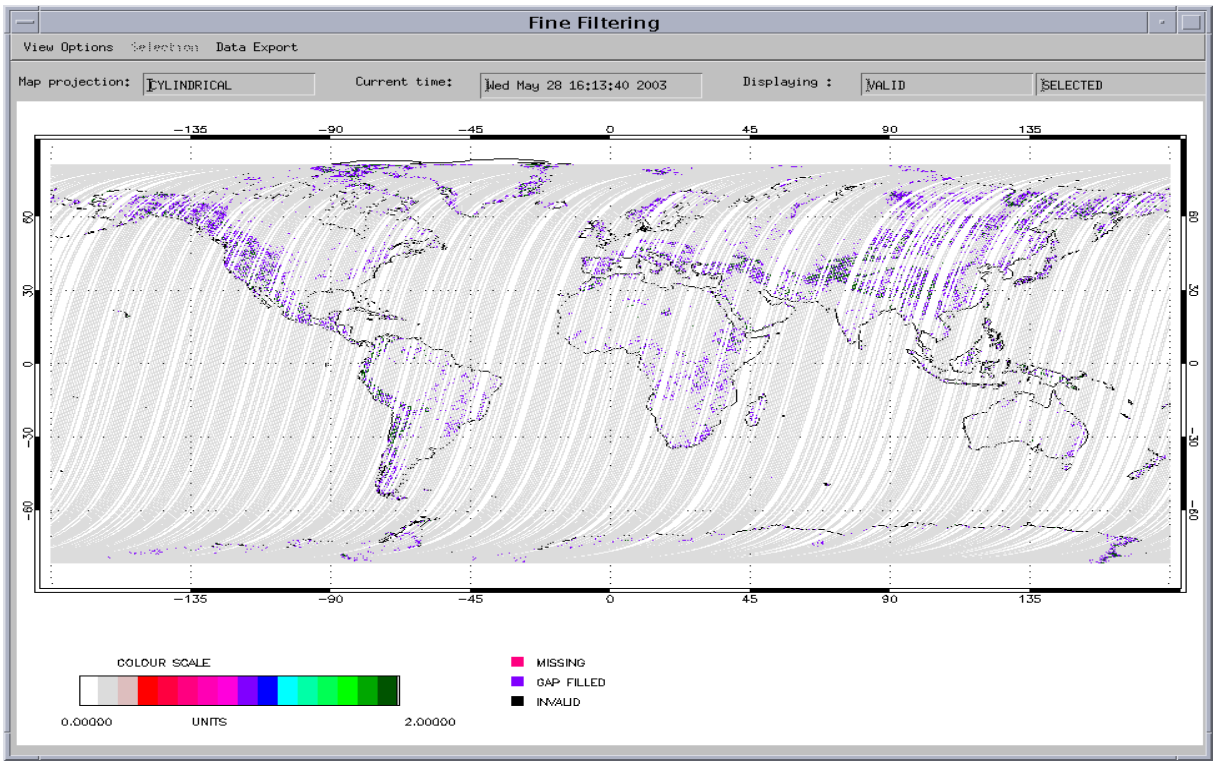

Figure 5: RA-2 Chirp ID for descending passes during cycle 16

The corresponding percentages of acquisition in the different resolutions subdivided by surface type are given in Table 5:

Surface type	320 MHz	80 MHz	20MHz
Open Ocean	99.99%	0.006%	0.004%
Costal Water (ocean depth < 5 Km)	98.30%	1.52%	0.18%
Sea Ice	99.13%	0.76%	0.11%
Ice Sheet	96.20%	3.03%	0.77%
Land	81.94%	13.63%	4.43%
All world	95.27%	3.60%	1.12%

Table 5: RA-2 Tracking capability: Chirp ID percentages discriminated by surface type

The figures given for the RA-2 tracking performances during this cycle are very much in line with the ones recorded at the end of the Commissioning Phase and presented in [R – 9]. The slight differences are due to the different algorithms used to discriminate the surface types.

7.1.4 SIGMA0 TRANSPONDER

No data relative to the Sigma_0 Transponder calibration is available for cycle 16. Some work has been performed to identify the temporary sites and to plan the acquisitions for the following cycle.

7.1.5 DATATION

No value is available for the datation bias relative to cycle 16 since the GDR data needed for this aim are not yet available.

7.1.6 MISPOINTING

In Figure 6 the trend and the histogram of the mispointing squared (smoothed over 120 s) is reported in deg^2*10e-4. In the left panel a temporary decrease of the value is to be noticed in correspondence to the out-of-plane orbit inclination manoeuvre performed on the 20th of May (ref. 5.3).
The average value is of about 0.027 deg^2 which is not in agreement with the figures reported at platform level. However we believe that this is due to a not perfect tuning of the algorithm used to retrieve the mispointing value from the RA-2 data. Work is on-going in order to refine the L2 mispointing retrieval algorithm.

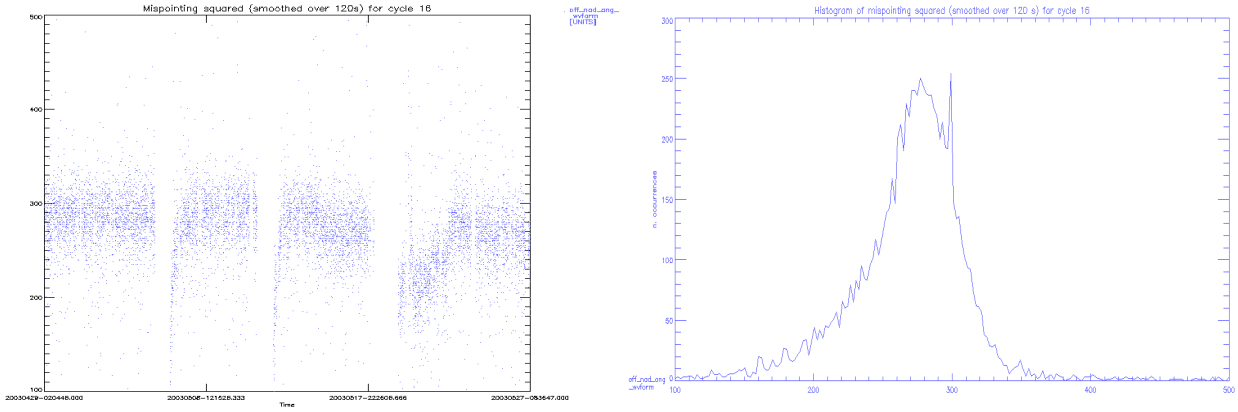

Figure 6: Smoothed mispointing squared trend and histogram for cycle 16 (deg^2*10^4)

7.2 RA-2 Altimeter Parameters

7.2.1 ALTIMETER RANGE

No current results for the time being. Monitoring of the RA-2 FD altimetric range is planned to be done along with the upgrade of the DORIS navigator data processing for the NRT orbit computation.

7.2.2 SIGNIFICANT WAVE HEIGHT

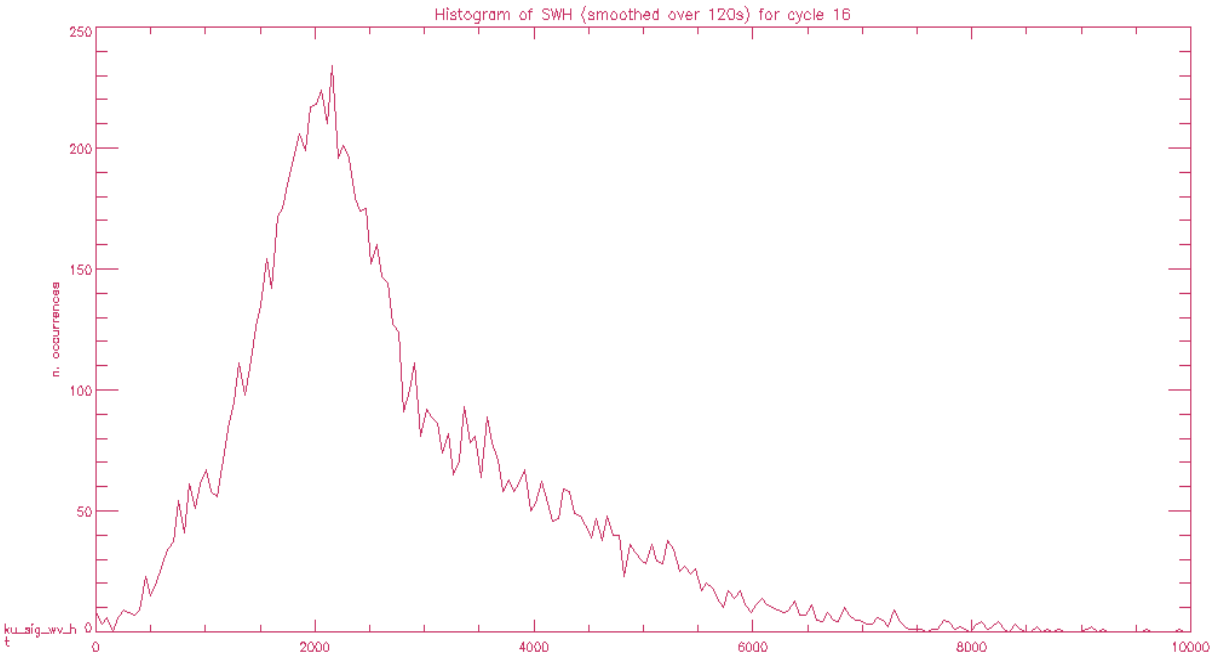

Figure 7: Histogram of smoothed Ku SWH for cycle 16 (mm)

7.2.3 BACKSCATTER COEFFICIENT – WIND SPEED

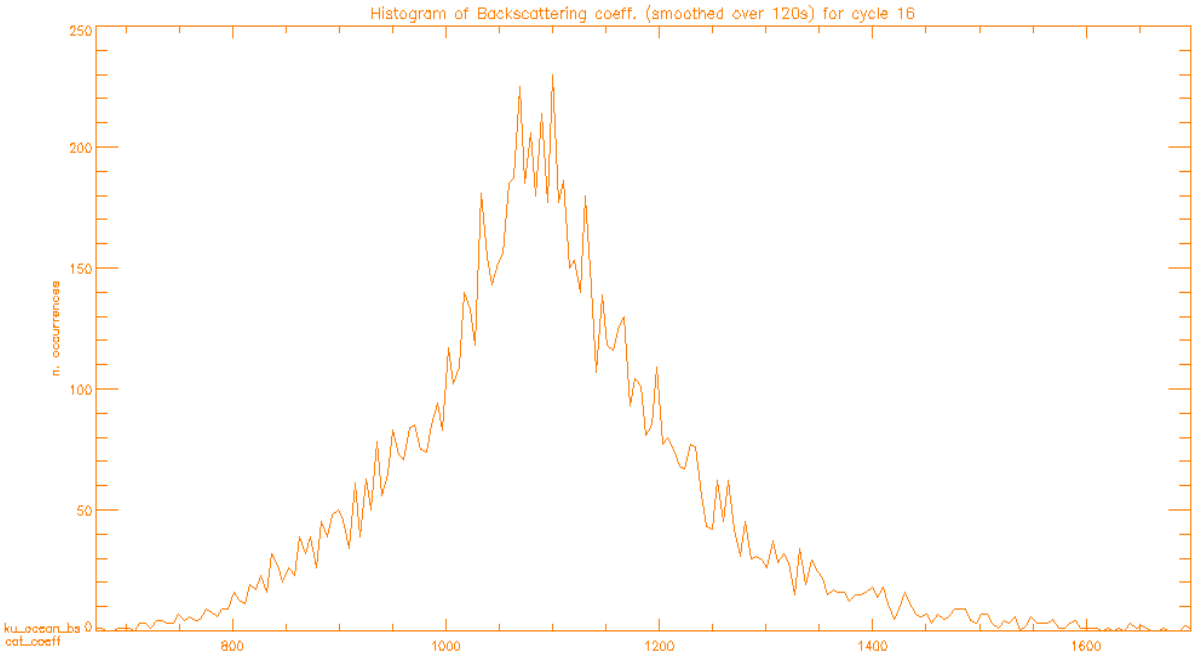

Figure 8: Histogram of smoothed Ku Backscattering Coefficient for cycle 16 (dB/100)

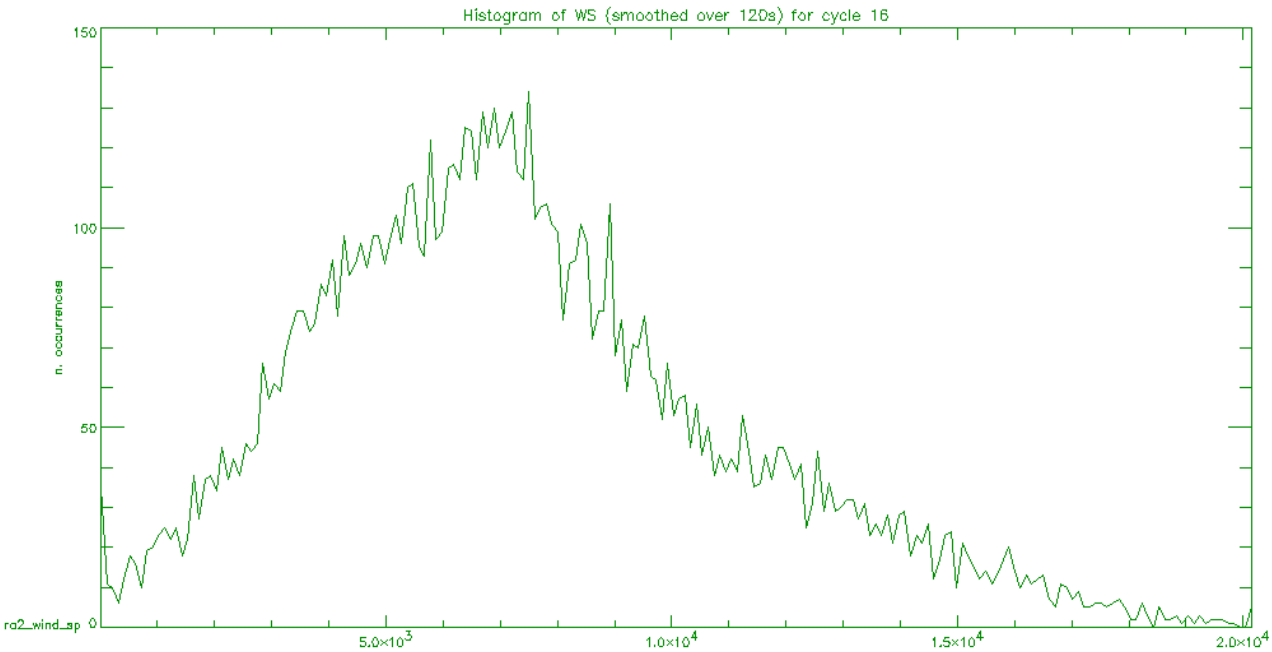

Figure 9: Histogram of smoothed Ku Wind Speed for cycle 16 (mm/s)

7.3 MWR Performances

Refer to the CLS Cyclic Report as given in [R – 2] and [R – 11].

7.4 DORIS Performances

Refer to the F-PAC Monthly Report as given in [R - 1].

8 PRODUCT PERFORMANCES

8.1 Availability of data

In Figure 10 and Table 6 the summary of unavailable RA-2 L0 products is given. There are mainly two causes of unavailability: RA-2 not planned unavailability (plotted in pink) and PDS failure (plotted in yellow). It is easy to notice that close to the Himalayas region a small gap is present daily, this is due to the daily instrument switch-off (Heater 2 mode) performed to prevent that the S-Band anomaly will last more than one day.
On top of the unavailability's hereafter summarized no data have been produced in the period from 18-May-2003 06:25:17 to 19-May-2003 15:59:28 due to a planned switch-off of the instrument.

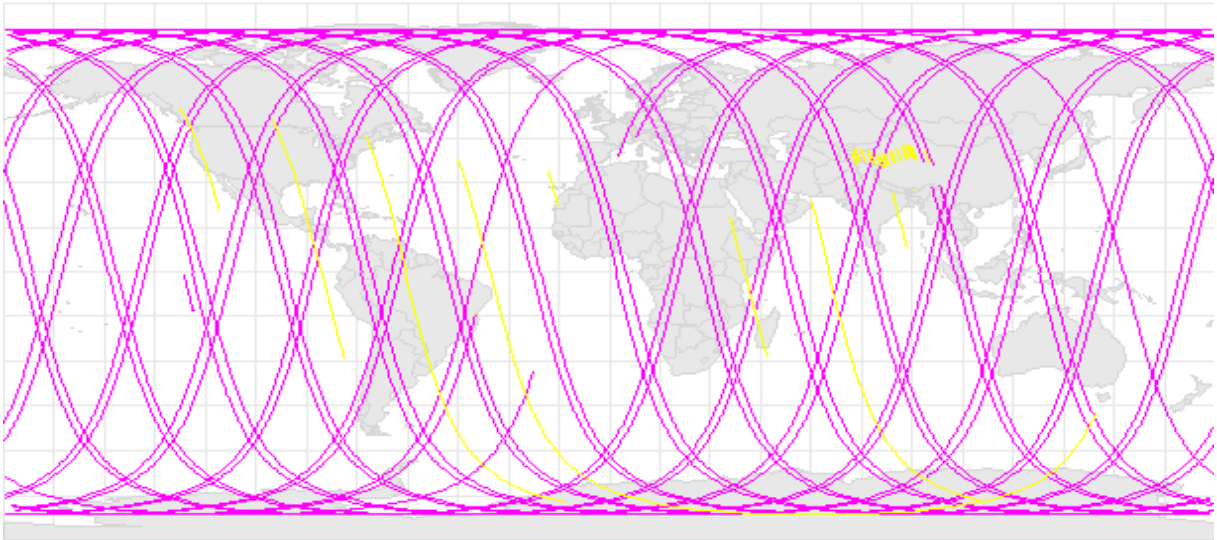

Figure 10: RA-2 L0 unavailable products for cycle 16

Start Date	Start Time	Stop Date	Stop Time	Duration (s)	Start Orbit	Stop Orbit	Reason
28-Apr-03	15:27:59	28-Apr-03	15:29:17	78	6063	6063	PDS_UNKNOWN_FAILURE

29-Apr-03	16:36:38	29-Apr-03	16:37:56	78	6078	6078	PDS_UNKNOWN_FAILURE
30-Apr-03	16:04:35	30-Apr-03	16:05:53	78	6092	6092	PDS_UNKNOWN_FAILURE
01-May-03	15:30:46	01-May-03	15:30:49	3	6106	6106	PDS_UNKNOWN_FAILURE
01-May-03	15:33:50	01-May-03	15:35:08	78	6106	6106	PDS_UNKNOWN_FAILURE
02-May-03	16:42:02	02-May-03	16:43:20	78	6121	6121	PDS_UNKNOWN_FAILURE
03-May-03	16:07:55	03-May-03	16:07:57	2	6135	6135	PDS_UNKNOWN_FAILURE
03-May-03	16:10:17	03-May-03	16:11:35	78	6135	6135	PDS_UNKNOWN_FAILURE
04-May-03	15:36:22	04-May-03	15:36:26	4	6149	6149	PDS_UNKNOWN_FAILURE
04-May-03	15:39:25	04-May-03	15:40:42	77	6149	6149	PDS_UNKNOWN_FAILURE
05-May-03	12:30:05	05-May-03	12:30:17	12	6161	6161	PDS_UNKNOWN_FAILURE
05-May-03	12:30:17	05-May-03	15:05:24	9307	6161	6163	UNAV_RA2
05-May-03	15:07:16	06-May-03	10:01:11	68035	6163	6174	UNAV_RA2
06-May-03	16:13:39	06-May-03	16:13:41	2	6178	6178	PDS_UNKNOWN_FAILURE
06-May-03	16:16:11	06-May-03	16:17:28	77	6178	6178	PDS_UNKNOWN_FAILURE
07-May-03	15:44:59	07-May-03	15:46:17	78	6192	6192	PDS_UNKNOWN_FAILURE
08-May-03	15:13:09	08-May-03	15:14:27	78	6206	6206	PDS_UNKNOWN_FAILURE
09-May-03	16:22:04	09-May-03	16:23:22	78	6221	6221	PDS_UNKNOWN_FAILURE
10-May-03	15:47:44	10-May-03	15:47:47	3	6235	6235	PDS_UNKNOWN_FAILURE
10-May-03	15:50:33	10-May-03	15:51:51	78	6235	6235	PDS_UNKNOWN_FAILURE
11-May-03	11:06:33	11-May-03	15:16:38	15005	6246	6249	UNAV_RA2
11-May-03	15:19:03	11-May-03	20:23:20	18257	6249	6252	UNAV_RA2
11-May-03	20:23:20	11-May-03	20:23:50	30	6252	6252	UNAV_RA2
11-May-03	20:23:55	12-May-03	10:14:36	49841	6252	6260	UNAV_RA2
12-May-03	16:27:57	12-May-03	16:29:15	78	6264	6264	PDS_UNKNOWN_FAILURE
13-May-03	15:56:07	13-May-03	15:57:25	78	6278	6278	PDS_UNKNOWN_FAILURE
14-May-03	15:22:13	14-May-03	15:22:15	2	6292	6292	PDS_UNKNOWN_FAILURE
14-May-03	15:24:56	14-May-03	15:26:14	78	6292	6292	PDS_UNKNOWN_FAILURE
15-May-03	16:31:11	15-May-03	16:31:13	2	6307	6307	PDS_UNKNOWN_FAILURE
15-May-03	16:33:50	15-May-03	16:35:08	78	6307	6307	PDS_UNKNOWN_FAILURE
16-May-03	15:59:13	16-May-03	15:59:15	2	6321	6321	PDS_UNKNOWN_FAILURE
16-May-03	16:01:42	16-May-03	16:03:00	78	6321	6321	PDS_UNKNOWN_FAILURE
17-May-03	15:30:51	17-May-03	15:32:08	77	6335	6335	PDS_UNKNOWN_FAILURE
18-May-03	06:21:41	18-May-03	06:25:17	216	6343	6343	UNAV_DMS
19-May-03	15:59:40	19-May-03	16:05:00	320	6364	6364	PDS_UNKNOWN_FAILURE
19-May-03	16:07:17	19-May-03	16:08:35	78	6364	6364	PDS_UNKNOWN_FAILURE
19-May-03	17:15:41	19-May-03	17:44:41	1740	6364	6365	PDS_UNKNOWN_FAILURE
19-May-03	19:10:36	19-May-03	19:23:49	793	6365	6366	PDS_UNKNOWN_FAILURE
19-May-03	22:46:03	19-May-03	22:49:19	196	6368	6368	PDS_UNKNOWN_FAILURE
19-May-03	23:43:29	20-May-03	00:31:15	2866	6368	6369	PDS_UNKNOWN_FAILURE
20-May-03	01:38:24	20-May-03	02:13:59	2135	6369	6370	PDS_UNKNOWN_FAILURE
20-May-03	03:33:18	20-May-03	03:56:01	1363	6370	6371	PDS_UNKNOWN_FAILURE
20-May-03	05:28:12	20-May-03	05:37:48	576	6372	6372	PDS_UNKNOWN_FAILURE
20-May-03	15:33:30	20-May-03	15:33:32	2	6378	6378	PDS_UNKNOWN_FAILURE
20-May-03	15:36:32	20-May-03	15:37:50	78	6378	6378	PDS_UNKNOWN_FAILURE

21-May-03	16:44:39	21-May-03	16:45:57	78	6393	6393	PDS_UNKNOWN_FAILURE
22-May-03	16:10:43	22-May-03	16:10:46	3	6407	6407	PDS_UNKNOWN_FAILURE
22-May-03	16:13:10	22-May-03	16:14:27	77	6407	6407	PDS_UNKNOWN_FAILURE
23-May-03	15:42:09	23-May-03	15:43:26	77	6421	6421	PDS_UNKNOWN_FAILURE
24-May-03	15:10:10	24-May-03	15:11:28	78	6435	6435	PDS_UNKNOWN_FAILURE
25-May-03	14:50:32	25-May-03	16:16:31	5159	6449	6450	PDS_UNKNOWN_FAILURE
25-May-03	16:19:05	25-May-03	16:25:44	399	6450	6450	PDS_UNKNOWN_FAILURE
26-May-03	15:44:51	26-May-03	15:44:54	3	6464	6464	PDS_UNKNOWN_FAILURE
26-May-03	15:47:45	26-May-03	15:49:02	77	6464	6464	PDS_UNKNOWN_FAILURE
27-May-03	15:16:05	27-May-03	15:17:23	78	6478	6478	PDS_UNKNOWN_FAILURE

Table 6: List of gaps for RA-2 L0 products during cycle 16

In Figure 11 and Table 7 the summary of unavailable MWR L0 products is given. Only gaps due to PDS failure since no unplanned MWR switch-off have happened during this cycle.
On top of the unavailability's hereafter summarized no data have been produced in the period from 18-May-2003 06:25:24 to 19-May-2003 14:45:40 due to a planned switch-off of the instrument.

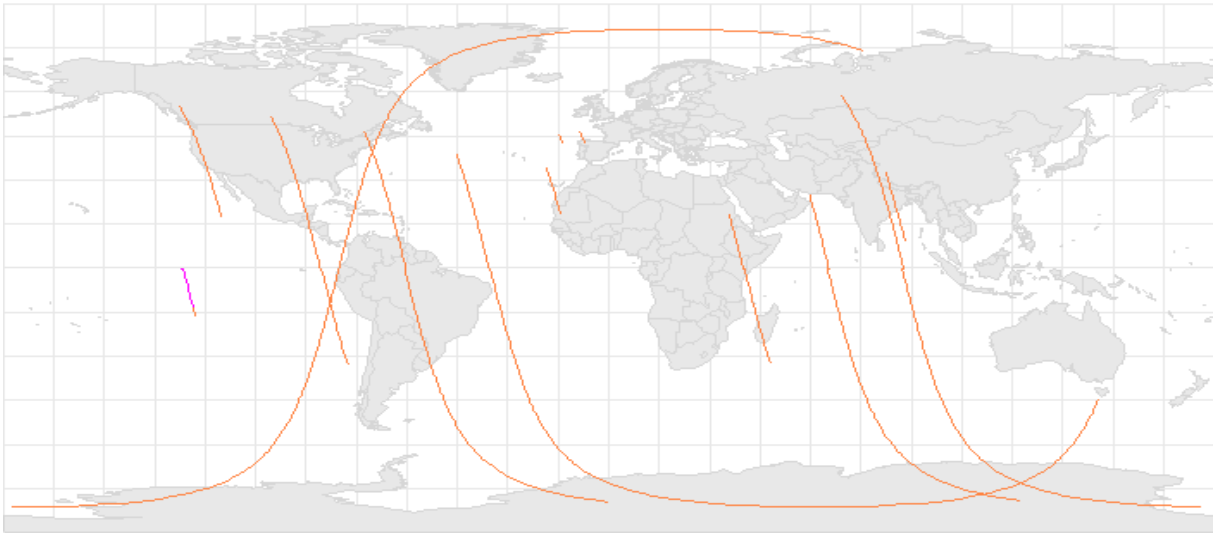

Figure 11: MWR L0 unavailable products for cycle 16

Start Date	Start Time	Stop Date	Stop Time	Duration (s)	Start Orbit	Stop Orbit	Reason
18-May-03	06:20:44	18-May-03	06:21:43	59	6343	6343	PDS_UNKNOWN_FAILURE
18-May-03	06:21:43	18-May-03	06:25:24	221	6343	6344	UNAV_DMS
19-May-03	16:00:01	19-May-03	16:06:41	400	6364	6364	PDS_UNKNOWN_FAILURE
19-May-03	17:14:41	19-May-03	17:45:05	1824	6364	6365	PDS_UNKNOWN_FAILURE
19-May-03	19:09:29	19-May-03	19:23:53	864	6365	6366	PDS_UNKNOWN_FAILURE

19-May-03	22:45:05	19-May-03	22:49:29	264	6368	6368	PDS_UNKNOWN_FAILURE
19-May-03	23:42:41	20-May-03	00:31:29	2928	6368	6369	PDS_UNKNOWN_FAILURE
20-May-03	01:37:29	20-May-03	02:14:17	2208	6369	6370	PDS_UNKNOWN_FAILURE
20-May-03	03:32:17	20-May-03	03:56:17	1440	6370	6371	PDS_UNKNOWN_FAILURE
20-May-03	05:27:05	20-May-03	05:37:53	648	6372	6372	PDS_UNKNOWN_FAILURE
20-May-03	22:20:18	20-May-03	22:21:06	48	6382	6382	PDS_UNKNOWN_FAILURE
24-May-03	21:54:26	24-May-03	21:55:38	72	6439	6439	PDS_UNKNOWN_FAILURE
25-May-03	14:49:40	25-May-03	16:25:40	5760	6449	6450	PDS_UNKNOWN_FAILURE

Table 7: List of gaps for MWR L0 products during cycle 16

In Figure 12 and Table 8 the summary of unavailable RA-2 L0 products is given. In this case no distinction is made among the different types of gaps.
On top of the unavailability's hereafter summarized no data have been produced in the period from 18-May-2003 06:25:17 to 19-May-2003 15:59:28 due to a planned switch-off of the instrument.

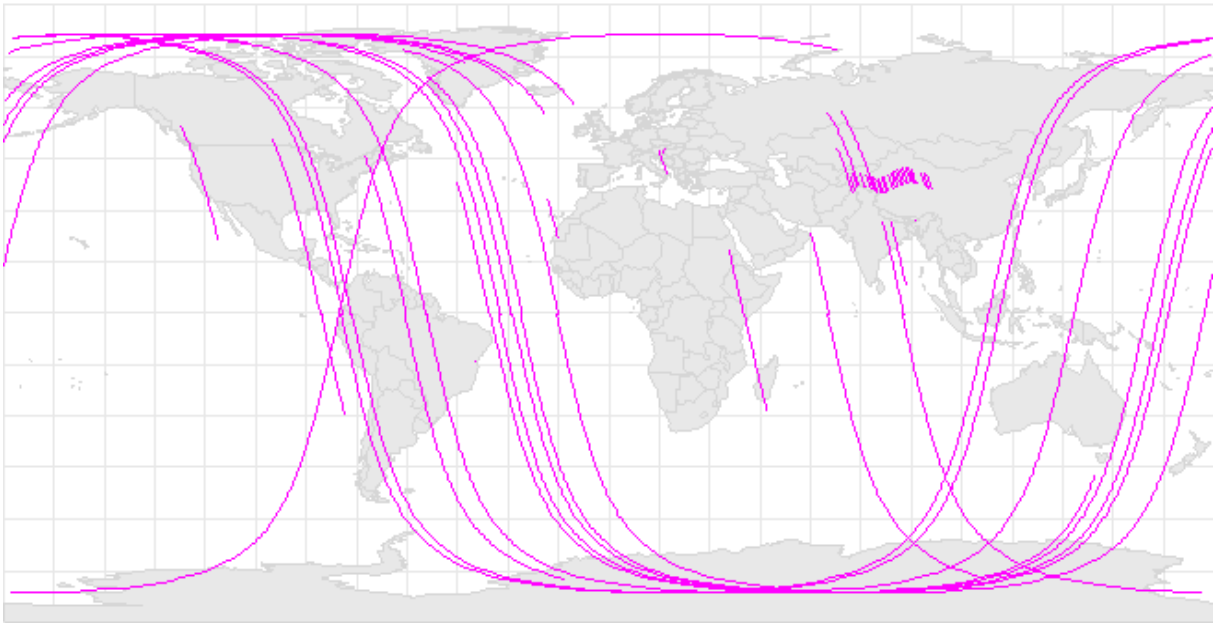

Figure 12: RA-2 L1b unavailable products for cycle 16

Start Date	Start Time	Stop Date	Stop Time	Duration (s)	Start Orbit	Stop Orbit	Reason
28-Apr-03	15:27:59	28-Apr-03	15:29:17	78	6063	6063	PDS_UNKNOWN_FAILURE
29-Apr-03	16:36:38	29-Apr-03	16:37:56	78	6078	6078	PDS_UNKNOWN_FAILURE
30-Apr-03	16:04:35	30-Apr-03	16:05:53	78	6092	6092	PDS_UNKNOWN_FAILURE
01-May-03	15:33:50	01-May-03	15:35:08	78	6106	6106	PDS_UNKNOWN_FAILURE
02-May-03	16:42:02	02-May-03	16:43:20	78	6121	6121	PDS_UNKNOWN_FAILURE
03-May-03	16:10:17	03-May-03	16:11:35	78	6135	6135	PDS_UNKNOWN_FAILURE
04-May-03	15:36:24	04-May-03	15:36:26	2	6149	6149	PDS_UNKNOWN_FAILURE

04-May-03	15:39:25	04-May-03	15:40:42	77	6149	6149	PDS_UNKNOWN_FAILURE
05-May-03	12:30:07	05-May-03	12:30:17	10	6161	6161	PDS_UNKNOWN_FAILURE
06-May-03	16:16:11	06-May-03	16:17:28	77	6178	6178	PDS_UNKNOWN_FAILURE
07-May-03	15:44:59	07-May-03	15:46:17	78	6192	6192	PDS_UNKNOWN_FAILURE
08-May-03	15:13:09	08-May-03	15:14:27	78	6206	6206	PDS_UNKNOWN_FAILURE
09-May-03	16:22:04	09-May-03	16:23:22	78	6221	6221	PDS_UNKNOWN_FAILURE
10-May-03	15:50:33	10-May-03	15:51:51	78	6235	6235	PDS_UNKNOWN_FAILURE
12-May-03	16:27:57	12-May-03	16:29:15	78	6264	6264	PDS_UNKNOWN_FAILURE
12-May-03	21:36:39	12-May-03	23:22:19	6340	6267	6268	PDS_UNKNOWN_FAILURE
13-May-03	15:56:07	13-May-03	15:57:25	78	6278	6278	PDS_UNKNOWN_FAILURE
13-May-03	22:49:21	14-May-03	00:31:56	6155	6282	6283	PDS_UNKNOWN_FAILURE
14-May-03	15:24:56	14-May-03	15:26:14	78	6292	6292	PDS_UNKNOWN_FAILURE
15-May-03	16:33:50	15-May-03	16:35:08	78	6307	6307	PDS_UNKNOWN_FAILURE
15-May-03	16:35:08	15-May-03	16:39:55	287	6307	6307	PDS_UNKNOWN_FAILURE
16-May-03	16:01:42	16-May-03	16:03:00	78	6321	6321	PDS_UNKNOWN_FAILURE
17-May-03	15:30:51	17-May-03	15:32:08	77	6335	6335	PDS_UNKNOWN_FAILURE
17-May-03	22:19:02	18-May-03	00:02:49	6227	6339	6340	PDS_UNKNOWN_FAILURE
18-May-03	01:46:42	18-May-03	03:28:43	6121	6341	6342	PDS_UNKNOWN_FAILURE
19-May-03	15:59:40	19-May-03	16:05:00	320	6364	6364	PDS_UNKNOWN_FAILURE
19-May-03	16:07:17	19-May-03	16:08:35	78	6364	6364	PDS_UNKNOWN_FAILURE
19-May-03	17:15:42	19-May-03	17:44:41	1739	6364	6365	PDS_UNKNOWN_FAILURE
19-May-03	19:10:37	19-May-03	19:23:49	792	6365	6366	PDS_UNKNOWN_FAILURE
19-May-03	22:46:04	19-May-03	22:49:19	195	6368	6368	PDS_UNKNOWN_FAILURE
19-May-03	23:43:31	20-May-03	00:31:15	2864	6368	6369	PDS_UNKNOWN_FAILURE
20-May-03	01:38:25	20-May-03	02:13:59	2134	6369	6370	PDS_UNKNOWN_FAILURE
20-May-03	03:33:19	20-May-03	03:56:01	1362	6370	6371	PDS_UNKNOWN_FAILURE
20-May-03	05:28:13	20-May-03	05:37:48	575	6372	6372	PDS_UNKNOWN_FAILURE
20-May-03	15:36:32	20-May-03	15:37:50	78	6378	6378	PDS_UNKNOWN_FAILURE
21-May-03	16:44:39	21-May-03	16:45:57	78	6393	6393	PDS_UNKNOWN_FAILURE
21-May-03	16:45:57	21-May-03	16:48:32	155	6393	6393	PDS_UNKNOWN_FAILURE
22-May-03	16:13:10	22-May-03	16:14:27	77	6407	6407	PDS_UNKNOWN_FAILURE
23-May-03	15:42:09	23-May-03	15:43:26	77	6421	6421	PDS_UNKNOWN_FAILURE
23-May-03	22:32:57	24-May-03	03:39:25	18388	6425	6428	PDS_UNKNOWN_FAILURE
24-May-03	15:10:10	24-May-03	15:11:28	78	6435	6435	PDS_UNKNOWN_FAILURE
25-May-03	14:50:33	25-May-03	16:16:31	5158	6449	6450	PDS_UNKNOWN_FAILURE
25-May-03	16:19:05	25-May-03	16:25:44	399	6450	6450	PDS_UNKNOWN_FAILURE
26-May-03	09:31:38	26-May-03	09:32:03	25	6460	6460	PDS_UNKNOWN_FAILURE
26-May-03	15:47:45	26-May-03	15:49:02	77	6464	6464	PDS_UNKNOWN_FAILURE
26-May-03	15:49:02	26-May-03	15:49:03	1	6464	6464	PDS_UNKNOWN_FAILURE
27-May-03	15:16:05	27-May-03	15:17:23	78	6478	6478	PDS_UNKNOWN_FAILURE
27-May-03	20:19:02	27-May-03	20:20:28	86	6481	6481	PDS_UNKNOWN_FAILURE
27-May-03	20:20:28	27-May-03	20:20:58	30	6481	6481	PDS_UNKNOWN_FAILURE

Table 8: List of gaps for RA-2 L1b products during cycle 16

8.2 Edited measurements

In order to produce the statistics reported in 7.2 the following editing criteria have been used:

Parameter	Surface type	Zone	Range
Ku SWH	Open Ocean	All world	[0, 12] (m)
Ku Backscattering Coeff.	Open ocean	All world	[2, 17] (dB)
Ku Wind Speed	Open ocean	All world	[0, 22] (m/s)

Table 9: Editing criteria for RA-2 parameters statistics

8.3 Product Disclaimer

For the product disclaimers relative to this cycle please refer to the following web link:
http://envisat.esa.int/dataproducts/availability/

8.4 Geophysical and Level 2 quality assessment

Refer to:

- ECMWF report as given in [R – 10].
- Envisat GDR Quality Assessment Report, SALP-RP-P2-EX-21121-CLS012, [R - 12]

9 INSTRUMENT LONG TERM MONITORING

For the time being, considering the amount of available data, no long-term monitoring is currently performed.

10 PARTICULAR INVESTIGATIONS

Particular investigations have been performed in this period in relation to the problematic behavior of the IF Calibration mode, see [R – 3]. Also the lately retrieved IF mask AUX file has been object of a detailed investigation, for this please refer to [R – 4].