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SCIAMACHY 4-MONTHLY REPORT: JANUARY -APRIL 2005

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SCIAMACHY 4-MONTHLY REPORT JANUARY – APRIL 2005

1 INTRODUCTION

The SCIAMACHY Bi-monthly report (this time 4-monthly report) documents the current status and recent changes to the SCIAMACHY instrument, its data processing chain, and its data products.
The Bi-Monthly Report (hereafter BMR) is composed of analysis results obtained by the Product Control Facility, combined with inputs received from the different groups working on SCIAMACHY operation, calibration, product validation and data quality.
The first part of the report is dedicated to Instrument Configuration and Performance. It is composed of contributions from SOST-DLR and SOST-IFE.
The remainder of the report is dedicated to Level 1 and Level 2 performance assessment and is generated by ESA/ESRIN PCF with contributions from ESA/ESTEC PLSO and DLR-IMF.

The structure of the report will be in constant evolution through the ENVISAT mission, as experience with SCIAMACHY data and quality control grows.

1.1 Scope

The main objective of the BMR is to give, on a regular basis, the status of SCIAMACHY instrument performance, data acquisition, results of anomaly investigations, calibration activities and validation campaigns. The BMR is composed of the following six sections:

- Summary;
- Instrument Configuration and Performance;
- Data Availability Statistics;
- Level 1 Product Quality Monitoring;
- Level 2 Product Quality Monitoring;
- Validation Activities and Results.

1.2 References

[1] 'ENVISAT Restituted Pitch Assessment', ENVI-SPPA-EOPG-TN-05-0011, Issue 2, Technical Note, L. Saavedra (SERCO), R. Mantovani (VITROCISET), A. Dehn (SERCO), 17 May 2005
[2] 'Comparison of SCIAMACHY limb pointing retrievals with ESOC correction tables', Technical Note, Christian von Savigny, Stefan Noël, Heinrich Bovensmann, University of Bremen, 24 Feb. 2004

1.3 *Acronyms and Abbreviations*

ADC	Analogue to Digital Converter
ADF	Auxiliary Data File
ANX	Ascending Node Crossing
AOCS	Attitude and Orbit Control System
APSM	Aperture Stop Mechanism
ATC	Active Thermal Control
BMR	Bi-Monthly Report
CA	Corrective Action
CTI	Configurable Transfer Item
DAC	Digital Analogue Converter
ESM	Elevation Scan Mechanism
FPN	Fixed Pattern Noise
HK	Housekeeping
ICE	Instrument Control Electronics
IECF	Instrument Engineering and Calibration Facilities
LK1	Leakage Current Auxiliary File (SCI_LK1_AX)
LOS	Line of Sight
MR	Monthly Report
NCWM	Nadir Calibration Window Mechanism
NDFM	Neutral Density Filter Mechanism
NNDEC	Non-nominal Decontamination
NRT	Near Real Time
OBM	Optical Bench Module
OCR	Operations Change Request
OSDF	Orbit Sequence Definition File
PCF	Product Control Facility
PDHS	Payload Data Handling Station (PDS)
PDHS-E	Payload Data Handling Station – ESRIN
PDHS-K	Payload Data Handling Station – Kiruna
PDS	Payload Data Segment
PE1	Pixel to Pixel/ Etalon Auxiliary File (SCI_PE1_AX)
PMD	Polarization Measurement Device
QUADAS	Quality Analysis of Data from Atmospheric Sounders
SAA	South Atlantic Anomaly
SCIAMACHY	Scanning Imaging Absorption Spectrometer for Atmospheric Chartography
SEU	Single Event Upset
SLS	Spectral Line Source
SMR	Sun Mean Reference
SOST	SCIAMACHY Operations Support Team
SP1	Spectral Calibration Auxiliary File (SCI_SP1_AX)
SU1	Sun Reference Auxiliary File (SCI_SU1_AX)
TC	Thermal Control
TRUE	Tangent height Retrieval by UV-B Exploitation

VCD	Vertical Column Density
WLS	White Light Source

Not complete

2 SUMMARY

- During the reported period SCIAMACHY measurements were nominal with respect to planning.

- Monthly Calibration was scheduled during Orbits
  - 15168-15172 (23-Jan-2005)
  - 15598-15602 (22-Feb-2005)
  - 16013-16017 (23-Mar-2005)
  - 16471-16475 (24-Apr-2005)

- Three OCRs have been implemented during January – April 2005.
  - OCR_013: *Vertical azimuth alignment in limb geometry*
  - OCR_021: *Improvement of limb/nadir matching in subsolar orbits*
  - OCR_022: *Vertical sampling of 1.6 km during TROCCINOX-2 campaign*

- Thermal adjustment for detector 5, which was close to its upper temperature limit of 222.4 K was commanded in orbit 16192 (05-Apr-2005).

- A non-nominal decontamination was performed, starting in orbit 14675 (20-Dec-2004) ending in orbit 14860 (02-Jan-2005).

- Planned measurement interruptions took place:
  - 03/04-Jan-2005 (orbit 14882-14898) as part of the post-decontamination activities
  - 07-Jan-2005 (orbit 14930-14936) due to a planned out-of-plane orbit control manoeuvre
  - 07-Mar-2005 (orbit 15916-15924) due to a planned out-of-plane orbit control manoeuvre

- Light Path monitoring:
  - Small degradation in UV (channels 1, 2); channel 1 degradation smaller than for other light paths – indication that ESM diffuser degrades less than ESM mirror
  - Channels 3-6 radiometricly stable
  - Channel 7 throughput rather stable after decontamination
  - Channel 8 throughput is reduced by about 20%

- Data availability for the ESRIN chain was affected by an acquisition problem during 24 January - 08 February 2005, which is reflected in the statistics.

- LK1 analysis shows an anomaly for a case in March, calculating a ratio of FPN of spectra from 3 weeks time distance for channel 3 only, where the ratio is very noisy.

- First Pointing Performance analysis results are released in a technical note. Conclusions are that SCIAMACHY deviates from AOCS with a bias that is not yet clarified. There is as well a constant slope close 1. An extended analysis is on-going.

- NO_2 VCD for days 30-31 March 2005 show anomalous high values between latitudes 40 – 60 degree north. Values are not appearing in Offline Products, nor prototype products. An Anomaly Report at the ground segment was opened to investigate the reason.

- A new SCIAMACHY Level 2 Offline product SCI_OL__2P was released (processor version 2.5) in January 2005.

3 INSTRUMENT CONFIGURATION AND PERFORMANCE

3.1 In-Flight Status and Performance

Detailed operations, planning and instrument status information can be found on the website of the *SCIAMACHY Operations Support Team (SOST)* under http://atmos.af.op.dlr.de/projects/scops/. These pages are maintained on a daily basis and show the history and actual progress of the SCIAMACHY mission.

3.1.1 Planned Operations and Measurements (SOST-DLR)

The reporting period covers the orbits 14843 (ANX = 01-Jan-2005, 00:14:34.621) to 16560 (ANX = 30-Apr-2005, 23:02:43.244). Four OSDF specified the planning baseline.

Orbit		ANX		OSDF
Start	Stop	Start	Stop	
14600	15043	15-Dec-2004 00:49:04.082	14-Jan-2005 23:34:20.250	MPL_OSD_SHVSH_20041115_010101_00000000_33040001_20041215_004906_20050115_011454
15044	15486	15-Jan-2005 01:14:56.178	14-Feb-2005 22:19:36.418	MPL_OSD_SHVSH_20041207_010101_00000000_33050001_20050115_011458_20050215_000010
15487	15887	15-Feb-2005 00:00:12.346	14-Mar-2005 22:39:43.603	MPL_OSD_SHVSH_20050112_010101_00000000_33060001_20050215_000014_20050315_002017
15888	16560	15-Mar-2005 00:20:19.531	30-Apr-2005 23:02:43.244	MPL_OSD_SHVSH_20050216_010101_00000000_33070001_20050315_002021_20050501_004317

Table 3-1: SCIAMACHY OSDF planning files from January – April 2005

All measurements were nominal, i.e. timelines executed on the dayside of the orbit limb/nadir sequences with wide swath settings. In-flight calibration and monitoring measurements occurred on daily, weekly and monthly timescales according to the mission scenarios. Monthly calibration was scheduled between orbits

- 15168-15172 (23-Jan-2005)
- 15598-15602 (22-Feb-2005)
- 16013-16017 (23-Mar-2005)
- 16471-16475 (24-Apr-2005)

Moon occultations were executed between orbits

- 15128-15193 (20-Jan-2005 to 25-Jan-2005)
- 15515-15616 (16-Feb-2005 to 24-Feb-2005)
- 15934-16039 (18-Mar-2005 to 25-Mar-2005)
- 16361-16459 (17-Apr-2005 to 23-Apr-2005)

In all other orbits of the monthly lunar visibility periods the moon was rising on the dayside.

Three OCRs have been implemented between January and April.

- OCR_013: *Vertical azimuth alignment in limb geometry*

The second part of this OCR was executed 12/13-Jan-2005 (orbit 15002-15015). Timelines on the dayside of the orbit were executed with nadir and limb states having small swath width.

- OCR_021: *Improvement of limb/nadir matching in subsolar orbits*
  From orbit 15054 onwards (15-Jan-2005), timelines in subsolar orbits are selected such that timeline pairs with IDs 48 / 52 and 51 / 49 (before subsolar event / after subsolar event) are executed. This combines sequence 1 / sequence 2 timelines. It results in an improved matching of limb and nadir states immediately after the subsolar event.
- OCR_022: *Vertical sampling of 1.6 km during TROCCINOX-2 campaign*
  Between 29-Jan-2005 and 23-Feb-2005 (orbit 15244-15603) the vertical step height in limb state ID 32 was reduced to 1.6 km. This is the limb state which is executed between latitudes 30° N and 60° S. The reduced step size supported measurements of the TROCCINOX-2 campaign over Brazil.

3.1.2 Instrument Measurement Status (SOST-DLR)

Final flight status for mission scenarios, states and timelines remained unchanged throughout the reporting period.

3.1.3 Executed Operations and Measurements (SOST-DLR)

Measurements

The OSDF planning files have been scheduled as requested except on 07-Jan-2005 (orbit 14930-14936) and 17-Mar-2005 (orbit 15916-15924) when SCIAMACHY was transferred to MEASUREMENT IDLE for a planned out-of-plane orbit control manoeuvre.

Another planned measurement interrupt occurred 03/04-Jan-2005 (orbit 14882-14898) as part of the post-decontamination activities (details see below under *decontamination*).

Detector thermal adjustment

The average temperature/orbit of detector 5 was close at its upper temperature limit of 222.4 K. A TC adjustment was therefore requested by SCIAMACHY and commanded in orbit 16192 (05-Apr-2005). Response of detectors 4 & 5 to the adjustment is shown in fig. 3-1.

TC settings (before / after adjustment) were

- DAC1 = 0.53 W / 0.53 W
- DAC2 = 0.70 W / 0.70 W
- DAC3 = 0.03 W / 0.00 W

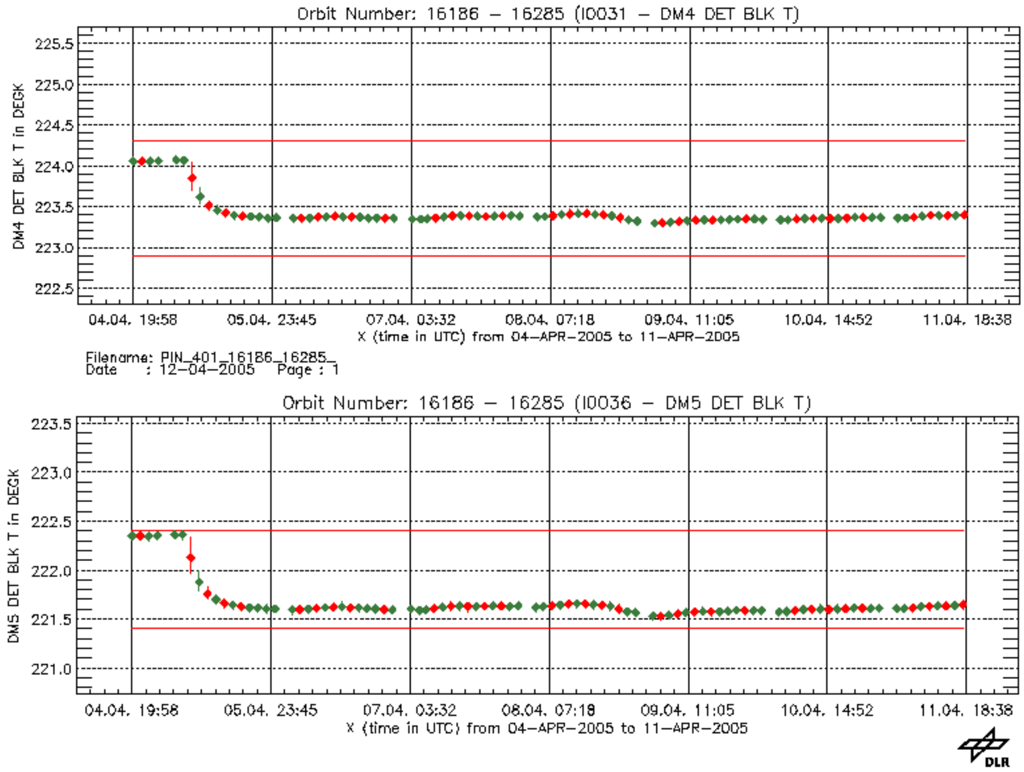


Fig. 3-1: Temperature adjustment of detectors 4 & 5

Decontamination

A non-nominal decontamination (NNDEC) had been started in orbit 14675 (20-Dec-2004, 08:05 UTC). Its warm-up phase ended 02-Jan-2005 (orbit 14860). This NNDEC implemented a new approach in the cool-down with the purpose to mimic instrument operations in January 2004, which might have been the cause for the good throughput in detector 7 after the December 2003 / January 2004 NNDEC. This approach included a planned transfer to STANDBY 37 hours after start of cool-down (orbit 14882), a period of 8.5 hours in STANDBY and transfer back to HEATER and MEASUREMENT, which was finally reached in orbit 14898. The result of this procedure for detectors 7 & 8 is discussed in chapter 3.1.5.

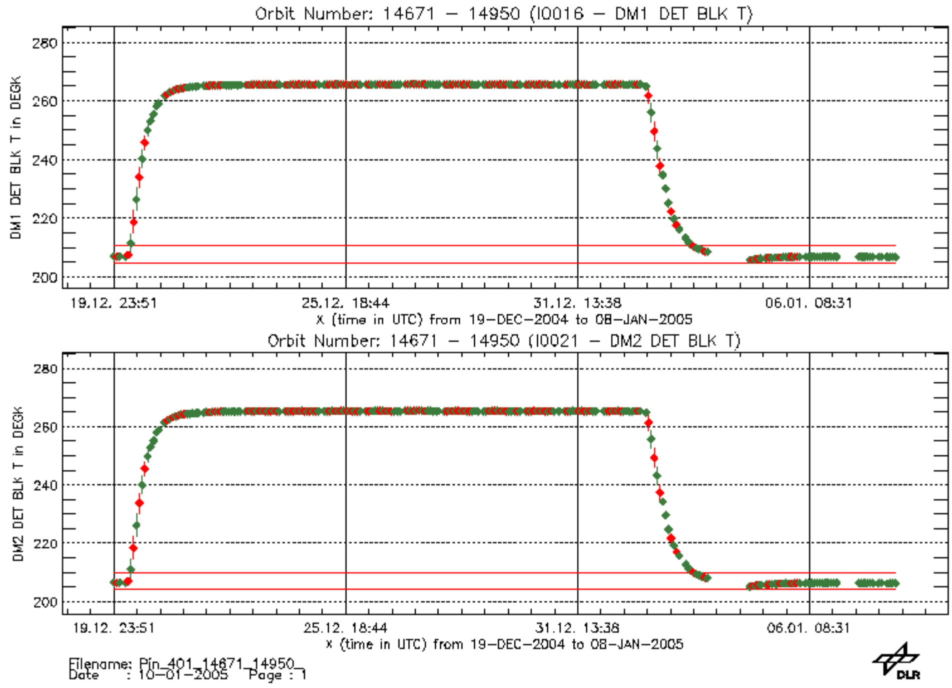


Fig. 3-2: Representative detector temperatures (detector 1 & 2) during warm-up and cool-down of the NNDEC. The gap at the end of the cool-down is caused by the transfer to STANDBY.

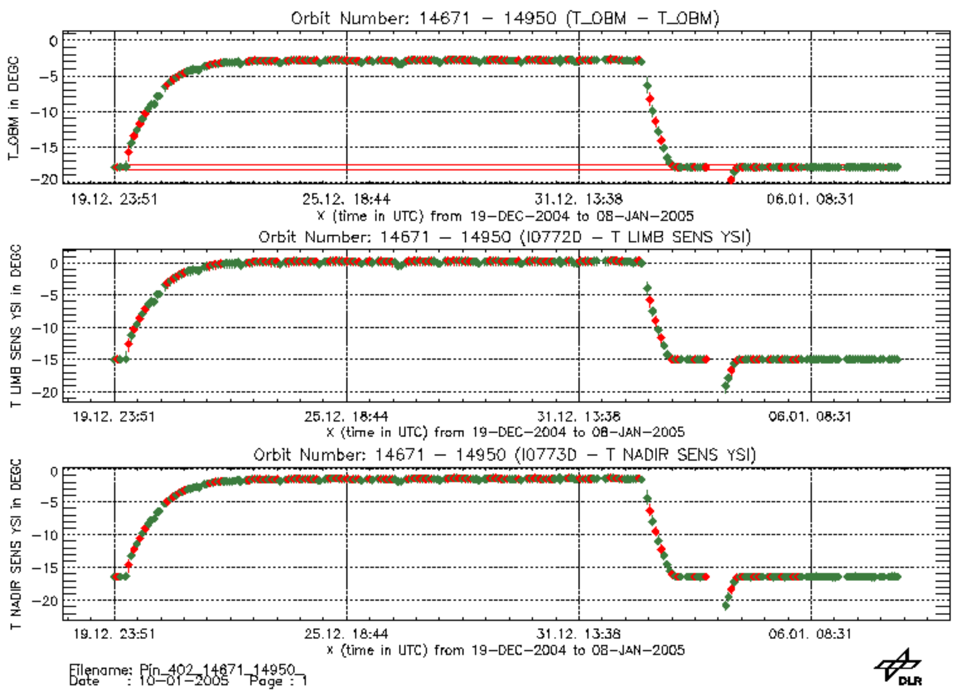


Fig. 3-3: OBM temperatures during warm-up and cool-down of the NNDEC. The gap at the end of the cool-down is caused by the transfer to STANDBY.

APSM/NDFM health checks & PMD ADC cal

In the reporting period 2 APSM/NDFM health check and 4 PMD ADC calibrations were executed. All showed nominal results.

APSM/NDFM			PMD ADC	
Orbit	ANX	Result	Orbit	ANX
15204	26-Jan-2005 07:05:00	ok	15205	26-Jan-2005 08:41:30
n.a.	n.a.	n.a.	15634	25-Feb-2005 07:55:16
16105	30-Mar-2005 05:36:41	ok	16106	30-Mar-2005 07:13:10
n.a.	n.a.	n.a.	16507	27-Apr-2005 07:30:12

Table 3-2: APSM/NDFM health check and PMD ADC calibrations

Anomalies

No anomalies, which would have transferred SCIAMACHY to a mode lower than MEASUREMENT, occurred in the reporting period.

Orbit	Date	Entry - UTC	Level	Entry Type	ID Content/Transition	Mode	Remark
14887	04-JAN-2005	2005.004.03.40.06.345	Instrument	COMPLEMENTARY FAILURES	---	Heater	SDPU_FRAME_FAULT_ON_RESET_SENT (problems on communication link betw een ICU and SDPU, fault indication 396)
15152	22-JAN-2005	2005.022.14.36.19.404	Instrument	COMPLEMENTARY FAILURES	---	Measurement	STATE_TRANS_OVERDUE (t/l setup delayed by 10 counts, fault indication 886)
15205	26-JAN-2005	2005.026.08.42.36.575	Instrument	COMPLEMENTARY FAILURES	---	Measurement	PMTC_FRAME_FAULT_ON_RESET_SENT (problems on communication link betw een ICU and PMTC, fault indication 444)
15590	22-FEB-2005	2005.053.05.57.32.495	Instrument	HK PARAMETER LIMIT EXCEEDING	53 (I0260)	MEASUREMENT	SDPC Warn 1 OB-Monitor
15590	22-FEB-2005	2005.053.05.57.35.448	Instrument	HK PARAMETER LIMIT EXCEEDING	53 (I0260)	MEASUREMENT	SDPC Warn 1 OB-Monitor
15934	18-MAR-2005	2005.077.06.47.14.873	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
15935	18-MAR-2005	2005.077.08.27.45.857	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
15936	18-MAR-2005	2005.077.10.08.16.736	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
15937	18-MAR-2005	2005.077.11.48.47.716	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
15938	18-MAR-2005	2005.077.13.29.18.798	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
15939	18-MAR-2005	2005.077.15.09.48.668	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
15940	18-MAR-2005	2005.077.16.50.20.649	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
15941	18-MAR-2005	2005.077.18.30.50.633	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 56 (mop01)
15941	18-MAR-2005	2005.077.18.31.48.672	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 54 (mos01)
15942	18-MAR-2005	2005.077.20.11.21.589	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
15943	18-MAR-2005	2005.077.21.51.52.589	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
16361	17-APR-2005	2005.107.02.41.21.331	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
16362	17-APR-2005	2005.107.04.21.49.335	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
16363	17-APR-2005	2005.107.06.02.17.261	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
16364	17-APR-2005	2005.107.07.42.45.295	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
16364	17-APR-2005	2005.107.07.42.46.217	Instrument	HK PARAMETER LIMIT EXCEEDING	94 (I0119)	MEASUREMENT	ASM control difference due to state 57 w arning
16365	17-APR-2005	2005.107.09.23.13.264	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
16366	17-APR-2005	2005.107.11.03.40.342	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
16366	17-APR-2005	2005.107.11.03.54.303	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 56 (mop01)
16366	17-APR-2005	2005.107.11.03.54.307	Instrument	HK PARAMETER LIMIT EXCEEDING	94 (I0119)	MEASUREMENT	ASM control difference due to state 57 w arning
16367	17-APR-2005	2005.107.12.44.08.158	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
16367	17-APR-2005	2005.107.12.44.09.177	Instrument	HK PARAMETER LIMIT EXCEEDING	94 (I0119)	MEASUREMENT	ASM control difference due to state 57 w arning
16368	17-APR-2005	2005.107.14.24.37.087	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
16471	24-APR-2005	2005.114.18.50.18.247	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)
16471	24-APR-2005	2005.114.18.50.19.266	Instrument	HK PARAMETER LIMIT EXCEEDING	100 (I0129)	MEASUREMENT	ESM control difference due to state 57 w arning
16471	24-APR-2005	2005.114.18.50.21.305	Instrument	HK PARAMETER LIMIT EXCEEDING	94 (I0119)	MEASUREMENT	ASM control difference due to state 57 w arning
16471	24-APR-2005	2005.114.18.50.37.212	Instrument	HK PARAMETER LIMIT EXCEEDING	86 (I0107)	MEASUREMENT	State 57 (mop02)

Table 3-3: Instrument anomalies

The only anomalies detected were complementary failures or HK parameter limit exceedings leading to Corrective Actions (CA) 0 or 9, i.e. the instrument continued operations. Most of them are attributed to lunar occultations. Although these measurements have only been scheduled when moonrise occurred beyond the terminator, i.e. on the nightside of Earth, the observing conditions could have been such that the Sun Follower (SF) was confused by the partially illuminated atmosphere. This caused the SF not to successfully acquire and track the lunar disk leading to the observed limit execeedings and anomaly entries in the report area.

Instrument unavailability

The instrument was unavailable for a total of 28 orbits. All unavailabilities were not anomaly driven but planned.

Unavailability					
Orbit		UTC		Event	Remark
Start	Stop	Start	Stop		
14882	14898	03-Jan-2005 19:10:10	04-Jan-2005 20:44:20	transfer to STANDBY	planned post-decontamination activity
14930	14936	07-Jan-2005 02:30:18	07-Jan-2005 13:43:45	transfer to MEASUREMENT/IDLE	OCM
15916	15924	17-Mar-2005 00:44:21	17-Mar-2005 14:08:18	transfer to MEASUREMENT/IDLE	OCM

Table 3-4: Instrument unavailabilities

3.1.4 Performance Monitoring - System (SOST-DLR)

Detector temperatures

Detector temperatures are monitored according to the requirements of the IOM procedure PIN-401. It requests to ensure that the average temperature per orbit remains within the specified limits. The average temperature per orbit is determined from the HK telemetry parameters I0016 (Detector 1), I0021 (Detector 2), I0026 (Detector 3), I0031 (Detector 4), I0036 (Detector (5), I0041 (Detector 6), I0046 (Detector 7) and I0051 (Detector 8). Fig. 3-4 displays the temperatures of all 8 detectors. Colour coding is as on the operational monitoring website, i.e. data from orbits with HK telemetry coverage > 90% are shown in red, for < 90% in green. Minimum/maximum values per orbit are indicated as vertical bars. The temperature limits of each detector are shown as horizontal lines.

At the start of the curve, temperatures approach nominal values from elevated levels at the end of the NNDEC cool-down phase. Then detectors cooled in the short period of planned STANDBY mode and returned from low levels.

OBM temperatures

OBM temperatures are monitored according to the requirements of the IOM procedure PIN-402. It requests to ensure that the average temperature per orbit remains within the specified limits. The average OBM temperature per orbit is determined from the HK telemetry parameters I0772D (Limb Sensor) and I0773D (Nadir Sensor) according to

$$T\_OBM = 0.5 \times (T\_LIMB + T\_NADIR) - 2.2\ ^{\circ}C$$

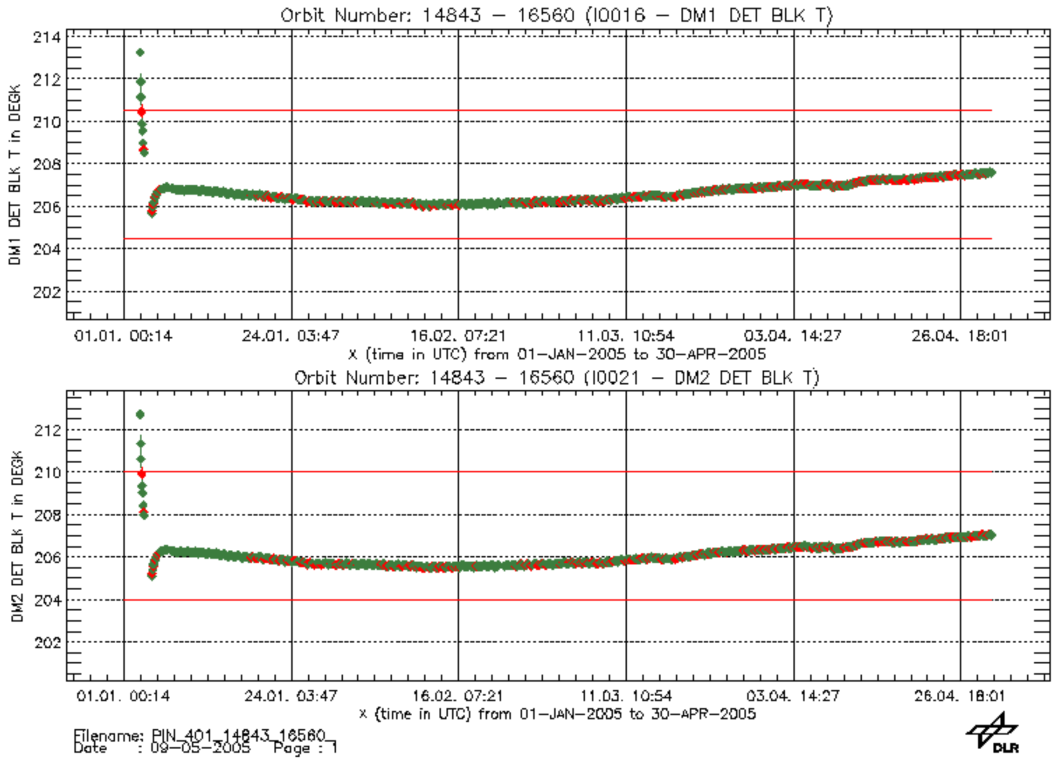
In addition, PIN-402 requires to monitor the power settings of the Active Thermal Control heaters. They are given by the HK telemetry parameters I0778D (ATC Limb), I0799D (ATC Nadir) and I0800D (ATC Rad A). Temperatures and ATC heater powers are given in fig. 3-5 and 3-6. Colour coding is as in fig. 3-4.

At the start of the curve, the end of the NNDEC cool-down and later on the short STANDBY period cause temperatures to be higher, respectively lower, than nominal for a few orbits.

PMD ADC status

The status of the PMD ADC is monitored according to the requirements of the IOM procedure PIN-404. It requests to ensure that no glitches occur caused by an SEU. The status of the PMD ADC is derived from the HK telemetry parameters I0009 (PMD Temperature) and I0012 (PMD Analogue Supply Voltage).

No PMD ADC glitches have been detected.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DM1 DET BLK T in DEGK
01.01. 00:14
24.01. 03:47
16.02. 07:21
11.03. 10:54
03.04. 14:27
26.04. 18:01
X (time in UTC) from 01–JAN–2005 to 30–APR–2005
Orbit Number: 14843 – 16560 (I0021 – DM2 DET BLK T)
DM2 DET BLK T in DEGK
X (time in UTC) from 01–JAN–2005 to 30–APR–2005
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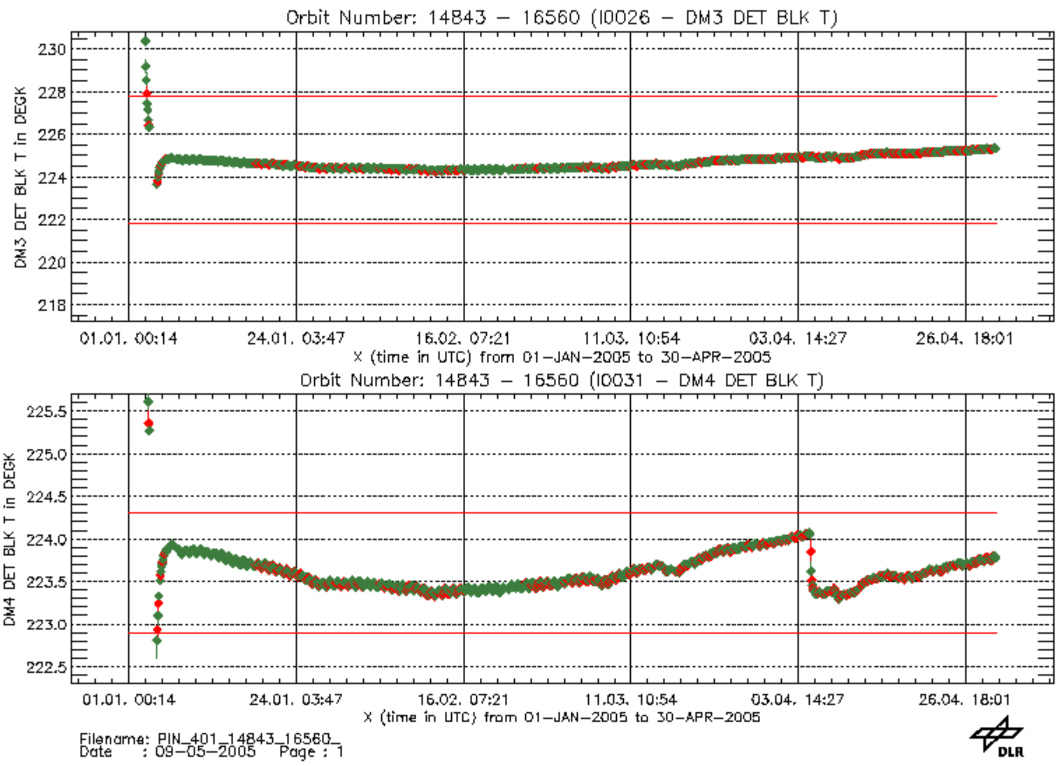
Date : 09–05–2005 Page : 1
DLR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DM3 DET BLK T in DEGK
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11.03. 10:54
03.04. 14:27
26.04. 18:01
X (time in UTC) from 01–JAN–2005 to 30–APR–2005
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DM4 DET BLK T in DEGK
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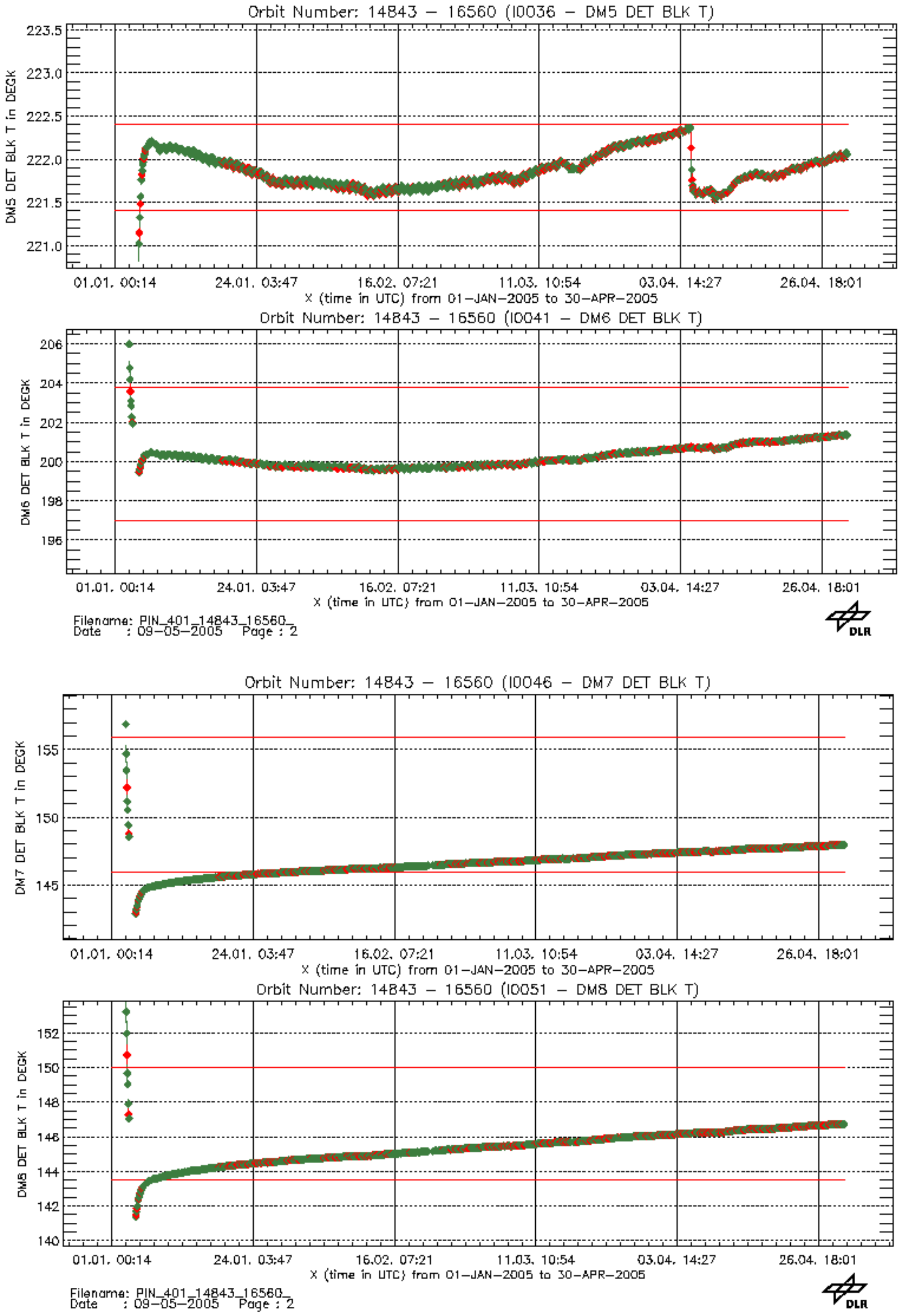

Fig. 3-4: Detector temperatures

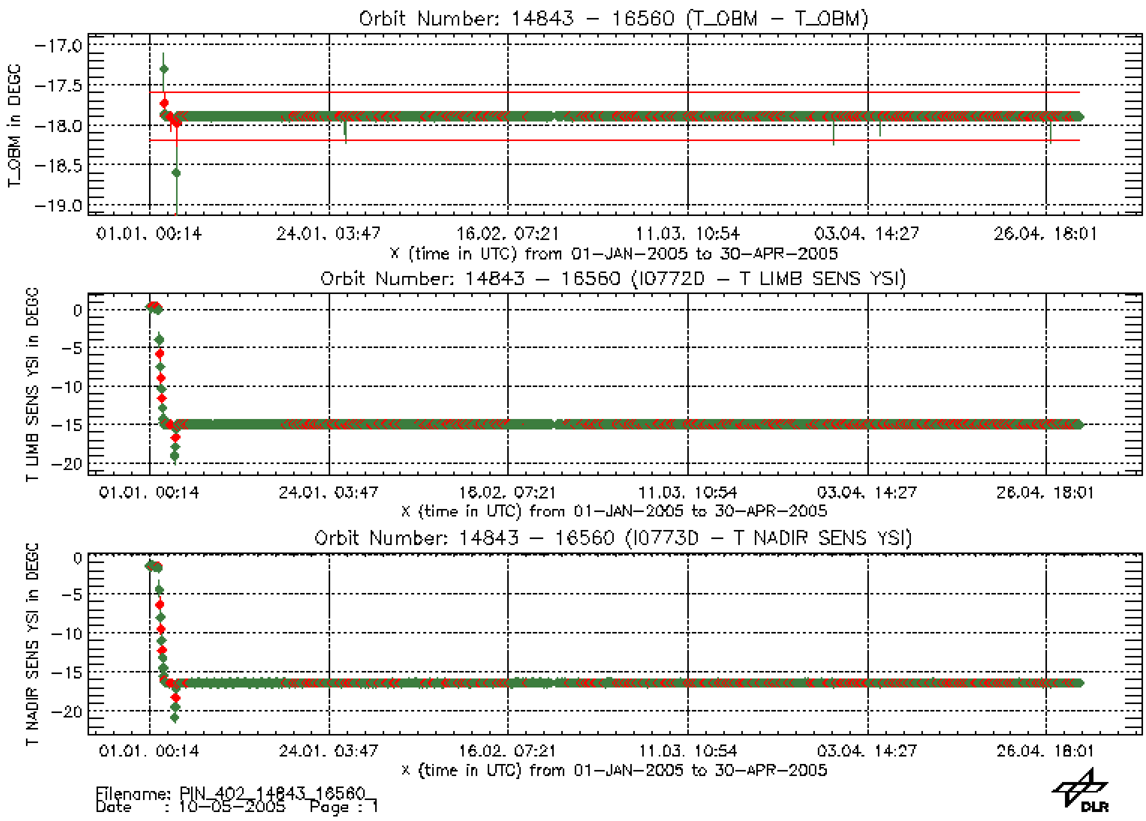

Fig. 3-5: OBM temperatures (top: derived OBM, middle: limb sensor, bottom: nadir sensor)

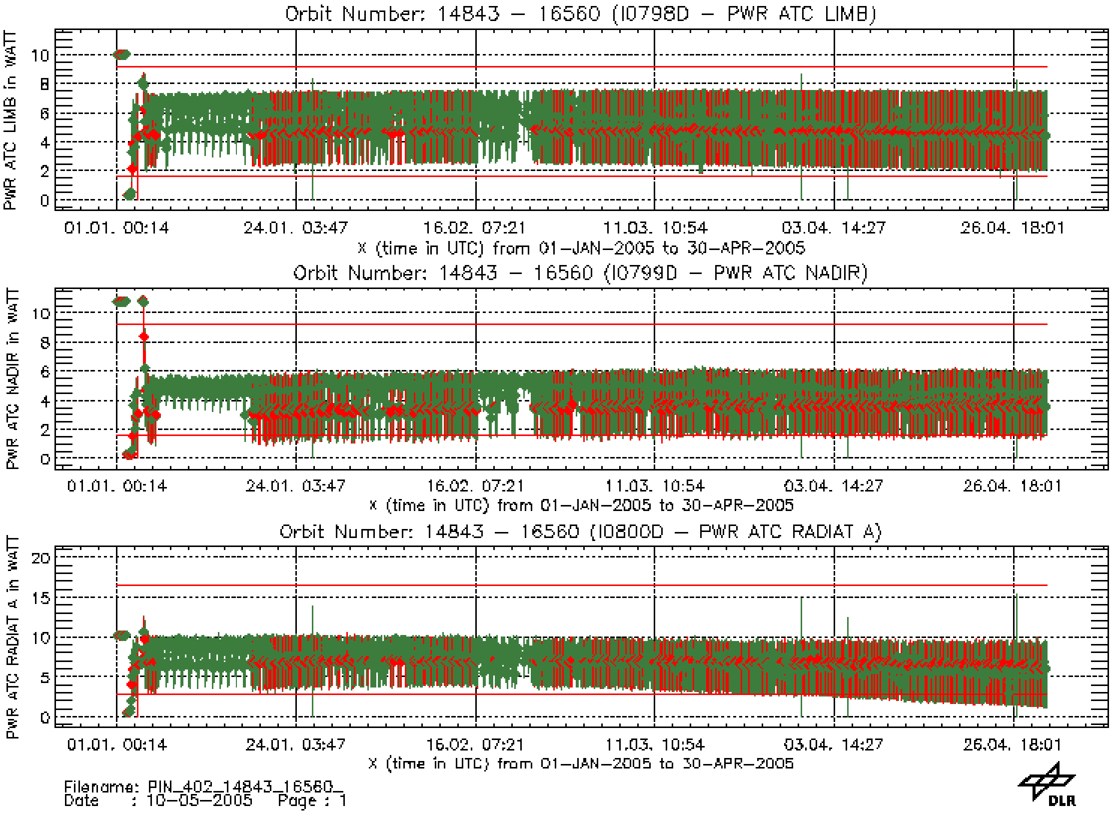

Fig. 3-6: ATC heater power (top: ATC limb, middle: ATC nadir, bottom: ATC Rad A)

LLI status

Life Limited Items are monitored based on analysis of the

- OSDF: This yields a predicted LLI usage.
- Report format: This results in actually used LLI switches or cycles. No WLS/SLS burning times can be derived thereof.

In addition, the in-flight usage of the cryogenic heat pipe is recorded. This subsystem has a limited number of cycles. Each decontamination increases the accumulated number of cycles by 1.

At the end of the reporting period the fractional usage of the LLI relative to the allowed in-flight budget was

- NDFM: 0.44
- APSM: 0.39
- NCWM (sub-solar port): 0.45
- WLS (switches): 0.10
- WLS (burning time): 0.20
- SLS (switches): 0.03

- SLS (burning time): 0.01

How the relative LLI usage has accumulated since launch can be seen in fig. 3-7. 'EOL' assumes a total mission lifetime of 0.5 years of Commissioning Phase and 4.5 years of routine operations.

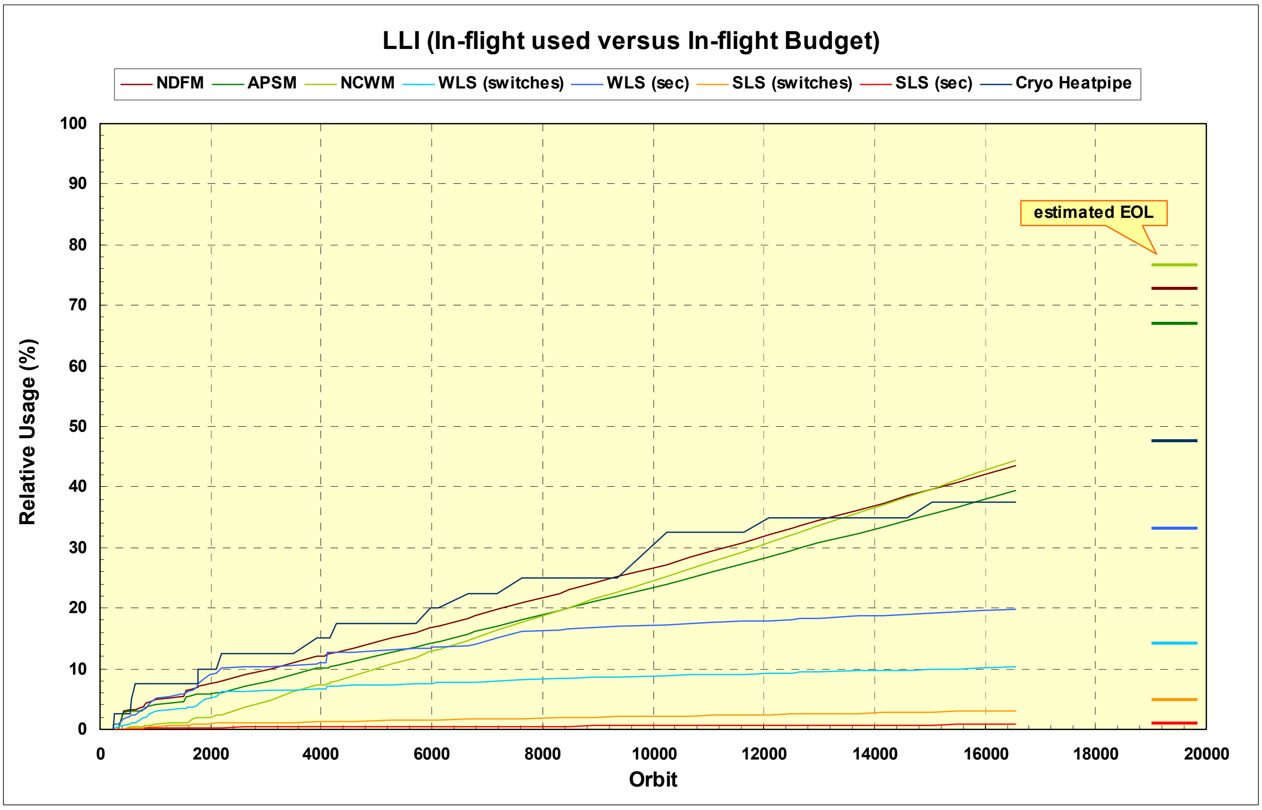

Fig. 3-7: Relative usage of LLIs. 'EOL' is derived for the currently specified mission lifetime.

The number of cryogenic heatpipe cycles increased by '1' to 15 at the start of the reporting period (NNDEC finished). This amounts to 38% of the allowed in-flight budget.

Time reference

The times quoted in all planning files refer to the reference orbit. Since the actual orbit differs from the reference orbit (e.g. orbit drift), the times given w.r.t. the reference orbit also do not reflect exactly the actual absolute times of events along the orbit (e.g. ANX, sunrise, sub-solar, moonrise, eclipse). The requirements for orbit maintenance may result in time differences of usually < ±10 sec. In some cases this value may even reach ±1 min, however.

SOST monitors how the reference time deviates from the actual time. This is done by using the predicted time which comes very close to the actual = restituted time. If the predicted times are delayed w.r.t. the reference orbit, then the difference *predicted – reference time* is > 0 sec; in the other case it is < 0 sec.

Fig. 3-8 displays the time difference *predicted – reference*. Orbit manouevres cause distinct discontinuities.

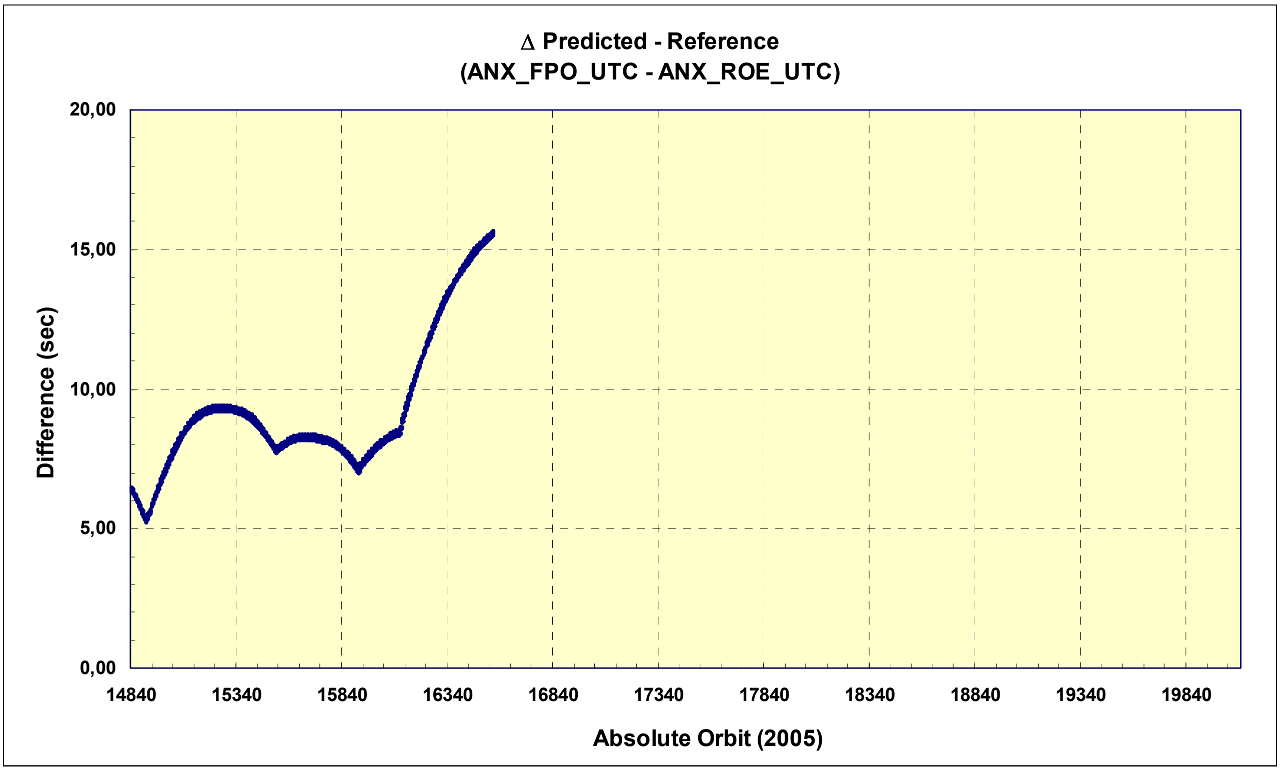

Fig. 3-8: Time difference between predicted and reference time.

3.1.5 Performance Monitoring - Light Path (SOST-IFE)

One part of the SOST long-term monitoring activities is the trend analysis of measurements with the internal White Light Source (WLS) and of observations of the unobscured Sun above the atmosphere. In order to monitor the different SCIAMACHY light paths solar measurements are taken in various viewing geometries: In limb/occultation geometry (via ASM and ESM mirrors), in nadir geometry (via the ESM mirror through the subsolar port), and via the so-called calibration light path involving the ASM mirror and the ESM diffuser.
SCIAMACHY long-term monitoring comprises a regular analysis of these measurements.

The plots displayed in Fig. 3-9 show results of these monitoring activities for the time interval January to April 2005.
All measured signals have been averaged over the entire channel and then divided by the corresponding measurement at a reference time (currently 2 August 2002, at about orbit 2200), yielding an effective instrument throughput for the different light paths.
The timing of subsolar measurements before 30 November 2002 (about orbit 3922) did not consider the known yaw misalignment of SCIAMACHY on ENVISAT. Therefore all

subsolar measurements after 30 November 2002 have been referred to orbit 4519 (10 January 2003, just after a long decontamination phase).
Note that measurements performed during times of reduced instrument performance (e.g. switch-offs or decontamination periods) have been omitted.

The results presented in Fig. 3-9 are based on the analysis of Level 0 data, which have been corrected for dead/bad pixels, dark current (fixed value from August 2002), scan angle dependencies, quantum efficiency changes, and the seasonally varying distance to the Sun. Additional calibration steps have not been performed, like for example a straylight correction. Therefore, variations smaller than about 1% require careful investigation.

The light path monitoring results presented in this section may be regarded as a first step towards spectrally resolved monitoring factors (m-factors) which will be produced based on Level 1b data.
Daily updated light path monitoring results can be found on the SOST or IUP web site (http://www.iup.physik.uni-bremen.de/sciamachy/LTM/LTM.html).

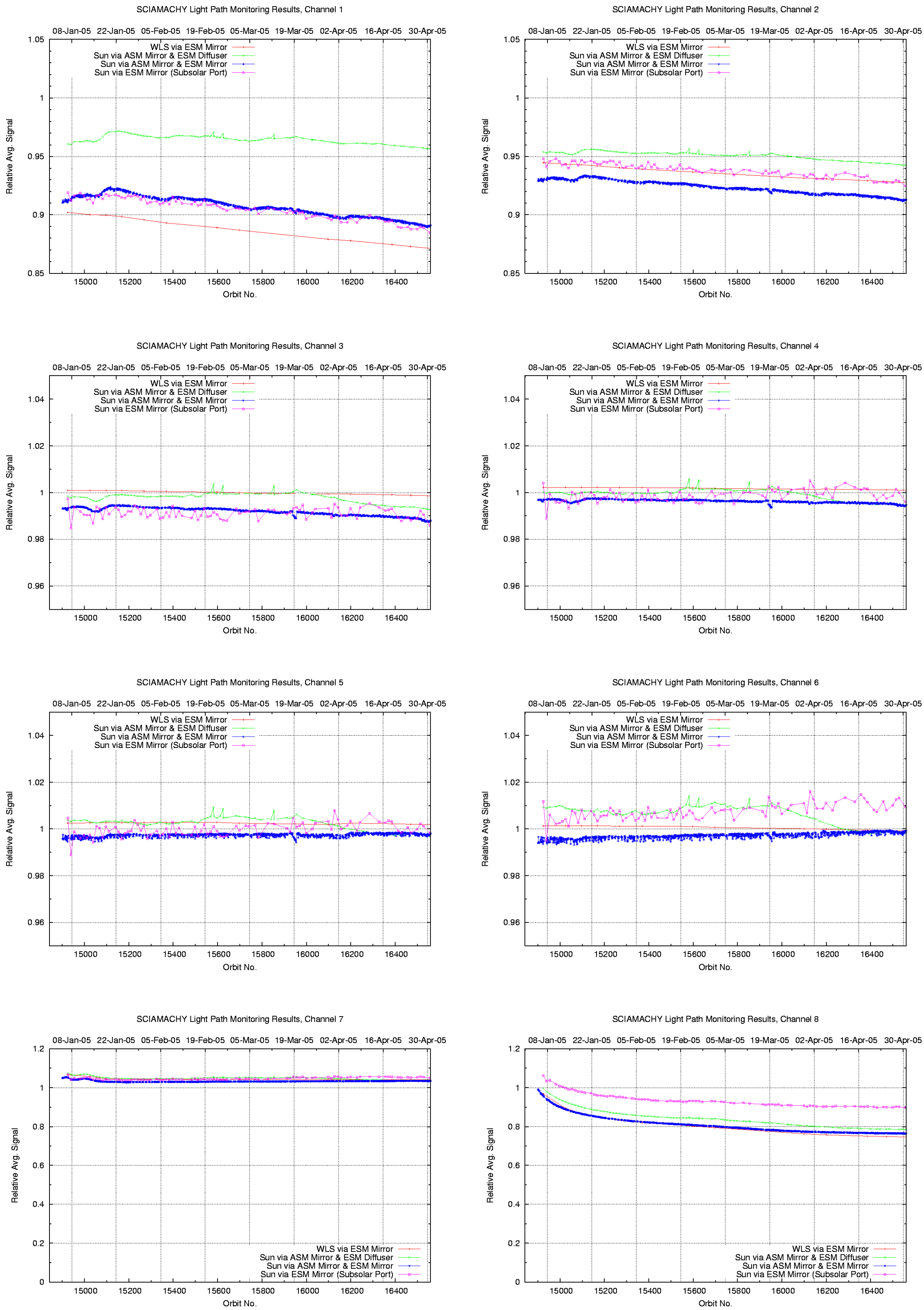

Fig. 3-9: Light path monitoring results Jan 2005 to Apr 2005.

The following specific features can be identified from the light path monitoring results during the time interval of this report:

- No data plotted until 4 January 2005 (orbit 14900) due to non-nominal decontamination.
- The small degradation in the UV (channels 1 & 2) continues; the degradation of the calibration light path is in channel 1 smaller than for other light paths, indicating that the ESM diffuser degrades less than the ESM mirror.
- Channels 3 to 6 remain radiometricly stable. The apparent throughput variations in channel 6 (increase for the limb light path, decrease for the ESM diffuser light path) are caused by an up to now uncorrected seasonal variation (probably due to insufficient calibration).
- The channel 7 throughput remains rather stable after the decontamination whereas the channel 8 throughput is reduced by 20 % due to icing.

3.1.6 Problem Report Status (DLR-BO)

In the reporting period no new problem report has been issued. None of the existing problem reports was closed.

4 DATA AVAILABILITY STATISTICS

4.1 Downlink/Acquisition Performance

Due to a hardware problem of the demodulator in the ESRIN acquisition chain, (start on 22nd of January 2005) PDHS-E products were of bad quality or missing. A first on-site intervention was performed on 02-Feb-2005 to 03-Feb-2005. Since then until the evening of 4th of February the data acquired on the LR chain was generally of nominal quality. After that date the LR demodulator failed again, thus there has been no low rate acquisition until the 7th of February. Since then all acquired data are of nominal quality. Affected orbits (PDHS-E only): 15198 – 15379

For SCIAMACHY complete orbits are either missing or orbits contain many small gaps; the Fig. 4-1 shows the GANTT chart for days 23 January - 15 February 2005, Level1b and Level0. The first two rows show the GANTT chart for Level 0 and Level 1 data inventoried into the ground segment for each calendar day that is listed above. Missing data are represented by the bars PA_SCI_NL__0P/missing/ PDS_UNKNOWN_FAILURE and PA_SCI_NL__1P/missing/ PDS_UNKNOWN_FAILURE. They are occurring especially on days 25, 27, 28, 29, 30, 31 January, 01, 02, 05, 06, 07, 08 February 2005. Days before and afterwards show significantly less missing data in the GANTT chart.

Fig. 4-1 GANTT chart 23-Jan-2005 – 15-Feb-2005, showing the above anomaly.

4.2 Statistics on unconsolidated data (SCI_NL__0P, SCI_NL__1P)

This paragraph reports the availability of NRT data on a monthly basis. The statistics are based on Level 0 data and Level 1 data inventoried in the ground segment tool. Unavailability periods due to instrument anomalies or Satellite switch-offs are excluded. The gaps considered are only interfile gaps.

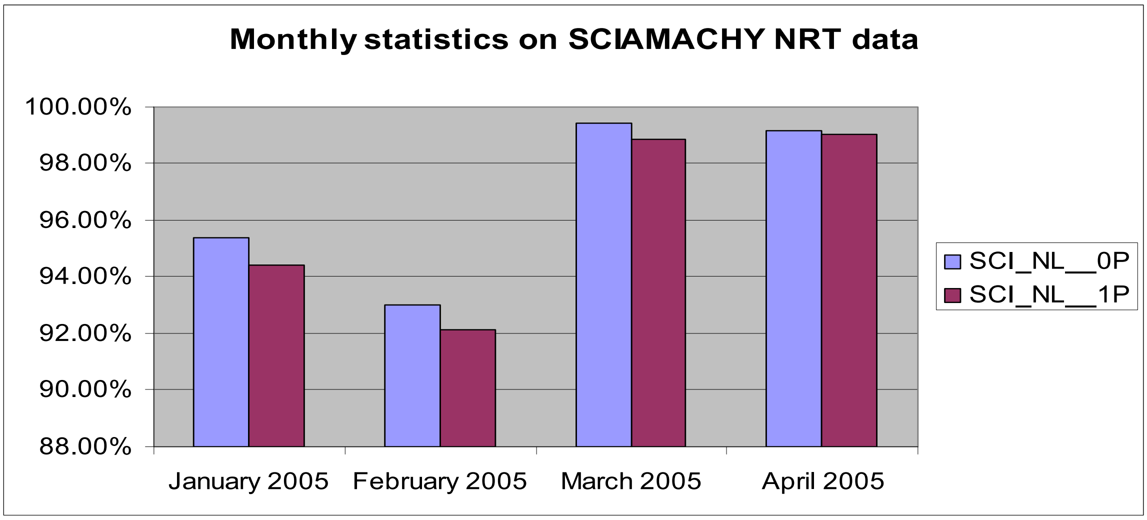

Fig. 4-2: Statistics on available unconsolidated Level 0 and Level 1 products

4.3 Statistics on consolidated data

In this paragraph statistics on consolidated data products L0 and L1 are presented.

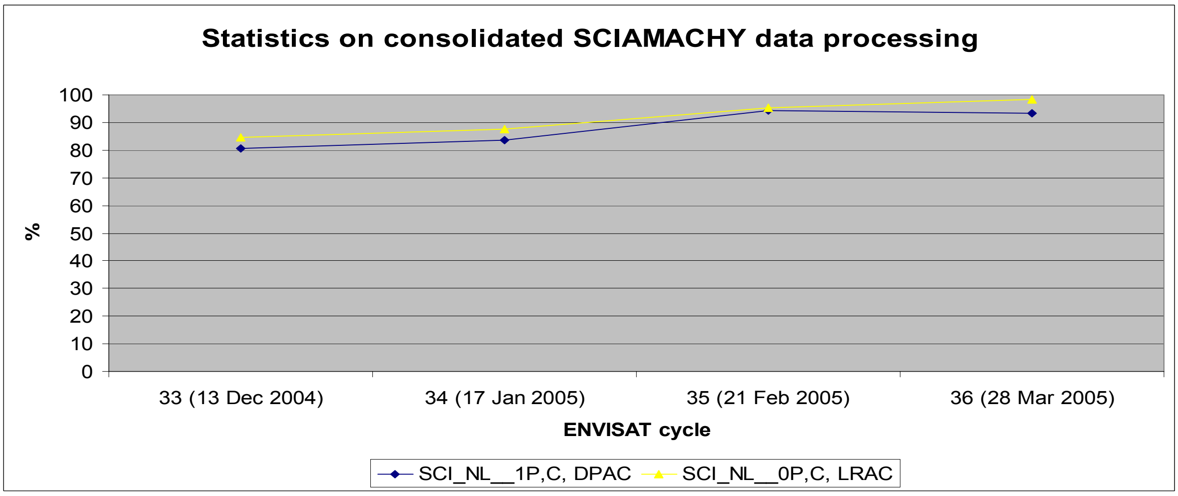

Fig. 4-3: Statistics on consolidated Level 0 and Level 1 products

4.4 Statistics on reprocessed data

Information about statistics on SCIAMACHY reprocessed data is made available by D-PAC.

Products from the time interval July 2002 to May 2004 (corresponding to cycles 7 -26, each cycle consisting of 501 orbits) are being reprocessed with IPF version 5.04 on consolidated L0/L1 data using the re-processed Auxiliary files (LK1, SU1, SP1, PE1). Data after that time interval have already been processed operationally with IPF 5.04

version and Auxiliary files had been processed operationally since then (the last status for the statistics in Fig. 4-4 is from 24/05/2005).
Data sets that lie in non-nominal decontamination periods are not re-processed to L2 products as the science data are not reliable.

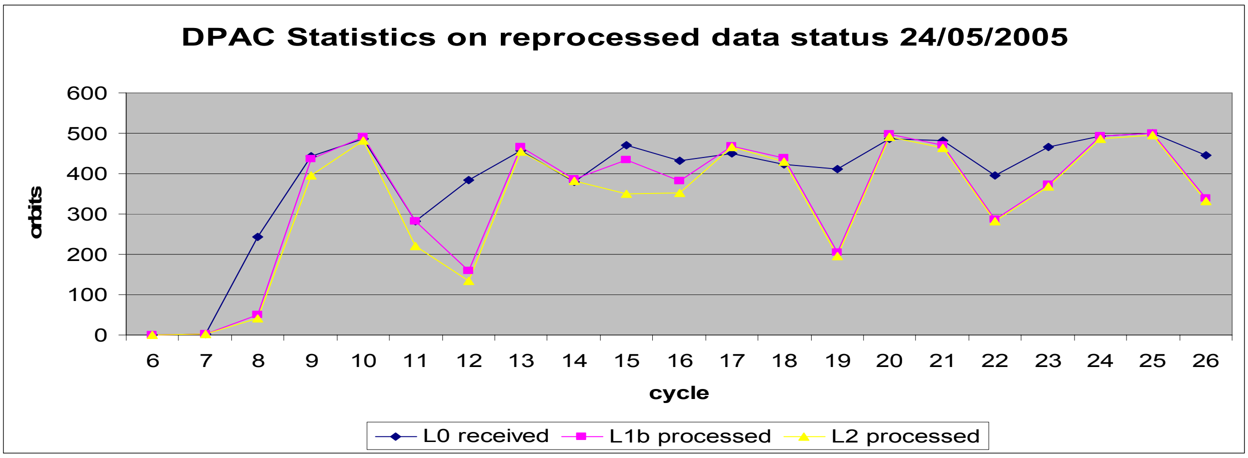

Fig. 4-4: DPAC statistics on reprocessed data

5 LEVEL 1 PRODUCT QUALITY MONITORING

5.1 Processor Configuration

5.1.1 Version

The current IPF version used for processing (and re-processing) of SCIAMACHY level 1 data is 5.04. The corresponding product specification is PO-RS-MDA-GS-2009_15_3H. The disclaimer at http://envisat.esa.int/dataproducts/availability/disclaimers/SCI_NL__1P_Disclaimers.pdf describes known artefacts.

Date	Version	Description of changes
21-AUG-2004	IPF version 5.04 has been activated from orbit 12942 at: PDHS-K	No algorithm specification changes were implemented, but two algorithm implementation errors have been corrected. In addition, code adaptations have been performed to resolve performance problems encountered during reprocessing. The list of modifications is as follows: • An incorrect polarisation-
20-AUG-2004	IPF version 5.04 has been activated from 12750 (+ reprocessing of some older products) at: LRAC	
16-AUG-2004	IPF version 5.04 has been activated from orbit 12823 at: PDHS-E	

12-AUG-2004	IPF version 5.04 has been activated 12879 (+ reprocessing of some older products)at: DPAC	ratio calculation has been corrected, to remove radiance discrepancies up to 1% between prototype and operational processor. • Memory leaks have been detected and eliminated • Two modifications have been performed to avoid level 1B processing crashes
31-MAR-2004	IPF version 5.01 has been activated at: DPAC	
24-MAR-2004	IPF version 5.01 has been activated at: PDHS-E PDHS-K LRAC	

Tab. 5-1: Processor Version and main changes

5.1.2 Auxiliary Data Files

For operation of the SCIAMACHY level 1 processor a set of Auxiliary files as input is required.
These Auxiliary files consist of a subset that usually changes only in correspondence with a new IPF version, namely the Initialisation file (SCI_LI1_AX), the Key Data File (SCI_KD1_AX). In addition there is the m-factor file (SCI_MF1_AX), which shall describe the degradation of the instrument during its stay in orbit (note that the m-factor file has not been changed so far).

Another subset of Auxiliary Files are the In-flight calibration Data files which are generated when calibration measurements are included in the set of level 0 data to be processed. Four types of In-flight calibration Auxiliary files exist:

- Leakage Current Calibration (SCI_LK1_AX - updated on orbital basis)
- Solar Reference Spectrum (SCI_SU1_AX - updated on daily basis)
- Spectral Calibration Parameters (SCI_SP1_AX - updated on a monthly basis)
- Pixel-to-Pixel Gain and Etalon Parameters (SCI_PE1_AX - updated on a monthly basis)

Since 04 May 2004 LK1 Auxiliary Files (Leakage Current Calibration) were processed operationally by the IECF. A SCI_LK1_AX is generated about every orbit (if measurements do not lie in the SAA area or orbit phase constraints occur).

SU1 Auxiliary Files were operationally processed starting from day 08 May 2004, a new SCI_SU1_AX file is generated every day with a validity time of two weeks.
PE1 and SP1 Auxiliary files are generated once per month with measurements of the monthly calibration orbits.
The table in Appendix A gives an overview about the Auxiliary files for the reporting period November – December 2004.
Fig: 5.1 shows statistics of the SU1 and LK1 ADFs generated operationally with the IECF. It has to be noted that unavailability periods are excluded from statistics. Generation of SU1 ADFs from August to October was 100%. In May 2004 two SU1 ADFs, in June three ADFs and in July three ADFs were missing, mainly due to hardware problems.
The LK1 ADF statistic is calculated by dividing the number of all LK1 ADFs by number of all available (to IECF) level 1 orbits. In average ADFs are available about 58% per month. The statistic does not take into account SAA and orbit phase constraints. Special analysis showed that only 6-8 orbits per day can be used for LK1 ADF processing, and therefore the performance is at 80-100%.

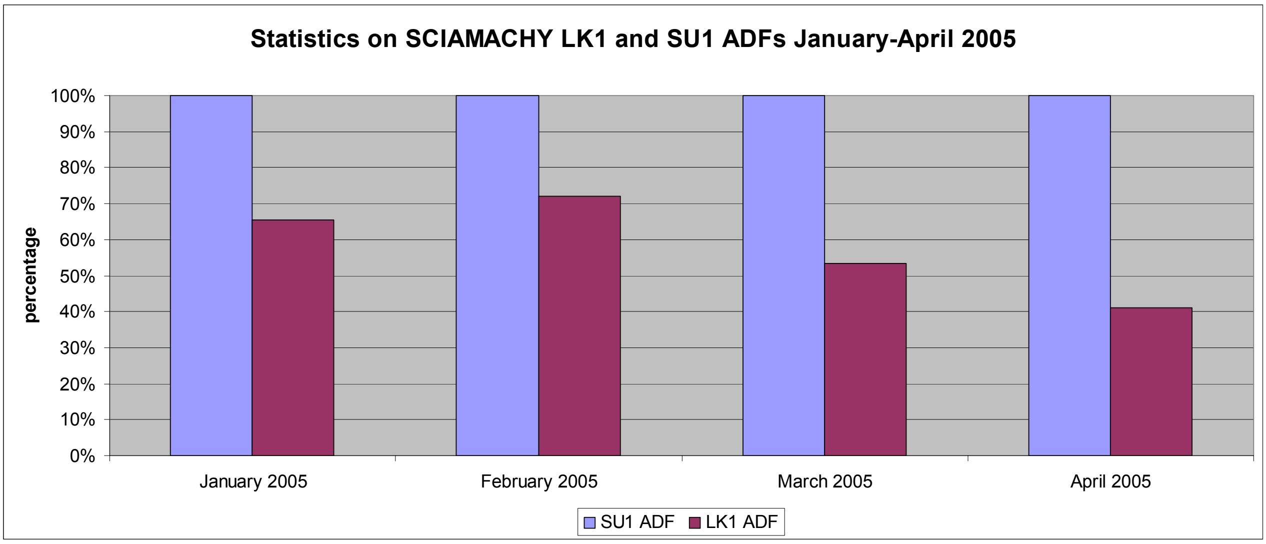

Fig. 5-1: Statistics on LK1 and SU1 processing

5.1.3 Spectral Performance

Future reports will contain analyses of spectral performance.

5.1.4 Radiometric Performance

Future reports will contain analyses of spectral performance.

5.1.5 Other Calibration Results

5.1.5.1 SMR analysis

The IECF generates daily SU1 Auxiliary Files, that contain new sun mean reference spectra for the different possible modes (e.g., subsolar, ESM diffuser, occultation, etc).
Fig. 5-2 to Fig. 5-9 show the ratios of SMR spectra derived from calibrated SMR/ESM during the month January - April 2005. The ratios were determined by dividing the spectra of the beginning of each month to a set of days during each month. All ratios are not corrected for variation of distance earth/sun.
In detail the spectra used for the ratios of each month are the following:

- **January 2005**
  Reference SMR - 06 Jan 2005
  SMR used for ratios: 07, 08, 09, 10, 11, 13, 14, 17, 18, 19, 21, 24, 25, 26, 27, 28, 29, 30, 31 Jan 2005
- **February 2005**
  Reference SMR - 01 Feb 2005
  SMR used for ratios: 02, 03, 04, 05, 06, 07, 14, 21, 28 Feb 2005
- **March 2005**
  Reference SMR - 01 March 2005
  SMR used for ratios: 02, 03, 04, 05, 06, 07, 14, 21, 31
- **April 2005**
  Reference SMR - 02 April 2005
  SMR used for ratios: 03, 04, 05, 06, 07, 08, 15, 22, 30

The analysis of January is impacted by the non-nominal decontamination phase that was completed on 02 January, however the SMR spectrum taken on 06 January was still under instable thermal condition.
The overall changes lie between 1 - 2 % during one month (besides January). In channel 1 around pixel 550 some features can be noticed as well as in channel 2 at pixel 840. The reason for these features need to be investigated. A possible explanation could be a solar variability causing Fraunhofer lines with different intensities. Generally a spectral feature could have significant impact on the product quality, especially when the affected spectral parts are used for DOAS retrieval.

The IR channels are impacted by more noise than the UV-visible channels.

January and February ratios of SMRs show some strong etalon like features, especially in channel 3. First investigation using level 0 data, showed that this is an artefact and no etalon structure, as the ratios in the Figures presented here were performed using wavelength calibrated data.

Fig. 5-10 shows a SMR ratio on a long term trend dividing the ESM spectra from days 18-Jul-2002 (first SMR spectrum since BOL) and 30-Apr-2005. As also here no correction for sun/earth distance was performed, a better analysis in future reports shall be considered by taking a reference spectrum of the same calendar day year 2002/2003.

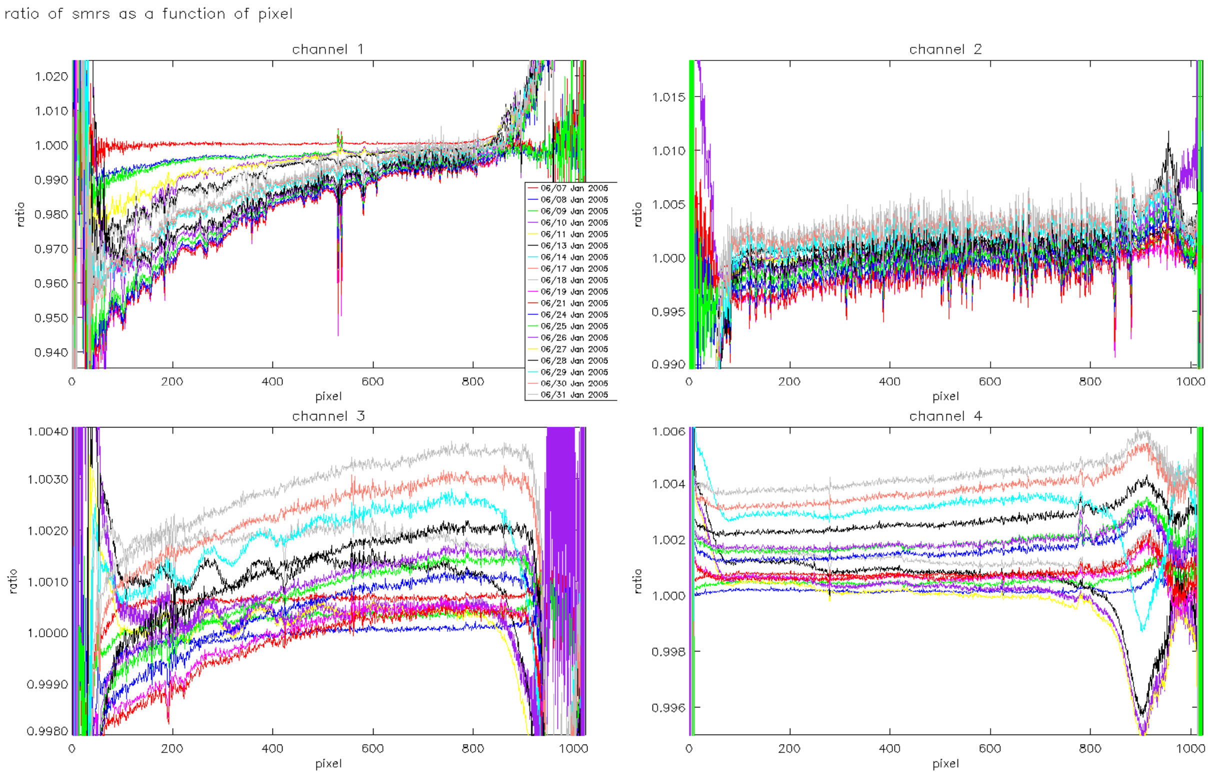

Fig. 5-2: SMR ratios per detector channel 1-4 (changes during January 2005)

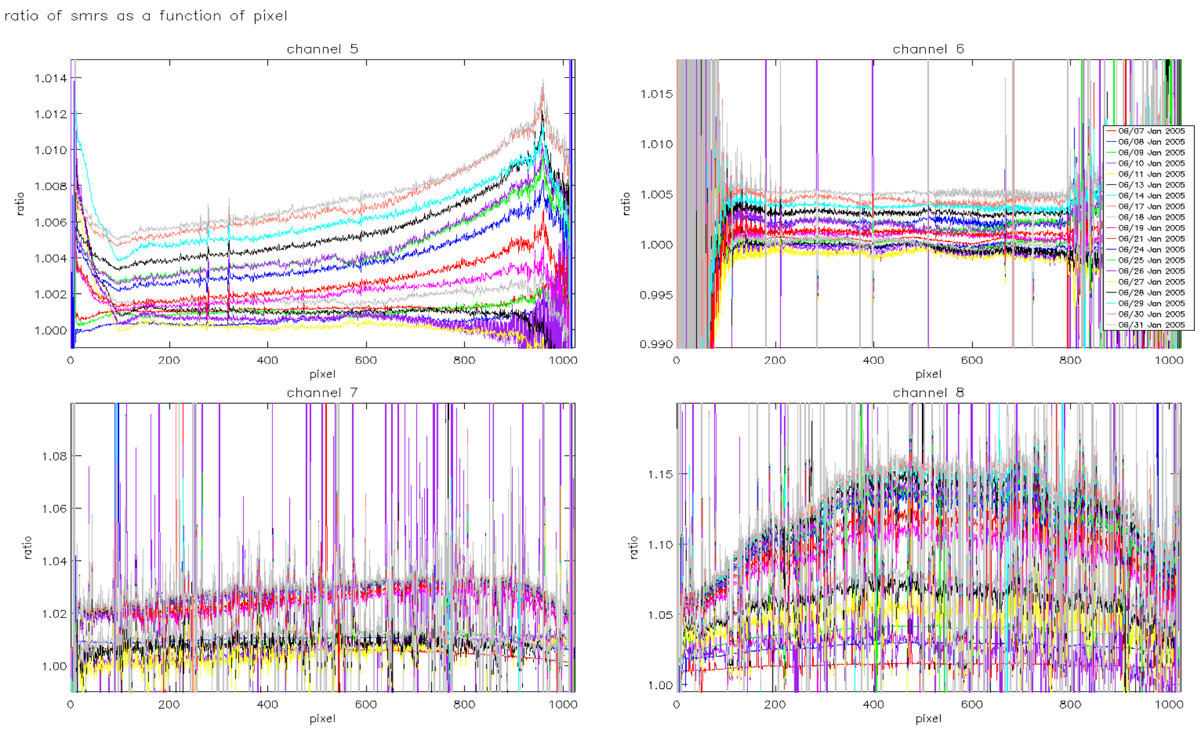

Fig. 5-3: SMR ratios per detector channel 5-8 (changes during January 2005)

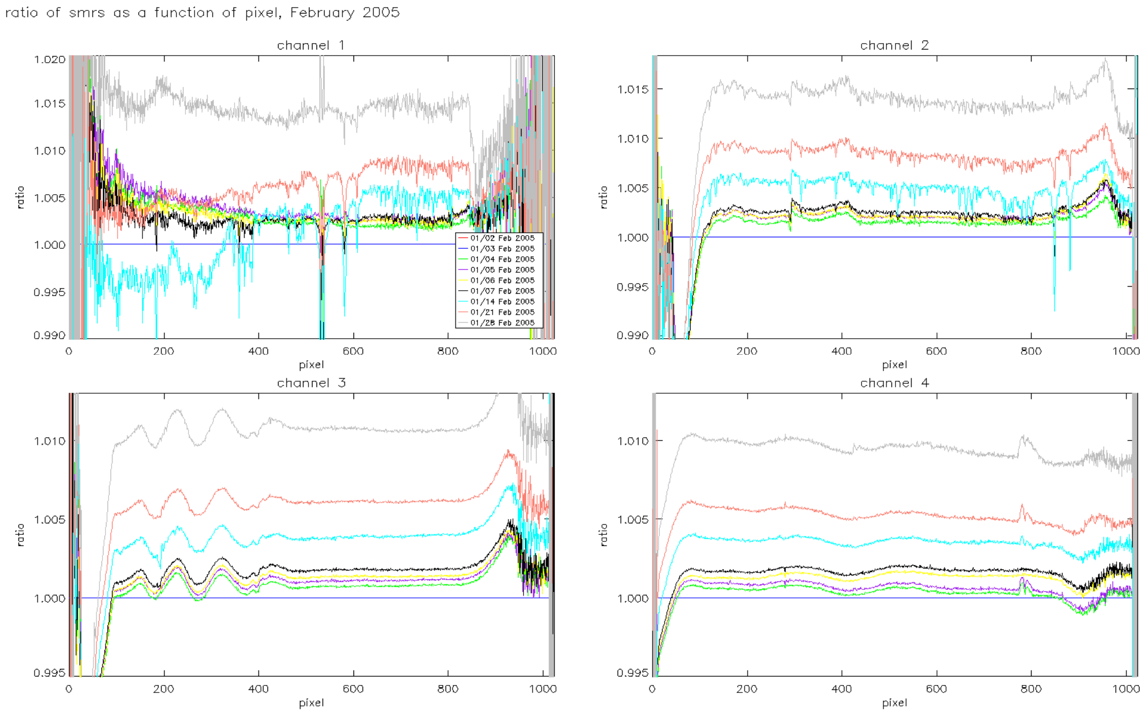

Fig. 5-4: SMR ratios per detector channel 1-4 (changes during February 2005)

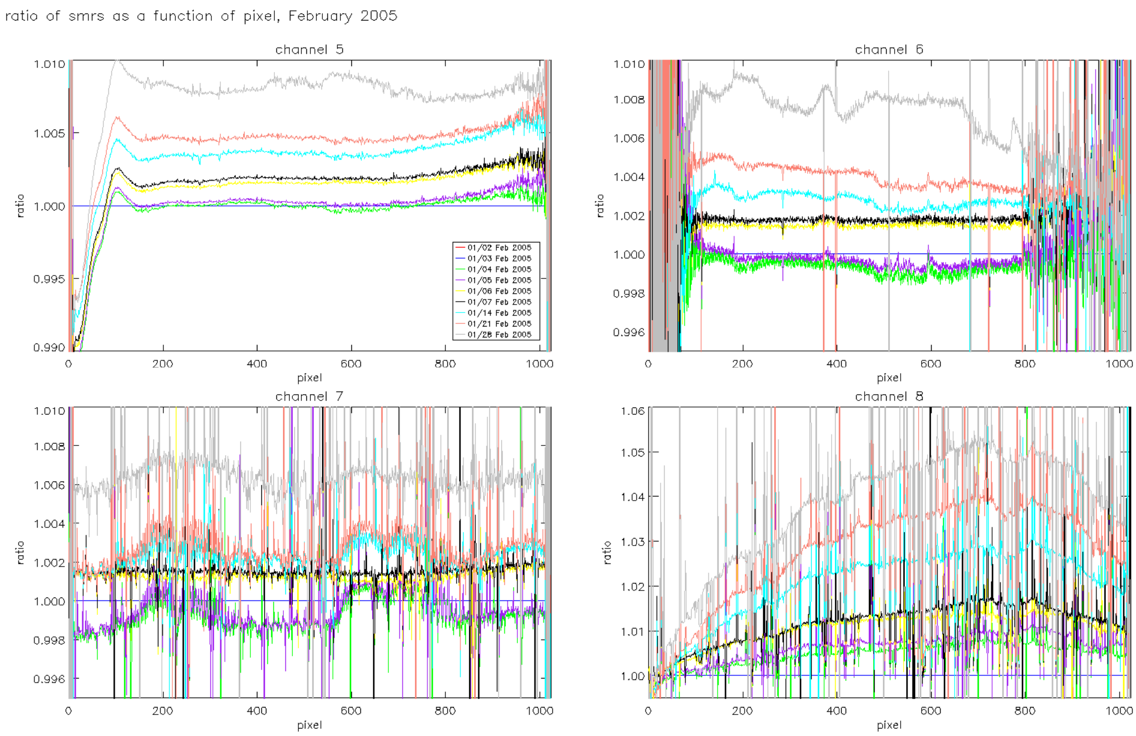

Fig. 5-5: SMR ratios per detector channel 5-8 (changes during February 2005)

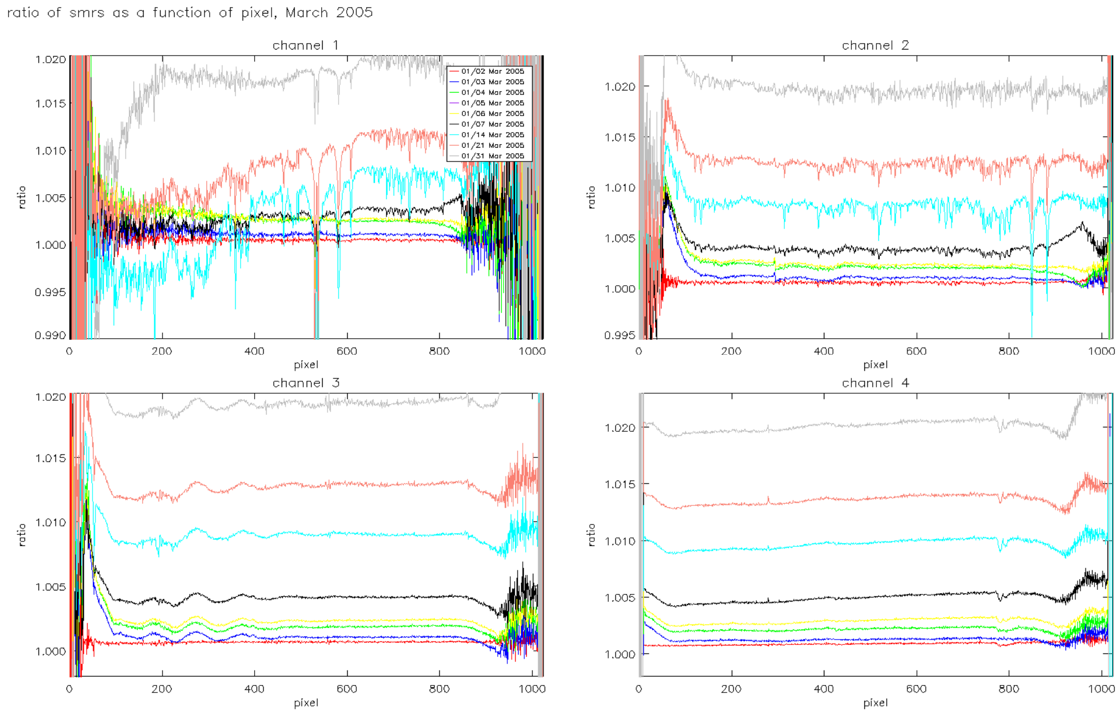

Fig. 5-6: SMR ratios per detector channel 1-4 (changes during March 2005)

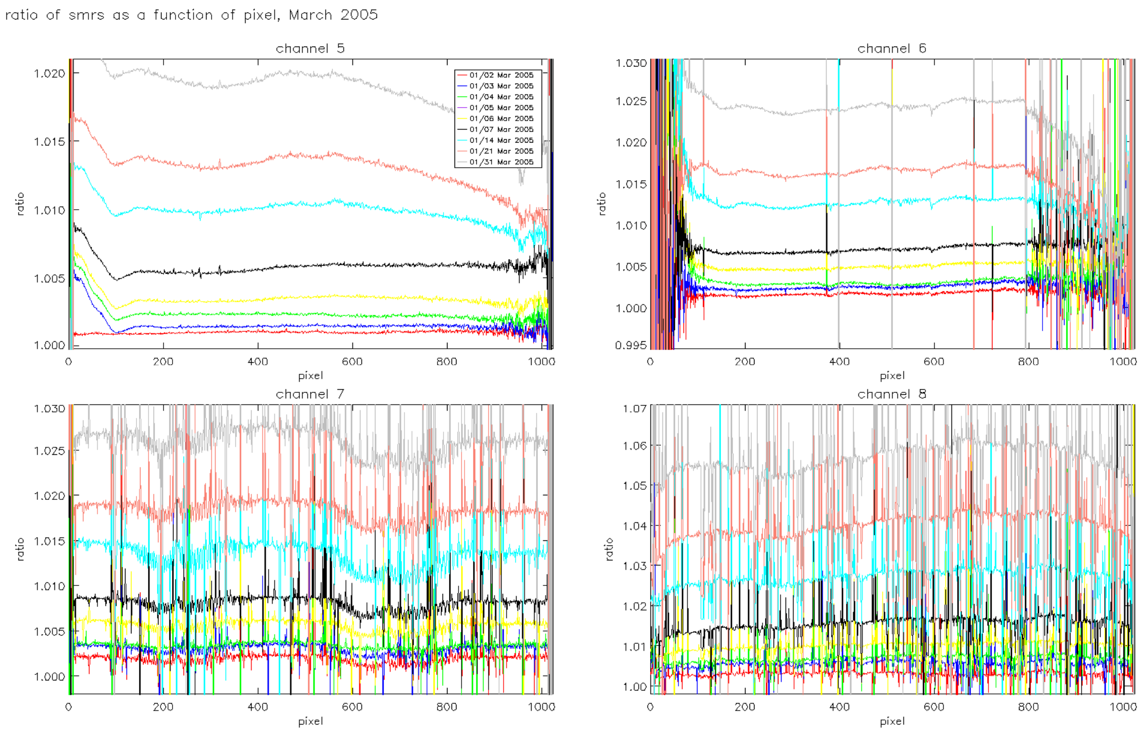

Fig. 5-7: SMR ratios per detector channel 5-8 (changes during March 2005)

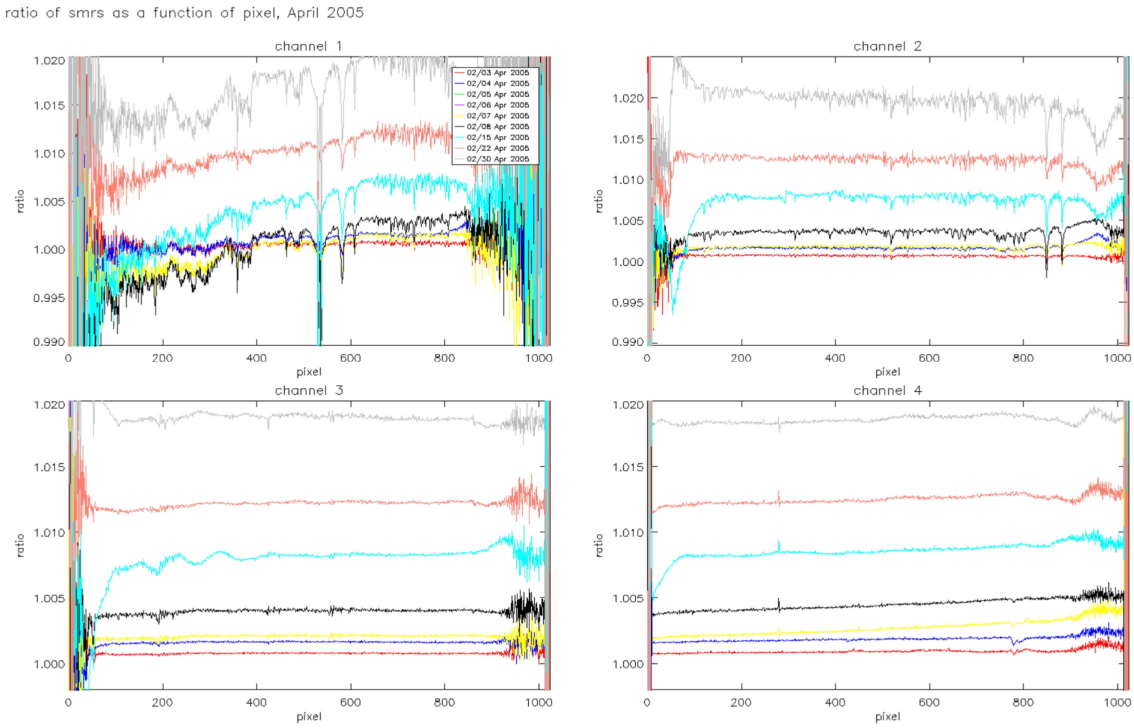

Fig. 5-8: SMR ratios per detector channel 1-4 (changes during April 2005)

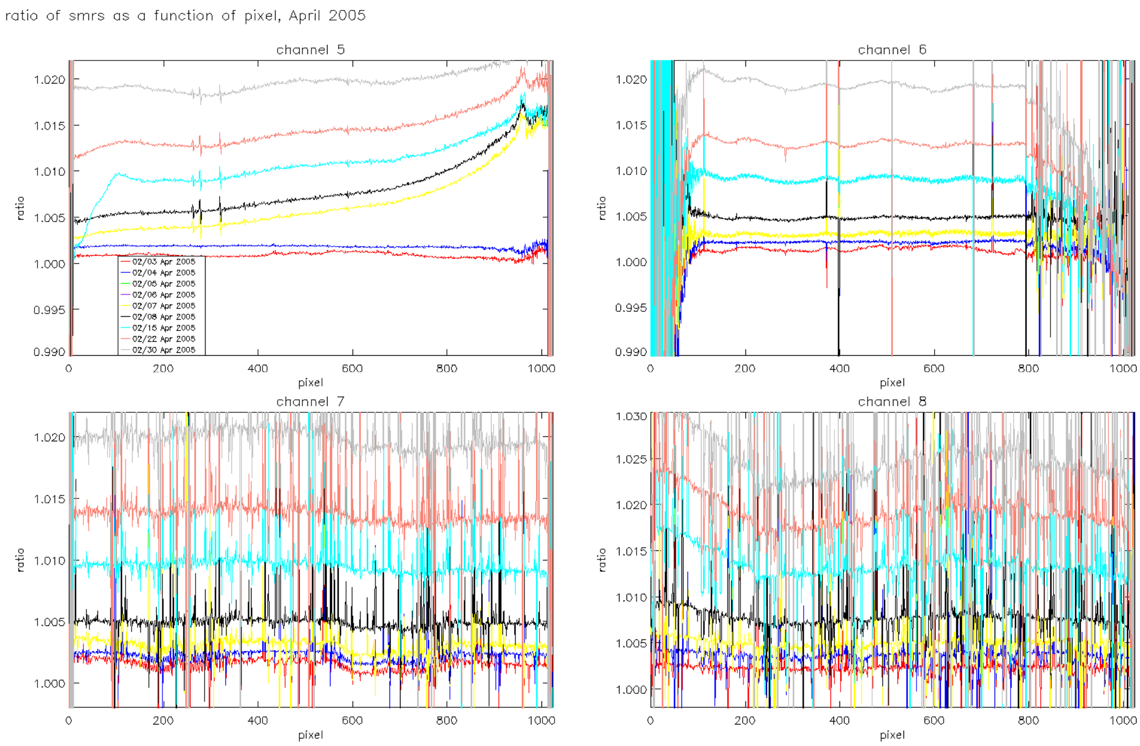

Fig. 5-9: SMR ratios per detector channel 5-8 (changes during April 2005)

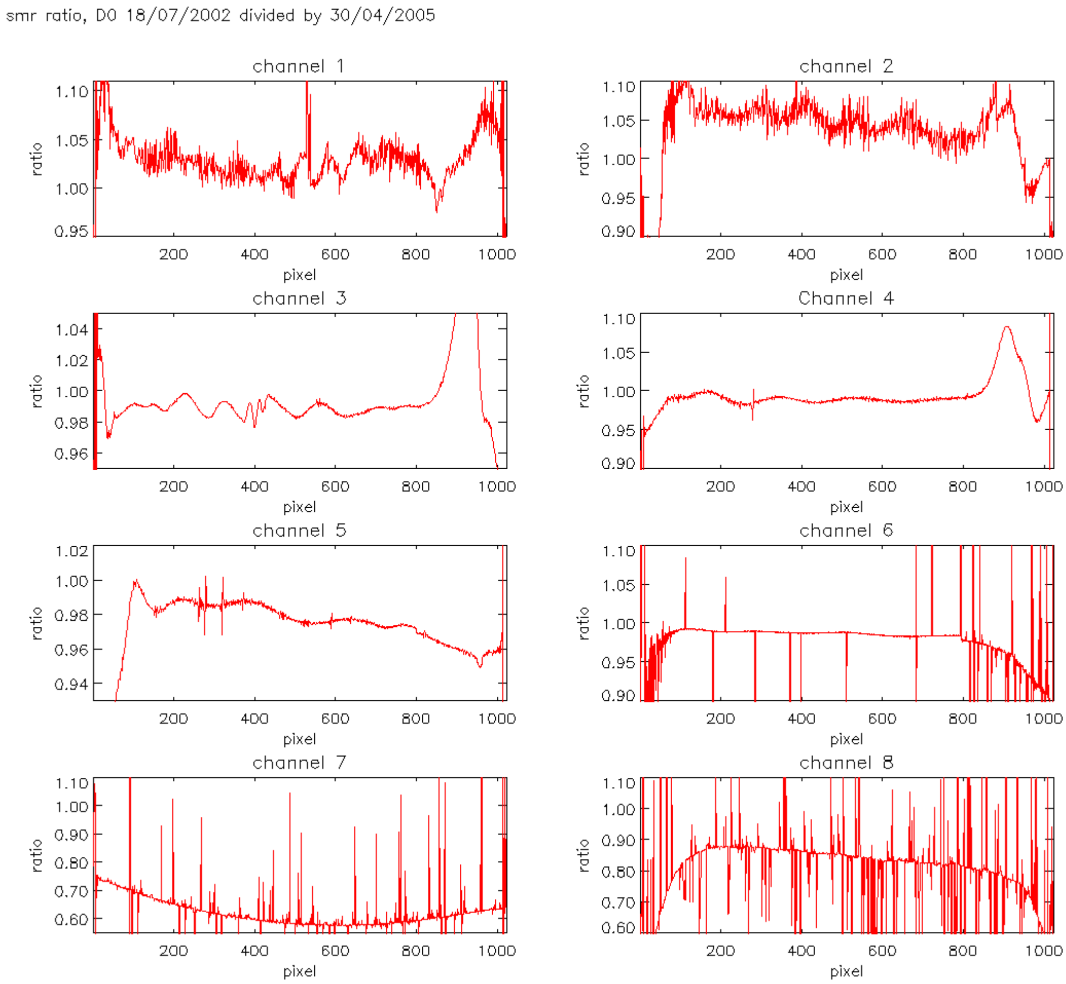

Fig. 5-10: SMR ratios per detector channel on Long Term Trend

5.1.5.2 LK1 analysis

On an orbital basis a leakage current calibration is performed, if measurement data do not lie in the South Atlantic Anomaly region.

In Fig. 5-11 to Fig. 5-18 the leakage constant part FPN (fixed pattern noise) of the LK1 ADFs are analysed by determining the ratios of the FPN of each month with a time distance of one orbit, one day, one week, two weeks, three weeks and a month.

For channels 1-5 and the first part of channel 6, during up to three weeks nearly no changes can be noticed. The IR channels show a lot of noise. Here an improvement is foreseen with a new processor version, where the time dependent part of the leakage current will be considered.

For the month of March, an “anomaly” can be observed in the three week ratio, which looks very noisy. The origin of this dark current behavior will be investigated deeper. The dark current anomaly is only visible for channel 3, but not in 1, 2 or 4.

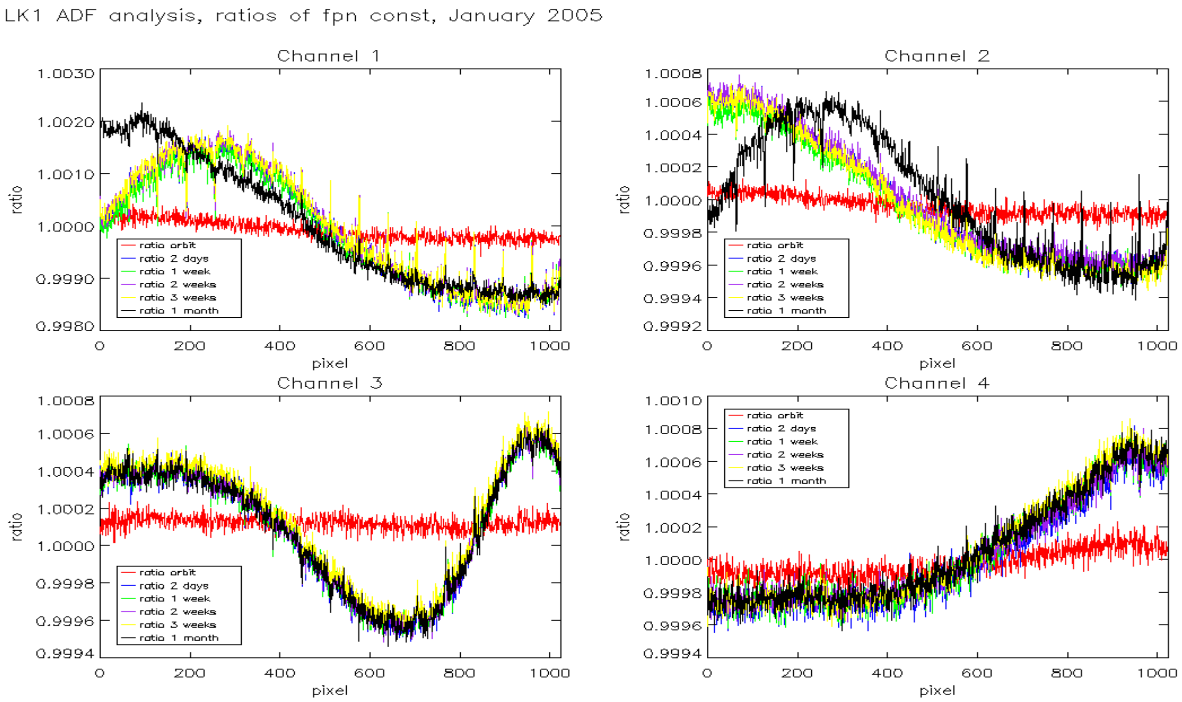

Fig. 5-11: dark current ratios (constant part) channel 1-4 during January 2005, Reference Spectrum used: Orbit 14876, 03-Jan-2005

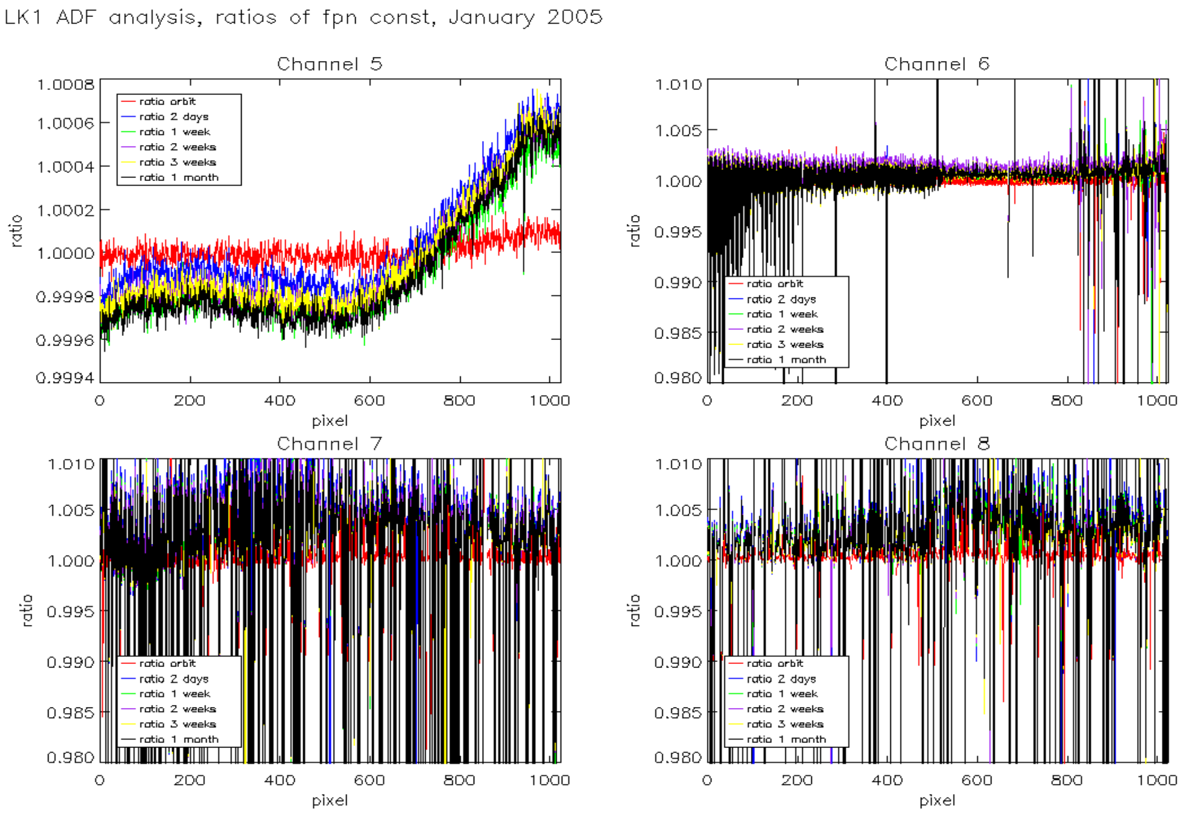

Fig. 5-12: dark current ratios (constant part) channel 5-8 during January 2005, Reference Spectrum used: Orbit 14876, 03-Jan-2005

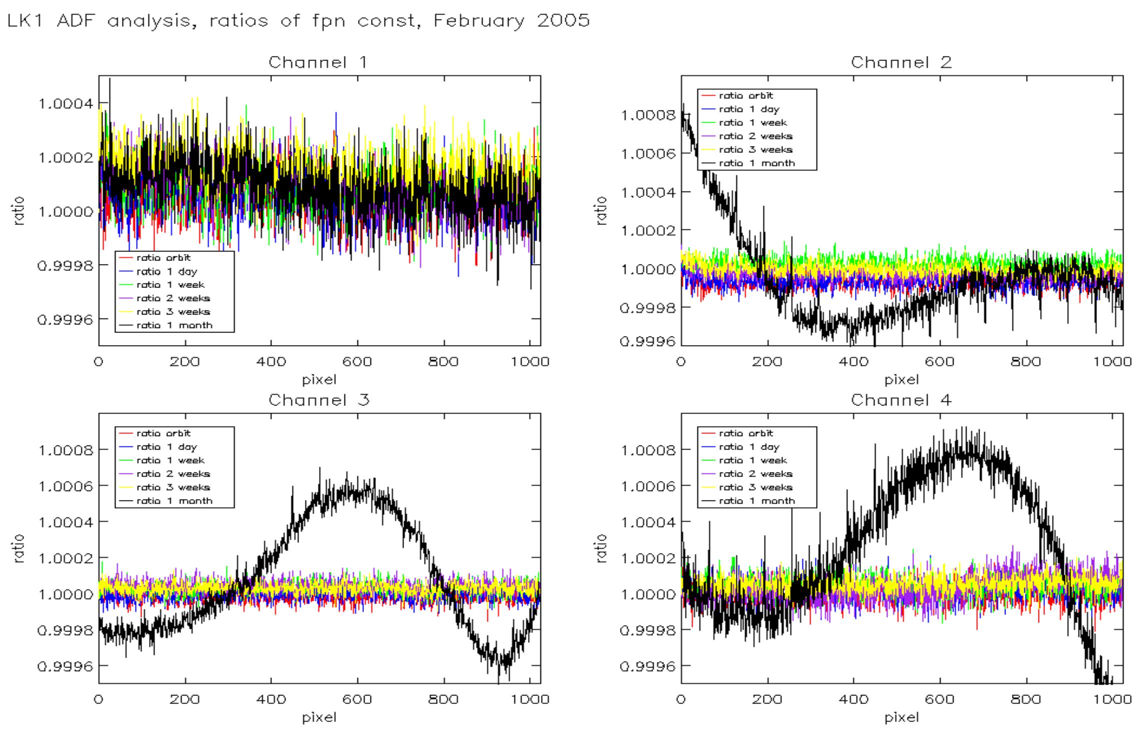

Fig. 5-13: dark current ratios (constant part) channel 1-4 during February 2005, Reference Spectrum used: Orbit 15291, 01-Feb-2005

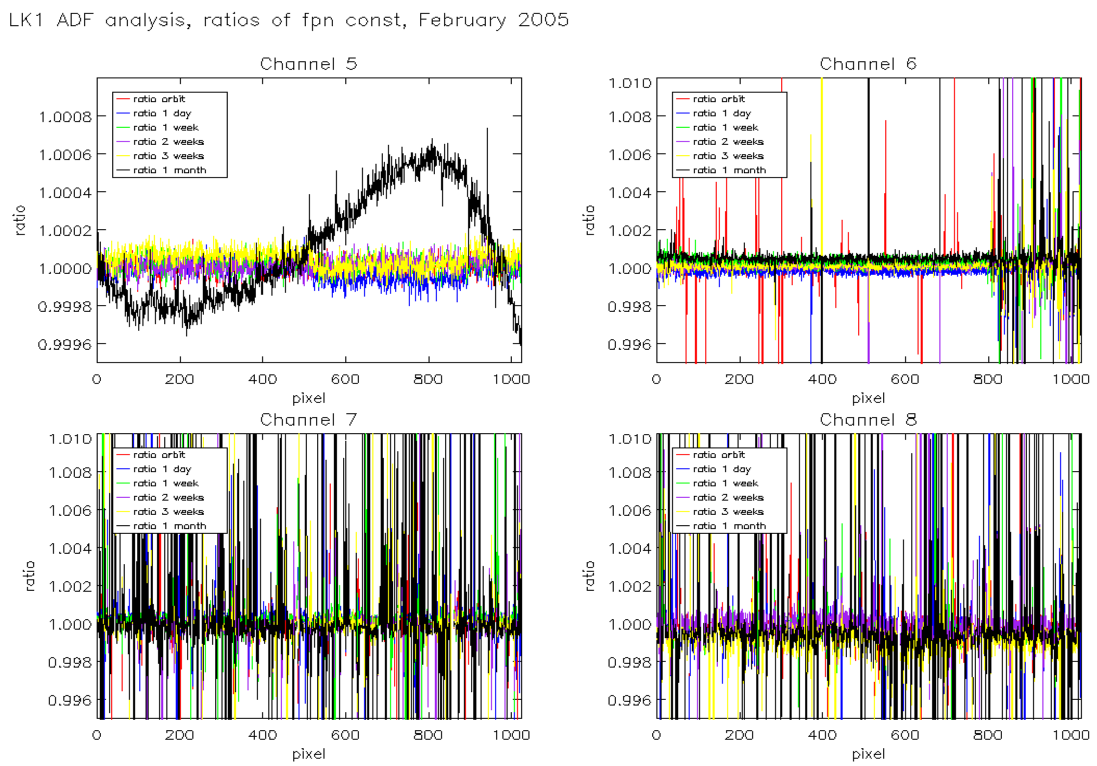

Fig. 5-14: dark current ratios (constant part) channel 5-8 during February 2005, Reference Spectrum used: Orbit 15291, 01-Feb-2005

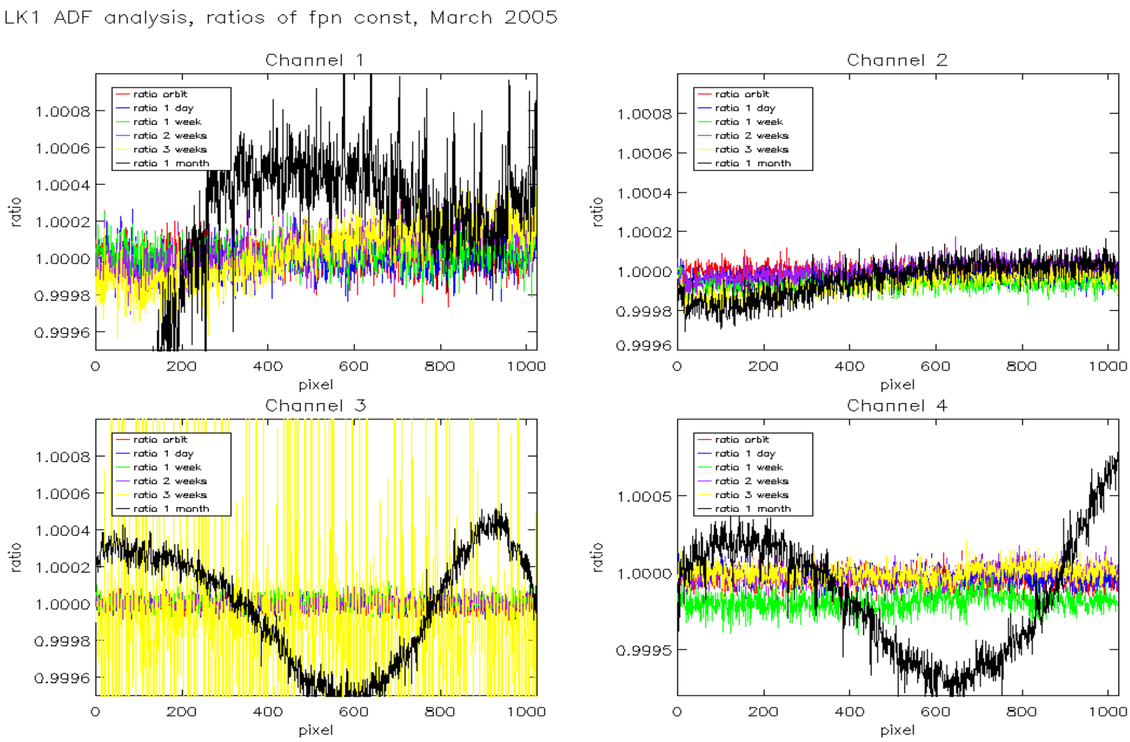

Fig. 5-15: dark current ratios (constant part) channel 1-4 during March 2005, Reference Spectrum used: Orbit 15692, 01-Mar-2005

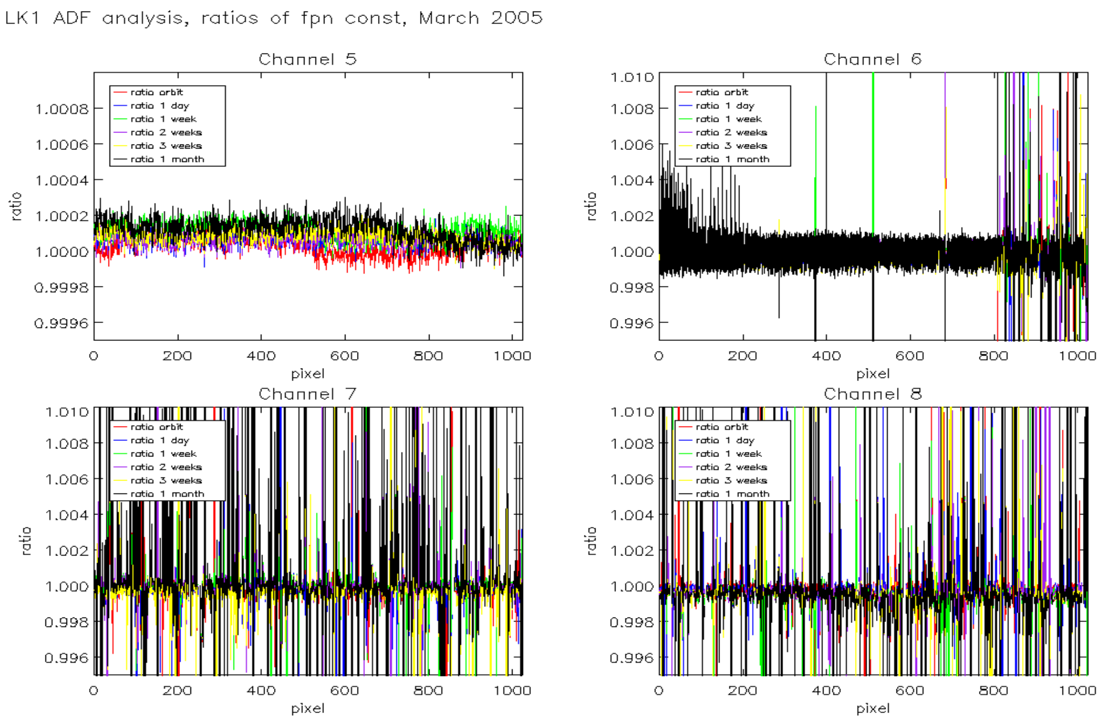

Fig. 5-16: dark current ratios (constant part) channel 5-8 during March 2005, Reference Spectrum used: Orbit 15692, 01-Mar-2005

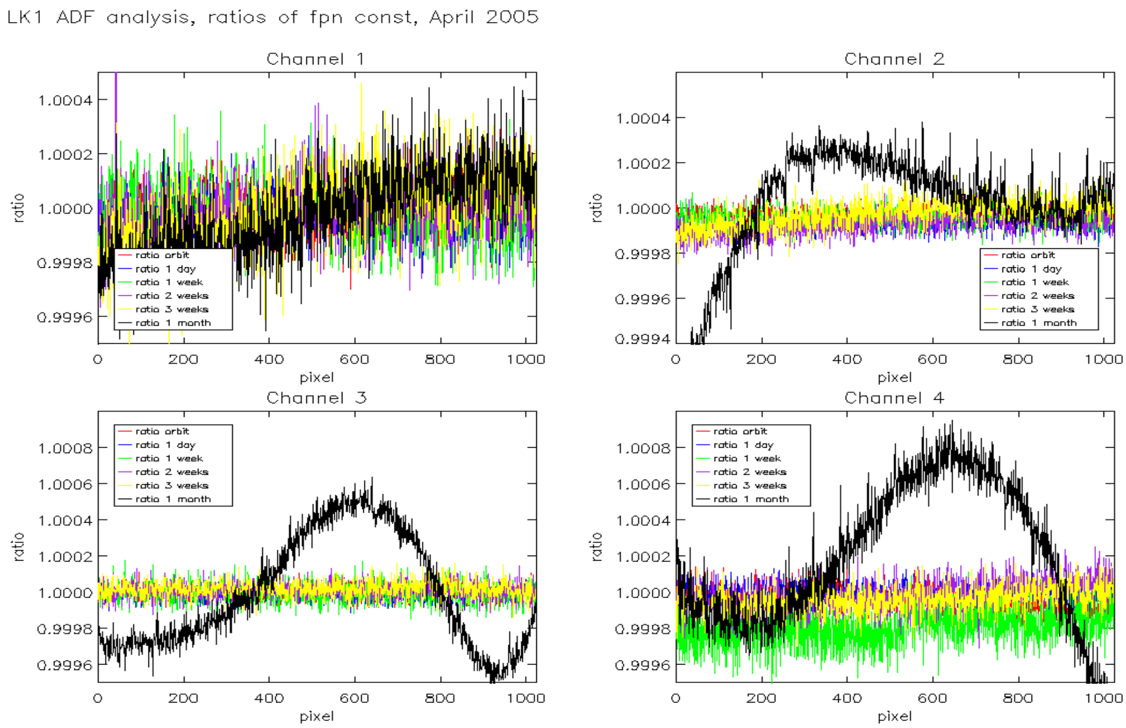

Fig. 5-17: dark current ratios (constant part) channel 1-4 during April 2005, Reference Spectrum used: Orbit 16164, 03-Apr-2005

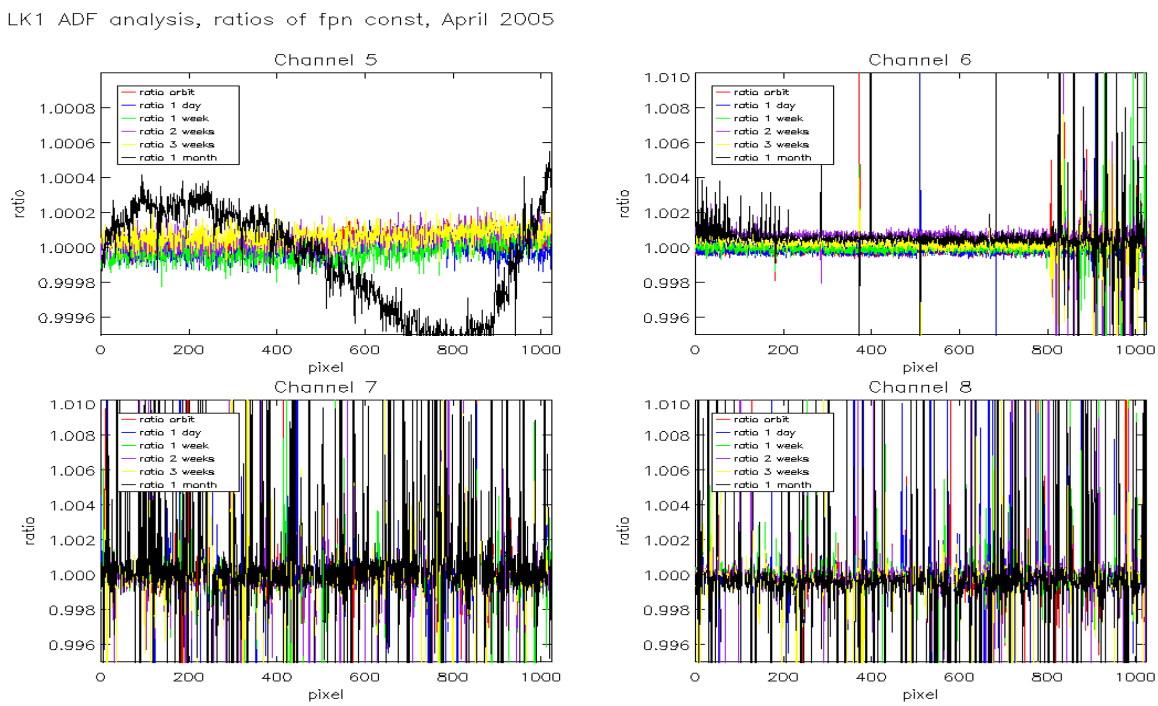

Fig. 5-18: dark current ratios (constant part) channel 5-8 during April 2005, Reference Spectrum used: Orbit 16164, 03-Apr-2005

5.1.6 Pointing Performance

The in-orbit ENVISAT pointing characterization in view of a new restituted attitude file delivered by ESOC (AOCS data) was assessed and results are described in detail in a dedicated technical note *ENVISAT Restituted Pitch Assessment, Issue 2,* ENVI-SPPA-EOPG-TN-05-0011 (ref. [1]).

The attitude information from AOCS that was used for the analysis consists of the de-pointing estimates generated by the star trackers.

SCIAMACHY pointing information can be retrieved from Limb scattering observations in the UV-B spectral range with the software tool TRUE (Tangent height Retrieval by UV-B Exploitation), developed by IFE-Bremen (ref. [2]). UV limb radiance profiles at wavelengths shorter than 320 nm exhibit a characteristic radiance peak in the upper stratosphere/lower thermosphere, with the peak altitude being a function of the wavelength. The limb radiance peak is called ‘knee’. If the atmospheric ozone profile is known, then the knee-altitude as well as the shape of the limb radiance profiles around the knee can be used to retrieve pointing information. The data analysis is restricted to the tropical range (latitudes between 20° S – 20° N), where the ozone layer is fairly constant and horizontally more homogeneous than at mid-latitudes, as the TRUE retrieval depends on a-priori ozone profile.
In the above mentioned technical note a long term trend comparison of SCIAMACHY Pitch values to AOCS data (averaged over the tropical zone) was performed. The result is shown in Fig. 5-19.

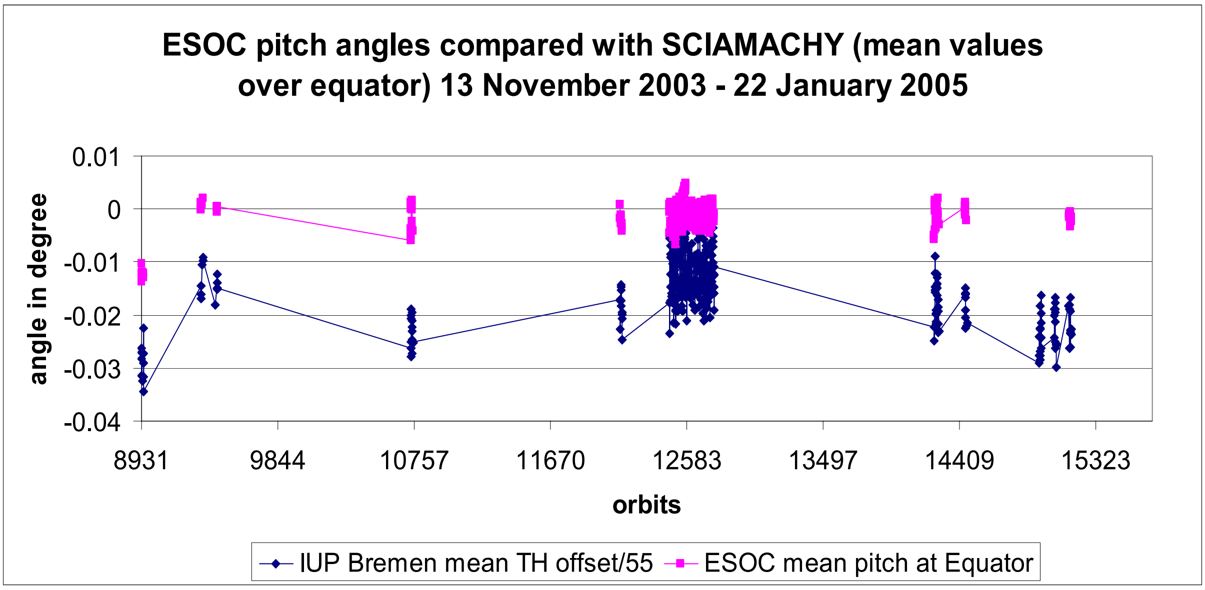

Fig. 5-19: Long Term Trend Pitch comparison between SCIAMACHY and AOCS

As first conclusion it was found that SCIAMACHY deviates from AOCS with a bias that is not yet clarified. There is as well a constant slope deviating from 1. Otherwise, the long-term trend correlates well.

As these results have insufficient statistical relevance, the pointing analysis will be expanded. Besides using a larger AOCS dataset, AOCS harmonic coefficients instead of individual estimator measurements will be used, which shall reduce the standard deviation and eliminate outliers. Preliminary results of this analysis show that the slope is close to 1 (+/- 20%) and a bias is about 16.8 mdeg.

With the results of this study an initial implementation into the SCIAMACHY prototype is foreseen in June 2005.

6 LEVEL 2 NRT PRODUCT QUALITY MONITORING

6.1 Processor Configuration

6.1.1 Version

The current IPF version used for processing (and re-processing) of SCIAMACHY level 2 data is 5.04. The according product specification is PO-RS-MDA-GS-2009_15_3H. The disclaimer at http://envisat.esa.int/dataproducts/availability/disclaimers/SCI_NL__2P_Disclaimers.pdf describes known artefacts. Table 6.1 shows the implementation dates of the IPF at the different PDS processing centres and the main modifications implemented.

<table>
<tr><th>Date</th><th>Version</th><th>Description of changes</th></tr>
<tr><td>21-AUG-2004</td><td>IPF version 5.04 has been activated from orbit 12942 at:
PDHS-K</td><td rowspan="3">No algorithm specification changes were implemented, but two algorithm implementation errors have been corrected. In addition, code adaptations have been performed to resolve performance problems encountered during reprocessing. The list of modifications is as follows:</td></tr>
<tr><td>20-AUG-2004</td><td>IPF version 5.04 has been activated from 12750 (+ reprocessing of some older products) at:
LRAC</td></tr>
<tr><td>16-AUG-2004</td><td>IPF version 5.04 has been activated from orbit 12823 at:
PDHS-E</td></tr>
</table>

<table>
<tr><td>12-AUG-2004</td><td>IPF version 5.04 has been activated 12879 (+ reprocessing of some older products)at:
DPAC</td><td>The incorrect handling of the season index 4 has been corrected.
An incorrect polarisation-ratio calculation has been corrected, to remove radiance discrepancies up to 1% between prototype and operational processor.
Memory leaks have been detected and eliminated
An adaptation has been implemented to allow co-existence with the initialisation file used by the Off-Line processor</td></tr>
<tr><td>31-MAR-2004</td><td>IPF version 5.01 has been activated at:
DPAC</td><td rowspan="2">description for cloud MDS updated
minor changes in MPI and USA climatology description
latitude grids fixed
list of surface types fixed, note about vegetation index added
O_3 FM formula fixed sizes of SCIA FM spectra fixed latitude zones fixed
solar zenith angle grid fixed</td></tr>
<tr><td>24-MAR-2004</td><td>IPF version 5.01 has been activated at:
PDHS-E
PDHS-K
LRAC</td></tr>
</table>

Tab. 6-1: Level 2 Processor Configuration

6.1.2 Auxiliary Data Files

Auxiliary Files being used as input for SCI_NL__2P products are listed in table 6-2. These ADF files are generally not changed.

SCI_FM2_AXVIEC20040309_092553_19990101_000000_20991231_235959
SCI_BL2_AXVIEC20020220_093709_20020101_000000_20200101_000000
SCI_CC2_AXVIEC20020220_094004_20020101_000000_20200101_000000
SCI_CL2_AXVIEC20020220_094214_20020101_000000_20200101_000000
SCI_CS2_AXVIEC20020220_094417_20020101_000000_20200101_000000
SCI_MF2_AXVIEC20040309_093236_19990101_000000_20991231_235959
SCI_PF2_AXVIEC20020220_100450_20020101_000000_20200101_000000
SCI_PR2_AXVIEC20020220_100642_20020101_000000_20200101_000000
SCI_RC2_AXVIEC20020220_100912_20020101_000000_20200101_000000
SCI_UC2_AXVIEC20040309_092027_19990101_000000_20991231_235959
SCI_SF2_AXVIEC20020220_101039_20020101_000000_20200101_000000
SCI_LI2_AXVIEC20040308_170000_20020101_000000_20200101_000000

Tab. 6-2: Level 2 Auxiliary Files

6.2 O_3 consistency checking

Future reports will contain information on this issue.

6.3 NO_2 consistency checking

NO_2 vertical column density (VCD) values of one month were averaged using QUADAS, filtering those data where the VCD flags are 0. Diurnal variations have not been corrected (no model applied). Fig. 6-1, Fig. 6-2, Fig. 6-3, Fig. 6-6 are aimed at processing consistency checking and are not intended for geophysical interpretation.
Generally, high concentration of NO_2 is expected over industrial regions, as over North America, especially the East coast, over central Europe, China and South Africa.

6.3.1 NO_2 VCD map January 2005

High NO_2 VCD values at high latitudes as over Ural region and West Siberia need to be reviewed, as well as the high values at the South pole.
Remark with respect to data analysis:

as the ingestion of the VCD quality flag into the database had not yet been performed for all January data, a different method was used for filtering “bad” data. For the January VCD map, data where used, where VCD was >0.

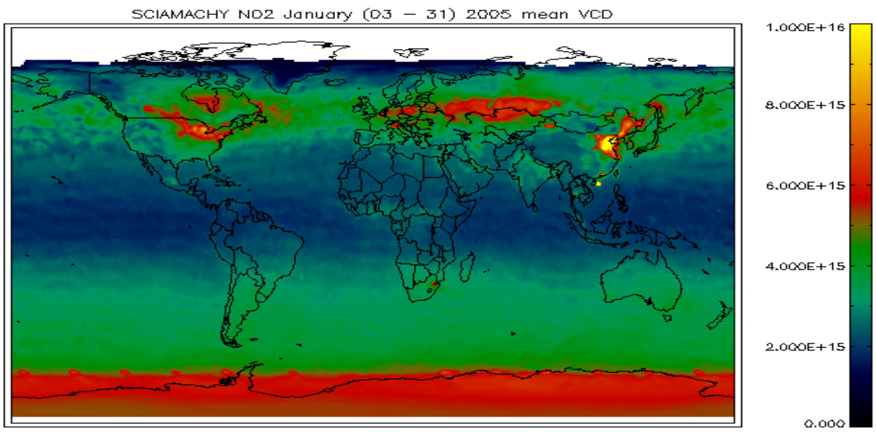

Fig. 6-1: NO_2 VCD world map 03 -31 January 2005 – monthly average

6.3.2 NO_2 VCD map February 2005

As for the January 2005 map, high NO_2 VCD values at high latitudes as over Ural region and West Siberia need to be reviewed, as well as the high values at the South pole.

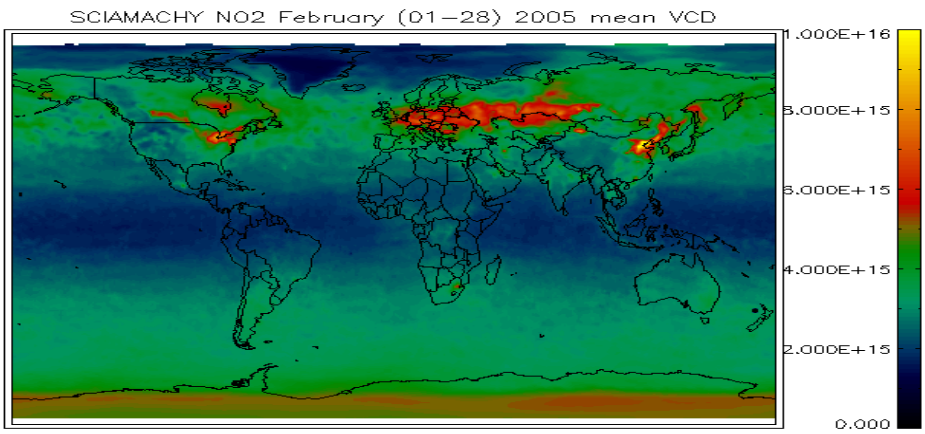

Fig. 6-2: NO_2 VCD world map 01-28 February 2005 – monthly average

6.3.3 NO_2 VCD map March 2005

For calculation of the monthly mean values of NO_2, the data from days 30 and 31 March were discarded, due to an anomaly in the NRT data, which is reported in chapter 6.3.3.1

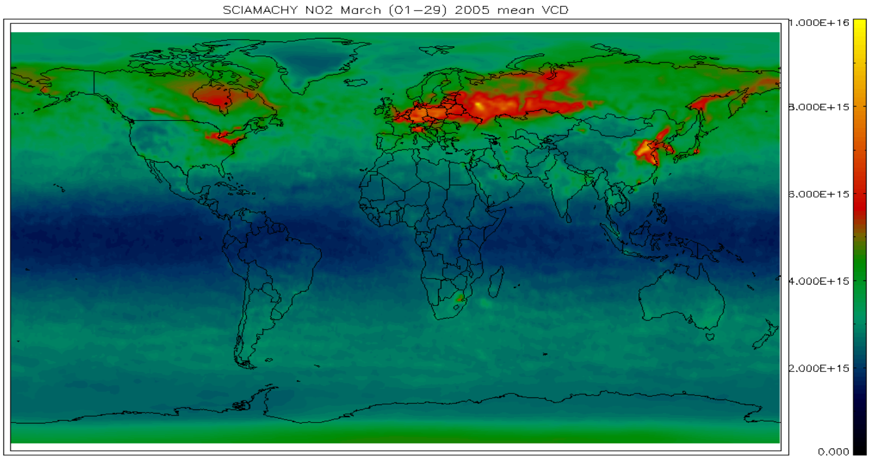

Fig. 6-3: NO_2 VCD world map 01-29 March 2005 – monthly average

6.3.3.1 *NO_2 VCD anomalous values during 30-31 March 2005*

During days 30 and 31 March anomalous high NO_2 VCD values were noticed in the latitude range 40-60 degree. Fig. 6-4 shows the NO_2 world map for days 29 March (with a nominal NO_2 distribution) and 30 March (with anomalous high values in red) in comparison. During daily systematic monitoring the anomalous values were appearing only in NRT products and not in the Level 2 Offline product. Neither could these values be reproduced with the prototype. Therefore an Anomaly report was raised against the PDS. Fig. 6-5 shows the VCD values as a sequence of time between 28-Mar-2005 and 04-Apr-2005. In average the values are 2-3 times higher than nominally.
The product disclaimer will be updated accordingly.

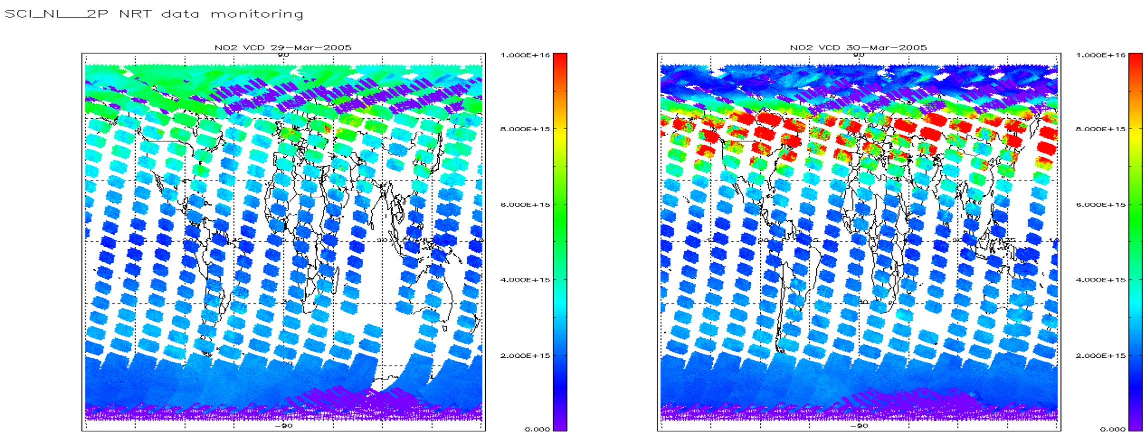

Fig. 6-4: NO_2 VCD world maps 29 March 2005 and 30 March 2005

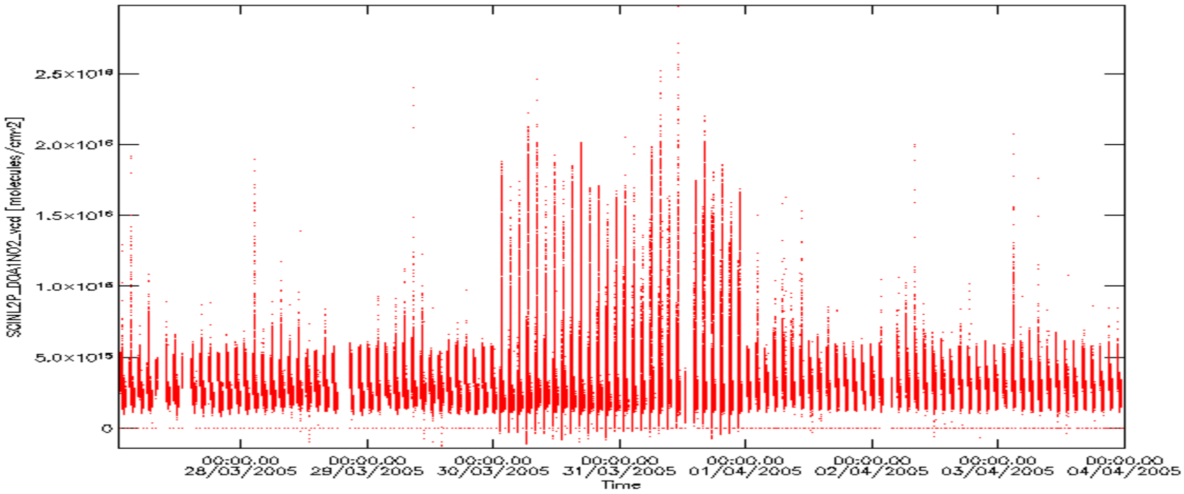

Fig. 6-5: NO_2 VCD values as sequence of time 28 March 2005 to 04 April 2005

6.3.4 NO_2 VCD map April 2005

Also for the April world map showing the distribution of mean values of NO_2 VCD, a review is needed to understand unphysical values at high latitudes.

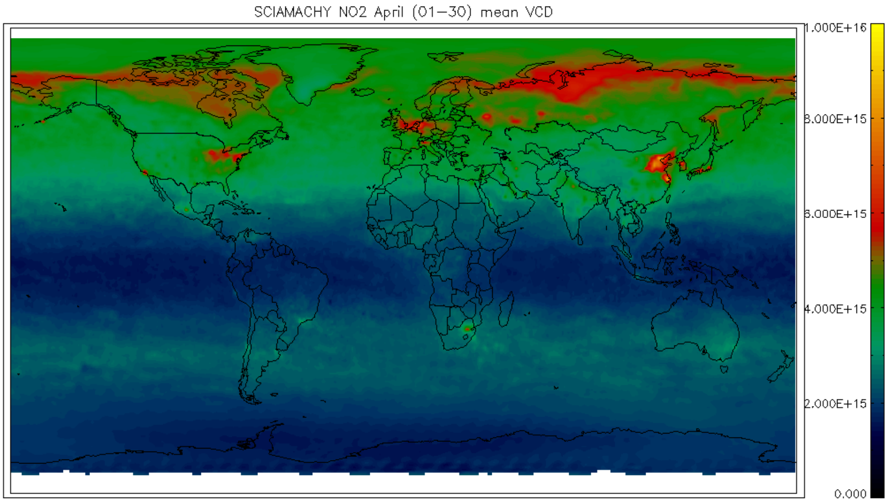

Fig. 6-6: NO_2 VCD world map 01-30 April 2005 – monthly average

7 LEVEL 2 OFFLINE PRODUCT QUALITY MONITORING

7.1 Processor Configuration

7.1.1 Version

In January 2005 the SCIAMACHY Level 2 Offline product SCI_OL__2P was released, data are generated with processor version 2.5.
The according product specification is PO-RS-MDA-GS-2009_15_3H. The disclaimer at http://envisat.esa.int/dataproducts/availability/disclaimers/SCI_OL_2P_Disclaimers.pdf describes known artefacts.
SCI_OL__2P products contain geolocated vertical column amounts of O_3, NO_2 Nadir measurements as well as stratospheric Limb profiles of O_3, NO_2.

7.1.2 Auxiliary Data Files

Input for Level 2 Offline processing is the Initialization File SCI_IN_AXNPDE20041221_112322_000000000000_000000 _000000_0000.N1, that usually is changed only in case of a processor upgrade.

7.1.3 Monitoring results

In future reports results on Limb and Nadir products will be presented here.

8 VALIDATION ACTIVITIES AND RESULTS

8.1 SCIAMACHY-ECMWF Comparisons using SCI_RV__2P

8.1.1 Summary of the ECMWF SCIAMACHY monthly report for January 2005

- SCIAMACHY data quality stable from 10 January onwards.
- Improvement on the agreement between SCIAMACHY and ECMWF ozone values.
- Decrease of the (negative) mean departures in the global means as compared to December 2004 in particular after 10 January.
- SCIAMACHY data about 10 DU lower in the global means than ECMWF ozone values after 10 January.

- Unrealistically large SCIAMACHY ozone values in the high latitudes have disappeared after the end of the decontamination activities.
- The monitoring report was produced with the operational ECMWF model, CY28R4.

The full report is available at http://earth.esa.int/pcs/envisat/tmp_calval_res/

Below see the ECMWF plot on SCIAMACHY mean observation in DU.

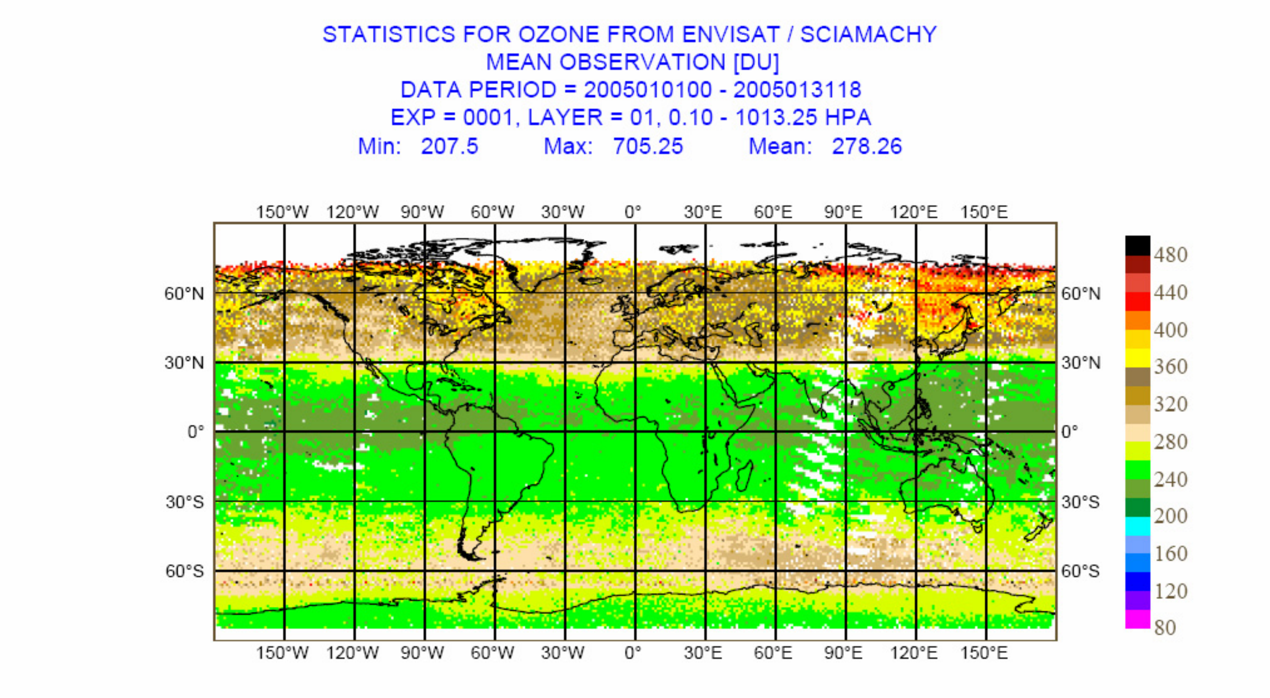

Fig. 8-1: Ozone Mean ECMWF January 2005

8.1.2 Summary of the ECMWF SCIAMACHY monthly report for February 2005

- SCIAMACHY data quality is relatively stable in February.
- SCIAMACHY data about 10 DU lower in the global mean than ECMWF ozone values.
- No SCIAMACHY data during the 0z cycles between 1 and 8 February.
- No SCIAMACHY data on 3-4 February.
- The monitoring report was produced with the operational ECMWF model, CY28R4.

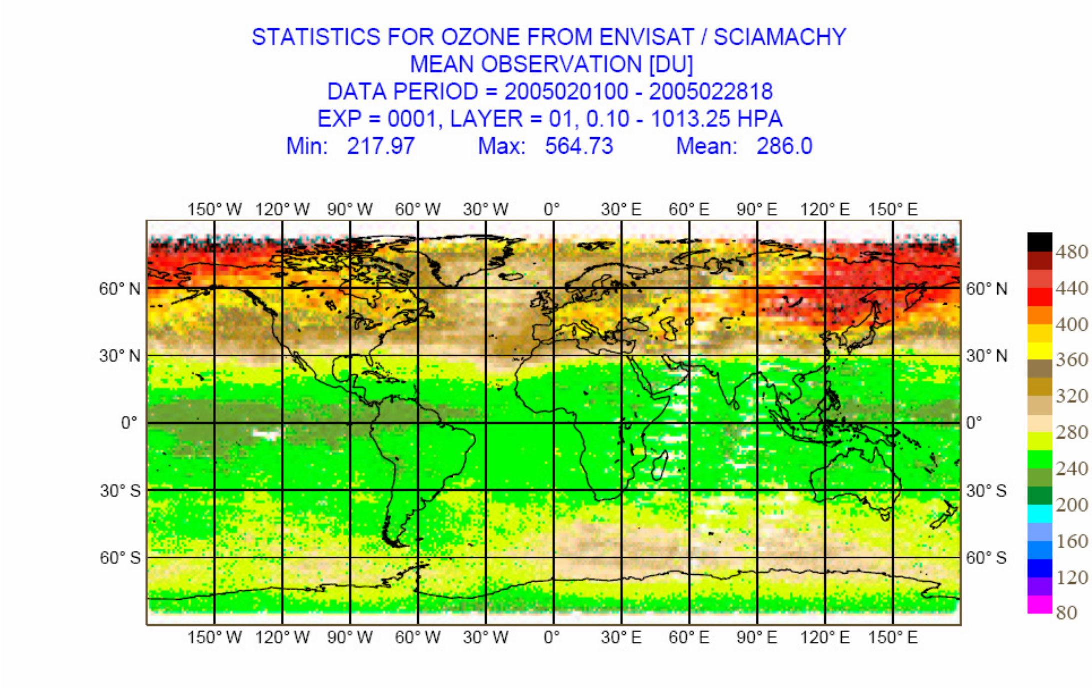

Fig. 8-2: Ozone Mean ECMWF February 2005

8.1.3 Summary of the ECMWF SCIAMACHY monthly report for March 2005

- SCIAMACHY data quality stable in March.
- SCIAMACHY data about 10 DU lower in the global mean than ECMWF ozone values.
- No SCIAMACHY data from 5 March to 6 March.
- The monitoring report was produced with the operational ECMWF model, CY28R4.

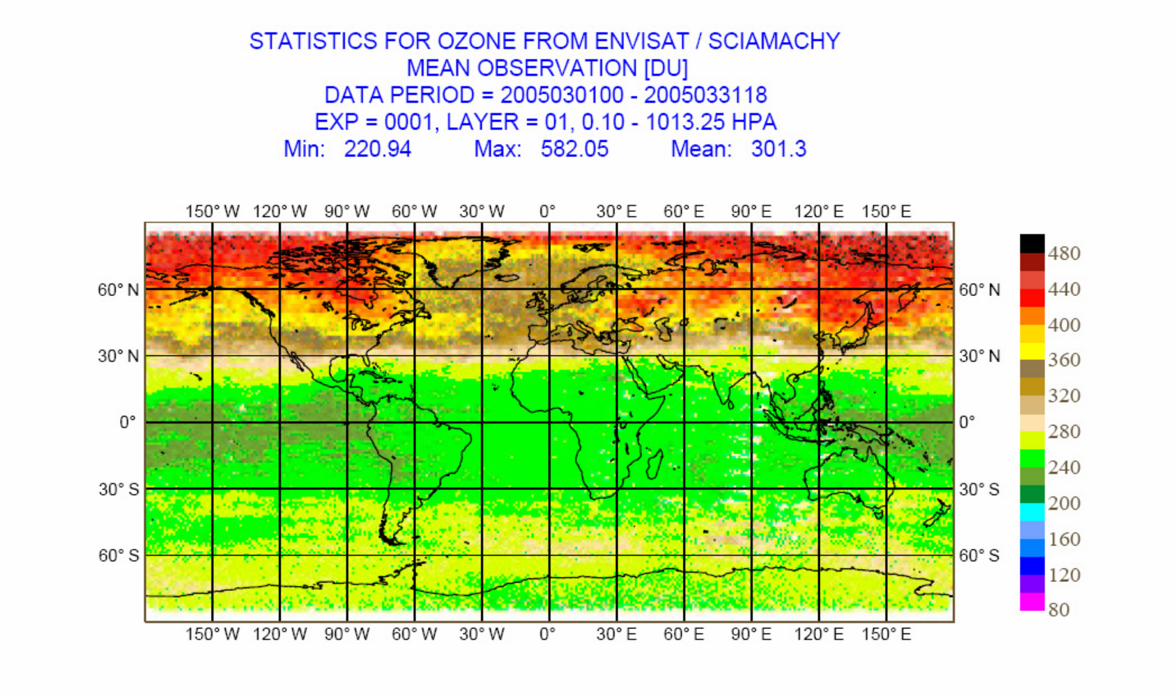

Fig. 8-3: Ozone Mean ECMWF March 2005

8.1.4 Summary of the ECMWF SCIAMACHY monthly report for April 2005

- SCIAMACHY data quality stable in April.
- SCIAMACHY data about 5 DU lower in the global mean than ECMWF ozone values.
- Decrease of the standard deviations of SCIAMACHY data at the northern high latitudes.
- On 5 April the operational ECMWF model changed from version CY28R4 to CY29R1.

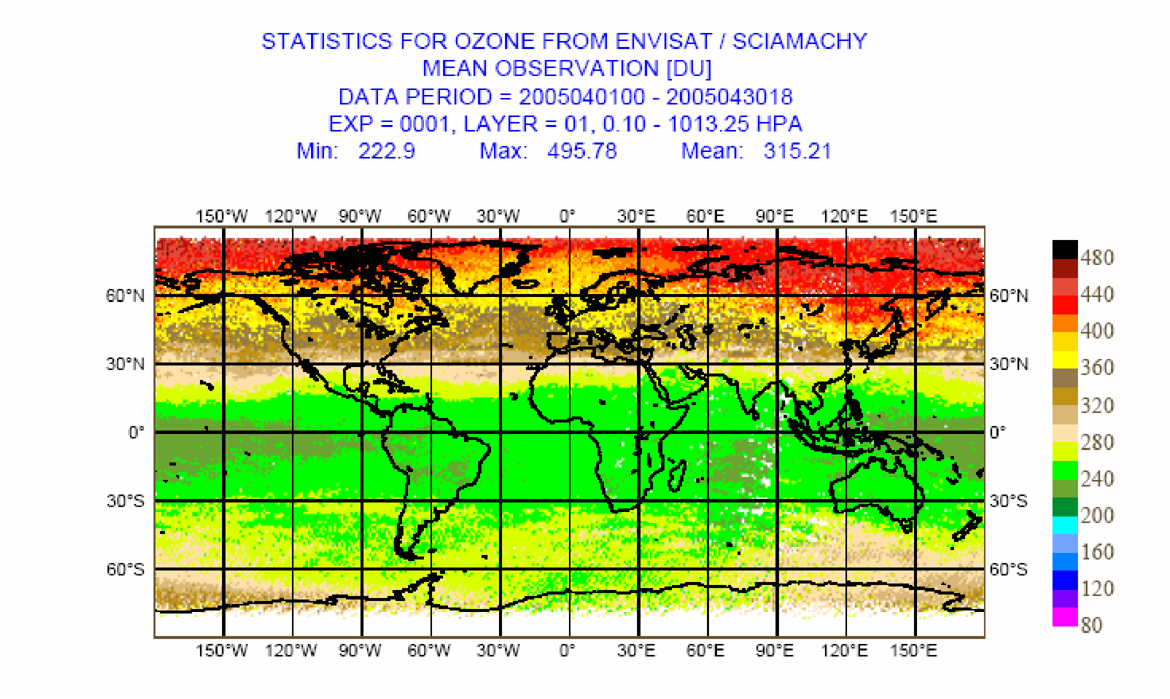

Fig. 8-4: Ozone Mean ECMWF April 2005

8.2 Statistics from Inter comparison with External Data

Future reports will contain information on this issue.

APPENDIX A

Type	ADF Name
PE1_AX	SCI_PE1_AXVIEC20050105_094321_20041216_000000_20900101_000000
	SCI_PE1_AXVIEC20050127_112836_20050123_000000_20900101_000000
SP1_AX	SCI_SP1_AXVIEC20050105_095309_20041216_000000_20050601_000000
	SCI_SP1_AXVIEC20050127_131328_20050123_000000_20050701_000000
	SCI_SP1_AXVIEC20050225_164117_20050222_000000_20050801_000000
	SCI_SP1_AXVIEC20050329_092351_20050323_000000_20050901_000000
	SCI_SP1_AXVIEC20050428_131041_20050424_000000_20051001_000000
SU1_AX	SCI_SU1_AXVIEC20050111_150656_20041226_202330_20050102_213717
	SCI_SU1_AXVIEC20050104_163519_20050101_122251_20050108_214625
	SCI_SU1_AXVIEC20050105_182647_20050102_200026_20050109_211805
	SCI_SU1_AXVIEC20050110_152100_20050106_000000_20050113_223238
	SCI_SU1_AXVIEC20050110_153129_20050107_001221_20050114_015253
	SCI_SU1_AXVIEC20050110_155300_20050103_003703_20050110_021630
	SCI_SU1_AXVIEC20050110_162420_20050104_220116_20050111_233557
	SCI_SU1_AXVIEC20050110_165841_20050105_000000_20050112_212421
	SCI_SU1_AXVIEC20050111_001456_20050108_011956_20050115_212908
	SCI_SU1_AXVIEC20050112_001754_20050109_005630_20050116_223826
	SCI_SU1_AXVIEC20050113_000800_20050110_002452_20050117_015817
	SCI_SU1_AXVIEC20050114_015601_20050111_023915_20050118_213533
	SCI_SU1_AXVIEC20050116_002447_20050113_003030_20050120_020302
	SCI_SU1_AXVIEC20050118_141813_20050114_103640_20050121_113652
	SCI_SU1_AXVIEC20050120_001219_20050117_000428_20050124_013833
	SCI_SU1_AXVIEC20050121_002240_20050118_011324_20050125_211445
	SCI_SU1_AXVIEC20050122_014832_20050119_004144_20050126_021526
	SCI_SU1_AXVIEC20050125_192434_20050121_001602_20050128_115633
	SCI_SU1_AXVIEC20050127_144457_20050115_100512_20050129_112822
	SCI_SU1_AXVIEC20050127_172108_20050124_002132_20050207_120225
	SCI_SU1_AXVIEC20050128_000730_20050125_004715_20050208_022434
	SCI_SU1_AXVIEC20050128_074916_20050112_205813_20050126_224348
	SCI_SU1_AXVIEC20050128_080020_20050116_002904_20050130_020913
	SCI_SU1_AXVIEC20050128_080903_20050120_001003_20050203_014316
	SCI_SU1_AXVIEC20050129_002143_20050126_015321_20050209_220241
	SCI_SU1_AXVIEC20050130_000634_20050127_012248_20050210_213121
	SCI_SU1_AXVIEC20050131_000656_20050128_070827_20050211_131556
	SCI_SU1_AXVIEC20050131_131754_20050122_161848_20050205_175946
	SCI_SU1_AXVIEC20050131_132758_20050123_204701_20050206_215614
	SCI_SU1_AXVIEC20050201_000511_20050129_063548_20050212_210807
	SCI_SU1_AXVIEC20050202_000822_20050130_060501_20050213_213614
	SCI_SU1_AXVIEC20050203_001106_20050131_031222_20050214_114355
	SCI_SU1_AXVIEC20050204_001729_20050201_003209_20050215_010420
	SCI_SU1_AXVIEC20050205_001059_20050202_013342_20050216_214153
	SCI_SU1_AXVIEC20050206_000743_20050203_010919_20050217_114620
	SCI_SU1_AXVIEC20050207_000858_20050204_003737_20050218_021047
	SCI_SU1_AXVIEC20050208_001329_20050205_061554_20050219_122455
	SCI_SU1_AXVIEC20050209_001149_20050206_072747_20050220_115412

	SCI_SU1_AXVIEC20050210_002800_20050207_065359_20050221_222428 SCI_SU1_AXVIEC20050211_001443_20050208_001120_20050222_014539 SCI_SU1_AXVIEC20050212_000811_20050209_012012_20050223_115804 SCI_SU1_AXVIEC20050213_000735_20050210_022021_20050224_222940 SCI_SU1_AXVIEC20050214_000712_20050211_001729_20050225_002542 SCI_SU1_AXVIEC20050215_000753_20050212_012537_20050226_120455 SCI_SU1_AXVIEC20050216_000605_20050213_005353_20050227_223517 SCI_SU1_AXVIEC20050217_001909_20050214_002209_20050228_015628 SCI_SU1_AXVIEC20050218_000623_20050215_013100_20050301_213218 SCI_SU1_AXVIEC20050219_001540_20050216_005916_20050302_224028 SCI_SU1_AXVIEC20050220_001049_20050217_002732_20050303_020258 SCI_SU1_AXVIEC20050221_000643_20050218_013129_20050304_213921 SCI_SU1_AXVIEC20050222_001646_20050219_010439_20050305_114515 SCI_SU1_AXVIEC20050223_000948_20050220_020626_20050306_221716 SCI_SU1_AXVIEC20050224_001138_20050221_013713_20050307_214530 SCI_SU1_AXVIEC20050225_001305_20050222_011001_20050308_211128 SCI_SU1_AXVIEC20050226_000821_20050223_003900_20050309_021124 SCI_SU1_AXVIEC20050227_002228_20050224_000632_20050310_014252 SCI_SU1_AXVIEC20050228_001753_20050225_022439_20050311_211646 SCI_SU1_AXVIEC20050301_001309_20050226_022413_20050312_223134 SCI_SU1_AXVIEC20050302_000440_20050227_001153_20050313_014608 SCI_SU1_AXVIEC20050303_001710_20050228_012043_20050314_120236 SCI_SU1_AXVIEC20050304_000941_20050301_052147_20050315_131130 SCI_SU1_AXVIEC20050305_001600_20050302_001757_20050316_015145 SCI_SU1_AXVIEC20050306_002409_20050303_012603_20050317_213412 SCI_SU1_AXVIEC20050307_003121_20050304_005502_20050318_020544 SCI_SU1_AXVIEC20050308_000547_20050305_063455_20050319_124531 SCI_SU1_AXVIEC20050309_002323_20050306_013123_20050320_213218 SCI_SU1_AXVIEC20050310_002544_20050307_010022_20050321_114341 SCI_SU1_AXVIEC20050312_005144_20050309_013643_20050323_213755 SCI_SU1_AXVIEC20050313_001732_20050310_035929_20050324_114932 SCI_SU1_AXVIEC20050314_000758_20050311_003356_20050325_020745 SCI_SU1_AXVIEC20050315_001218_20050312_014202_20050326_214956 SCI_SU1_AXVIEC20050316_003155_20050313_011100_20050327_211819 SCI_SU1_AXVIEC20050317_001455_20050314_004046_20050328_021322 SCI_SU1_AXVIEC20050318_002736_20050315_000813_20050329_014138 SCI_SU1_AXVIEC20050319_003306_20050316_011619_20050330_212348 SCI_SU1_AXVIEC20050320_002958_20050317_140916_20050331_223323 SCI_SU1_AXVIEC20050321_000817_20050318_001248_20050401_015250 SCI_SU1_AXVIEC20050322_000912_20050319_012054_20050402_212913 SCI_SU1_AXVIEC20050323_004846_20050320_005124_20050403_020218 SCI_SU1_AXVIEC20050324_002326_20050321_001852_20050404_015848 SCI_SU1_AXVIEC20050325_010835_20050322_012659_20050405_213611 SCI_SU1_AXVIEC20050327_001111_20050324_002413_20050407_015639 SCI_SU1_AXVIEC20050328_000755_20050325_013135_20050408_214018 SCI_SU1_AXVIEC20050329_000839_20050326_010238_20050409_114609 SCI_SU1_AXVIEC20050330_000440_20050327_050344_20050410_221930 SCI_SU1_AXVIEC20050401_001817_20050329_010850_20050412_115157 SCI_SU1_AXVIEC20050405_130625_20050308_002836_20050322_020233 SCI_SU1_AXVIEC20050405_131639_20050323_100028_20050406_114108 SCI_SU1_AXVIEC20050421_092305_20050328_203218_20050411_214822

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LK1_AX	SCI_LK1_AXVIEC20050105_183136_20050102_230433_20050110_003909 SCI_LK1_AXVIEC20050105_184343_20050103_021427_20050110_033158 SCI_LK1_AXVIEC20050105_184817_20050103_033123_20050110_051358 SCI_LK1_AXVIEC20050105_085050_20050103_051307_20050110_065455 SCI_LK1_AXVIEC20050105_185432_20050103_080012_20050110_094340 SCI_LK1_AXVIEC20050105_190037_20050103_094143_20050110_112403 SCI_LK1_AXVIEC20050110_144929_20050105_040947_20050112_055139 SCI_LK1_AXVIEC20050110_145302_20050105_073303_20050112_083912 SCI_LK1_AXVIEC20050110_145659_20050105_083728_20050112_101920 SCI_LK1_AXVIEC20050110_141850_20050107_190557_20050114_204630 SCI_LK1_AXVIEC20050110_104455_20050107_215845_20050114_234146 SCI_LK1_AXVIEC20050110_103432_20050107_234733_20050115_012206 SCI_LK1_AXVIEC20050110_111347_20050108_023243_20050115_041644 SCI_LK1_AXVIEC20050110_154602_20050108_041523_20050115_055704 SCI_LK1_AXVIEC20050110_142350_20050108_055559_20050115_070458 SCI_LK1_AXVIEC20050110_143025_20050108_070324_20050115_084450 SCI_LK1_AXVIEC20050110_144401_20050108_084304_20050115_102453

	SCI_LK1_AXVIEC20050110_151508_20050108_102340_20050115_120636
	SCI_LK1_AXVIEC20050110_152933_20050108_120415_20050115_134455
	SCI_LK1_AXVIEC20050110_153241_20050108_134259_20050115_152237
	SCI_LK1_AXVIEC20050110_153705_20050108_152117_20050115_165949
	SCI_LK1_AXVIEC20050110_164135_20050108_183844_20050115_201647
	SCI_LK1_AXVIEC20050110_160427_20050108_212731_20050115_231006
	SCI_LK1_AXVIEC20050110_161238_20050108_231554_20050116_005029
	SCI_LK1_AXVIEC20050110_162239_20050109_020212_20050116_034441
	SCI_LK1_AXVIEC20050110_162657_20050109_034343_20050116_052531
	SCI_LK1_AXVIEC20050110_164705_20050109_070346_20050116_081242
	SCI_LK1_AXVIEC20050110_165401_20050109_081124_20050116_095524
	SCI_LK1_AXVIEC20050110_165950_20050109_095351_20050116_113412
	SCI_LK1_AXVIEC20050110_170421_20050109_113235_20050116_131238
	SCI_LK1_AXVIEC20050110_170903_20050109_131119_20050116_145147
	SCI_LK1_AXVIEC20050110_171652_20050109_144937_20050116_163035
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	SCI_LK1_AXVIEC20050419_060852_20050418_112328_20050502_130309
	SCI_LK1_AXVIEC20050420_035323_20050418_161601_20050502_175550
	SCI_LK1_AXVIEC20050420_030803_20050419_062310_20050503_073201
	SCI_LK1_AXVIEC20050420_042516_20050419_073035_20050503_091322
	SCI_LK1_AXVIEC20050420_043008_20050419_091219_20050503_105214
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