
EUROPEAN SPACE AGENCY
DIRECTORATE OF TECHNICAL & OPERATIONAL SUPPORT
MISSION OPERATIONS DEPARTMENT

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OAI
No. 345
Week 18
04.05.09
Routine Phase

Prepared by: MJH. Walker (OPS-OAI) and INTEGRAL FCT

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1 General

The Flight Control Team at MOC has compiled this report with some input provided by the Flight Dynamics Team, ISOC and ISDC.

It addresses the activities from 25.04.09 until 01.05.09 (both dates inclusive) and covers the revolutions 798 and 799.

2 Summary of Activities

The operations were performed according to the planning inputs from ISOC combined with some manual commanding by MOC.

The targets of these revolutions consisted of three raster dithers of PKS B2149-307 (RA 21:51:55.52, DEC -30:27:53.7), an OMC Flat-field calibration at attitude (RA 19:57:12.00, DEC -22:36:00.0), and a hexagonal dither of the Gamma Ray Source 1915+105 (RA 21:51:55.52, DEC -30:27:53.7).

Note: Some further information concerning the activities is provided in the Appendix.

3 Satellite Status

3.1 Platform

The performance of the platform was good. No new unexpected behaviour / malfunction was identified.

3.1.1 AOCS

The AOCS operations were performed from the timeline during this period.

No slews were missed from TL, during the observation period.

The fuel consumption over the period between 25/04/2009 and 01/05/2009 was 0.1282 Kg. The remaining propellant is in the order of 134.5529 Kg.

Note: Some more information concerning the AOCS operations and the fuel budget is provided in the Appendix.

3.1.2 Power

All the other units of EPS are working nominally; available power from the arrays is of the order of 2100W.

3.1.3 Thermal

The thermal control of the satellite is working well. The temperatures are currently all within the specified operational limits.

3.1.4 OBDH

The OBDH subsystem is working flawlessly. No on-board communications problem has been identified.

The PST was over-subscribed by 3 packets, which were allocated to SPI during the Instrument window for the entire reporting period.

3.1.5 RFS

The RF subsystem is working properly. The link margin is sufficient to ensure proper TM reception and execution of commands with the ranging channel enabled.

3.2 Payload

3.2.1 SPI

The overall status of the gamma-ray spectrometer is nominal. The 13th Annealing started on 19-04-2009 at 23:56Z. Operations for this annealing are progressing nominally. The main activities were as follows:

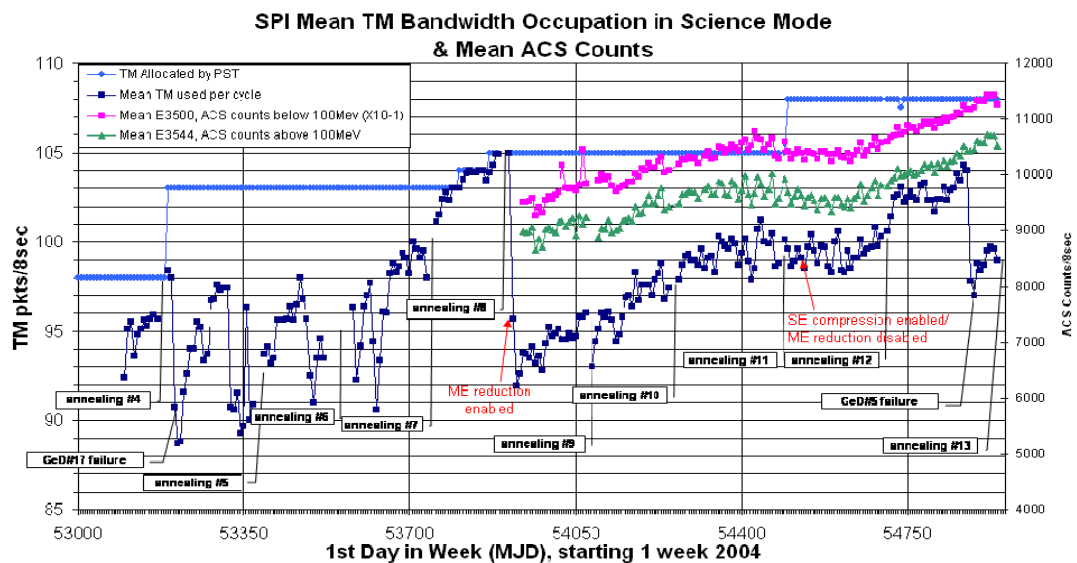
Date/Time	Activity
19/04/2009 23:56Z	Configure SPI for start of Annealing and stop SPI active cooling
20/04/2009 01:00Z	Annealing Heater Main ON
20/04/2009 03:00Z	Annealing Heater Redundant ON
20/04/2009 15:35Z	Heat Pipe Heater Main ON, All Antifreeze Heaters (1A; 2A; 1B; 2B) OFF
21/04/2009 03:35Z	Heat Pipe Heater Redundant ON
21/04/2009 12:00Z	Cold plate temperature reached 373K (100degC)

The cryo-cooler was in Standby mode during the reporting period due to the annealing.

Inline with OCR-239, on 29-04-2009 the operations to change the SPI Compressor Drive Electronics (CDE) configuration such that each CDE is powered by 2 LCLs were attempted. The first part, to test the correct status changes of LCL2 for each CDE in response to the relevant TCs was successful. However following this, during the execution of FCP_SPI1_2570, the TC E9968 sent at 14:59:16Z to switch the CDE1 internal relay position from "LCL1" to "LCL1+2" failed, with the status of this relay remaining unchanged. Execution of this procedure was stopped at this point and the cryo-cooler was returned to the nominal Standby configuration (each CDE powered by only one LCL). This was completed at 15:18:42Z. Full details of this anomaly and further investigations are given in Anomaly Report INT-SC-254.

Throughout the reporting period SPI was in CONF mode with a TM allocation of 30 packets/cycle due to the annealing.

The following plot shows the evolution of the assigned and the average occupation of the SPI TM bandwidth along with the mean ACS count rate evolution (since July 2006). As can be seen, there is a strong correlation between the evolution of the background as measured by the ACS and the overall TM bandwidth usage.



Note: Some more information concerning the SPI operations is provided in the Appendix 8.3.2.

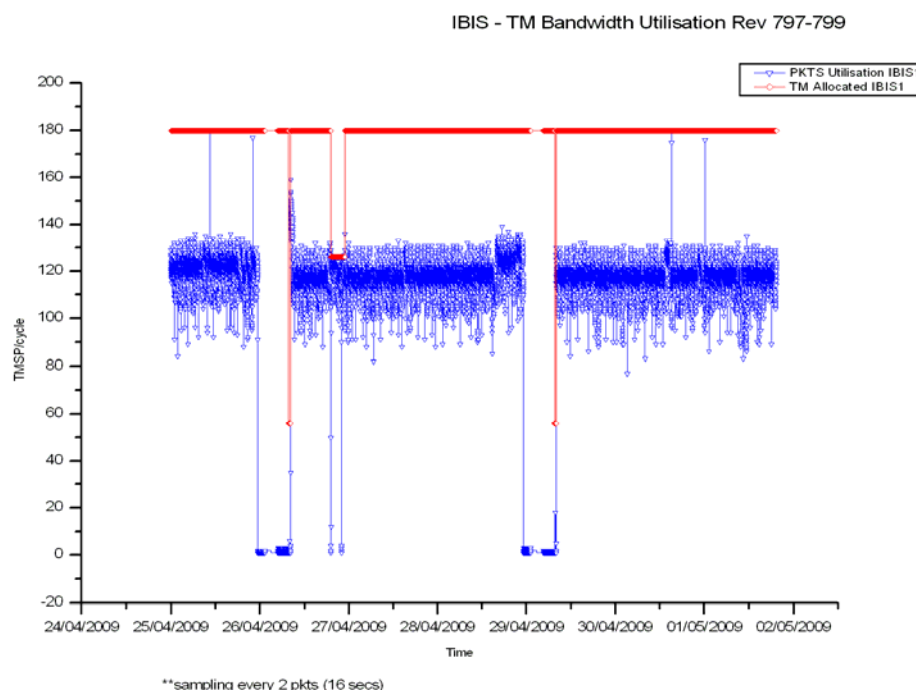
3.2.2 IBIS

The overall status of the unit is nominal.

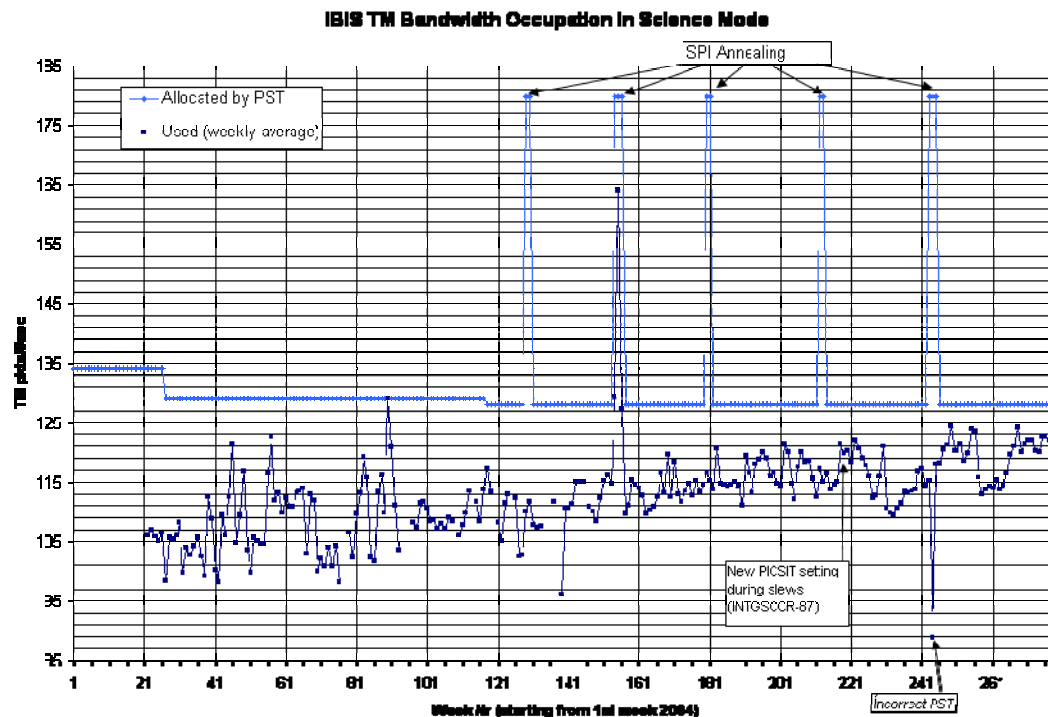
During the reporting period, the TM bandwidth statistics were as follows:

- PST allocation to IBIS above radiation belts: 180 packets/cycle
- IBIS mean bandwidth utilisation in science mode: 117.98 packets/cycle (up 0.35 on previous week)
- Percentage of TM cycles for which bandwidth usage was ≥ 128 packets/cycle: 3.86%

The plot below shows the IBIS TM utilisation during the reporting period.



A plot of the IBIS weekly bandwidth utilisation since 2004 is shown below:



Note: Some more information concerning the IBIS operations is provided in the Appendix.

3.2.3 JEM-X

The status of both JEM-X units is nominal.

JEM-X operations were performed by the automatic Timeline.

JEM-X 1&2 were operated in Data Taking mode with a TM allocation of 15 packets/cycle each.

Note: Some more information concerning the JEM-X operations is provided in the Appendix Section 8.3.4.

3.2.4 OMC

The status of OMC is nominal.

OMC operations were performed by the automatic Timeline. OMC was operated in Science Normal mode during science observations, with a TM allocation of 9 packets per cycle, except from 2009-04-26T19:14:28Z to 2009-04-26T23:02:00Z during the Flat-Field calibration, when the allocation was 63 packets/cycle.

During this reporting period, all of the 147 planned science pointings were executed nominally.

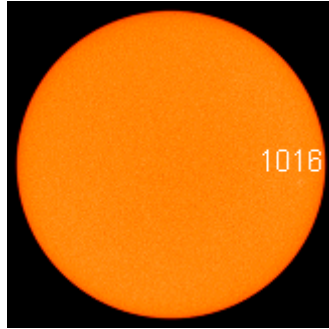
Note: Some more information concerning the OMC operations is provided in the Appendix.

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by low solar activity. The sun was blank at the beginning of the week, on the 28th April, a small new spot appeared, which remained until the end of the week. The risk of solar flares was very low.



Reference: www.spaceweather.com

Note: Some more information concerning the IREM operations is provided in the Appendix Section 8.3.6.

4 Ground Facilities

The Operational ground facilities performance was good this week. The overall performance was over the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was good this week. No slews were missed from TL, during the observation period. During the reporting period six restarts of the IFRD and ISDS tasks on the isdsb machine were required. The reason is not known.

4.2 Ground Stations & Network

The performance of the ground stations and Network was good this week. On DoY 118 28/04/2009 at 02:21z bad frames from REDU were reported. There was no impact.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

New PSFs have been received for revolutions 683 and 684.

Observations have been planned for revolutions 679 to 683.

Revolutions 678 and 679 were re-planned at short notice, the former while the revolution was ongoing due to an urgent TOO on the flaring BL Lac object Mrk 421, which reached flux levels of several Crab at ultrahigh energies.

New TSFs have been received for revolutions 678 and 679.

2. Observation status

New ECS files have been received for revolutions 659 and 667 to 670.

3. ISOC Science Data Archive

No news.

4. ISOC system

V19.1 is still in preparation. A major effort went into the investigation of file transfer problems, see below.

5. Problems

File transfer to MOC and ISDC is not working correctly at the time of writing. The exact reason is being traced currently, but is apparently not in IFTS, instead it seems to be a problem in FTP setup (under control of OPS-E).

4.3.2 ISDC

Status of ISDC observation processing on 01/05/2009:

- Latest Standard Analysis completed: observation 06200210012 (GRS 1915+105, Revolutions 788) on 01/05/2009.
- Latest products archived: observation 06200220001 (Eta Carinae, Revolutions 781, 783 & 785) on 20/04/2009.
- Latest observation products sent to the observer: observation 06200220001 (Eta Carinae, Revolutions 781, 783 & 785) on 22/04/2009.

5 Special Events

6 Anomalies

The following anomaly report was entered into the ARTS system this week.

AR id	Date Created	Subject	Segment	Status
INT_SC-254	2009-04-30	SPI CDE: Failure of TC E9968 to switch CDE1 internal relay position	Payload	Pending

7 Future Milestones

The 13th annealing operations started on 19th April at radiation belt entry of revolution 795. Below is the summary timeline of the planned annealing activities:

13th SPI ANNEALING - revs 795-803				
ID	Task Name	Duration	Start	Resource Names
2	Start SPI Annealing - Warm-up Phase	35.95 hrs	19 Apr 23:40	PST[20 pkts]
17	Annealing at 104degC	260 hrs	21 Apr 11:37	PST[20 pkts]
32	Stop SPI Annealing - Passive Cooling Phase	96.2 hrs	02 May 07:37	PST[20 pkts]
37	ACS Calibration	40.2 hrs	02 May 07:37	PST[20 pkts]
40	Start Cryocoolers - Active Cooling Phase	82 hrs	05 May 12:49	PST[20 pkts]
56	Start Cryocoolers - Active Cooling Phase (cont.)	59.5 hrs	08 May 22:49	PST[20 pkts]
62	Camera Switch on & Performance Tests	27.2 hrs?	09 May 18:19	PST[108 pkts]
63	Resume SPI POS Observations	63 hrs	11 May 06:30	PST[108 pkts]
65	Active Cooling Fine Tuning	59 hrs	11 May 10:19	PST[108 pkts]

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 798

The observations in revolution 798 began with a raster dither of PKS B2149-307 (RA 21:51:55.52, DEC -30:27:53.7), lasting ~10.2 hours. They continued with an OMC Flat-field calibration at attitude (RA 19:57:12.00, DEC -22:36:00.0), lasting ~3.4 hours. After this, a return to the raster dither of PKS B2149-307 (RA 21:51:55.52, DEC -30:27:53.7), lasting ~38.9 hours was performed. Finally a hexagonal dither of the Gamma Ray Source 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), lasting ~5.6 hours was performed until the end of the revolution.

Revolution 799

The observations in revolution 799 consisted entirely of a raster dither of PKS B2149-307 (RA 21:51:55.52, DEC -30:27:53.7), lasting ~59.3 hours.

Throughout these observations all instruments were in their nominal science modes, except SPI, which was being annealed. The TM allocation was IBIS 180; SPI 30; JEM-X1 15; JEM-X2 15; OMC 9, except from 2009-04-26T19:14:28Z to 2009-04-26T23:02:00Z, during the OMC Flat-Field calibration, when it was IBIS 126; SPI 30; JEM-X1 15; JEM-X2 15; OMC 63.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2009-04-11T06:54:49.000Z	134.9259	F	Automatic TM processing.
2009-04-11T16:09:54.000Z	134.8928	F	Automatic TM processing.
2009-04-14T01:46:16.000Z	134.8664	F	Automatic TM processing.
2009-04-14T06:13:28.000Z	134.8509	F	Automatic TM processing.
2009-04-15T15:30:20.000Z	134.8203	F	Automatic TM processing.
2009-04-17T06:03:04.000Z	134.8038	F	Automatic TM processing.
2009-04-18T08:04:35.000Z	134.7550	F	Automatic TM processing.
2009-04-20T05:53:04.000Z	134.7370	F	Automatic TM processing.
2009-04-21T15:14:04.000Z	134.7022	F	Automatic TM processing.
2009-04-23T05:40:48.000Z	134.6811	F	Automatic TM processing.
2009-04-24T14:54:44.000Z	134.6421	F	Automatic TM processing.
2009-04-26T05:25:45.000Z	134.6294	F	Automatic TM processing.
2009-04-27T15:28:28.000Z	134.5902	F	Automatic TM processing.
2009-04-29T05:09:36.000Z	134.5749	F	Automatic TM processing.
2009-04-30T14:55:00.000Z	134.5529	F	Automatic TM processing.

This report was generated Fri May 1 08:00:33 GMT 2009

8.3 Detailed Satellite Information

This section contains some detailed information concerning the various subsystems of the satellite and instruments.

8.3.1 AOCS SUMMARY OPERATIONS REPORT, 25/04/2009 – 01/05/2009

The AOCS operations were executed from the Automatic Timeline.

During this period, 99 Open Loop Slews, 60 Closed Loop Slews and 4 Momentum Biases were executed (as reported by ACC OEM).

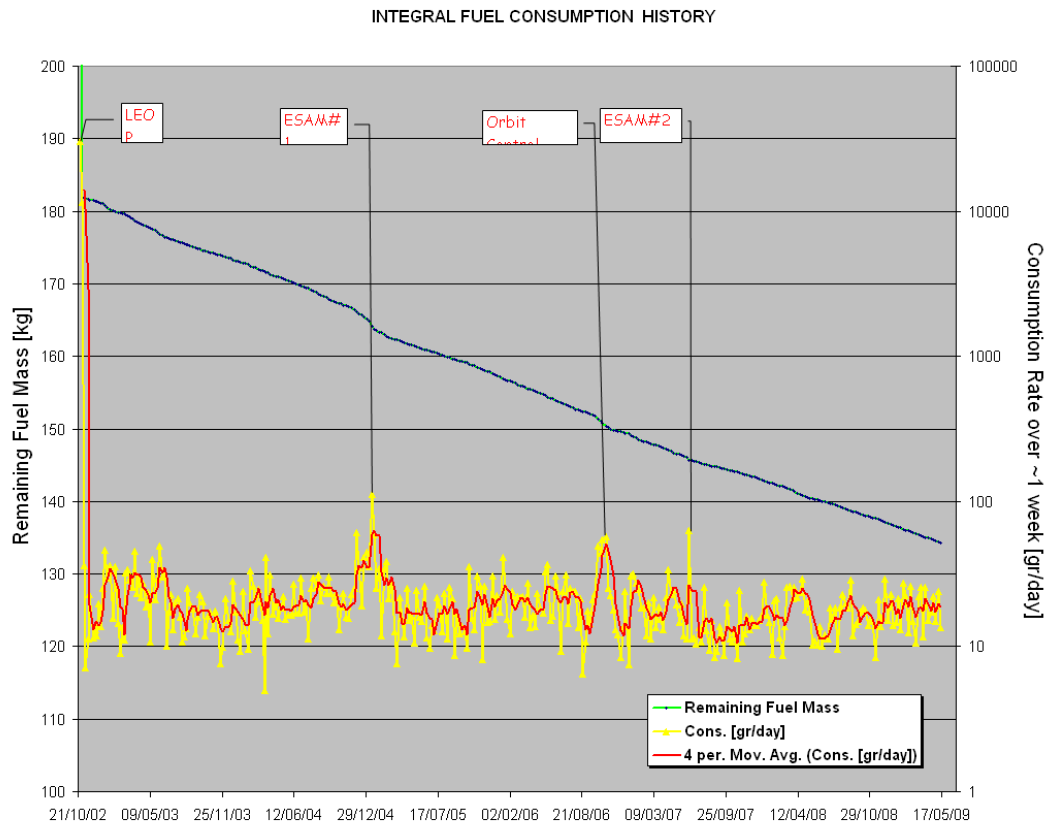
No slews were missed from TL, during the observation period.

Orbit Control

No update.

Fuel consumption

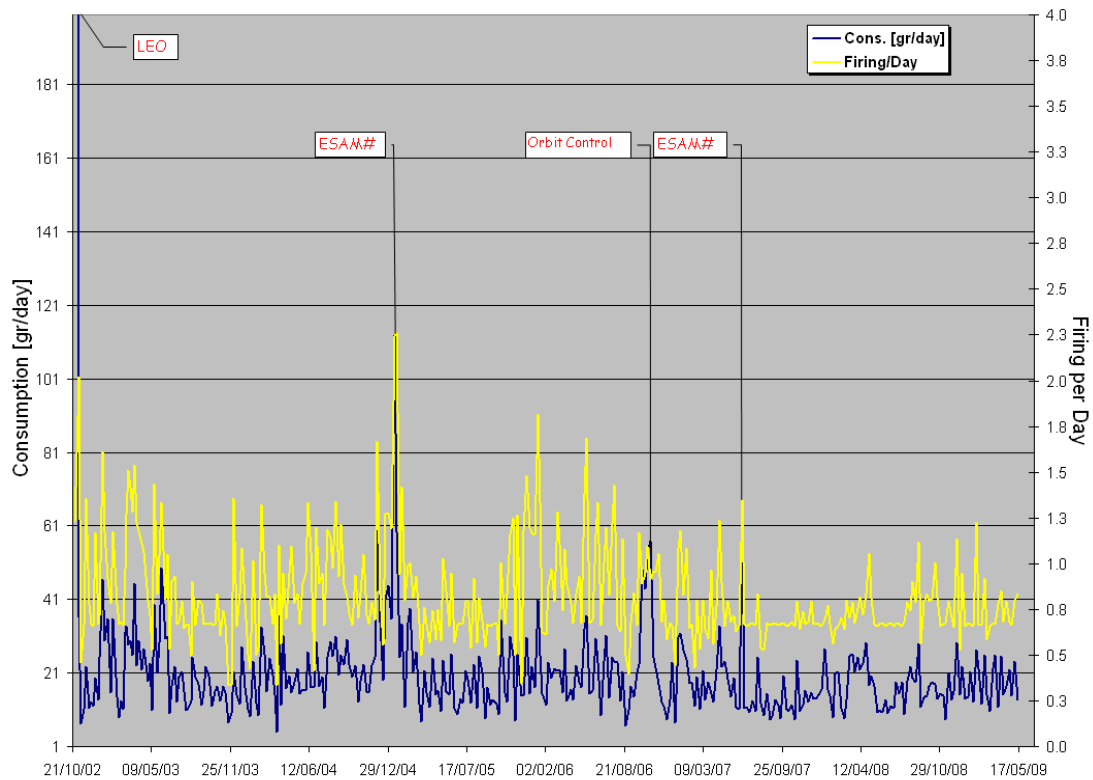
The fuel consumption (total, grams per day) over the period between 01/11/2002 and 01/05/2009 is reported in the plot below.



The above plot considers the ESAM fuel consumption spread over period of ~1 week.

The firing per day over the period between 01/11/2002 and 01/05/2009 is reported in the plot below.

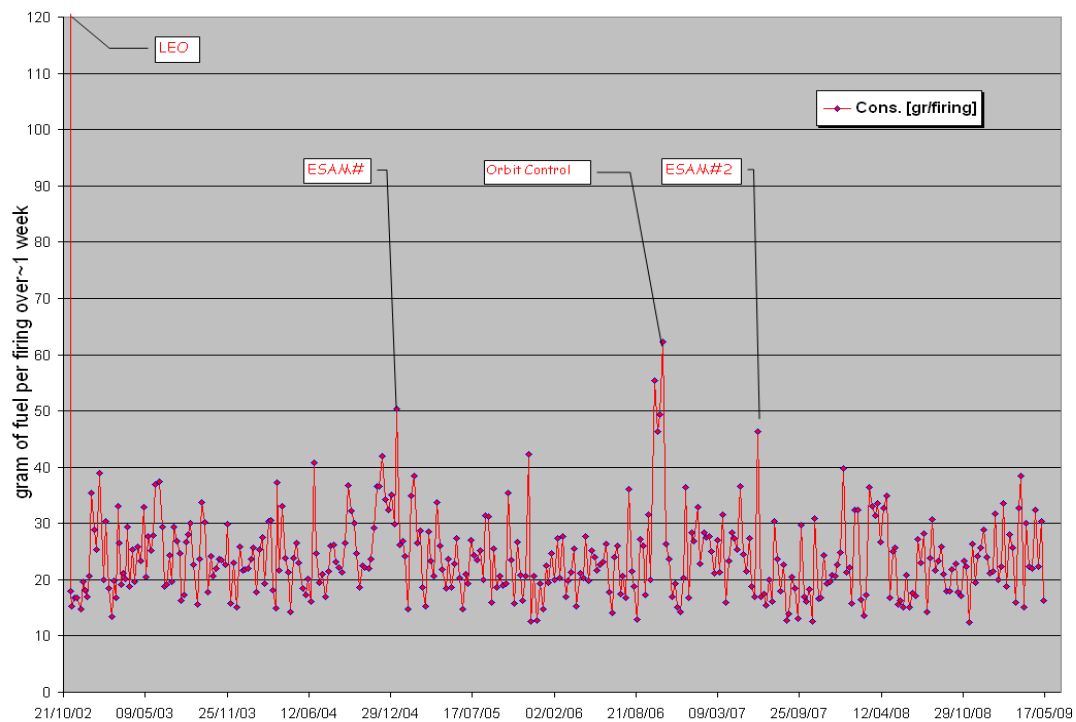
INTEGRAL FIRING PER DAY HISTORY



The above plot considers the ESAM fuel consumption spread over period of ~1 week.

The fuel per firing over the period between 01/11/2002 and 01/05/2009 is shown in the plot below.

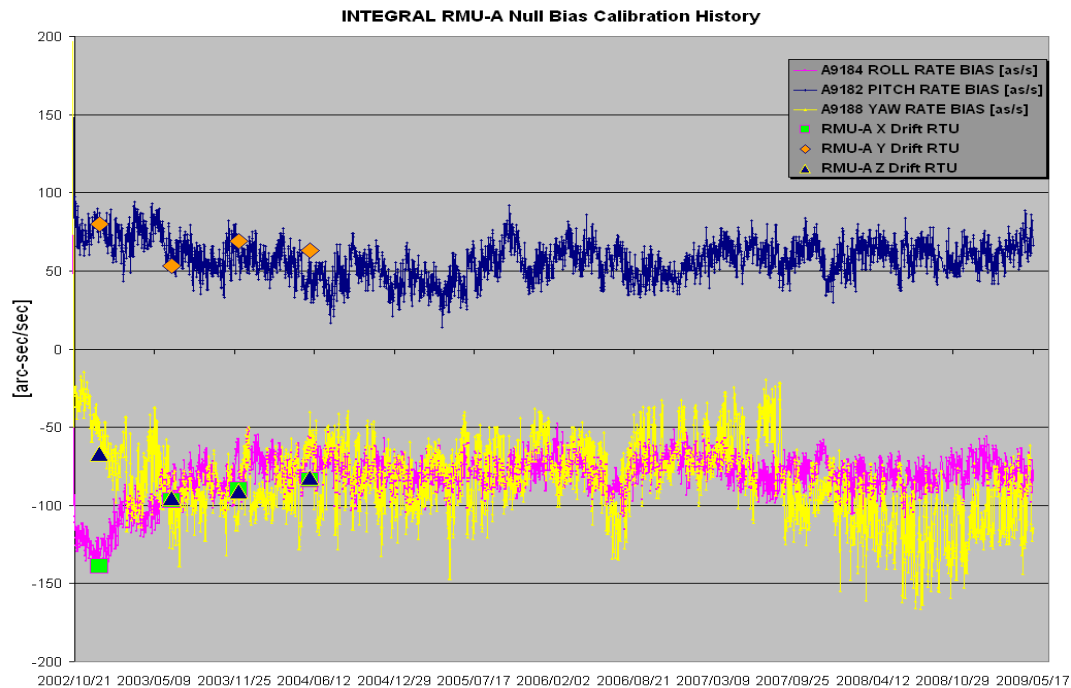
INTEGRAL FUEL MASS PER FIRING HISTORY



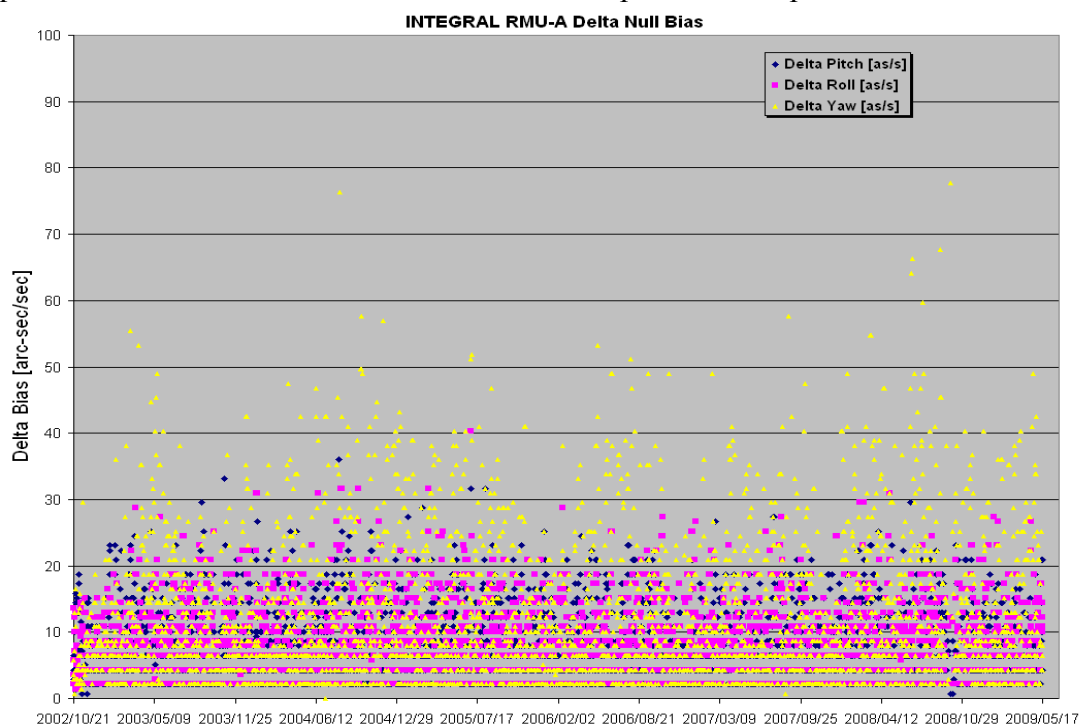
The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 01/05/2009 is reported in the plot below.

The evolution of the drift on yaw channel is under constant monitoring but the values are still well within the specs. At moment the current constraints (for drift update generation) on the FDS have been relaxed to cope with the current situation.



The RMU-A delta null bias calibration history, on pitch, roll and yaw channel over period between 01/11/2002 and 01/05/2009 is reported in the plot below.



25/04/2009 (Day of Year 115, Revolution 797)

Nothing to report.

26/04/2009 (Day of Year 116, Revolution 797-798)

Nothing to report.

27/04/2009 (Day of Year 117, Revolution 798)

Nothing to report.

28/04/2009 (Day of Year 118, Revolution 798)

Nothing to report.

29/04/2009 (Day of Year 119, Revolution 798-799)

Nothing to report.

30/04/2009 (Day of Year 120, Revolution 799)

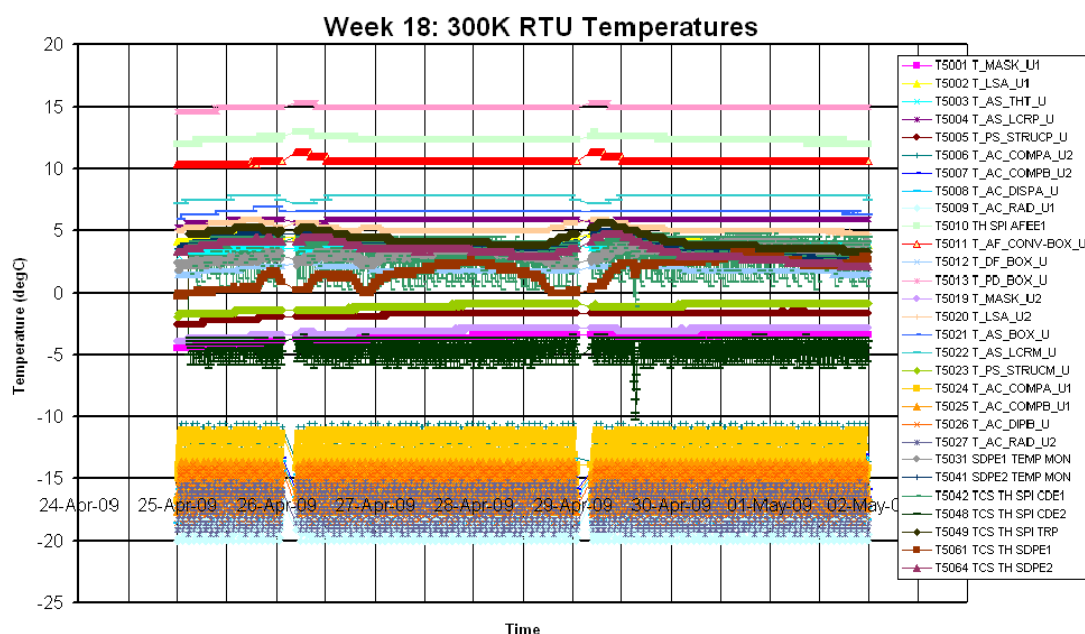
Nothing to report.

01/05/2009 (Day of Year 121, Revolution 799)

Nothing to report.

8.3.2 SPI Operations

Unit Temperatures: All the equipment temperatures are inside the operational limits. The following plot shows their evolution during the reporting period.



Stirling Compressors and Cryostat:

The cryocooler was in Standby mode throughout the reporting period due to the ongoing annealing operations.

As reported in Section 3.2.1, an anomaly occurred on 29-04-2009, during the operations to implement OCR-239 to change the SPI Compressor Drive Electronics (CDE) configuration such that each CDE is powered by 2 LCLs.

The operations started at 14:47:02Z and the first part, to test the correct status changes of LCL2 for each CDE in response to the relevant TCs was successful:

P3300	CDE2 LCL2 OFF	2009.119.14.50.35
P3301	CDE2 LCL2 ON	2009.119.14.50.03
P3060	CDE1 LCL2 OFF	2009.119.14.47.31
P3061	CDE1 LCL2 ON	2009.119.14.47.02

The CDEs were then switched off (all LCLs OPEN):

P3300	CDE2 LCL2 OFF	ES2520	2009.119.14.54.29
P3270	CDE2 LCL1 OFF	ES2520	2009.119.14.53.59
P3060	CDE1 LCL2 OFF	ES2520	2009.119.14.53.30
P3030	CDE1 LCL1 OFF	ES2520	2009.119.14.53.12

Following this, during the execution of FCP_SPI1_2570, the TC E9968 sent at 14:59:16Z to switch the CDE1 internal relay position from "LCL1" to "LCL1+2" failed, with the status of this relay remaining unchanged. The execution of this procedure at this point was stopped and the cryo-cooler returned to the nominal Standby configuration (each CDE powered by only one LCL). This was completed at 15:18:42Z.

The following points were then verified:

1) The correct encoding of the TCs for the CDE relay status This was verified in cooperation with Alenia.

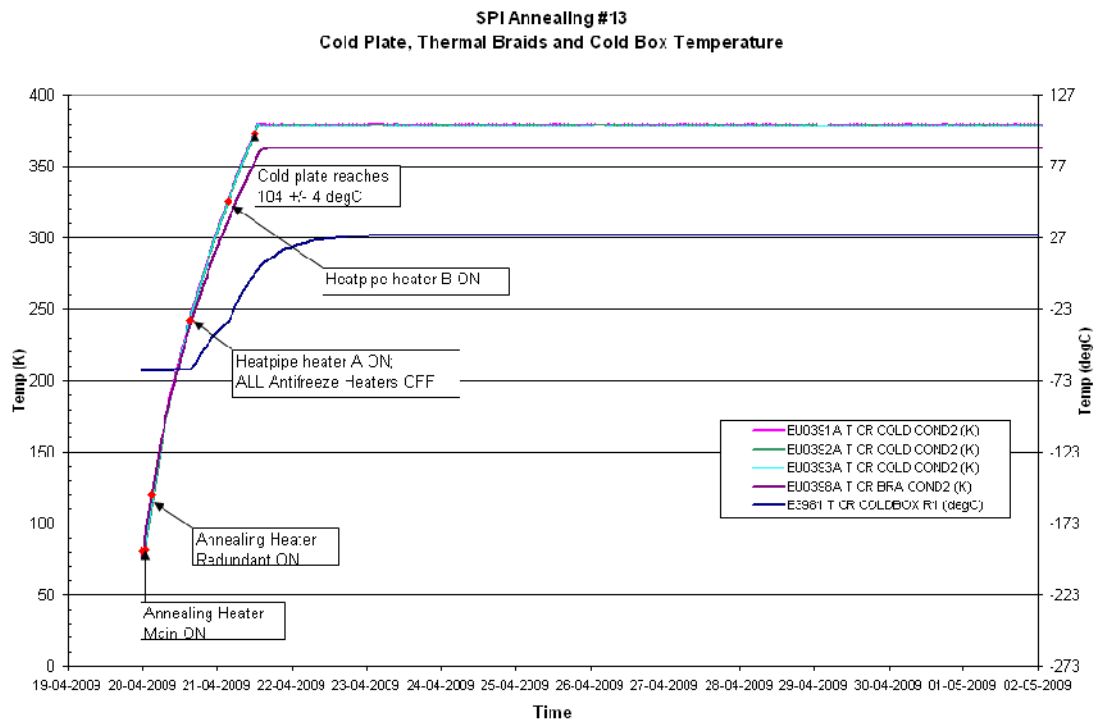
2) The representation of the relay status in TM (status line) As the CDE relays were in the "LCL1+2" position during launch, a TM retrieval was made from launch and confirmed that the status was correctly represented in TM at that time. Also, the relay status is correctly reported when the LCLs are OPEN:

2002.290.16.49.31.054628	F9970 1	LCL 1+2
2002.290.16.49.31.054628	F9990 1	LCL 1+2
2002.290.16.49.32.050631	P1160 0	OPEN
2002.290.16.49.32.050631	P1161 0	OPEN
2002.290.16.49.32.050631	P1162 0	OPEN
2002.290.16.49.32.050631	P1163 0	OPEN
2002.290.16.49.32.054631	F9970 0	LCL 1
2002.290.16.49.32.054631	F9990 1	LCL 1+2
2002.290.16.49.33.050636	P1160 0	OPEN
2002.290.16.49.33.050636	P1161 0	OPEN
2002.290.16.49.33.050636	P1162 0	OPEN
2002.290.16.49.33.050636	P1163 0	OPEN

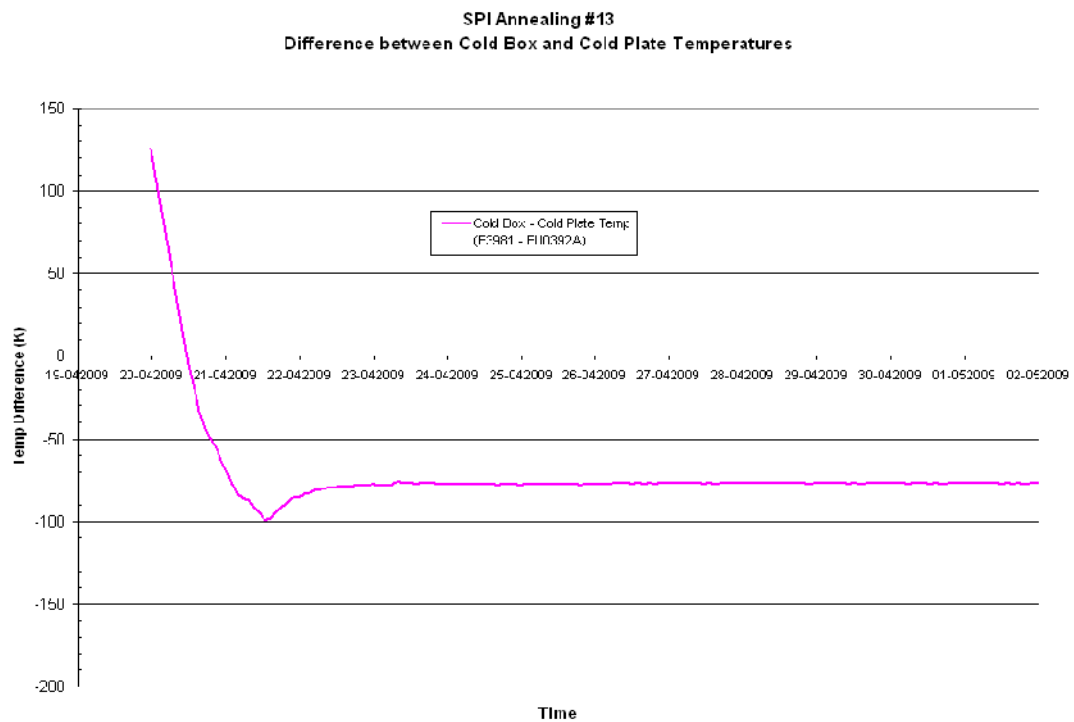
3) Previous tests of this configuration on ground: According to SVT plans and reports, the backup CDE1 mode, including the TC E9968 was tested during SVT-E.

Following consultation with TAS-I, the PI and previous Integral Project team, there was a strong recommendation to abandon the implementation of this OCR until further investigations have been performed such that the failure is better understood. If required, and considered safe, a further attempt to implement this OCR could be made during the next Annealing. This, along with further details of the investigations is recorded in Anomaly Report INT_SC-254.

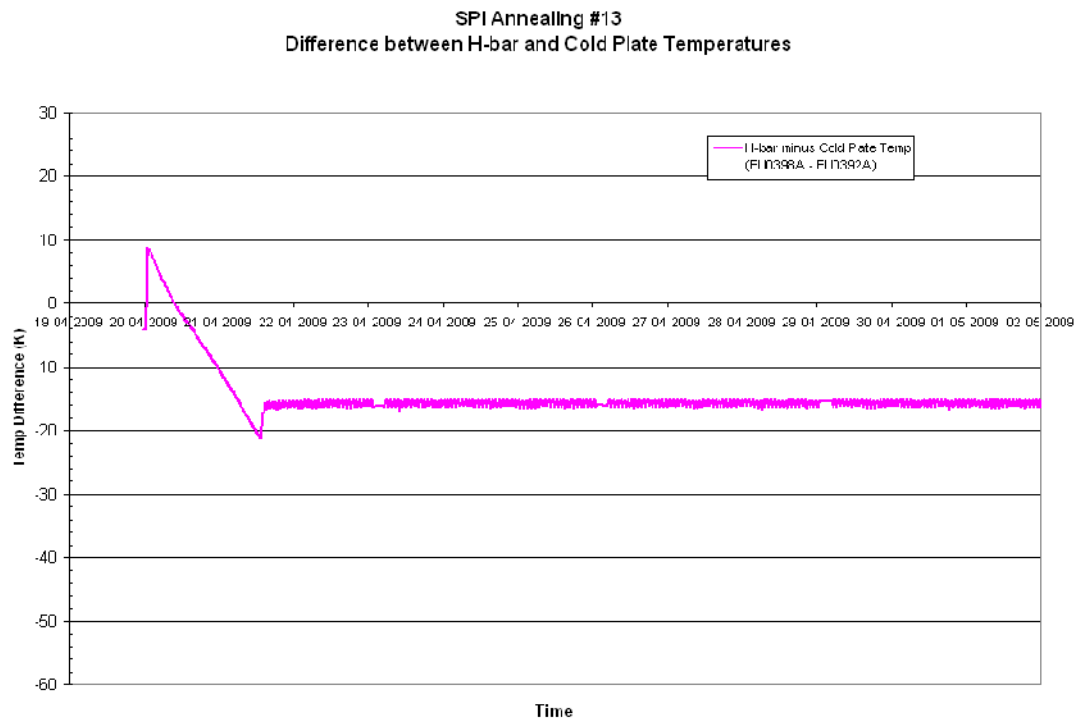
The following plot shows the evolution of the Cold Plate, Thermal Braids and Cold Box temperatures since the start of annealing:



The following plot shows the difference between the Cold Box and Cold Plate temperatures since the start of annealing:



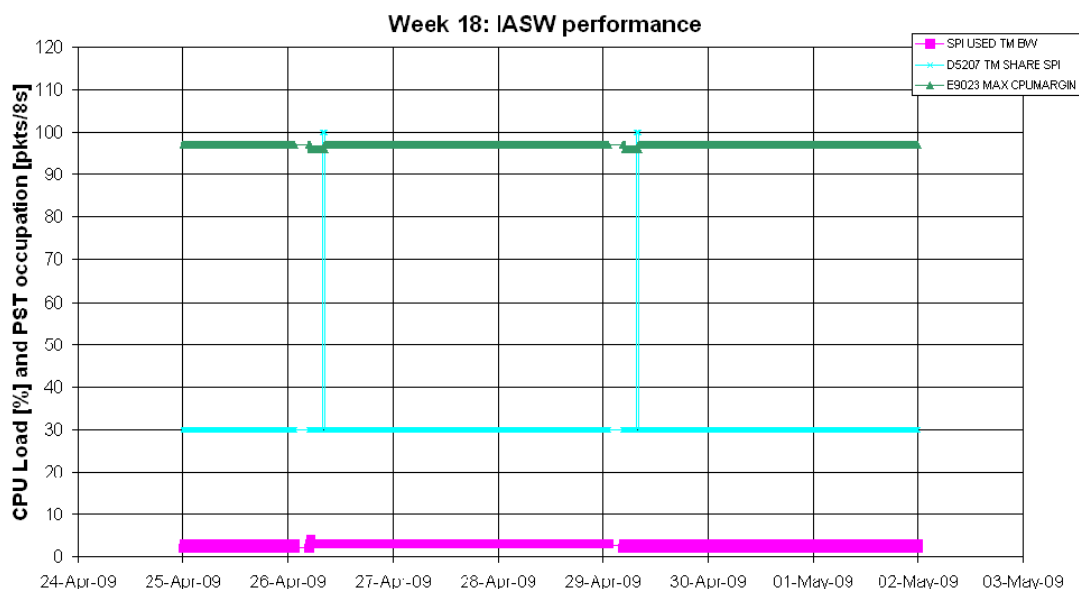
The following plot shows the difference between the H-bar and Cold Plate temperatures since the start of annealing:



DPE & IASW: The DPE health and IASW performance are nominal.

The IASW version installed is v4.3.4 with SE compression only enabled and the spectra scaling factor set to 8/19 SE. Due to the annealing operations, SPI was in CONF mode with a TM allocation of 30 packets/cycle.

The following plot shows the IASW performance in terms of TM bandwidth occupation and DPE CPU load during the reporting period.

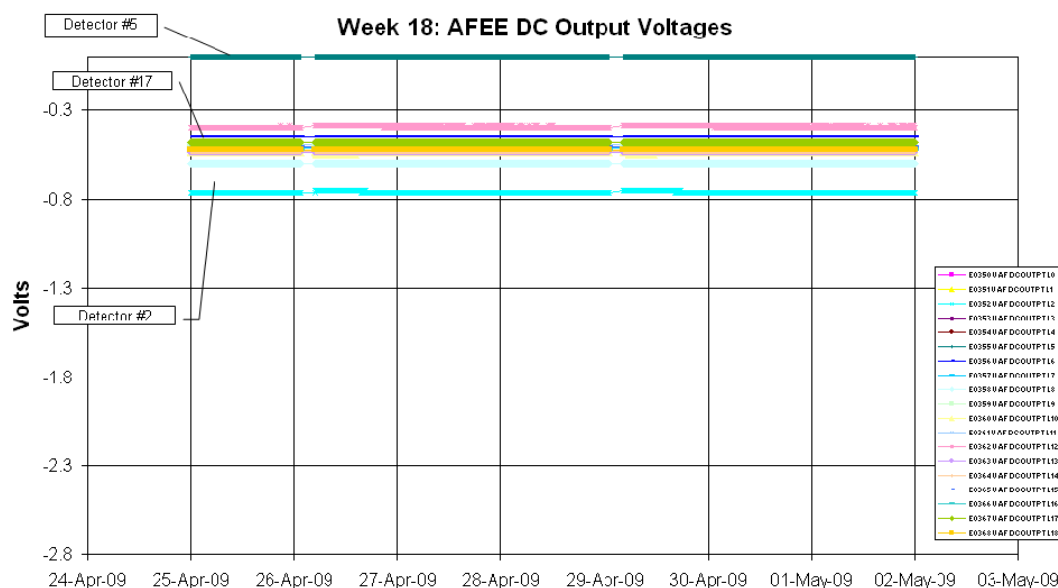


ACS: The performance of the ACS is nominal, except for FEE #81 which remains nominally switched off since the anomaly on 29/10/2006 (INT_SC-162) and FEE #57 which is nominally OFF due to the anomaly on 5/8/2003 (INT_SC-61).

For the 13th annealing operations, which started on 19/04/2009, the ACS High Voltages were set to the minimum voltage (~980V) and the ACS was in CONF mode.

AFEE: The health of the AFEE is nominal. The following plot shows the dc output voltage of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06/12/2003; detector #17 is failed since 17/07/2004 and detector #5 is failed since 19/02/2009. The HV of the failed detectors are nominally set to 0.5kV.

For the 13th annealing operations, which started on 19/04/2009, all detector HVPSSs were switched off and only the LVPSs are left on and the AFEE was in CONF mode.



DFEE: The health of the unit is nominal. For the 13th annealing operations, which started on 19/04/2009, the DFEE was in CONF mode.

PSD: The health of the unit is nominal. For the 13th annealing operations, which started on 19/04/2009, the PSD was in CONF mode.

Event Log:

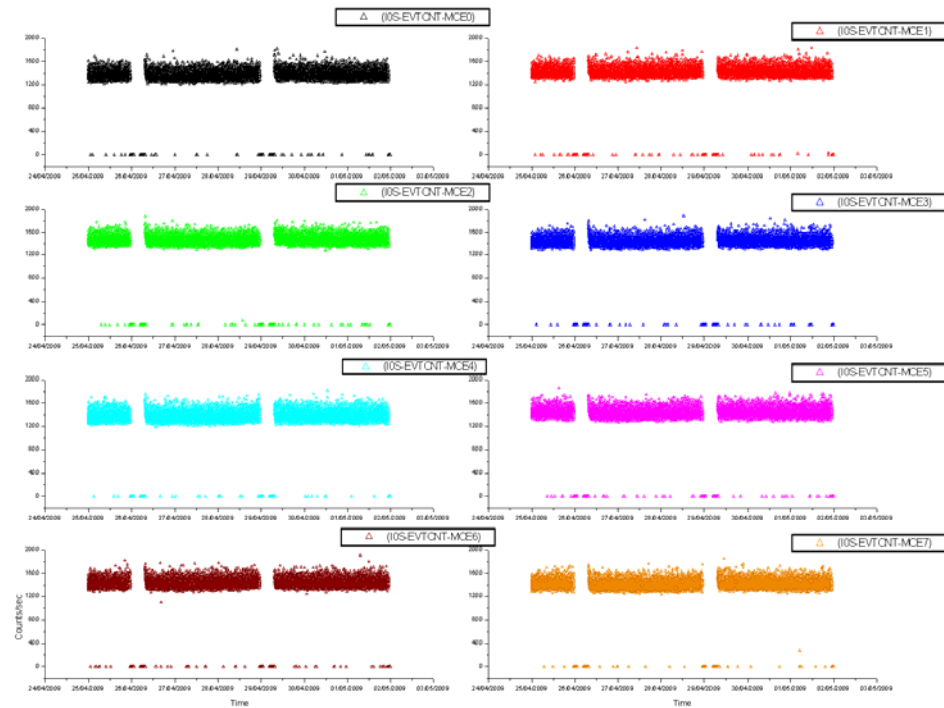
Other than the cryocooler anomaly INT_SC-254 described above, no non-nominal events occurred with SPI during the reporting period.

8.3.3 IBIS Operations

IBIS Event Counters Plots

ISGRI Counters:

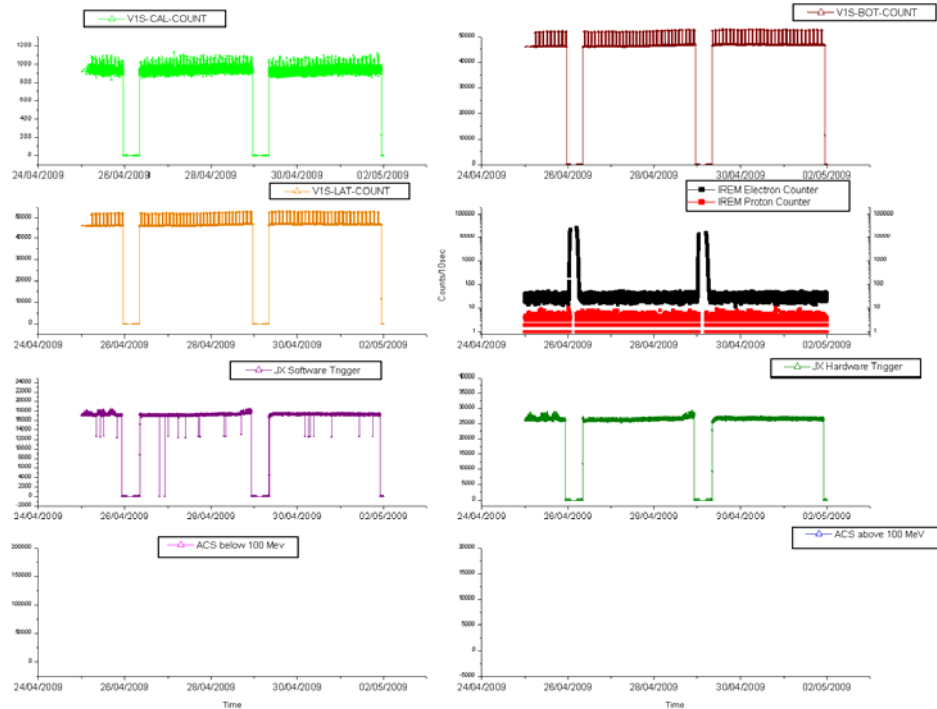
IBIS - ISGRI Counters Rev 797-799



**sampling every 4 pkts (32 secs)

VETO vs Payload Counters:

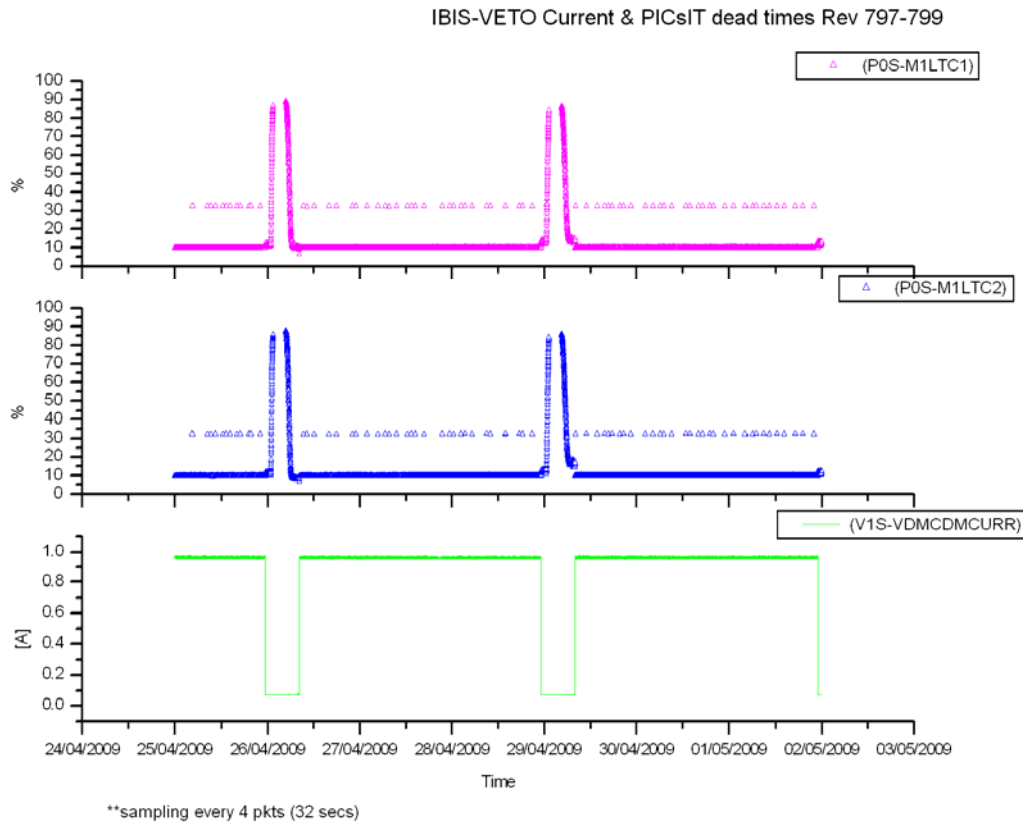
IBIS-VETO vs Payloads Counters Rev 797-799



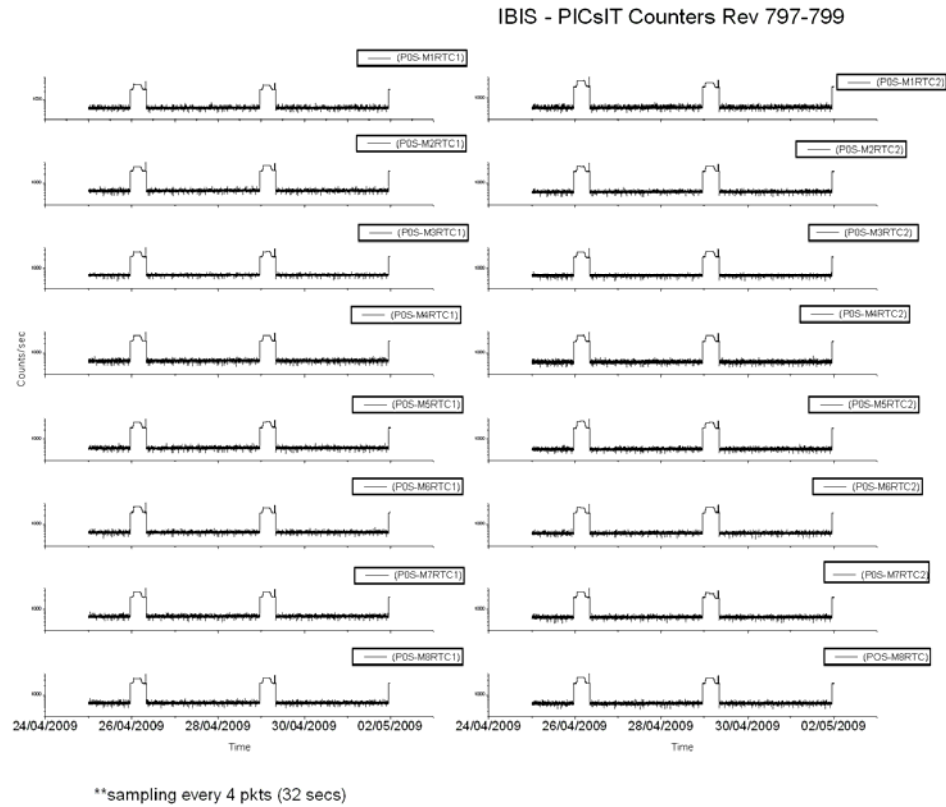
**with the exception of IREM counters (counts/10sec), all the plots are reporting counts/sec sampling every 5 pkts (40 sec)

The background radiation level was low during the week.

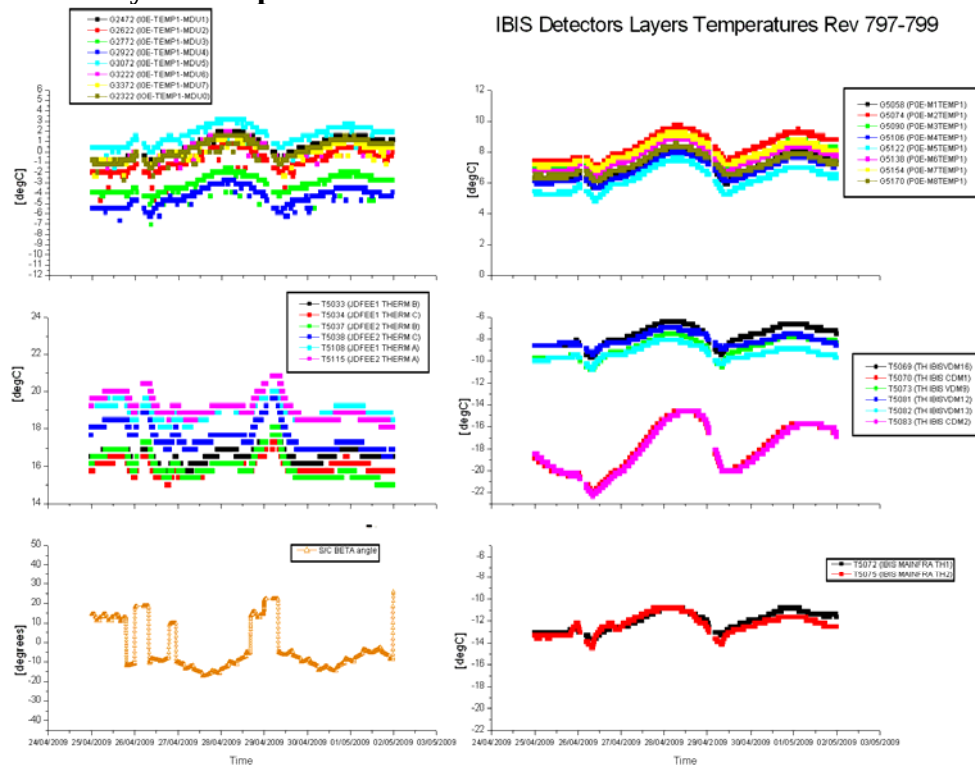
VETO Current:



PICsIT Counters:



IBIS Detectors Layers Temperatures:



**sampling every 8 pkts (64 secs)

IBIS daily report:

The usual Out Of Limits on TM parameter G8015 (S1E-A2_PMT_V), G5002 (P0S-Mi_RTC1) and G5003 (P0S-Mi_RTC2) families and G2000 family (I0E-OVFWPXADD-Mi) were received during the radiation belt passages.

2009-04-25 (DOY 115, Rev 797) to 2009-04-26 (DOY 116, Rev 797-798)

IBIS operations executed nominally.

2009-04-27 (DOY 117, Rev 798)

At 23:26:33Z TM parameters G6062 and G6063 (VETO bottom and lateral counters respectively) went OOL Warning High. As they returned within limits of their own accord at 23:26:41Z, no action was taken.

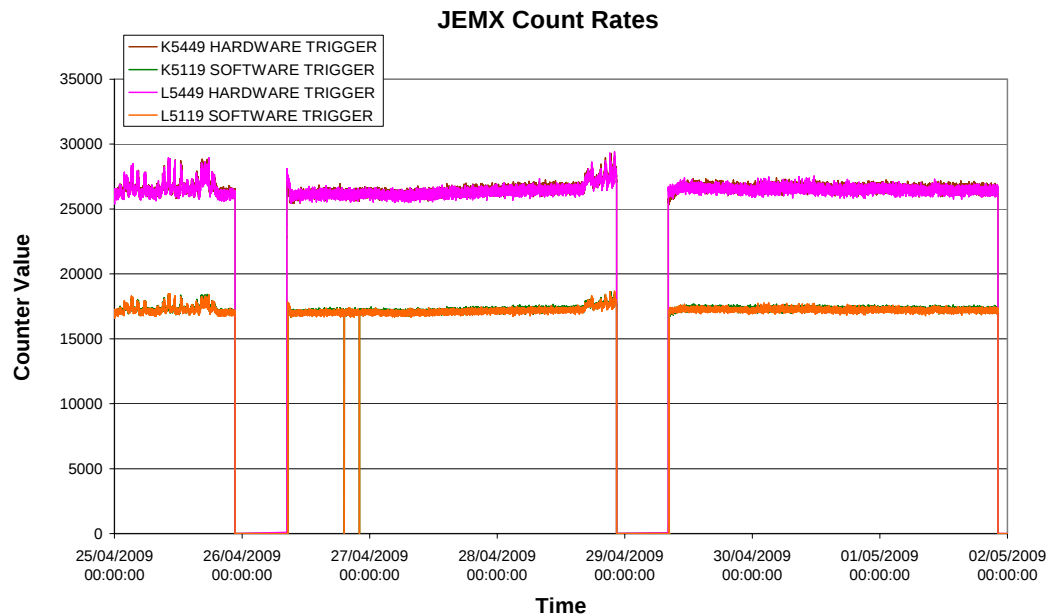
2009-04-28 (DOY 118, Rev 798) to 2009-05-01 (DOY 121, Rev 799)

IBIS operations executed nominally.

8.3.4 JEM-X Operations

JEM-X Count Rates

JEM-X count rates over the reporting period are displayed in the following graph¹.



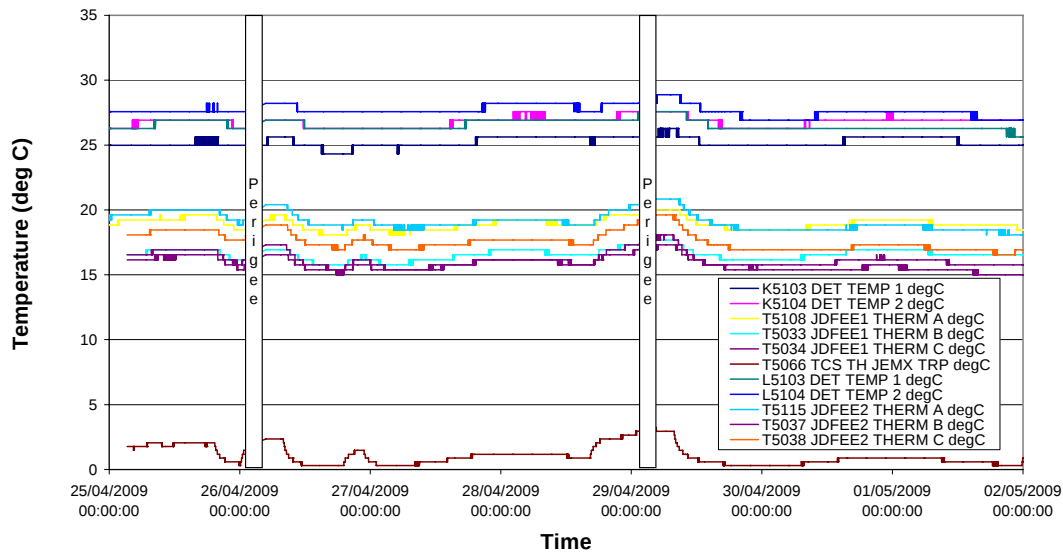
JEM-X Temperatures

JEM-X Detector and DFEE temperatures, along with the temperature on the detector bench between the two units, over the reporting period are displayed in the following graph².

¹ Data sampled (1 frame in 4) and smoothed to remove spikes in S/W Trigger due to flushing of buffer after slews.

² Data sampled (1 frame in 8)

JEMX Detector & DFEE Temperatures



JEM-X Daily Report

2009-04-25 (DoY 115, Rev 797) to 2009-05-01 (DoY 121, Rev 799)

JEM-X 1&2 operations executed nominally.

8.3.5 OMC Operations

2009-04-25 (DoY 115, Rev 797)

Nothing to report.

2009-04-26 (DoY 116, Rev 798)

From 19:14:01 to 22:05:32, a Flat Field calibration was successfully performed. This was followed from 22:06:01 to by a Dark-Current calibration, also performed successfully.

2009-04-27 (DoY 117, Rev 798) to 2009-05-01 (DoY 121, Rev 799)

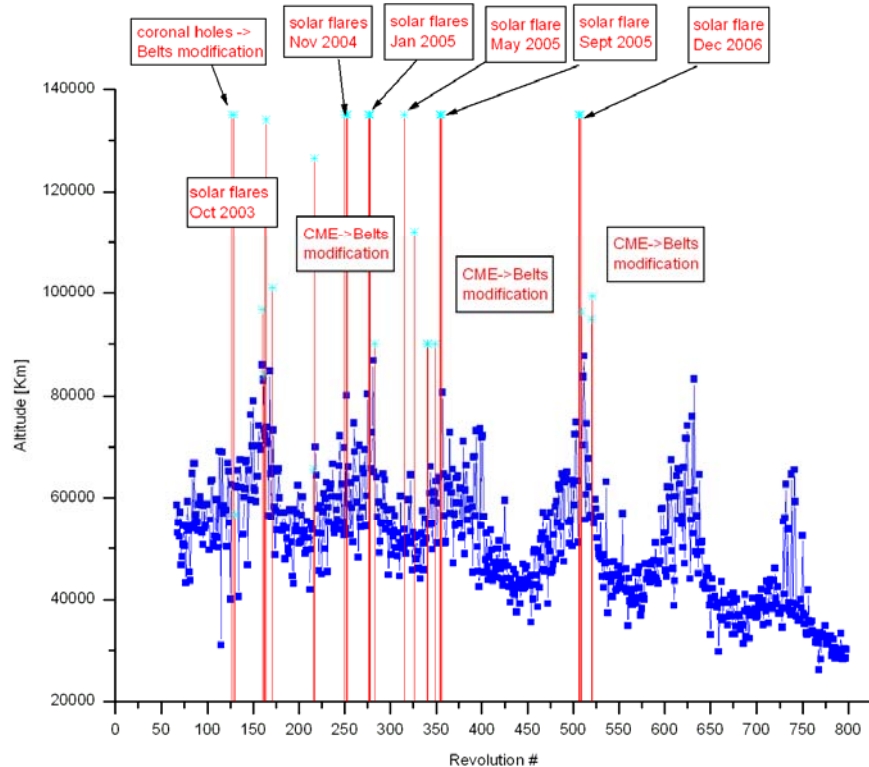
Nothing to report.

On DoY 115 at 23:26:12, DoY 118 at 23:13:32 and DoY 121 at 22:59:48 OMC went to SAFE mode nominally, at the radiation belt entry time as set in the Broadcast Packet.

8.3.6 IREM Operations

Radiation Belts Entry

Evolution of Radiation Belt Entry 2003-2008



IREM daily report

Nothing to report.

Electron Belts

REV	S/C BCPKT (electron)	Electron CUT-OFF Observed Entry/Exit	Observed Entry/Exit Altitude [Km]	Electron CUT-OFF Predicted Entry/Exit	Predicted Entry/Exit Altitude [Km]
797	RAD_ENTR R 2009-04-25T23:26:06Z	26/04/2009 00:49:47	28513.9	26-Apr-2009 00:28:48	32133.53
798	RAD_EXIT R 2009-04-26T08:03:44Z	26/04/2009 06:32:43	>>34227.3	26-Apr-2009 06:58:48	47687.17
798	RAD_ENTR R 2009-04-28T23:13:30Z	29/04/2009 00:31:31	30210.1	29-Apr-2009 00:10:05	32916.07
799	RAD_EXIT R 2009-04-29T07:50:21Z	29/04/2009 06:28:03	>>34266.7	29-Apr-2009 06:40:05	47117.43

Reference

High radiation

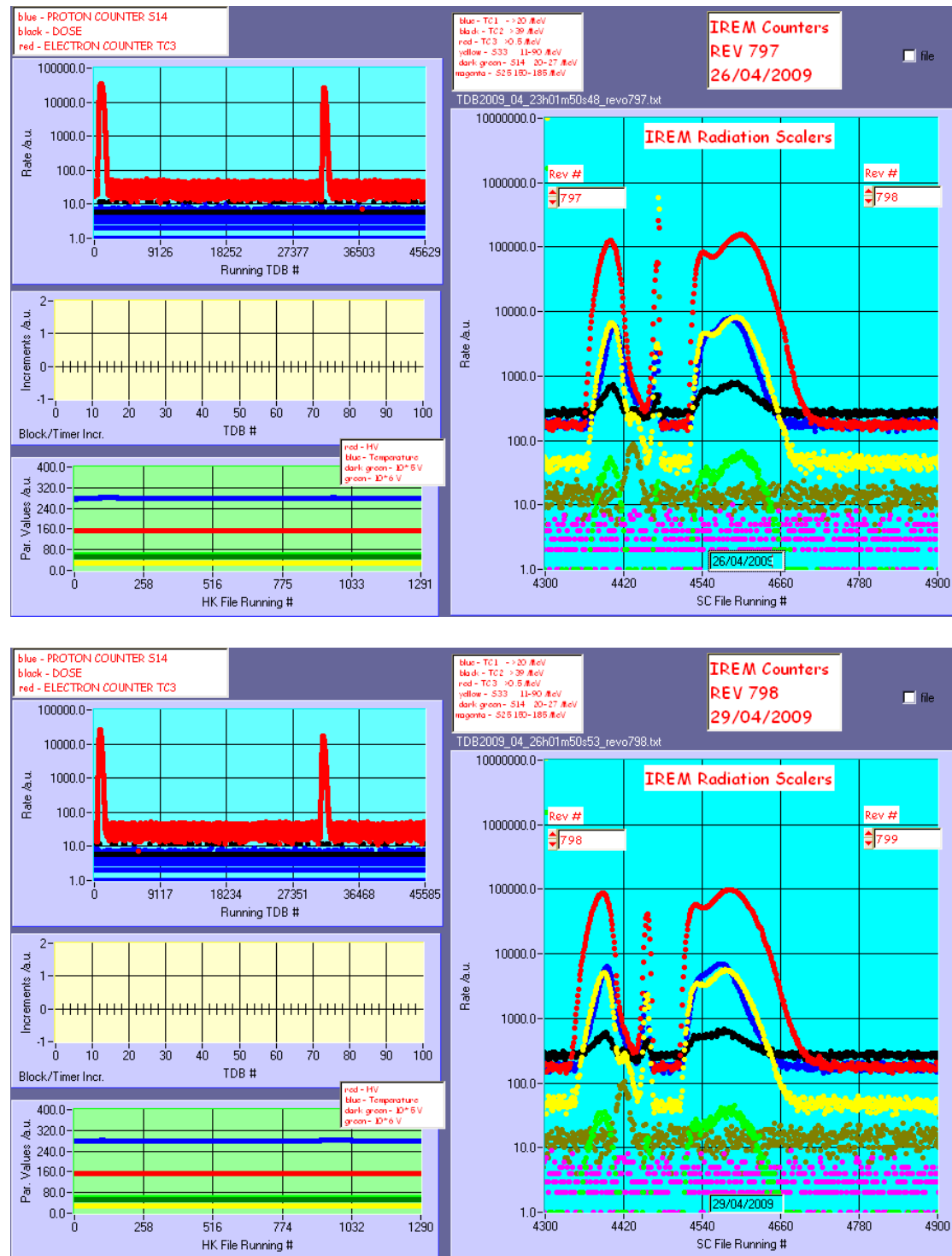
Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

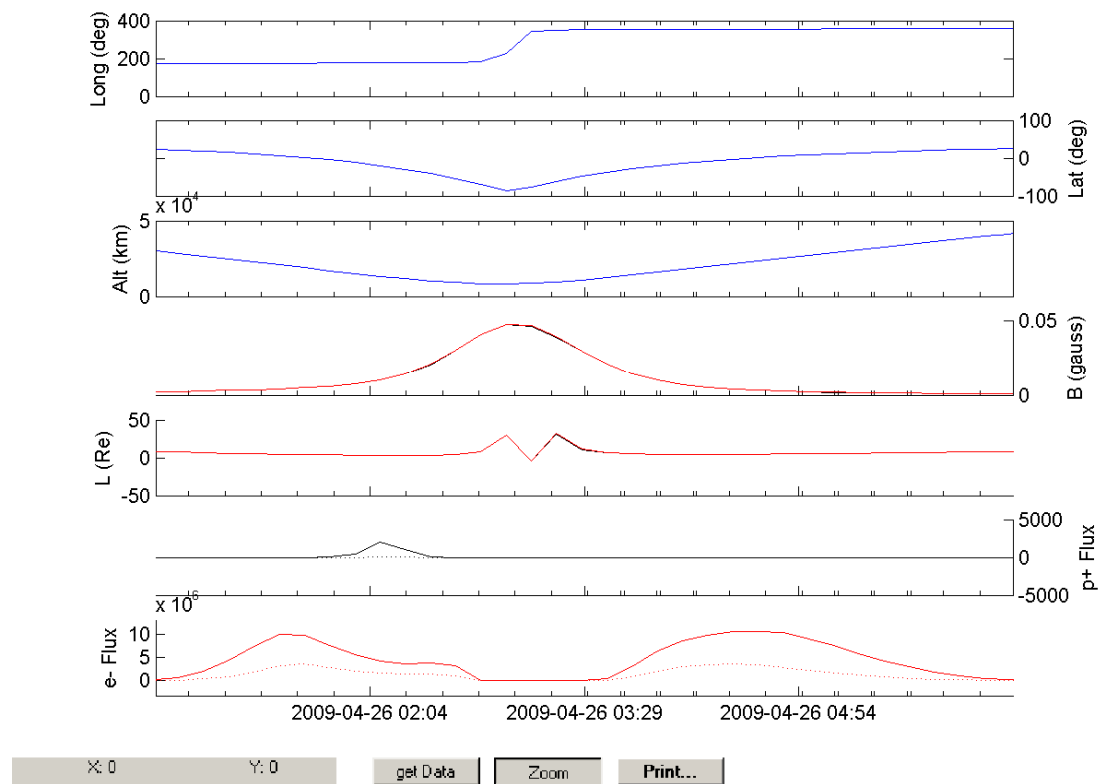
* Rad belt entry time ignoring previous threshold crossings where a gap of more than 30 minutes is present.

IREM radiation counters:

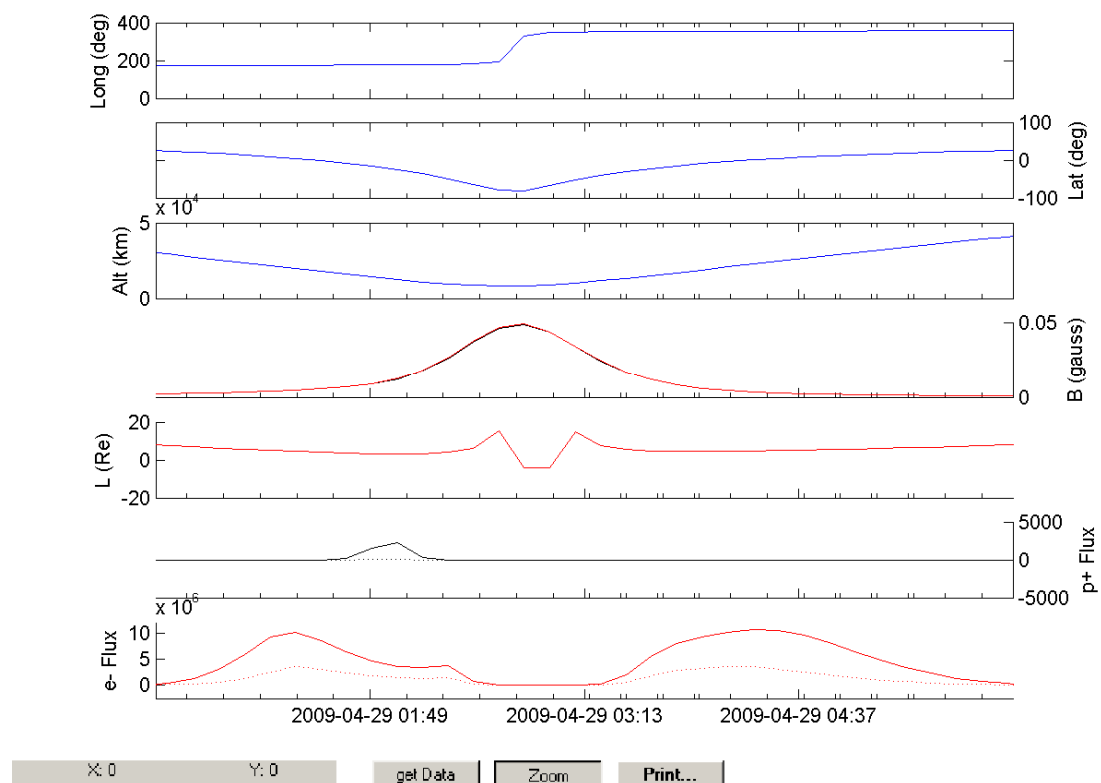


IREM Predicted Radiation Belt Passages

Rev 797



Rev 798



Radiation Assessment

Generated with SEIS Report and Analysis tool.

INTRODUCTION

This note summarises the space weather status over the observation period

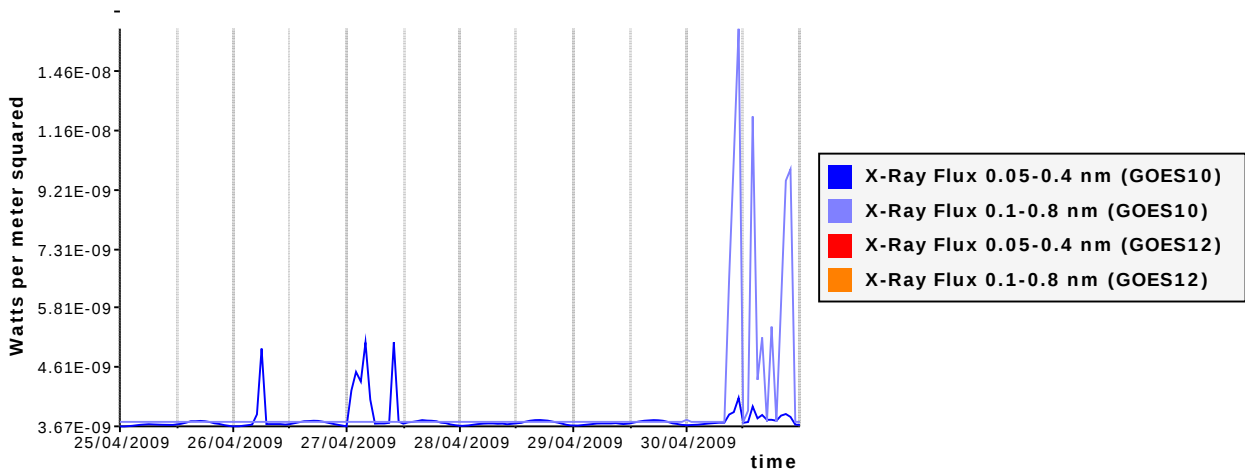
DAILY SUN

see in WR section 3.2.5

RADIATION FLUXES

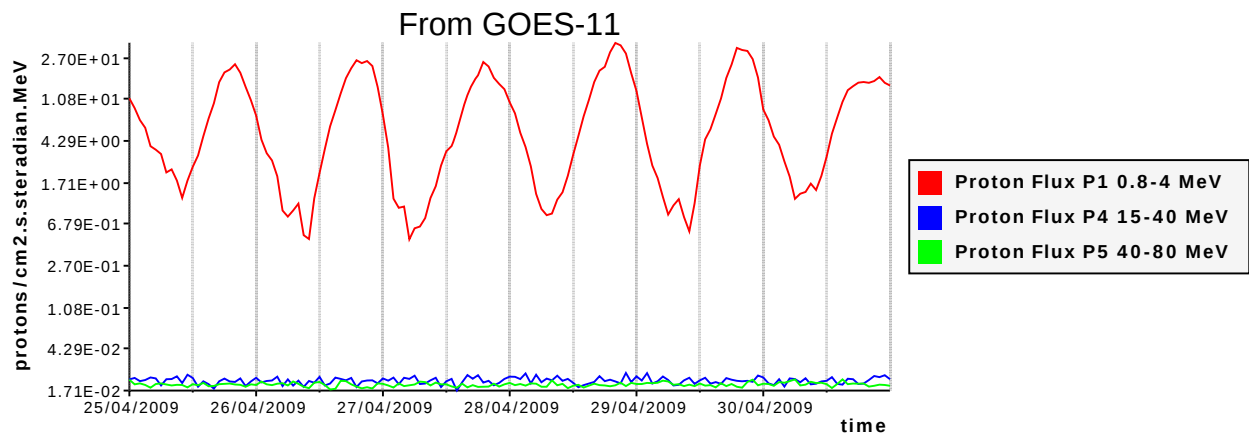
X-ray fluxes

X-ray fluxes for different energies are presented below as reported by GOES satellites. From $1\text{E-}5$ W/m^2 , they start featuring significant radiation activity corresponding to M-class solar flares from $1\text{E-}5$ to $1\text{E-}4$ W/m^2 , and to X-class solar flares from $1\text{E-}4$ and onwards.



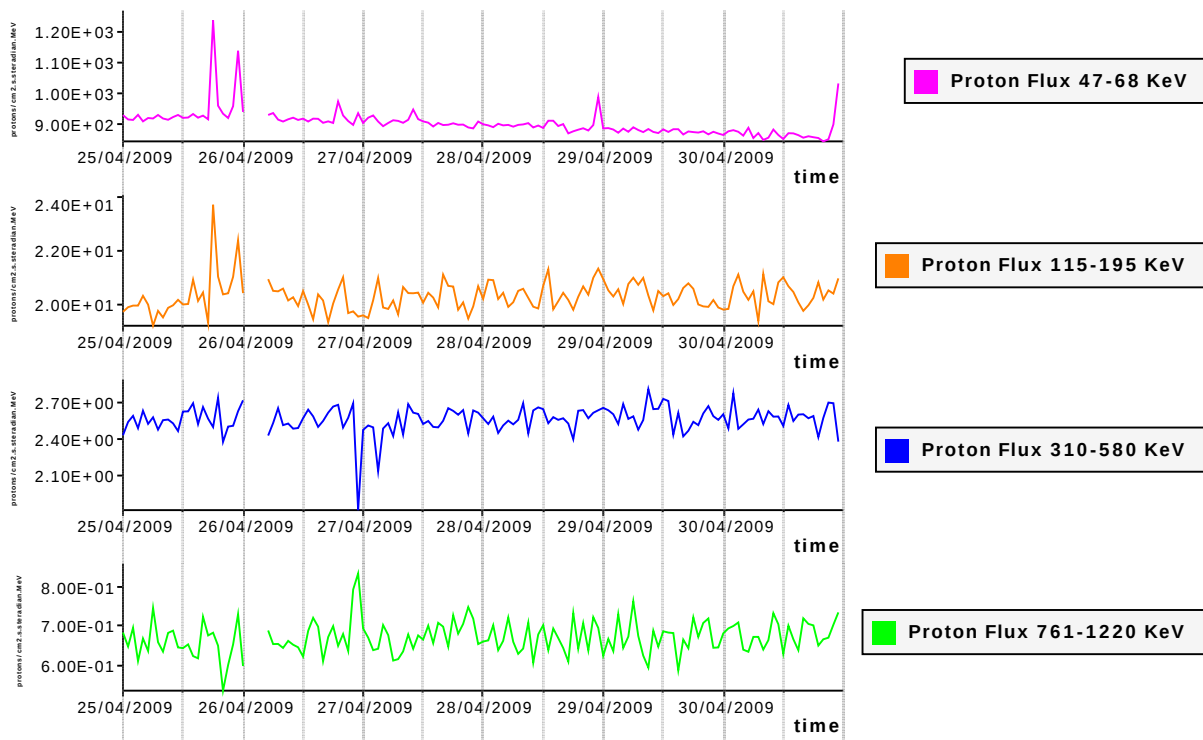
Proton fluxes (GOES-11)

Proton fluxes as measured by GOES satellites are presented in the following plot. Usually P1 oscillates between $1\text{E}+1$ and $1\text{E}+2$, while P2 and P3 evolve around $1\text{E-}2$.



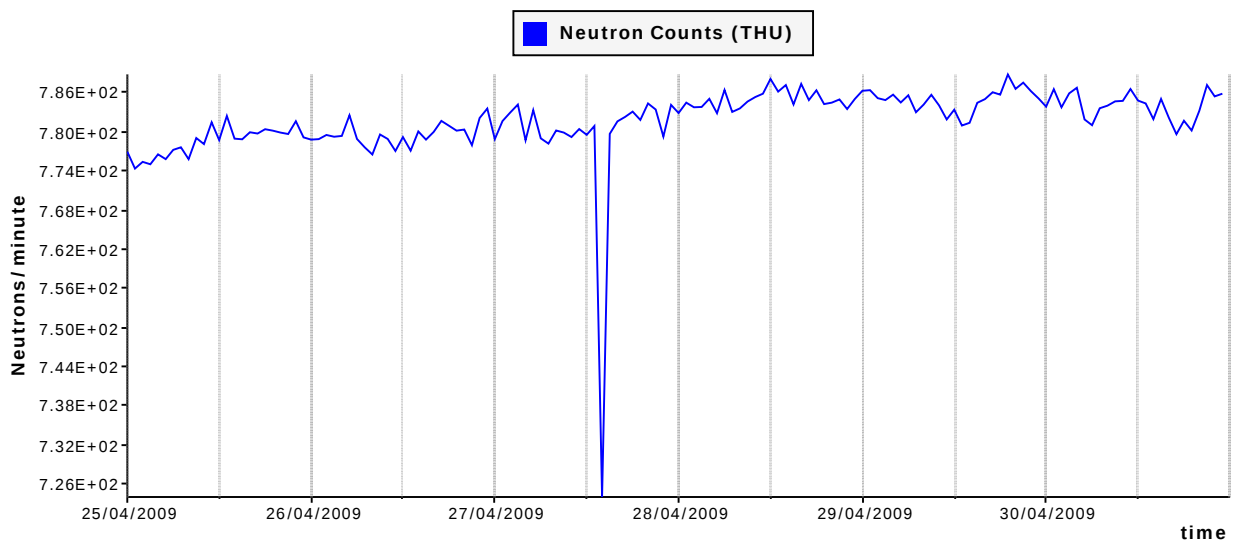
Proton fluxes (ACE)

Proton fluxes as measured by ACE satellite are presented in the following plot.



Neutron counts

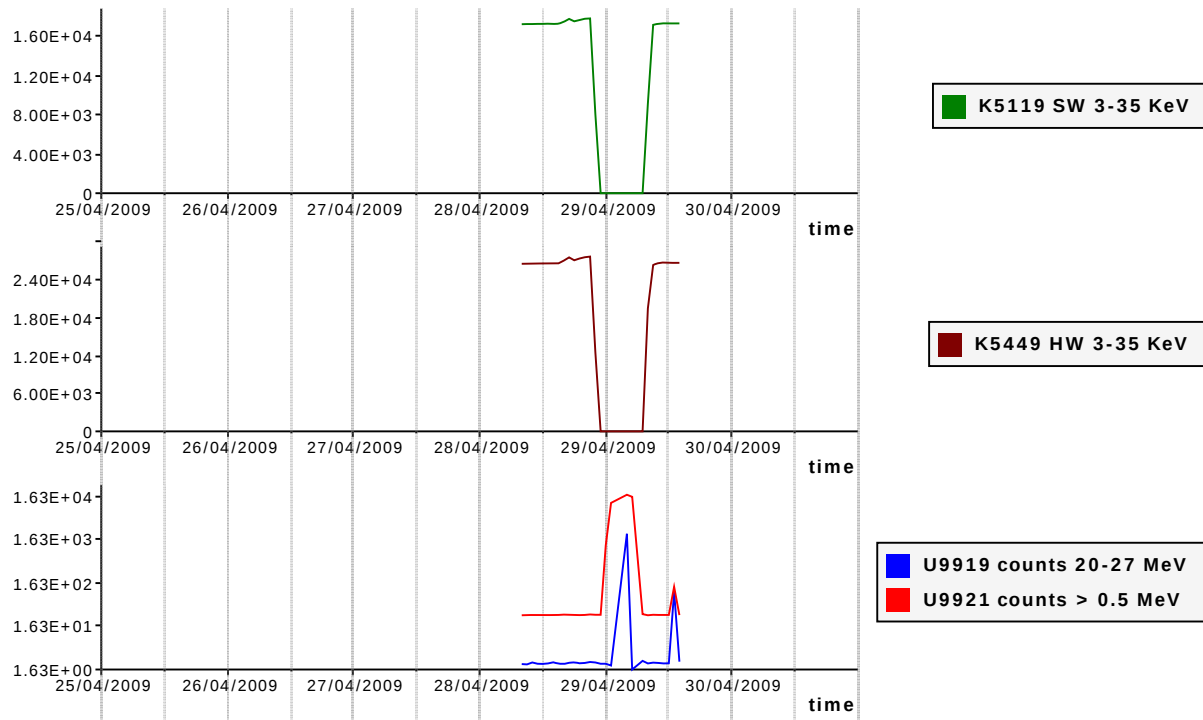
The neutron counts for the last 3 days are presented in the following plot. Nominally they remain stable around 7.2E+2.



IREM and JEM-X (INTEGRAL)

IREM proton and electron fluxes as well as JEM-X1 software and hardware triggers are presented in the following plots.

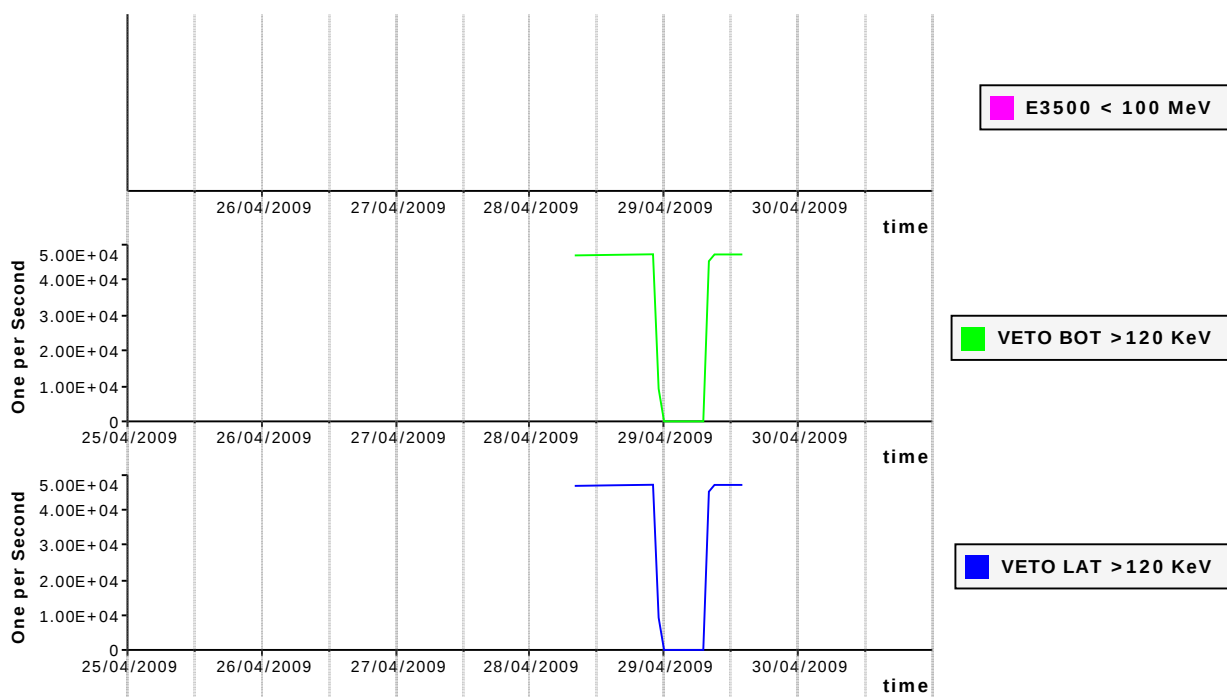
Nominal values are respectively about 1 and 18 for IREM counts, and, 13000 and 19000 for JEM-X ones.



SPI and IBIS (INTEGRAL)

SPI-ACS counters below 100MeV as well as IBIS-VETO bottom and lateral counters are presented in the following plots.

Nominal values are respectively about 90000 for SPI counts, and 36000 for IBIS ones.



SOLAR FLARES FORECAST

The probabilities of M and X-class solar flares during the last month are presented below. Chances of solar flare start to be meaningful from 15%.

