P2SC-ROB-WR-037-20101122 Weekly report #037	**P2SC Weekly report**	
Period covered: Date: Written by: Released by:	Mon Nov 22 to Sun Nov 28 2010 Wed Nov 29 2010 Carlos Cabanas Joe Zender	Royal Observatory of Belgium PROBA2 Science Center
To:	LYRA PI, marie.dominique@sidc.be SWAP PI, david@sidc.be	http://proba2.sidc.be ++ 32 (0) 2 373 0 559
cc:	ROB DIR, ronald@oma.be ESA Redu, Etienne.Tilmans@esa.int ESA D/SRE, Joe.Zender@esa.int ESA D/TEC, Karsten.Strauch@esa.int	

1. Science

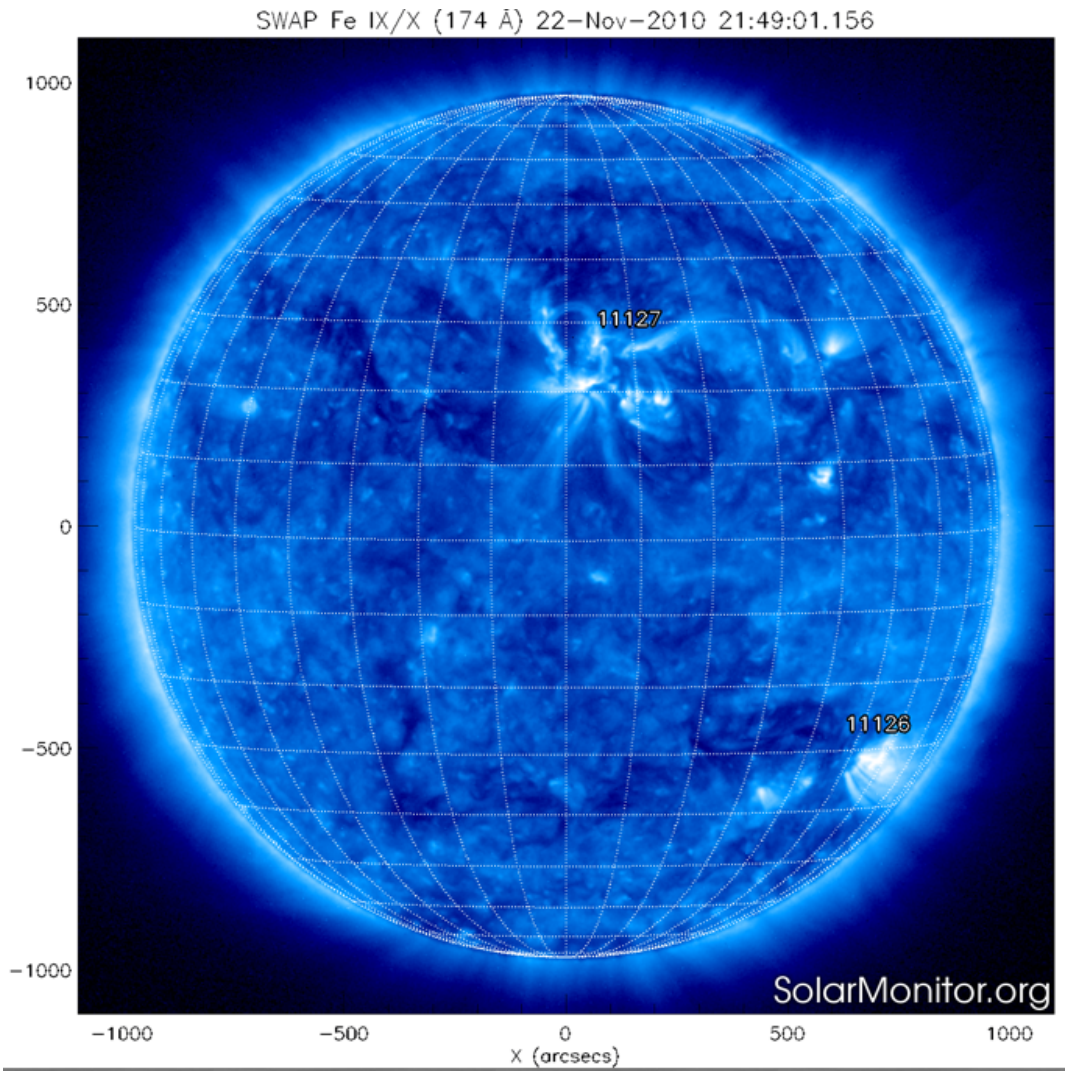
Solar & Space weather events

Very quiet space weather conditions persisted during the whole week.

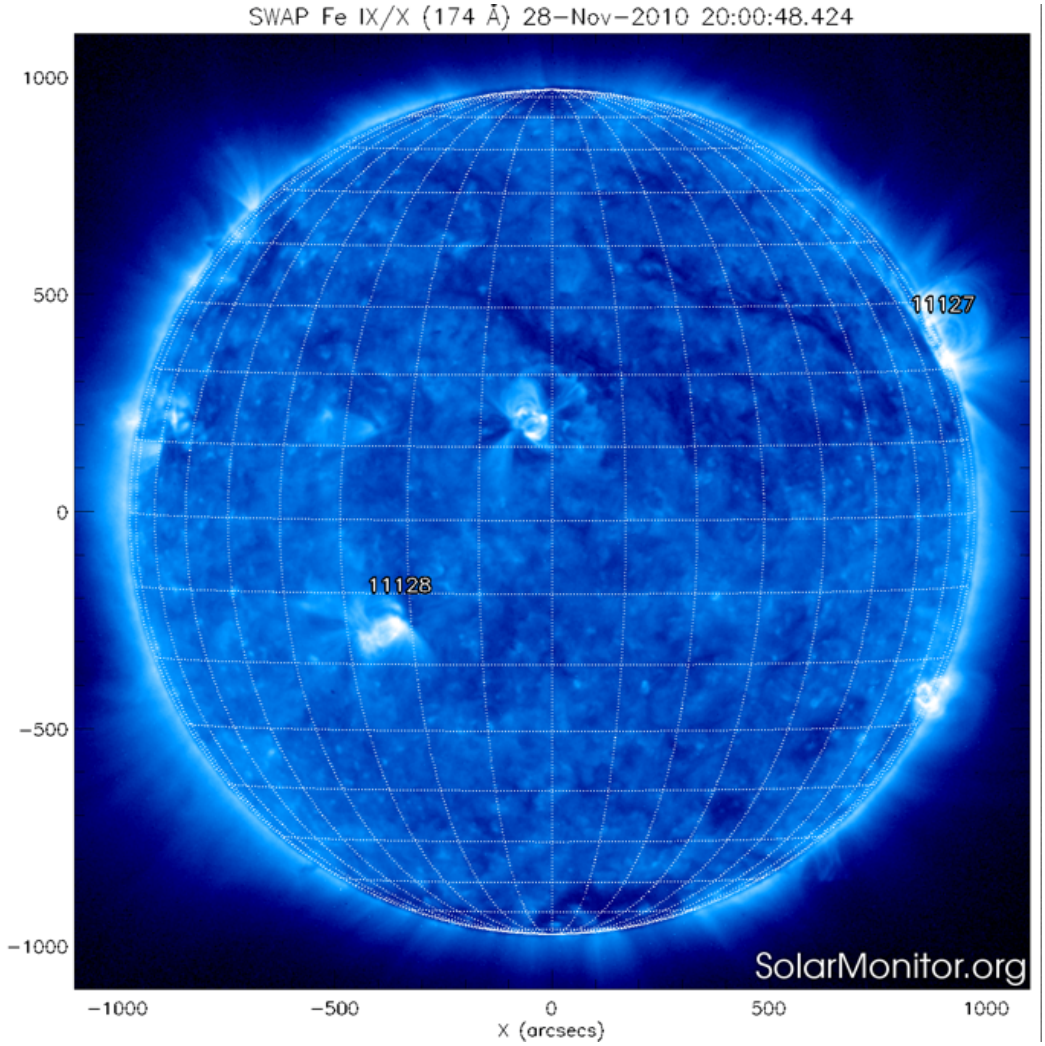
Active regions overview:

- NOAA 11127, rotated in the northern hemisphere from central meridian to the limb meanwhile producing low-level events (B-class flares).
- NOAA 11126 rotated off the disk at the beginning of the week producing low level events.
- A new active region, designated NOAA 11128, rotated on to the disk in the southern hemisphere and was the source of a B2.9 flare at 21:30 UT on 25-Nov-2010

SWAP Active Regions at the beginning of the reported period



SWAP Active Regions at the end of the reported period:



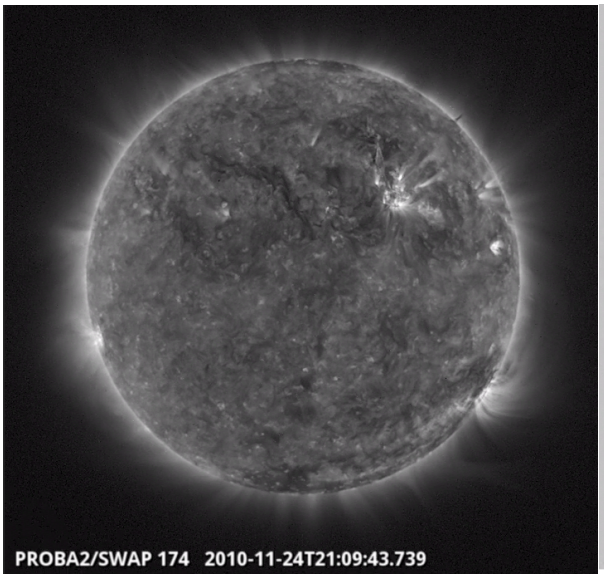
Eruptions and jet on 24 Nov/25 Nov

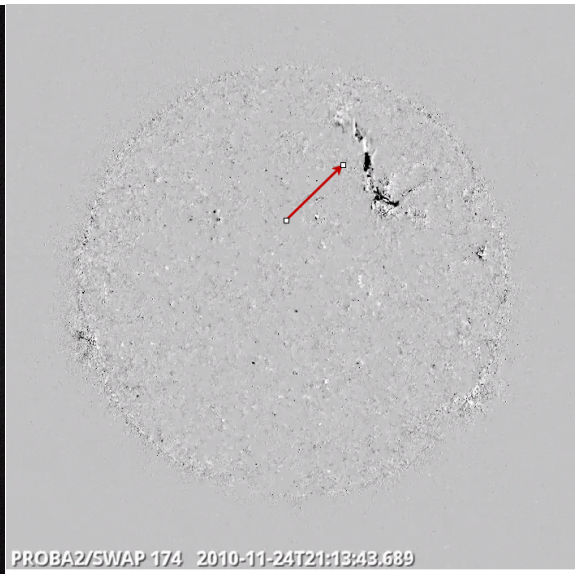
In the daily movies

- http://proba2.sidc.be/swap/data/mpg/movies/20101124_swap_movie.mp4
- http://proba2.sidc.be/swap/data/mpg/movies/20101124_swap_diff.mp4

The following interesting events were observed in the neighbourhood of the active region NOAA11127:

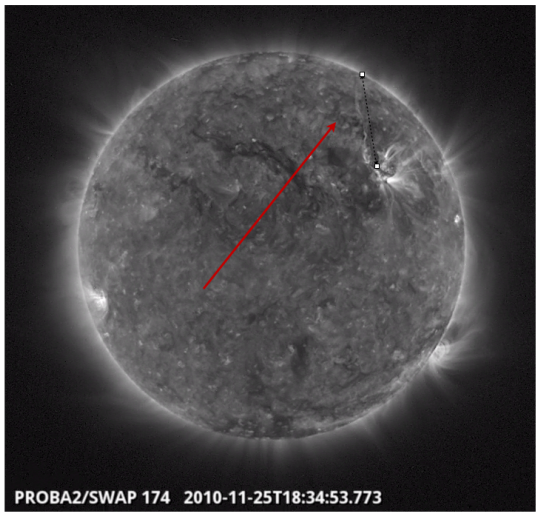
- A weak off limb eruption in the NW quadrant was seen in SWAP between 05:54UT and 7:57UT.
- A jet is seen at Nov 24 06:35UT.
- Filament activation from 15:04UT onwards and eruption after 21:00 UT (see figure below)

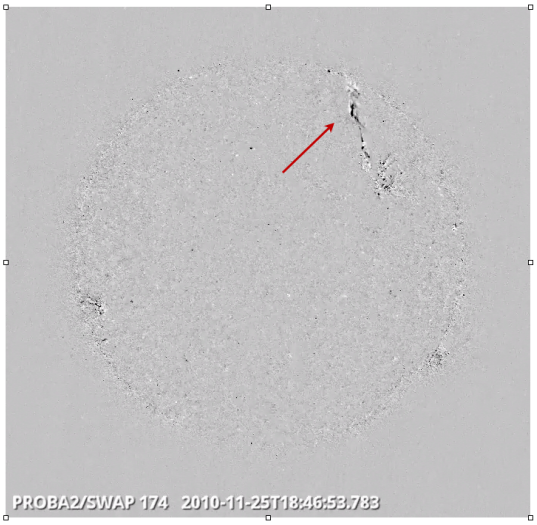




Another eruption occurred from the same location on Nov 25:

- http://proba2.sidc.be/swap/data/mpg/movies/20101125_swap_movie.mp4
- http://proba2.sidc.be/swap/data/mpg/movies/20101125_swap_diff.mp4

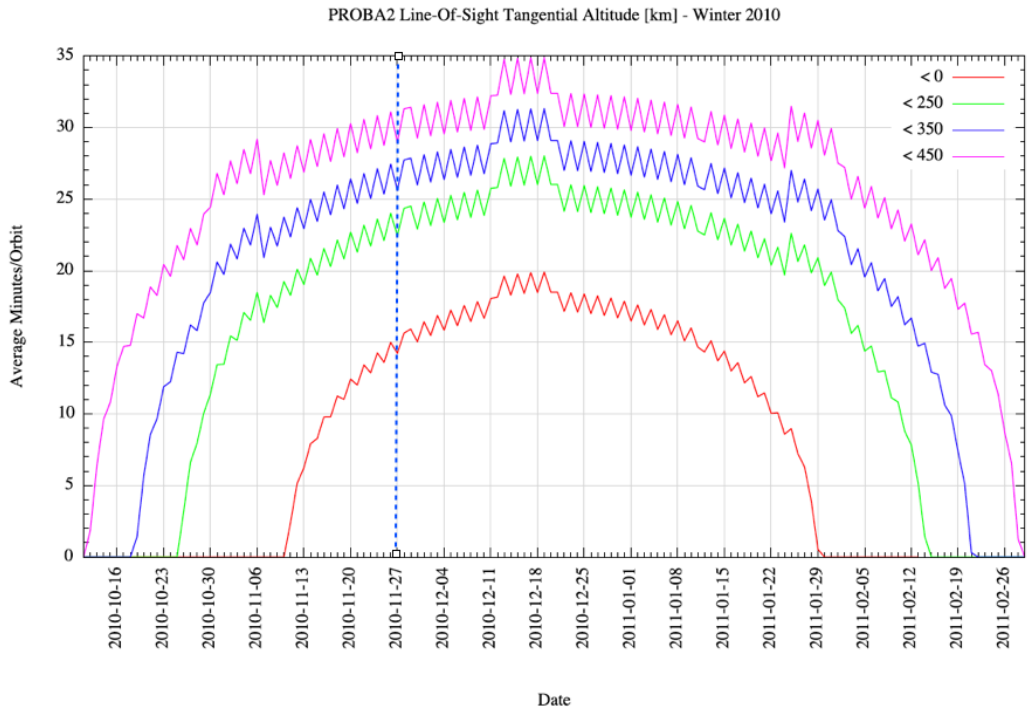




Scientific campaigns

Eclipse period

The eclipsed season continues for PROBA2. We are getting closer to the coldest days of the year (approx 20, 21 & 22th of December).



The reported week started with EUV occultations of 26 minutes, increasing up to 28 minutes at the end of the week.

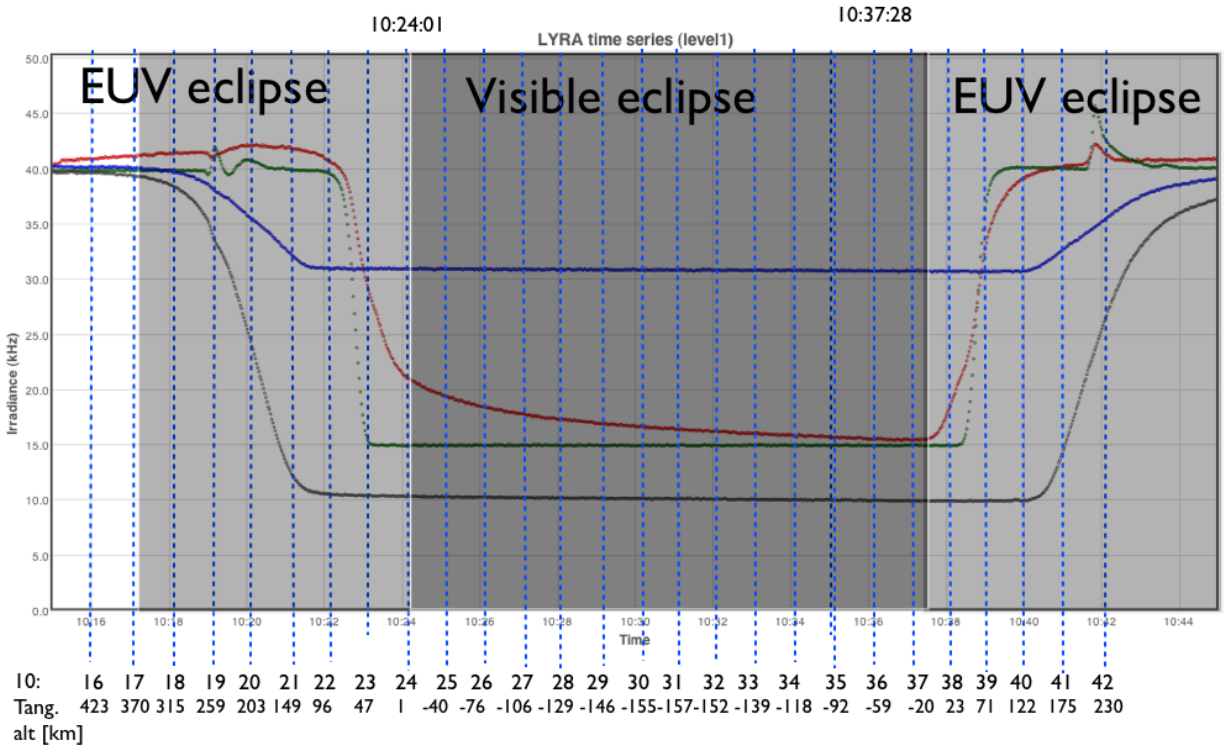
Aeronomy

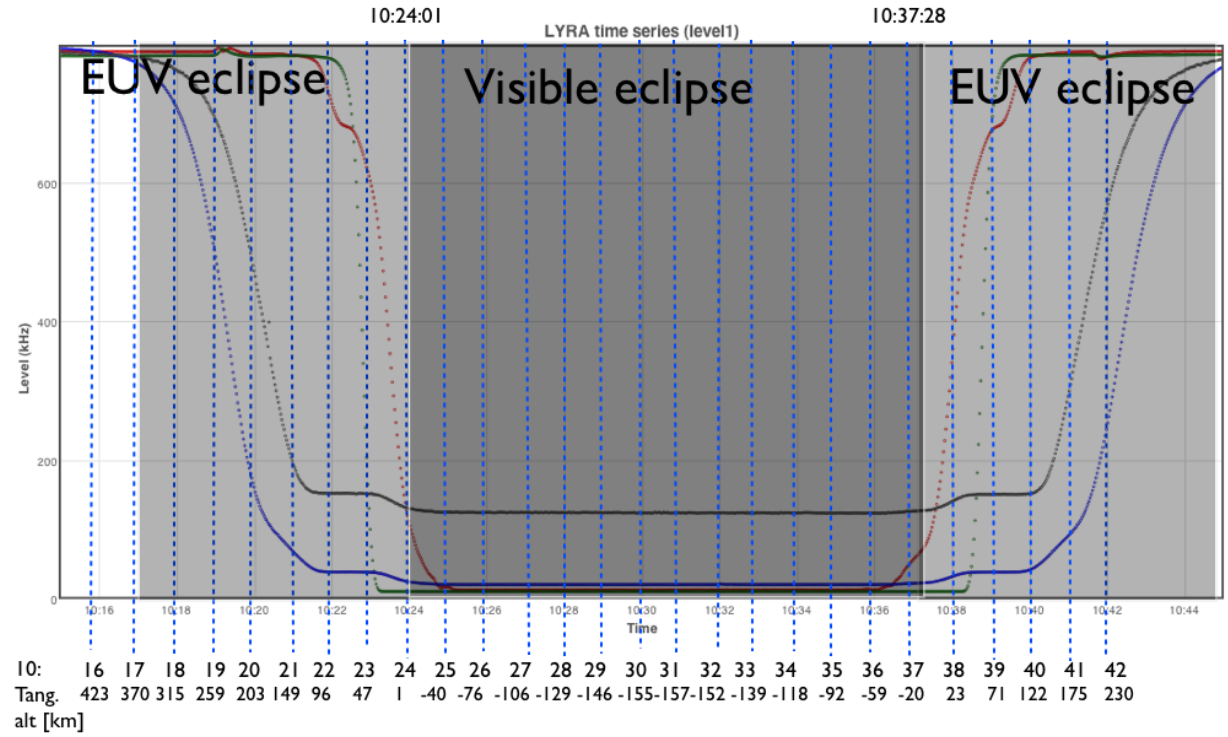
Orbital sunsets and sunrise, as seen from LYRA, correspond to a vertical scan of the atmosphere.

Five LYRA occultation campaigns took place during the week. The campaign of Thursday 25 is missed due to a LYRA anomaly: covers were closed unexpectedly. The campaign results on Nov. 22nd , 24th and 26th are similar to the ones obtained from Nov. 19th. campaign. The results of Nov. 19th campaign can be found at http://proba2.sidc.be/P2SC_weekly_reports/P2SC-ROB-WR-036-20101115.pdf

Below we can see the extinction profiles from the occultation data:

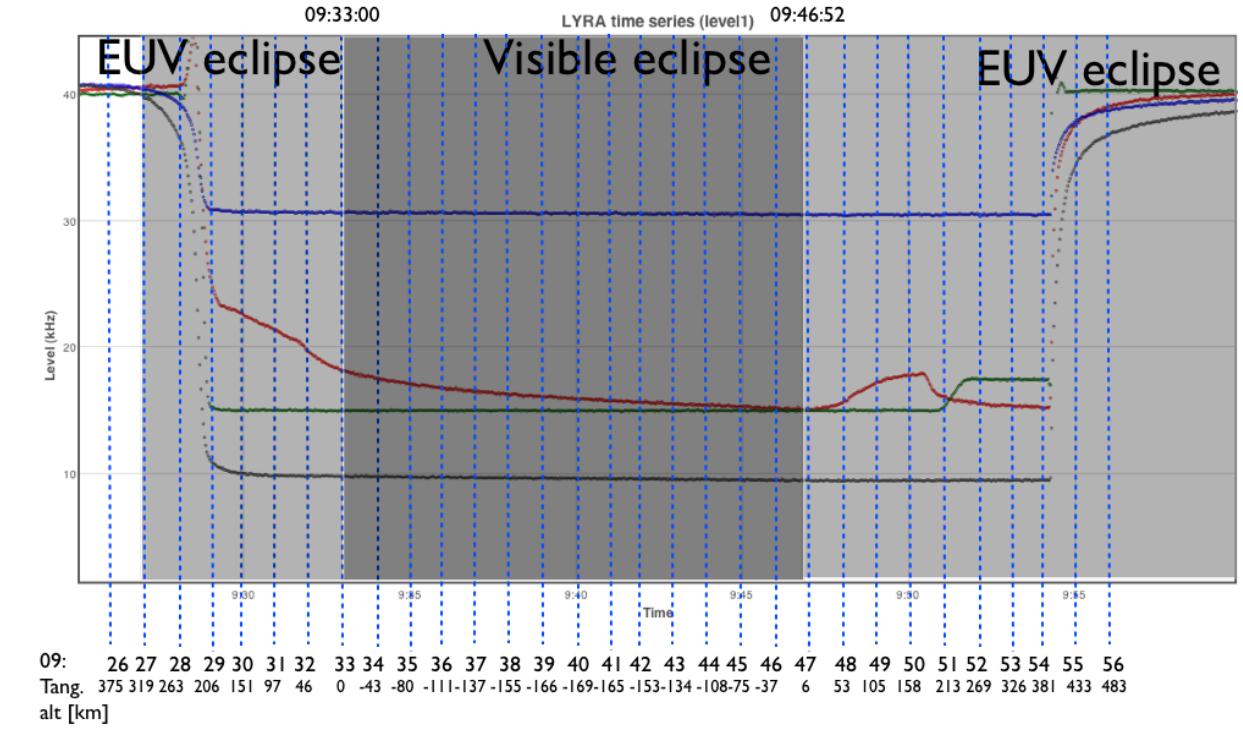
LYRA OCCULTATION CAMPAIGN ON Nov. 22nd - UNIT2 and UNIT3

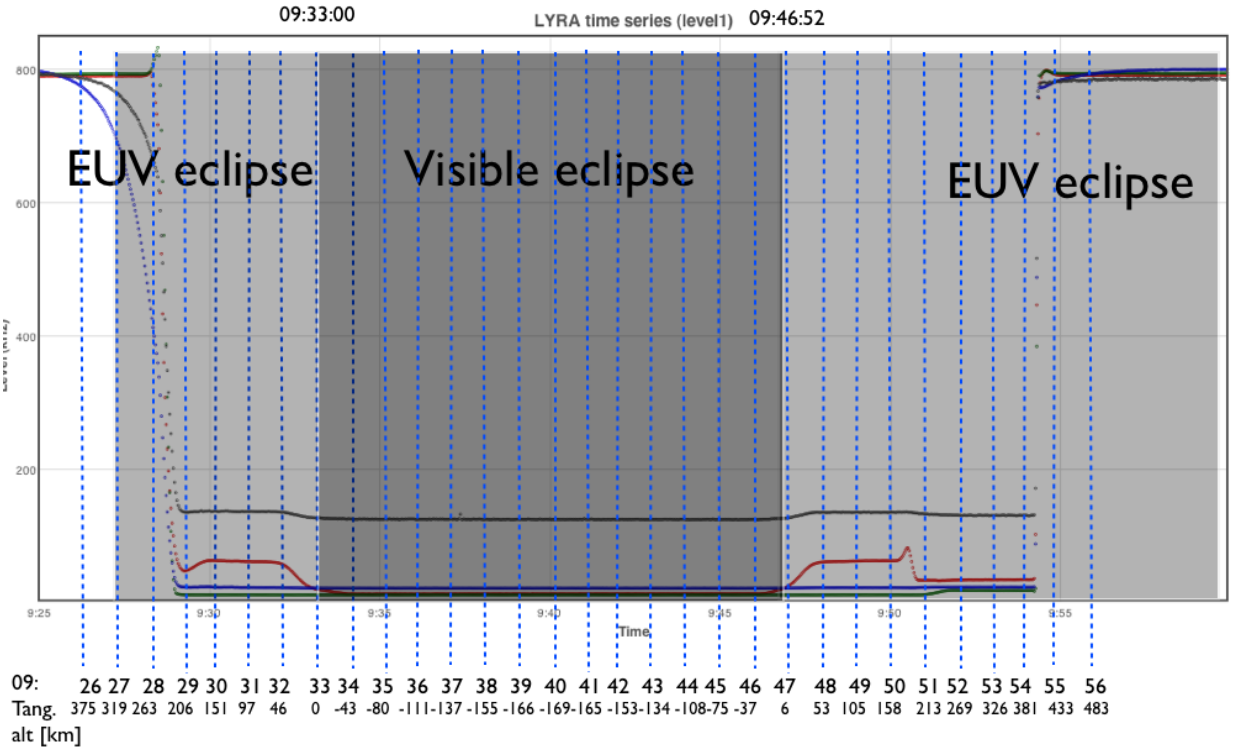




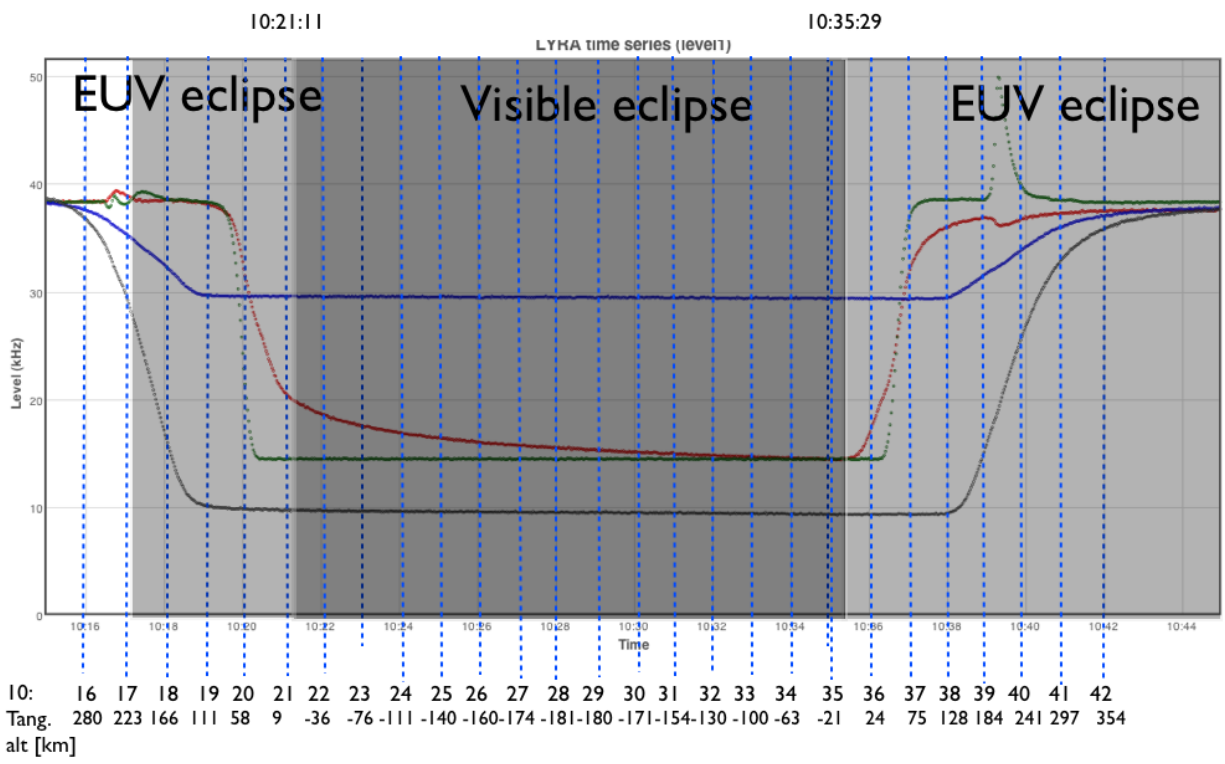
LYRA OCCULTATION CAMPAIGN ON Nov. 23rd - UNIT2 and UNIT3

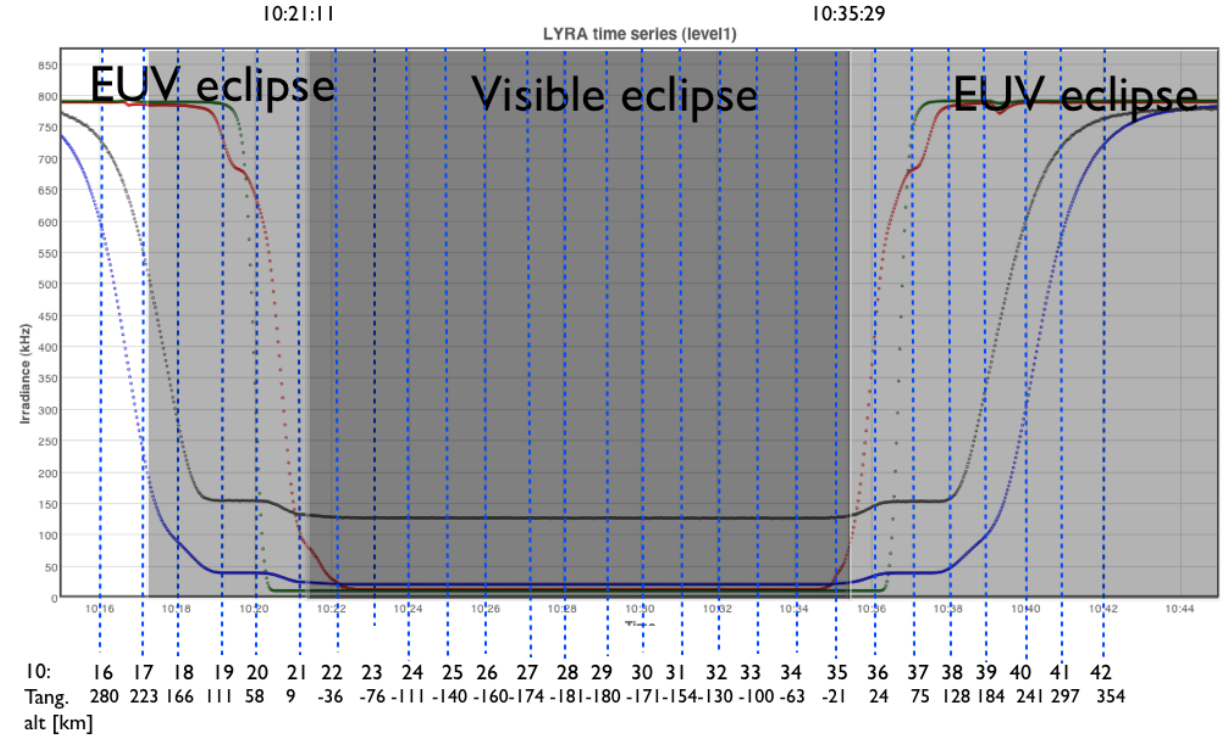
PROBA2 performed a 3 degree off point from 09:26UTC at 09:53 UTC , and that's the reason these occultation campaign results seem different than the other ones.



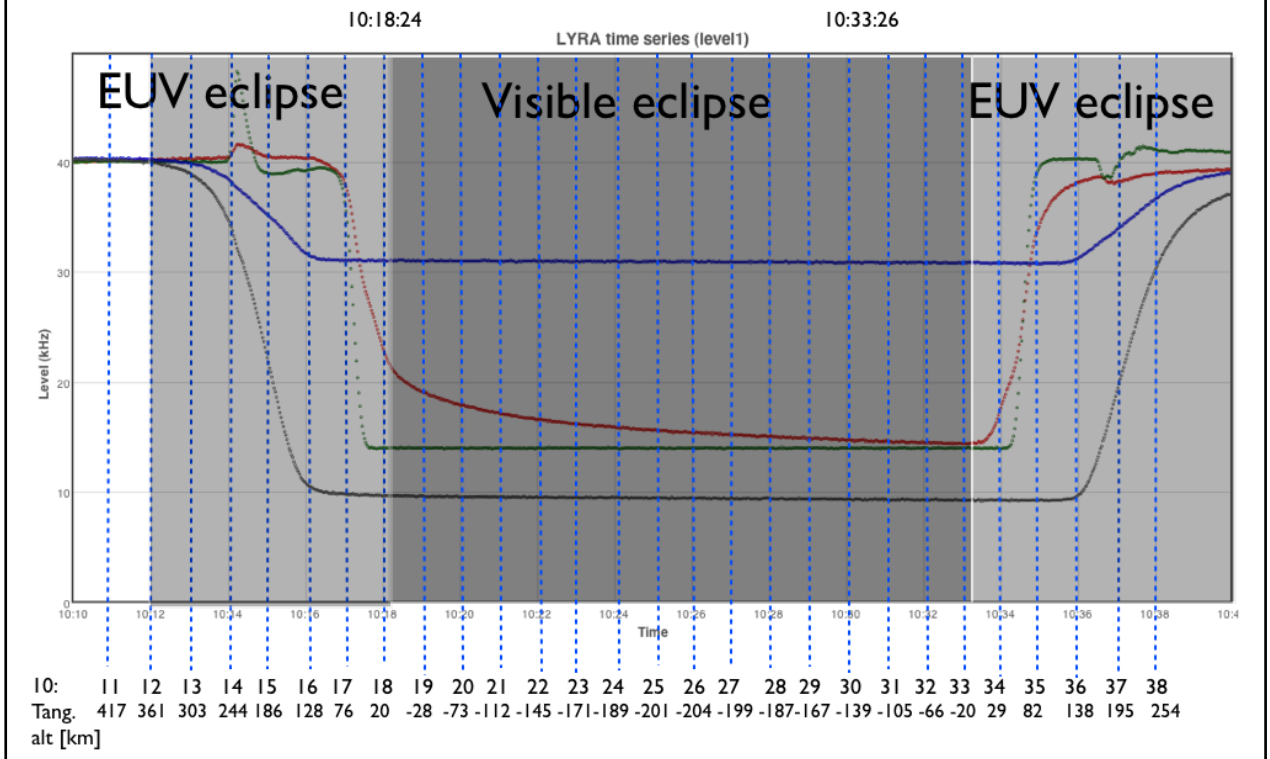


LYRA OCCULTATION CAMPAIGN ON Nov. 24th. - UNIT2 and UNIT3

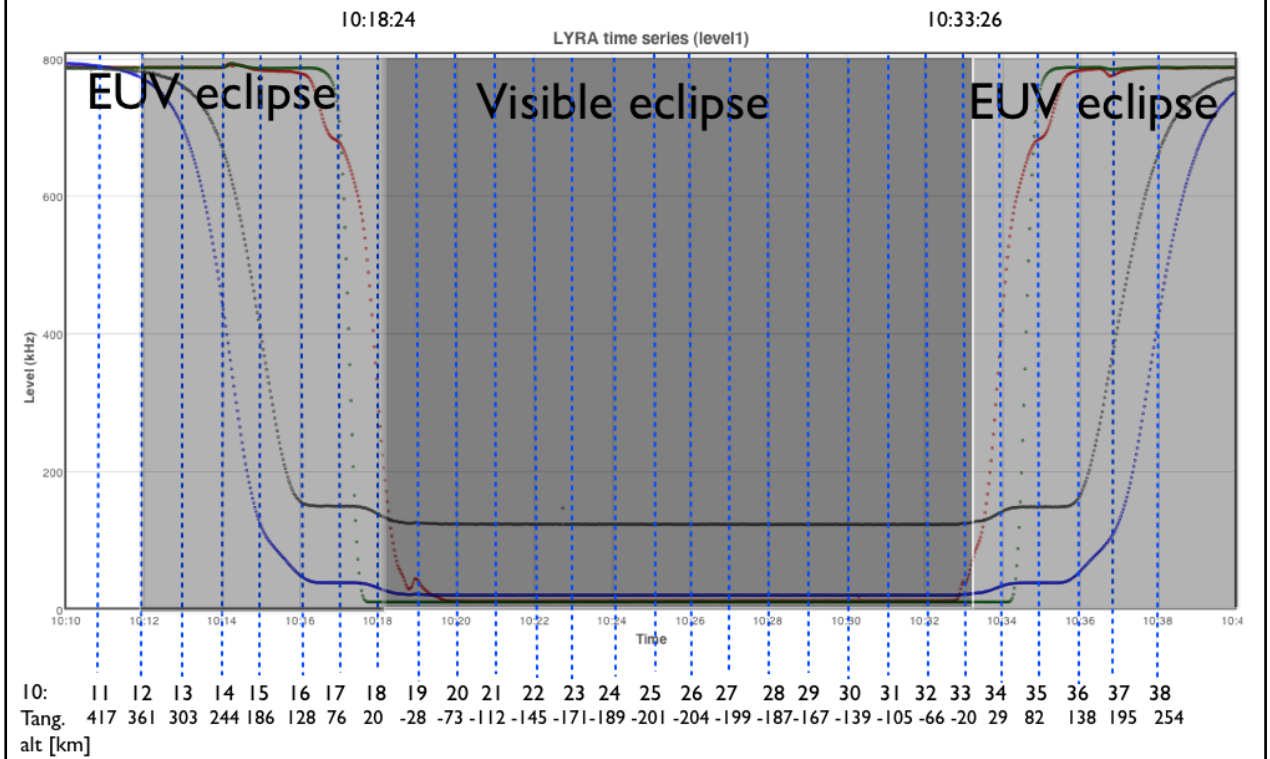




LYRA OCCULTATION CAMPAIGN ON Nov. 26th - UNIT2 and UNIT3



10:	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
Tang. alt [km]	417	361	303	244	186	128	76	20	-28	-73	-112	-145	-171	-189	-201	-204	-199	-187	-167	-139	-105	-66	-20	29	82	138	195	254



10:	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
Tang. alt [km]	417	361	303	244	186	128	76	20	-28	-73	-112	-145	-171	-189	-201	-204	-199	-187	-167	-139	-105	-66	-20	29	82	138	195	254

Outreach, papers, presentations, etc.

On Tuesday 23 November PROBA2 Science Centre had a visit of a secondary school. Elke D'Huys (ROB), Petra Vanlommel (ROB) and Anik De Groof (ESA/ROB) gave presentations about PROBA2.

2. LYRA instrument status

Calibration

A LYRA calibration and backup campaign took place on Nov. 24 from 10 to 23 UTC.
The calibration for Unit1/2 and 3/2 worked fine.
The Unit3/2 backup acquisition also worked fine, but the backup for Unit1 did not succeed due to an error in the IOS:

Unit1 was set as nominal, while Unit3 as backup:
2010.11.24T22:30:00.000 warm_up 50ms **unit_1 unit_3** 200000 off 0 open open
It should have been
2010.11.24T22:30:00.000 warm_up 50ms **unit_2 unit_1** 200000 off 0 open open
where Unit2 is set as nominal and Unit1 as backup.

IOS & operations

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Nominal acquisition + Unit2/3 occultaion campaign (LYRA00111)	Nominal acquisition + Unit2/3 occultation campaign (LYRA00111)	Nominal acquisition + Unit2/3 occultation campaign + Calibration campaign (LYRA00112)	Nominal acquisition + Unit2/3 occultation campaign (LYRA00113)	Nominal acquisition + Unit2/3 occultation campaign (LYRA00113)	Nominal acquisition (LYRA00113)	Nominal acquisition (LYRA00113)

IOS LYRA00111
Support for the occultation campaigns scheduled during the week + nominal imaging.

IOS LYRA00112
LYRA calibration and backup campaign for both Unit1 and Unit3. The IOS includes the Unit3 occultation campaigns for the whole week.

IOS LYRA00113

LYRA was not behaving properly. UNIT2 cover was closed unexpectedly on Nov.24th. at 23:11:10 UTC (after a calibration campaign).
A new IOS got LYRA back and supported the occultation campaign on Friday Nov.25th.

Temperatures

The main temperature increase seen in all units corresponds to the calibration campaign of Nov. 24th

A temperature drop can be seen just after the 'calibration campaign bump' in all units on Thursday 25, when all covers were closed unexpectedly

LYRA temperatures do not show such a sharp decreasing tendency as we could see during the previous weeks. Presumably, plasma payload effects are compensating this decrease from Wednesday onwards.

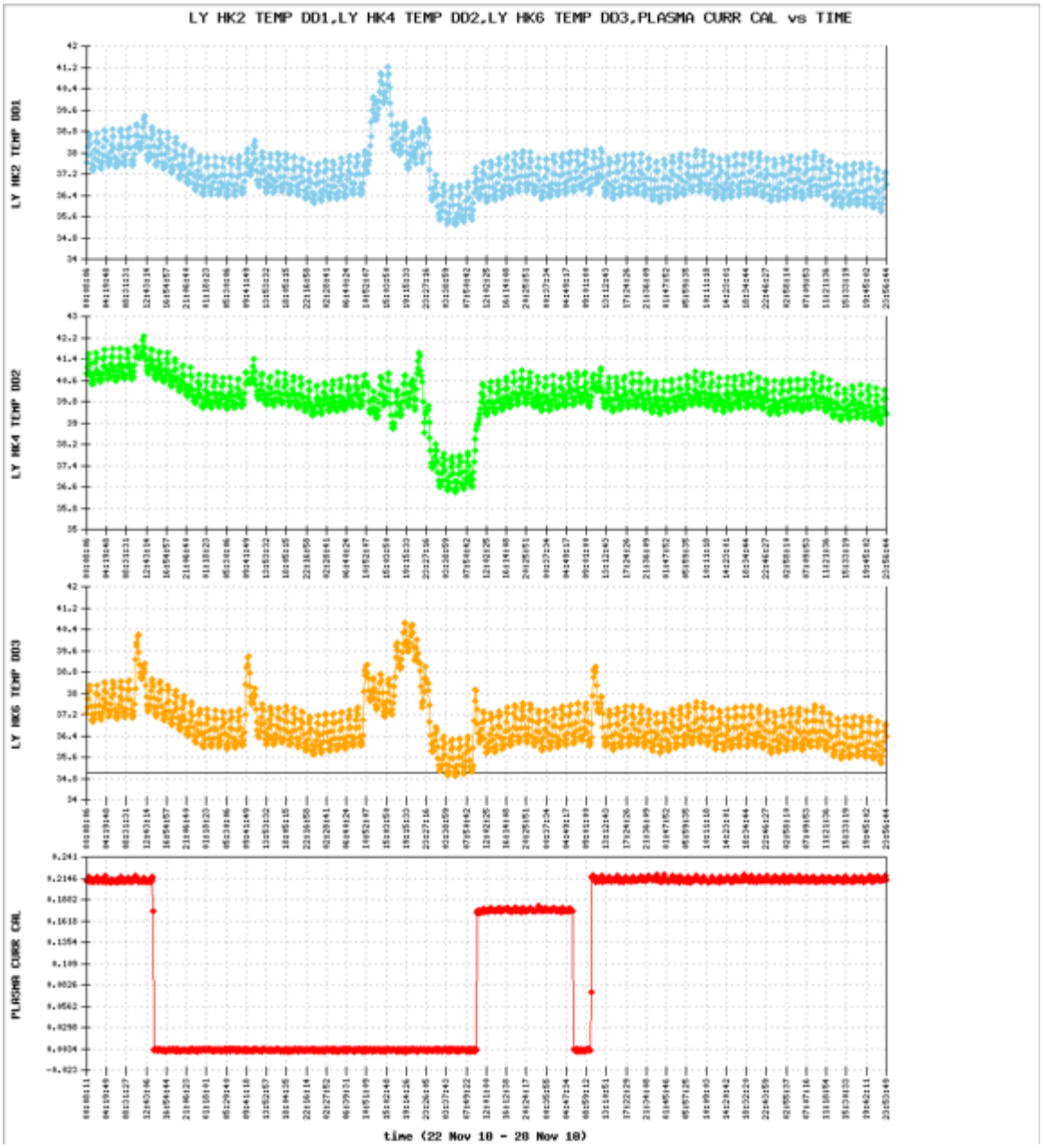


Figure: LYRA temperatures from 15Nov to 21Nov.

Lyra onboard anomaly 1

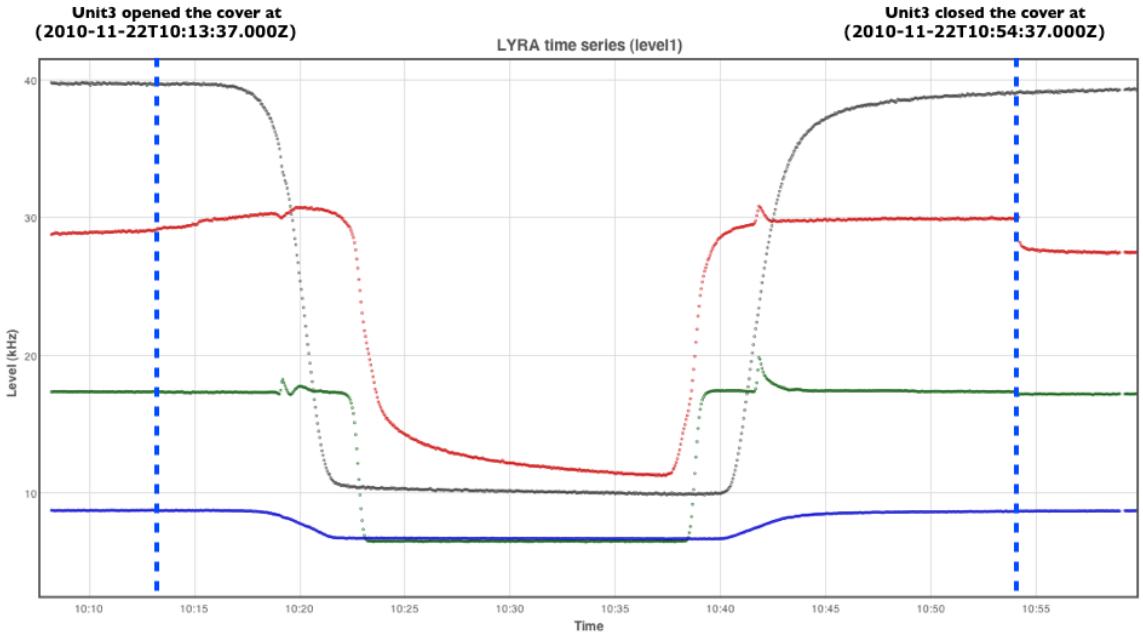
Lyman alpha jumped in Unit2 when Unit3 opened and closed the cover.
Temperature effects are ruled out since the signal decreases when opening the cover and increases when closing it.

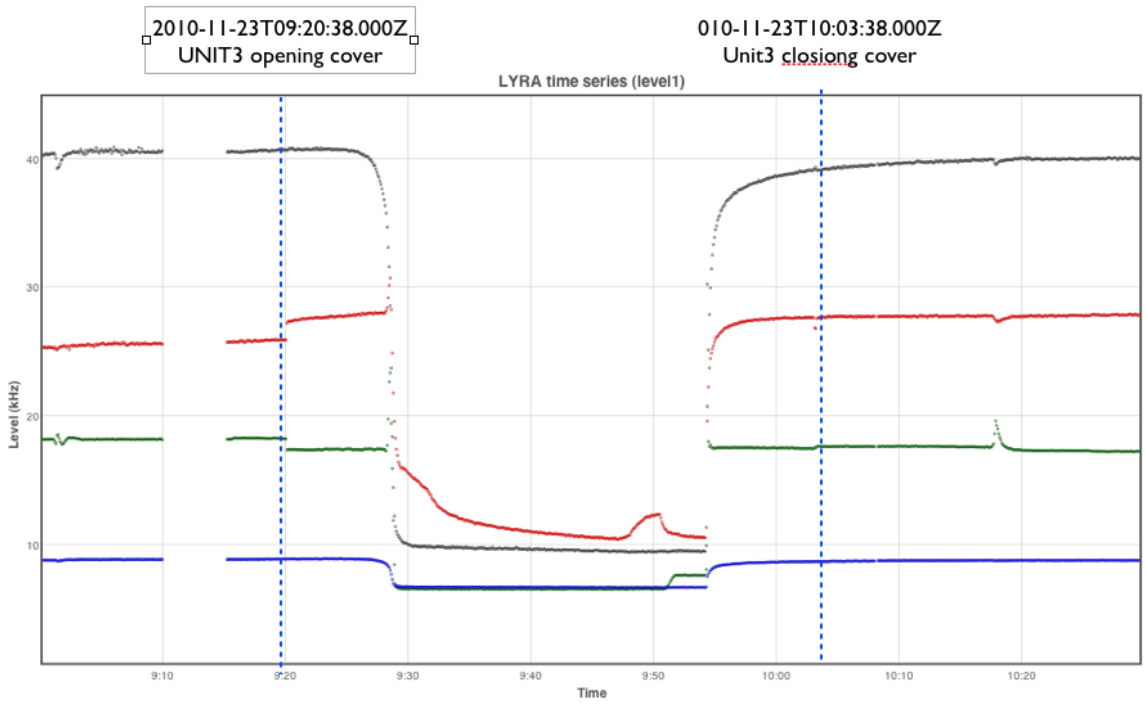
Opening/closing doors were scheduled on:

- 22/11: Open cover 3 at 10:13, close it at 10:54
- 23/11: Open cover 3 at 09:20, close it at 10:03
- 24/11: Open cover 3 at 10:10, close it at 10:52
- 25/11: Open cover 3 at 09:19, close it at 10:01

- 26/11: Open cover 3 at 10:07, close it at 10:50

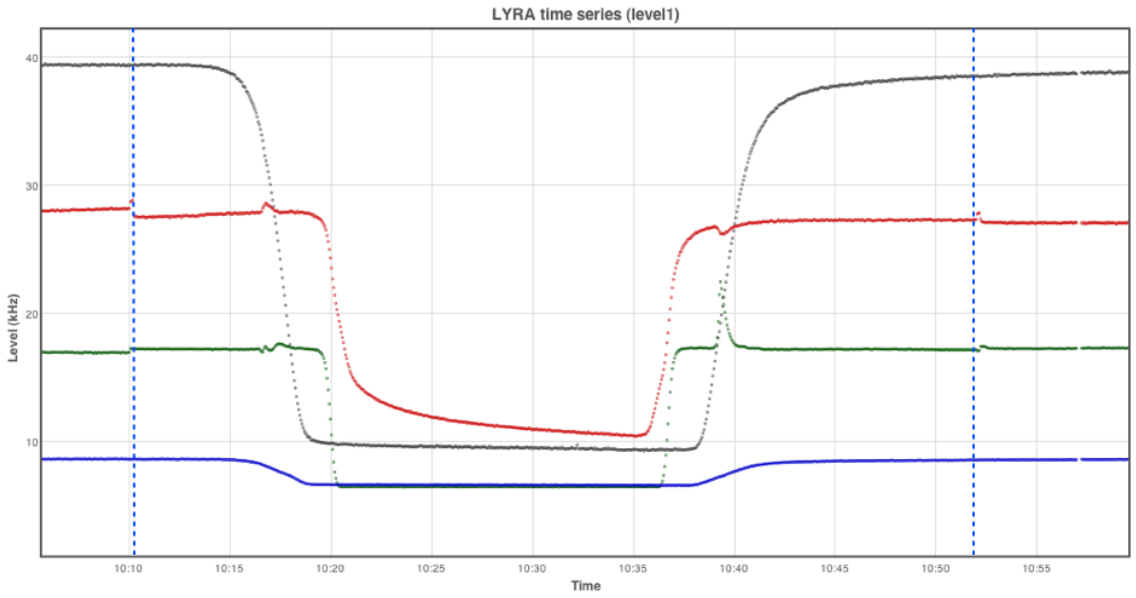
The mentioned jumps can be seen in below figures:





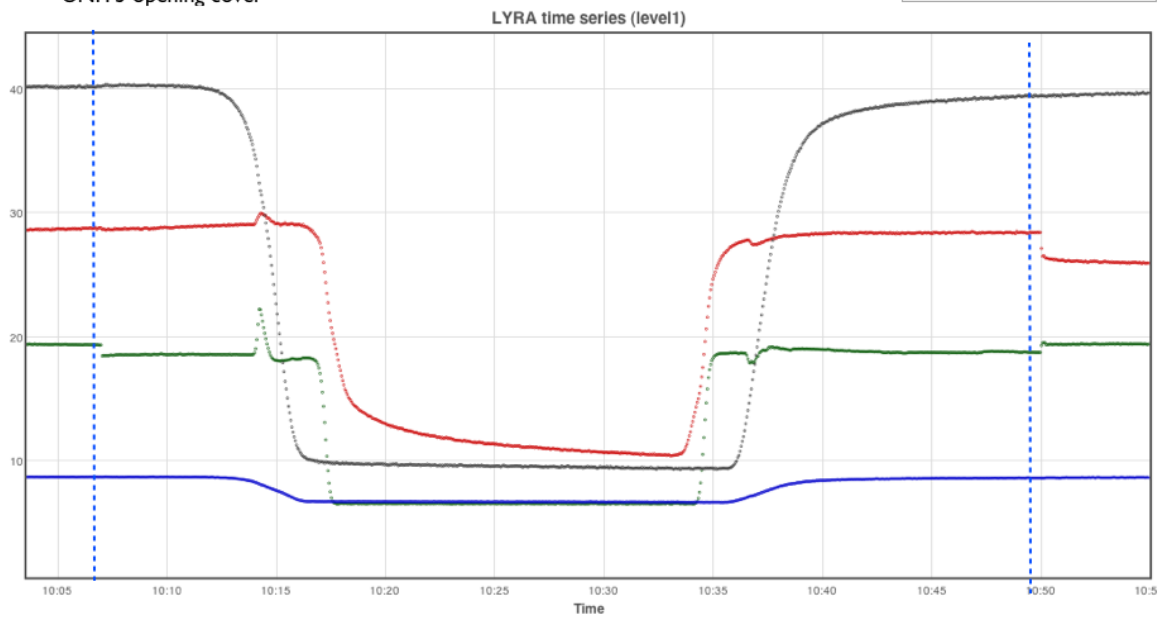
2010-11-24T10:10:39.000Z
UNIT3 opening cover

010-11-24T10:52:09.000Z
Unit3 closiong cover

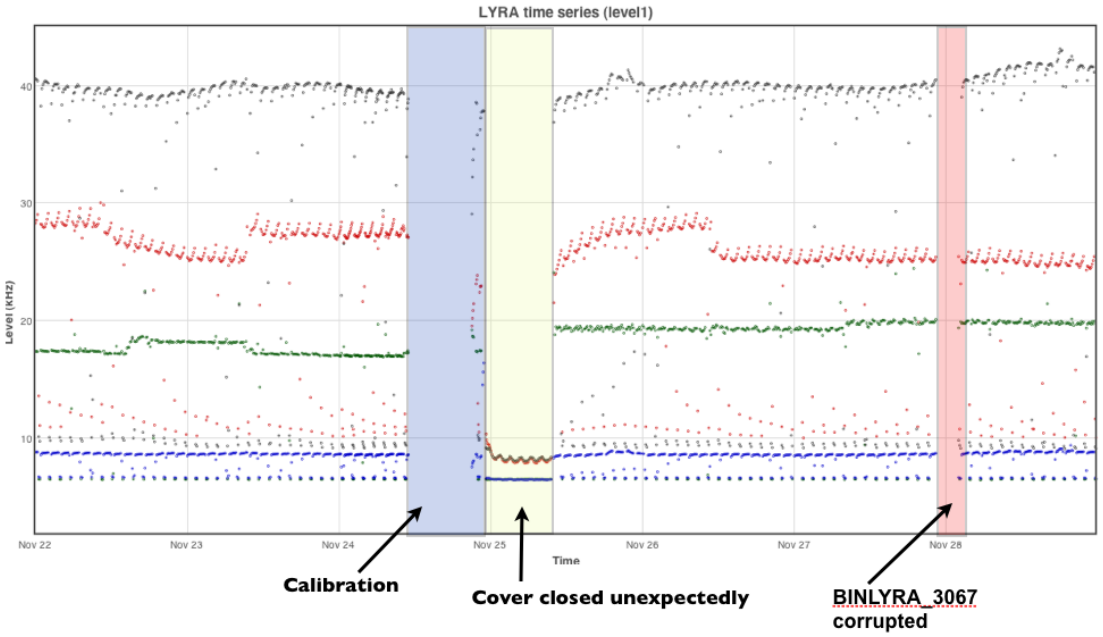


2010-11-26T10:07:42.000Z
UNIT3 opening cover

010-11-25T10:50:12.000Z
Unit3 closiong cover

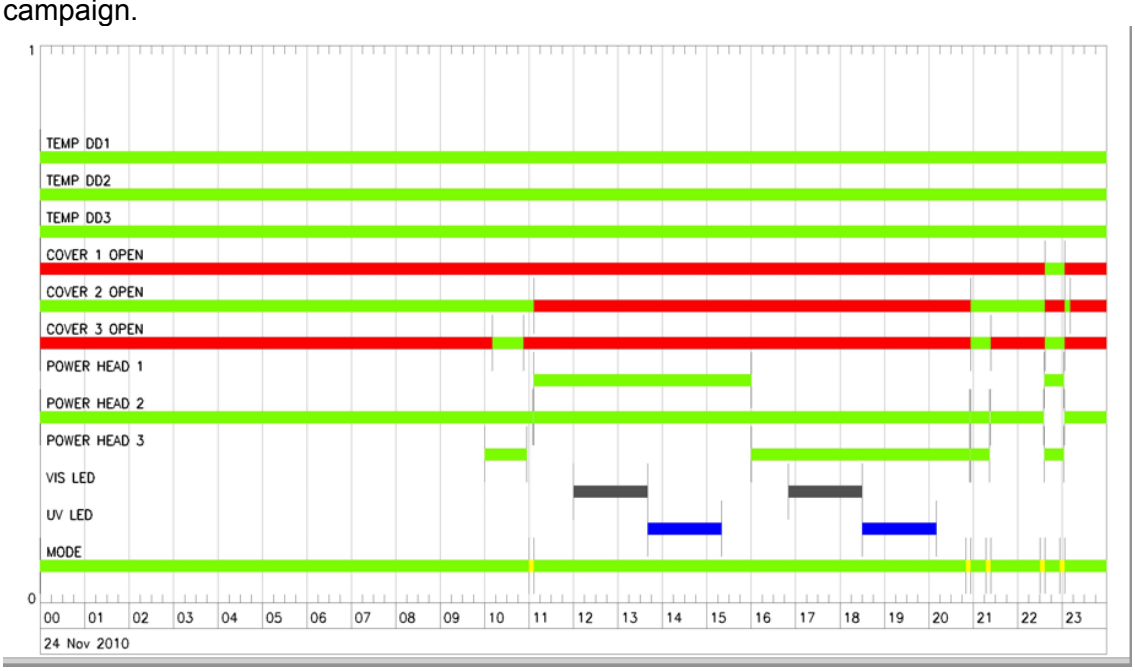


Below a weekly perspective of Lyman alpha and Herzberg jumps can be seen.
Unit2 ‘Zirconium, Aluminium ’ channels were not influenced by the Unit3 covers.

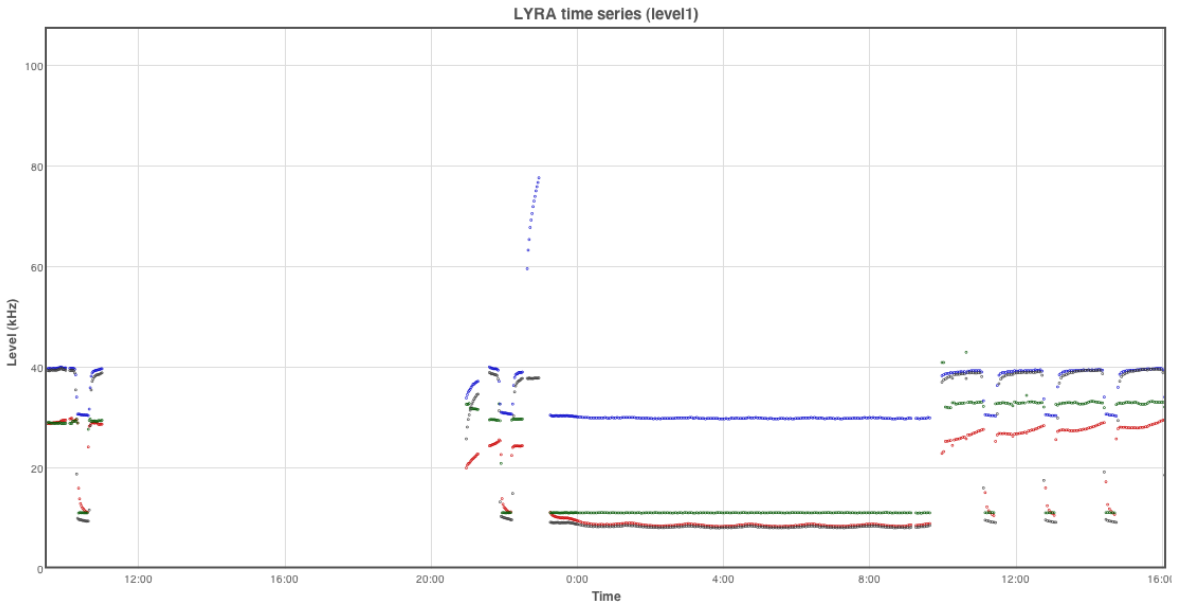


Lyra onboard anomaly 2

On Nov. 25th LYRA covers were closed unexpectedly at 23:11:10 UTC after the calibration campaign.



The problem was solved sending a new IOS (IOSLYRA00113) that set Unit2 in nominal acquisition mode. It started at 09:40, just after the PASS 3044 (09:29 -09:37).
Below the LYRA recuperation can be seen (the gap corresponds to the LYRA calibration):



Problem at SOC side

Commanding LYRA directly (opening/closing doors) from REDU via tele-commands during the occultation campaigns have some impacts in the P2SC pipeline:

LY-EDG is not aware whether LYRA UNIT3 cover is opened or closed. Normally it checks for this information from the commanding_database. As the door opening/closing was not commanded with the PTI (instead, it was commanded directly via telecommand from REDU), this information is missed in the commanding database. Therefore during the occultations campaigns the scientific data is considered as calibration data because LY-EDG thinks that the UNIT3 cover is closed.
The result is that the unit 3 data corresponding to the occultation campaigns ends in bca FITS instead of bsd FITS.

The problem can not be easily solved faking the 'commanding database' : a warm_up implies more operations than opening/closing the covers.

3. SWAP instrument status

MCPM errors
The number of MCPM errors remained unchanged (recoverable: 208, unrecoverable:0).

IOS & operations

Monday 22 Nov	Tuesday 23 Nov	Wednesday 24 Nov	Thursday 25 Nov	Friday 26 Nov	Saturday 27 Nov	Sunday 28 Nov

Nominal + eclip jumping Cadence:80 IOS00205	Nominal + eclip jumping + calibration campaign Cadence:80 IOS00207	Nominal + eclip jumping Cadence:80 IOS00207	Nominal + eclip jumping + ESP test Cadence:80 IOS00208	Nominal + eclip jumping Cadence:80 IOS00208	Nominal + eclip jumping Cadence:70 IOS00209	Nominal + eclip jumping Cadence:70 IOS00209

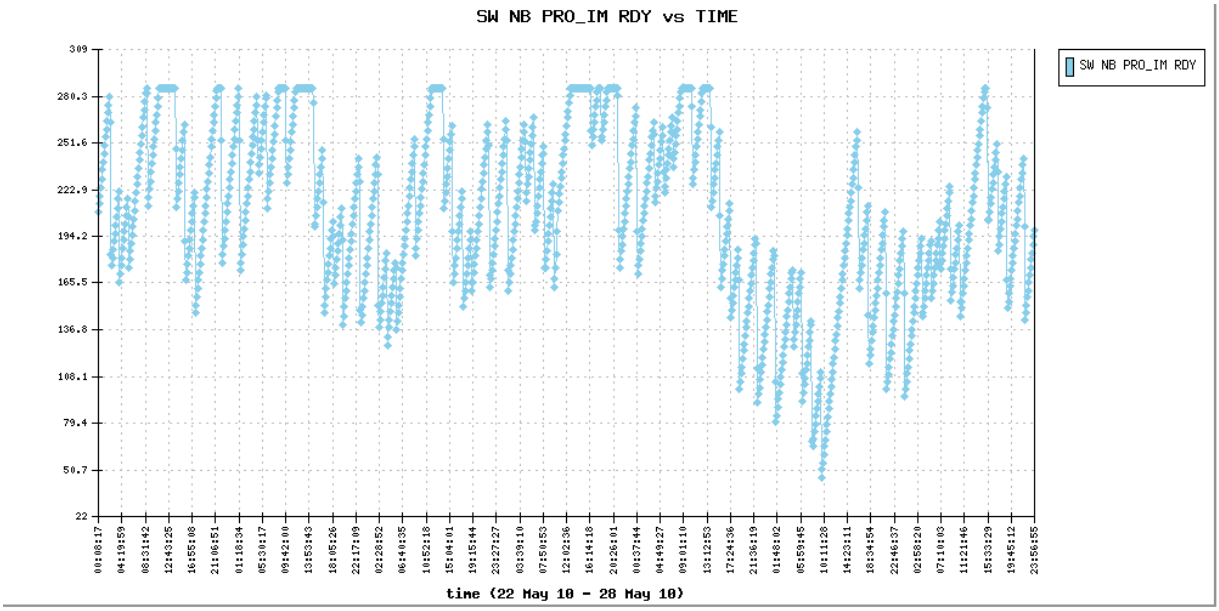
SWAP IOS 206
The intentions of this IOS were - jump the eclipsed periods from [Tuesday to Friday] - SWAP calibration campaign (Tuesday starting at 2010.11.23T09:26:10.000) - ESP jump It was overwritten because the ESP jump was scheduled when PROBA2 was not seeing the sun. This IOS was never executed onboard.

SWAP IOS 207
It overwrote partially SWAPIOS 206 (from 26 Nov onwards) to correct the ESP error mentioned above.

SWAP IOS 208
REDU asked SOC to resend this IOS IOS207 did not get uploaded. The first attempt was done at pass 3021 but failed without any error being given. Maybe it happened because IOS206 got only partially uploaded during the uplink pass 3019.

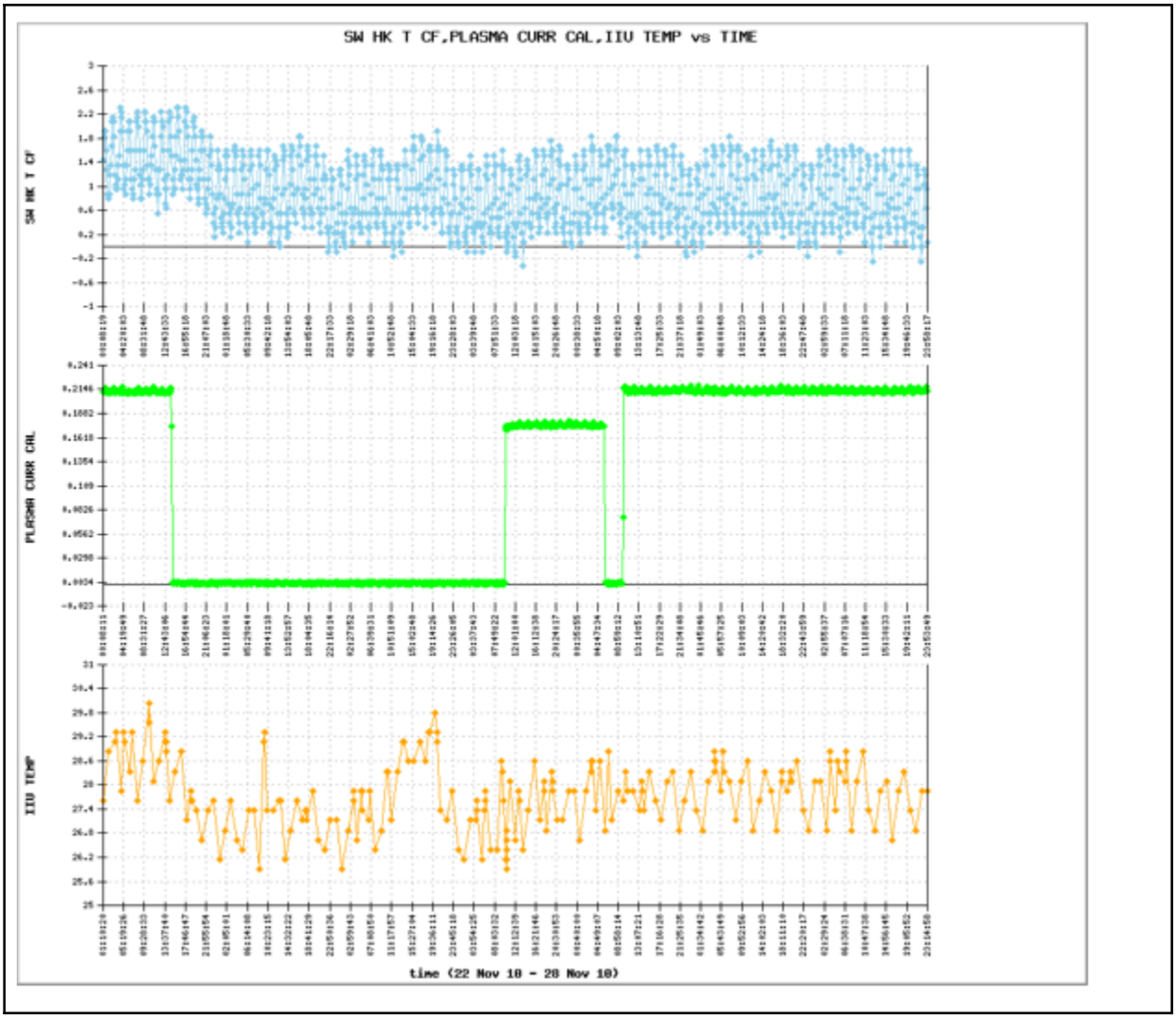
SWAP has been nominally imaging throughout the period making use of the automated eclipse skipping mechanism implemented at P2SC.
The nominal imaging cadence was 80s during the week and it was increased to 70s during the weekend as the buffer was requiring it.

Below we can see the number of processed images stored in the buffer during the reported period:



SWAP detector and IIU temperature

As reported for LYRA temperature, SWAP temperature do not show such a decreasing tendency as could be seen during the previous weeks.



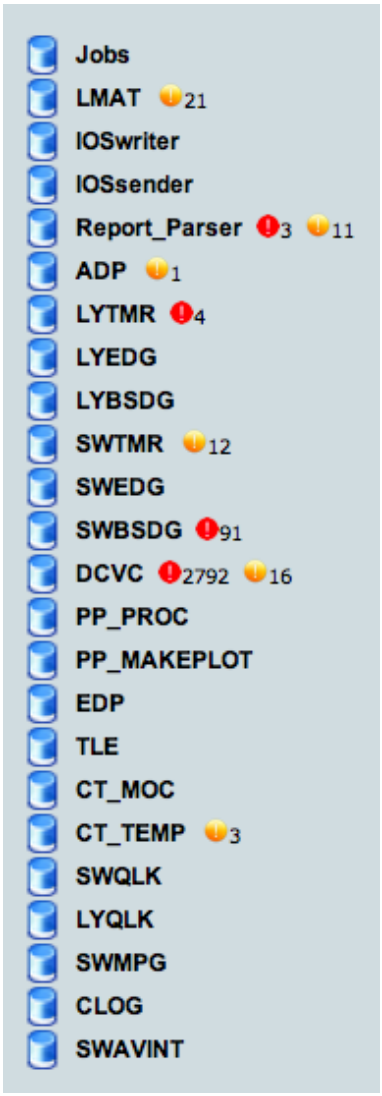
4. PROBA2 Science Center Status

Carlos Cabanas was operator during this week. SWAP daily movies were created manually during the week, but they were automated during the weekend. The programme run three times per day by crontab (1,8,15) UTC on 28,29 Nov and now it is running every hour.

One update was done in the P2SC pipeline:

- SWAVINT: 'ECLIPSE' is added to the QUALITY column (23/11/10 13:03:16) r3807

P2SC status at the end of the week
This is how the P2SC pipeline looked like at the end of the reported period (without dismissing any error/warning during the week):



- ***Logging, Monitoring and Activity Trigger*** (LMAT) warned the operator 21 times, pointing that *Lyra Quick Look* (LYQKL), *Swap Quick Look* (SWQKL) and *Lyra Base Science Data Generator* (LYBSDG) were taking too long and the status changed to not responding. It is being solved.

- ***Report Parser***
  The file detection system triggered twice the *Report Parser* tool with the same file as input. It does not have a major impact on the pipeline except extra work for the operator when dismissing these errors/warnings. It is being solved.
  The warnings pointed out images (numbers) missed in some SWAP packets.

- ***Ancillary Data Processor*** (ADP) logged one warning during the week. It claimed that it did not have enough housekeeping to calculate the orbit. It happens often when we have a lack/gap of housekeeping. This is the case. It was triggered after the data/HK gap of 27 Nov. (now we do not see the gap because REDU sent the housekeeping afterwards -pass3058-)

- **LYRA Telemetry Reformatter (LYTMR)** logged four errors due to a BINLYRA corrupted packet: (BINLYRA_3067_SVA1_2010.11.28T02.33.19)

- ***SWAP Telemetry Reformatter*** (SWTMR) detected twelve warnings due to three packets were corrupted (see more in section.5 under *Data coverage SWAP*)

- ***SWAP Base Science Data Generator*** (SBSDG) logged 91 errors that can be explained in means of:
    - The data gap of Nov 27th that produced a lack of housekeeping (temperatures).
    - Too many IDL licenses were used at the same time..

- ***Data Consistency and Validation Checker*** (DCVC) found 2792 errors. All of them can be explained by the fact that LYRA Cover 3 is being opened/closed directly by tele command from REDU instead from ROB. Thus the ROB commanding_database does not contain this information, so when the housekeeping arrived these inconsistencies are noticed.

- ***Cleaning Tool of Temp Directory*** (CT_TEMP) encountered problems trying to clean the SWBSDRP_logs.db because it does not exist. This problem has been solved.

5. Data reception & discussions with MOC

Data coverage HK

- OK
  There was a housekeeping gap of 188 minutes starting at 2010-11-26T23:43:15.000Z and ending at 2010-11-27T02:51:55.000Z. SOC got the data afterwards, so the gap was filled.

Data coverage SWAP

- BINSWAP_3067_SVA1_2010.11.28T02.33.21.tar trigger the warnings with runID 69285
  BINSWAP20101127234939000020135 0PROCESSED - Packet CRC does not validate

- BINSWAP_3064_RED3_2010.11.27T18.18.04.tar trigger the warnings with runID 69206
  BINSWAP20101127172708000020113 7PROCESSED - Truncated packet: 42589 < 65530

- BINSWAP_3044_SVA1_2010.11.25T10.05.07.tar trigger the warnings with runID 68669
  BINSWAP20101125063451000019957 4PROCESSED - Truncated packet: 33001 < 65530

  Total number of images between 2010 Nov 22 0UT and 2010 Nov 29 0UT: 4709
  Highest cadence in this period: 30 seconds (SWAP calibration)
  Average cadence in this period: 128.45 seconds
  Number of image gaps larger than 300 seconds: 102 (101 eclipse gaps + 1 for ESP test)
  Largest data gap: 31.50 minutes

Data coverage LYRA

- BINLYRA_3067_SVA1_2010.11.28T02.33.19 was corrupted.

6. APPENDIX Frequently used acronyms

ADP ADPMS	Ancillary Data Processor Advanced Data and Power Management System

AOCS	Attitude and Orbit Control System
APS	Active Pixel image Sensor
ASIC	Application Specific Integrated Circuit
BBE	Base Band Equipment
CME	Coronal Mass Ejection
COGEX	Cool Gas Generator Experiment
CRC	Cyclic Redundancy Check
DR	Destructive Readout
DSLP	Dual Segmented Langmuir Probe
EIT	Extreme ultraviolet Imaging Telescope
FITS	Flexible Image Transport System
FOV	Field Of View FPA Focal Plane Assembly
FPGA	Field Programmable Gate Arrays
GPS	Global Positioning System
HAS	High Accuracy Star tracker
HK	Housekeeping
ICD	Interface Control Document
IIU	Instrument Interface Unit
IOS	Instrument Operations Sheet
LED	Light Emitting Diode
LEO	Low Earth Orbit
LYRA	LYman alpha RAdiometer
LYTMR	LYRA Telemetry Reformatter (software module of P2SC)
LYEDG	LYRA Engineering Data Generator (software module of P2SC)
MCPM	Mass Memory, Compression and Packetisation Module
MOC	Mission Operation Center
NDR	Non Destructive Readout
OBET	On board Elapsed Time
OBSW	On board Software
PE	Proximity Electronics
PGA	Programmable Gain Amplifier
PI	Principal Investigator
P2SC	PROBA2 Science Center
PPT	Pointing, Positioning and Time (software module of P2SC)
ROB	Royal Observatory of Belgium
SAA	South Atlantic Anomaly
SCOS	Spacecraft Operation System
SEU	Single Event Upset
SOHO	Solar and Heliospheric Observatory
SWAP	Sun Watcher using APS detector and image Processing
SWBSDG	SWAP Base Science Data Generator
SWEDG	SWAP Engineering Data Generator (software module of P2SC)
SWTMR	SWAP Telemetry Reformatter (software module of P2SC)
TBC	To Be Confirmed
TBD	To Be Defined
TBW	To Be Written
TC	Telecommand
TPMU	Thermal Plasma Measurement Unit
UTC	Coordinated Universal Time
UV	Ultraviolet