P2SC-ROB-WR-096-20120123 Weekly report #096	**P2SC Weekly report**	
Period covered: Date: Written by: Released by:	Mon Jan 23 to Mon Jan 30, 2012 01 Feb 2012 Erik Pylyser David Berghmans	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, Stefano.Santandrea@esa.int	

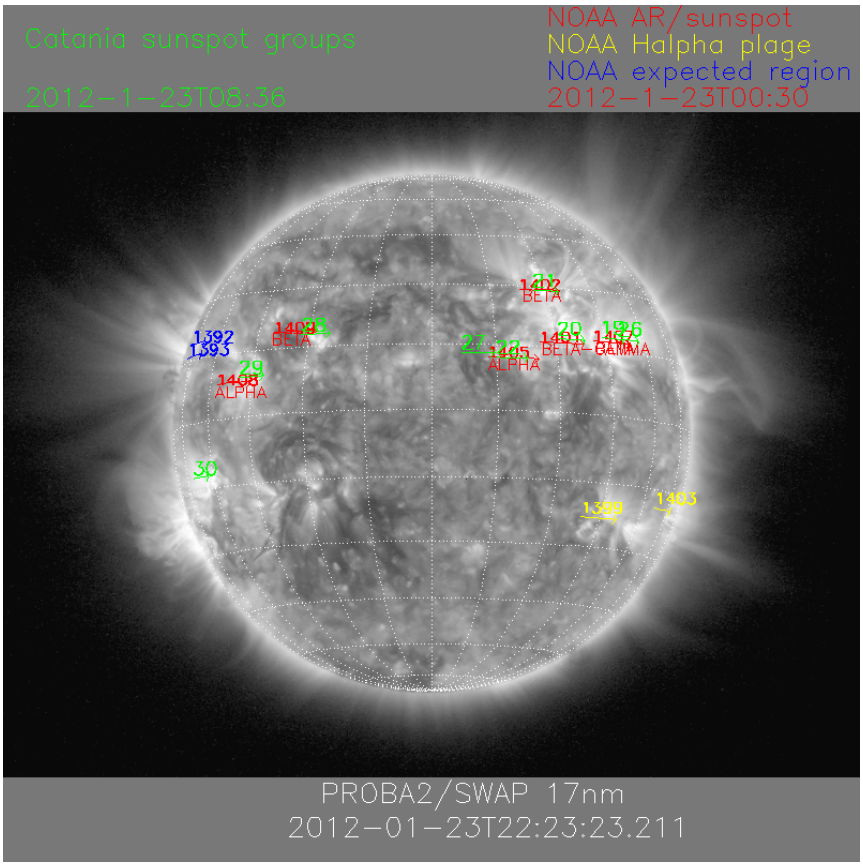
1. Science

Solar & Space weather events

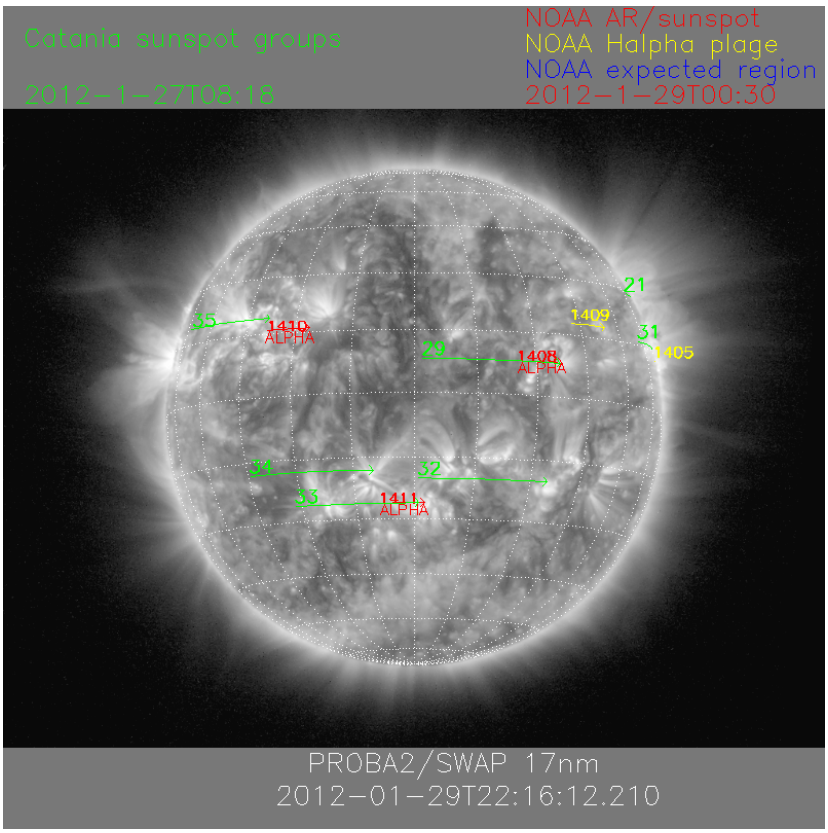
Overview

Solar activity was dominated by the flaring activity of NOAA AR 1402, which produced a M8.7 flare on Jan. 23 (0359 UT peak time) accompanied by a fast halo CME (1400 km/s as measured using COR2 A coronagraph) and a proton event (10 and 50 MeV protons), which ended on Jan. 27. While close to the west limb, AR 1402 produced an X1.7 class flare on Jan. 27, peaking at 1837 UT. It was linked again to a fast halo CME (1900 km/s on COR2 A) and a new proton event from 10 to 100 MeV.

The SWAP images of Jan 23 and Jan 29 are shown below, with annotated active regions:

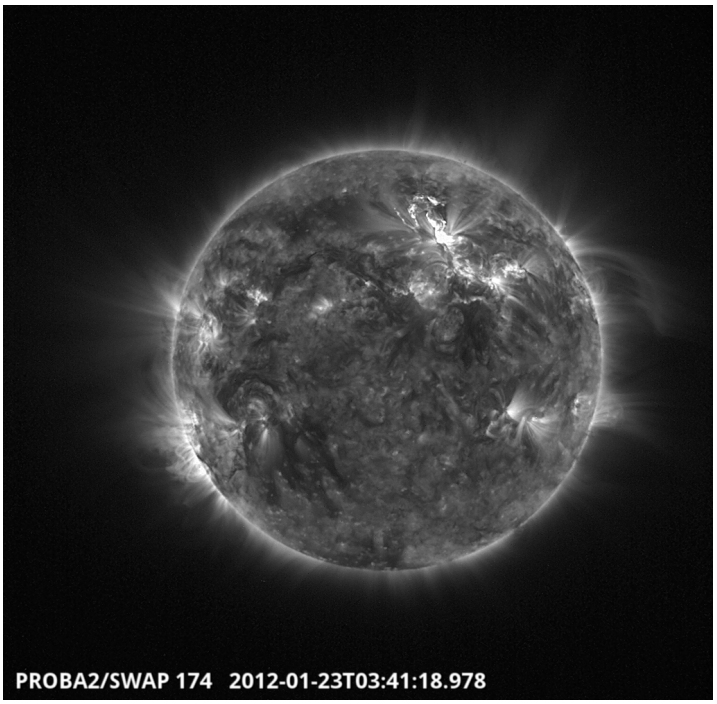


http://sidc.be/html/CmapPage.html



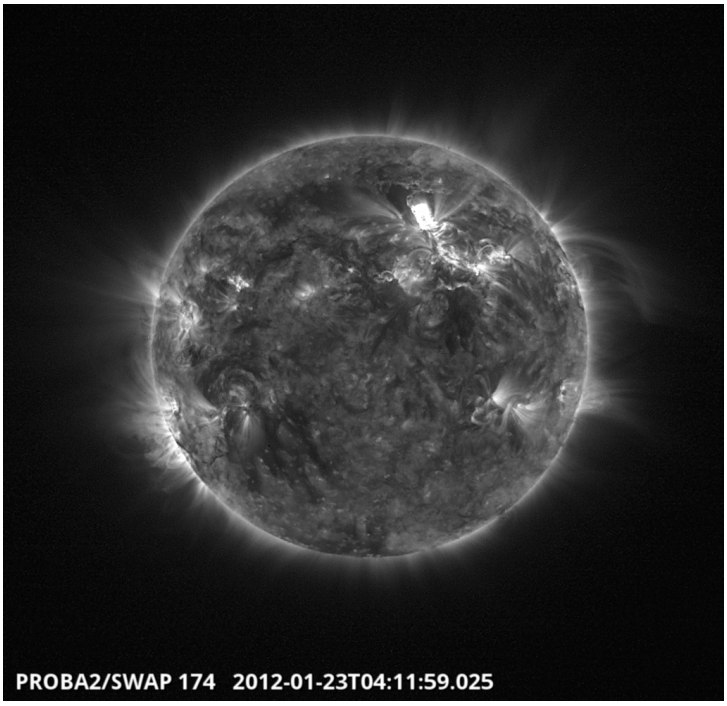
The week started off with a long-lasting energetic M8.7 flare, early Monday morning. This event was seen by both LYRA and SWAP.

* Onset of the flare:



http://proba2.oma.be/swap/data/qlviewer/2012/01/23/swap_01149369661925_0beacdfc.png

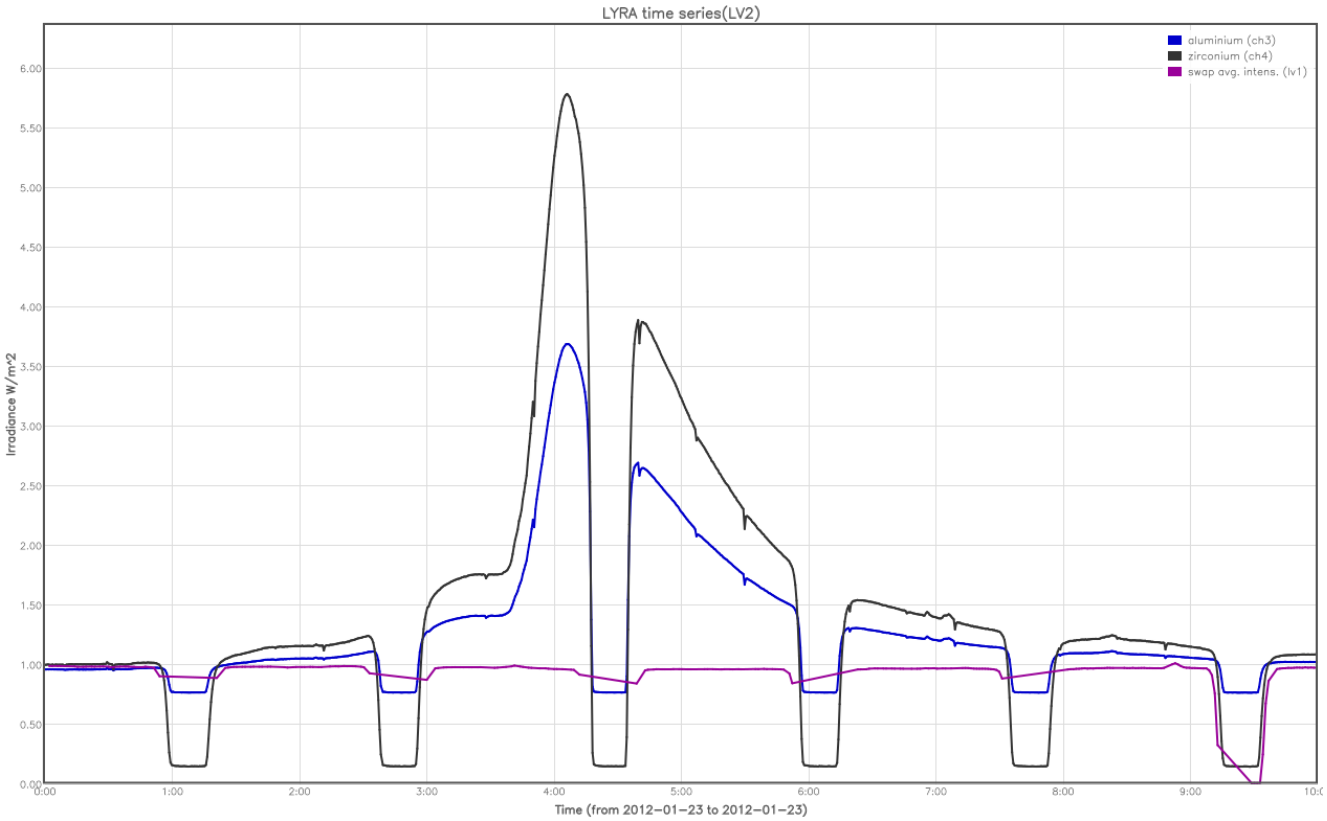
* Around maximum::



http://proba2.oma.be/swap/data/qlviewer/2012/01/23/swap_01149399808541_77ede27f.png

* The associated daily SWAP movie can be found on (the event starts around 3:30): http://proba2.oma.be/swap/data/mpg/movies/20120123_swap_movie.mp4

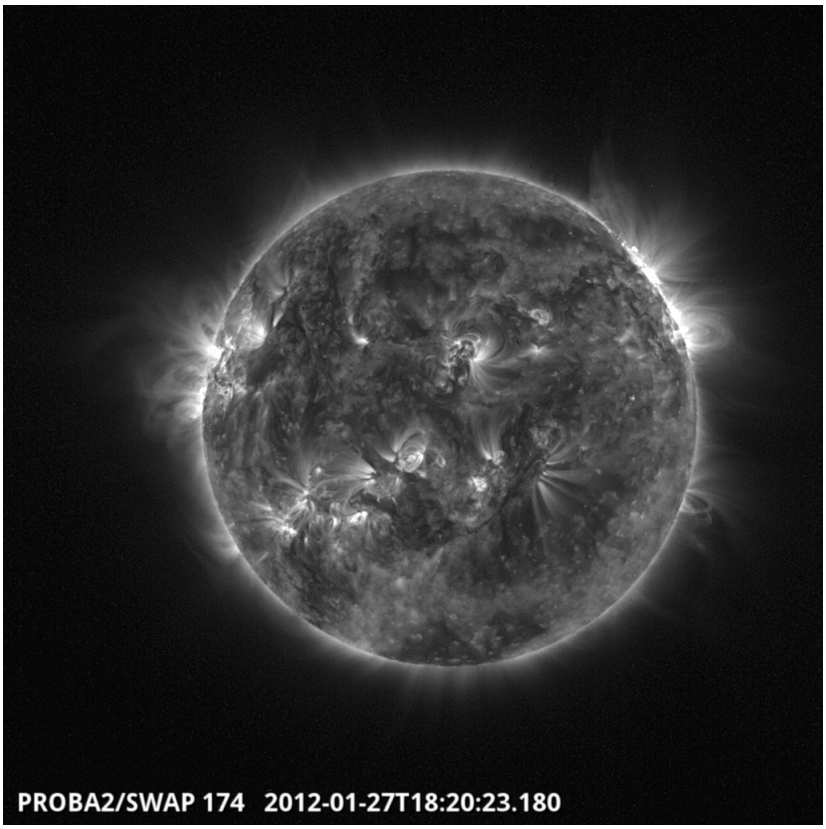
* LYRA curves for the M8.7 event:



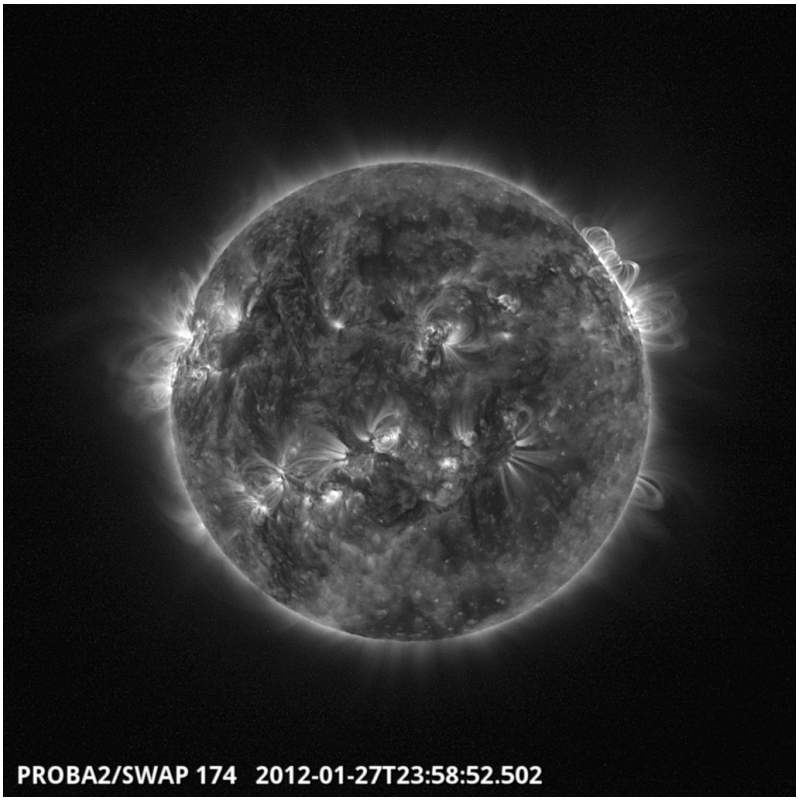
On Friday, AR 11402 - rounding the west limb of the Sun - waved goodbye with an X1.7 flare. The flare started around 18:20.

* The associated daily SWAP movie can be found on (the event starts around 18:20): http://proba2.oma.be/swap/data/mpg/movies/20120127_swap_movie.mp4

* On the first image below, the - previously closed - magnetic structure on the upper North-West limb is seen to be opened as a consequence of the explosive onset of the flare. The next image shows the solar arcade which was formed between 18:30 and 23:50.

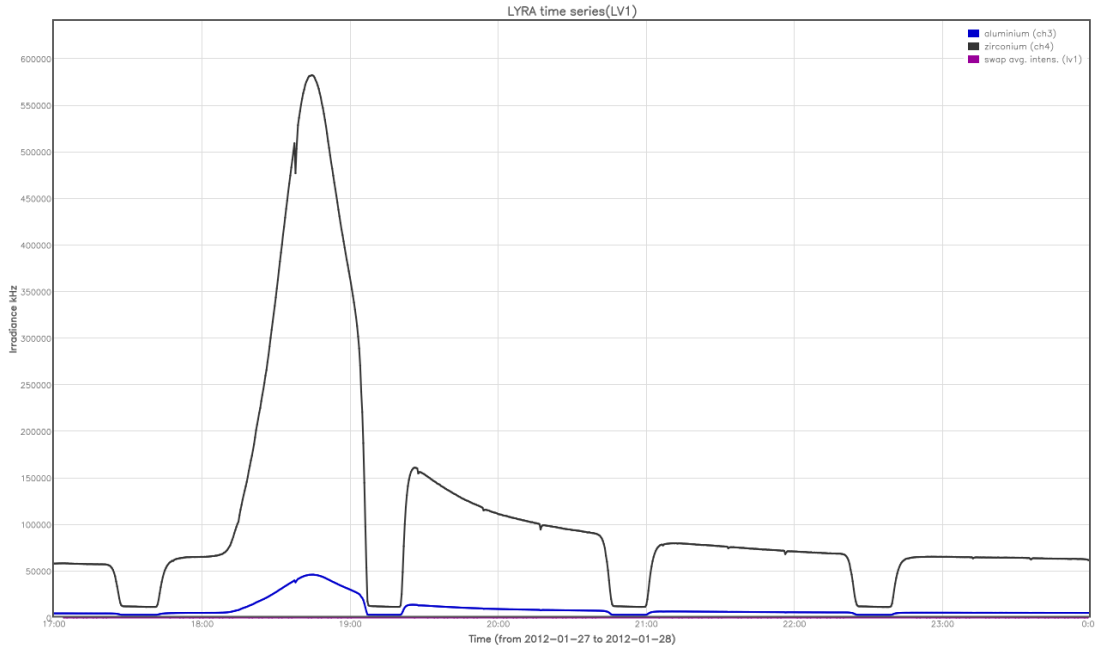


http://proba2.sidc.be/swap/data/qlviewer/2012/01/27/swap_01155894753625_a5b21150.png

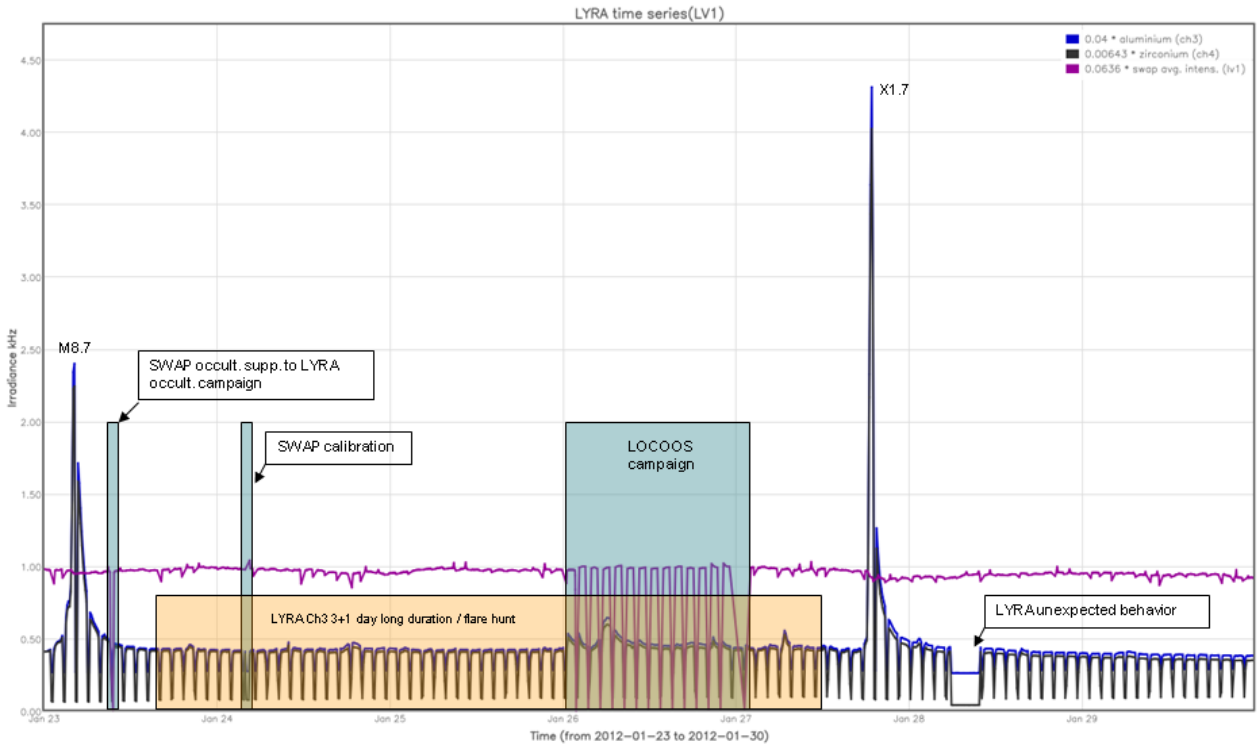


http://proba2.sidc.be/swap/data/qlviewer/2012/01/27/swap_01156228808602_23d6d330.png

* LYRA curves for the X1.7 event of Friday 27/01/2012:



Below is provided an overview of the weekly LYRA & SWAP data:



The blue shaded periods correspond, from left to right, to 1. the SWAP support to LYRA occultation campaign, 2. a SWAP calibration on Tue, and 3. the LOCOOS campaign on Thu. The orange shaded period corresponds to the 3+1-day LYRA campaign with Channel 3 (see below for more details).

Scientific campaigns

The following LYRA and SWAP specific scientific campaigns are on-going:
- daily LYRA occultation ingress & egress (planned around 10:00 every day), with channel 3,
- bi-weekly, on Monday, a LYRA occultation ingress & egress with channel 1, right after the channel 3 occultation of that Monday (not performed this week),
- weekly SWAP occultation ingress & egress imaging (planned on Mon, in parallel to the 10:00 LYRA occultation)

A LYRA long exposure - 3 day - campaign with Channel 3 - in parallel with Channel 2, was initiated on Monday 23rd, to:
- allow for the capture of an eventual new flare,
- analyse degradation effects on Ch3 of 3-day non-stop exposure.

Ultimately, a 4th day of Ch3 observing was commanded, as a flare hunting campaign.

SWAP normal imaging was interrupted for 24 hours on 26/01, to support a LOCOOS test campaign. SWAP RAW images were kept and downlinked during this period, but no on-board processing was performed.

Outreach, papers, presentations, etc.

- The following web-page was set up to present in a timely manner the events associated with the flares on Thu 19th and Mon 23rd:
  * http://sidc.be/news/144/welcome.html (also 'distributed' on Facebook)

- Several small updates to P2SC website - http://proba2.sidc.be/index.html/

- A section of the weekly STCE bulletin covers the weekly results of SWAP & LYRA

2. LYRA instrument status

Calibration

No LYRA calibration this week.

IOS & operations

Monday 23 Jan	Tuesday 24 Jan	Wednesday 25 Jan	Thursday 26 Jan	Friday 27 Jan	Saturday 28 Jan	Sunday 29 Jan
Nominal acquisition + Long-duration Ch3 + flare hunt LYIOS00213 -> 214	Nominal acquisition + Long-duration Ch3 + flare hunt LYIOS00214	Nominal acquisition + Long-duration Ch3 + flare hunt LYIOS00214	Nominal acquisition Extension flare hunt Ch3 LYIOS00214 -> 215 -> 216	Nominal acquisition LYIOS00215	Nominal acquisition LYIOS00215	Nominal acquisition LYIOS00215

On Monday, an IOS was issued to initiate a 3-day long LYRA exposure campaign with Channel 3, to:
- allow for the capture of a potential big flare,
- analyse degradation effects on Ch3 of 3-day non-stop exposure.

On Thu, given the potential for additional flaring events, Ch3 was re-opened for another day of monitoring, 45 mins after previous closure.

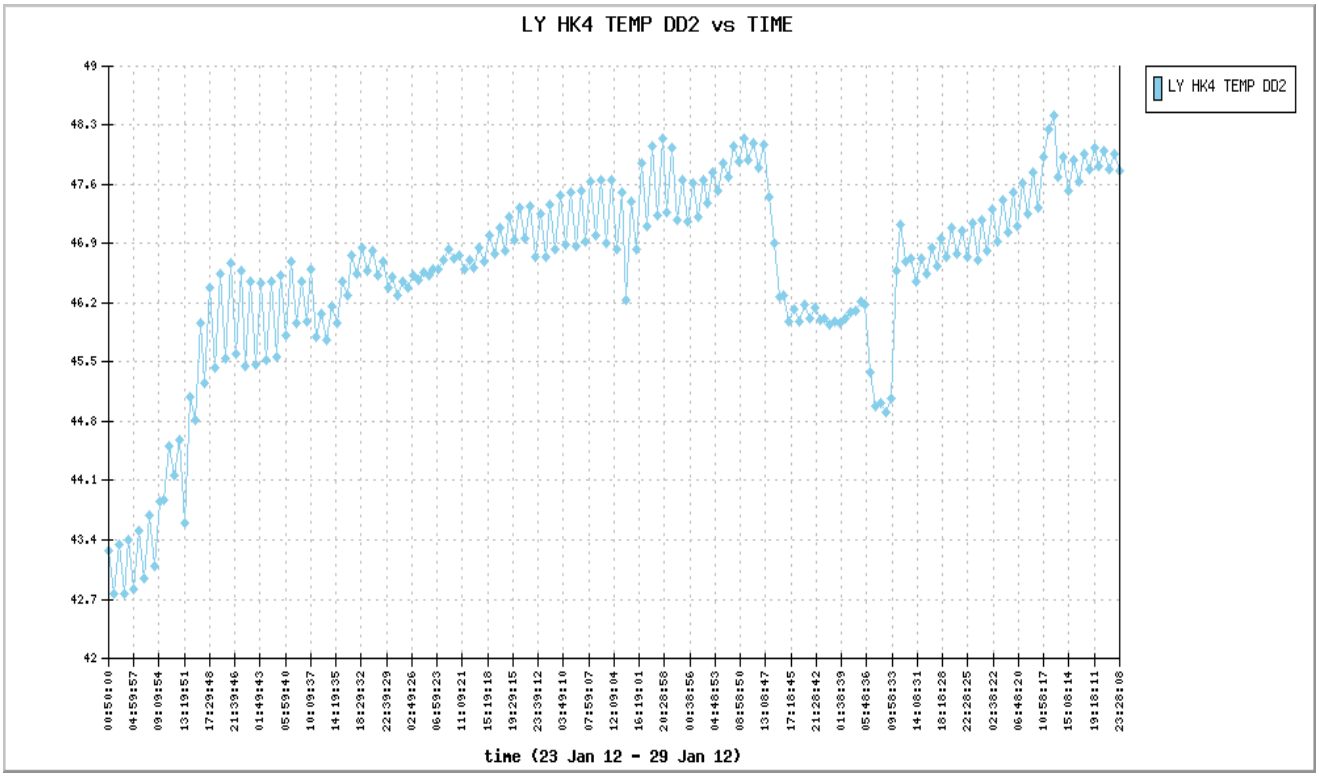
The daily occultation campaign continued for the other remaining days.

On Saturday 28, around 05:45, the signal from Channel 2 dropped unexpectedly, as well as the temperature of LYRA DD2. The situation remained as such until the planned occultation commands at 09:47 restored nominal operations. This unexpected behavior is likely caused by a mode change within LYRA - in this case, at the end of a VFC 5V calibration, which would have resulted in a partial closure of cover 2.

LYRA detector temperature

The LYRA detector 2 temperature (nominal unit) fluctuated between 42.7 and 48.3 degrees during nominal operations (see figure below).
Temperature clearly rises on Monday (PM) due to the initiation of the 3-day observing campaign of Ch3.
As expected, a significant drop in the gradually rising temperature of Ch2 is observed, when Ch3 isclosed after 4 days of un-interrupted data gathering.

Another significant drop can be observed on Saturday between 05:45 and 09:49, when the Ch2 signal dropped unexpectedly.



To be explored
- analyse the long-duration exposure with Ch3 for degradation.

3. SWAP instrument status

Calibration

A standard SWAP calibration was performed on Tue.
From here on this calibration will be performed every 2 weeks.

MCPM errors
The number of MCPM recoverable errors increased from 1536 to 1598.
The number of MCPM unrecoverable errors is still 0.

IOS & operations

Monday 23 Jan	Tuesday 24 Jan	Wednesday 25 Jan	Thursday 26 Jan	Friday 27 Jan	Saturday 28 Jan	Sunday 29 Jan
Nominal acquisition 80s cadence + occult. jumps IOS00362 596 images	Nominal acquisition + occult campaign + occult. jumps IOS00362 607 images	Nominal acquisition + + occult. jumps IOS00362 693 images	LOCOOS test - limited acq - RAW images downlink IOS00363 94 images	Nominal acquisition + + occult. jumps IOS00363 600 images	Nominal acquisition + occult. jumps IOS00363 552 images	Nominal acquisition + occult. jumps IOS00363 562 images

On Mondays, SWAP participates in the LYRA daily occultation campaign, by ‘not jumping’ over the same occultation as the chosen LYRA occultation.

Occultation imaging jumps are commanded and performed during each orbit.

On Thursday 26th, a LOCOOS test was performed. Consequently, SWAP was commanded to low cadence acquisition, in which RAW images are not processed on-board, and downlinked at such. This explains the very low number of images taken on Thu. After the LOCOOS test, SWAP was commanded back to nominal acquisition.

SWAP detector temperature
The SWAP Cold Finger Temperature increased, in a fluctuating manner between -2.0 and +1.6 degrees Celsius, under nominal operations.

To be explored
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4. PROBA2 Science Center Status

The main operator is Koen Stegen; Erik Pylyser provides support, when needed.

The weekly 'P2SC Operations meeting' was held on 25/01/2012.

P2SC long-duration processing problems were tracked down to a problem of AuxDB database inquiring and the use of associated indices. The problem was alleviated by choosing to use only the most appropriate index. From then on, all pass processing went smoothly and significantly increased the efficiency of the overall P2SC monitoring. The DCVC is now again being executed after each pass.

Updates to P2SC, this week:
- Complete update of repository: 25/01/2012: r4328
- libp2sc: 25/01/2012: r4328
- ODP/PP_Plot: 23/01/2012: r4325 (optimize queries to improve performance of SWQLK and LYQLK)
- DCVC: 23/01/2012: r4326 (optimize queries to improve performance of DCVC and reduce the risk of locked database).

5. Data reception & discussions with MOC

Passes The delivery of the following passes for this week (passes 6859 till 6919) was not nominal: - none.
Data coverage HK The HK data were complete over this period.
Data coverage SWAP The SWAP data were complete over this period. Statistics for the week: Total number of images between 2012 Jan 23 0UT and 2012 Jan 30 0UT: 3745 Highest cadence in this period: 0 seconds Average cadence in this period: 161.44 seconds Number of image gaps larger than 300 seconds: 140 Largest data gap: 125.00 minutes The LOCOOS campaign of Thursday explains the lower number of images taken this week, as well as the large data gap (125 minutes).

Data coverage LYRA The LYRA data were complete.

6. APPENDIX Frequently used acronyms

ADP	Ancillary Data Processor
ADPMS	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

SWAVINT	SWAP AVerage INTensity
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