P2SC-ROB-WR-088-20111121 Weekly report #088	**P2SC Weekly report**	
Period covered: Date: Written by: Released by:	Mon Nov 21 to Sun Nov 27, 2011 01 Dec 2011 Erik Pylyser David Berghmans	Royal Observatory of Belgium PROBA2 Science Center
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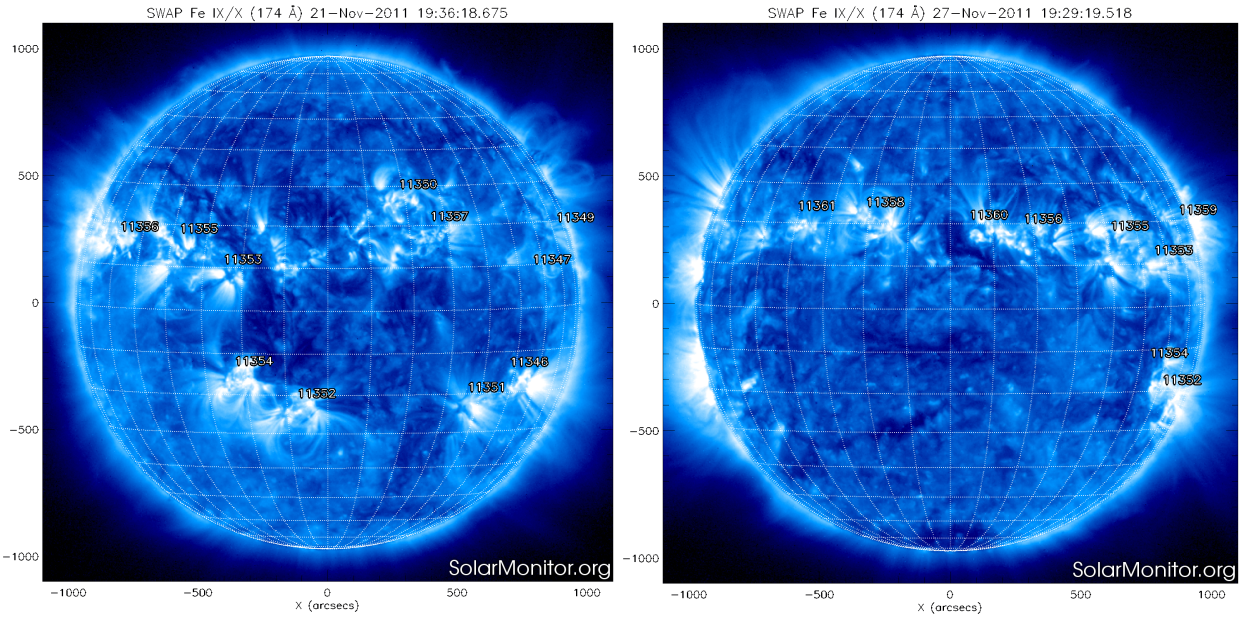
1. Science

Solar & Space weather events

Overview

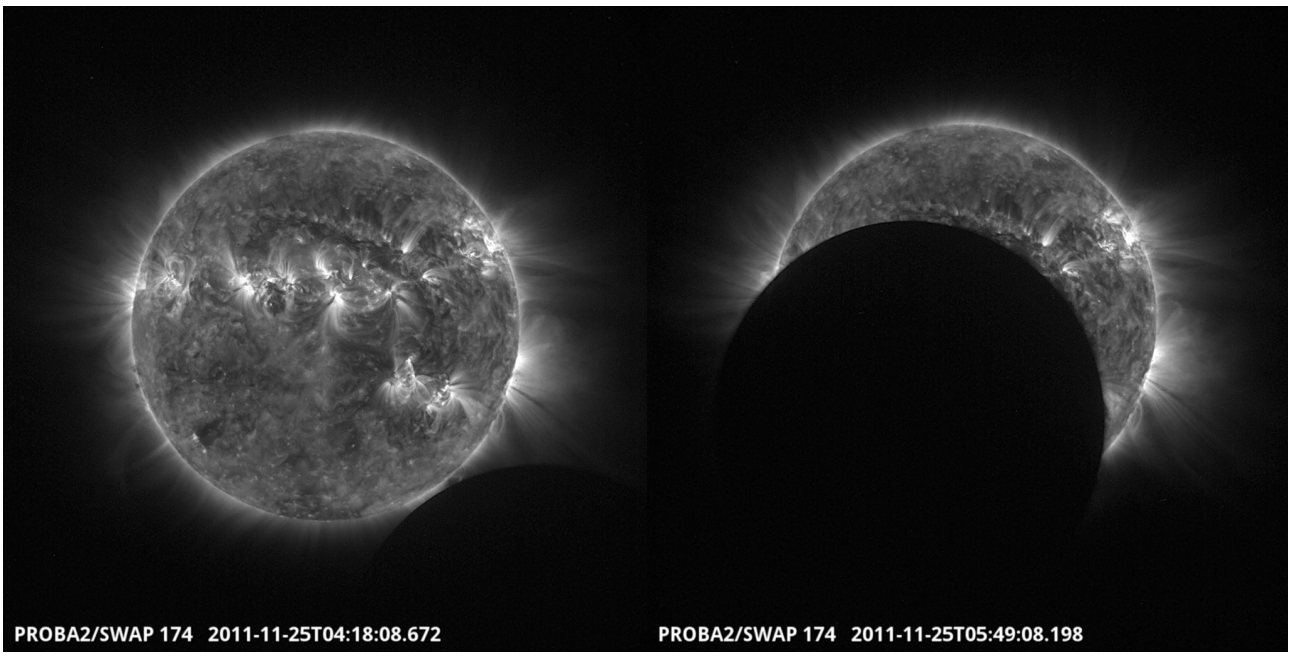
The SWAP images of November 21 and November 27 are shown below, with annotated active regions:



Solar activity was at MEDIUM level this week. Thirteen sunspot groups were reported.
Flaring activity, at the low end of the C-level, has been decreasing during the course of the week, with the strongest flare being the C4.9 flare peaking at 04:04 UT on November 22 in NOAA AR 1356. A weak partial halo CME was detected by SOHO/LASCO in association with this flare, accompanied by coronal dimmings and a post-eruption arcade detected by SDO/AIA. The CME first appeared in the LASCO C2 field of view at 06:24 UT, with the speed of around 590 km/s and the angular width around 200 degrees. Due to the source region position far from the central meridian (N12E46), this CME was directed mostly to the east and did not arrive at the Earth.

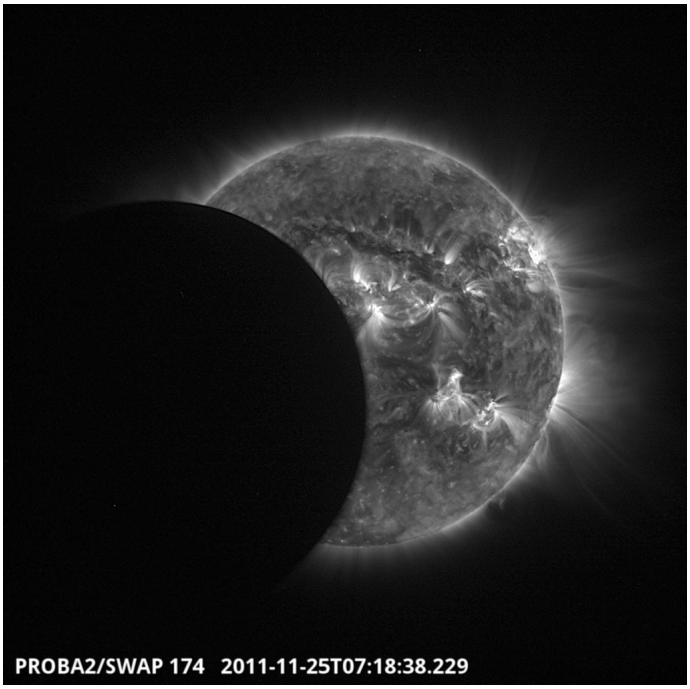
On November 26th, a solar proton event was detected by GOES and ACE. The proton flux at energies above 10 MeV was detected by GOES starting from around 08:30 UT, and the SEP event threshold was crossed around 11:00 UT. The event was produced by the full halo CME first detected in the LASCO C2 field of view at 07:00 UT on the same day. Its speed was around 780 km/s. Coronal dimmings, a filament eruption and a post-eruption arcade were detected by SDO/AIA to the west of NOAA AR 1353, in association with this event. The CME was associated with the double-peaked C-class flare. The C1.2 peak at 07:10 UT at N11W47 was associated with the above-mentioned filament eruption. The C1.5 peak at 08:24 UT located in the Catania sunspot group 55 (NOAA AR 1357) at the north-west limb was not associated with any CME.

On Friday 25th, between 04:20 and 07:30, a partial solar eclipse occurred, preceded by a ‘coronal’ eclipse. SWAP and LYRA were commanded in specific working modes for this event.

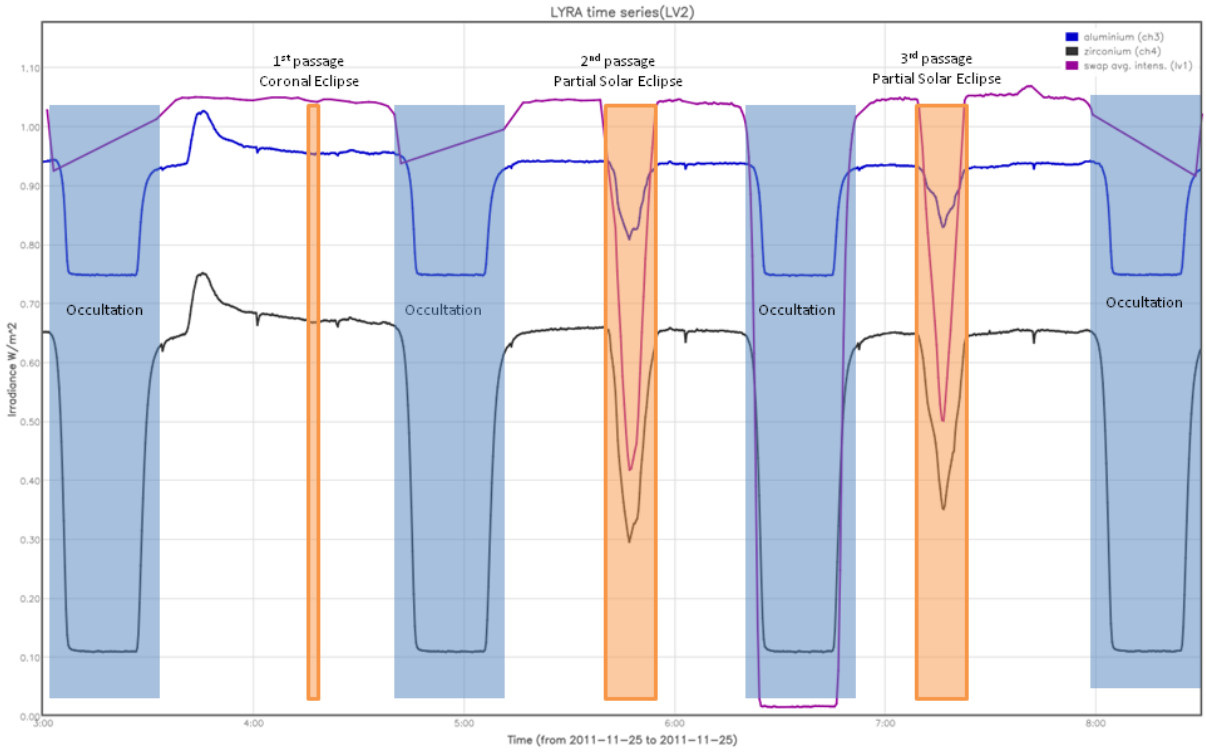


First transit - Coronal eclipse

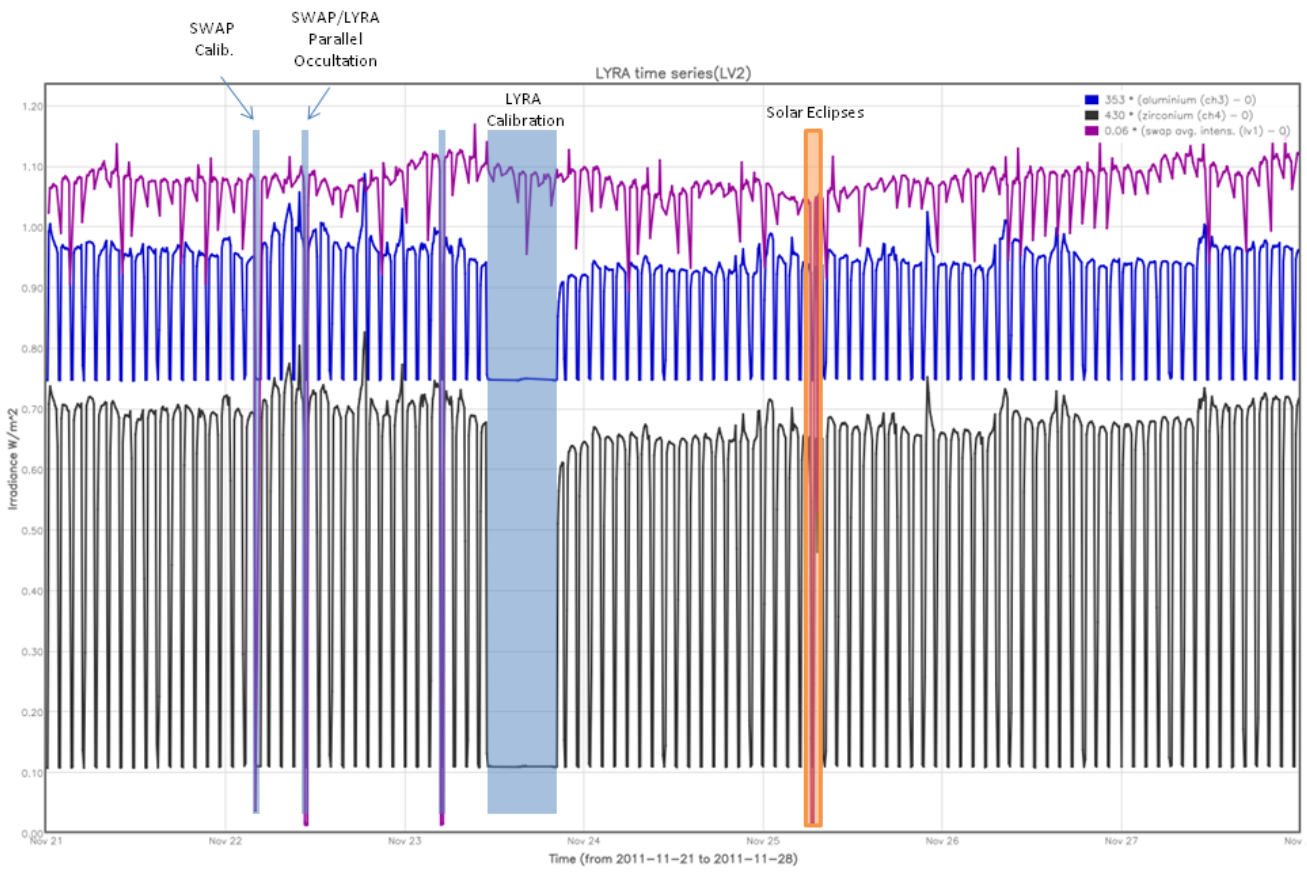
Second transit - first partial eclipse



Third transit - second partial eclipse



Above are shown the LYRA recordings of the triple passage of the Moon in front of the Sun. Luckily they all happened in-between Earth occultations. The first transit which didn't occult the solar disk can hardly be identified.



Above is shown the weekly overview of LYRA Al/Zr signals and SWAP average intensity (SWAVINT in purple). SWAVINT as well as the LYRA channels exhibit luminosity dips, due to the occultation season.
The blue areas indicate, from left to right, the weekly SWAP calibration campaign (on Tue), the weekly LYRA/SWAP parallel occultation campaign, an occultation for which SWAP was not commanded to 'jump over' - an operator error, and the LYRA bi-weekly calibration campaign (on Wed), respectively.
The orange area indicates the period of the 3 Moon-Sun passages - on 25/11 between 04:15UT and 07:30UT.

Scientific campaigns

The following science campaigns are on-going:
- daily occultation campaign of LYRA
- weekly LYRA/SWAP parallel occultation campaign

In addition, an eclipse campaign was set up for the eclipses on 25/11 - both for LYRA and SWAP.

Early in the week, the occurrence of irregularities in LYRA commanding, identified between 18 & 23 of November (see also P2SC weekly report #87) were investigated.
Two Guest Investigators have arrived this week.

Mr. David Long is visiting the P2SC as GI-investigator from Nov 21 till Dec 20 and will work on the observations of EIT waves in SWAP data.

Mr. Vladimir Slemzin visited the P2SC as GI-investigator from Nov 21 to Nov 27, after which he participated at the PROBA2 SWT at the ESWW8 conference. His GI grant deals with "Long-term study of the solar EUV corona and its dependence on the magnetic field structure and local sources of plasma outflow"

Outreach, papers, presentations, etc.

/TBD.

To be explored
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2. LYRA instrument status

Calibration

No calibration this week.

IOS & operations

Monday 21 Nov	Tuesday 22 Nov	Wednesday 23 Nov	Thursday 24 Nov	Friday 25 Nov	Saturday 26 Nov	Sunday 27 Nov
Nominal acquisition + occultation LYIOS00199	Nominal acquisition + occultation LYIOS00199	Nominal acquisition + occultation LYIOS00199	Nominal acquisition + occultation LYIOS00201	Nominal acquisition + occultation + solar eclipse LYIOS00201	Nominal acquisition + occultation LYIOS00201	Nominal acquisition + occultation LYIOS00201

The occurrence of irregularities in LYRA commanding, identified from 18th till 23rd of November (see P2SC weekly report #87) were investigated.
Each time, the irregularities were linked to the powering ON of LYRA channel 3 (HD3 and/or VCF2) for the daily occultation campaign. The consequences were the loss of LYRA data - except for the 19nd, in the context of the occultation campaign, because the equipment failed to switch ON.

REDU identified the problem to be related to the issuing of IOS's, containing commands to be executed beyond a period of 20 days in the future - which was the case for the currently applicable IOS for LYRA. It was found that a ground system at REDU was not properly processing the

commands beyond the 20-days period, and that some commands got lost in that processing. It was agreed between P2SC and Redu to extend this period to 40 days, and that P2SC would make sure not to send IOSs with commands 40 days in the future.
Once the solution was found, P2SC issued a new IOS to avoid further data loss, and, since then, that solved the problem for the LYRA daily occultation campaign.

LYRA detector temperature

The LYRA detector 2 temperature (nominal unit) fluctuated between 41.5 and 38.8, during nominal operations.

To be explored
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3. SWAP instrument status

Calibration
Weekly extended LED calibration campaign executed on 22 November.

MCPM recoverable errors
Increased from 1335 to 1409 this week.
The number of MCPM unrecoverable errors is still 0.

IOS & operations

Monday 21 Nov	Tuesday 22 Nov	Wednesday 23 Nov	Thursday 24 Nov	Friday 25 Nov	Saturday 26 Nov	Sunday 27 Nov
Nominal acquisition 110s cadence + occult. jumps IOS00343 570 images	Nominal acquisition + LED calibration + occult. jumps + parallel occult w/ LYRA IOS00344 695 images	Nominal acquisition + occult. jumps IOS00344 584 images	Nominal acquisition + ESP campaign + occult. jumps IOS00344 553 images	Nominal acquisition + occult. jumps + solar eclipse IOS00344 785 images	Nominal acquisition + occult. jumps IOS00345 565 images	Nominal acquisition + occult. jumps IOS00345 566 images

Occultation jumps occur during every orbit.
On Tuesdays SWAP images the entry & exit of one particular occultation in parallel with LYRA.

SWAP detector temperature
The SWAP Cold Finger Temperature fluctuated between -2.3 and - 4.8 degrees Celsius, under nominal operations.

To be explored

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4. PROBA2 Science Center Status

Erik Pylyser was operator during this week.

As during last week, the nominal processing of incoming data was perturbed by the parallel re-processing of SWAP data. This parallel re-processing ended during the week-end, subsequently, most of the near-real time processing problems disappeared.

5. Data reception & discussions with MOC

Passes All data were received.
Data coverage HK The HK data were complete this week.
Data coverage SWAP All data was received. Statistics for complete week: *Total number of images between 2011 Nov 21 0UT and 2011 Nov 28 0UT: 4318* *Highest cadence in this period: 18 seconds* *Average cadence in this period: 139.80 seconds* *Number of image gaps larger than 300 seconds: 99* *Largest data gap: 29.68 minutes* The data gap of 29.68 min was commanded to allow for an ESP test.
Data coverage LYRA The LYRA data were complete this week.

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