P2SC-ROB-WR-053-20110321 Weekly report #053	**P2SC Weekly report**	
Period covered: Date: Written by: Released by:	Mon Mar 21 to Sun Mar 27 2011 Tue April 5 2011 Anik De Groof Carlos Cabanas	Royal Observatory of Belgium PROBA2 Science Center
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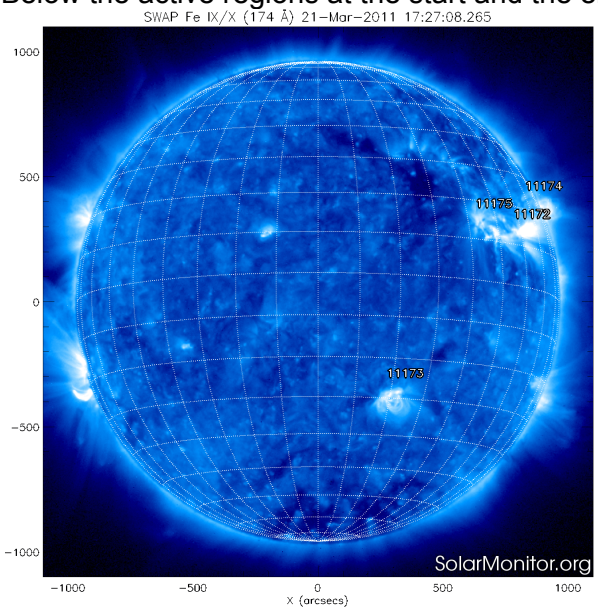
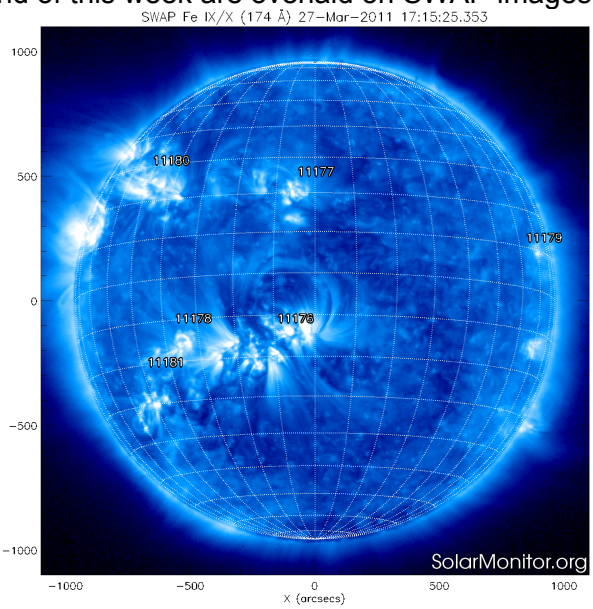
1. Science

Solar & Space weather events

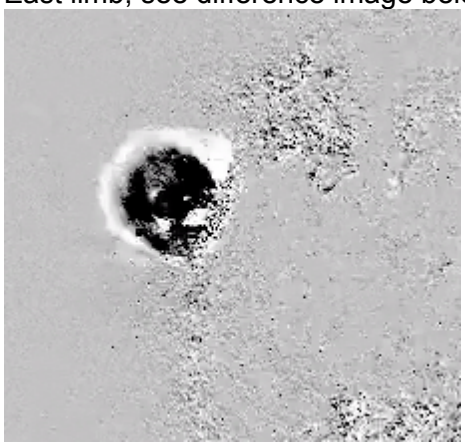
Below the active regions at the start and the end of this week are overlaid on SWAP images:



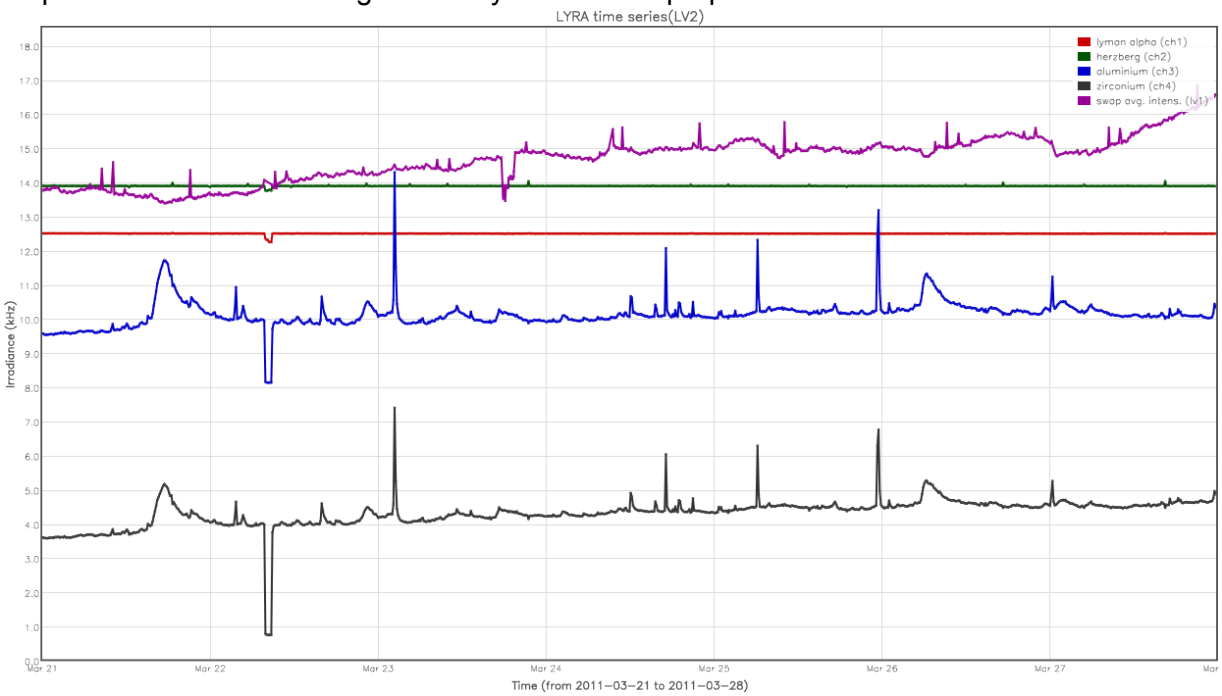


- 21 mar: A long duration C-flare took place, with associated CME. The source region is located in the west: AR 1176.
- 23 mar: NOAA AR 1176 was responsible for an M-flare in the morning, while it was still behind the limb.

- 24 mar: An M8.6 flare peaked at 12:05UT in AR 1176. The X-ray curve shows a sharp small peak. No CME is associated with the event.
- 25 mar: A big peak in LYRA around 6:10 which is not reported by SolarSoft events. This peak is associated with an EUV jet in SWAP and a global coronal wave around 6:20UT. During the morning also several long-lasting intensity variations along long loops are seen in SWAP.
- 26 mar: An M-flare occurred just before midnight from AR 1176. Long duration event in LYRA around 6:20UT. SWAP CME (see diff movies) associated with it. Later that day more jet like features and intensity oscillations in SWAP difference movies.
- 27 mar: Day starts with large global, coronal wave. Then around 5UT, a nicely formed CME cloud leaves the East limb, see difference image below:



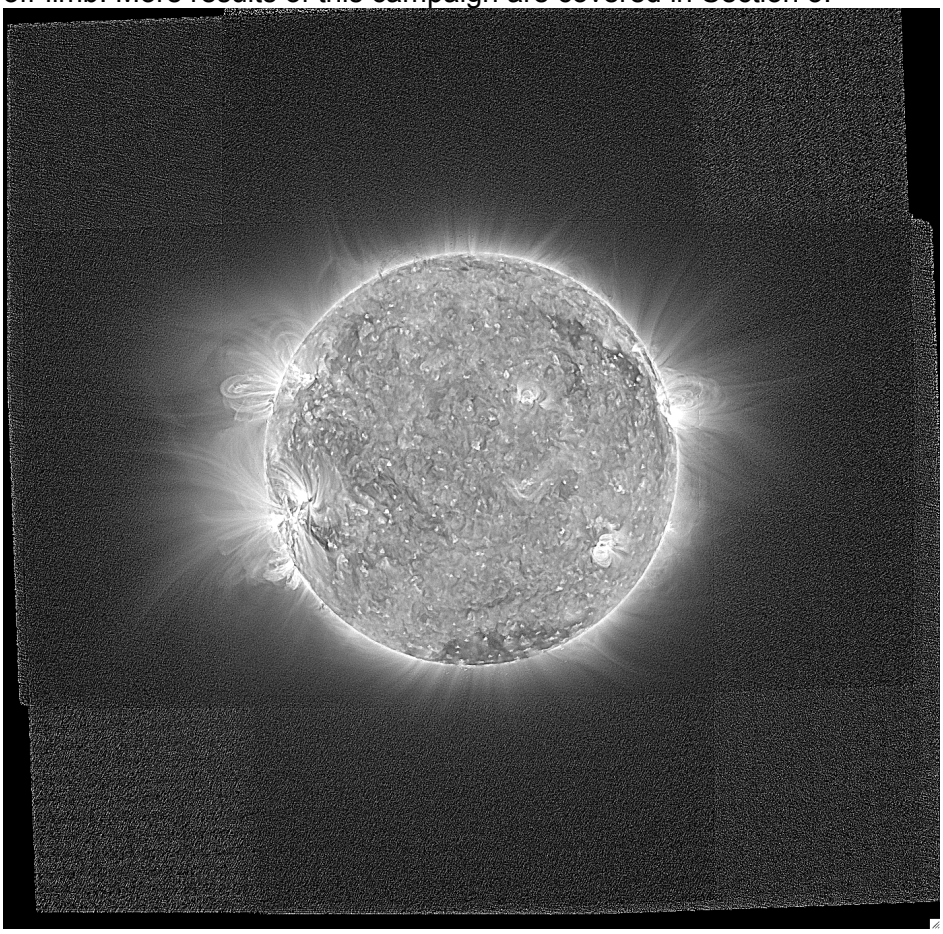
LYRA overview of the week, in W/m^2, with factors (2000,20,4000,4000) for (Ly-a, Hz, Al, Zr) resp. Also the SWAP average intensity is shown in purple:



The drop in all LYRA signals on Mar 22 is due to the SWAP LED campaign (3 degrees offpointing).
The drop in SWAP average intensity on Mar 23 is a side-effect of the mosaic campaign, described later (8.3 arcmins offpointing).
The overall EUV response is increasing over the week because of the active regions moving

into the field of view.

Scientific campaigns
NOAA ARs 1176,1177,1178,1180, 1181 showed their activity on the East limb on March 23, day selected by SWAP team to perform an off-pointing campaign. PROBA2 was slightly offpointed (around 8.3 arcmins) to all four corners of the SWAP FOV, while SWAP was acquiring at 30s cadence (10s integration time). The images were used to construct a SWAP mosaic image showing enterely the EUV corona. The image below is contrast enhanced to show the fine structures of the corona. It however kills some of the (vague) structures further off-limb. More results of this campaign are covered in Section 3.



Outreach, papers, presentations, etc.

A group of secondary school pupils was visiting P2SC on Tuesday March 22. They got a full day programme with interactive workshops and talks on PROBA2, the PROBA2 Science Center and Space Weather prediction.

To be explored
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2. LYRA instrument status

Calibration
No LYRA calibration this week.

IOS & operations

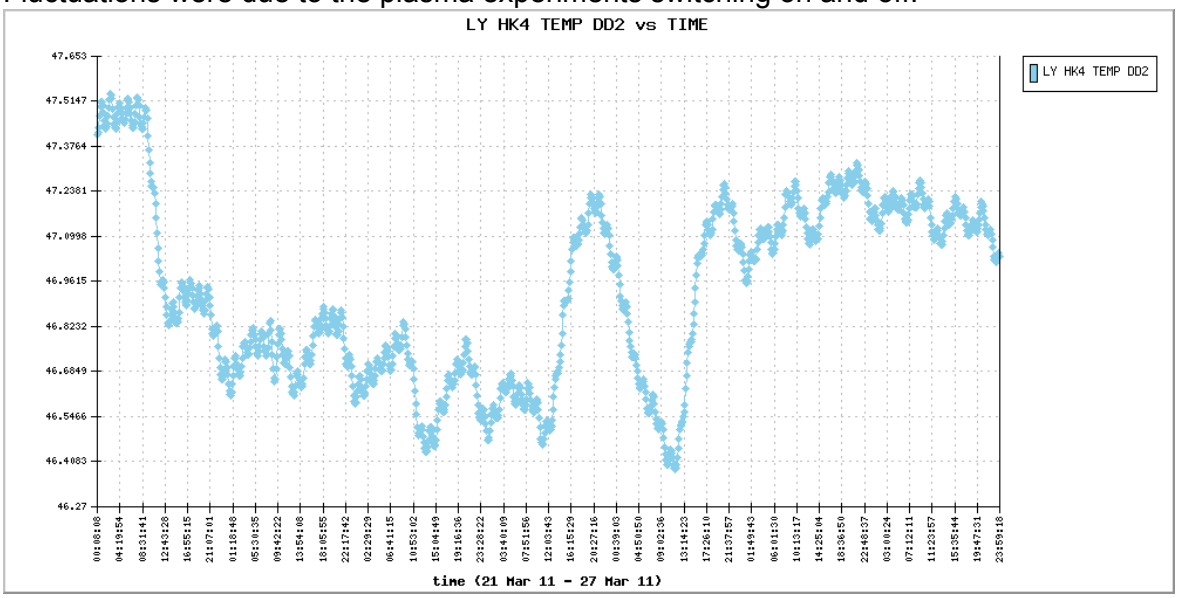
Nominal acquisition at 50ms for the whole week - no IOSs sent for LYRA.

Monday 21 Mar	Tuesday 22 Mar	Wednesday 23 Mar	Thursday 24 Mar	Friday 25 Mar	Saturday 26 Mar	Sunday 27 Mar
Nominal acquisition (LYRA00150)	Nominal acquisition (LYRA00150)	Nominal acquisition (LYRA00150)	Nominal acquisition (LYRA00150)	Nominal acquisition (LYRA00150)	Nominal acquisition (LYRA00150)	Nominal acquisition (LYRA00150)

An ASIC reload (automatically scheduled onboard every 100 orbits) took place on 2011-03-24T12:22:24.

LYRA temperature

The LYRA detector 2 temperature fluctuated between 46.4 and 47.4 degrees Celcius. Fluctuations were due to the plasma experiments switching on and off.



To be explored

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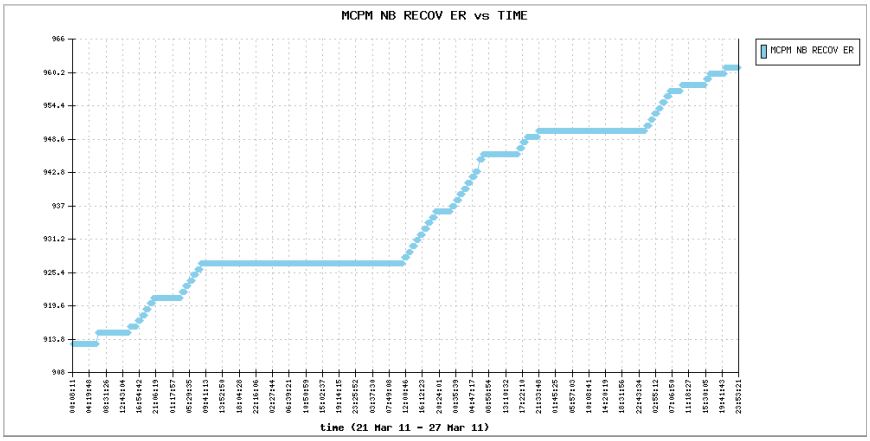
3. SWAP instrument status

MCPM recoverable errors

increased from 913 to 961 this week.



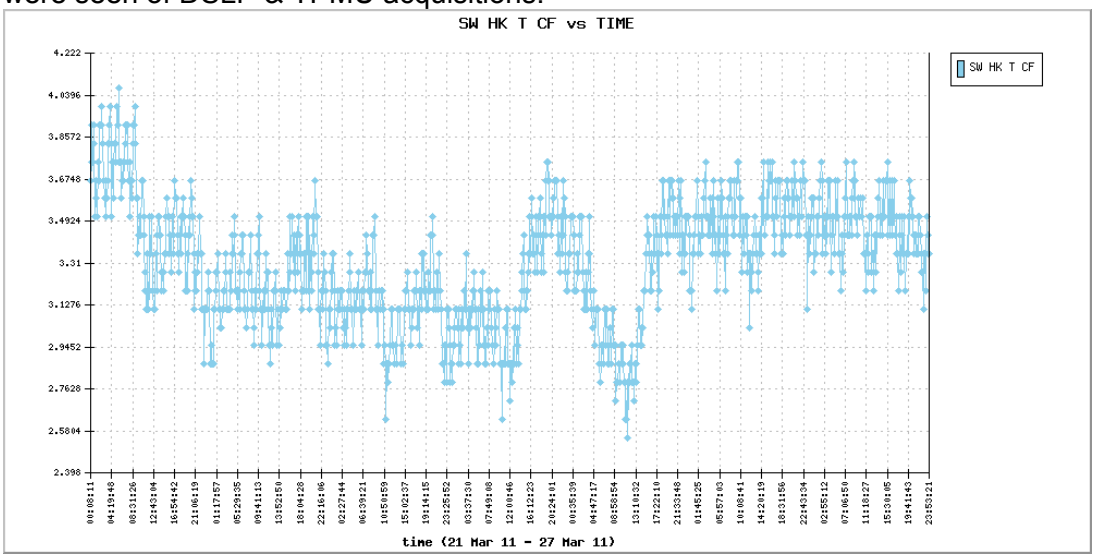
The number of MCPM unrecoverable errors is still 0.

IOS & operations

Monday 21 Mar	Tuesday 22 Mar	Wednesday 23 Mar	Thursday 24 Mar	Friday 25 Mar	Saturday 26 Mar	Sunday 27 Mar
Nominal acquisition + Lower cadence from 100s to 120s (IOS00267 & IOS00268) 666 images	Nominal acquisition + Extended LED campaign (IOS00268) 663 images	Nominal acquisition + SWAP mosaic (IOS00270) 718 images	Nominal acquisition + ESP test (IOS00270) 620 images	Nominal acquisition (IOS00270) 688 images	Nominal acquisition (IOS00270) 618 images	Nominal acquisition + Increase cadence from 120s to 110s (IOS00272) 679 images

SWAP detector temperature

The SWAP Cold Finger Temperature fluctuated between 2.6 and 4 degrees Celsius. Effects were seen of DSLP & TPMU acquisitions.



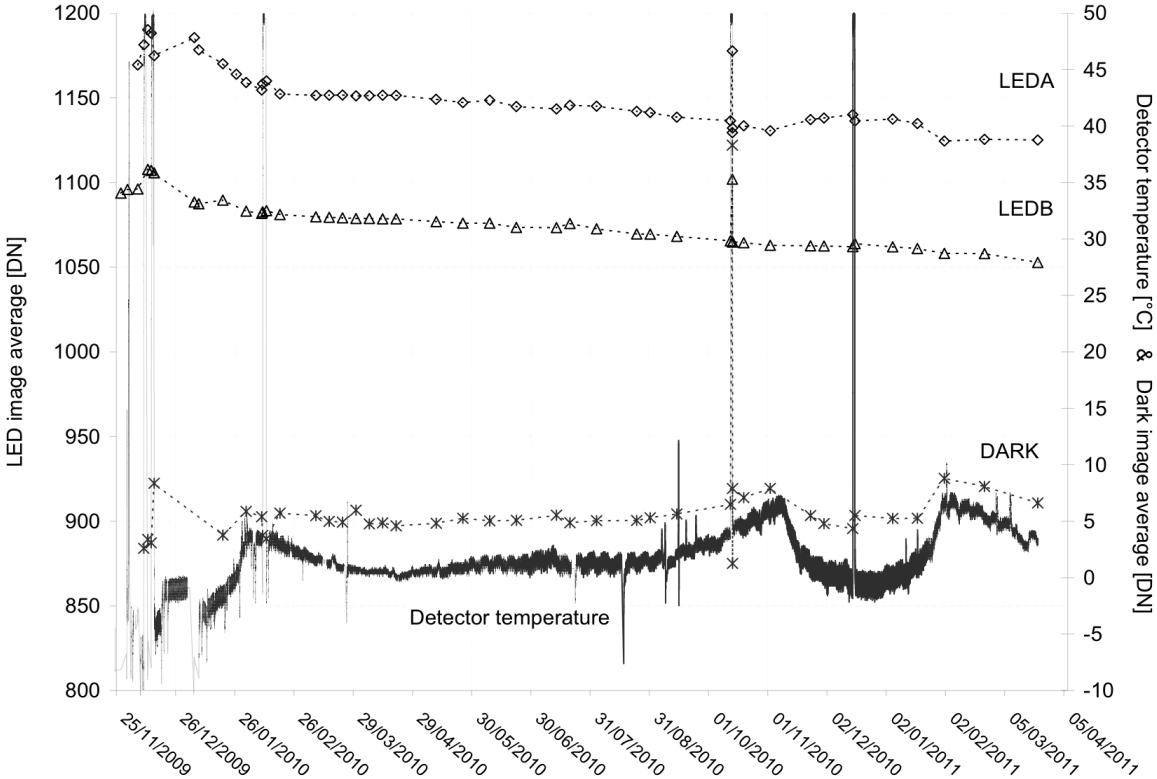
Extended LED calibration

On Tuesday March 22, an extended LED campaign was scheduled from 7:53 to 9:13

(IOS00268). The sequences of images taken during this campaign are the following:

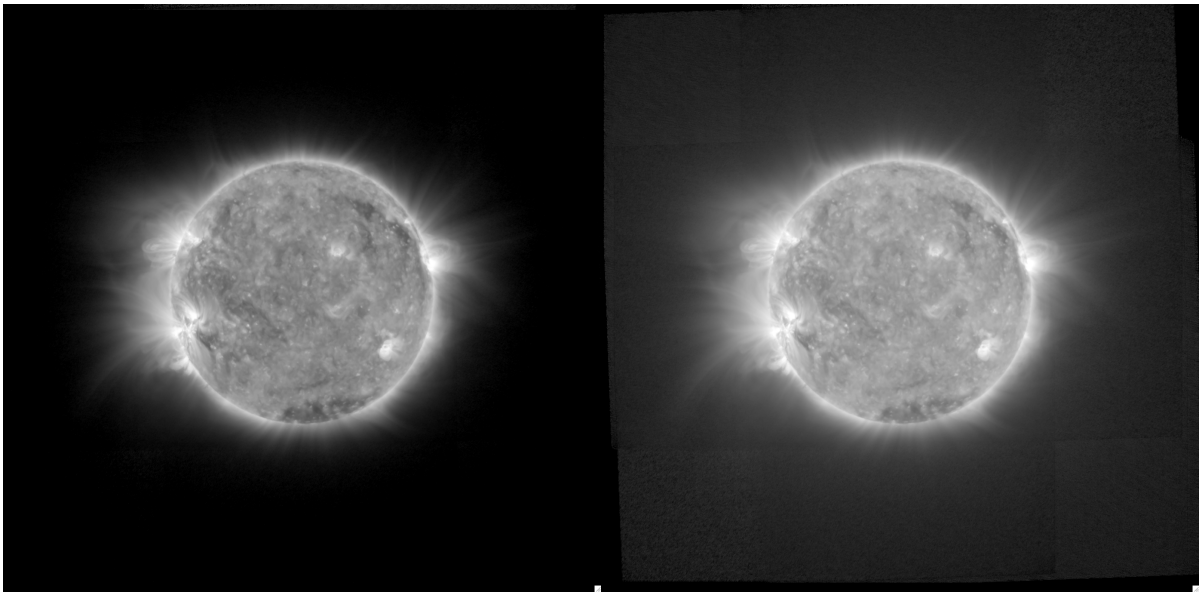
5 images of LED A, with a 3 sec integration time
5 images of LED B, with a 3 sec integration time
5 dark images, with a 3 sec integration time
5 images of LED A, with a 4 sec integration time
5 dark images, with a 4 sec integration time
5 images of LED A, with a 5 sec integration time
5 dark images, with a 5 sec integration time
5 images of LED A, with a 6 sec integration time
5 dark images, with a 6 sec integration time
20 dark images, with a 10 sec integration time

The first 3 sets of images were already used to complete the calibration graphs, as shown below:

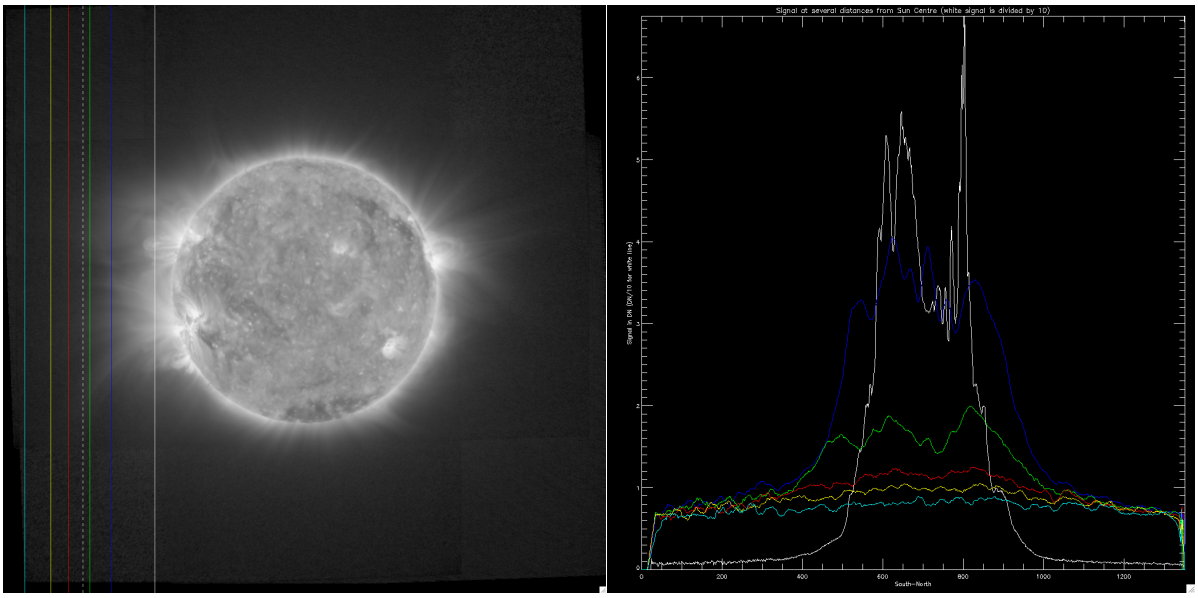


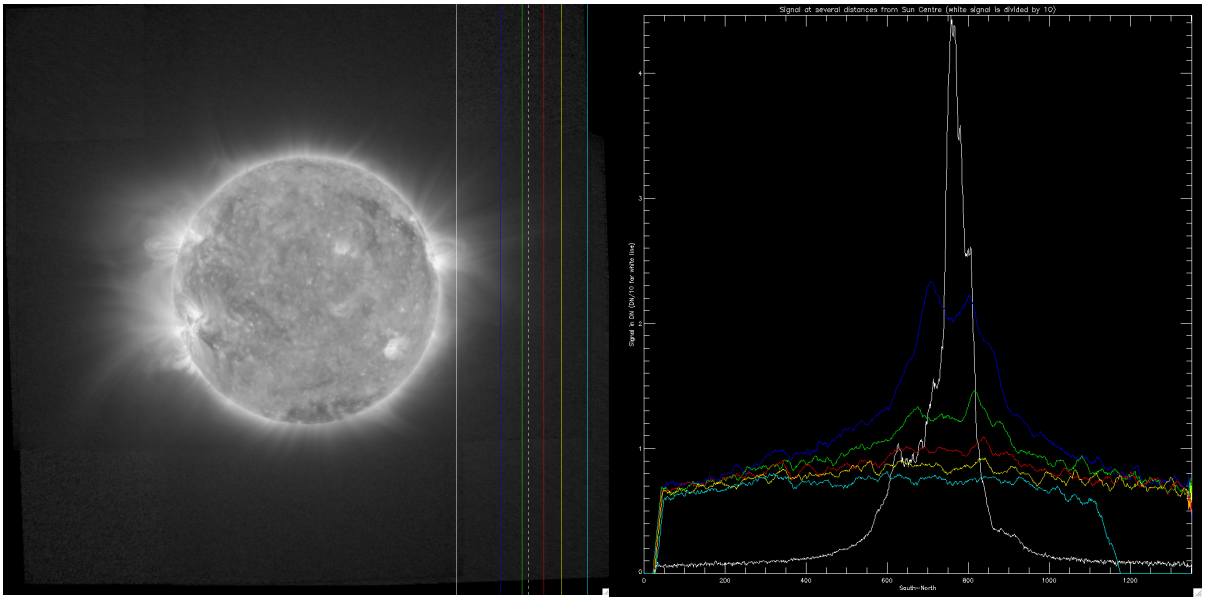
SWAP mosaic campaign

The SWAP mosaic campaign was performed on March 23 from 17:45 to 19:30UT and resulted in the following SWAP mosaic images, composed as a stack of 4 times ~40 images in different offpoint directions (all around 8.3arcmins).
The image below left is the original stack, the one of the right shows more details as it is enhanced using bytscl.



We analysed how far off-limb we can see signal in this picture and below is the result for both the East and West limbs (the strong signal over the white line is divided by 10 in the plots on the right):





As a preliminary conclusion, we can say that we can see solar signal up to at least 1 solar radius away from the limb. In the plot, we see clear structures up to the yellow, probably even the light blue cut. These cuts were drawn resp. at 280 and 340 pixels away from the limb, while 1 solar radius is 305 pixels.

4. PROBA2 Science Center Status

Anik De Groof was operator during this week.

No P2SC tools were updated on the operational server this week.

5. Data reception & discussions with MOC

Passes
No passes were completely missed. Some lost some SWAP images or contained corrupted packets, as listed below.

Data coverage HK
Complete. Some passes were missed at first but resend later.

Data coverage SWAP

- Corrupted first packets (image not readable) in passes 4108, 4151
- Missing images in packets 4126 (at least 1), 4130 (at least 7) and 4162 (at least 2)
- JPEG data truncated in pass 4121, 4126, 4129, 4131, and 4142

The overall data coverage was fine, with a daily number of images between 620 and 720 (see SWAP IOS table in Sect. 3).

Statistics for complete week: *Total number of images between 2011 Mar 21 0UT and 2011 Mar 28 0UT: 4654* *Highest cadence in this period: 30 seconds* *Average cadence in this period: 129.95 seconds* *Number of image gaps larger than 300 seconds: 4 (ESP + 3 times 3 consecutive images missing)* *Largest data gap: 28.33 minutes (ESP test)*
Data coverage LYRA 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
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