


P2SC-ROB-WR-610 - 20211129	<b>P2SC Weekly report</b>	
Period covered: Date:  Written by: Approved by:	Mon Nov 29 to Sun Dec 05, 2021 06 Dec 2021  Jennifer O'Hara Marie Dominique	Royal Observatory of Belgium - PROBA2 Science Center
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## 1. Science

### Solar & Space weather events

The level of solar activity<sup>1</sup> fluctuated between **very low and moderate** this week.

Only M- and X-flares are mentioned, the most energetic one(s) per day are presented in **bold**:

	Monday 29 Nov	Tuesday 30 Nov	Wednesday 01 Dec	Thursday 02 Dec	Friday 03 Dec	Saturday 04 Dec	Sunday 05 Dec
Activity	very low	very low	very low	very low	very low	low	moderate
Flares	-	-	-	-	-	-	<b>M1.4</b>

<sup>1</sup> See appendix. All timings are given in UT.

## **Solar Activity**

Solar flare activity increased from very low to moderate during the week.

In order to view the activity of this week in more detail, we suggest to go to the following website from which all the daily (normal and difference) movies can be accessed: <https://proba2.oma.be/ssa>

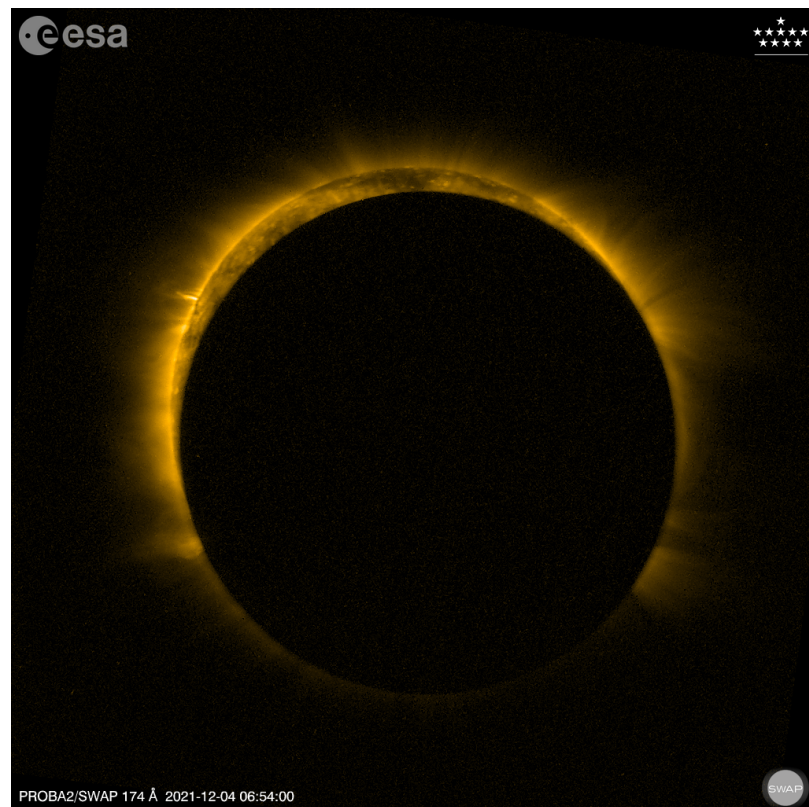
This page also lists the recorded flaring events.

A weekly overview movie can be found [here](#) (SWAP week 610).

Details about some of this week's events can be found further below.

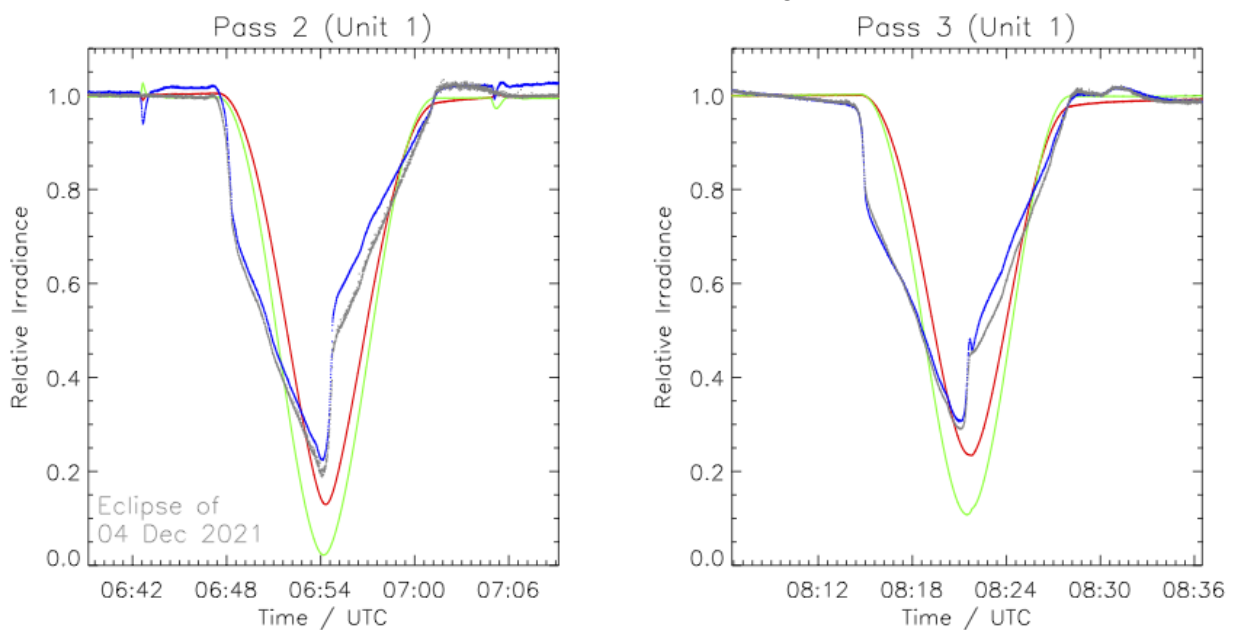
If any of the linked movies are unavailable they can be found in the P2SC movie repository [here](#)

Saturday Dec 04



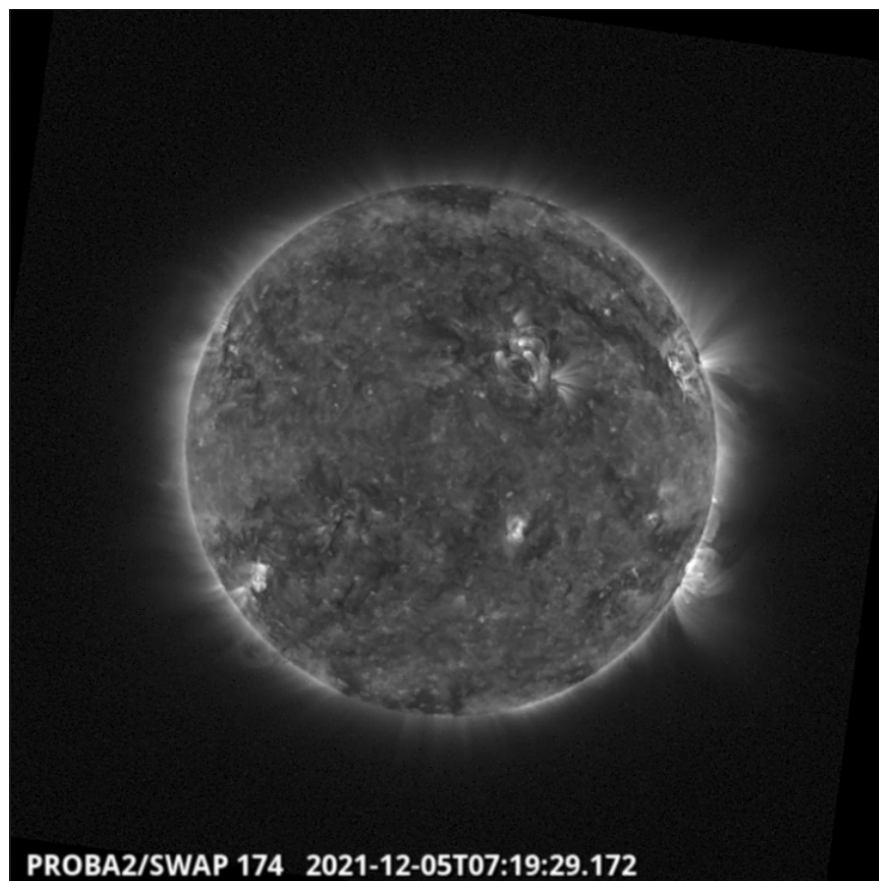
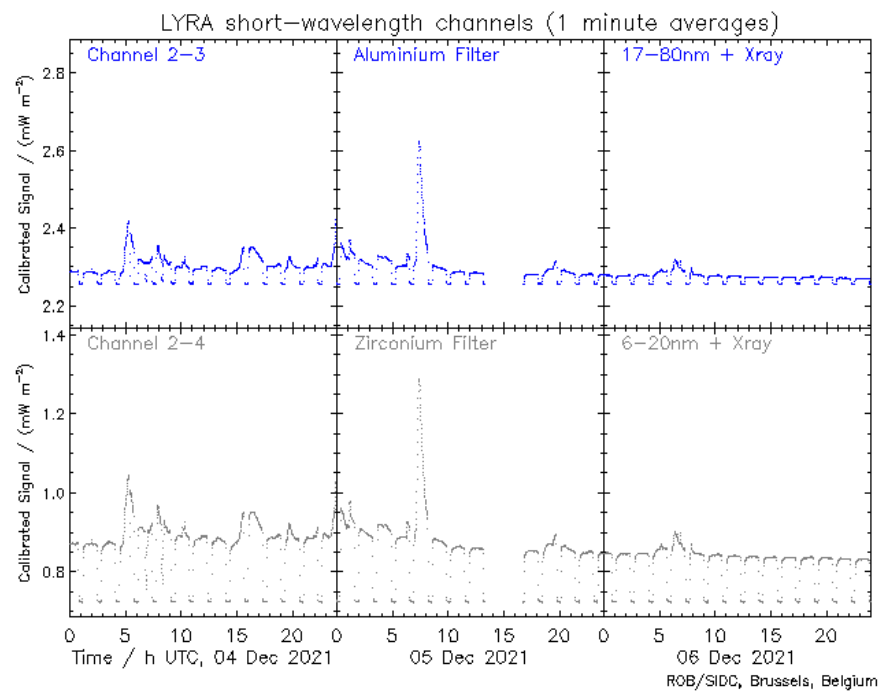
On 2021-Dec-04 a total eclipse as seen from Earth was observed by SWAP and LYRA as three partial solar eclipses. The SWAP image above was taken during the second partial occultation.

Find a movie of the event [here](#) and further images available [here](#)



The occultations were also observed by LYRA's "calibration unit" (unit 1) in addition to the nominal one (unit 2). The plots above show normalized observations by LYRA during two passes in the eclipse zone. The colors correspond to the observations by the four channels of LYRA: red = Lyman-alpha, green = Herzberg, blue = Aluminum, black = Zirconium.

Sunday Dec 05



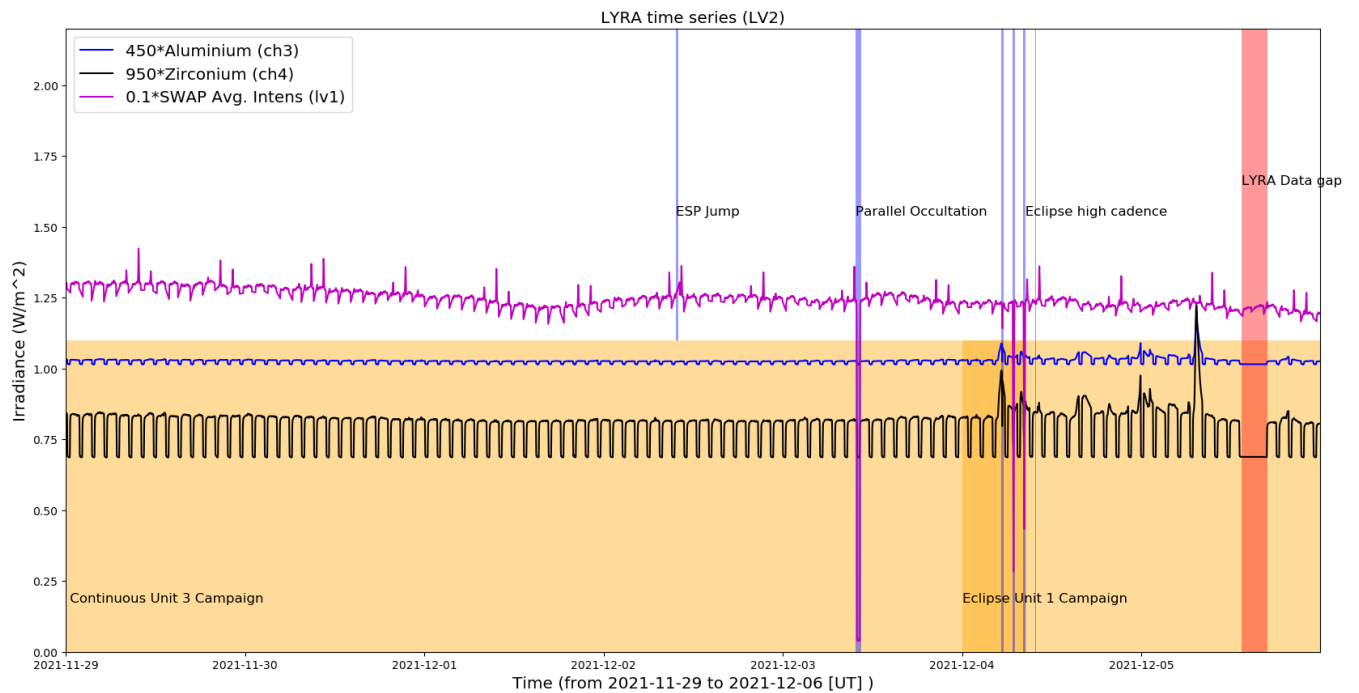
The largest flare of the week, an M1.4 flare, was observed by SWAP and LYRA. The flare is visible on the south-west limb of the solar disk on 2021-Dec-05, as shown in the SWAP image above taken at 07:19 UT.

Find a movie of the event [here](#) (SWAP movie)

An overview of the weekly LYRA & SWAP data is provided below:

The following curves are visible:

- black: Zirconium Channel LYRA Unit 2
- blue: Aluminium Channel of LYRA Unit 2
- purple: SWAVINT (SWAP Average Intensity; integrated solar intensity per SWAP image pixel )



### Operations and Calibrations:

The blue shaded periods related to SWAP, correspond to, from left to right:

- ESP Jump, 2021-Dec-02
- Parallel occultation with LYRA, 2021-Dec-03
- Eclipse high cadence campaign, 2021-Dec-04

The orange shaded periods related to LYRA correspond to, from left to right:

- Continuous unit 3 campaign
- Eclipse unit 1 Campaign, 2021-Dec-04

The red shaded periods related to other issues corresponds to:

- The BINLYRA for pass 39433 failed due to a known bug in the LYTMR. This created a Data gap between 13:26 and 16:53 UT on Dec 05.

## 2. LYRA instrument status

### IOS

Start IOS	Mon Nov 29 2021	LYIOS00918
End IOS	Sun Dec 05 2021	LYIOS00919

### LYRA detector temperature

LYRA detector 2 temperature globally varied between 42.42 and 47.15 °C.

### 3. SWAP instrument status

#### **MCPM errors**

The number of MCPM recoverable errors increased from 24668 to 24726.

The number of MCPM unrecoverable errors remained at 3135.

#### **IOS**

Start IOS	Mon Nov 29 2021	IOS01006
End IOS	Sun Dec 05 2021	IOS01008

#### **SWAP detector temperature**

The SWAP Cold Finger Temperature globally varied between -4.49 and -1.37 °C.

#### **4. PROBA2 Science Center Status**

The following changes were made to the P2SC:

- None.



## 5. Data reception & discussions with MOC

### Passes

The delivery of the passes for this week (passes 39373 to 39436) was nominal, except for:

- None.

### Data coverage HK

All HK data files (LYRA\_AD) have been received, except:

- None.

### Data coverage SWAP

All SWAP Science data files (BINSWAP) have been received, except:

- None.

Total number of images between 2021 Nov 29 00:00 UT and 2021 Dec 06 00:00 UT: 4623

Highest cadence in this period: 17 seconds

Average cadence in this period: 130.84 seconds

Number of image gaps larger than 300 seconds: 152

Largest data gap: 32.50 minutes

### Data coverage LYRA

All LYRA Science data files (BINLYRA) have been received, except:

- None

## 6. APPENDIX: Frequently used acronyms

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
DAC	Data Acquisition Controller
DBR	Deployment, backup & recovery
DDA	Decommutated data archive
ESP	Experimental Solar Panel
FITS	Flexible Image Transport System
FOV	Field Of View FPA Focal Plane Assembly
FPGA	Field Programmable Gate Arrays
GPS	Global Positioning System
HK	Housekeeping
IOS	Instrument Operations Sheet
LED	Light Emitting Diode
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
OBSW	On board Software
PI	Principal Investigator
P2SC	PROBA2 Science Center
ROB	Royal Observatory of Belgium
SAA	South Atlantic Anomaly
SEU	Single Event Upset
SoFAST	Solar Feature Automated Search Tool
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
TC	Telecommand
UTC	Coordinated Universal Time
UV	Ultraviolet
VFC	Voltage to Frequency Converter

## **7. APPENDIX Solar Activity Definitions**

In the science section we use the following solar activity standards.

The standard scale for solar activity is:

- very low (almost no flares, only B)
- low (a few C flares)
- moderate (many C flares and at least an M flare)
- high (several M flares and an X flare)
- very high (continuous background of C flares, numerous M flares, more than one X flare)