


P2SC-ROB-WR-737 - 20240506	P2SC Weekly report	
Period covered: Date: Written by: Approved by:	Mon May 06 to Sun May 12, 2024 15 May 2024 Laurence Wauters Marie Dominique	Royal Observatory of Belgium - PROBA2 Science Center
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1. Science

Solar & Space weather events

The level of solar activity¹ fluctuated between **moderate and very high** this week.

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

	Monday 6 May	Tuesday 7 May	Wednesday 8 May	Thursday 9 May	Friday 10 May	Saturday 11 May	Sunday 12 May
Activity	high	moderate	very high	very high	high	very high	high
Flares	M4.3, M1.2, M1.4, X4.5, M1.3, M1.6	M3.2, M3.3, M2.1, M8.2, 2*M1.0, M1.5, M2.4, M1.3, M5.1, M2.6	M9.8, X1.0, M1.7, M2.0, M2.9, M7.9, M8.6, M4.1, M2.1, M1.8, M4.5, M7.1, 2*X1.0, M1.8, M3.4	M1.5, M1.2, M2.6, 2*M1.0, X1.1, M3.7, M2.9, M3.1, X2.2, M2.1, M2.3, M1.4, M4.5, M4.0	M3.8, M1.9, M1.1, M2.0, M1.7, M1.1, M5.9, M2.2, X3.9, 2*M1.3, M1.4	M1.2, M8.8, M1.7, X1.5, M1.6, M3.1, X5.8	M1.0, 2*M1.1, M4.8, X1.0, M1.5, M1.0, M1.6, M2.4, M3.2

¹ See appendix. All timings are given in UT.

Solar Activity

Solar flare activity fluctuated from moderate to very high 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.

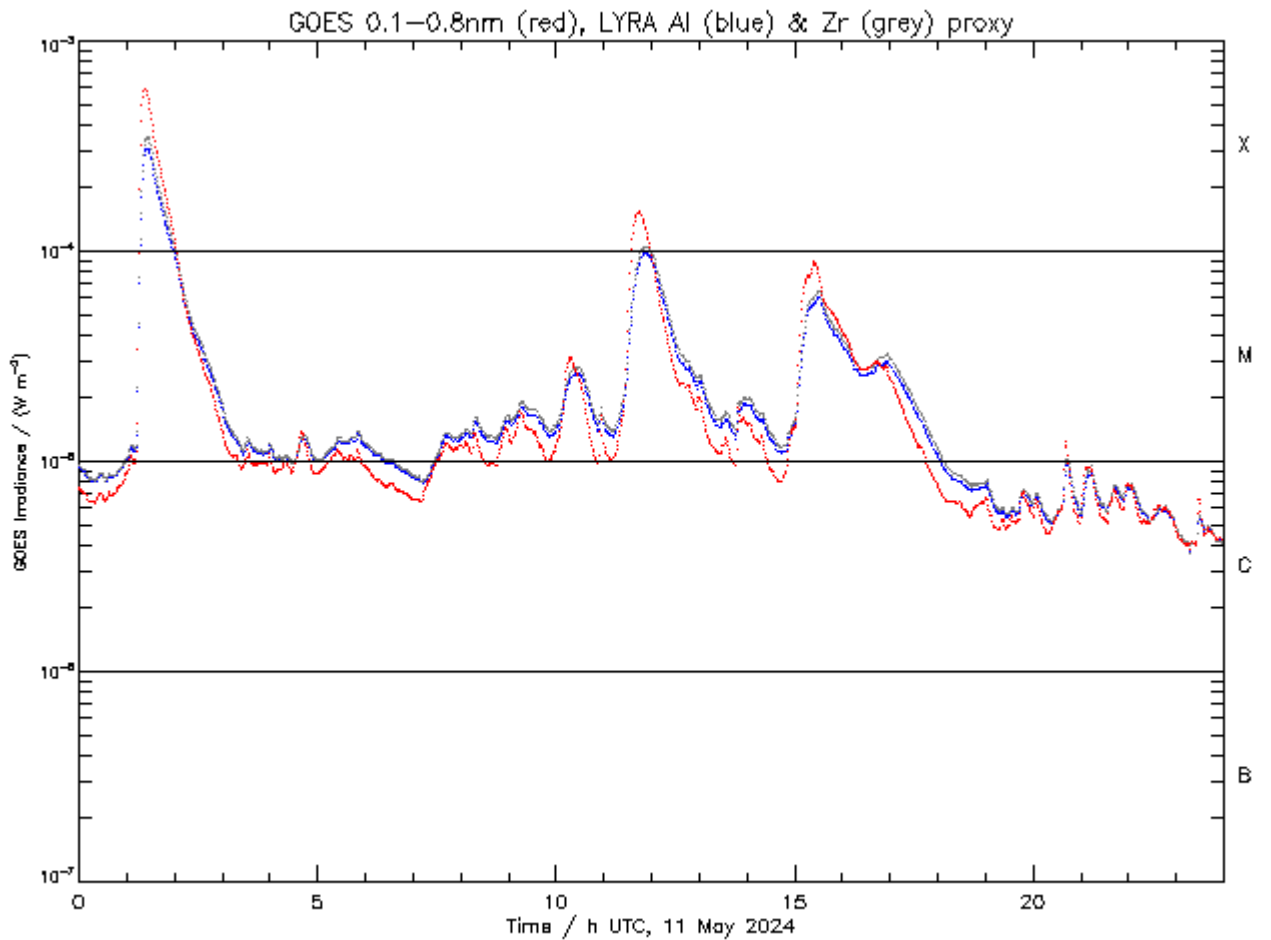
A weekly overview movie can be found [here](#) (SWAP week 737).

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

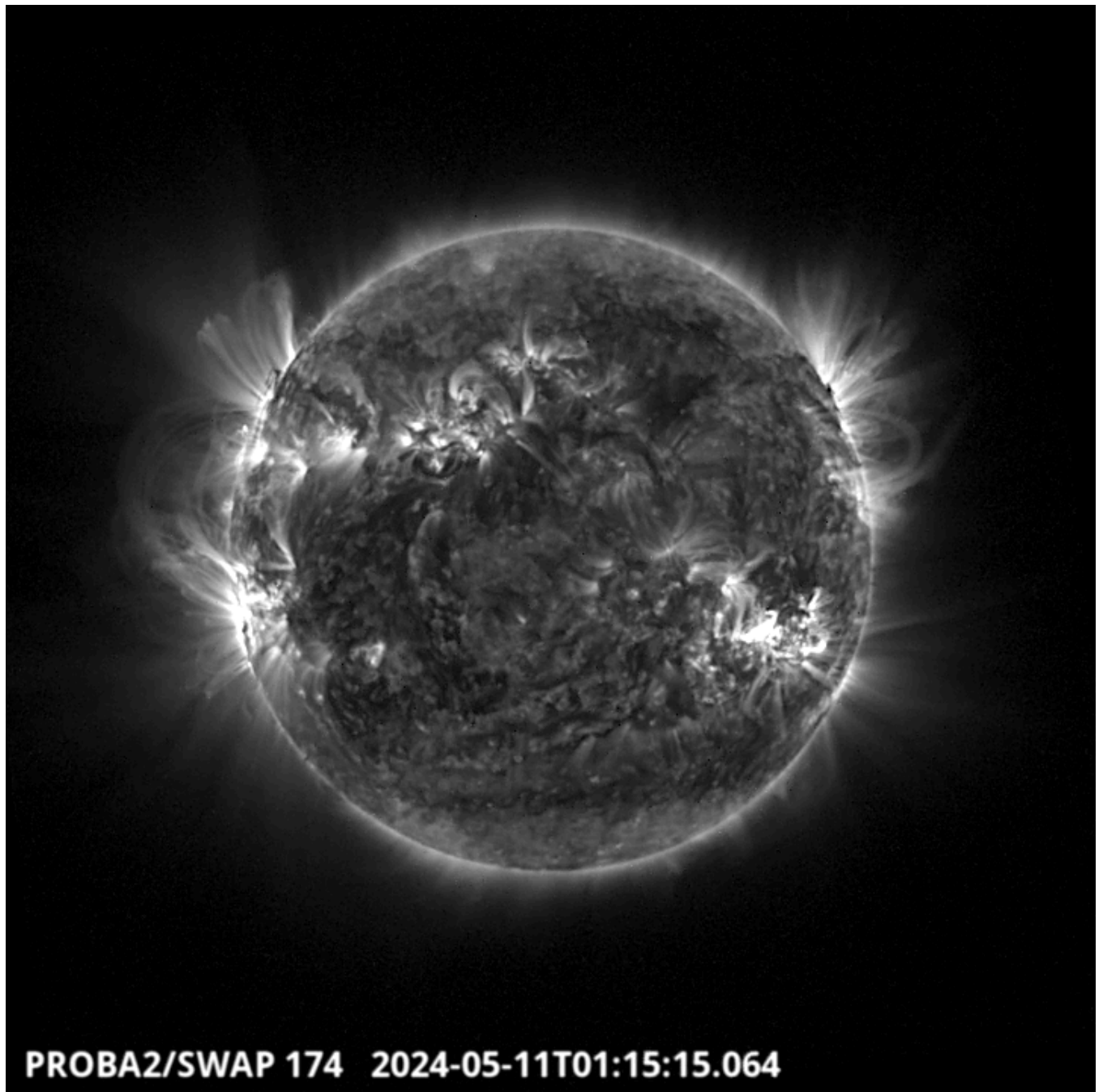
If any of the linked movies are unavailable they can be found in the P2SC movie repository [here](#)

Throughout the week, there was a notable surge in solar activity, marked by an exceptional number of flares and CMEs. Multiple X-class flares, predominantly originating from two significant active regions identified as AR 3663 and 3664, garnered considerable attention from the astronomical community. They caused the geomagnetic storm that produced the auroras observed all over the country. Such a sequence of solar flares had not been observed since the noteworthy Halloween storm of 2003. The week was also marked by the most powerful solar flare recorded since 2017.

Saturday May 11



ROB/SIDC, Brussels, Belgium

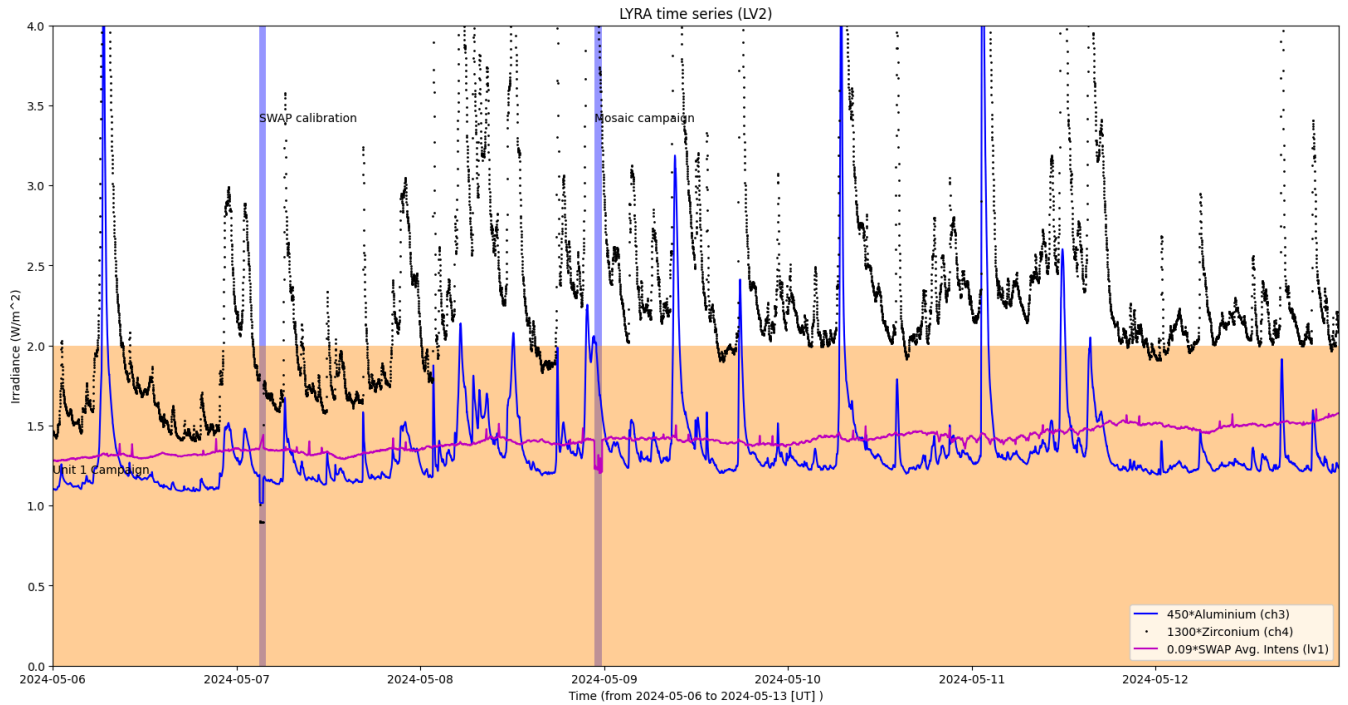


The highest flare of the cycle 25, a X5.8, has been recorded by LYRA and SWAP around 1:15 am. It has been produced by the active region 3664 located on the South West part of the solar disk. A halo coronal mass ejection (CME) was also observed on SOHO/LASCO-C2. The corresponding interplanetary coronal mass ejections impacted the Earth on the evening of May 12. Auroras have been visible until Belgium and France latitudes.

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:

- SWAP calibration, 2024-May-07
- Mosaic campaign, 2024-May-08

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

- Unit1 flare campaign

The red shaded periods related to other issues corresponds to:

- None

2. LYRA instrument status

IOS

Start IOS	Mon May 06 2024	LYIOS01078
End IOS	Sun May 12 2024	LYIOS01080

LYRA detector temperature

LYRA detector 2 temperature globally varied between 52.13 and 52.60°C.

3. SWAP instrument status

MCPM errors

The number of MCPM recoverable errors increased from 57782 to 58145

The number of MCPM unrecoverable errors remained at 3135.

IOS

Start IOS	Mon May 06 2024	IOS01199
End IOS	Sun May 12 2024	IOS01200

SWAP detector temperature

The SWAP Cold Finger Temperature globally varied between -0.49 and 0.39°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 47110 to 47171) 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 2024 May 06 00:00 UT and 2024 May 13 00:00 UT: 4331

Highest cadence in this period: 30 seconds

Average cadence in this period: 139.58 seconds

Number of image gaps larger than 300 seconds: 208

Largest data gap: 11.00 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)