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| P2SC-ROB-WR-717 - 20231218 | P2SC Weekly report |  |
| Period covered: Date: Written by: Approved by: | Mon Dec 18 to Sun Dec 24, 2023 04 Jan 2024 Laurence Wauters Marie Dominique | Royal Observatory of Belgium - PROBA2 Science Center |
| To: | LYRA PI, marie.dominique@sidc.be SWAP PI, elke.dhuys@sidc.be | https://proba2.sidc.be ++ 32 (0) 2 3730559 |
| cc: | ROB DIR, ronald@oma.be ESA Redu, Rene.Wittmann@esa.int and Marcus.De.Deus.Silva@esa.int ESA D/SRE, Joe.Zender@esa.int ESA D/TEC, Juha-Pekka.Luntama@esa.int and Melanie.Heil@esa.int | |

1. Science

Solar & Space weather events

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

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

| | Monday 18 Dec | Tuesday 19 Dec | Wednesday 20 Dec | Thursday 21 Dec | Friday 22 Dec | Saturday 23 Dec | Sunday 24 Dec |
|----------|------------------|-------------------|---------------------|--------------------|------------------|--------------------|-----------------------------|
| Activity | low | low | low | moderate | low | low | moderate |
| Flares | - | - | - | M3.3, M4.2 | - | - | M1.2, M2.6, M2.9 |

¹ See appendix. All timings are given in UT.

Solar Activity

Solar flare activity fluctuated from 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>

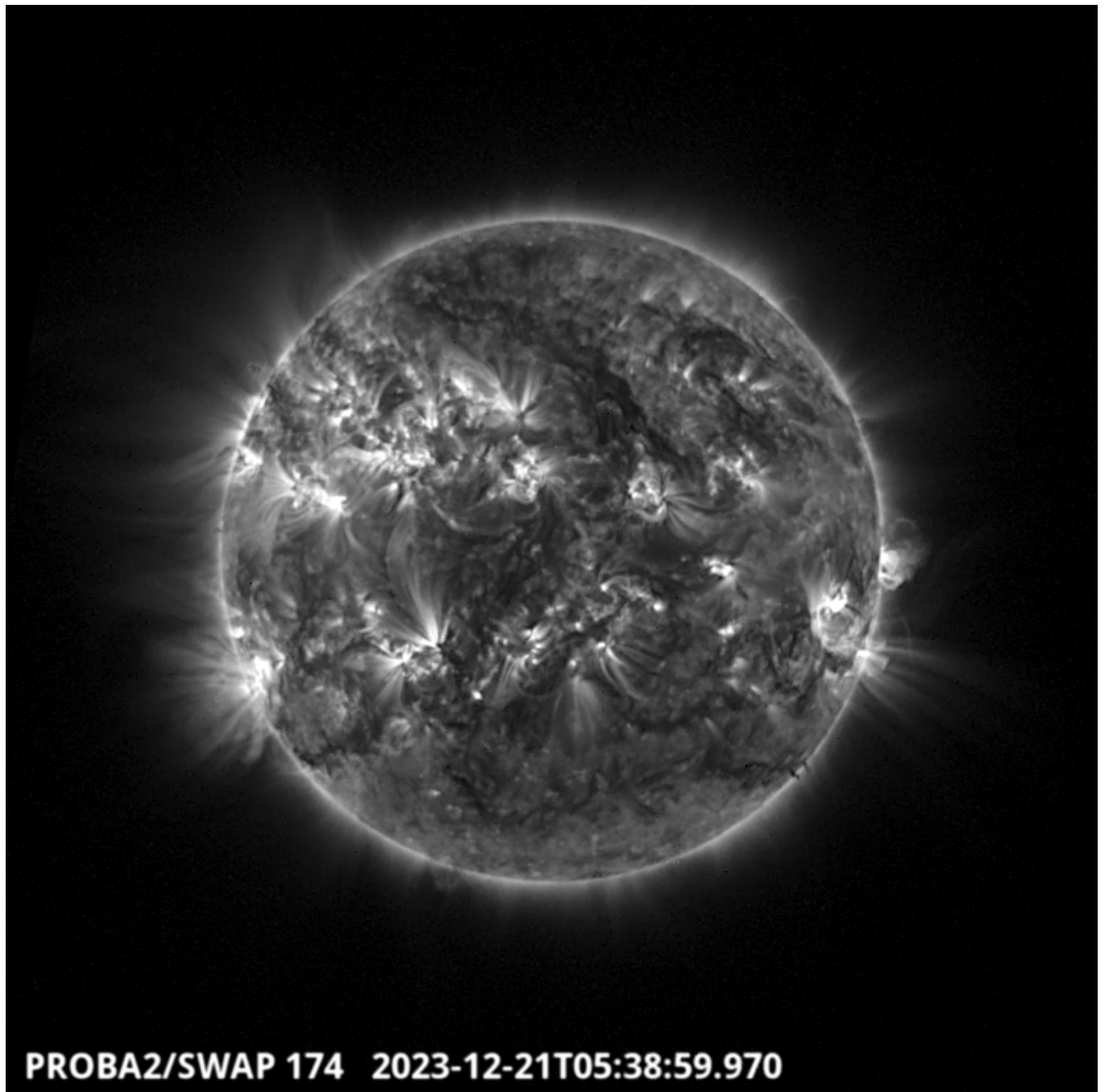
This page also lists the recorded flaring events.

A weekly overview movie can be found [here](#) (SWAP week 717).

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](#)

Thursday Dec 21

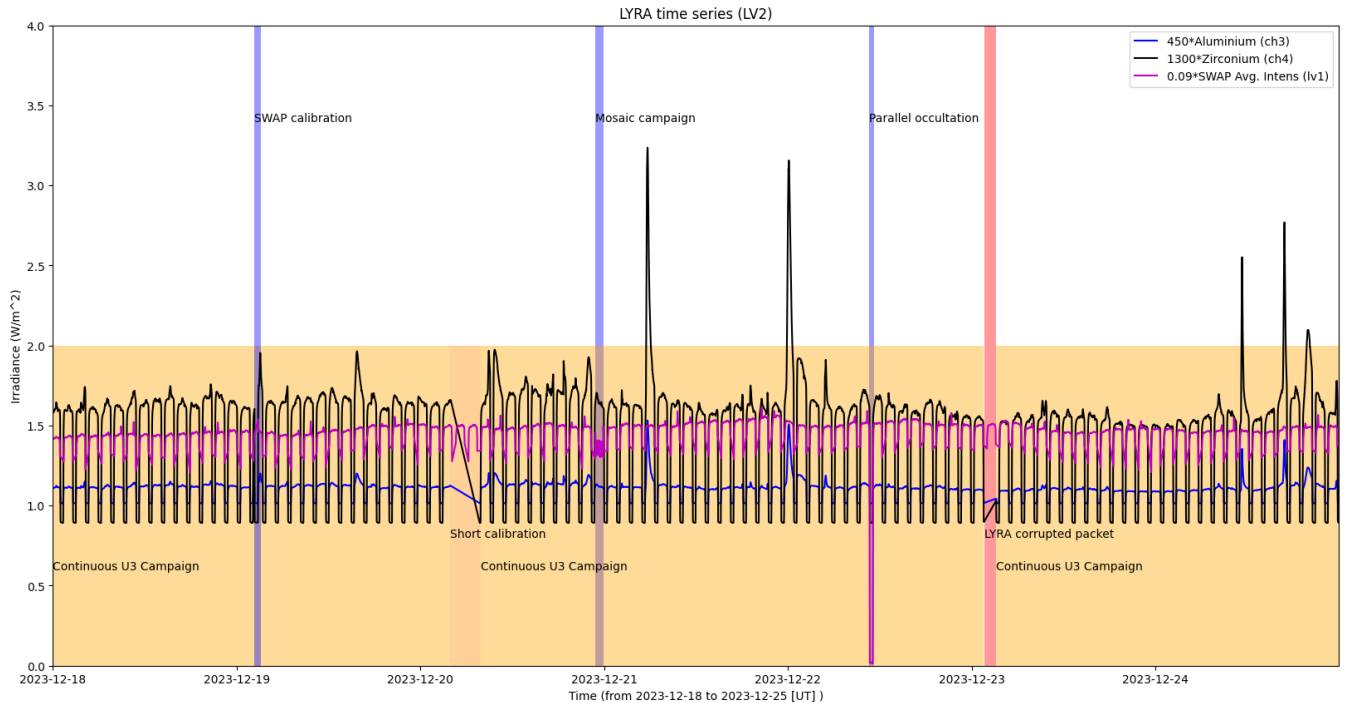


The biggest flare of the week is a M4.2 flare. It has been produced around 5:39 UT by the NOAA active region 3519 located in the South West part of the solar disk close to the limb (S12W61). Find a SWAP movie of the event [here](#).

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, 2023-Dec-19
- SWAP mosaic campaign, 2023-Dec-20
- SWAP parallel occultation with LYRA, 2023-Dec-22

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

- Continuous Unit 3 campaign
- LYRA short calibration, 2023-Dec-20

The red shaded periods related to other issues corresponds to:

- LYRA pass 45961 seems corrupted onboard, 2023-Dec-23

2. LYRA instrument status

IOS

| | | |
|-----------|-----------------|------------|
| Start IOS | Mon Dec 18 2023 | LYIOS01046 |
| End IOS | Sun Dec 24 2023 | LYIOS01047 |

LYRA detector temperature

LYRA detector 2 temperature globally varied between 44.06 and 46.17 °C.

3. SWAP instrument status

MCPM errors

The number of MCPM recoverable errors increased from 51457 to 51494.

The number of MCPM unrecoverable errors remained at 3135.

IOS

| | | |
|-----------|-----------------|----------|
| Start IOS | Mon Dec 18 2023 | IOS01163 |
| End IOS | Sun Dec 24 2023 | IOS01164 |

SWAP detector temperature

The SWAP Cold Finger Temperature globally varied between -3.77 and -1.93 °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 45917 to 45975) 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 2023 Dec 18 00:00 UT and 2023 Dec 25 00:00 UT: 4408

Highest cadence in this period: 18 seconds

Average cadence in this period: 137.03 seconds

Number of image gaps larger than 300 seconds: 186

Largest data gap: 31.17 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)