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|---|--|---|
| P2SC-ROB-WR-756 - 20240916 | P2SC Weekly report |  |
| Period covered: Date: Written by: Approved by: | Mon Sep 16 to Sun Sep 22, 2024 25 Sep 2024 Dana Talpeanu 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 **low and moderate** this week.

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

| | Monday 16 Sep | Tuesday 17 Sep | Wednesday 18 Sep | Thursday 19 Sep | Friday 20 Sep | Saturday 21 Sep | Sunday 22 Sep |
|----------|------------------|-------------------|---------------------|--------------------|------------------|--------------------|------------------|
| Activity | low | low | low | low | low | low | moderate |
| Flares | - | - | - | - | - | - | M3.7 |

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>

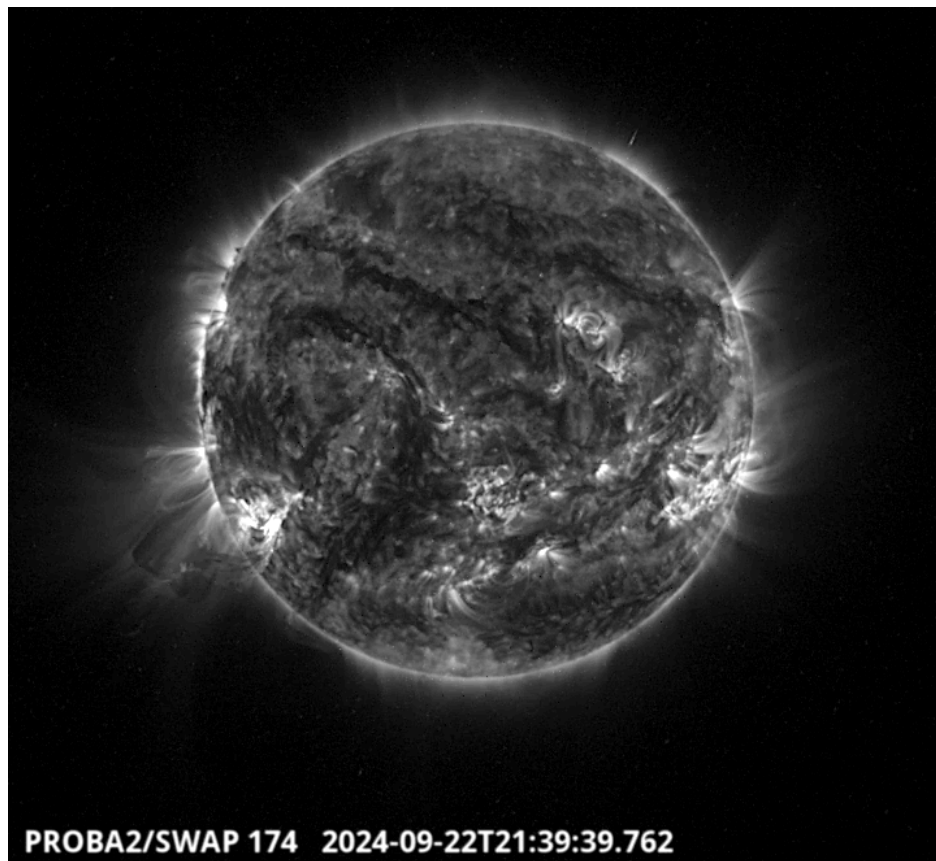
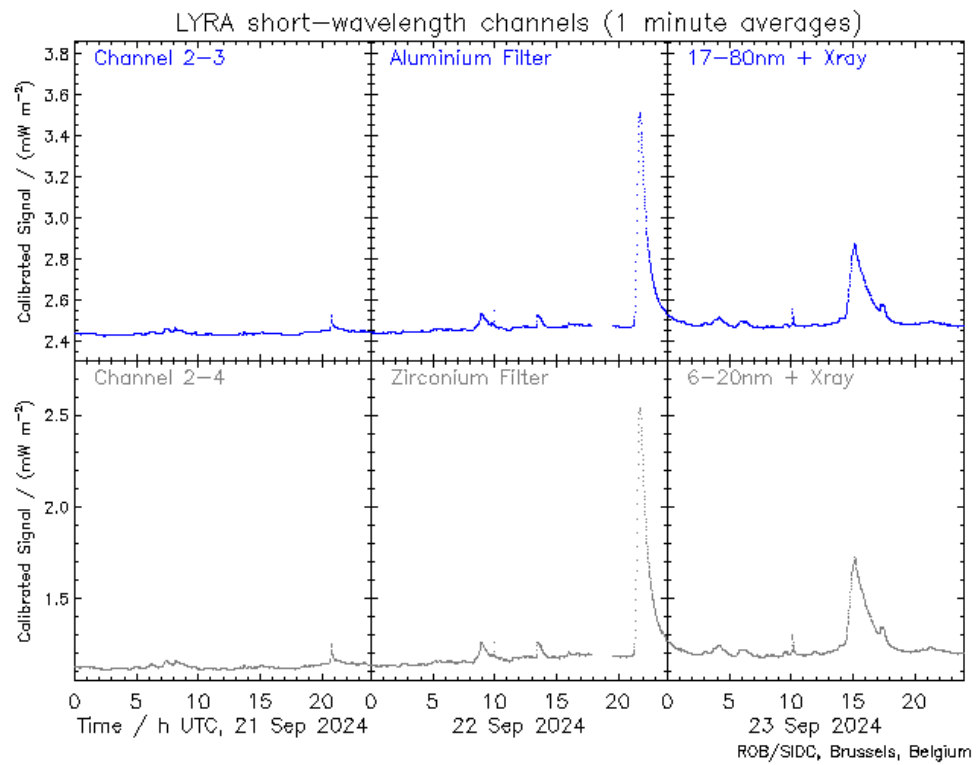
This page also lists the recorded flaring events.

A weekly overview movie can be found [here](#) (SWAP week 756).

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](#)

Sunday Sep 22



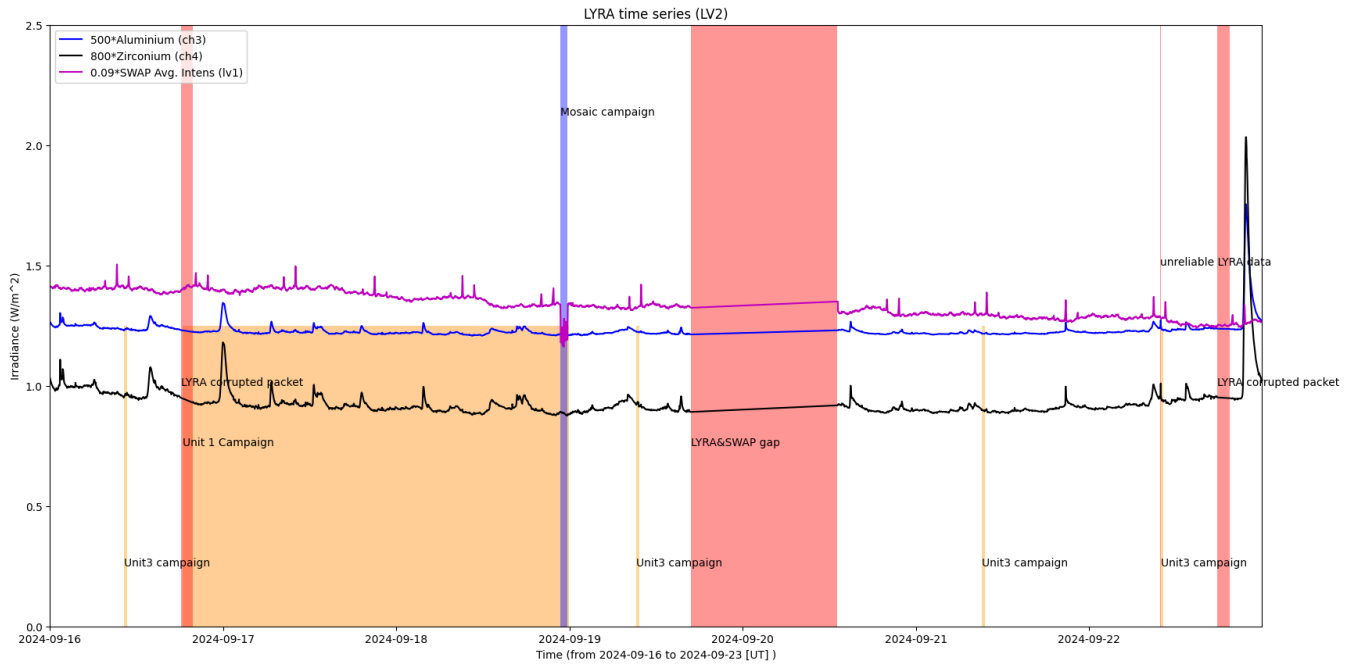
The largest and only M-flare of this week was an M3.7, and it was observed by LYRA (top panel) and SWAP (bottom panel). The flare peaked on 2024-Sep-22 at 21:39 UT. It occurred in the south-eastern quadrant, originating from active region NOAA3835.

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:

- Mosaic campaign, 2024-Sep-18

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

- Daily Unit 3 campaign, 2024-Sep-16
- Unit 1 flare campaign, from 2024-Sep-16 at 18:22 until 2024-Sep-18 at 23:55 UT
- Daily Unit 3 campaign, 2024-Sep-19
- Daily Unit 3 campaign, 2024-Sep-21
- Daily Unit 3 campaign, 2024-Sep-22

The red shaded periods related to other issues corresponds to:

- corrupted packet for BINLYRA of pass 48270, resulting in a LYRA data gap on 2024-Sep-16 between 18:08 - 19:47 UT.
- data gap and SWAP HK gap due to the instruments being switched to IDLE mode for the debris avoidance maneuver between 2024-Sep-19 at 16:48 UT and 2024-Sep-20 at 13:09 UT.
- The visible LED turned on for one second without being commanded during the unit 3 campaign on 2024-Sep-22, resulting in brief unreliable LYRA data between 09:55 - 10:01 UT.
- Corrupted packet in BINLYRA file for pass 48322, resulting in LYRA data gap on 2024-Sep-22 between 17:49 - 19:33 UT.

2. LYRA instrument status

IOS

| | | |
|-----------|-----------------|------------|
| Start IOS | Mon Sep 16 2024 | LYIOS01114 |
| End IOS | Sun Sep 22 2024 | LYIOS01118 |

LYRA detector temperature

LYRA detector 2 temperature globally varied between 47.18 and 53.35 °C.

3. SWAP instrument status

MCPM errors

The number of MCPM recoverable errors increased from 62427 to 62828.

The number of MCPM unrecoverable errors remained at 3135.

IOS

| | | |
|-----------|-----------------|----------|
| Start IOS | Mon Sep 16 2024 | IOS01219 |
| End IOS | Sun Sep 22 2024 | IOS01223 |

SWAP detector temperature

The SWAP Cold Finger Temperature globally varied between -5.05 and 0.87 °C.

4. PROBA2 Science Center Status

The following changes were made to the P2SC:

- None.

5. Data reception & discussions with MOC

On 2024-Sep-19, Redu performed a collision avoidance maneuver, predicted to happen at 18:00:54.073. This led to LYRA and SWAP being switched from acquisition to IDLE mode between 2024-Sep-19 at 16:48 UT and 2024-Sep-20 at 13:09 UT.

Passes

The delivery of the passes for this week (passes 48263 to 48323) was nominal, except for:

- 48270, corrupted LYRA packets
- 48296 - 48301 (including themselves), due to the debris avoidance maneuver executed on 2024-Sep-19
- 48322, corrupted LYRA packets

Data coverage HK

All HK data files (LYRA_AD) have been received, except:

- data gap for the SWAP HK data, due to SWAP being turned off for the debris avoidance maneuver between 2024-Sep-19 at 16:48 UT and 2024-Sep-20 at 13:09 UT.

Data coverage SWAP

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

- data from passes 48296 - 48301 (including themselves), due to the debris avoidance maneuver executed on 2024-Sep-19; passes 48286 and 48287 were received, but they just contain buffer data from previous passes; this resulted eventually in a data gap between 2024-Sep-19 at 16:48 UT and 2024-Sep-20 at 13:11 UT

Total number of images between 2024 Sep 16 00:00 UT and 2024 Sep 23 00:00 UT: 3988

Highest cadence in this period: 60 seconds

Average cadence in this period: 151.67 seconds

Number of image gaps larger than 300 seconds: 173

Largest data gap: 1223.18 minutes

Data coverage LYRA

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

- corrupted packet for BINLYRA of pass 48270, resulting in a LYRA data gap on 2024-Sep-16 between 18:08 - 19:47 UT.
- data gap due to LYRA being turned off for the debris avoidance maneuver between 2024-Sep-19 at 16:48 UT and 2024-Sep-20 at 13:09 UT.
- The visible LED turned on for one second without being commanded during the unit 3 campaign, resulting in brief unreliable LYRA data on 2024-Sep-22 between 09:55 - 10:01 UT.
- Corrupted packet in BINLYRA file for pass 48322, resulting in LYRA data gap on 2024-Sep-22 between 17:49 - 19:33 UT.

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)