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| P2SC-ROB-WR-680 - 20230403 | P2SC Weekly report |  |
| Period covered: Date: | Mon Apr 03 to Sun Apr 09, 2023 27 Apr 2023 | 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 03 Apr | Tuesday 04 Apr | Wednesday 05 Apr | Thursday 06 Apr | Friday 07 Apr | Saturday 08 Apr | Sunday 09 Apr |
|----------|------------------|-------------------|---------------------|--------------------|------------------|--------------------|------------------|
| Activity | low | low | low | moderate | low | moderate | low |
| Flares | - | - | - | M3.0 | - | 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>

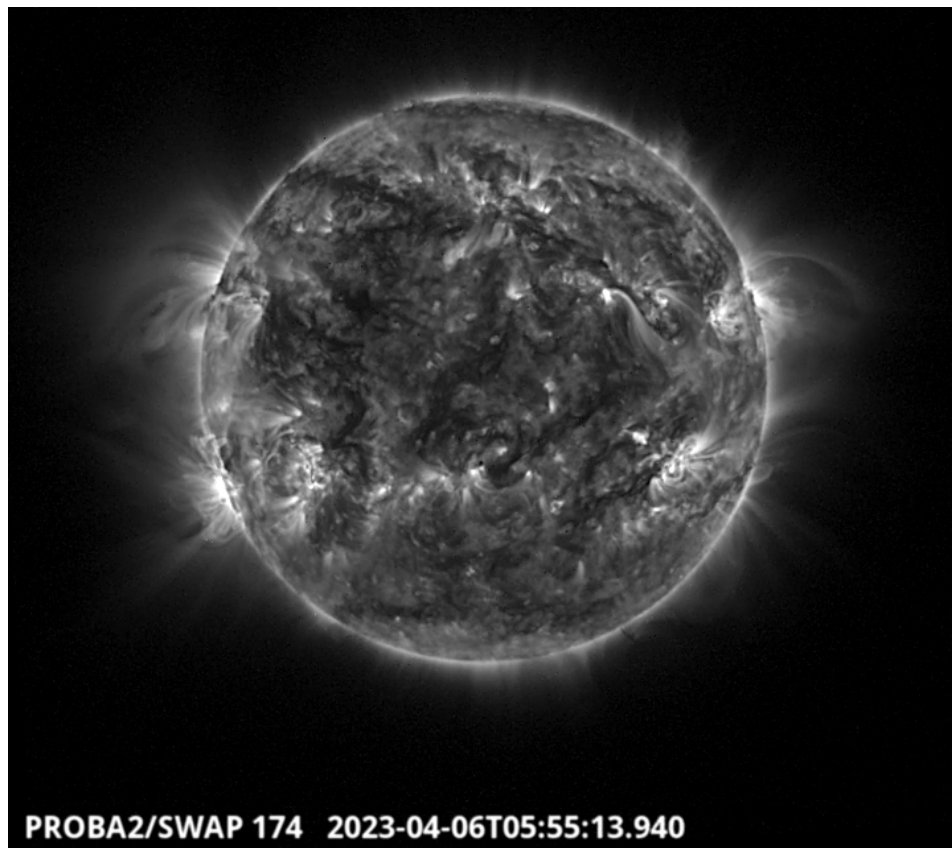
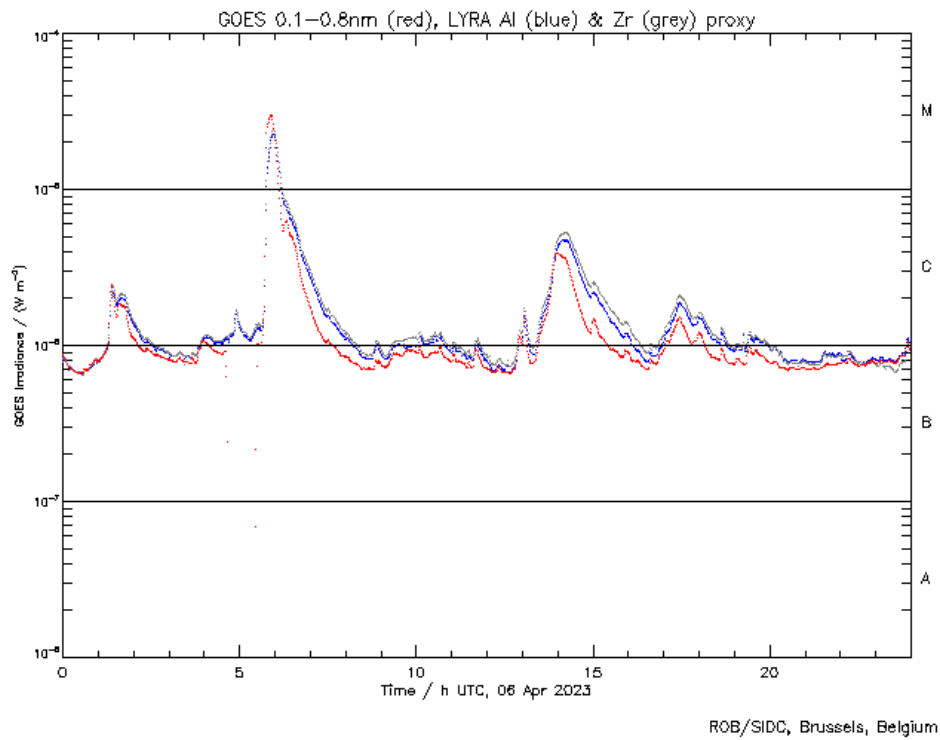
This page also lists the recorded flaring events.

A weekly overview movie can be found [here](#) (SWAP week 680).

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 Apr 06



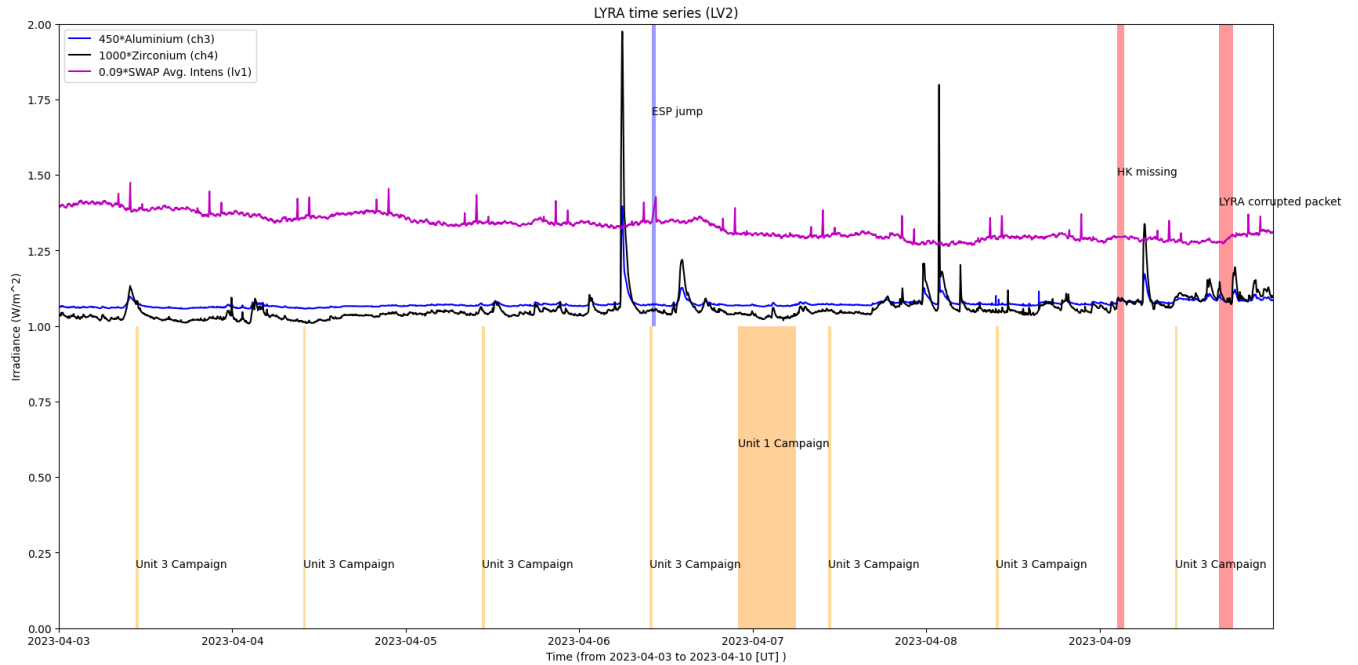
The largest flare of the week, an M3.0, was observed by LYRA (top panel) and SWAP (bottom panel). The flare occurred on 2023-Apr-06 (peak at 05:53 UT) at the south-eastern limb of the Sun, and it was associated with NOAA AR3272.

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:

- ESP jump, 2023-Apr-06

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

- Daily Unit 3 campaign, 2023-Apr-03
- Daily Unit 3 campaign, 2023-Apr-04
- Daily Unit 3 campaign, 2023-Apr-05
- Daily Unit 3 campaign, 2023-Apr-06
- Unit 1 joint campaign with SolO, from 2023-Apr-06 22:00 to 2023-Apr-07 06:00
- Daily Unit 3 campaign, 2023-Apr-07
- Daily Unit 3 campaign, 2023-Apr-08
- Daily Unit 3 campaign, 2023-Apr-09

The red shaded periods related to other issues corresponds to:

- HK data gap on 2023-Apr-09 between 02:23 and 03:22 UT due to bad signal during dump of store 43736
- Artifacts visible in the uncalibrated data on 2023-Apr-09 between approx. 16:30 and 18:30 UT. Most probable onboard corruption of data.

2. LYRA instrument status

IOS

| | | |
|-----------|-----------------|------------|
| Start IOS | Mon Apr 03 2023 | LYIOS01000 |
| End IOS | Sun Apr 09 2023 | LYIOS01002 |

LYRA detector temperature

LYRA detector 2 temperature globally varied between 50.38 and 53.13 °C.

3. SWAP instrument status

MCPM errors

The number of MCPM recoverable errors increased from 40171 to 40539.

The number of MCPM unrecoverable errors remained at 3135.

IOS

| | | |
|-----------|-----------------|-----------|
| Start IOS | Mon Apr 03 2023 | IOS001113 |
| End IOS | Sun Apr 09 2023 | IOS001113 |

SWAP detector temperature

The SWAP Cold Finger Temperature globally varied between -0.57 and 0.47 °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 43683 to 43744) was nominal, except for:

- The prime EMCS was frozen between supports 43725 and 43738 (2023-04-07 21:07:00 to 2023-04-09 10:03:00). Data from these passes were re-extracted by Redu and re-processed.
- During the support 43719, the signal was very bad during the dump of the LYRA store. The store 6 was re-dumped during the support 43722 (2023-04-07 13:29:09).
- HK data gap on 2023-Apr-09 between 02:23 and 03:22 UT due to bad signal during dump of store 43736

Data coverage HK

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

- HK data gap on 2023-Apr-09 between 02:23 and 03:22 UT due to bad signal during support 43736

Data coverage SWAP

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

- None.

Total number of images between 2023 Apr 03 0UT and 2023 Apr 10 0UT: 4451

Highest cadence in this period: 0 seconds

Average cadence in this period: 135.87 seconds

Number of image gaps larger than 300 seconds: 174

Largest data gap: 33.67 minutes

Data coverage LYRA

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

- Artifacts visible in the uncalibrated data on 2023-Apr-09 between approx. 16:30 and 18:30 UT. Most probable onboard corruption of data.

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)