


P2SC-ROB-WR-682 - 20230417	<b>P2SC Weekly report</b>	
Period covered: Date:  Written by: Approved by:	Mon Apr 17 to Sun Apr 23, 2023 27 Apr 2023  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 activity<sup>1</sup> 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 17 Apr	Tuesday 18 Apr	Wednesday 19 Apr	Thursday 20 Apr	Friday 21 Apr	Saturday 22 Apr	Sunday 23 Apr
Activity	low	low	low	low	moderate	low	low
Flares	-	-	-	-	<b>M1.7</b>	-	-

<sup>1</sup> 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>

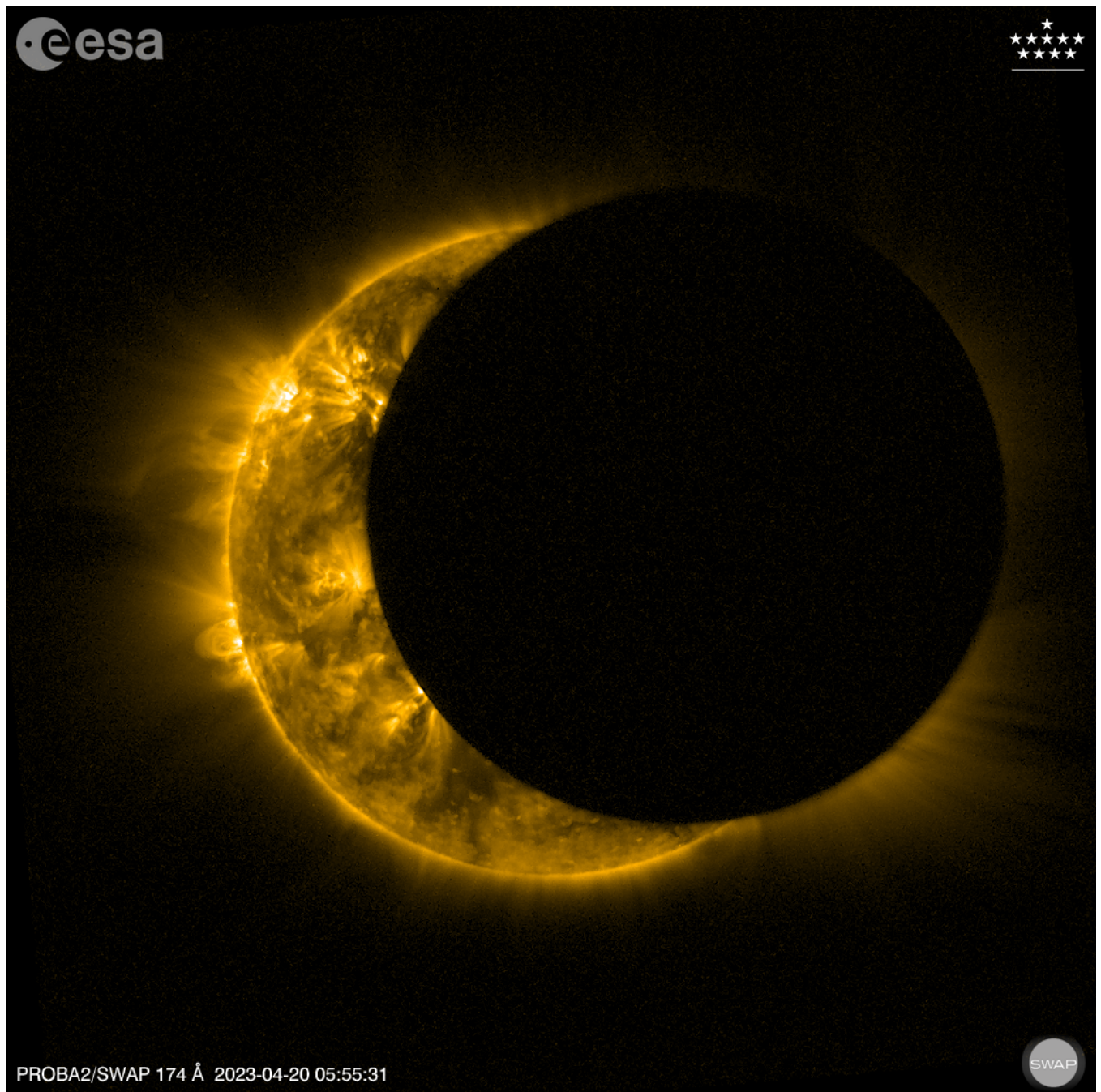
This page also lists the recorded flaring events.

A weekly overview movie can be found [here](#) (SWAP week 682).

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

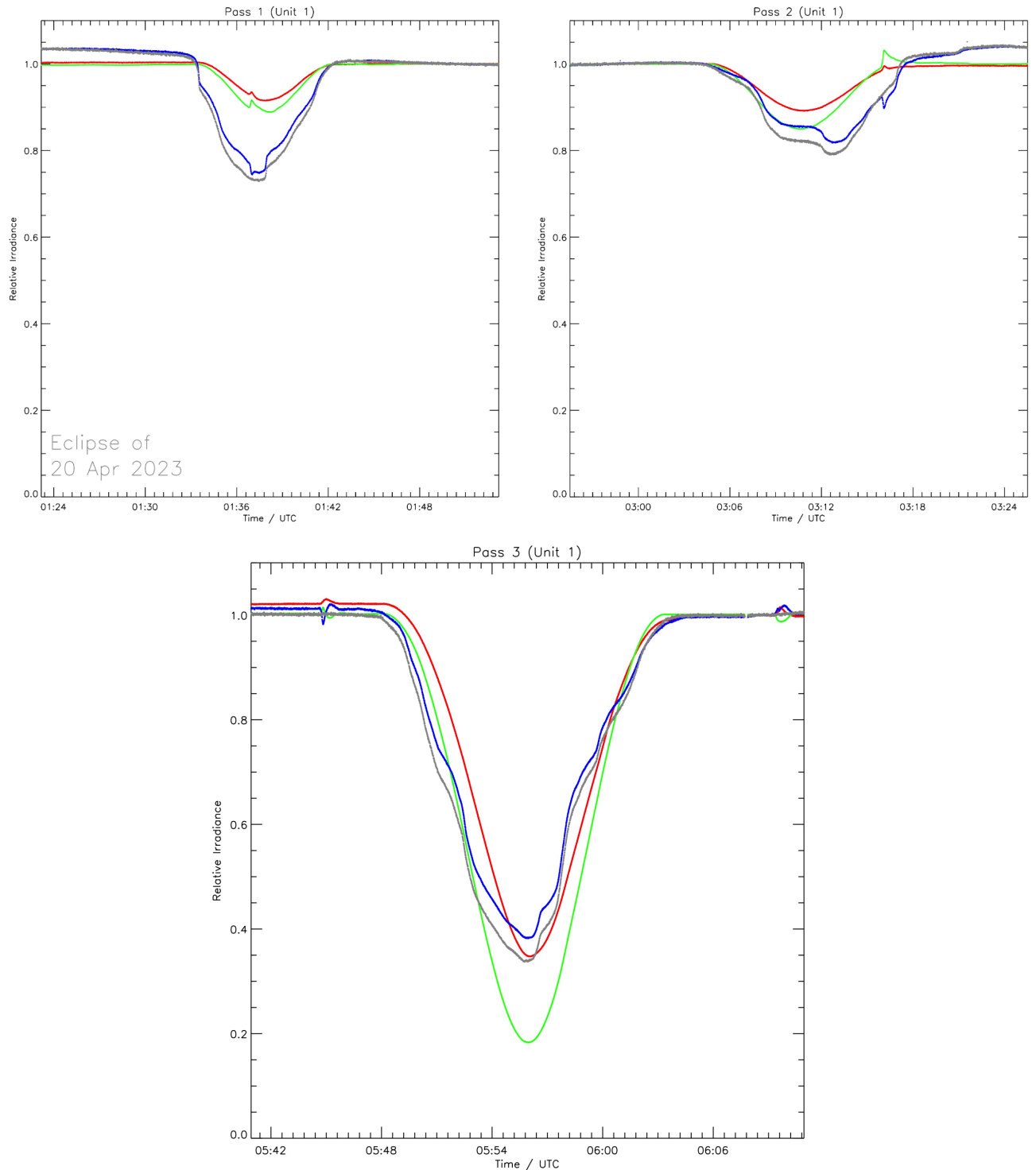
If any of the linked movies are unavailable they can be found in the P2SC movie repository [here](#)

Thursday Apr 20



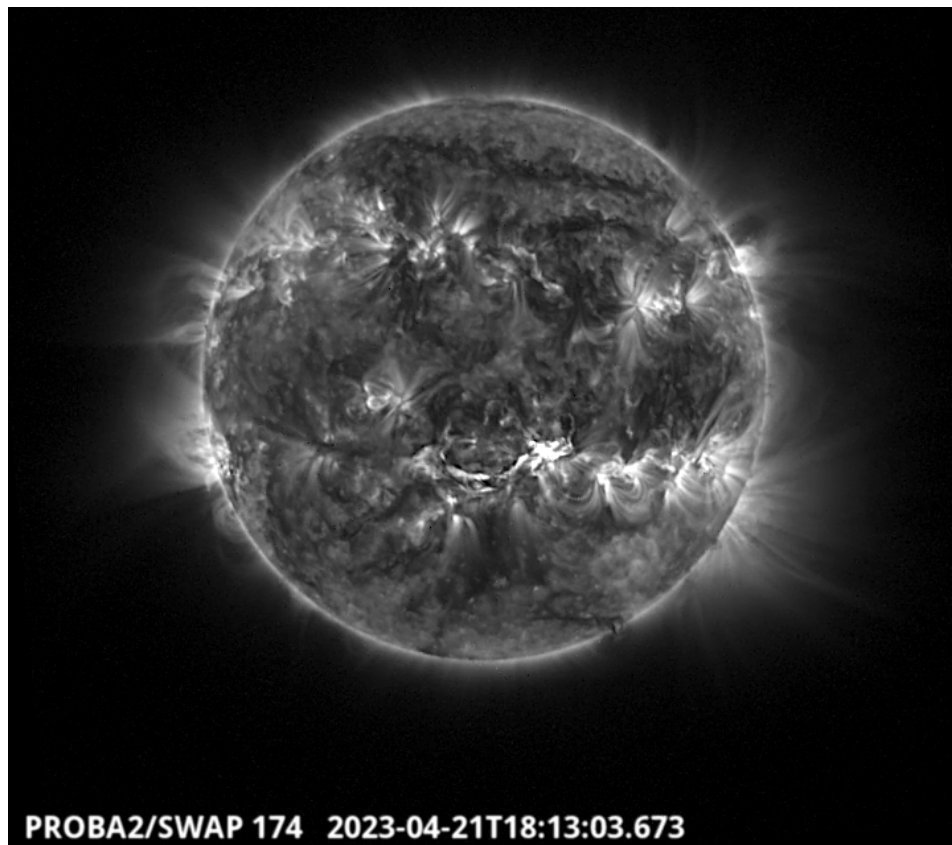
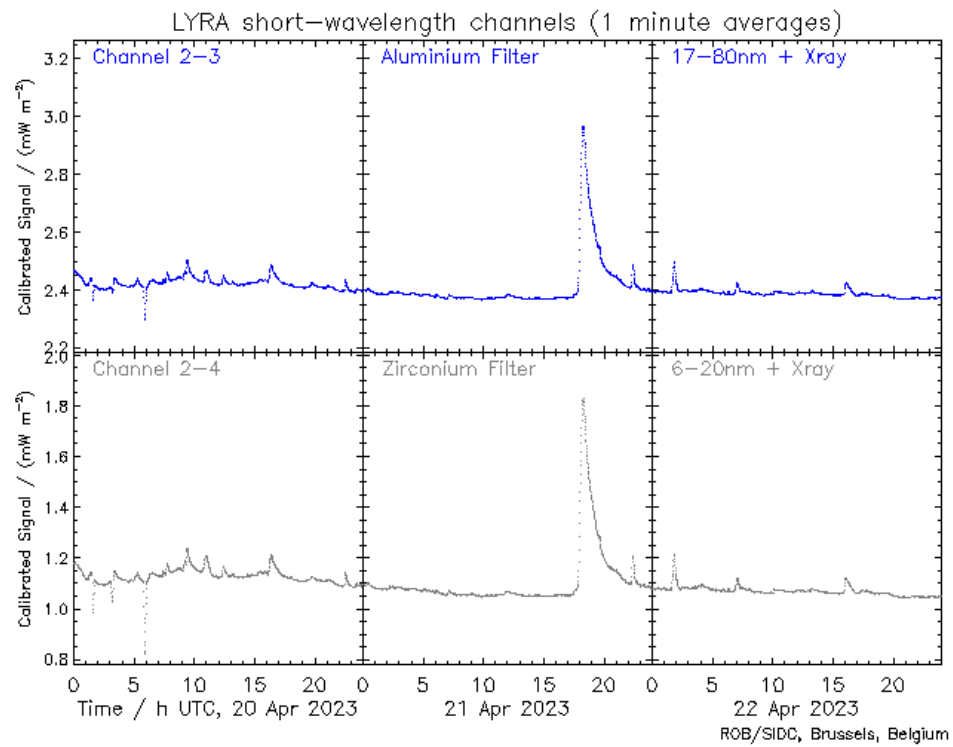
**On 2023-Apr-20 a total solar eclipse as seen from Earth was observed by SWAP and LYRA as three partial solar eclipses. The SWAP image above was taken during the third partial occultation.**

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 the three passes in the eclipse zone. During the third pass (bottom panel), the Moon was covering the Sun the most, hence the deeper decrease in irradiance as compared to the other two curves/passes (top panels). The colors correspond to the observations by the four channels of LYRA: red = Lyman-alpha, green = Herzberg, blue = Aluminum, black = Zirconium.

Friday Apr 21



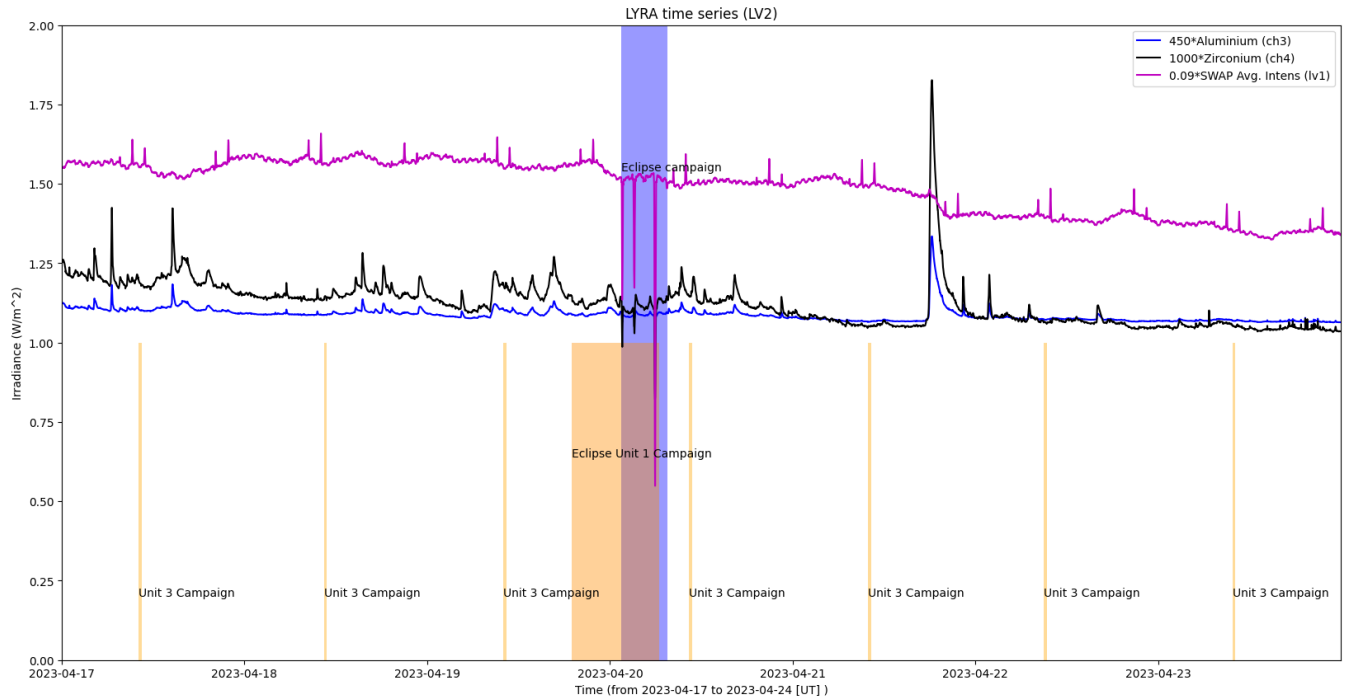
The largest flare of the week, an M1.7, was observed by LYRA (top panel) and SWAP (bottom panel). The flare occurred on 2023-Apr-21 (peak at 18:12 UT) close to the center of the solar disc, and it was associated with NOAA AR3283.

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:

- Eclipse high-cadence (20 sec) imaging on 2023-Apr-20 between: 01:28-01:45, 02:56-03:24, 04:21-04:40, 05:43-06:07, and 07:23-07:32

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

- Daily Unit 3 campaign, 2023-Apr-17
- Daily Unit 3 campaign, 2023-Apr-18
- Daily Unit 3 campaign, 2023-Apr-19
- Eclipse Unit 1 campaign, from 2023-Apr-19 at 19:30 until 2023-Apr-20 at 06:30 UT
- Daily Unit 3 campaign, 2023-Apr-20
- Daily Unit 3 campaign, 2023-Apr-21
- Daily Unit 3 campaign, 2023-Apr-22
- Daily Unit 3 campaign, 2023-Apr-23

The red shaded periods related to other issues corresponds to:

- None

## 2. LYRA instrument status

### IOS

Start IOS	Mon Apr 17 2023	LYIOS01003
End IOS	Sun Apr 23 2023	LYIOS01004

### LYRA detector temperature

LYRA detector 2 temperature globally varied between 49.52 and 52.45 °C.

### 3. SWAP instrument status

#### MCPM errors

The number of MCPM recoverable errors increased from 40779 to 41037.

The number of MCPM unrecoverable errors remained at 3135.

#### IOS

Start IOS	Mon Apr 17 2023	IOS001117
End IOS	Sun Apr 23 2023	IOS001118

#### SWAP detector temperature

The SWAP Cold Finger Temperature globally varied between -0.97 and 0.07 °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 43812 to 43878) 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 Apr 17 0UT and 2023 Apr 24 0UT: 4861

Highest cadence in this period: 19 seconds

Average cadence in this period: 124.40 seconds

Number of image gaps larger than 300 seconds: 162

Largest data gap: 9.17 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)