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|---|---|---|
| P2SC-ROB-WR-361<br>- 20170220<br>Weekly report #361         | <b>P2SC Weekly report</b>   |  |
| Period covered:<br>Date:<br><br>Written by:<br>Approved by: | Mon Feb 20 to Sun Feb 26, 2017<br>27 Feb 2017<br><br>Jennifer O'Hara<br>Matthew West  | Royal Observatory<br>of Belgium<br><br>-<br>PROBA2 Science<br>Center                |
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## 1. Science

### Solar & Space weather events

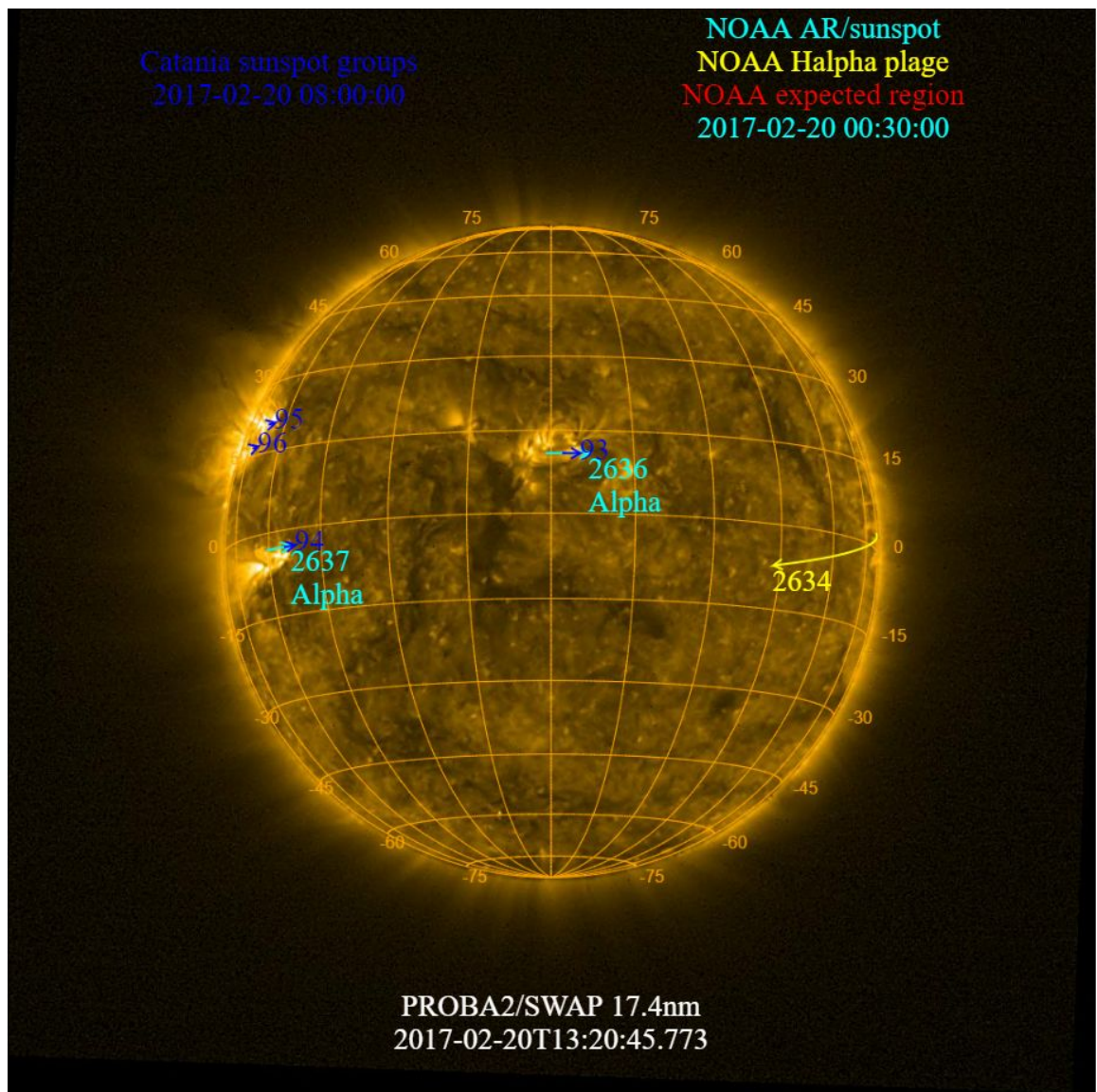
The level of solar activity<sup>1</sup> fluctuated between **very low** and **low** this week.

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

|          | Monday<br>20 Feb | Tuesday<br>21 Feb | Wednesday<br>22 Feb | Thursday<br>23 Feb | Friday<br>24 Feb | Saturday<br>25 Feb | Sunday<br>26 Feb |
|----------|------------------|-------------------|---------------------|--------------------|------------------|--------------------|------------------|
| Activity | very low         | very low          | low                 | low                | low              | very low           | very low         |
| Flares   | -                | -                 | -                   | -                  | -                | -                  | -                |

<sup>1</sup> See appendix. All timings are given in UT.

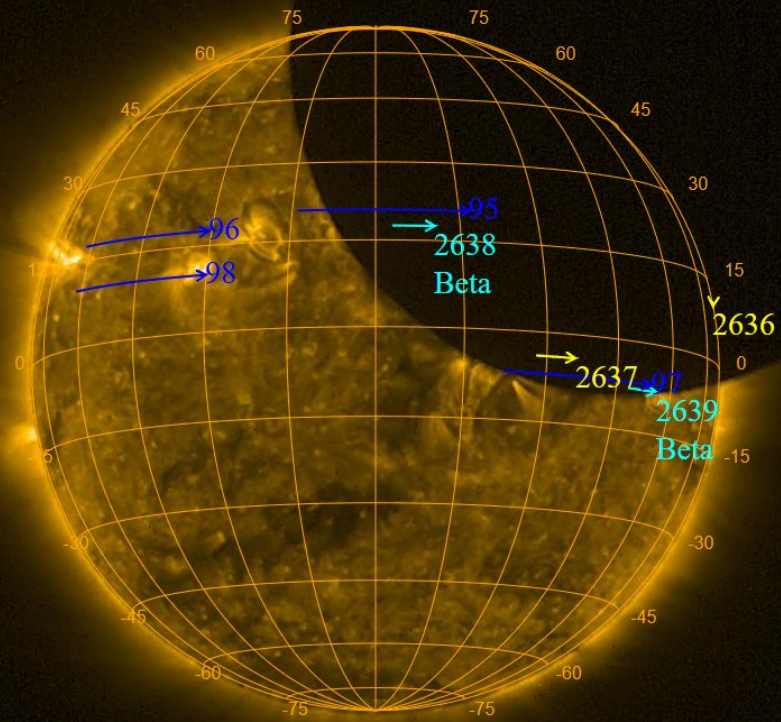
The SWAP images of Feb 20 and Feb 26 are shown below, with annotated active regions.



<http://sidc.be/soteria/soteria.php>

Catania sunspot groups  
2017-02-24 08:30:00

NOAA AR/sunspot  
NOAA Halpha plage  
NOAA expected region  
2017-02-26 00:30:00



PROBA2/SWAP 17.4nm  
2017-02-26T12:59:13.053

## **Solar Activity**

Solar flare activity fluctuated between very low and low 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: <http://proba2.oma.be/ssa>

This page also lists the recorded flaring events.

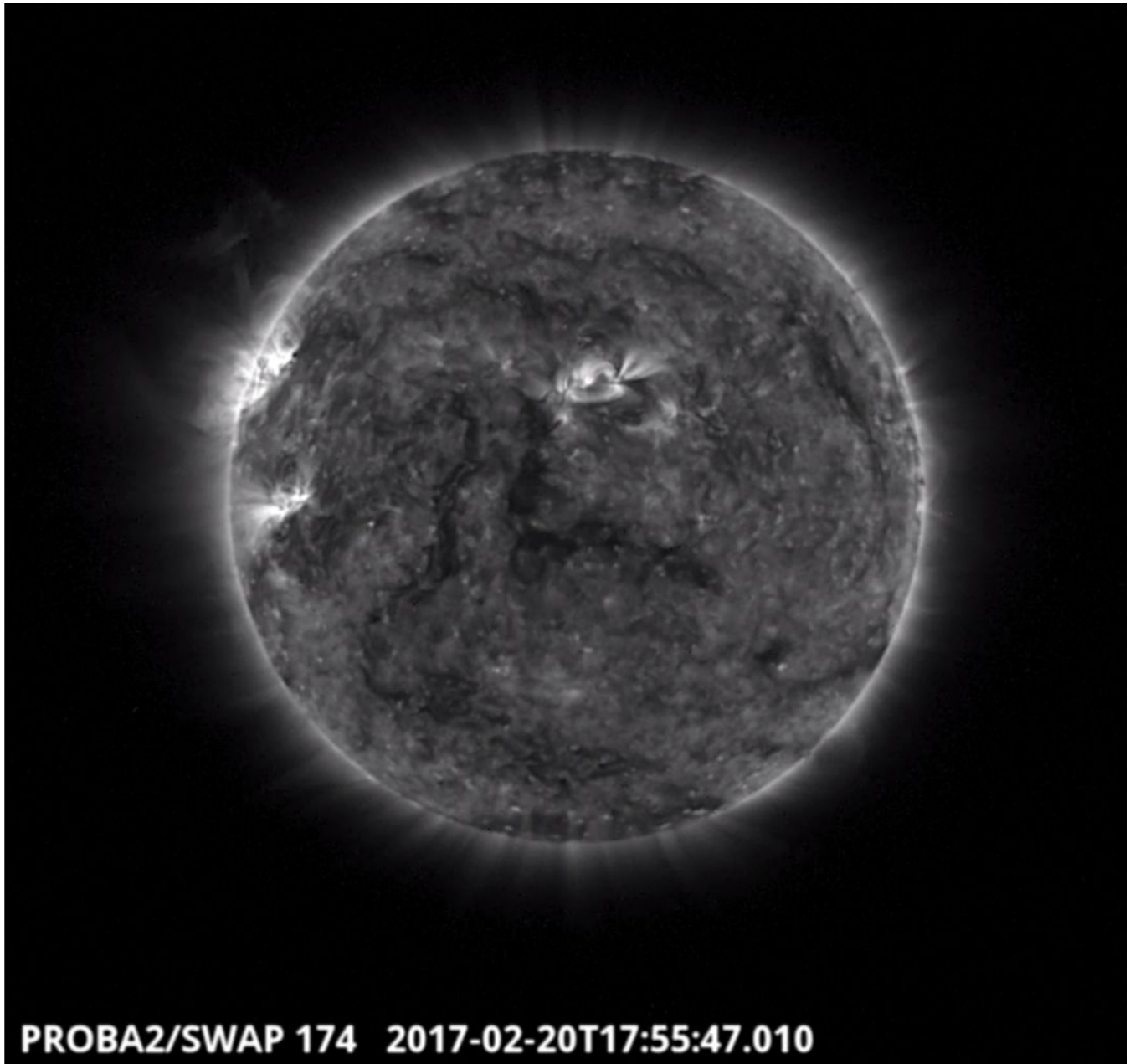
A weekly overview movie can be found [here](#) (SWAP week 361).

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](#)

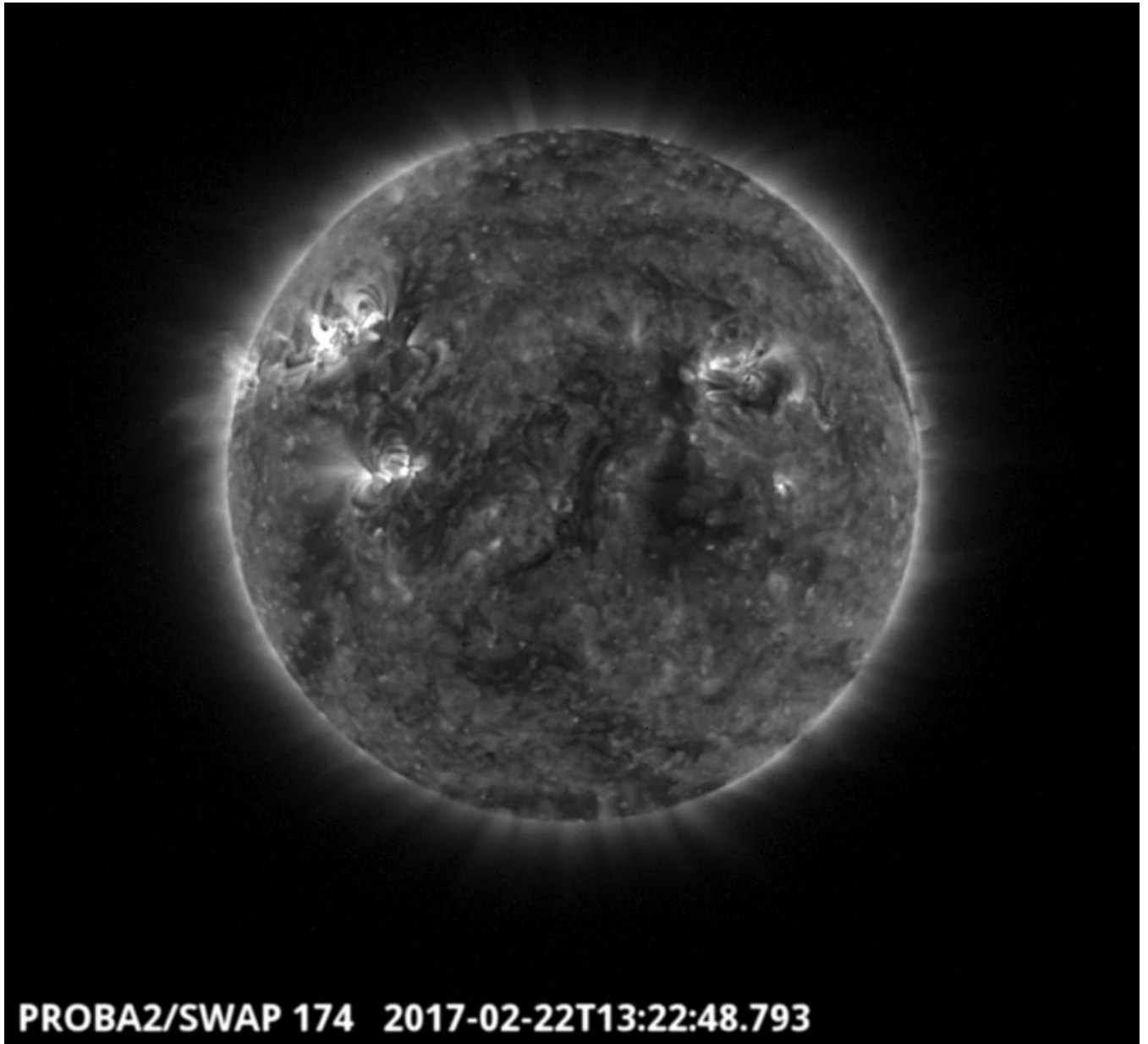


Monday Feb 20



An eruption was observed by SWAP on the east limb of the Sun on 2017-Feb-20 at 17:55 UT.  
Find a movie of the event [here](#) (SWAP movie)

Wednesday Feb 22



**PROBA2/SWAP 174 2017-02-22T13:22:48.793**  
A C4.1 class flare was observed by SWAP in the Eastern hemisphere of the Sun on 2017-Feb-22  
shown here at 13:22 UT  
Find a movie of the events [here](#) (SWAP movie)

Sunday Feb 26



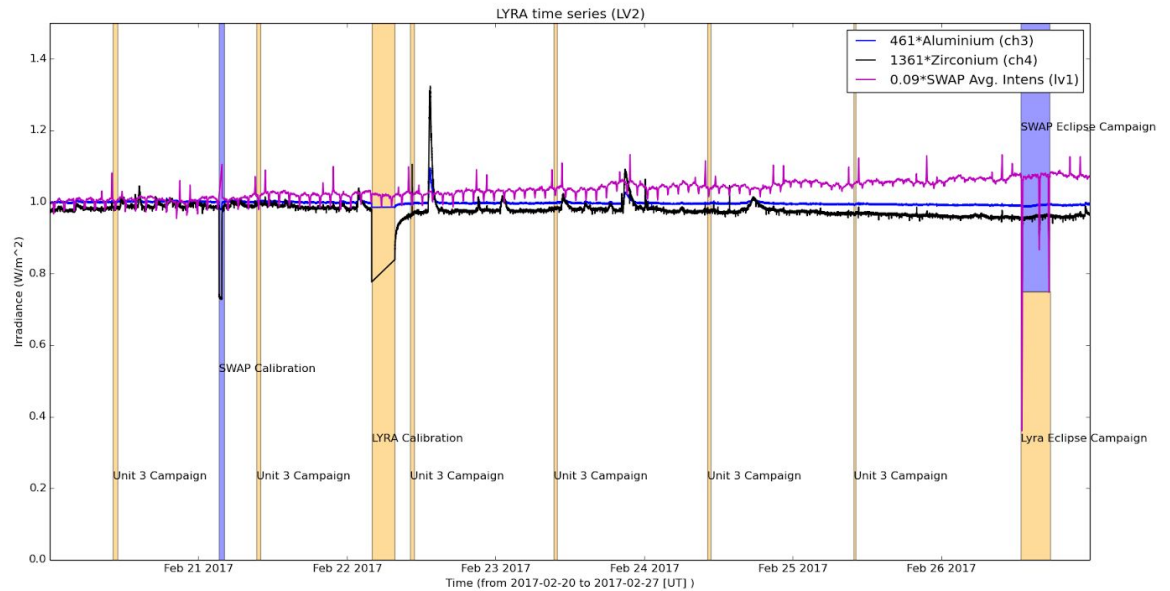
**Eclipse Campaign in SWAP images on 2017-Feb-26.**

Find a movie of the events [here](#) (SWAP movie)

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 )



The blue shaded periods correspond to, from left to right:

- SWAP calibration, 2017-Feb-21
- SWAP eclipse Campaign, 2017-Feb-26

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

- Daily unit 3 campaign, 2017-Feb-20
- Daily unit 3 campaign, 2017-Feb-21
- LYRA bi-weekly Calibration, 2017-Feb-22
- Daily unit 3 campaign, 2017-Feb-22
- Daily unit 3 campaign, 2017-Feb-23
- Daily unit 3 campaign, 2017-Feb-24
- Daily unit 3 campaign, 2017-Feb-25
- LYRA eclipse campaign, 2017-Feb-26

The red shaded period corresponds to:

- None



## **Outreach, papers, presentations, etc.**

Please consult <http://proba2.oma.be/science/publications> for a list of interesting articles using SWAP & LYRA data, as well as a link to the complete article list.

The science section of this weekly report is also published in the weekly STCE newsletter (<http://www.stce.be/newsletter/newsletter.php>).

A special eclipse observation campaign was organised on 2016-Feb-26. The event was reported on Facebook, Twitter and the PROBA2 front page: <http://proba2.oma.be/eclipse-february-2017>

## **Guest Investigator Program**

- None

## 2. LYRA instrument status

### Calibration

Calibration campaign on Wednesday this week.

### IOS & operations

| Monday<br>20 Feb               | Tuesday<br>21 Feb              | Wednesday<br>22 Feb                         | Thursday<br>23 Feb             | Friday<br>24 Feb               | Saturday<br>25 Feb             | Sunday<br>26 Feb                          |
|--------------------------------|--------------------------------|---|--------------------------------|--------------------------------|--------------------------------|---|
| Nominal acquisition + daily U3 | Nominal acquisition + daily U3 | Nominal acquisition + daily U3+ Calibration | Nominal acquisition + daily U3 | Nominal acquisition + daily U3 | Nominal acquisition + daily U3 | Nominal acquisition + U3 eclipse campaign |
| LYIOS00601                     | LYIOS00601                     | LYIOS00601                                  | LYIOS00601                     | LYIOS00601                     | LYIOS00602                     | LYIOS00602                                |

The following science campaigns were performed by LYRA:

- Daily U3 observations campaign (except on 2017-Feb-26, which was coordinated during the eclipse)

On 2017-Feb-22

- LYRA bi-weekly calibration

On 2017-Feb-26

- U3 eclipse campaign

### LYRA detector temperature

LYRA detector 2 temperature globally varied between 50.29 and 52.92 °C.

### 3. SWAP instrument status

#### Calibration

Calibration campaign on Tuesday this week.

#### MCPM errors

The number of MCPM recoverable errors increased from 6575 to 6973.

The number of MCPM unrecoverable errors remained at 0.

#### IOS & operations

| Monday<br>20 Feb       | Tuesday<br>21 Feb                 | Wednesday<br>22 Feb    | Thursday<br>23 Feb     | Friday<br>24 Feb       | Saturday<br>25 Feb     | Sunday<br>26 Feb                       |
|------------------------|-----------------------------------|------------------------|------------------------|------------------------|------------------------|--|
| Nominal acquisition    | Nominal acquisition + Calibration | Nominal acquisition    | Nominal acquisition    | Nominal acquisition    | Nominal acquisition    | Nominal acquisition + Eclipse campaign |
| IOS00690<br>533 images | IOS00690<br>719 images            | IOS00690<br>606 images | IOS00691<br>695 images | IOS00691<br>666 images | IOS00691<br>697 images | IOS00691<br>1039 images                |

Special operations for SWAP, this week:

On 2017-Feb-21

- SWAP bi-weekly calibration

On 2017-Feb-26

- SWAP eclipse campaign

#### SWAP detector temperature

The SWAP Cold Finger Temperature globally varied between 0.95 and 2.87 °C.

#### **4. PROBA2 Science Center Status**

The main operator is Jennifer O'Hara.

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 23251 to 23317) 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 2017 Feb 20 00:00 UT and 2017 Feb 27 00:00 UT: 5019

Highest cadence in this period: 0 seconds

Average cadence in this period: 120.51 seconds

Number of image gaps larger than 300 seconds: 91

Largest data gap: 10.00 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)