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| P2SC-ROB-WR-285 - 20150907 Weekly report #285 | P2SC Weekly report |  |
| Period covered: Date: Written by: Approved by: | Mon Sep 07 to Sun Sep 13, 2015 17 Sep 2015 Katrien Bonte D.B. Seaton | Royal Observatory of Belgium - PROBA2 Science Center |
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1. Science

Solar & Space weather events

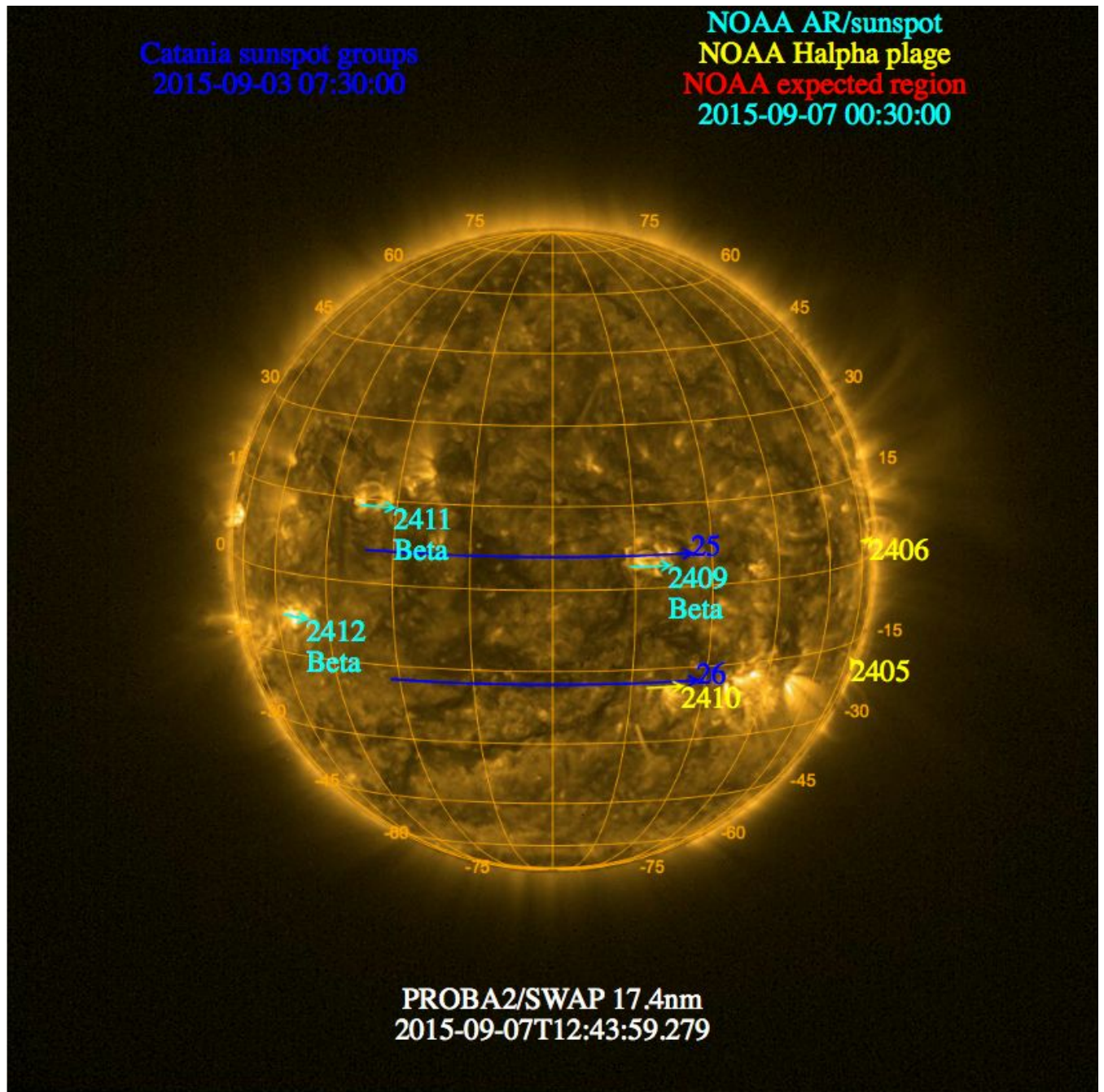
The level of solar activity¹ fluctuated between **quiet** and **low** this week.

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

| | Monday 07 Sep | Tuesday 08 Sep | Wednesday 09 Sep | Thursday 10 Sep | Friday 11 Sep | Saturday 12 Sep | Sunday 13 Sep |
|----------|------------------|-------------------|---------------------|--------------------|------------------|--------------------|------------------|
| Activity | very low | quiet | quiet | quiet | low | quiet | very low |
| Flares | - | - | - | - | - | - | - |

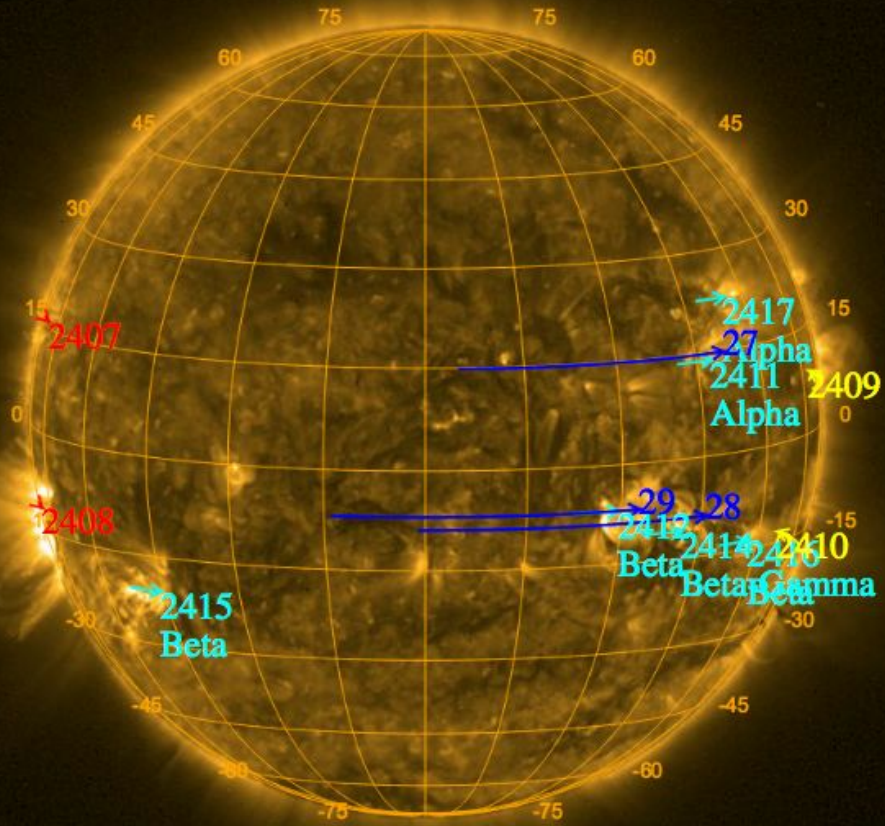
¹ See appendix. All timings are given in UT.

The SWAP images of Sep 07 and Sep 13 are shown below, with annotated active regions.



Catania sunspot groups
2015-09-10 07:30:00

NOAA AR/sunspot
NOAA Halpha plage
NOAA expected region
2015-09-13 00:30:00



PROBA2/SWAP 17.4nm
2015-09-13T12:49:00.058

Solar Activity

Solar flare activity fluctuated between quiet 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.

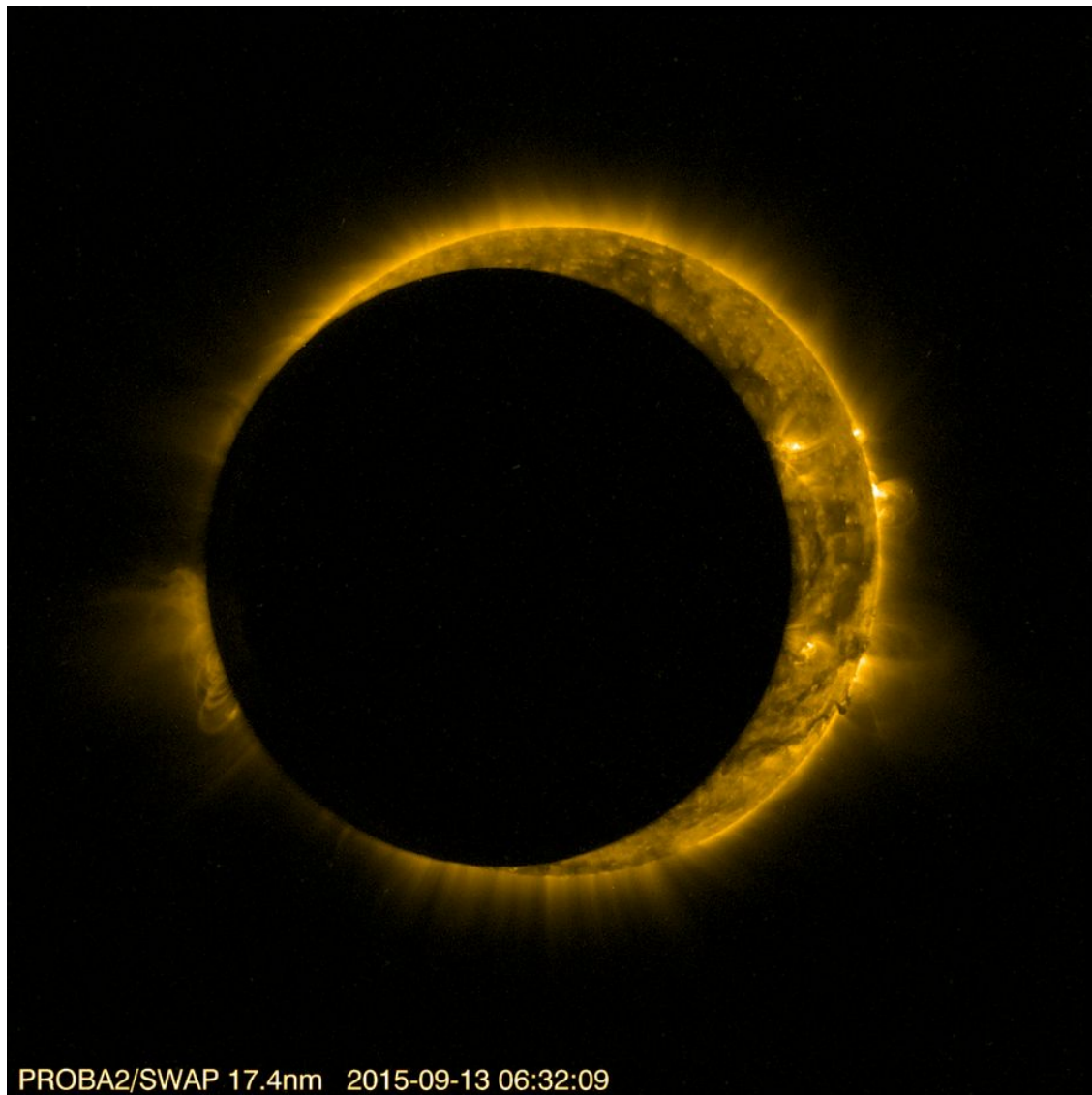
A weekly overview movie can be found [here](#) (SWAP week 285).

The Sun has been particularly quiet this week, no M-class flares or above were observed.

However, one specific event drew our attention: On Sunday 13 September, the PROBA2 satellite witnessed **three partial/annular solar eclipses**. The SWAP image provided below shows a snapshot of one of the eclipses. Images and movies of the events can be found on the PROBA2 website:

<http://proba2.oma.be/Events/2015-Sep-13-SolarEclipse/>

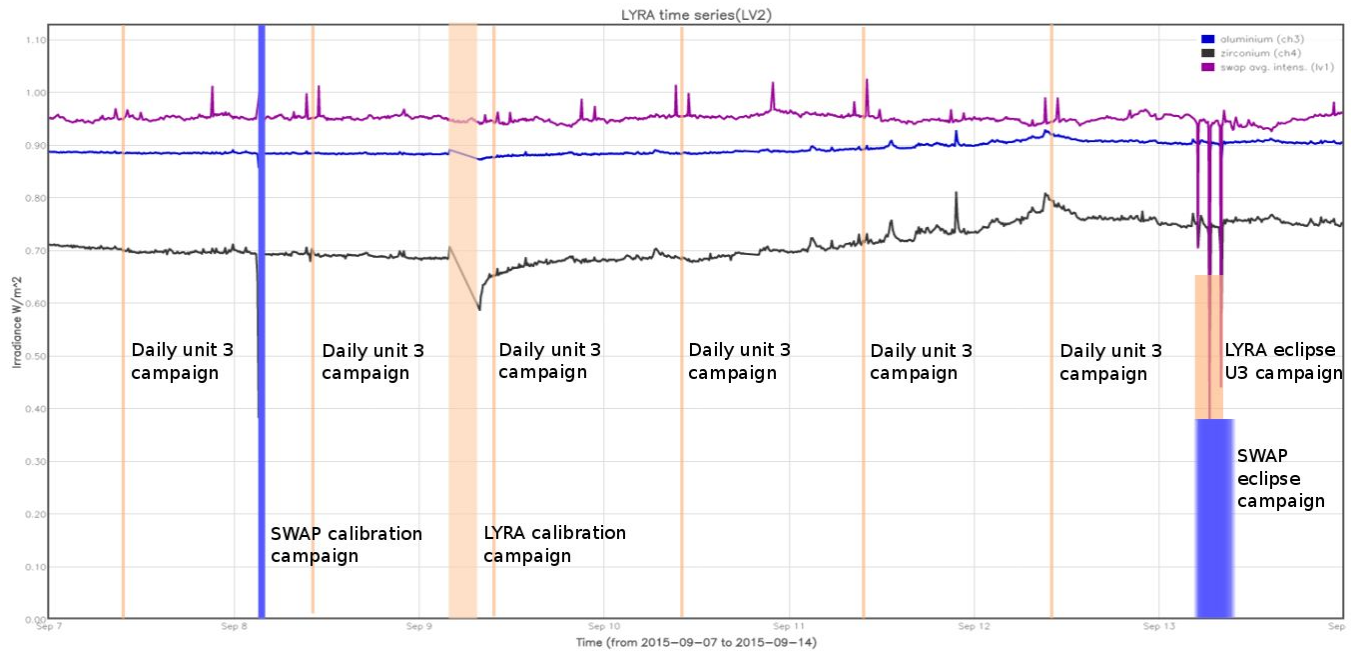
The complete daily SWAP movie from that day can be found [here](#).



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)



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

- SWAP bi-weekly calibration campaign on 2015-09-08
- SWAP eclipse high cadence observation campaign on 2015-09-13

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

- LYRA daily U3 campaign on 2015-09-07
- LYRA daily U3 campaign on 2015-09-08
- LYRA short bi-weekly calibration on 2015-09-09
- LYRA daily U3 campaign on 2015-09-09
- LYRA daily U3 campaign on 2015-09-10
- LYRA daily U3 campaign on 2015-09-11
- LYRA daily U3 campaign on 2015-09-12
- LYRA U2 + U3 eclipse observation campaign on 2015-09-13

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>).

Eclipses from 13 September 2015

A news item about the partial eclipses observed by our satellite was published on the PROBA2 website: "SWAP Observes Another Eclipse - and this Time it's Annular".

See <http://proba2.oma.be/annular-eclipse-2015>

An image and movie of the eclipses have also been put online on the ESA website, these can be found here:

Image: http://www.esa.int/spaceinimages/Images/2015/09/Proba-2_eclipse

Movie: http://www.esa.int/spaceinvideos/Videos/2015/09/Proba-2_partial_eclipses

Guest Investigator Program

- None

2. LYRA instrument status

Calibration

Calibration campaign on Wednesday this week.

IOS & operations

| Monday 07 Sep | Tuesday 08 Sep | Wednesday 09 Sep | Thursday 10 Sep | Friday 11 Sep | Saturday 12 Sep | Sunday 13 Sep |
|--------------------------------|--------------------------------|--|--------------------------------|--------------------------------|--------------------------------|--|
| 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 + eclipse U2+U3 campaign |
| LYIOS00491 | LYIOS00491 | LYIOS00491 | LYIOS00491 | LYIOS00492 | LYIOS00492 | LYIOS00492 |

The following science campaigns were performed by LYRA:

- Daily U3 observation campaigns
- Short bi-weekly calibration on 2015-09-09
- Eclipse U2 + U3 observation campaign on 2015-09-13

LYRA detector temperature

LYRA detector 2 temperature globally varied between 46.66 and 49.65 °C.

3. SWAP instrument status

Calibration

Calibration campaign on Tuesday this week.

MCPM errors

The number of MCPM recoverable errors remained 136.

The number of MCPM unrecoverable errors remained 0.

IOS & operations

| Monday 07 Sep | Tuesday 08 Sep | Wednesday 09 Sep | Thursday 10 Sep | Friday 11 Sep | Saturday 12 Sep | Sunday 13 Sep |
|------------------------|---|------------------------|------------------------|------------------------|------------------------|---|
| Nominal acquisition | Nominal acquisition + calibration | Nominal acquisition | Nominal acquisition | Nominal acquisition | Nominal acquisition | Nominal acquisition + eclipse campaign |
| IOS00594 586 images | IOS00594 638 images | IOS00594 666 images | IOS00594 610 images | IOS00594 604 images | IOS00594 562 images | IOS00595 647 images |

Special operations for SWAP, this week:

- Bi-weekly calibration on 2015-09-08
- Eclipse high cadence observation campaign on 2015-09-13

SWAP detector temperature

The SWAP Cold Finger Temperature globally varied between -1.29 and -0.09 °C.

4. PROBA2 Science Center Status

The main operator is Katrien Bonte.

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 18402 to 18462) 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 2015 Sep 07 0UT and 2015 Sep 14 0UT: 4313

Highest cadence in this period: 29 seconds

Average cadence in this period: 140.21 seconds

Number of image gaps larger than 300 seconds: 212

Largest data gap: 11.00 minutes

Data coverage LYRA

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

- BINLYRA_18434 (The level of the signal was extremely bad during this pass)

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 |
| 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)