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| P2SC-ROB-WR-215- 20140505 Weekly report #215 | P2SC Weekly report |  |
| Period covered: Date: Written by: Approved by: | Mon May 05 to Sun May 11, 2014 14 May 2014 Erik Pylyser Matthew West | Royal Observatory of Belgium - PROBA2 Science Center |
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1. Science

Solar & Space weather events

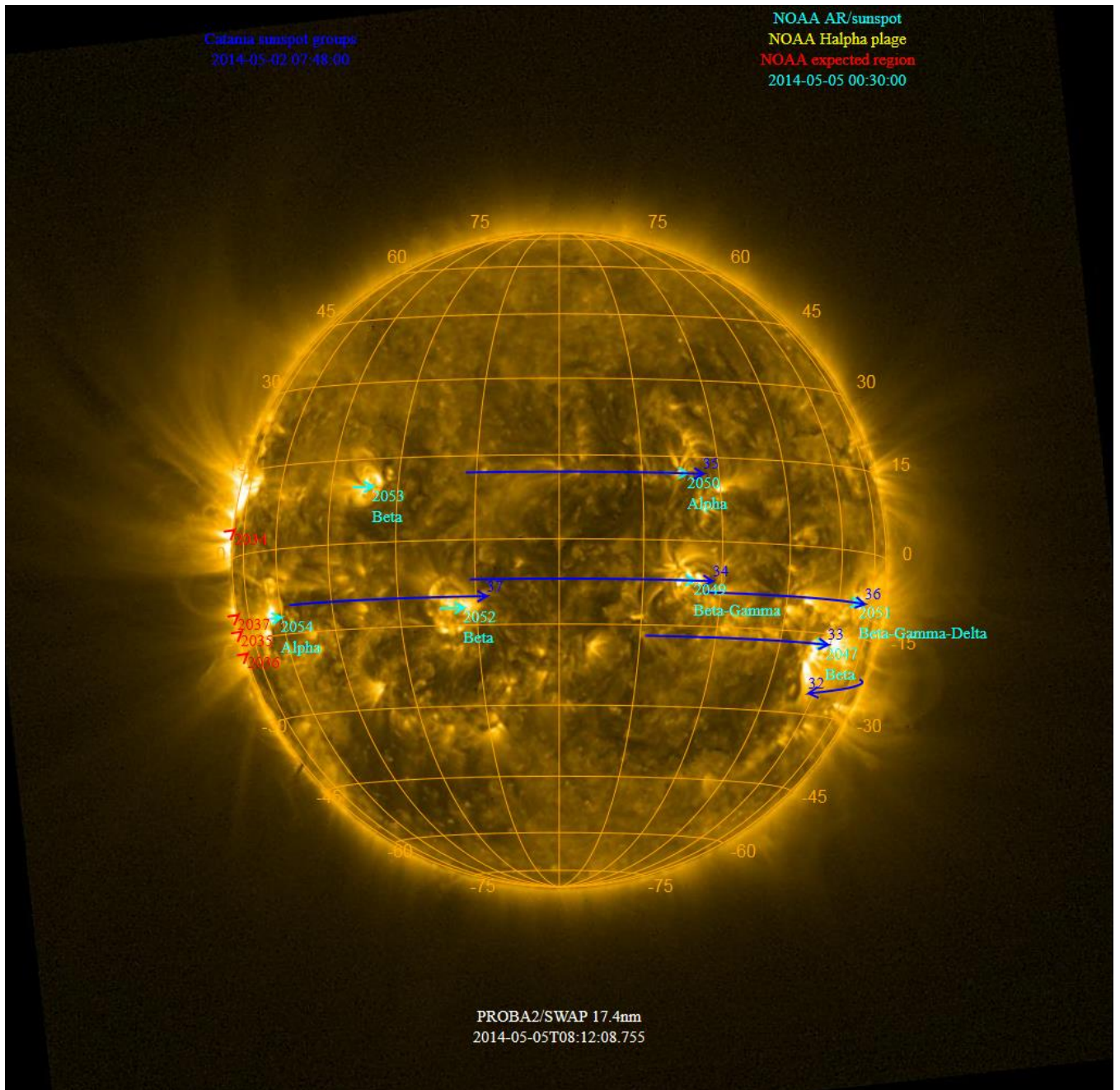
The level of solar activity¹ fluctuated between **low and moderate** this week.

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

| | Monday 05 May | Tuesday 06 May | Wednesday 07 May | Thursday 08 May | Friday 09 May | Saturday 10 May | Sunday 11 May |
|----------|------------------|---------------------------------|---------------------|---------------------------------|------------------|--------------------|------------------|
| Activity | low | moderate | moderate | moderate | low | low | low |
| Flares | - | M1.8@08:41 M1.0@22:01 | M1.2@16:07 | M5.2@09:20 M5.2@09:59 | - | - | - |

¹ See appendix. All timings are given in UT.

The SWAP images of May 05 and May 11 are shown below, with annotated active regions.



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

Solar Activity

Solar flare activity fluctuated between low and moderate during the week.

In order to view the activity of this week in more detail, we suggest going to the following website from which all the daily (normal and difference) movies can be accessed: <http://proba2.oma.be/ssa>.

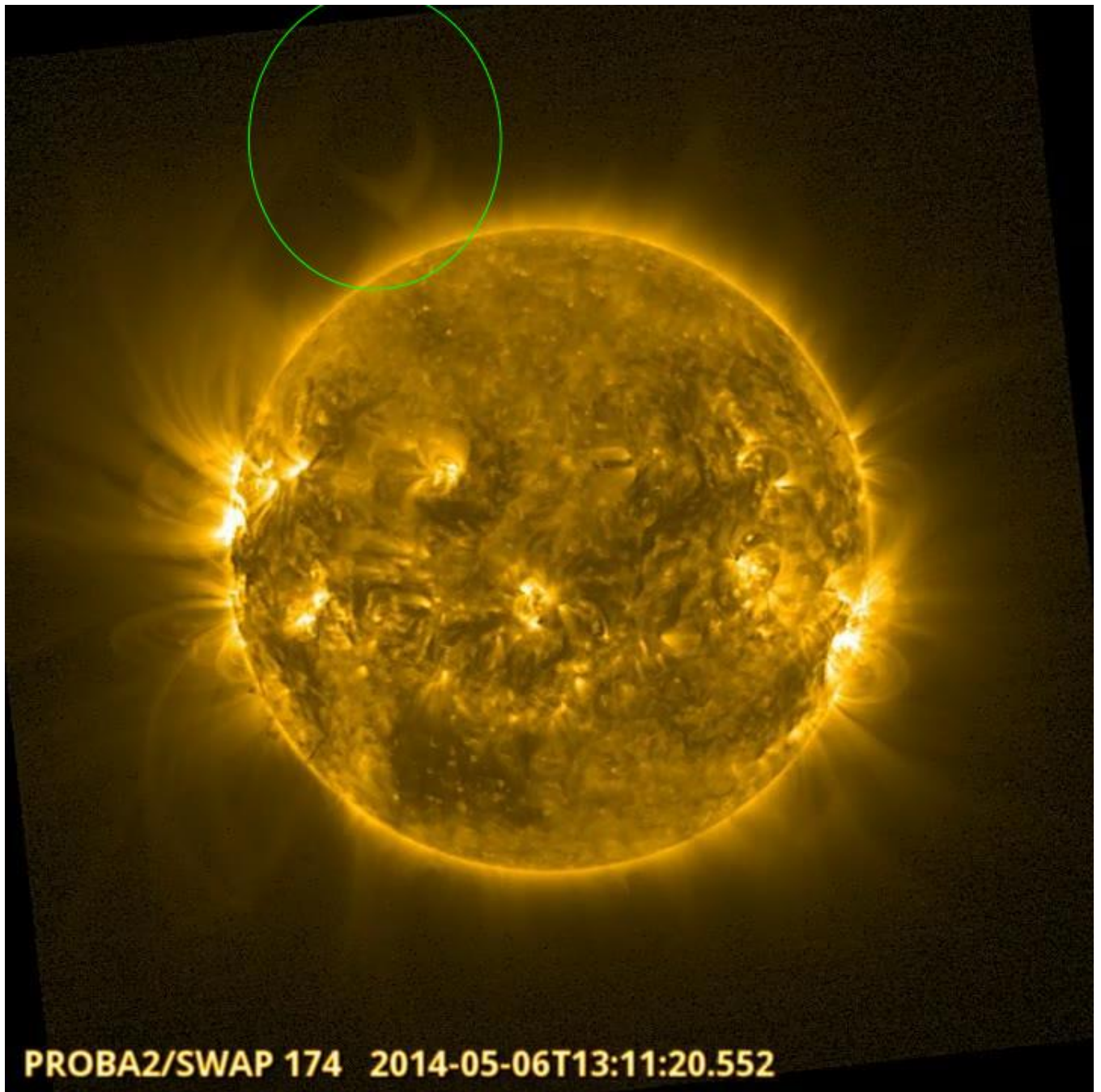
This page also lists the recorded flaring events.

A weekly overview movie can be found [here](#) (SWAP week 215).

At 2 occasions the Sun is seen to be off-pointed East, due to special campaigns (see sections below). Early in the week (Tue, Wed), some quite large scale structures and eruptions can be observed in the eastern corona (North and South, respectively).

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

Tuesday May 06



Cavity eruption, North East Limb @ 13:11 - SWAP image



Eruption on West Limb @ 23:06 - SWAP difference image
Find a movie [here](#) (SWAP difference movie)

Thursday May 08



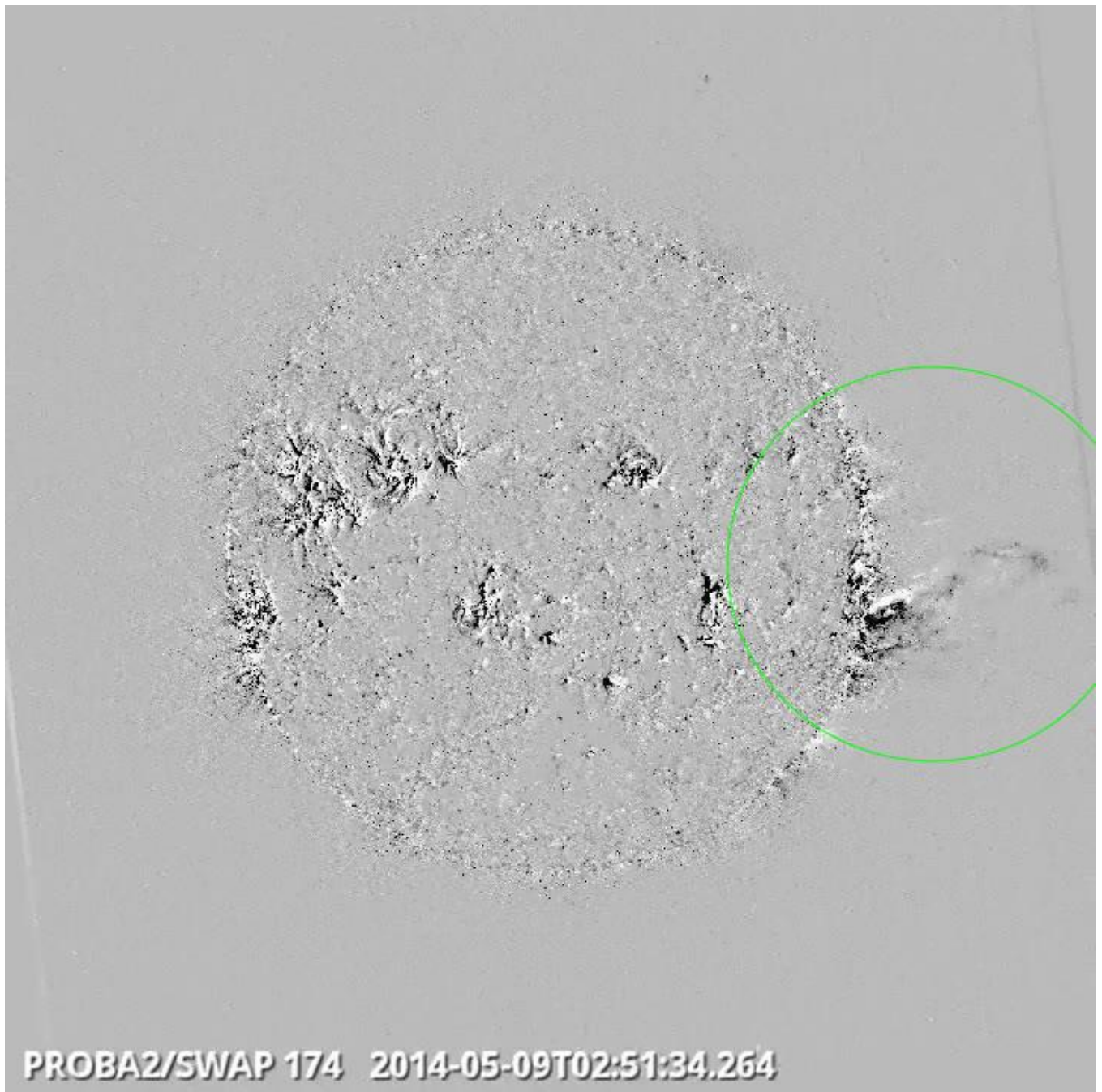
Eruption (and wave) along West Limb @ 03:12 - SWAP difference image
Find a movie [here](#) (SWAP difference movie)



**Eruption in North East Quadrant, with EIT wave moving Northwards @ 08:25 -
SWAP difference image**

Find a movie [here](#) (SWAP difference movie)

Friday May 09



Eruption on West Limb, extending up to SWAP FOV @ 02:51 - SWAP difference image
Find a movie [here](#) (SWAP difference movie)

Saturday May 10



Backside eruption behind West Limb @ 04:25 - SWAP difference image

Sat/Sun/Monday May 10/11/12

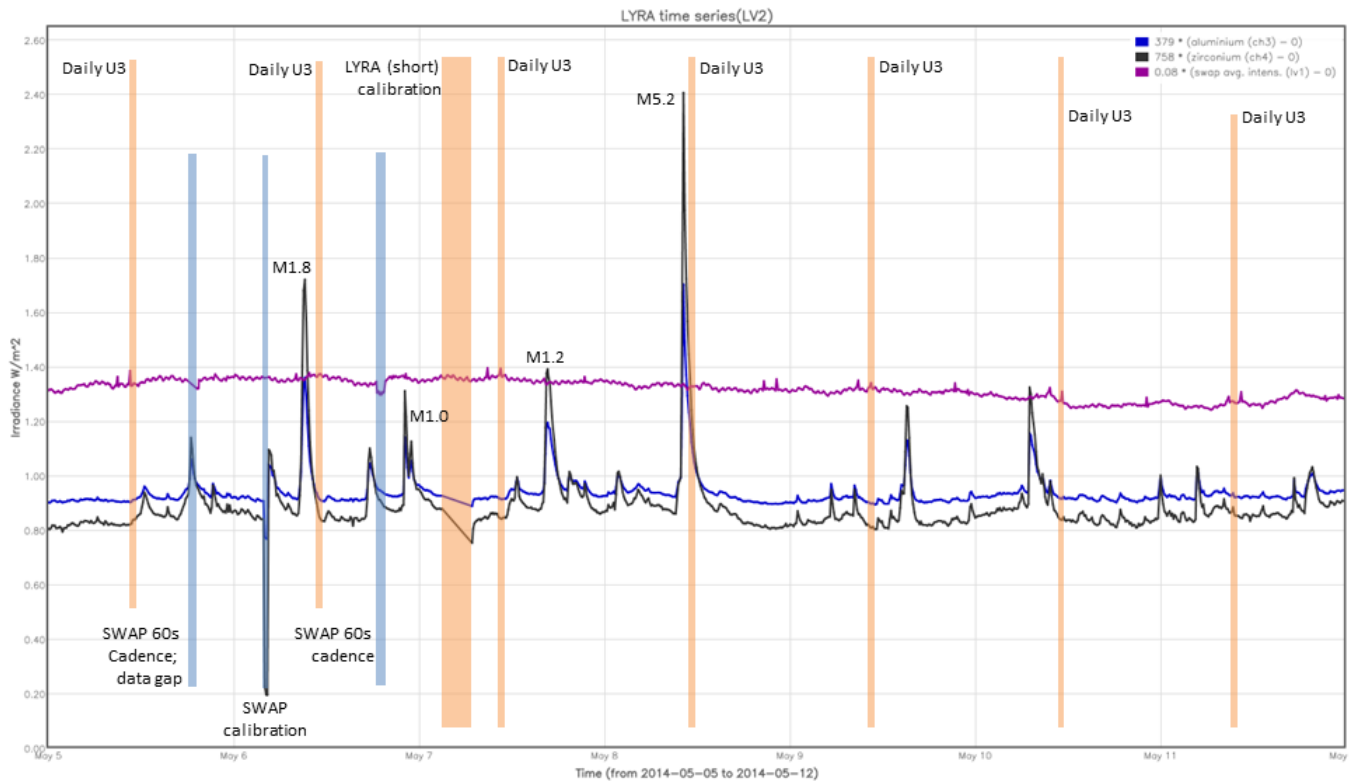


**Multiple and extended flow-activity along the South-East limb @ 17:54 on Saturday -
SWAP difference image**
(see the daily movies of 10/11/12 of May)

An overview of the weekly LYRA & SWAP data is provided below:

The following curves are visible:

- black: Zirconium Channel LYRA Unit 2
- blue: Aluminum Channel of LYRA Unit 2
- purple: SWAVINT (SWAP Average Intensity; integrated solar intensity per SWAP image pixel)



The (LYRA related) orange shaded periods correspond to, from left to right (see also section 2):

- Daily LYRA unit 3 campaigns (7 consecutive days)
- Calibration campaign on Wednesday morning

The (SWAP related) blue shaded periods correspond to, from left to right (see also section 3)

- East offpointing, and increased cadence, campaign on Monday 05/05, evening
- calibration campaign on Tuesday morning
- East offpointing, and increased cadence, campaign on Tuesday 06/05, evening

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>).

Guest Investigator Program

- Vida Zigman joined the P2SC for her research on: 'Modelling flare induced ionization enhancements of the lower ionosphere with LYRA data.'
Her stay will last from May 05 till May 28.
- Christian Bethge joined P2SC for his follow-up stay, from May 05 until May 23.
He is 'Combining SWAP and CoMP to study coronal pseudostreamers and their influence on solar wind speeds'.

Other Visitors

- None

2. LYRA instrument status

Calibration

LYRA calibration on Wednesday this week.

This is the second occurrence of a new LYRA calibration campaign, which is much shorter than earlier calibration campaigns. This shorter campaign was found adequate for calibration purposes, and will be used from now on.

IOS & operations

| Monday 05 May | Tuesday 06 May | Wednesday 07 May | Thursday 08 May | Friday 09 May | Saturday 10 May | Sunday 11 May |
|--------------------------------|--------------------------------|--|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 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 + daily U3 |
| LYIOS00394 | LYIOS00395 | LYIOS00395 | LYIOS00395 | LYIOS00395 | LYIOS00395 | LYIOS00395 |

The following science campaigns were performed by LYRA:

- daily U3 observation campaign (7 consecutive days)

LYRA detector temperature

During normal operations, the LYRA detector 2 temperature varied between 48.1 °C to 47 °C, taking into account the small daily U3 activation temperature peaks.

During calibration, the temperature dropped down to 45.6 °C

3. SWAP instrument status

Calibration

SWAP calibration on Tuesday this week.

MCPM errors

The number of MCPM recoverable errors increased from 18380 to 18640.

The number of MCPM unrecoverable errors remained at 1127.

IOS & operations

| Monday 05 May | Tuesday 06 May | Wednesday 07 May | Thursday 08 May | Friday 09 May | Saturday 10 May | Sunday 11 May |
|--|--|------------------------|------------------------|------------------------|------------------------|------------------------|
| Nominal acquisition + 60s cadence campaign | Nominal acquisition + calibration + 60s cadence campaign | Nominal acquisition | Nominal acquisition | Nominal acquisition | Nominal acquisition | Nominal acquisition |
| IOS00521 569 images | IOS00521 720 images | IOS00521 647 images | IOS00521 664 images | IOS00521 663 images | IOS00521 664 images | IOS00521 510 images |

Special SWAP operations this week:

- 2 off-pointed (East), increased cadence campaigns, in response to an expected higher solar activity on the east limb:
 - 60s cadence on Monday 05/05, from 18:00 to 19:30
 - 60s cadence on Tuesday 06/05, from 18:00 to 19:30

SWAP detector temperature

The SWAP Cold Finger Temperature varied between -0.40 °C and -1.36 °C (the latter during LYRA calibration).

4. PROBA2 Science Center Status

The main operator is Erik Pylyser (supported by Robbe Vansintjan)

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 14082 and 14141) was nominal.

Data coverage HK

All HK data files (LYRA_AD) have been received.

Data coverage SWAP

All SWAP Science data files (BINSWAP) have been received.

Total number of images between 2014 May 05 0UT and 2014 May 12 0UT: 4439

Highest cadence in this period: 30 seconds

Average cadence in this period: 137.06 seconds

Number of image gaps larger than 300 seconds: 2

Largest data gap: 75.17 minutes

The larger gap originates from the special high cadence campaign on Monday. Due to an operational error (wrong choice of data priority in combination with a relatively full buffer at that time), the data gathered during this campaign was overwritten before it could be downlinked.

Data coverage LYRA

All LYRA Science data files (BINLYRA) have been received.

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 |
| 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)