


P2SC-ROB-WR-164- 20130513 Weekly report #164	P2SC Weekly report	
Period covered: Date: Written by: Approved by:	Mon May 13 to Sun May 19, 2013 27 May 2013 Erik Pylyser Matthew West	Royal Observatory of Belgium - PROBA2 Science Center
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1. Science

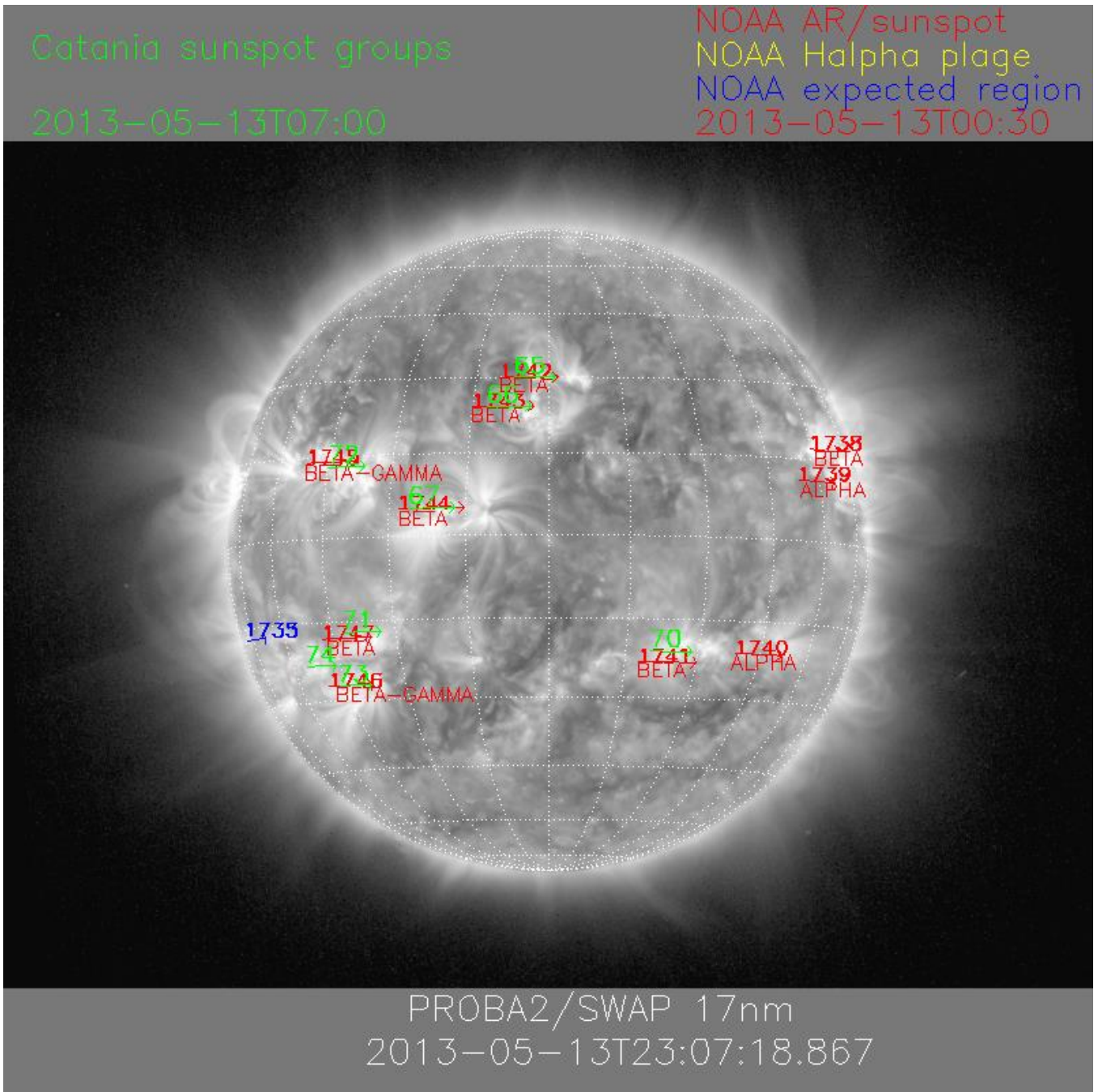
Solar & Space weather events

The level of solar activity¹ this week was very high to high in the first part of the week, weakening to low in the week-end. Only M- and X-flares are mentioned below, the most energetic one(s) are presented in **bold**:

	Monday 13 May	Tuesday 14 May	Wednesday 15 May	Thursday 16 May	Friday 17 May	Saturday 18 May	Sunday 19 May
Activity	very high	high	high	moderate	moderate	low	low
Flares	X1.7@01:53 M1.3@11:57 X2.8@15:48	X3.2@00:00	X1.2@01:25	M1.3@21:36	M3.2@08:43	-	-

¹ See appendix. All timings are given in UT.

The SWAP images of May 13 and May 19 are shown below, with annotated active regions.

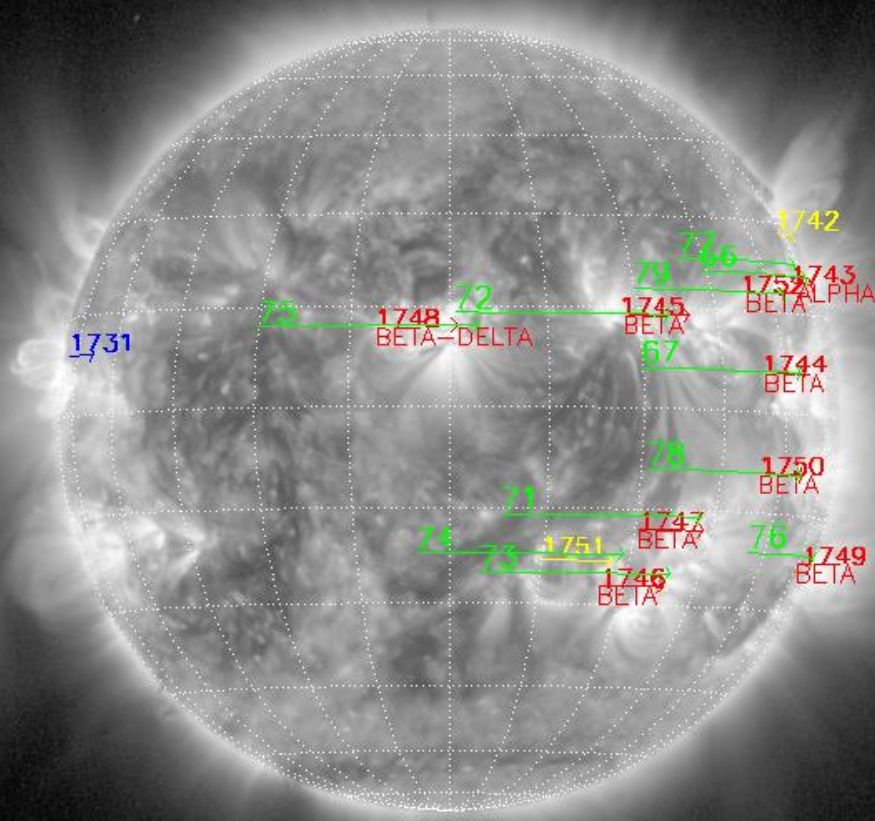


<http://sidc.be/html/CmapPage.html>

Catania sunspot groups

2013-05-17T08:36

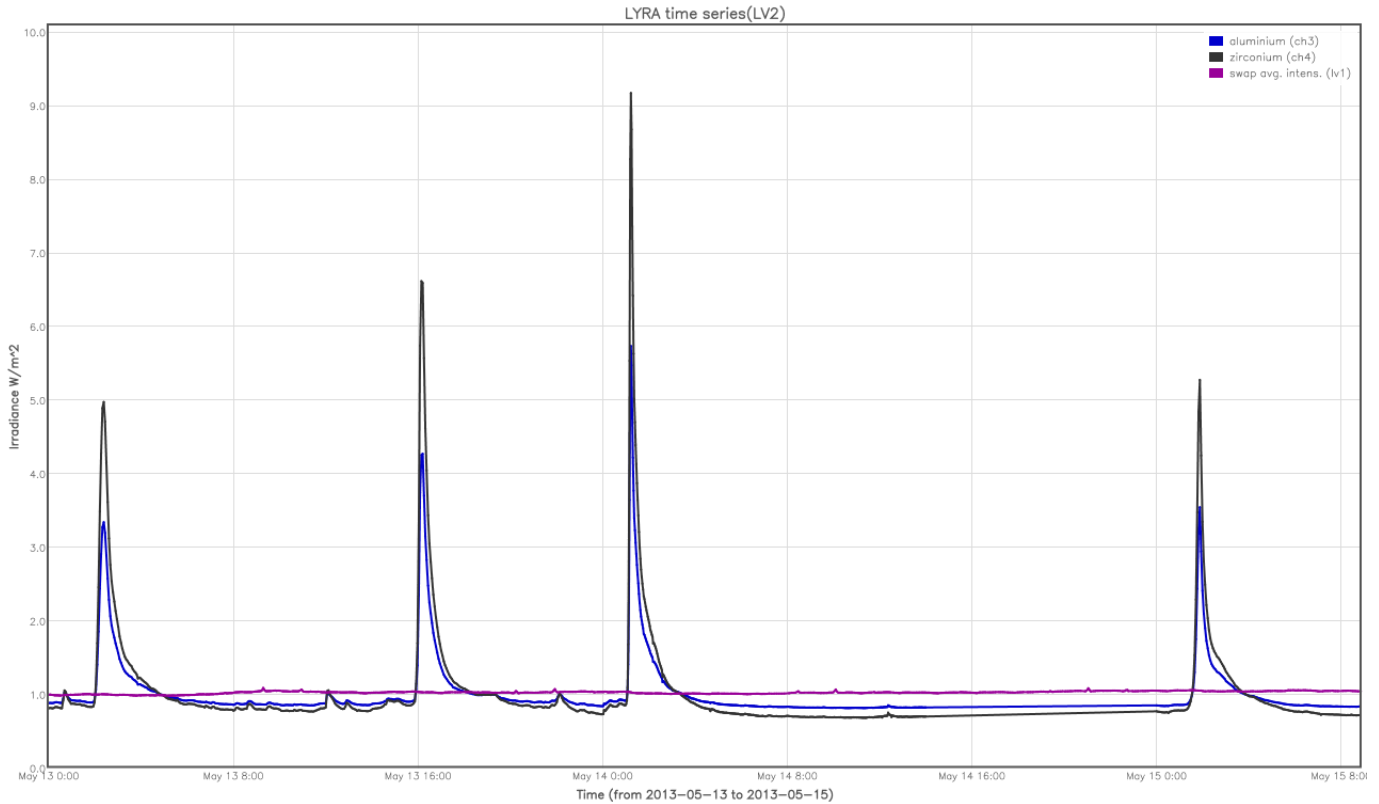
NOAA AR/sunspot
NOAA Halpha plage
NOAA expected region
2013-05-19T00:30



PROBA2/SWAP 17nm
2013-05-19T22:56:57.566

Solar Activity

This week's solar flaring activity started off with a bang! Several bangs actually. 4 consecutive X-level flares were observed over 48 hours, between Monday morning and Wednesday morning (see figure below).



The biggest flare occurred on Tuesday morning, reaching level X3.2.

Also, a few M-flares were recorded. All recorded higher level flares originated from active region AR11748.

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](#) (SWAP174/AIA304 combination; HelioViewer.org).

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

Monday 13th:

All the events of Monday 13th can be seen in the [following](#) SWAP 174/AIA 304 combined movie.

Two X-flares are observed, one early morning, one in the afternoon.



X1.7 flare along the East limb @ 02:40 - SWAP difference image

Find a movie of this event [here](#) (SWAP174 difference movie)



X2.8 flare along the East limb @ 02:40 - SWAP difference image
Find a movie of this event [here](#) (SWAP174 difference movie)

Note the follow-up eruption on the NW limb in this movie (see also picture below).



Tuesday 14th:

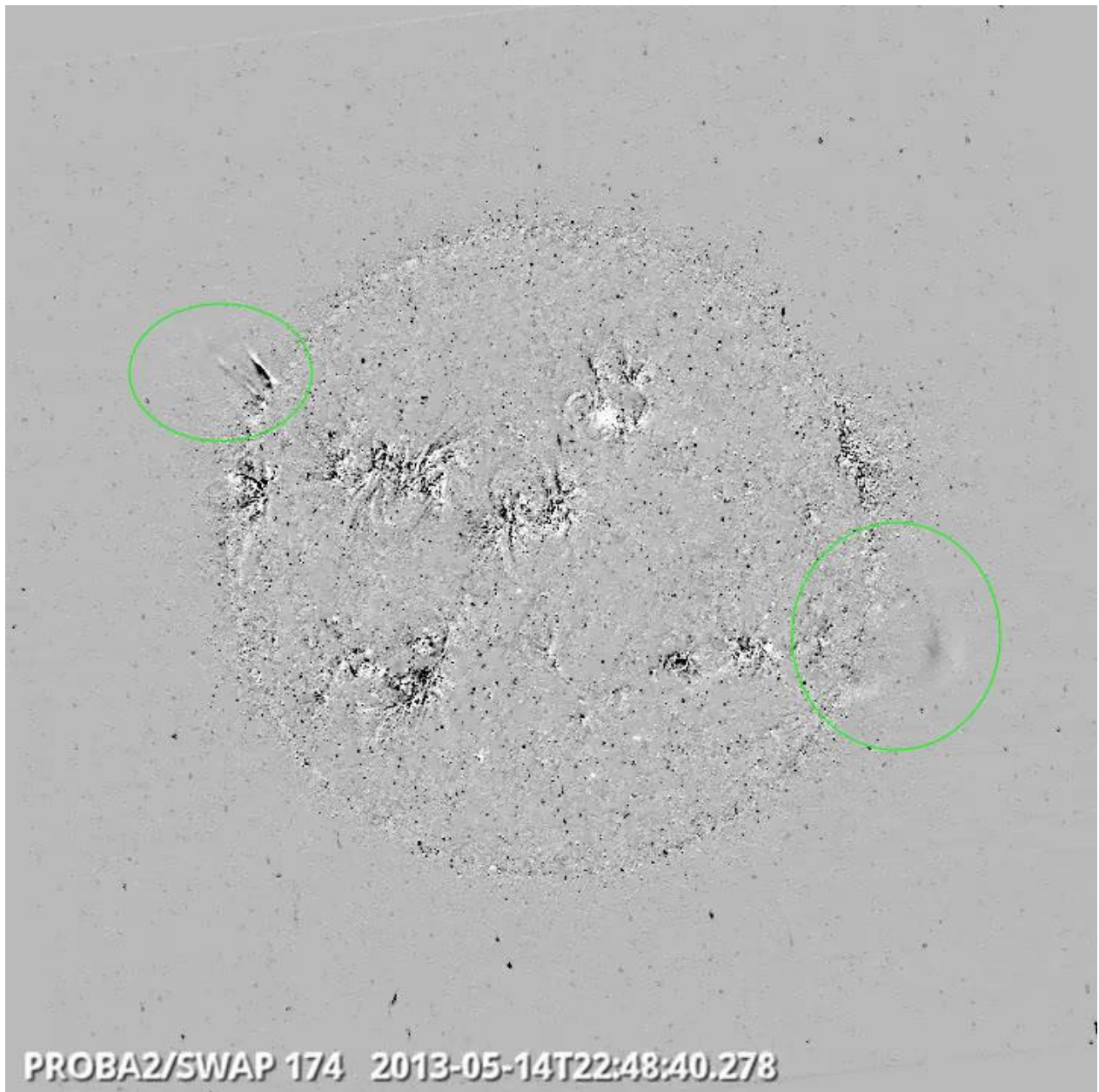
Another X-flare occurred:



X3.2 flare along the East limb @ 01:19 - SWAP difference image

Find a movie of this event [here](#) (SWAP174 difference movie)

Later on the same day, a few smaller eruptions occurred on the north east limb, the one below in parallel with a prominence eruption along the South West limb (see below).



X3.2 flare along the East limb @ 01:19 - SWAP difference image

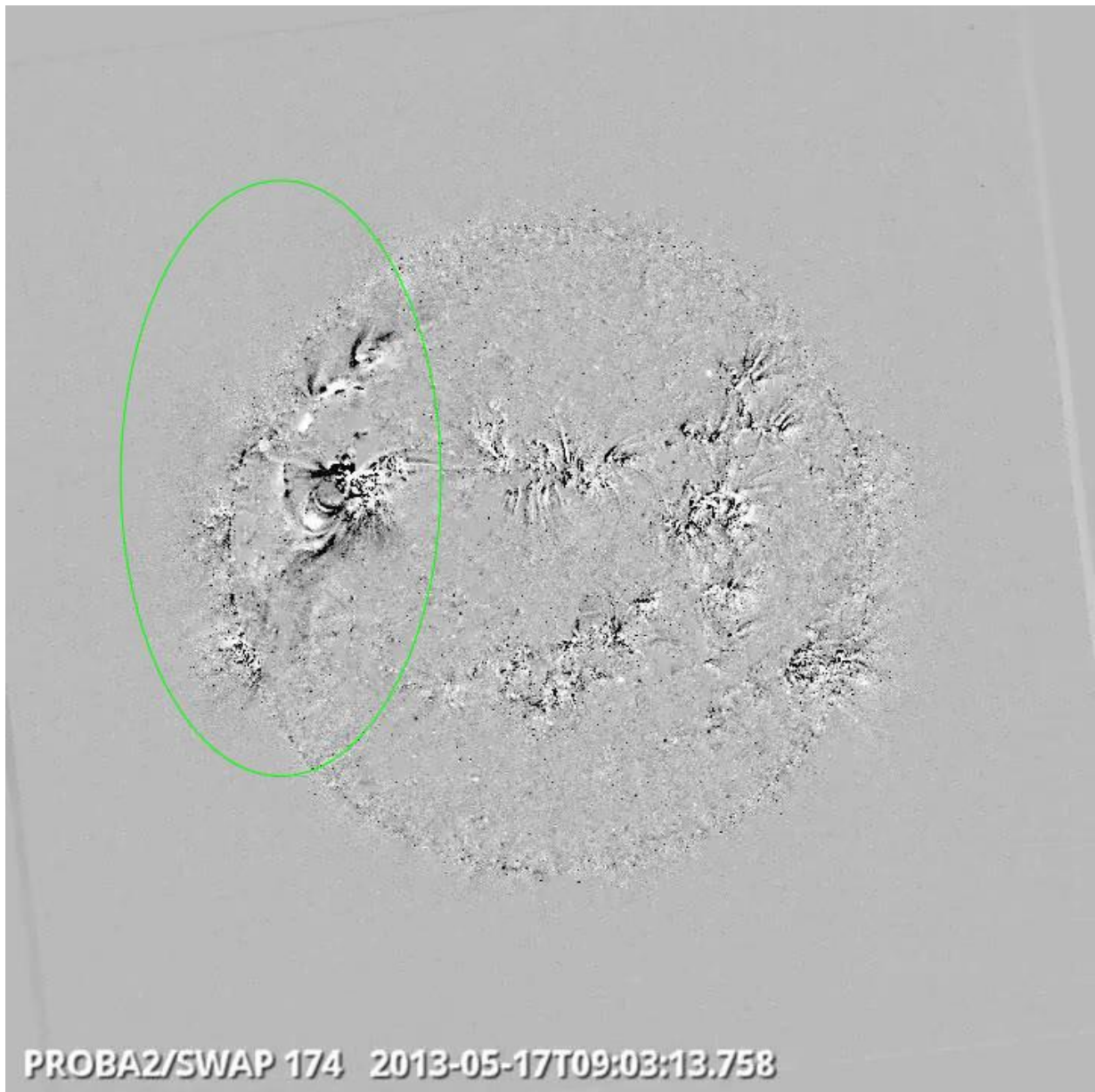
Find a movie of this event [here](#) (SWAP174 difference movie)

Wednesday 15th:



X1.2 flare along the East limb @ 01: 48 - SWAP difference image
Find a movie of this event [here](#) (SWAP174 difference movie)

Friday 17th:

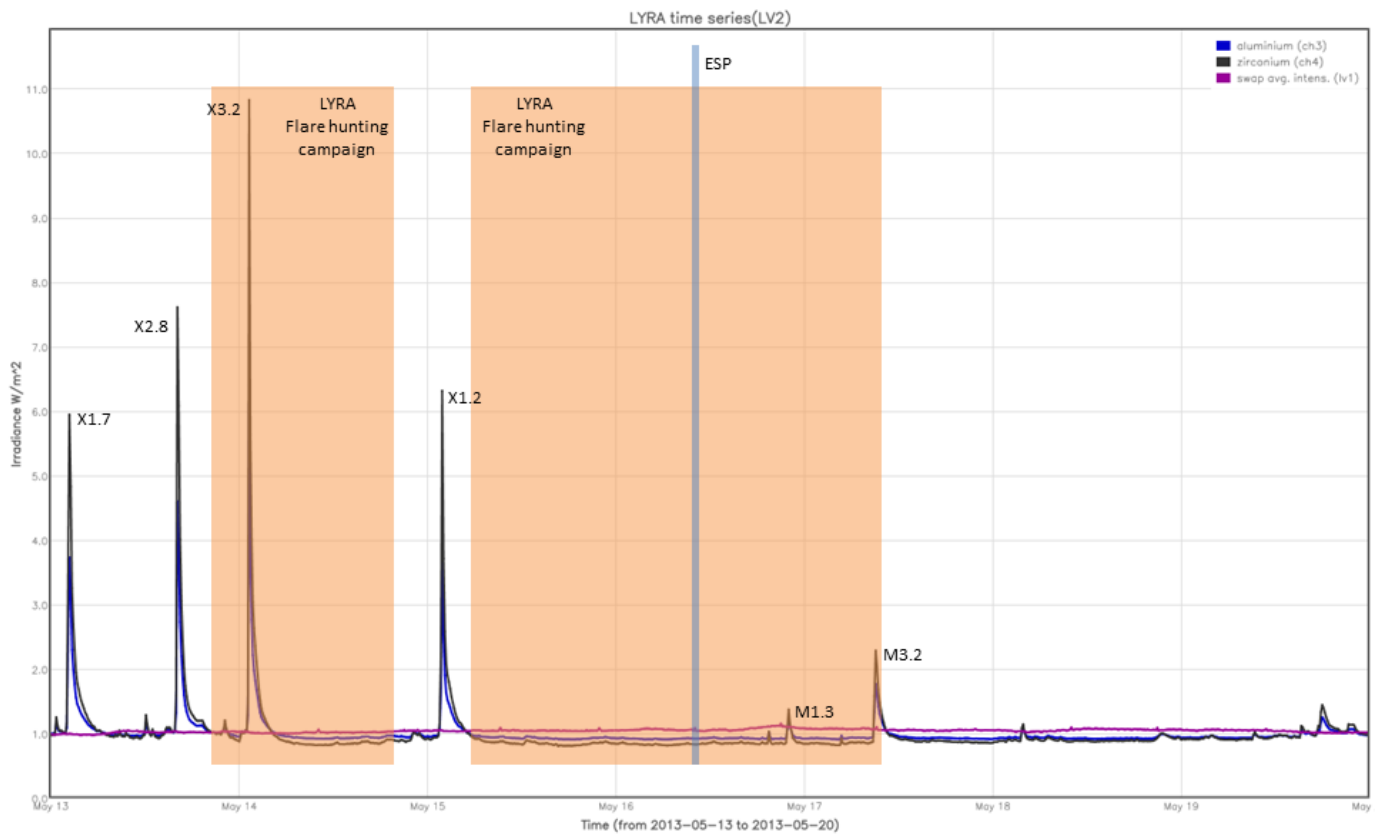


M3.2 flare along the East limb @ 09:03 - SWAP difference image
Find a movie of this event [here](#) (SWAP174 difference movie)

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 (solar intensity derived from 'integrated' SWAP images)



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

- ESP experiment on Thursday

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

- special flare hunting campaigns:
 - from Mon 13th, 20:00 until Tue 14th, 20:00
 - from Wed 15th, 05:05 until Fri 17th, 10:20.

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.

Guest Investigator Program

- None

2. LYRA instrument status

Calibration

No calibration campaign this week.

IOS & operations

Monday 13 May	Tuesday 14 May	Wednesday 15 May	Thursday 16 May	Friday 17 May	Saturday 18 May	Sunday 19 May
Nominal acquisition + daily U3 + flare hunting	Nominal acquisition + daily U3 + flare hunting	Nominal acquisition + daily U3 + flare hunting	Nominal acquisition + daily U3 + flare hunting	Nominal acquisition + daily U3 + flare hunting	Nominal acquisition + daily U3	Nominal acquisition + daily U3
LYIOS00328 - > 330	LYIOS00330	LYIOS00331	LYIOS00331 -> 332	LYIOS00332	LYIOS00332	LYIOS00332

The following science campaigns were performed by LYRA:

- daily U3 observations campaign
- special flare hunting campaigns:
 - from Mon 13th, 20:00 until Tue 14th, 20:00,
 - from Wed 15th, 05:05 until Fri 17th, 10:20.

LYRA detector temperature

LYRA detector 2 temperature globally varied between 46.7 and 47.3 degrees C, taking into account the daily U3 activation periods; the latter result in a temperature increase of about 0.6 degrees C. During the flare hunting campaigns, temperature rose to 49.4.

To be explored

- None.

3. SWAP instrument status

Calibration

No calibration campaign this week.

MCPM errors

The number of MCPM recoverable errors increased from 7659 to 7788.

The number of MCPM unrecoverable errors remained at 1127.

IOS & operations

Monday 13 May	Tuesday 14 May	Wednesday 15 May	Thursday 16 May	Friday 17 May	Saturday 18 May	Sunday 19 May
Nominal acquisition	Nominal acquisition	Nominal acquisition	Nominal acquisition + ESP	Nominal acquisition	Nominal acquisition	Nominal acquisition
IOS00465 627 images	IOS00466 603 images	IOS00466 632 images	IOS00466 626 images	IOS00466 596 images	IOS00466 641 images	IOS00466 599 images

Special operations for SWAP, this week:

- ESP jump on Thursday

SWAP detector temperature

The SWAP Cold Finger Temperature, globally rose from -1.30 to -0.50 degrees C.

During the flare hunting campaigns of LYRA, temperature rose with an additional 0.4 degrees..

To be explored

- None.

4. PROBA2 Science Center Status

The main operator is Koen Stegen.

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 10999 to 11059) was nominal, except for:

- Pass 11011:
 - no science data received for this pass; HK data was received at delivery of pass 11012.

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:

- BINSWAP_11011.

Total number of images between 2013 May 13 OUT and 2013 May 20 OUT: 4324

Highest cadence in this period: 130 seconds

Average cadence in this period: 139.86 seconds

Number of image gaps larger than 300 seconds: 12

Largest data gap: 34.33 minutes

The largest gap is due to the ESP campaign on Thursday. The other image gaps, larger than 300s are caused by missing images of pass 11011.

Data coverage LYRA

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

- BINLYRA_11011.

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)
- (+ extreme?)