


P2SC-ROB-WR-161- 20130422 Weekly report #161	P2SC Weekly report	
Period covered: Date: Written by: Approved by:	Mon Apr 22 to Sun Apr 28, 2013 01 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. Only M- and X-flares are mentioned, the most energetic one(s) are presented in **bold**:

	Monday 22 Apr	Tuesday 23 Apr	Wednesday 24 Apr	Thursday 25 Apr	Friday 26 Apr	Saturday 27 Apr	Sunday 28 Apr
Activity	moderate	low	low	low	low	low	low
Flares	M1.0 @ 10:31	-	-	-	-	-	-

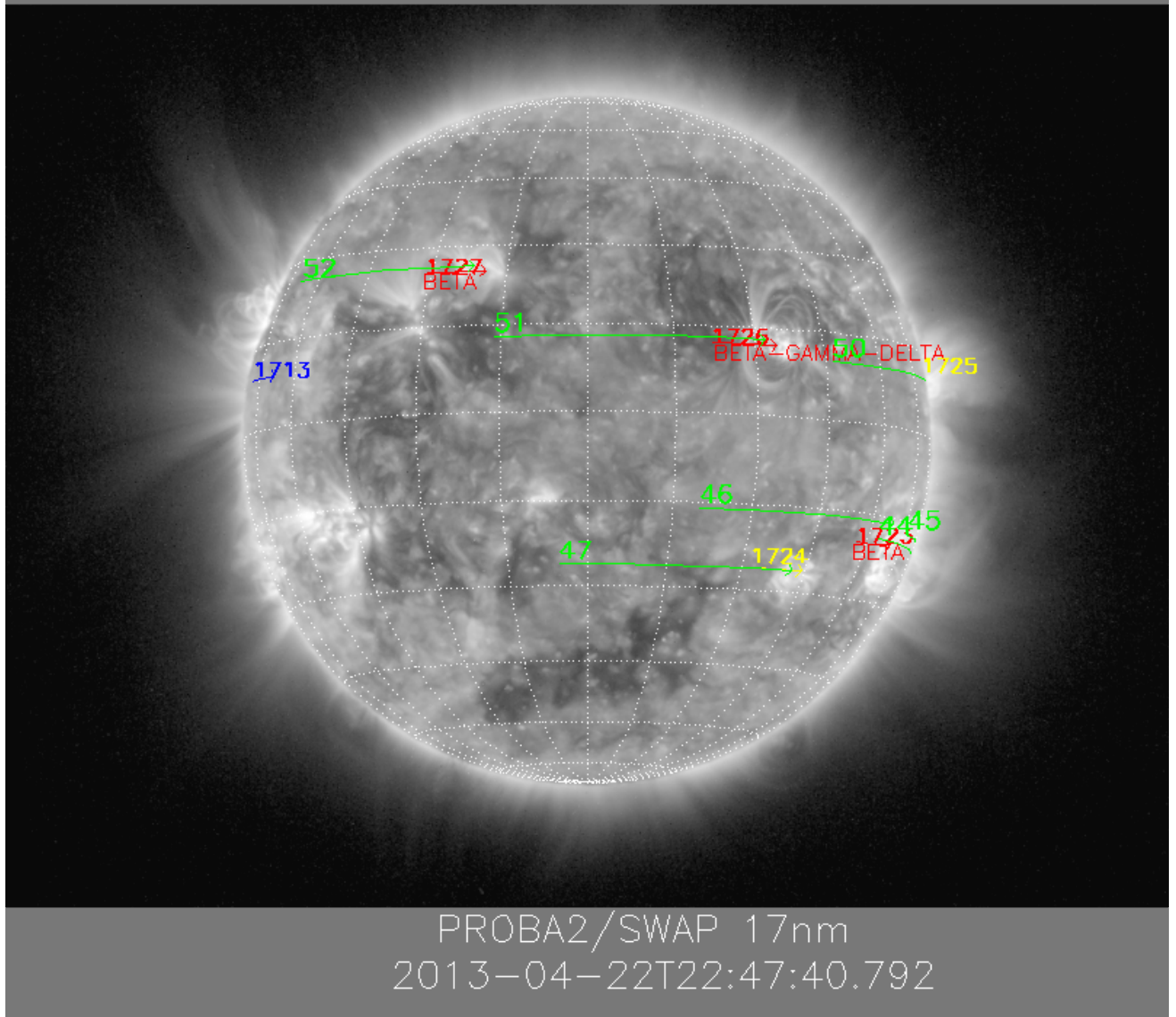
The SWAP images of April 22 and April 28 are shown below, with annotated active regions.

¹ See appendix. All timings are given in UT.

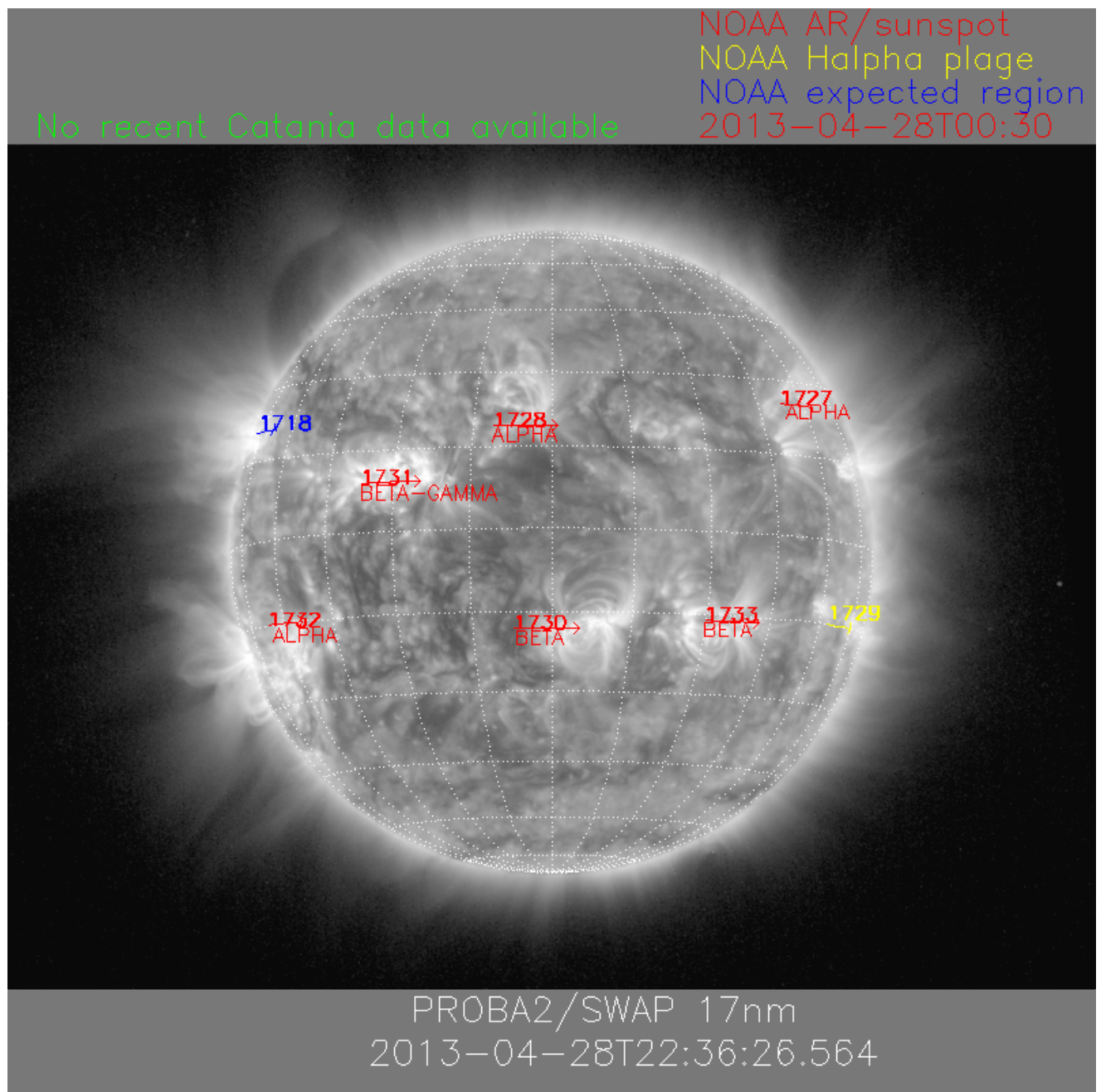
Catania sunspot groups

2013-04-19T08:00

NOAA AR/sunspot
NOAA Halpha plage
NOAA expected region
2013-04-22T00:30



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



Solar Activity

Solar (flaring) activity was mainly dominated by AR 11726 which produced an M1.0 flare on Monday. The remainder of the week showed many smaller flares from the same AR against a slowly increasing background level. Solar (flaring) activity was moderate on Monday, and low for the rest of the week. The largest flare during the flare hunting campaign was a C8.2 flare produced by AR 11726.

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

Details about some of the events in this movie can be found further below (limited to SWAP imaging).

During the week, several interesting events occurred, some of which are presented below.

Tuesday 23rd:



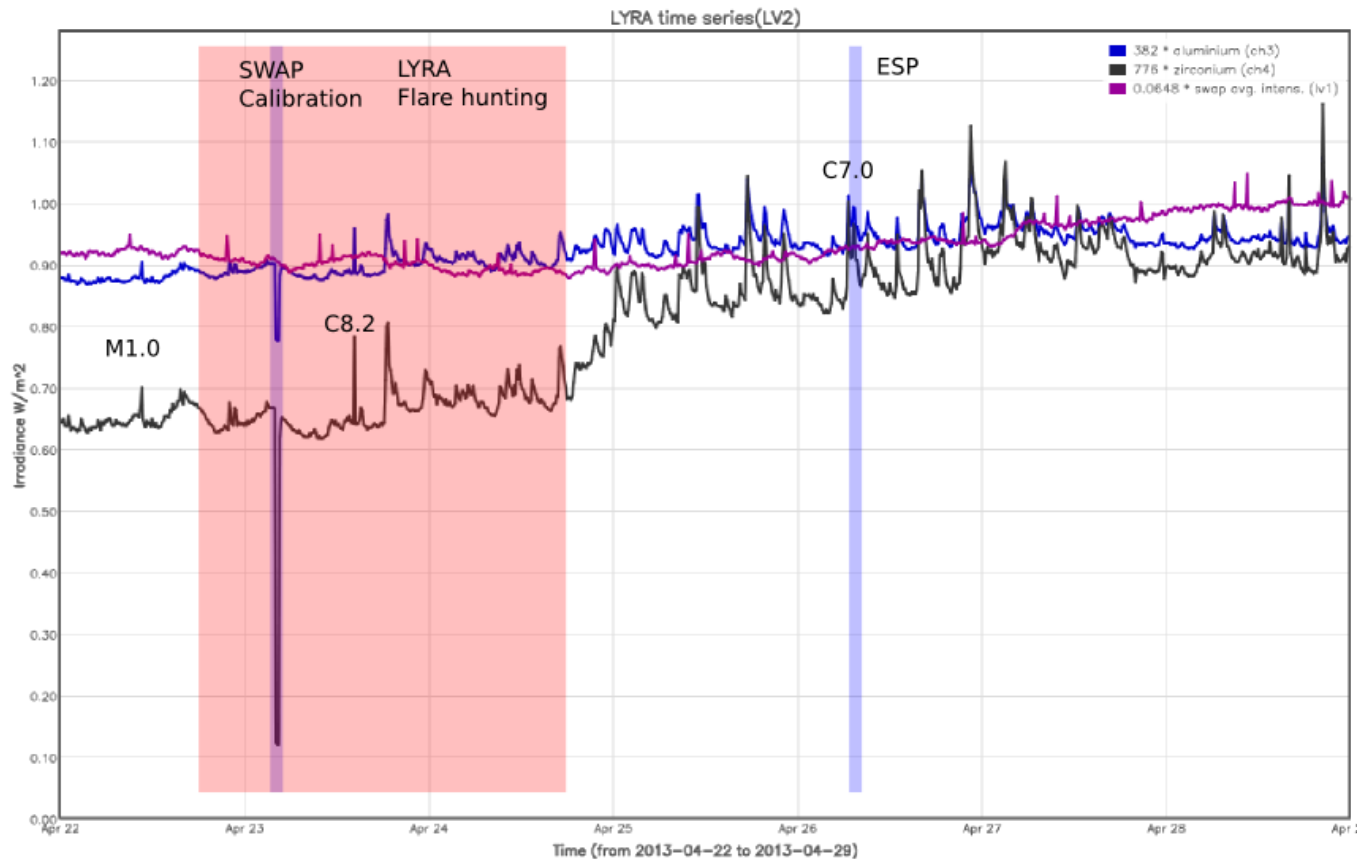
An eruption on the south west limb starting @ 18:12 - SWAP difference image

Click [here](#) for a SWAP difference movie of this event.

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:

- SWAP calibration on Tuesday
- ESP experiment on Thursday

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

- None

The red shaded period corresponds to:

- 48 hr LYRA Flare hunting campaign.

Outreach, papers, presentations, etc.

- The scientific part of the contents of the “Solar Activity” section above is published in this week’s STCE Bulletin (see <http://www.stce.be/newsletter/newsletter.php>)

- Space Weather Workshop 2013 Boulder Colorado, 17/04/2013: Title: "European Space Agency Space Situational Awareness Programme"; By Alexi Glover; From: European Space Agency

- ISES meeting Boulder Colorado, 20/04/2013: Title: "Royal Observatory Belgium Regional warning Center Services"; By: Matthew West; From: Royal Observatory Belgium
- On Tuesday 23rd, a group of astrophysics students from the university of Mons (B) visited the Royal Observatory and received a presentation on PROBA2 and P2SC operations.
- On Thursday 25th, a group of high school students visited the Space Pole and received a presentation on PROBA2 and P2SC operations.
- STCE workshop: [Solar EUV Irradiance Working group](#)

Please also 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

One Guest Investigator has joined the P2SC for a GI program:

- Jason Byrne (SWAP) - 'Studying the Low-Corona Initiation Phase of CMEs'; period April 8th - 29th.

2. LYRA instrument status

Calibration

No LYRA calibration on Wednesday due to the ongoing flare hunting campaign.

IOS & operations

Monday 22 Apr	Tuesday 23 Apr	Wednesday 24 Apr	Thursday 25 Apr	Friday 26 Apr	Saturday 27 Apr	Sunday 28 Apr
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	Nominal acquisition + daily U3	Nominal acquisition + daily U3
LYIOS00324 -> LYIOS00325	LYIOS00325 -> LYIOS00326	LYIOS00326	LYIOS00326	LYIOS00326	LYIOS00326	LYIOS00326

The following science campaigns were performed by LYRA:

- daily U3 observations campaign
- 48 hour flare hunting campaign on Monday 22nd - Wednesday 24th.

LYRA detector temperature

LYRA detector 2 temperature globally varied between 45.8 to 43.4 degrees C, taking into account the daily U3 activation periods; the latter result in a temperature increase of about 0.6 degrees C.

To be explored

- In the overview figure above in section 1, note that the black curve is steepening after the 2 days of U3 flare hunting. The reason why this happened is not yet known and is under investigation (solar, instrument or calibration related?).

3. SWAP instrument status

Calibration

SWAP calibration on Tuesday

MCPM errors

The number of MCPM recoverable errors increased from 7431 to 7509.

The number of MCPM unrecoverable errors remained at 1127.

IOS & operations

Monday 22 Apr	Tuesday 23 Apr	Wednesday 24 Apr	Thursday 25 Apr	Friday 26 Apr	Saturday 27 Apr	Sunday 28 Apr
Nominal acquisition	Nominal acquisition + calibration	Nominal acquisition	Nominal acquisition + ESP	Nominal acquisition	Nominal acquisition	Nominal acquisition
IOS00463 513 images	IOS00463 630 images	IOS00463 617 images	IOS00463 630 images	IOS00463 664 images	IOS00463 618 images	IOS00463 535 images

Special operations for SWAP, this week:

- Calibration on Tuesday
- ESP jump on Thursday

SWAP detector temperature

The SWAP Cold Finger Temperature, globally varied between -1.45 and -1.61 degrees C.

To be explored

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4. PROBA2 Science Center Status

The main operator is Koen Stegen.

The following changes were made to the P2SC:

- Update to the LYRA calibration code to include the latest degradation estimates

5. Data reception & discussions with MOC

Passes

The delivery of the passes for this week (passes 10827 to 10887) was nominal, except for:

- None

Data coverage HK

All HK data files (LYRA_AD) have been received, except for:

- None

Data coverage SWAP

All SWAP Science data files (BINSWAP) have been received, except for:

- 5 images missing from pass 10863

Total number of images between 2013 Apr 22 0UT and 2013 Apr 29 0UT: 4207

Highest cadence in this period: 30 seconds

Average cadence in this period: 143.77 seconds

Number of image gaps larger than 300 seconds: 1

Largest data gap: 34.33 minutes

The large gap is due to the ESP experiment on Thursday.

Data coverage LYRA

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

- 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
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?)