


P2SC-ROB-WR-151- 20130211 Weekly report #151	P2SC Weekly report	
Period covered: Date: Written by: Approved by:	Mon Feb 11 to Sun Feb 17, 2013 20 Feb 2012 Erik Pylyser David Berghmans	Royal Observatory of Belgium PROBA2 Science Center
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On Saturday February 16th, at 05:15, the PROBA2 satellite went into Bdot mode, probably due to a navigation/GPS problem (under investigation).

SWAP and LYRA data became thereby unavailable/not useful.

On Monday February 18th, SWAP and LYRA science data reception resumed at 10:22 and 13:53 respectively.

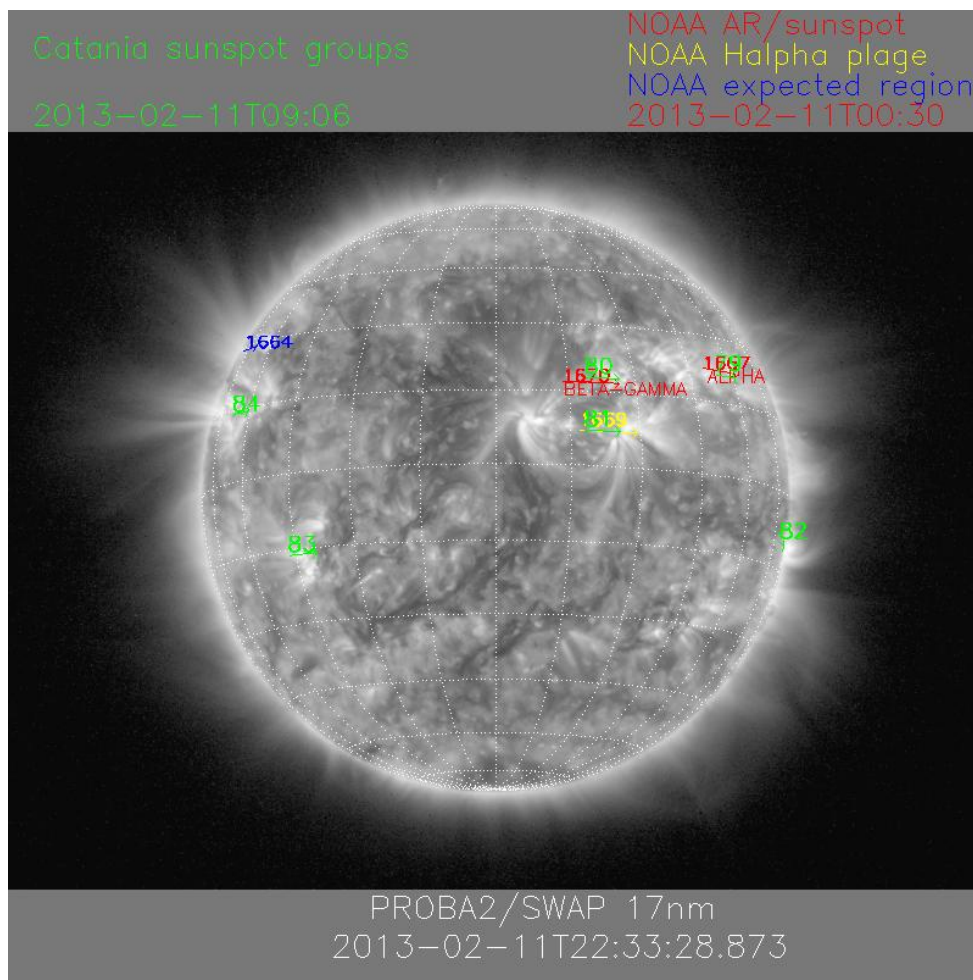
1. Science

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 11 Feb	Tuesday 12 Feb	Wednesday 13 Feb	Thursday 14 Feb	Friday 15 Feb	Saturday 16 Feb	Sunday 17 Feb
Activity	very low	low	very low	low	very low	very low	moderate
Flares	-	-	-	-	-	-	M1.9 @ 15:45

The SWAP images of February 11 and February 17 are shown below, with annotated active regions.



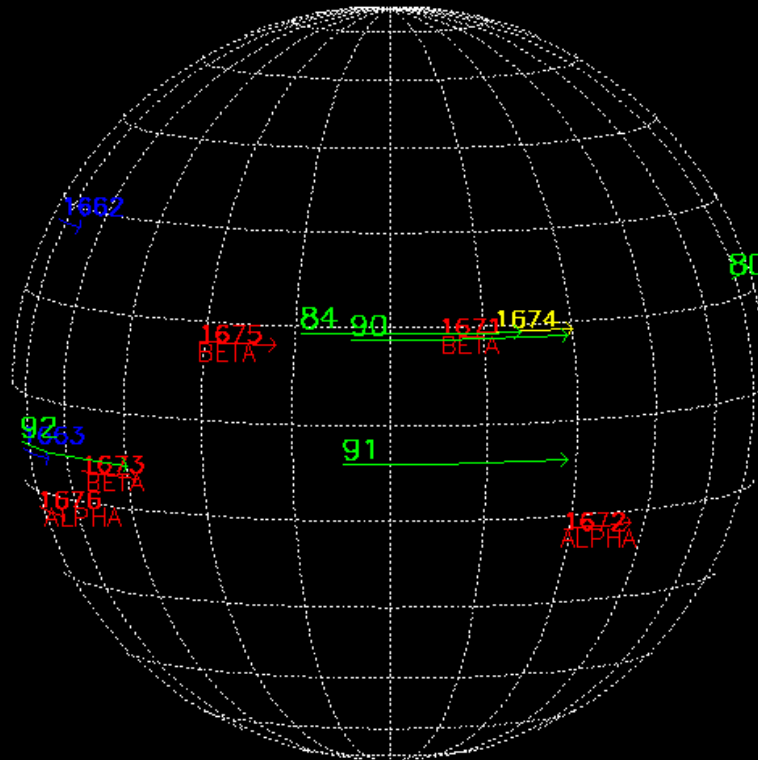
<http://sidc.be/html/CmapPage.html>

¹ See appendix. All timings are given in UT.

Catania sunspot groups

2013-02-15T08:48

NOAA AR/sunspot
NOAA Halpha plage
NOAA expected region
2013-02-17T00:30



PROBA2/SWAP 17nm
No recent SWAP observation

In the image above, the usual superimposed SWAP image is missing due to PROBA2 being in Bdot mode.

Solar Activity

Solar (flaring) activity fluctuated between **very low** and **low** until Sunday 17th, when an M1.9 flare occurred in the earth-oriented AR 11657.

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.

On Monday 11th of February, the following events were seen in the SWAP difference movies:



Eruption near the Solar West Limb



Eruption visible at Solar North-East Limb

On Friday 15th, the following event could be seen with SWAP:



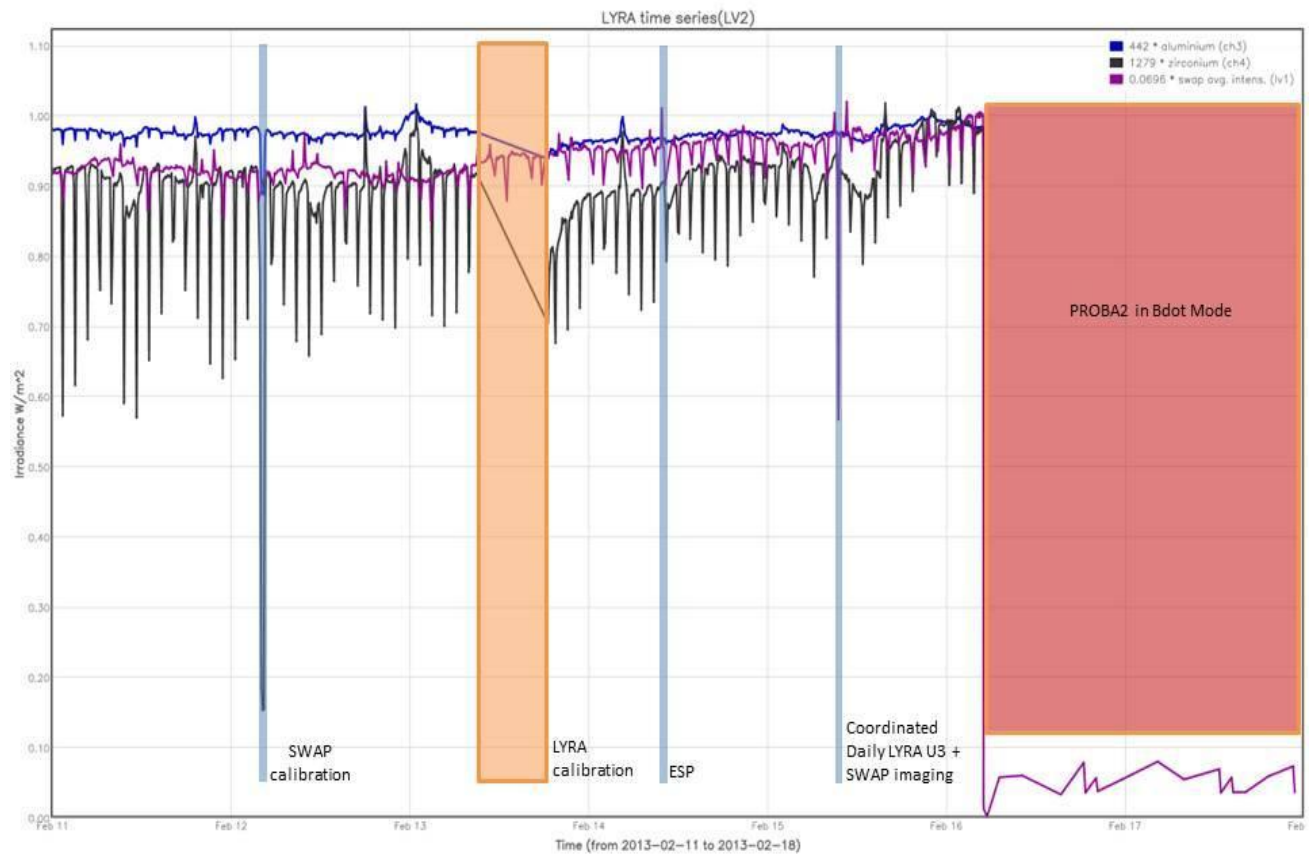
Eruption on the Solar South-East Limb

Several prominence eruptions occurred during the week, but these were not visible in EUV (i.e. by SWAP).

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
- Coordinated imaging campaign with LYRA daily U3 campaign on Friday.

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

- LYRA calibration on Wednesday
- First monthly campaign with U1 on Friday

The red shaded period corresponds to:

- PROBA2 in Bdot mode.

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>)

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

Guest Investigator Andrew Inglis arrived at P2SC on February 10th, 2013. His stay will last until February 23rd, 2013. The topic of his program is 'Enhancing understanding of pulsations in flares using LYRA data'.

2. LYRA instrument status

Calibration

LYRA calibration on Wednesday.

IOS & operations

Monday 11 Feb	Tuesday 12 Feb	Wednesday 13 Feb	Thursday 14 Feb	Friday 15 Feb	Saturday 16 Feb	Sunday 17 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 + daily U3
LYIOS00308	LYIOS00308	LYIOS00309	LYIOS00309	LYIOS00309	LYIOS00309	LYIOS00310

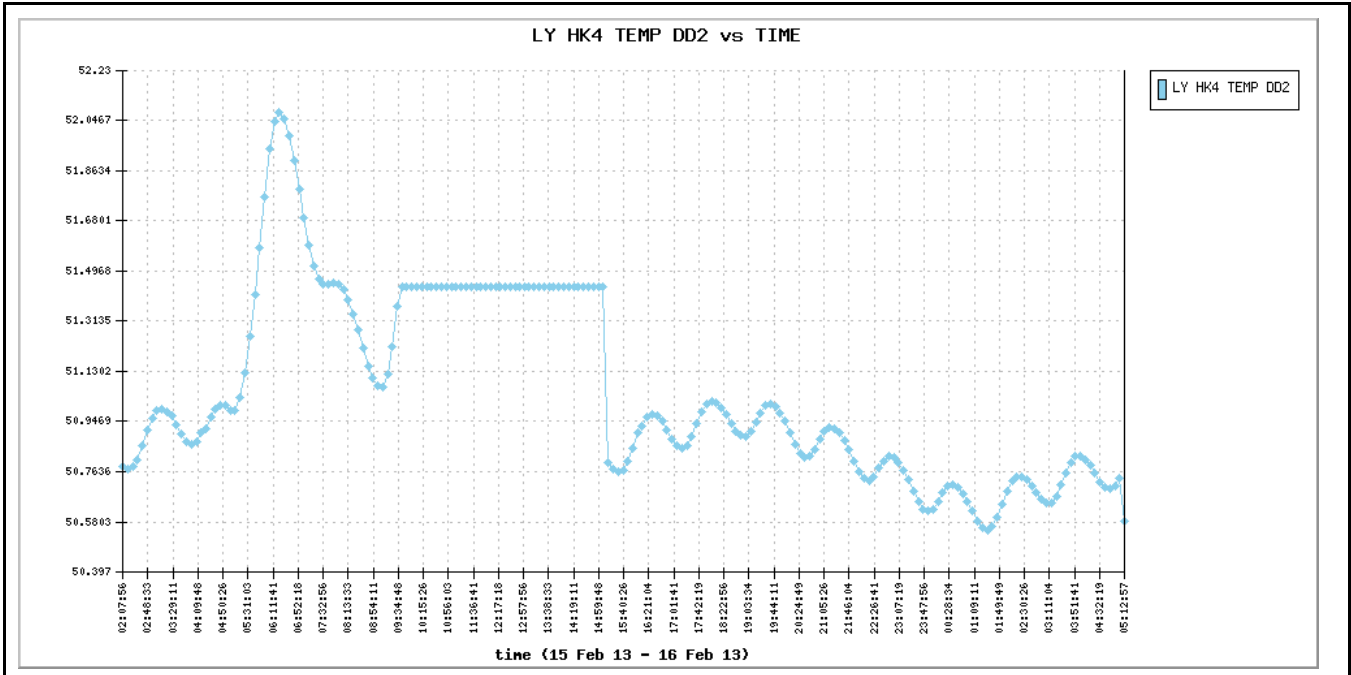
The following science campaigns were performed by LYRA:

- the daily U3 campaign
- the first monthly observation campaign with unit 1 on Friday 15th. This campaign will from now on be executed every 15th of the month.

LYRA detector temperature

LYRA detector 2 temperature globally increased between 50.5 and 52.0 degrees C, including the daily U3 activation periods. The latter result in a temperature increase of about 0.4 degrees C. During calibration, temperature decreased to 49.3 degrees C.

On Friday 15th, all 'HK' LYRA temperatures showed a plateau between 09:30 and 15:30 (see figure below, of e.g. DD2 temperature). After investigation, evidence points at the occurrence of a Single Event Upset, which occurred around 09:30. The behavior stopped when a planned VFC calibration command was issued on-board.



To be explored
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3. SWAP instrument status

Calibration

SWAP calibration on Tuesday.

MCPM errors

The number of MCPM recoverable errors increased from 6780 to 6811.

The number of MCPM unrecoverable errors remained at 1127.

IOS & operations

Monday 11 Feb	Tuesday 12 Feb	Wednesday 13 Feb	Thursday 14 Feb	Friday 15 Feb	Saturday 16 Feb	Sunday 17 Feb
Nominal acquisition	Nominal acquisition + calibration	Nominal acquisition	Nominal acquisition + ESP	Nominal acquisition + SWAP/LYRA coord. camp.	Nominal acquisition	Nominal acquisition
IOS00451 445 images	IOS00451 625 images	IOS00452 663 images	IOS00452 589 images	IOS00452 717 images	IOS00452 172 images	IOS00453 27 images

Special operations for SWAP, this week:

- Occultation jumps
- ESP jump
- Coordinated imaging campaign with LYRA daily U3 campaign on Friday.

The limited number of images on Saturday and Sunday are due to the PROBA2 spacecraft being in Bdot mode, and SWAP still taking a picture now and then. Since PROBA2 was no longer sun-pointing, these pictures only show black sky in EUV.

SWAP detector temperature

The SWAP Cold Finger Temperature, under nominal operations, increased overall, fluctuating between 2.2 and 3.2 degrees Celsius.

After entry into Bdot mode, single disparate SWAP Cold Finger temperature measurements showed an increase up to 4.8 degrees C at some point.

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:

- None

5. Data reception & discussions with MOC

Passes

The delivery of the passes for this week (i.e. 10220 to 10279) was nominal, except for:

- passes 10266 to 10284 included (PROBA2 in Bdot mode).

Data coverage HK

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

- pass 10278; that data was however provided in the delivery of pass 10277.

Data coverage SWAP

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

- pass 10278; that data was however provided in the delivery of pass 10277.

During the Bdot phase of PROBA2, BINSWAP files were still created and provided. There were, however, only limited number of images available, and they were all from black sky regions.

Total number of images between 2013 Feb 11 0UT and 2013 Feb 18 0UT: 3240

Highest cadence in this period: 29 seconds

Average cadence in this period: 185.36 seconds

Number of image gaps larger than 300 seconds: 125

Largest data gap: 99.27 minutes

The large number and length of gaps is due to PROBA2 being in Bdot mode from Saturday 16th, 05:15 until Monday 18th AM.

A number of (smaller) gaps is due to the implementation of the SWAP occultation jumps.

Data coverage LYRA

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

- passes 10266 to 10284 included (PROBA2 in Bdot mode).

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
EIT	Extreme ultraviolet Imaging Telescope
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

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?)