P2SC-ROB-WR-145-20121230 Weekly report #145	**P2SC Weekly report**	
Period covered: Date: Written by: Approved by:	Mon Dec 31 to Sun Jan 06, 2013 09 Jan 2012 Erik Pylyser David Berghmans	Royal Observatory of Belgium PROBA2 Science Center
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1. Science

Solar & Space weather events

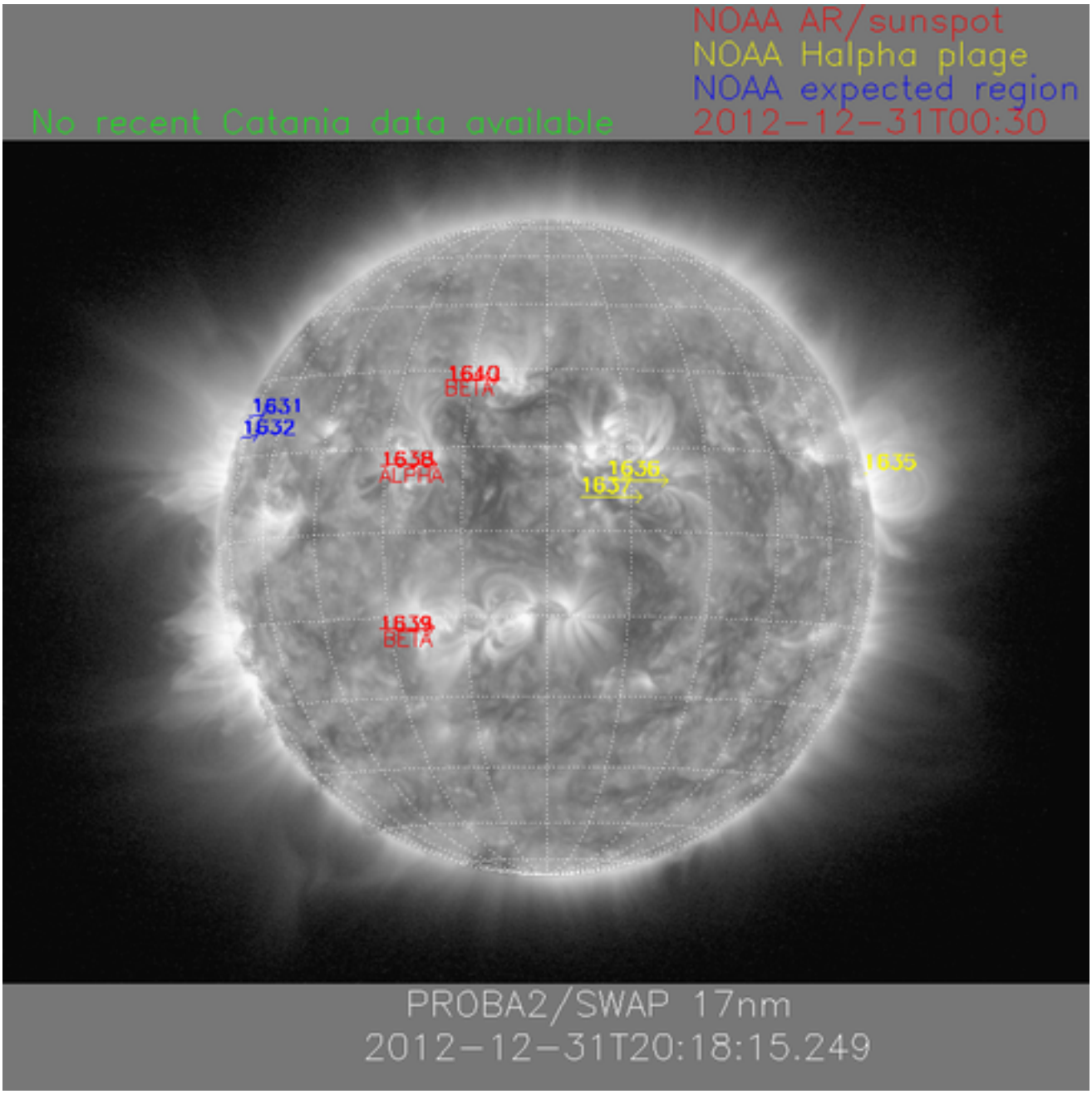
Overview

The level of solar activity[1] this week. Only M- and X-flares are mentioned:

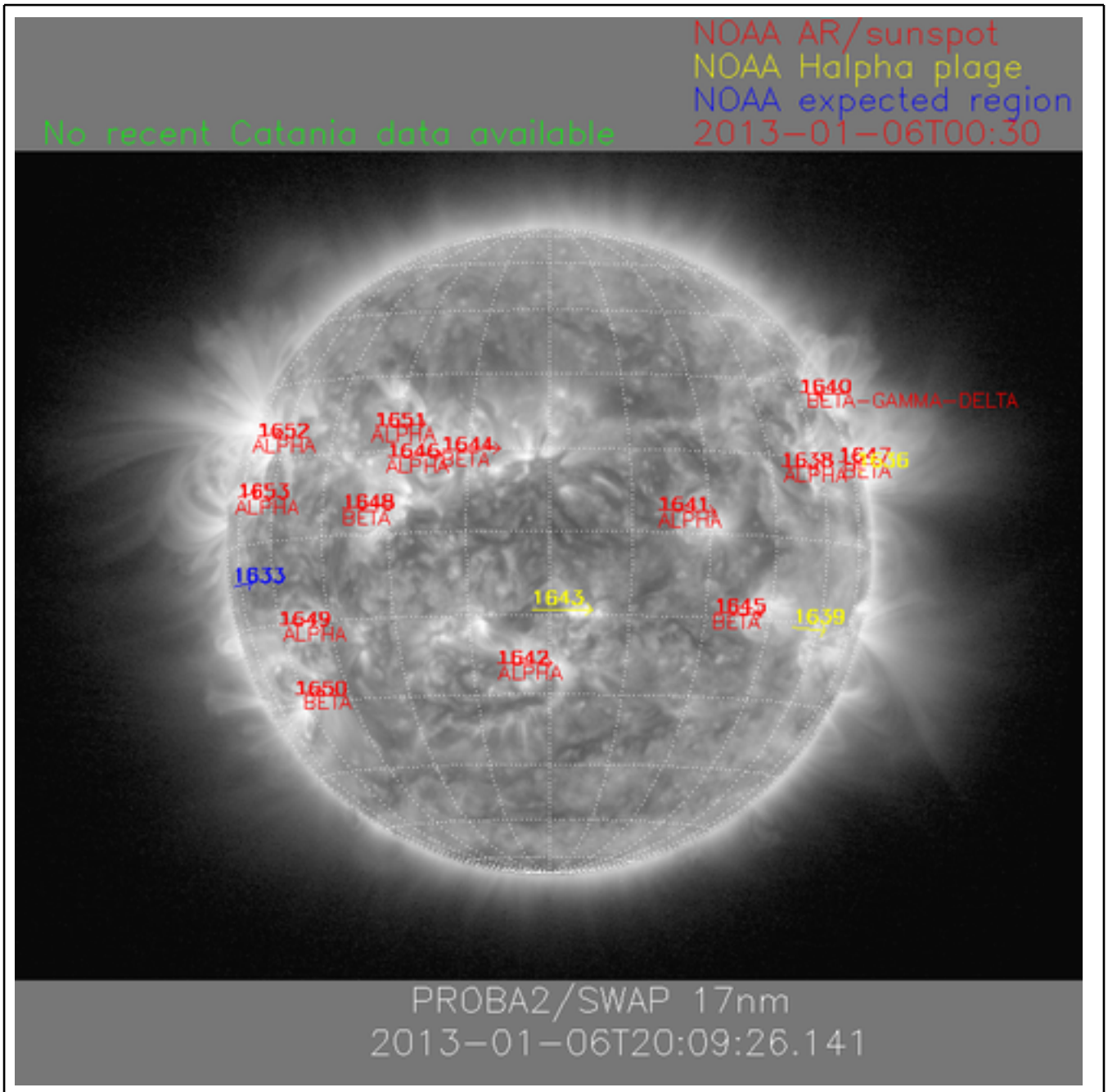
	Monday 31 Dec	Tuesday 01 Jan	Wednesday 02 Jan	Thursday 03 Jan	Friday 04 Jan	Saturday 05 Jan	Sunday 06 Jan
Activity	very low	low	low	low	low	moderate	low
Flares	-	-	-	-	-	**M1.7 @ 09:26**	-

[1] See appendix. All timings are given in UT.

The SWAP images of Dec 31 and Jan 06 are shown below, with annotated active regions.



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


NOAA AR/sunspot
NOAA Halpha plage
NOAA expected region
2013-01-06T00:30
No recent Catania data available
1640
BETA-GAMMA-DELTA
1652
ALPHA
1651
ALPHA
1646
ALPHA
1644
BETA
1638
ALPHA
1647
BETA
1653
ALPHA
1648
BETA
1641
ALPHA
1633
1643
1649
ALPHA
1645
BETA
1639
1642
ALPHA
1650
BETA
PROBA2/SWAP 17nm
2013-01-06T20:09:26.141

Solar Activity

Solar (flare) activity evolved from **very low** on Monday to **low** until Saturday. A sizeable active region (AR11652) rounded the East limb on Jan 3rd and the back-ground EUV radiation started increasing significantly. Flare activity increased to **moderate**, when the region generated a (single) M1.7 flare.

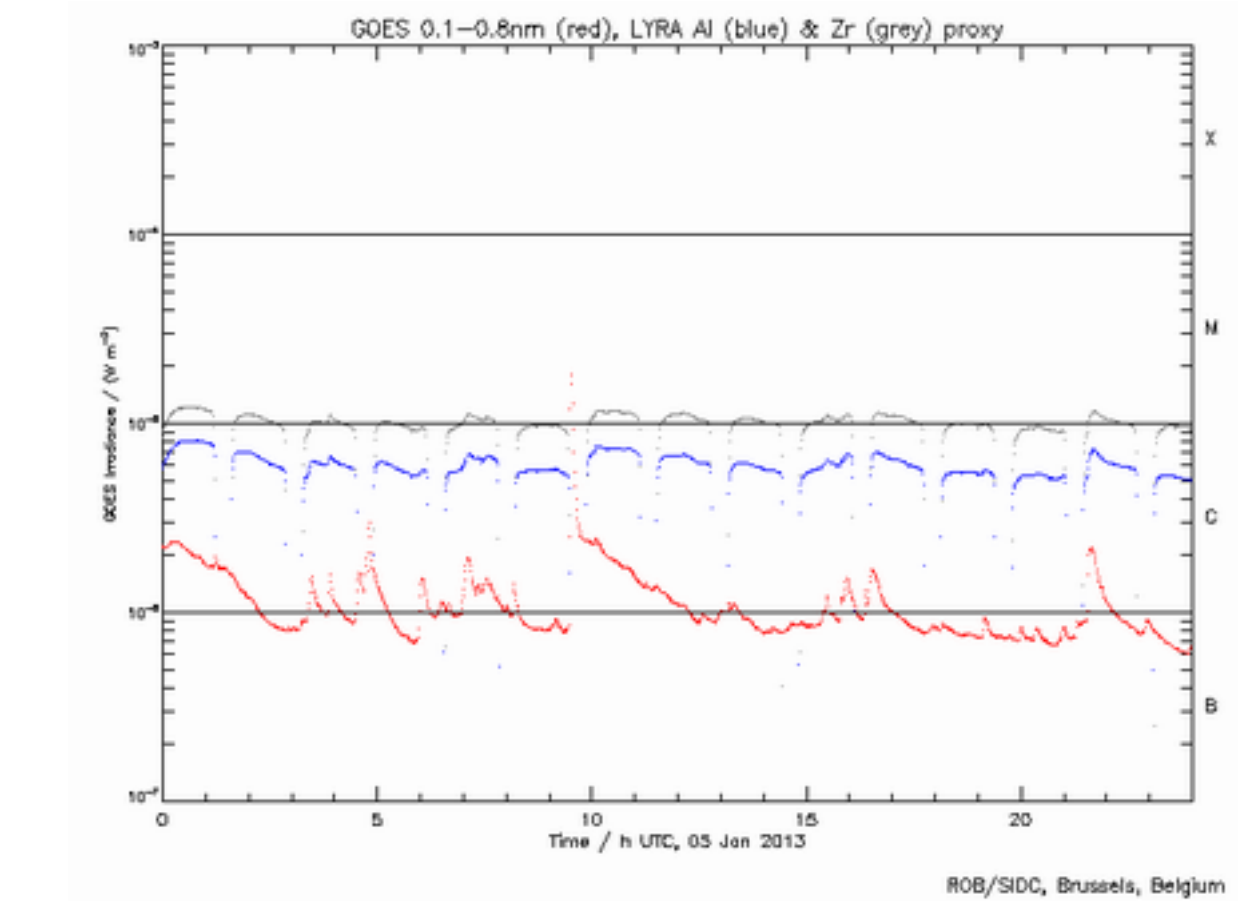
In order to view the activity of this week in more detail, we suggest to go to the following website from which all the daily (normal and difference) movies can be accessed: http://proba2.oma.be/ssa.
This page also lists the recorded flaring events.

A weekly overview movie can be found here (SWAP174/AIA304 combination; HelioViewer.org).
Some details about the events in this movie can be found further below.

In this movie, the swirling higher altitude movements of the magnetosphere and the impacts of the eruptions on it, can be seen throughout the week, both on the East and West side of the Sun.

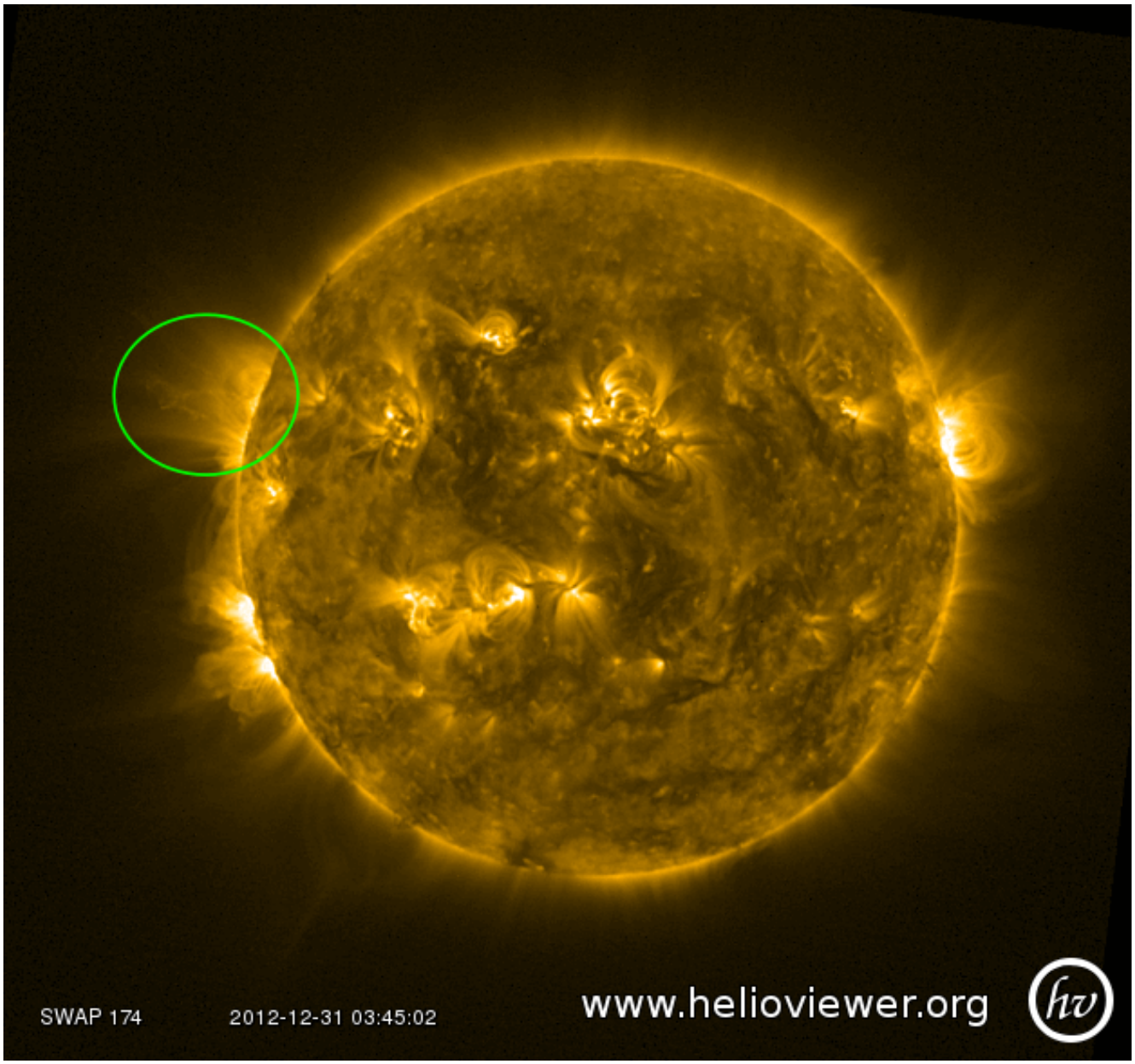
The M1.7 flare on Saturday occurred during a SWAP/LYRA occultation and could therefore not be seen by our instruments.

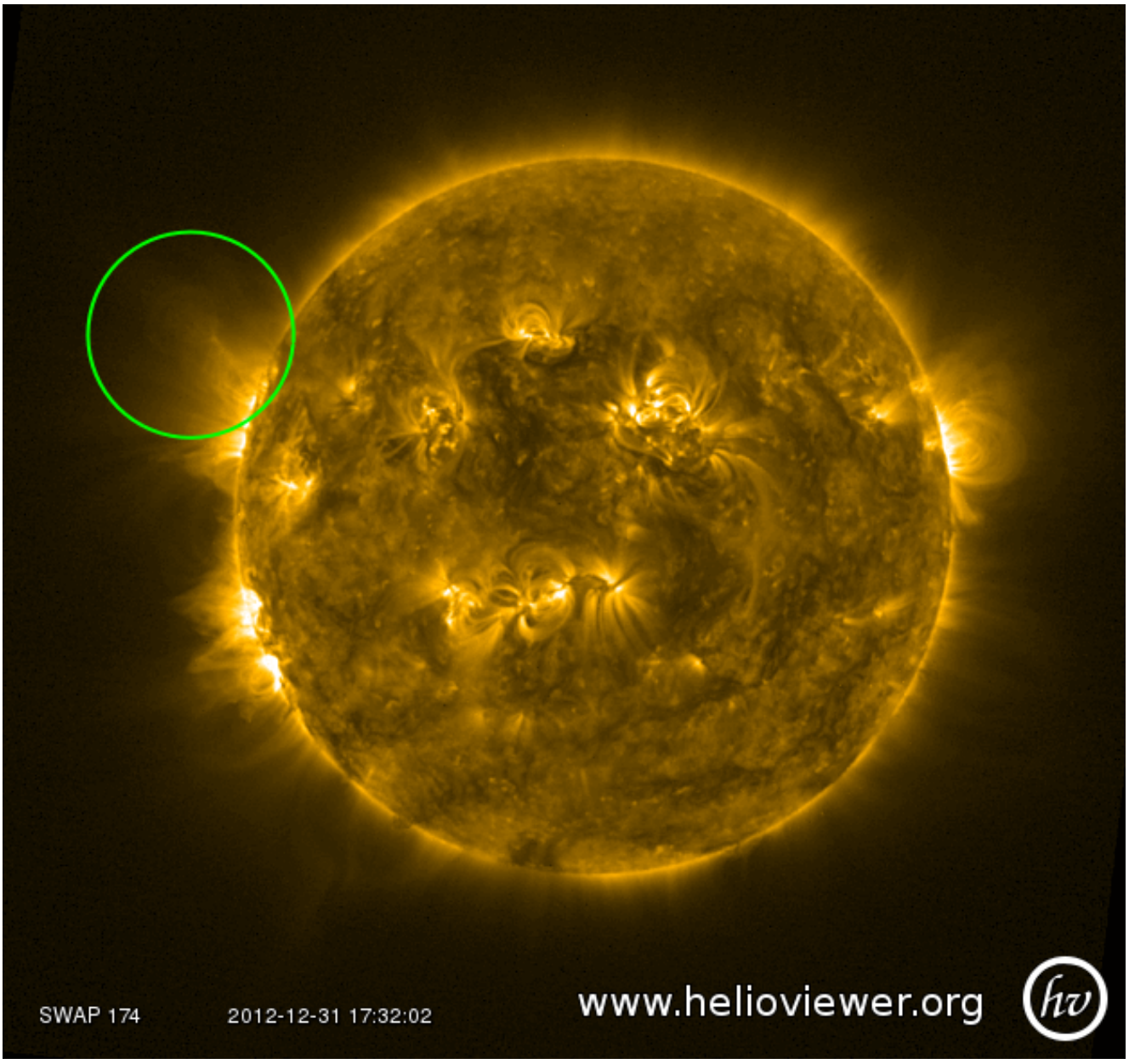
Below is shown a plot of the GOES, LYRA Al and Zr channels with associated colors. The M1.7 flare occurred at 9:26 (see Red GOES plot), after the start of a PROBA2/LYRA occultation.



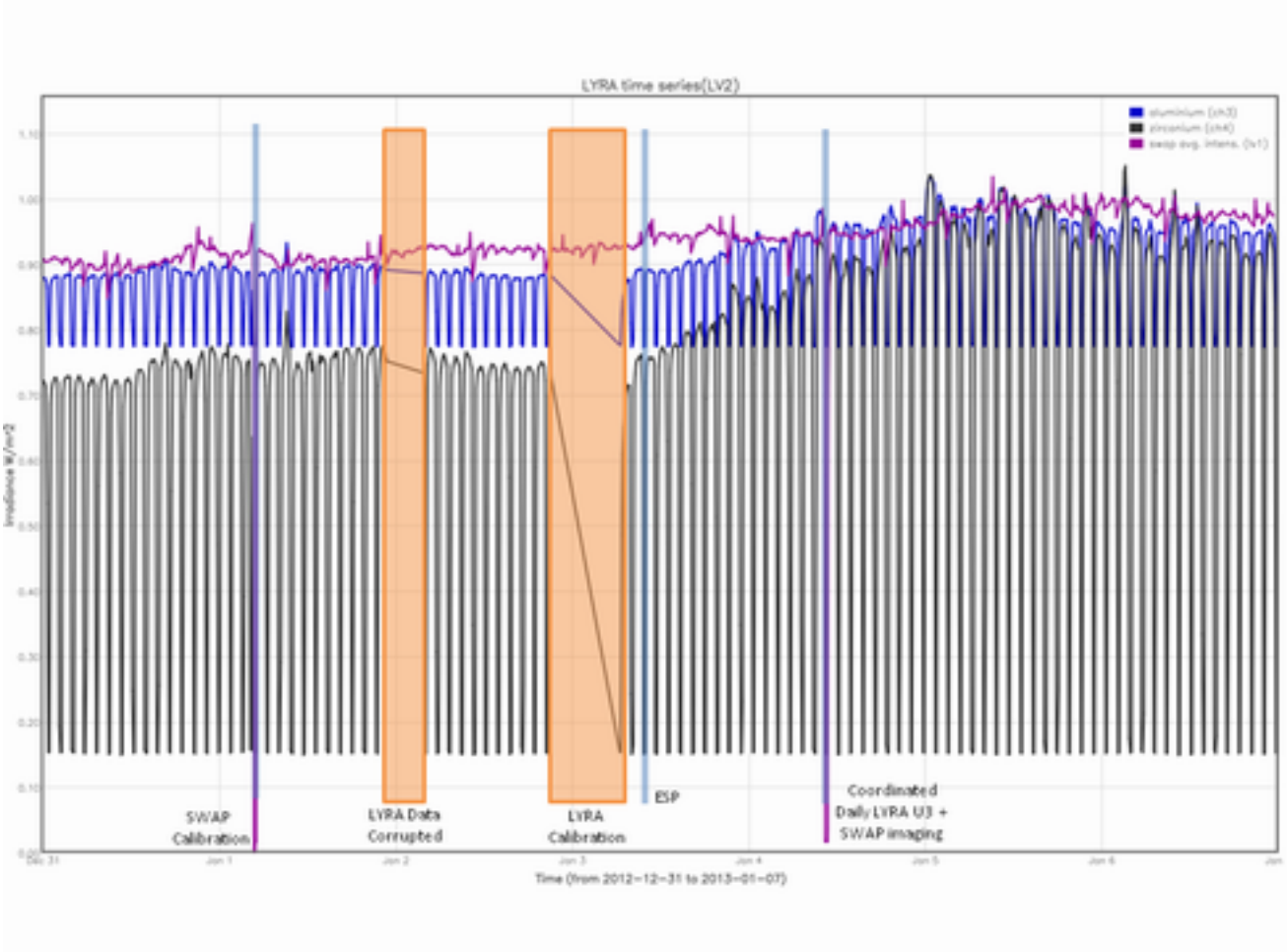
During this week, several prominence eruptions occurred, some of them seen by SWAP, some of them not.

Below are two eruptions from the (to be) AR11652 while it is still behind the East limb. Both occurred on December 31st. The pictures were taken at 03:45 and 17:32 respectively.




SWAP 174
2012-12-31 17:32:02
www.helioviewer.org

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
- ESP experiment on Thursday
- Coordinated imaging campaign with LYRA daily U3 campaign on Friday.

The orange shaded periods correspond to, from left to right:
- Data unprocessable (pass 9880; gap between 2013-01-01 22:53 until 2013-01-02 03:44.
- LYRA Calibration

LYRA data downlinked during pass 9880 was of low quality due to a non-optimal downlink connection. This resulted in corrupted data within the corresponding BINLYRA_9880 file, the data could not be processed and resulted in a data gap.

The red shaded period corresponds to:
- None

Outreach, papers, presentations, etc.

- None

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 Programme

- Guest Investigator Muzhou Lu has arrived at P2SC on January 03, 2013. His stay will last until February 2nd, 2013. The topic of his program is 'Observations and Modeling of Solar Coronal Structures Using High-Resolution Eclipse Images and Space-based telescopes with Wide FOV'.

2. LYRA instrument status

Calibration

LYRA calibration during night of Wednesday to Thursday (should have started on Wed 09:00; operator error).

IOS & operations

Monday 31 Dec	Tuesday 01 Jan	Wednesday 02 Jan	Thursday 03 Jan	Friday 04 Jan	Saturday 05 Jan	Sunday 06 Jan
Nominal acquisition + daily U3 LYIOS00296	Nominal acquisition + daily U3 LYIOS00296	Nominal acquisition + daily U3 + calibration LYIOS00296 -> 297	Nominal acquisition + daily U3 LYIOS00297	Nominal acquisition + daily U3 LYIOS00297	Nominal acquisition + daily U3 LYIOS00298	Nominal acquisition + daily U3 LYIOS00298

The following science campaigns were performed by LYRA:
- the daily U3 campaign.

LYRA detector temperature

LYRA detector 2 temperature fluctuated between 39.5 and 41.4 degrees C, including the daily U3 activation periods. The latter result in a temperature increase of about 0.4 degrees.

During calibration on Wednesday, temperature reached 38.2.

To be explored

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3. SWAP instrument status

Calibration

SWAP calibration on Wednesday.

MCPM errors

The number of MCPM recoverable errors increased from 5639 to 5706.

The number of MCPM unrecoverable errors remained at 1127.

IOS & operations

Monday 31 Dec	Tuesday 01 Jan	Wednesday 02 Jan	Thursday 03 Jan	Friday 04 Jan	Saturday 05 Jan	Sunday 06 Jan
Nominal acquisition IOS00438 517 images	Nominal acquisition + calibration IOS00438 603 images	Nominal acquisition IOS00438 547 images	Nominal acquisition + ESP IOS00439 548 images	Nominal acquisition + SWAP/LYRA coordination IOS00440 599 images	Nominal acquisition IOS00440 568 images	Nominal acquisition IOS00440 552 images

Special operations for SWAP, this week:
- Occultation jumps
- ESP jump
- Coordinated imaging campaign with LYRA daily U3 campaign on Friday.

SWAP detector temperature

The SWAP Cold Finger Temperature, under nominal operations, increased overall, fluctuating between - 2.5 and - 4.6 degrees Celsius.

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 (passes 9863 to 9923) 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:
- None

Total number of images between 2012 Dec 31 0UT and 2013 Jan 07 0UT: 3934
Highest cadence in this period: 29 seconds
Average cadence in this period: 153.75 seconds
Number of image gaps larger than 300 seconds: 105
Largest data gap: 33.70 minutes

The large gap is due to the ESP experiment on Thursday.
The 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:
- None

LYRA data downlinked during pass 9880 was of low quality due to a non-optimal downlink connection. This resulted in corrupted data within the corresponding BINLYRA_9880 file and the data could not be processed.

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?)