P2SC-ROB-WR-133-20121008 Weekly report #133	**P2SC Weekly report**	
Period covered: Date: Written by: Approved by:	Mon Oct 08 to Sun Oct 14, 2012 17 Oct 2012 Erik Pylyser David Berghmans	Royal Observatory of Belgium PROBA2 Science Center
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1. Science

Solar & Space weather events

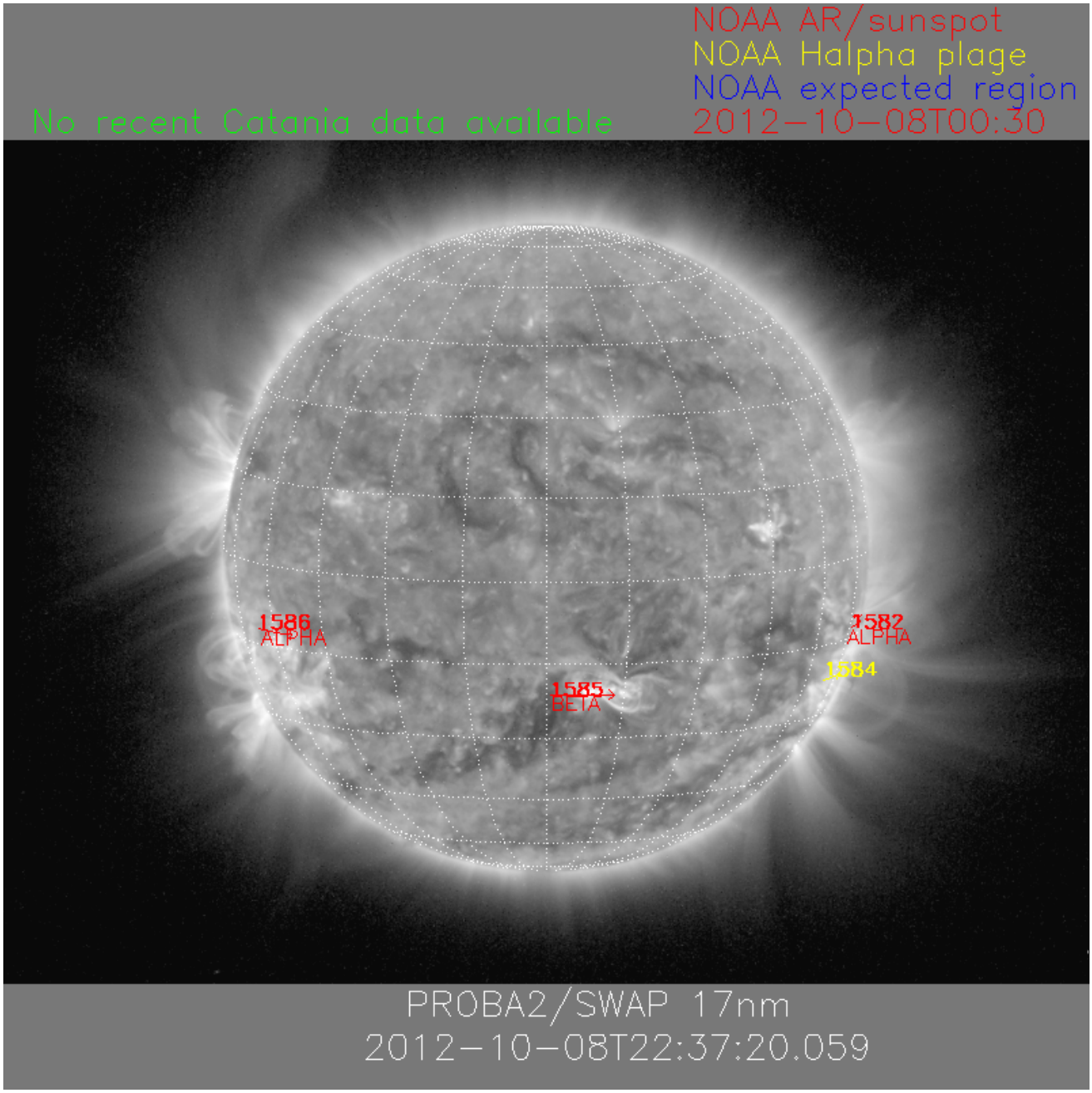
Overview

The level of solar activity[1] this week and associated M- and X-flares:

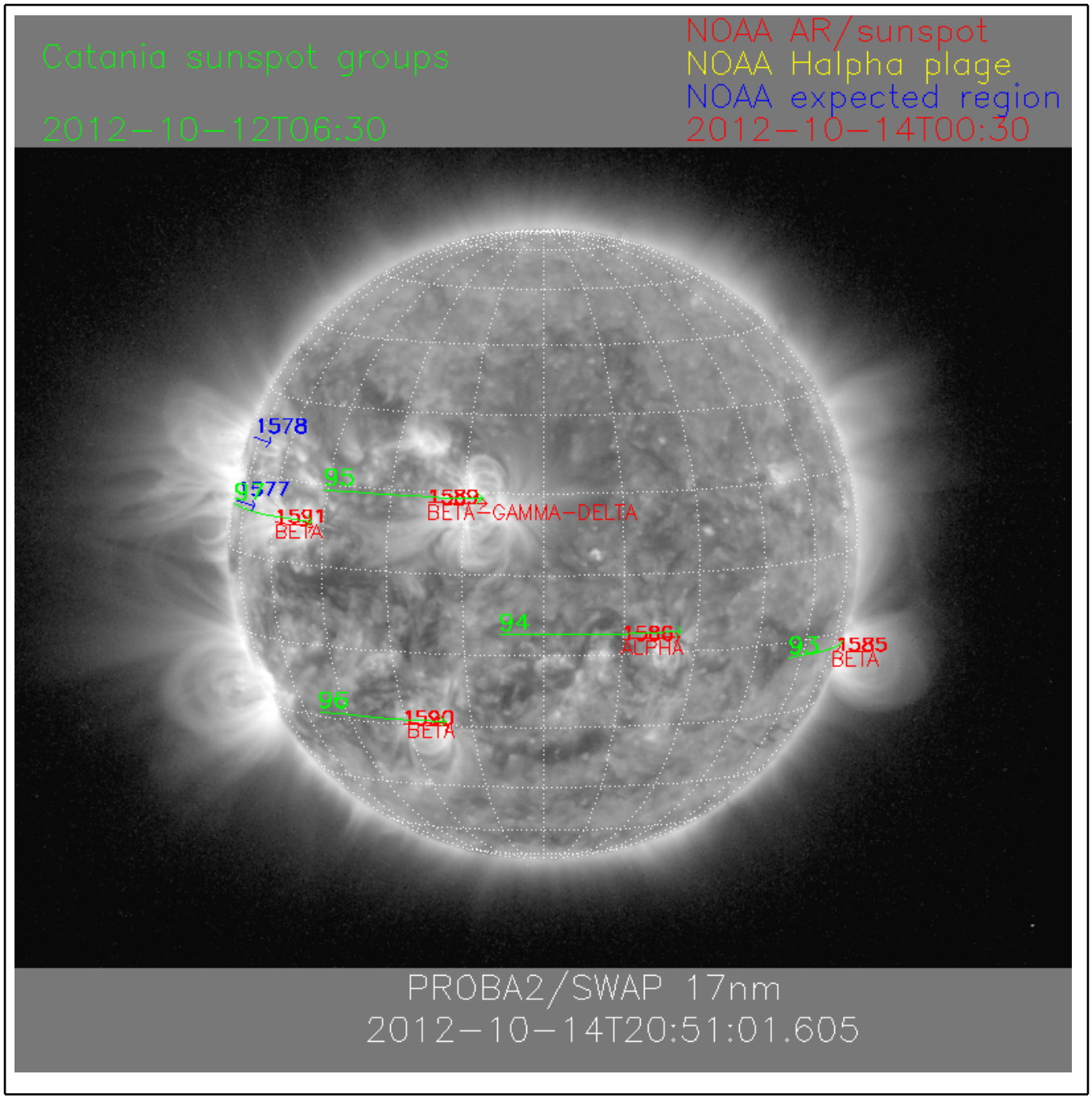
	Monday 08 Oct	Tuesday 09 Oct	Wednesday 10 Oct	Thursday 11 Oct	Friday 12 Oct	Saturday 13 Oct	Sunday 14 Oct
Activity	moderate	moderate	moderate	low	low	low	low
Flares	**M2.3@11:05**	**M1.7@23:22**	**M1.0@04:51**	-	-	-	-

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

The SWAP images of Oct 08 and Oct 14 are shown below, with annotated active regions.



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

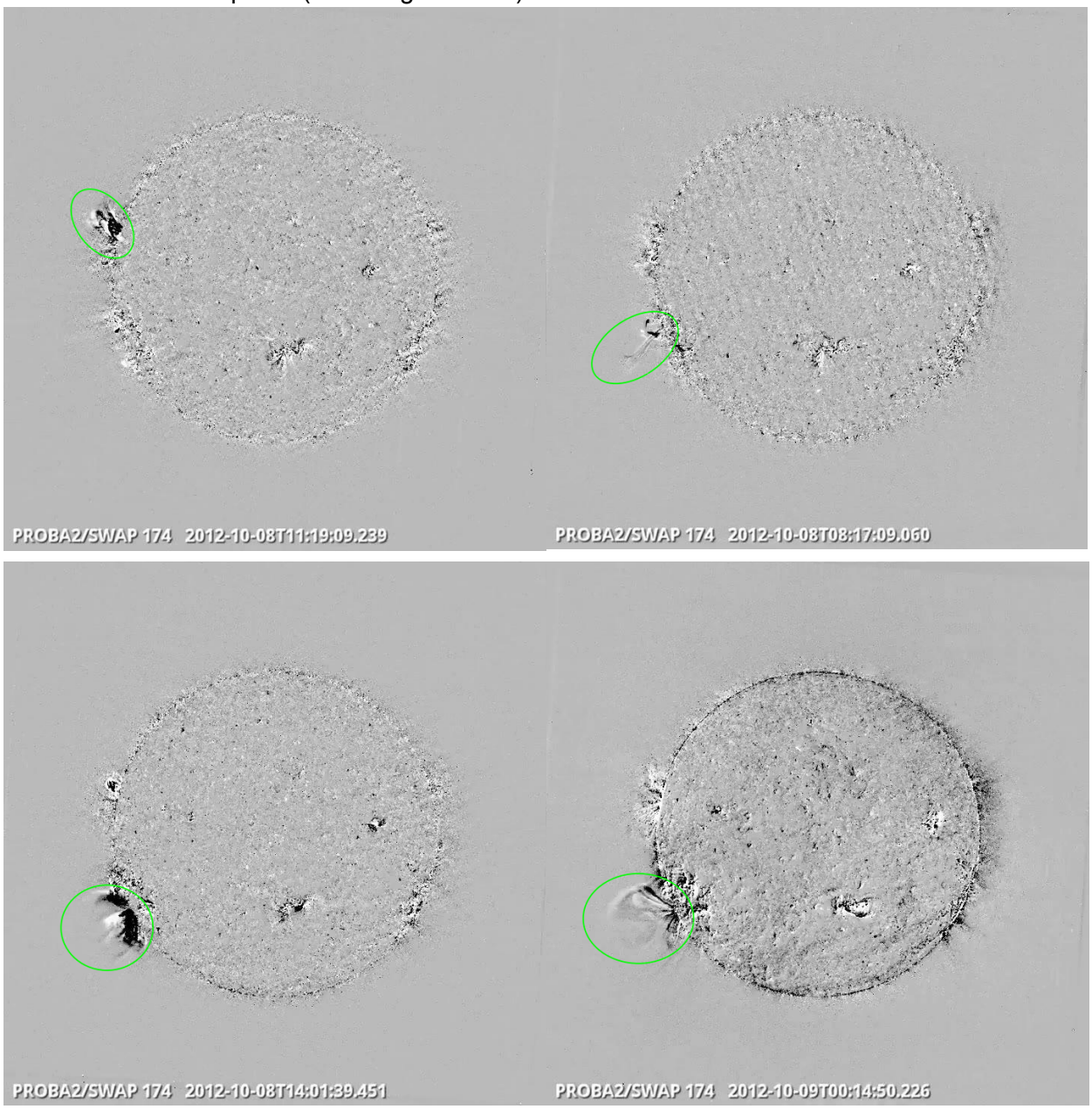

Catania sunspot groups
2012-10-12T06:30
NOAA AR/sunspot
NOAA Halpha plage
NOAA expected region
2012-10-14T00:30
1578
9577
95
1589
BETA-GAMMA-DELTA
1591
BETA
94
1586
ALPHA
93
1585
BETA
96
1590
BETA
PROBA2/SWAP 17nm
2012-10-14T20:51:01.605

Solar Activity

After last week's low level of activity, the Sun started off with a *Moderate* level activity this week. Two active regions (one north - AR 11589, one south - AR 11590) started being visible on the east limb - and generated one M-flare a day until Wednesday. After that, solar activity went down to *Low*, with a C9.0 flare on Friday.

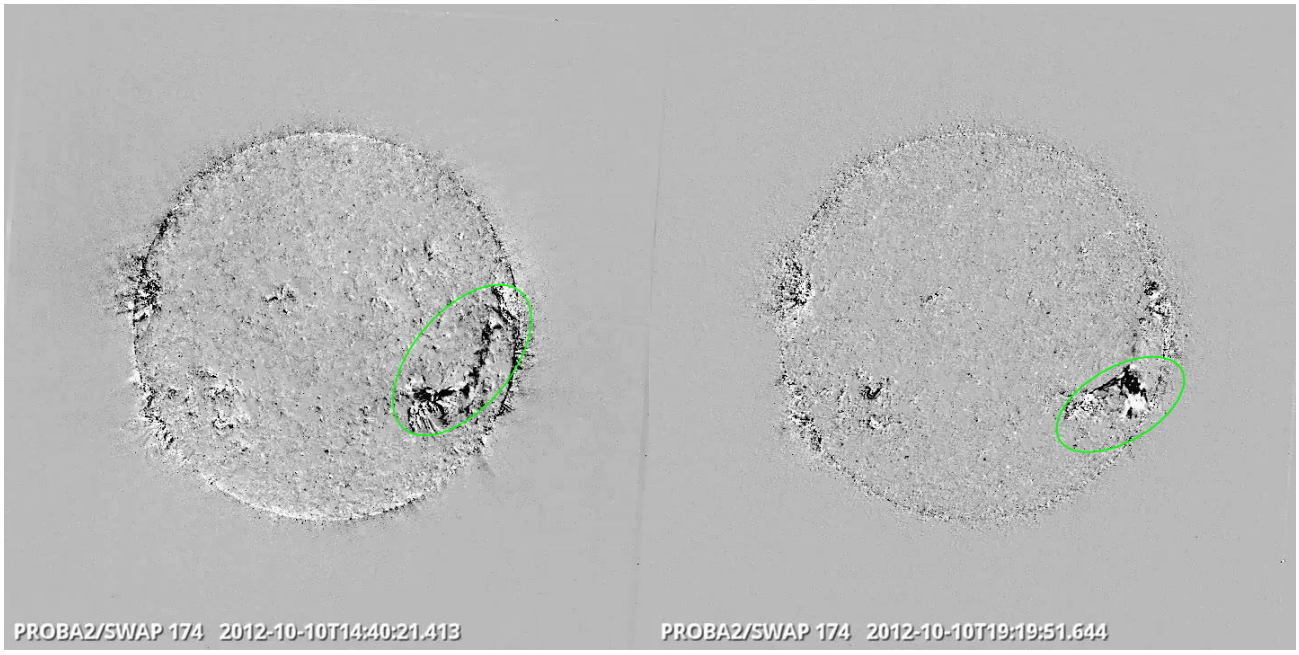
In order to view the activity of this week in more detail, we suggest to go to the following website from which all the daily (normal and difference) movies can be accessed: http://proba2.oma.be/ssa.
This page also lists the recorded flaring events.

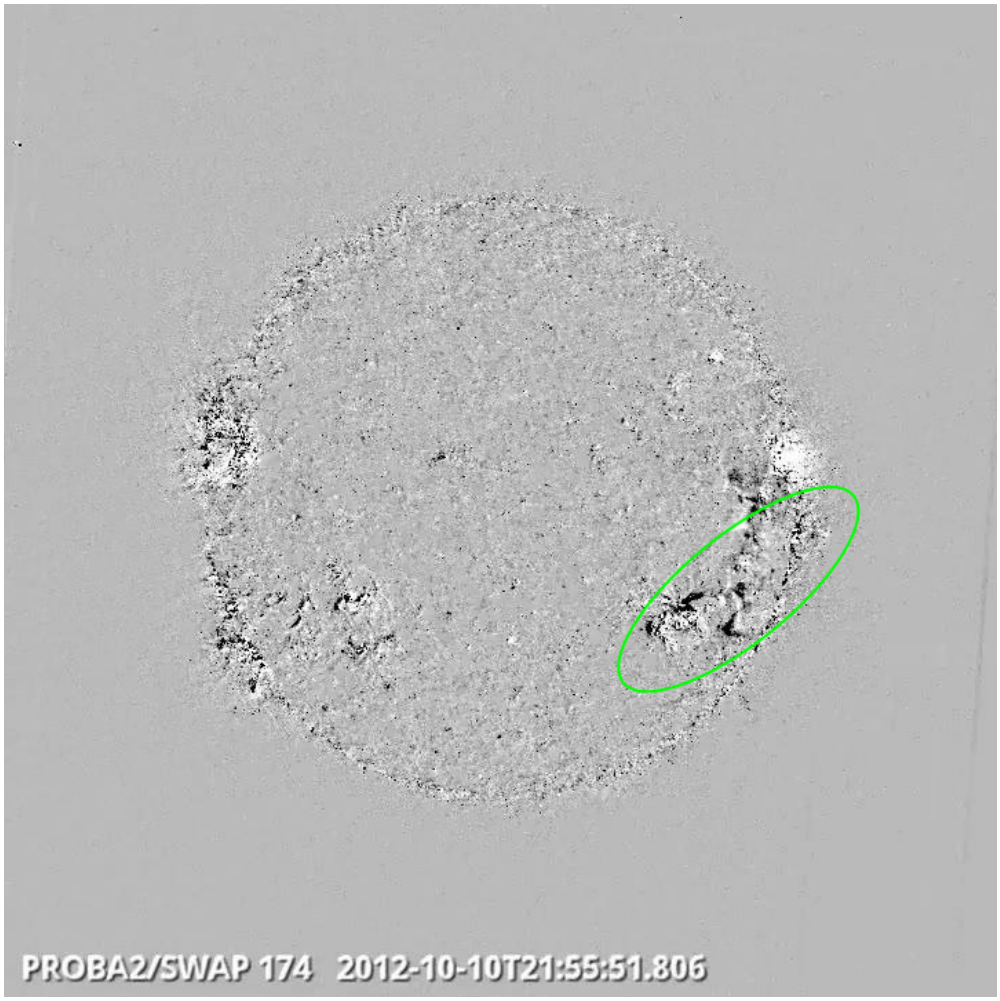
October 8th
Several eruptions occurred on the east limb during the day, 1 north and 3 (from the same region) south of the solar equator (see images below).



October 10th

Several eruptions occurred during the second half of the day, all originating from AR 11585 (south west quadrant; SWAP difference movie here).





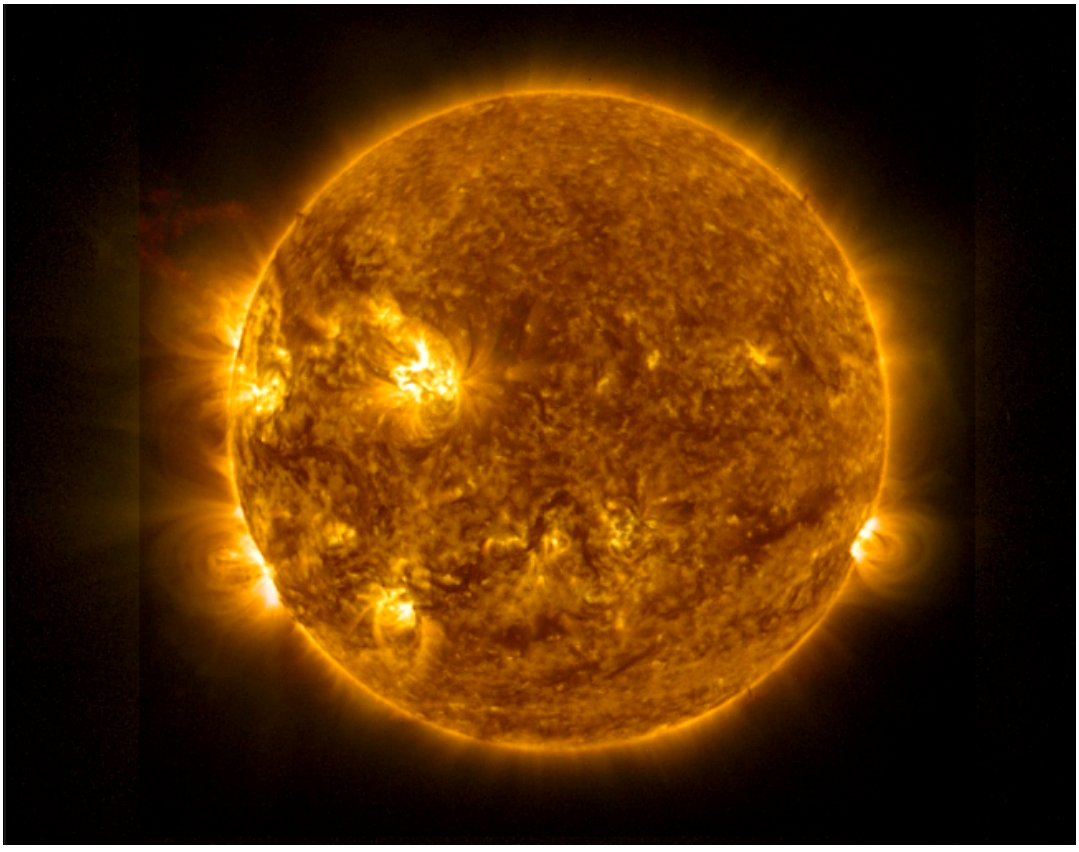
October 12th

Bulb-like eruption occurred on the north-west limb, at 06:05 UT (HelioViewer SWAP/AIA movie here).

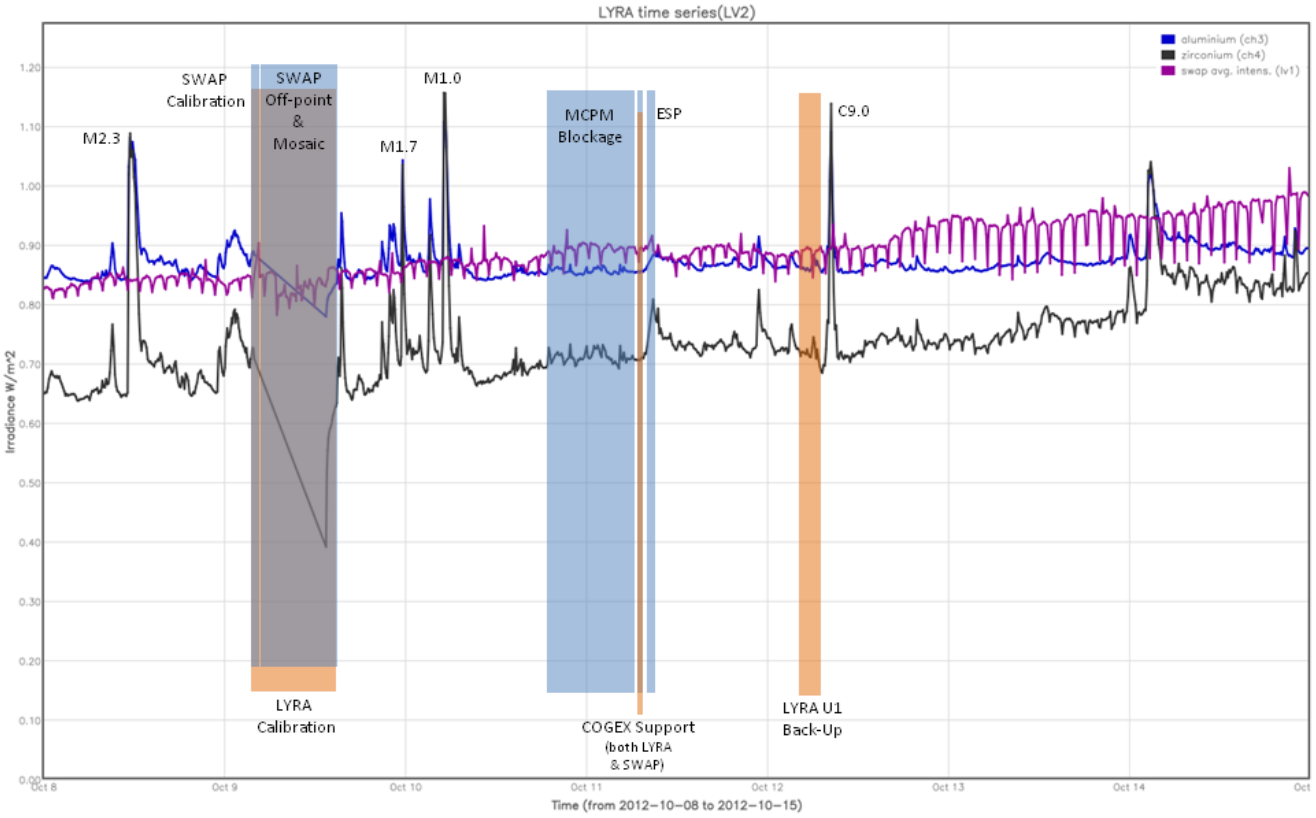
October 14th

Two eruptions occurred consecutively on (from behind?) the north east limb (HelioViewer SWAP/AIA movie, see here).

Note, in the image below, the SWAP extended field of view (yellow), with respect to the AIA 304 FoV (orange).



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 campaign on Tuesday
- SWAP special off-pointing & mosaic campaign on Tuesday, after calibration
- MCPM blockage - whereby SWAP data continued to be acquired, but none downlinked.
- SWAP in IDLE mode, for COGEX experiment support.
- ESP experiment on Thursday

The orange shaded periods correspond to, from left to right:
- LYRA calibration campaign, on Tuesday, in parallel with special SWAP campaigns (see above)
- LYRA OFF during COGEX experiment support, on Thursday.

The red shaded period corresponds to:
- None

The occultation season has definitively started, the intensity dips are clearly visible and deepening during the week.

Outreach, papers, presentations, etc.

"The importance of Space-Weather Automated detection: Validation & development"; K. Bonte; IUAP Leuven; October 8th 2012.

“Solar flare studies with the LYRA - instrument onboard PROBA2"; M. Dominique; IUAP Leuven; October 8th 2012.

“PROBA2: Mission Extension Plan”; A. De Groof; ESTEC, at the Solar System Exploration Working Group meeting reviewing all ESA mission extension cases in the solar system; October 8th 2012

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

This week, Jack Ireland (program 2011-2012) arrived for a period of 2 weeks.

2. LYRA instrument status

Calibration

Calibration on Tuesday, this week

IOS & operations

Monday 08 Oct	Tuesday 09 Oct	Wednesday 10 Oct	Thursday 11 Oct	Friday 12 Oct	Saturday 13 Oct	Sunday 14 Oct
Nominal acquisition + daily U3 LYIOS00272	Nominal acquisition + daily U3 + calibration LYIOS00272	Nominal acquisition + daily U3 LYIOS00273	Nominal acquisition + daily U3 + COGEX support LYIOS00273	Nominal acquisition + daily U3 + U1 back-up obs campaign LYIOS00274	Nominal acquisition+ daily U3 LYIOS00274	Nominal acquisition+ daily U3 LYIOS00274

This week's special LYRA campaigns:
- daily U3 campaign
- LYRA to OFF mode on Thursday, to support COGEX experiment
- Unit 1 (trimestrial) back-up observation campaign on Friday.

LYRA detector temperature

LYRA detector 2 temperature fluctuated between 48.2 and 49.3 degrees, including the daily U3 activation periods. The latter result in a temperature increase of about 0.4 degrees.
During special operations this week, temperature went to a minimum 45.8 degrees (LYRA OFF; COGEX) and maximum 50 degrees (Unit 1 campaign)

To be explored

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3. SWAP instrument status

Calibration

Calibration on Tuesday, this week

MCPM errors

The number of MCPM recoverable errors increased from 4019 to 4153.

The number of MCPM unrecoverable errors is still 0.

IOS & operations

Monday 08 Oct	Tuesday 09 Oct	Wednesday 10 Oct	Thursday 11 Oct	Friday 12 Oct	Saturday 13 Oct	Sunday 14 Oct
Nominal acquisition IOS00416 515 images	Nominal acquisition + calibration + special off-pointing & mosaic campaign IOS00416 601 images	Nominal acquisition IOS00416 339 images	Nominal acquisition + ESP + COGEX support IOS00416 575 images	Nominal acquisition IOS00416 662 images	Nominal acquisition IOS00416 567 images	Nominal acquisition IOS00416 648 images

Special operations for SWAP, this week:
- off-point & mosaic campaign on Tuesday
- mode change to IDLE in support of COGEX experiment

Between Wednesday 15:50 (during pass 9170) and Thursday morning 06:32 (during pass 9176), a so-called ‘MCPM blockage’ occurred. The MCPM was unblocked by REDU Thursday morning during pass 9176 and downloading of images was resumed at 06:32.

SWAP detector temperature

The SWAP Cold Finger Temperature, under nominal operations, increased generally, fluctuating between 0.3 to 1.5 degrees Celsius. Temperature went down to -0.8 degrees during the SWAP IDLE period on Thursday.

LAR delays were missed on the following occasions:
- None

causing each time a temporary increase of temperature of an estimated 0.6-0.7 degrees.

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:

LYRA-BSDG
10/10/2012: r4597 Change 1AU-correction position: now before degradation correction.

5. Data reception & discussions with MOC

Passes

The delivery of the passes for this week (passes 9147 to 9208) was nominal, except for:
- BINSWAP_9170 very small and BINSWAP_9171/9172/9173/9174/9175 missing (on-board problem).

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:
- BINSWAP_9170 very small and BINSWAP_9171/9172/9173/9174/9175 missing (on-board problem)

Total number of images between 2012 Oct 08 0UT and 2012 Oct 15 0UT: 3967
Highest cadence in this period: 30 seconds
Average cadence in this period: 152.47 seconds
Number of image gaps larger than 300 seconds: 49
Largest data gap: 34.33 minutes

The large gap is due to the ESP experiment on Thursday.
The low number of images this week is due to the MCPM blockage.

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
EIT	Extreme ultraviolet Imaging Telescope
FITS	Flexible Image Transport System
FOV	Field Of View FPA Focal Plane Assembly
FPGA	Field Programmable Gate Arrays
GPS	Global Positioning System
HAS	High Accuracy Star tracker
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
OBET	On board Elapsed Time
OBSW	On board Software
PE	Proximity Electronics
PI	Principal Investigator
P2SC	PROBA2 Science Center
ROB	Royal Observatory of Belgium
SAA	South Atlantic Anomaly
SEU	Single Event Upset
SOHO	Solar and Heliospheric Observatory
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?)