P2SC-ROB-WR-239 - 20150309 Weekly report #259	**P2SC Weekly report**	
Period covered: Date: Written by: Approved by:	Mon Mar 09 to Sun Mar 15, 2015 15 Mar 2015 Matthew West Daniel Seaton	Royal Observatory of Belgium - PROBA2 Science Center
To:	LYRA PI, marie.dominique@sidc.be SWAP PI, dseaton@sidc.be	http://proba2.sidc.be ++ 32 (0) 2 3730559
cc:	ROB DIR, ronald@oma.be ESA Redu, Etienne.Tilmans@esa.int ESA D/SRE, Joe.Zender@esa.int ESA D/TEC, Juha-Pekka.Luntama@esa.int	

1. Science

Solar & Space weather events

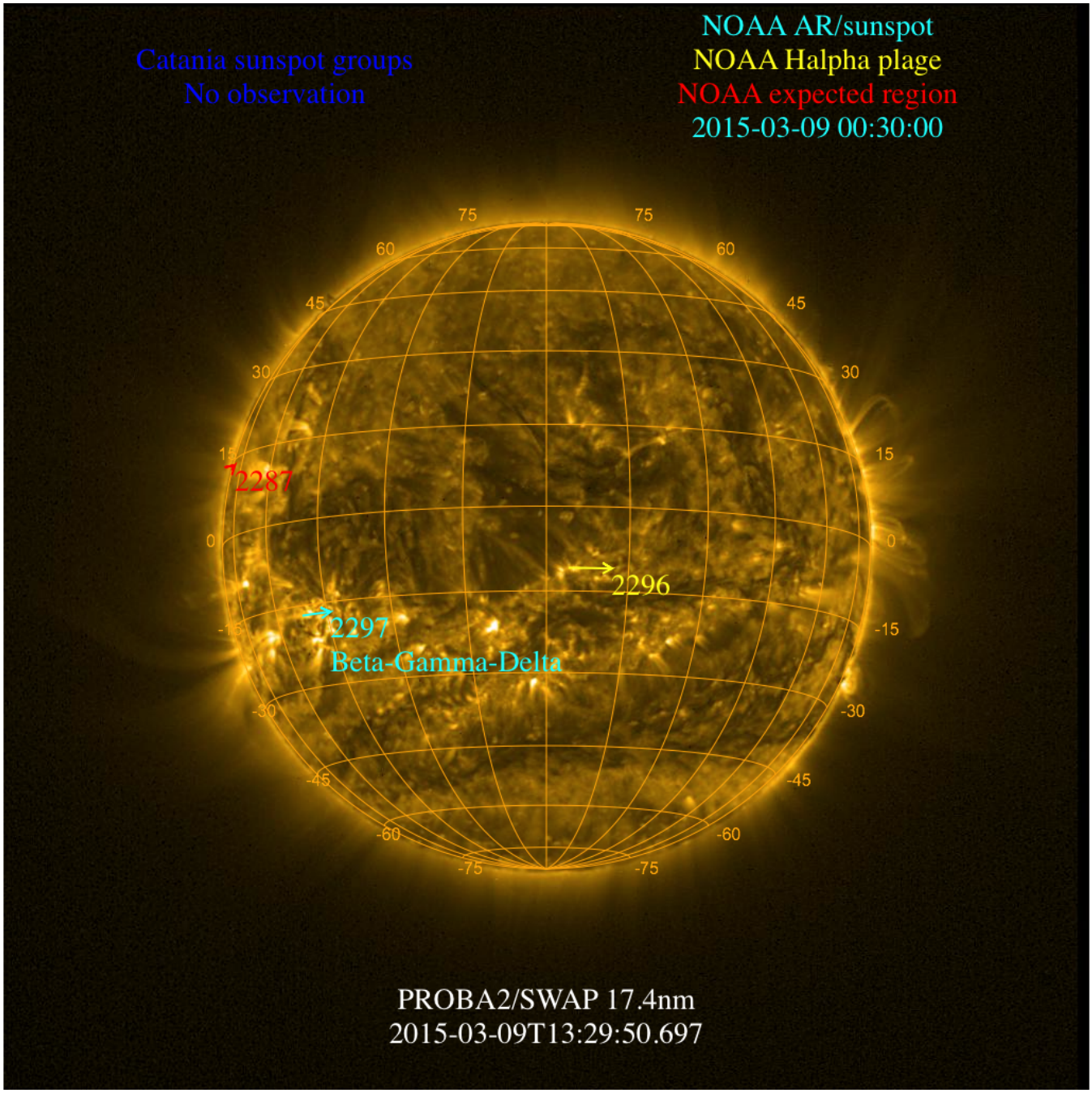
The level of solar activity[1] fluctuated between **moderate** and **high** this week.

Only M- and X-flares are mentioned, the most energetic one(s) per day are presented in **bold**, and their peak times in UT are indicated in brackets:

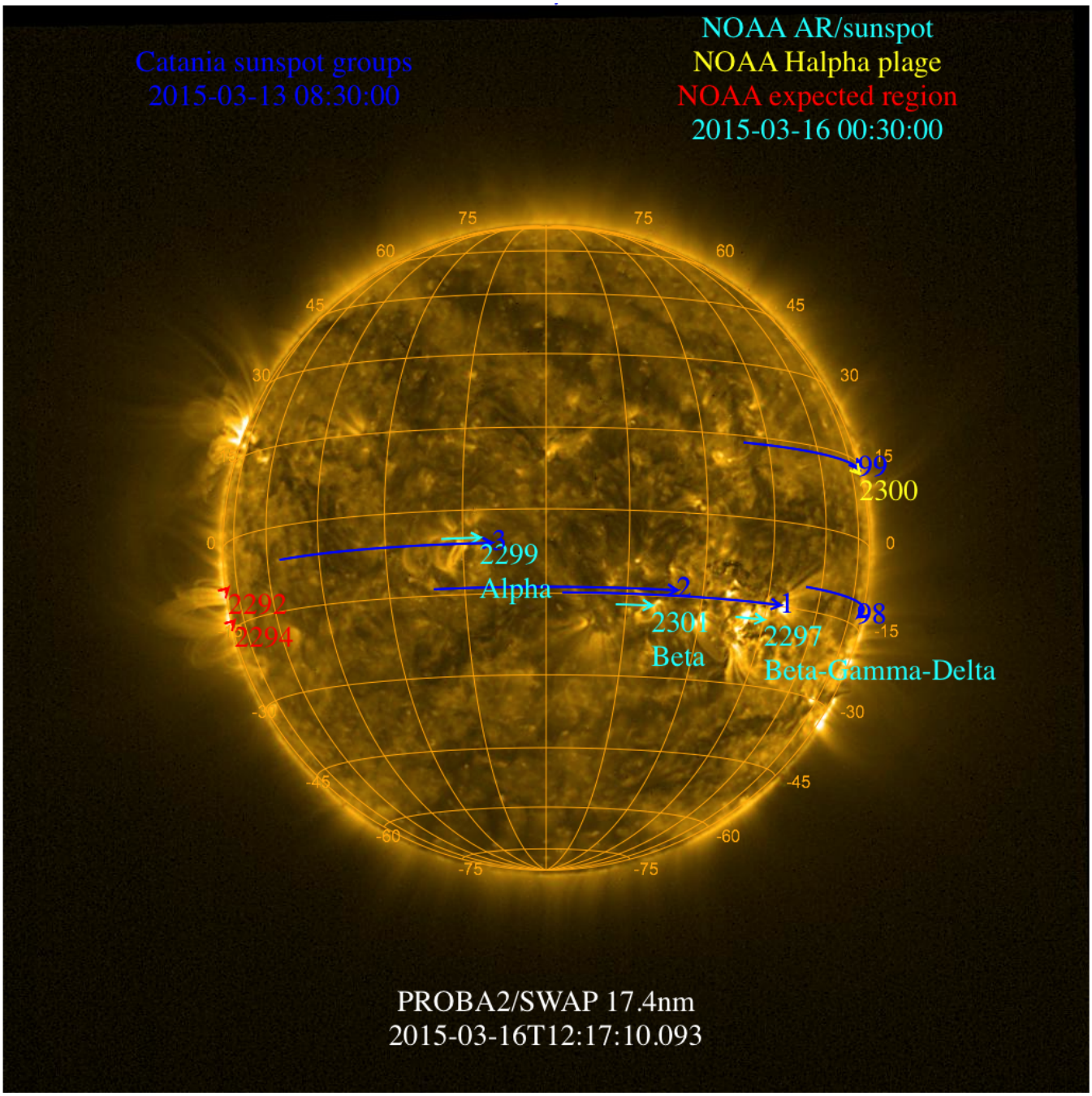
	Monday 09 Mar	Tuesday 10 Mar	Wednesday 11 Mar	Thursday 12 Mar	Friday 13 Mar	Saturday 14 Mar	Sunday 15 Mar
Activity	moderate	moderate	high	moderate	moderate	moderate	moderate
Flares	M4.5 (14:33) **M5.8 (23:53)**	**M5.1 (03:24)** M2.9 (00:02)	M1.8 (07:18) M2.6 (07:57) **X2.1 (16:22)** M1.0 (18:51)	M3.2 (04:46) M1.6 (11:50) M1.4 (12:14) **M4.2 (14:08)** M2.7 (21:51)	M1.2 (04:01) **M1.8 (06:07)**	**M1.3 (04:40)**	M1.0 (09:40) **M1.2 (23:22)**

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

The SWAP images of Mar 09 and Mar 15 are shown below, with annotated active regions.



http://sidc.be/soteria/soteria.php

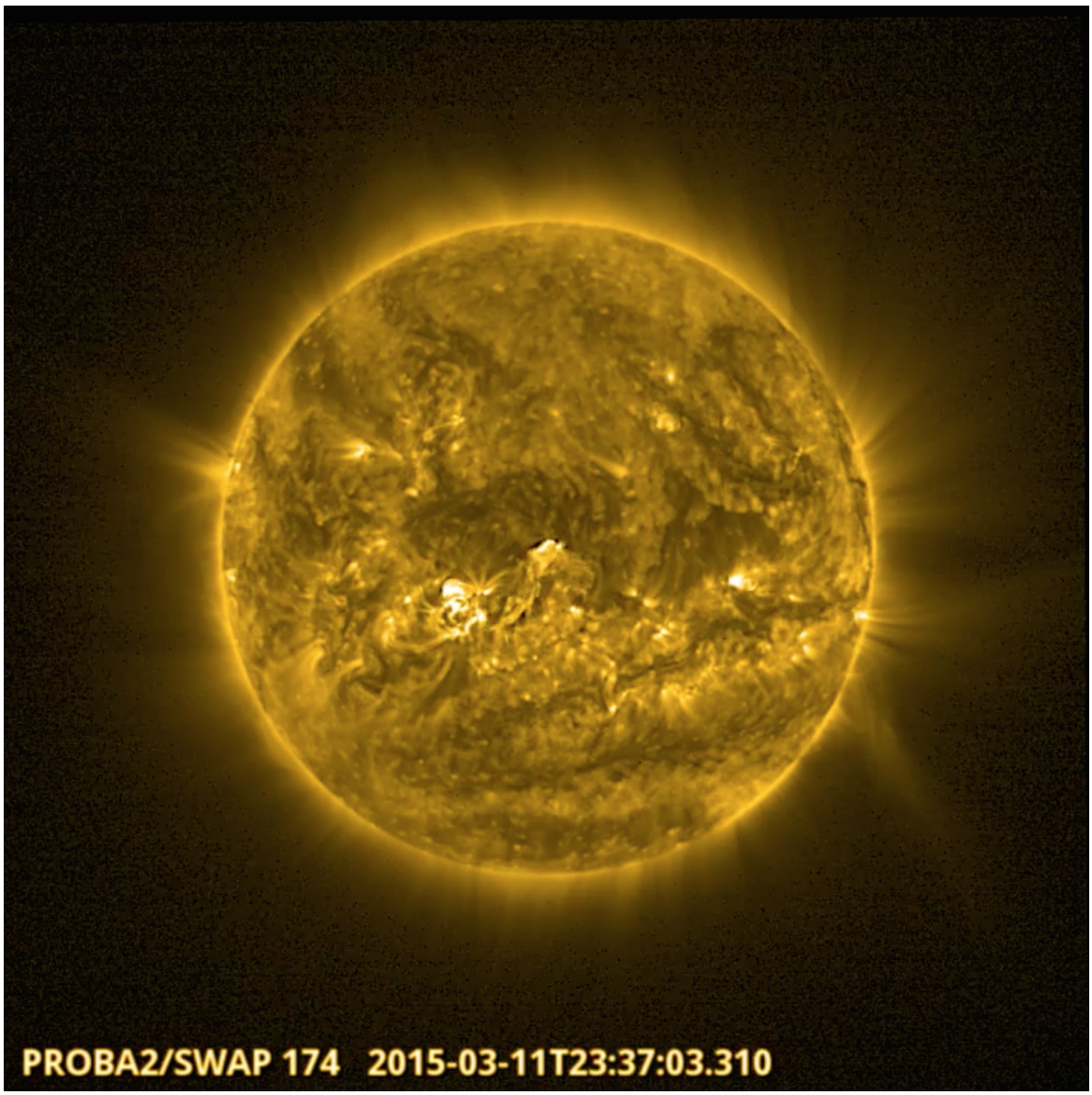

Catania sunspot groups
2015-03-13 08:30:00
NOAA AR/sunspot
NOAA Halpha plage
NOAA expected region
2015-03-16 00:30:00
75
60
45
30
15
0
-15
-30
-45
-60
-75
99
2300
3
2299
Alpha
2
1
98
2292
2294
2301
Beta
2297
Beta-Gamma-Delta
PROBA2/SWAP 17.4nm
2015-03-16T12:17:10.093

Solar Activity

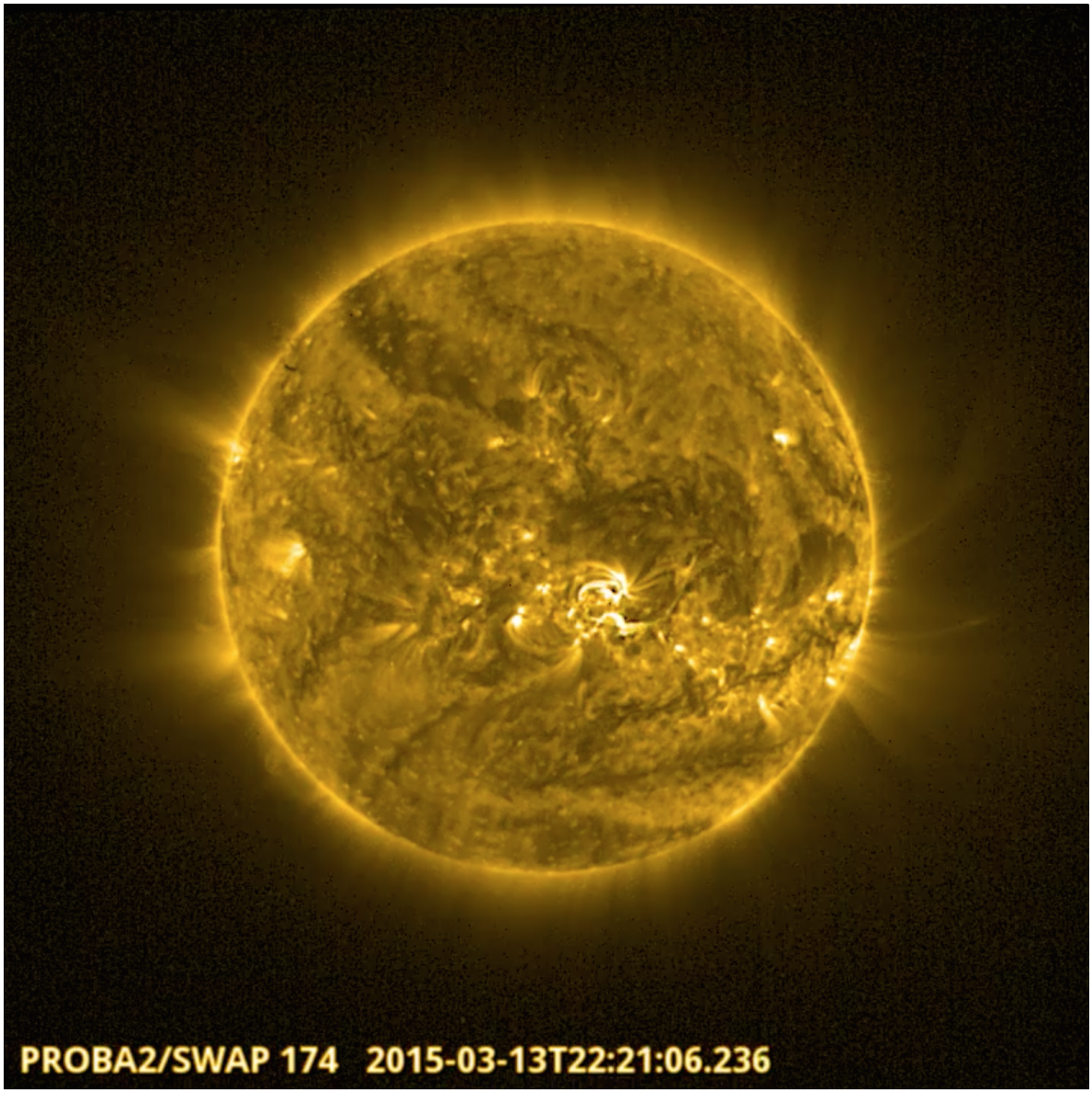
Solar flare activity fluctuated between moderate and high during the week.
In order to view the activity of this week in more detail, we suggest to go to the following website from which all the daily (normal and difference) movies can be accessed: http://proba2.oma.be/ssa
This page also lists the recorded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

A weekly overview movie can be found here (SWAP week 197).

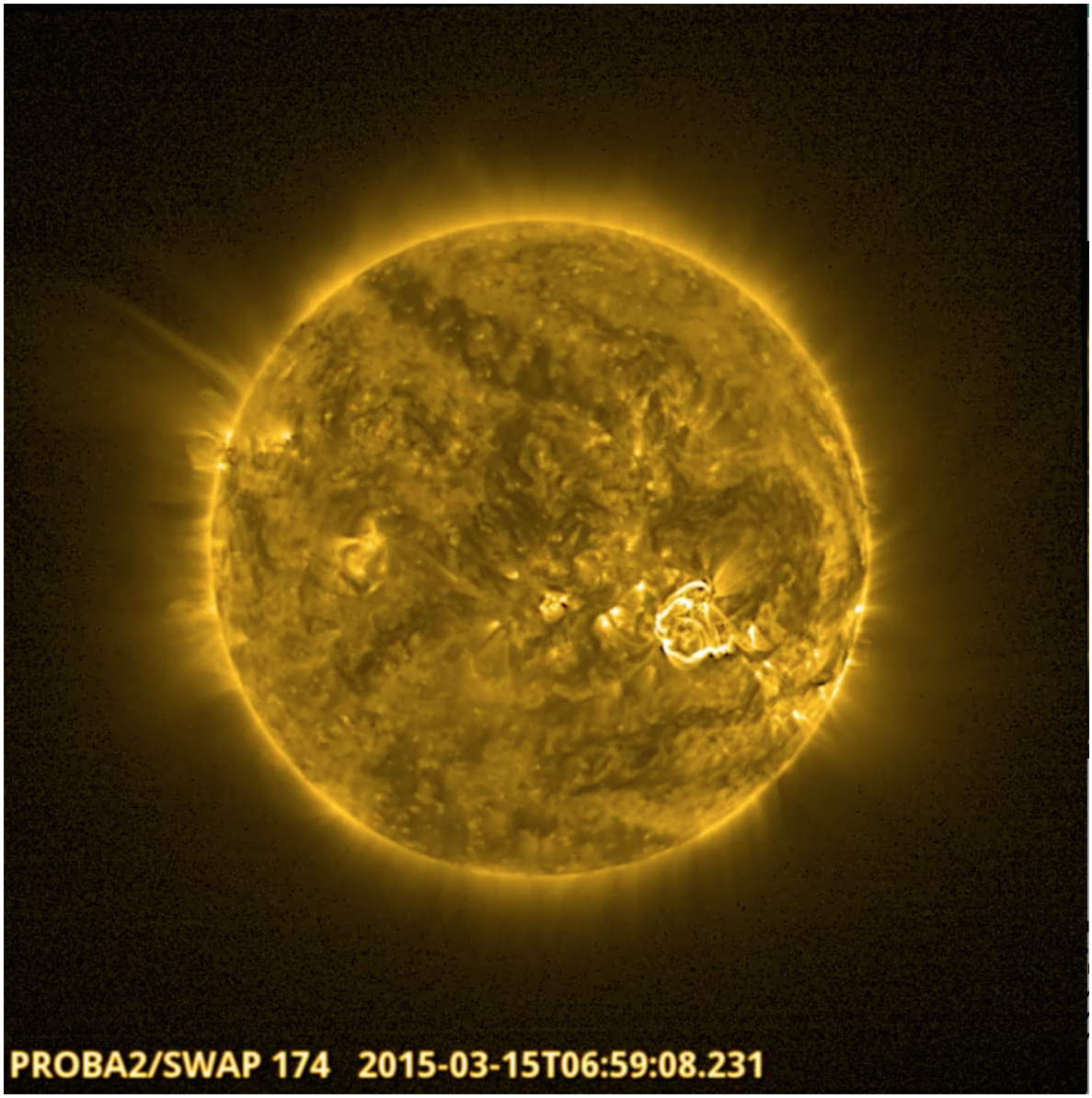
AR 2297 was extremely active over the past week, producing 13 M-class flares, 1 X-class flare and at least 5 CMEs. Several of these eruptions were classified as partially failed, whereby hot material was seen to rise before returning towards the solar surface. Examples include the eruption on 2015-Mar-03 (brightening close to disk centre):



A second partially failed eruption from 2015-Mar-03 can be seen below, where the majority of the hot material is seen to return back to the solar surface (brightening close to disk centre).



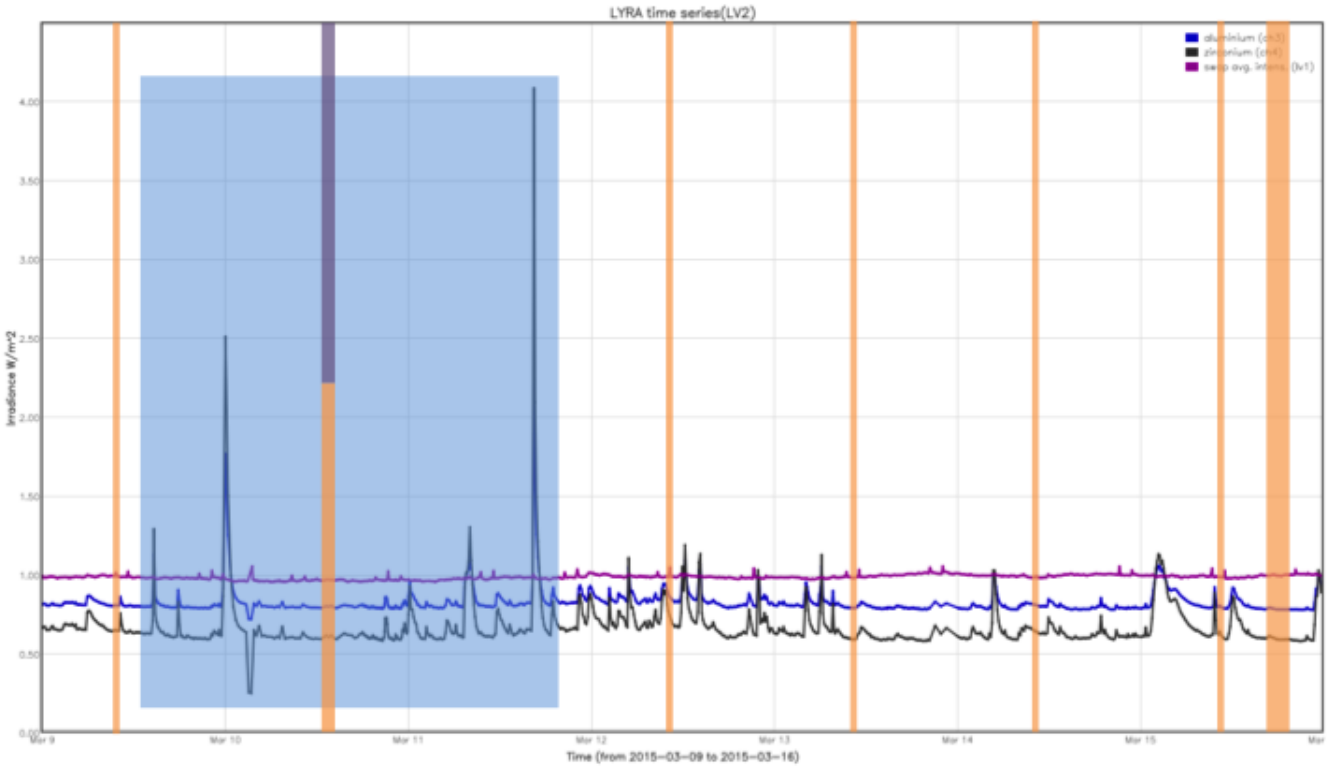
In contrast an eruptive flare was seen on 2015-Mar-15, and was associated with a large CME (see below; brightening to the right of disk centre).



There is currently a great deal of scientific research looking into why some eruptive flares are contained whilst others fully erupt. Such understanding is important for space weather research and predicting when eruptions will be geoeffective. Please see the weekly movie linked above to see all the eruptions produced by AR 2297.

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 (SWAP Average Intensity; integrated solar intensity per SWAP image pixel)



The mauve shaded periods correspond to SWAP related processes, from left to right:

- SREP calibration 03:00-03:50UT 10-Mar-2015

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

- LYRA daily U3 campaign 10:00-10:20 UT 09-Mar-2015
- SREP calibration 03:00-03:50 UT 10-Mar-2015
- LYRA daily U3 campaign 10:00-10:20 UT 12-Mar-2015
- LYRA daily U3 campaign 10:00-10:20 UT 13-Mar-2015
- LYRA daily U3 campaign 10:00-10:20 UT 14-Mar-2015
- LYRA daily U3 campaign 10:00-10:20 UT 15-Mar-2015
- LREP backup acquisition campaign 19:00 - 20:49 UT 15-Mar-2015

The blue shaded period corresponds to:

- LYRA flare hunting campaign with unit 3 13:30 UT (09-Mar-2015) - 20:00UT (11-Mar-2015)

Activity level periods are indicated per day by horizontal arrows.

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.

The science section of this weekly report is also published in the weekly STCE newsletter (http://www.stce.be/newsletter/newsletter.php).

Guest Investigator Program

- None

2. LYRA instrument status

Calibration

Calibration campaign on Wednesday this week.

IOS & operations

Monday 09 Mar	Tuesday 10 Mar	Wednesday 11 Mar	Thursday 12 Mar	Friday 13 Mar	Saturday 14 Mar	Sunday 15 Mar
Nominal acquisition + daily U3 LYIOS00455 -> 456	Nominal acquisition + daily U3 LYIOS00456 -> 457	Nominal acquisition + daily U3 LYIOS00457 -> 458	Nominal acquisition + daily U3 LYIOS00458 -> 459	Nominal acquisition + daily U3 LYIOS00459	Nominal acquisition + daily U3 LYIOS00459	Nominal acquisition + daily U3 LYIOS00459

The following science campaigns were performed by LYRA:

- daily U3 observations campaign

LYRA detector temperature

LYRA detector 2 temperature globally varied between 49.92 and 52.83 °C, taking into account the daily U3 activation periods; the latter result in a temperature increase of about 0.6 °C.

3. SWAP instrument status

Calibration

Calibration campaign on Tuesday this week.

MCPM errors

The number of MCPM recoverable errors increased from 26541 to 26544.
The number of MCPM unrecoverable errors increased from 5093 to 5261.

IOS & operations

Monday 09 Mar	Tuesday 10 Mar	Wednesday 11 Mar	Thursday 12 Mar	Friday 13 Mar	Saturday 14 Mar	Sunday 15 Mar
Nominal acquisition IOS00569 592 images	Nominal acquisition IOS00569 539 images	Nominal acquisition IOS00569 584 images	Nominal acquisition IOS00569 519 images	Nominal acquisition IOS00569 639 images	Nominal acquisition IOS00569 643 images	Nominal acquisition IOS00569 563 images

Special operations for SWAP, this week:

- None

SWAP detector temperature

The SWAP Cold Finger Temperature globally varied between 1.67 and 0.55 °C.

4. PROBA2 Science Center Status

The main operator is Robbe Vansintjan.

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 16779 to 16840) was nominal, except for:

- None.

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:

- None

Total number of images between 2015 Mar 09 0UT and 2015 Mar 16 0UT: 4079
Highest cadence in this period: 30 seconds
Average cadence in this period: 149.18 seconds
Number of image gaps larger than 300 seconds: 6
Largest data gap: 6.00 minutes

Data coverage LYRA

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

- 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
SoFAST	Solar Feature Automated Search Tool
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)