P2SC-ROB-WR-758 - 20240930	**P2SC Weekly report**	
Period covered: Date: Written by: Approved by:	Mon Sep 30 to Sun Oct 6, 2024 09 Oct 2024 Laurence Wauters Marie Dominique	Royal Observatory of Belgium - PROBA2 Science Center
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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**:

	Monday 30 Sep	Tuesday 01 Oct	Wednesday 02 Oct	Thursday 03 Oct	Friday 04 Oct	Saturday 05 Oct	Sunday 06.Oct
Activity	moderate	High	moderate	High	moderate	moderate	moderate
Flares	**M7.6**	**X7.1, M1.5, M1.0**	**M3.3, M1.4, M3.2, M1.1, M3.6, M1.2**	**M2.3, M6.7, 4*M1.5, X9.0, M1.1**	**3*M1.2, M1.1, M4.0**	**M2.4, M1.1, M1.6, M1.4, M1.0**	**M1.5, M1.4, 2*M1.0, M1.3**

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

Solar Activity

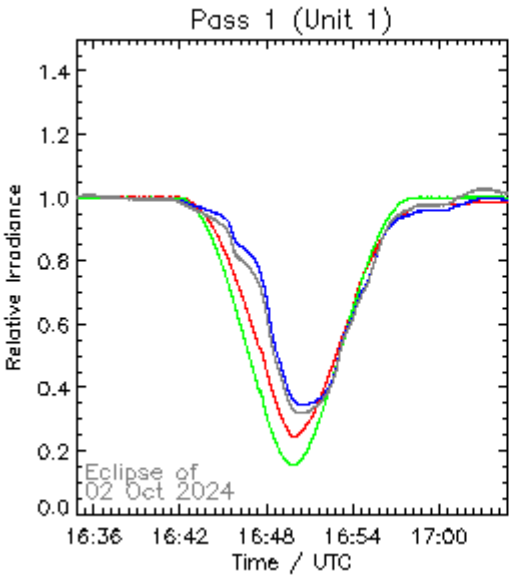
Solar flare activity fluctuated from moderate to high during the week.
In order to view the activity of this week in more detail, we suggest to go to the following website from which all the daily (normal and difference) movies can be accessed: https://proba2.oma.be/ssa
This page also lists the recorded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

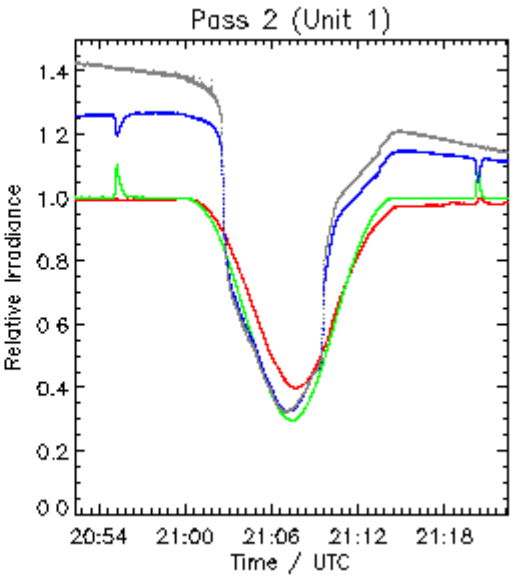
A weekly overview movie can be found here (SWAP week 758).

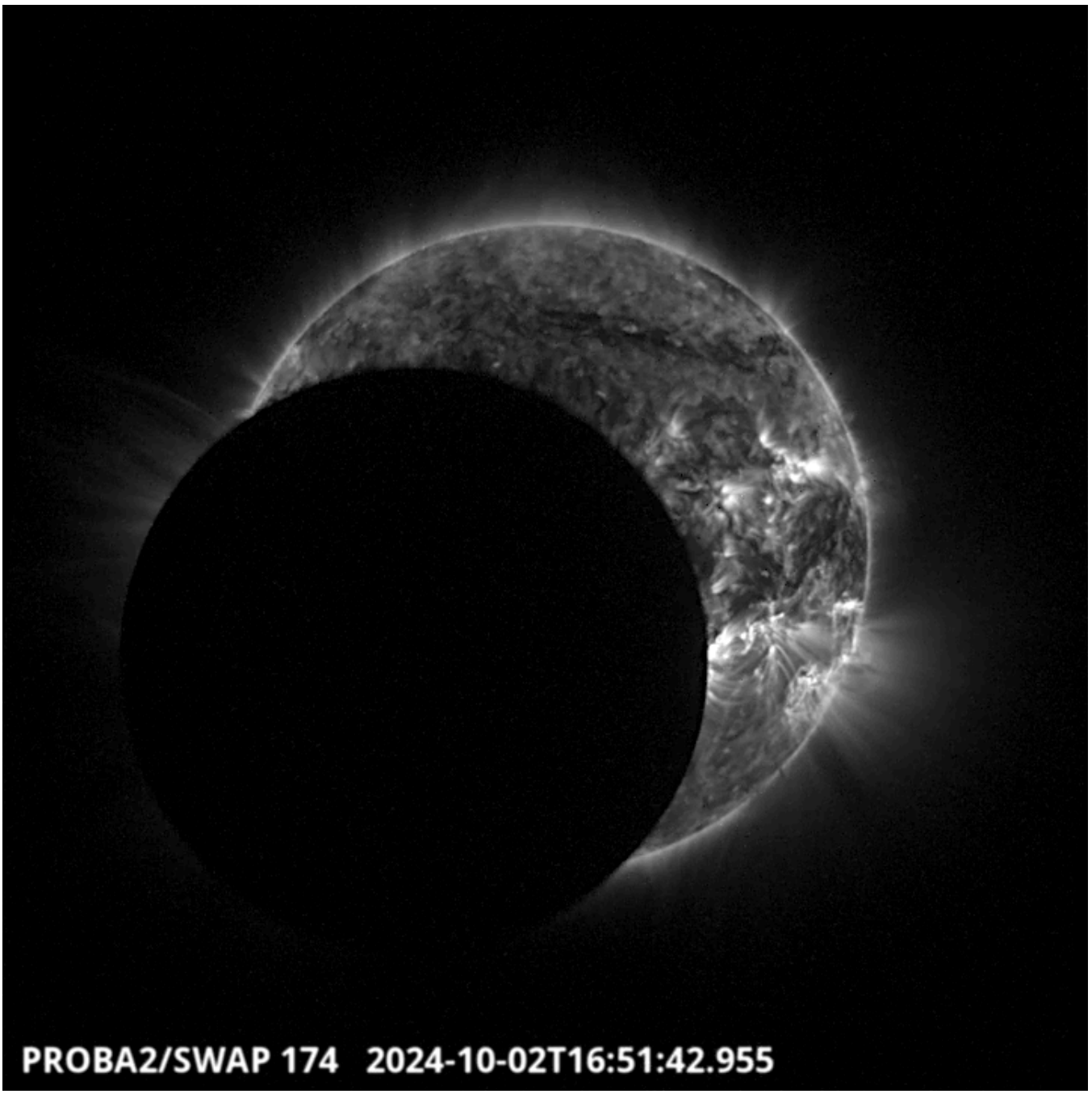
Details about some of this week's events can be found further below.

If any of the linked movies are unavailable they can be found in the P2SC movie repository here

Wednesday Oct 2

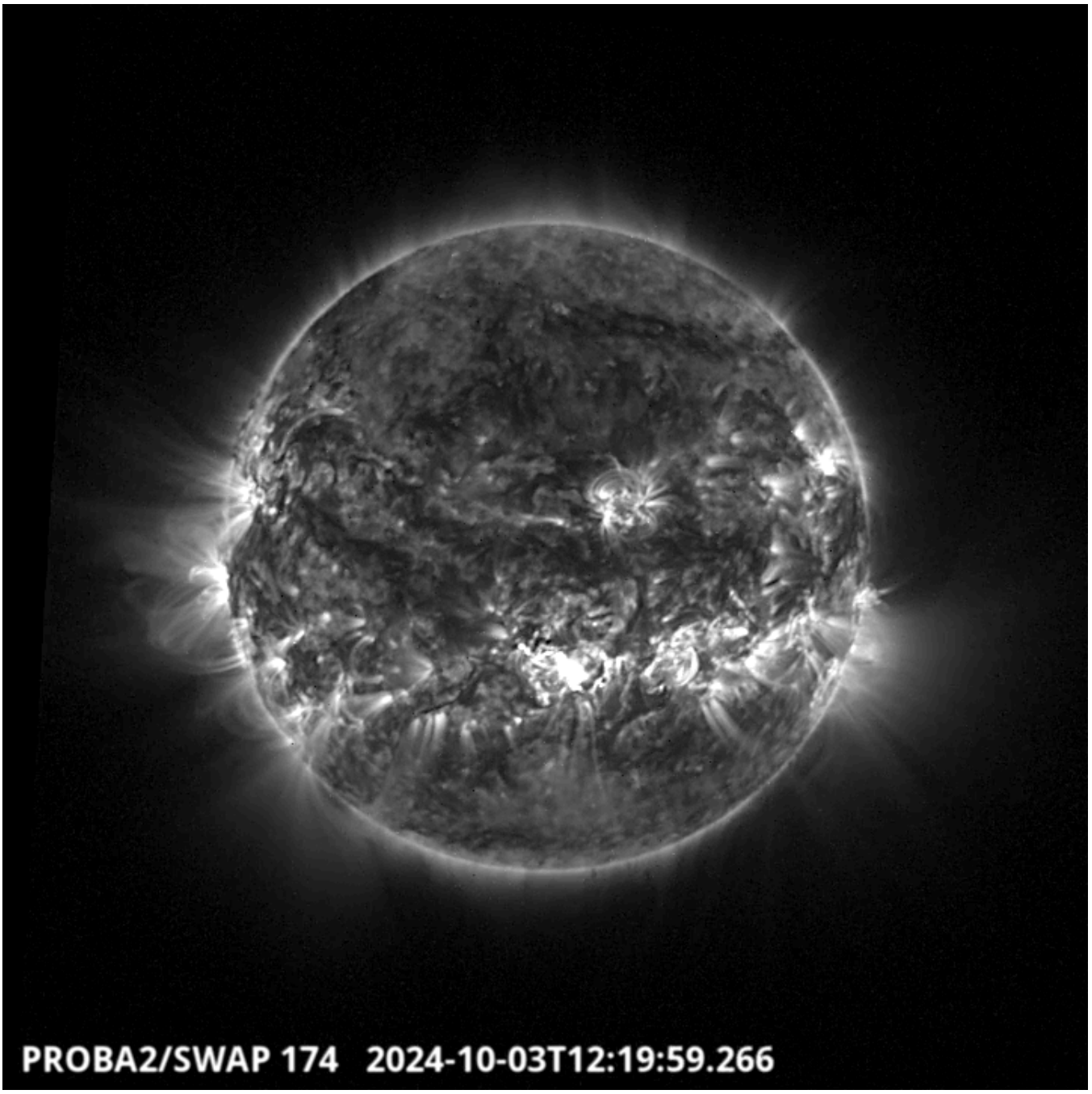






The solar eclipse of October 2 was observed and recorded by LYRA and SWAP. The irradiance plots above, corresponding to the two primary transits of PROBA2 through the eclipse zone, illustrate the gradual reduction in irradiance across the four channels of LYRA's backup unit as the Moon passed in front of the Sun. The SWAP image captures the moment when the eclipse reached its maximum phase. More detailed explanations can be found on the proba2 website.
Find a SWAP movie of the event here.

Thursday Oct 03

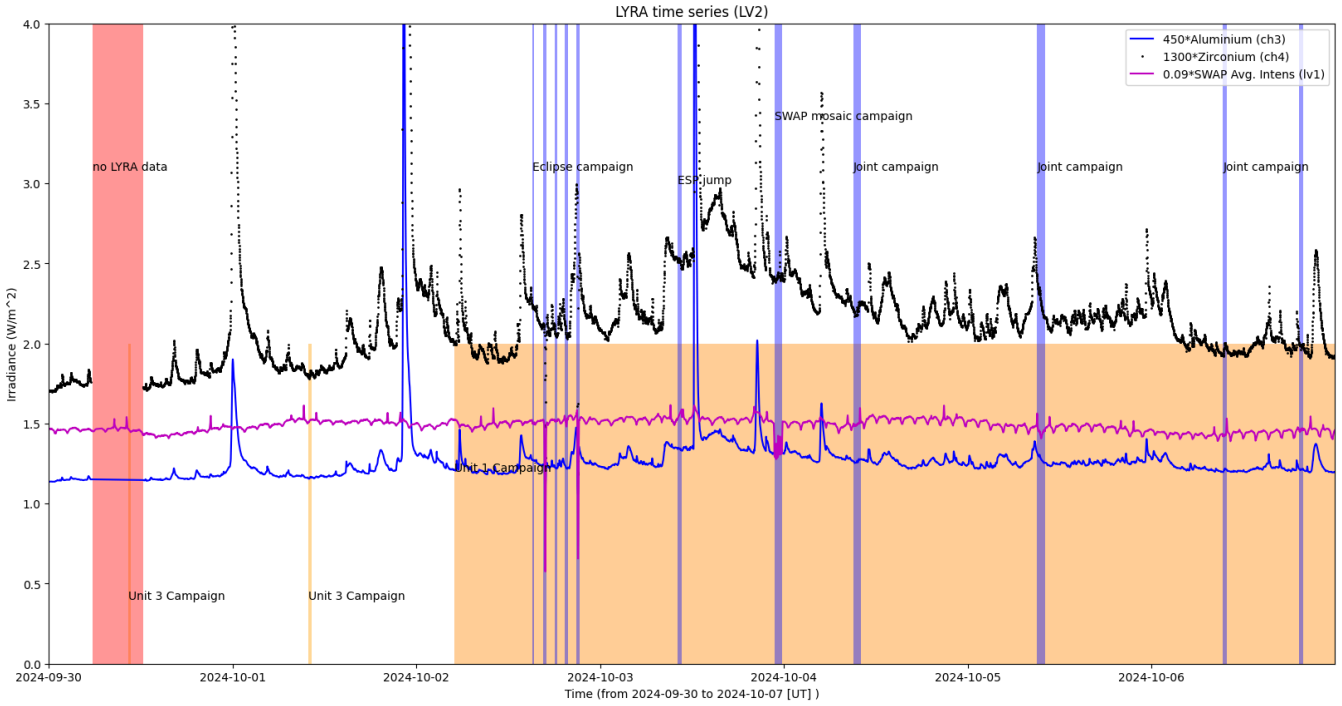


The strongest solar flare of the current solar cycle, which reached the X9.0 class, was produced by the active region 3842 around 12:18 UT. It produced an Earth-directed CME. Additionally, around 13:30 UT, a filament erupted in the North-West part of the solar disk (see also the SWAP difference movie).

Find a SWAP movie of the event here.

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)



Operations and Calibrations:

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

- High-cadence (15 sec) eclipse campaign on 2024-Oct-02 between: 15:09:45-15:22:00, 16:35:30-17:02:00, 18:04:00-18:25:30, 19:25:00-19:50:15, 20:56:30-21:19:30 UT
- High-cadence (15 sec) joint campaign with EUI/HRIEUV, on 2024-Oct-03 between 09:05:50-10:07:00 UT
- ESP jump, on 2024-Oct-03 between 10:07-10:37 UT
- Mosaic campaign, on 2024-Oct-03 between 22:45-23:45 UT
- High-cadence (15 sec) joint campaign with EUI/HRIEUV, on 2024-Oct-04 between 09:05:50-10:05:50 UT
- High-cadence (15 sec) joint campaign with EUI/HRIEUV, on 2024-Oct-05 between 09:05:45-10:05:45 UT
- High-cadence (15 sec) joint campaign with EUI/HRIEUV, on 2024-Oct-06 between 09:20:40-09:50:40 UT
- High-cadence (15 sec) joint campaign with EUI/HRIEUV, on 2024-Oct-06 between 19:20:40-19:50:40 UT
- High-cadence (15 sec) joint campaign with EUI/HRIEUV, on 2024-Oct-07 between 09:20:35-09:50:35 UT
- High-cadence (15 sec) joint campaign with EUI/HRIEUV, on 2024-Oct-07 between

19:20:35-19:50:35 UT

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

- Daily Unit 3 campaigns, 2024-Sep-30 and 2024-Oct-01
- Unit 1 joint campaign with HRI-EUV and eclipse campaign, 2024-Oct-02
- Unit 1 flare campaign starting at the end of the eclipse lasting the whole week
- Unit 1 joint campaign with HRI-EUV, on 2024-Oct-03, -04, -05, -06 (simultaneous to the flare campaign).

The red shaded periods related to other issues corresponds to:

- LYRA gap for pass 48387&48388: We didn’t ask for a re-dump (it currently gives rise to processing issues), 2024-Sept-30

2. LYRA instrument status

IOS

Start IOS	Mon Sep 30 2024	LYIOS01119
End IOS	Sun oct 06 2024	LYIOS01120

LYRA detector temperature

LYRA detector 2 temperature globally varied between 51.56 and 54.79 °C.

3. SWAP instrument status

MCPM errors

The number of MCPM recoverable errors remained at 63317.
The number of MCPM unrecoverable errors remained at 3135.

IOS

Start IOS	Mon Sep 30 2024	IOS01223
End IOS	Sun Oct 06 2024	IOS01224

SWAP detector temperature

The SWAP Cold Finger Temperature globally varied between 0.55 to 2.23 °C.

4. PROBA2 Science Center Status

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 48385 to 48450) was nominal, except for:

- Pass 48387 & 48388, REDU said: SSC encountered a problem with the switch matrix for the support 48387 and 48388

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 2024 Sep 30 00:00 UT and 2024 Oct 07 00:00 UT: 4613
Highest cadence in this period: 17 seconds
Average cadence in this period: 131.09 seconds
Number of image gaps larger than 300 seconds: 332
Largest data gap: 32.13 minutes

Data coverage LYRA

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

- 48387&48388: We don’t ask a re-dump (it currently gives rise to processing issues)

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
DAC	Data Acquisition Controller
DBR	Deployment, backup & recovery
DDA	Decommutated data archive
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)