

# STCE Newsletter

14 Aug 2017 - 20 Aug 2017



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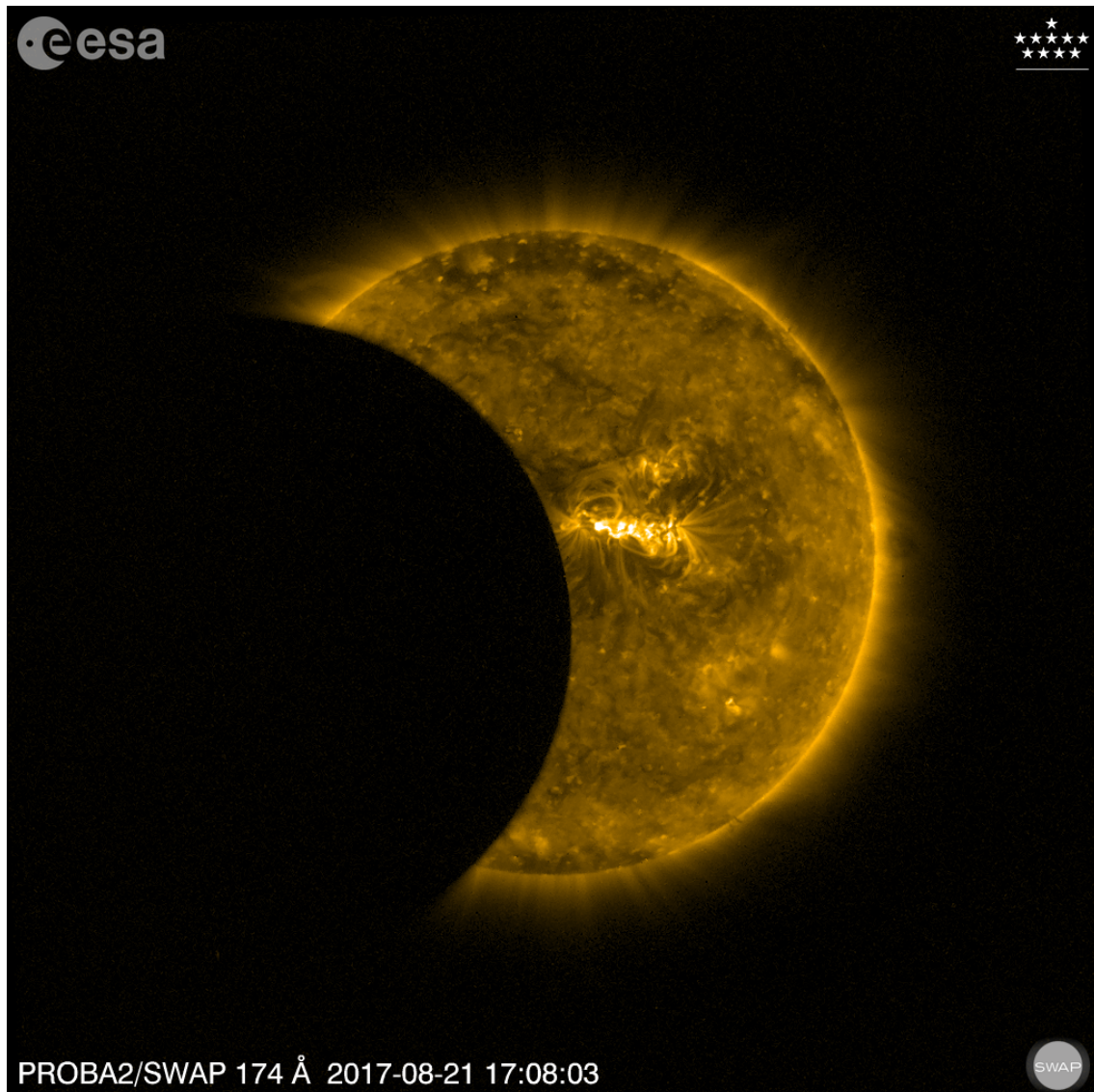
The Solar-Terrestrial Centre of Excellence (STCE) is a collaborative network of the Belgian Institute for Space Aeronomy, the Royal Observatory of Belgium and the Royal Meteorological Institute of Belgium.

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Final Editor : Petra Vanlommel  
Contact : R. Van der Linden, General Coordinator STCE,  
Ringlaan - 3 - Avenue Circulaire, 1180 Brussels,  
Belgium

## 1. Solar Eclipse - PROBA2 did it

PROBA2 saw the solar eclipse from its 750 km-high seat in space. PROBA2 captured this EUV-image with the moon partly covering the sun.



The telescope SWAP onboard of the micro-satellite PROBA2 recorded the passing of the moon in front of the sun. This is a still image taken at 17:08UT. It is an EUV-image showing part of the solar atmosphere and a very bright region in the middle of the solar disk.

Check the PROBA2 website for movies and more pictures: <http://proba2.oma.be/eclipse-August-2017>

## 2. Modelling the Solar Wind

At a 'Talk Cosmic to me' event - The Sun, more than a gigantic tan factory, check <https://www.facebook.com/talkcosmictome/> somebody draw an accurate and detailed model of the solar corona and the solar wind off the top of his head, just like that. This research clearly shows that the Sun has a hidden personality. Do you see it?



### **3. PROBA2 Observations (14 Aug 2017 - 20 Aug 2017)**

#### **Solar Activity**

Solar flare activity fluctuated between very low and moderate 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.

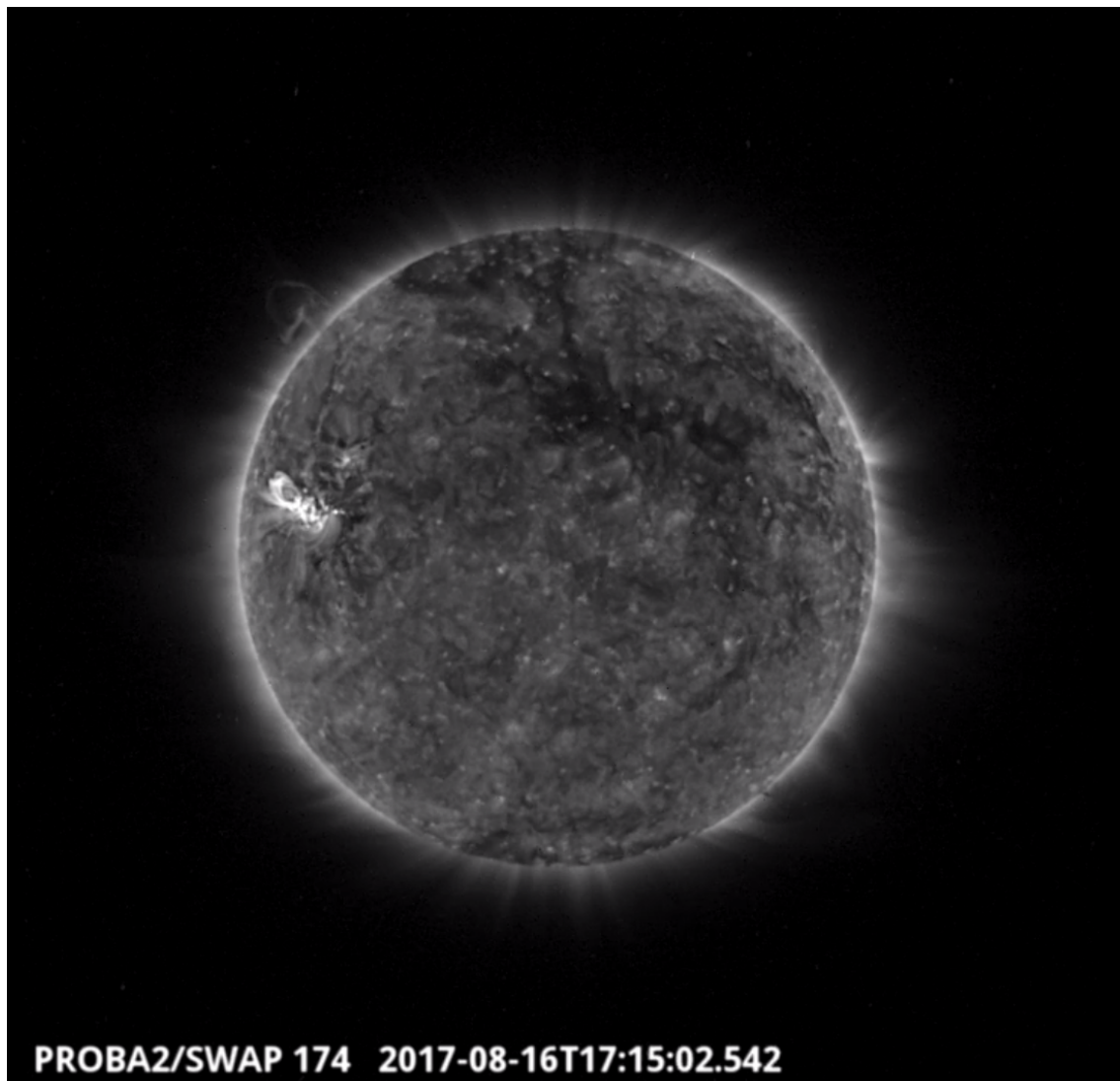
A weekly overview movie can be found here (SWAP week 386):

[http://proba2.oma.be/swap/data/mpg/movies/weekly\\_movies/weekly\\_movie\\_2017\\_08\\_14.mp4](http://proba2.oma.be/swap/data/mpg/movies/weekly_movies/weekly_movie_2017_08_14.mp4)

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:  
<http://proba2.oma.be/swap/data/mpg/movies/>

**Wednesday Aug 16**



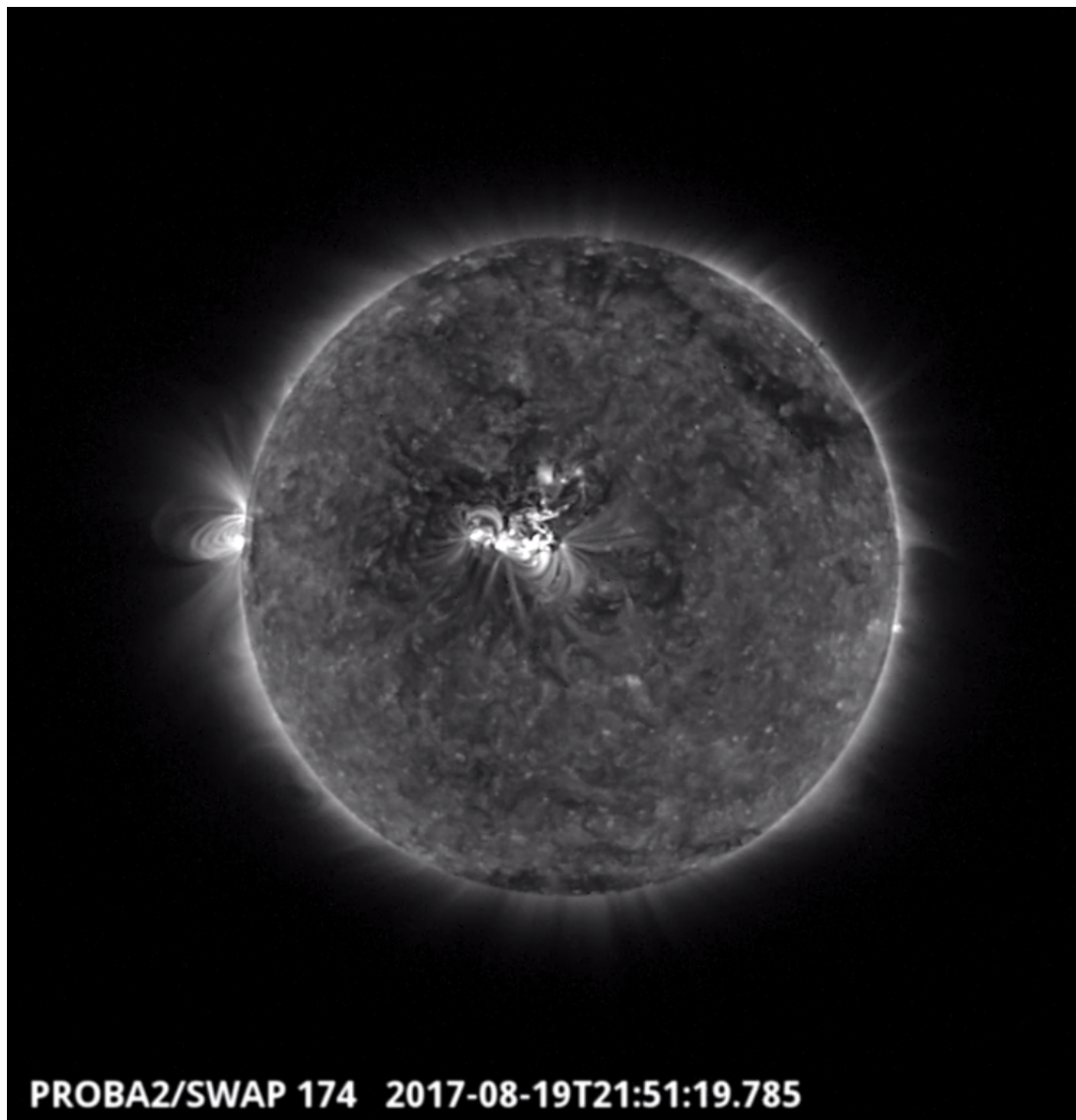
A prominence was observed by SWAP in the north east quadrant of the Sun shown in the SWAP image above at 17:15 UT on 2017-Aug-16

Find a movie of the event here (SWAP movie):

[http://proba2.oma.be/swap/movies/20170816\\_swap\\_movie.mp4](http://proba2.oma.be/swap/movies/20170816_swap_movie.mp4)



**Saturday Aug 19**

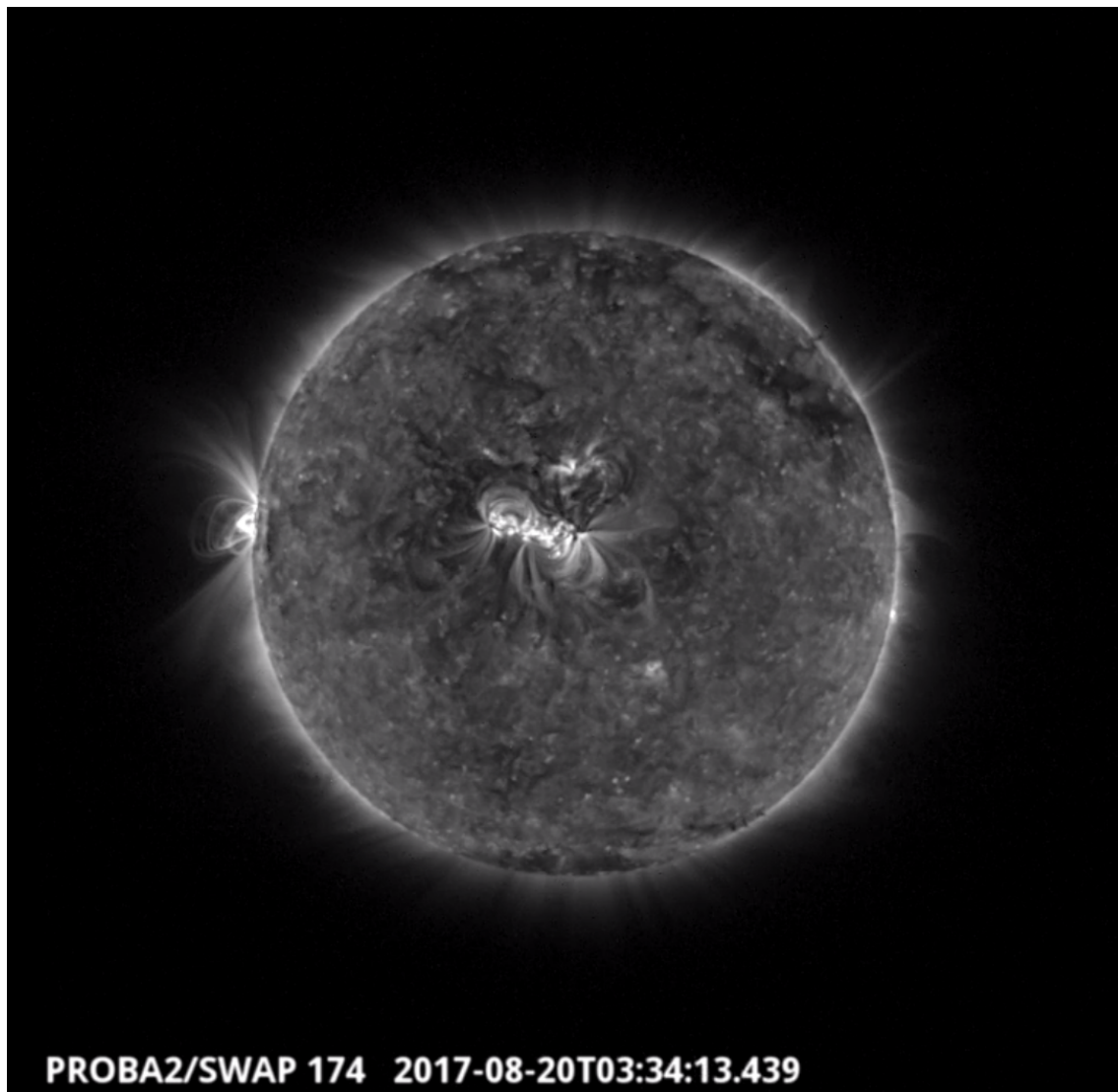


NOAA active region 2671 produced multiple c-class flares over the week. The largest flare it produced was a C7.0 flare, which occurred on 2017-Aug-19, and is shown in the centre of the solar disk in the SWAP image above at 21:51 UT.

Find a movie of the event here (SWAP movie):

[http://proba2.oma.be/swap/movies/20170819\\_swap\\_movie.mp4](http://proba2.oma.be/swap/movies/20170819_swap_movie.mp4)

**Sunday Aug 20**



The largest flare of the week was an M-class (M1.1) flare on 2017-Aug-20 from NOAA AR 2672, shown on the eastern limb of the Sun in the SWAP image above at 03:34 UT.

Find a movie of the event here (SWAP movie):

[http://proba2.oma.be/swap/movies/20170820\\_swap\\_movie.mp4](http://proba2.oma.be/swap/movies/20170820_swap_movie.mp4)

## **4. Review of solar and geomagnetic activity**

### **SOLAR ACTIVITY**

The week started with NOAA AR 2671 rotating into view and producing numerous C-class flares. The region grew in size and complexity (evolved into beta gamma delta configuration by August 17, and went back to beta gamma on the day after), but did not produce any flare between 16 and 18 August. On August 18, NOAA AR 2672 (beta magnetic field configuration) started to produce C-class flares as it rotated into view. On August 20 it produced an M1.1 flare peaking at 01:52 UT, this was the strongest flare of the week.

No Earth-directed CMEs were observed.

## GEOMAGNETIC ACTIVITY

Geomagnetic conditions were quiet until August 17 when the fast speed stream from a positive polarity coronal hole (in the northern hemisphere) arrived to the Earth and produced K up to 4 locally at Dourbes, whereas at planetary levels Kp reached 5. The speed reached 780 km/s with interplanetary magnetic field magnitudes up to 13 nT. The disturbed geomagnetic conditions lasted until the end of the week.

## 5. Space Weather Briefing

The Monday Space Weather Briefing presented by the forecaster on duty from Aug 14 to 20. It reflects in images and graphs what is written in the Solar and Geomagnetic Activity report.



The movie icons refer to the following links:

movie 1: [http://www.stce.be/movies/20170821\\_hmi.mp4](http://www.stce.be/movies/20170821_hmi.mp4)

movie 2: [http://www.stce.be/movies/20170821\\_CME-Aug16.mp4](http://www.stce.be/movies/20170821_CME-Aug16.mp4)

movie 3: [http://www.stce.be/movies/20170821\\_CME-Aug18.mp4](http://www.stce.be/movies/20170821_CME-Aug18.mp4)

## 6. Noticeable Solar Events (14 Aug 2017 - 20 Aug 2017)

DAY	BEGIN	MAX	END	LOC	XRAY	OP	10CM	TYPE	Cat	NOAA
20	0136	0152	0203		M1.1					2672

LOC: approximate heliographic location

XRAY: X-ray flare class

OP: optical flare class

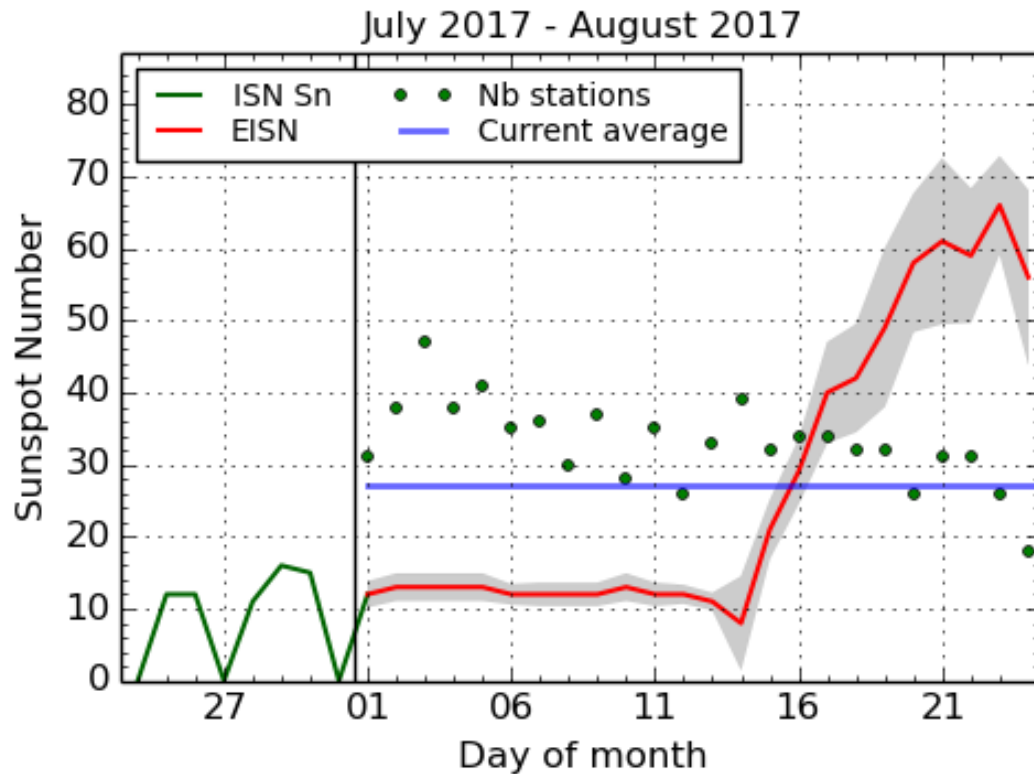
TYPE: radio burst type

Cat: Catania sunspot group number

NOAA: NOAA active region number

10CM: peak 10 cm radio flux

## 7. The International Sunspot Number (14 Aug 2017 - 20 Aug 2017)

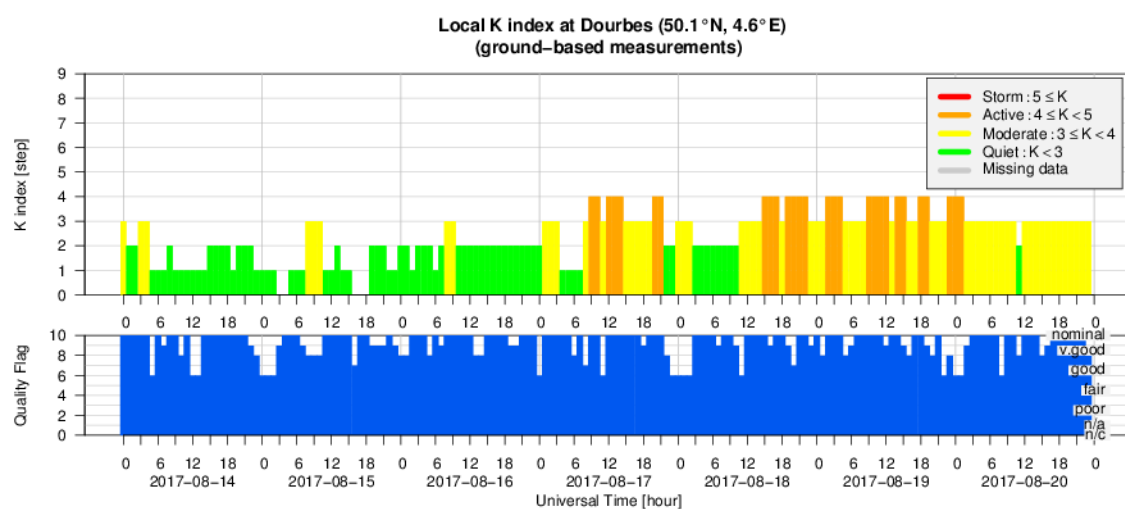


SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium, 2017 August 24

The daily Estimated International Sunspot Number (EISN, red curve with shaded error) derived by a simplified method from real-time data from the worldwide SILSO network. It extends the official Sunspot Number from the full processing of the preceding month (green line). The plot shows the last 30 days (about one solar rotation). The horizontal blue line shows the current monthly average, while the green dots give the number of stations included in the calculation of the EISN for each day.

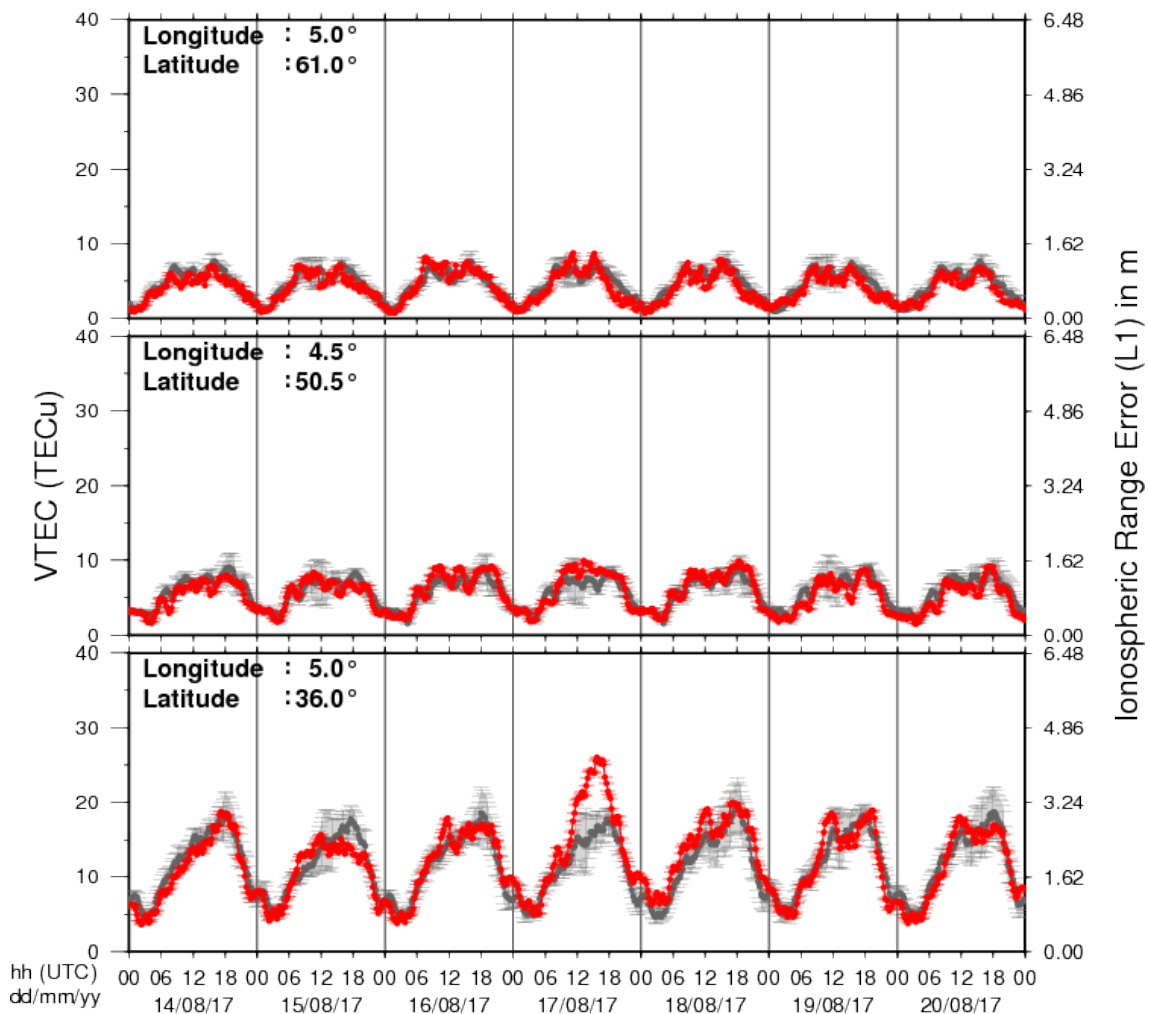


## 8. Geomagnetic Observations at Dourbes (14 Aug 2017 - 20 Aug 2017)



## 9. Review of ionospheric activity (14 Aug 2017 - 20 Aug 2017)

### VTEC Time Series



The figure shows the time evolution of the Vertical Total Electron Content (VTEC) (in red) during the last week at three locations:

- a) in the northern part of Europe (N61°, 5°E)
- b) above Brussels (N50.5°, 4.5°E)
- c) in the southern part of Europe (N36°, 5°E)

This figure also shows (in grey) the normal ionospheric behaviour expected based on the median VTEC from the 15 previous days.

The VTEC is expressed in TECu (with  $\text{TECu} = 10^{16}$  electrons per square meter) and is directly related to the signal propagation delay due to the ionosphere (in figure: delay on GPS L1 frequency).

The Sun's radiation ionizes the Earth's upper atmosphere, the ionosphere, located from about 60km to 1000km above the Earth's surface. The ionization process in the ionosphere produces ions and free electrons. These electrons perturb the propagation of the GNSS (Global Navigation Satellite System) signals by inducing a so-called ionospheric delay.

See [http://stce.be/newsletter/GNSS\\_final.pdf](http://stce.be/newsletter/GNSS_final.pdf) for some more explanations ; for detailed information, see [http://gnss.be/ionosphere\\_tutorial.php](http://gnss.be/ionosphere_tutorial.php)

## 10. Future Events

For more details, see <http://www.spaceweather.eu/en/event/future>

### 2017 Joint IAPSO-IAMAS-IGA Assembly in Cape Town, South Africa

Start : 2017-08-27 - End : 2017-09-01

The Joint IAPSO-IAMAS-IGA Assembly, endorsed by the University of Cape Town and the South African Department of Science and Technology, will take place from 27 August to 1 September 2017 at the Cape Town International Convention Centre (CTICC). Several IGA and IAMAS sessions are of Space Weather interests as well as the joint session 'Space Weather throughout the Solar System: Bringing Data and Models together'.

Website:

<http://iapso-iamas-iga2017.com/index.php>

### Workshops on Radiation Monitoring for the International Space Station in Torino, Italy

Start : 2017-09-05 - End : 2017-09-07

The Workshop on Radiation Monitoring for the International Space Station is an annual meeting to discuss the scientific definition of an adequate radiation monitoring package and its use by the scientific community on the ISS. Types of instruments and research topics need to be defined in order to optimise the radiation safety of the ISS crew.

Website: <http://wrmiss.org/>

### International Workshop on Solar, Heliospheric & Magnetospheric Radioastronomy in Meudon, France

Start : 2017-11-06 - End : 2017-11-10

Jean-Louis Steinberg has been one of the major pioneers in radioastronomy. Co-founder of the Nançay Observatory, he has actively participated to, and inspired a large number of radio instruments on many international space missions. Jean-Louis Steinberg is the founder of the Space Radioastronomy laboratory of the Paris Observatory in 1963. Later on, this laboratory widened its science interests and became the DESPA (1971) and then the current LESIA (2002) which is one of the major space sciences laboratories in France. The aim of this workshop is to cover the science topics which Jean-Louis Steinberg has promoted during his career, focusing on Solar, Heliospheric & Magnetospheric radioastronomy & physics. This will be done by covering both observations from either ground facilities (NDA, RH, LOFAR, Artemis etc ...) or space missions (ISSEE, Ulysses, WIND, CLUSTER, STEREO, CASSINI, JUNO etc ...) and models/theories. A series of invited talks is also foreseen to cover the new developments in the discipline which may come with the future facilities such as Solar Orbiter, Solar Probe Plus, JUICE, JUNO, LOFAR+, SKA etc ....

This workshop will also be the opportunity to remember both the extraordinary personal & professional lives of Jean-Louis Steinberg especially for new generation of scientists. At the occasion of this workshop it is also expected that the Building 16 (historical Space Sciences building) on the Meudon campus will be renamed "Building Jean-Louis Steinberg".

Website:

<https://jlsworkshop.sciencesconf.org/>

### European Space Weather Week 14

Start : 2017-11-27 - End : 2017-12-01

The ESWW is the main annual event in the European Space Weather calendar. It is the European forum for Space Weather as proven by the high attendance to the past editions. The agenda will be composed

of plenary/parallel sessions, working meetings and dedicated events for service end-users. The ESWW will again adopt the central aim of bringing together the diverse groups in Europe working on different aspects of Space Weather.

Website:

<http://www.stce.be/esww14/>