

# STCE Newsletter

13 Mar 2017 - 19 Mar 2017



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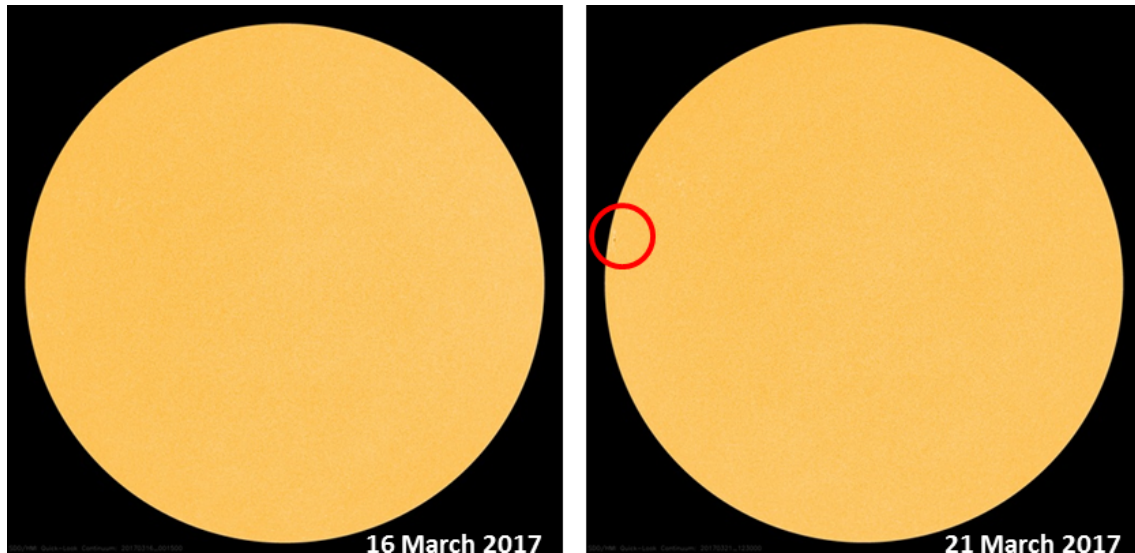
The Solar-Terrestrial Centre of Excellence (STCE) is a collaborative network of the Belgian Institute for Space Aeronomy, the Royal Observatory of Belgium and the Royal Meteorological Institute of Belgium.

| Content  | Page |
|--|------|
| 1. Sleeping Beauty   | 2    |
| 2. The hunt for fake flares  | 3    |
| 3. PROBA2 Observations (13 Mar 2017 - 19 Mar 2017)                 | 4    |
| 4. Review of solar and geomagnetic activity                        | 6    |
| 5. The International Sunspot Number                                | 8    |
| 6. Geomagnetic Observations at Dourbes (13 Mar 2017 - 19 Mar 2017) | 9    |
| 7. Review of ionospheric activity (13 Mar 2017 - 19 Mar 2017)      | 10   |
| 8. Future Events   | 11   |

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## 1. Sleeping Beauty

On 21 March, a tiny spot near the Sun's east limb marked the end of a spotless stretch that started on 6 March. That means that no sunspot had been observed for 15 consecutive days (preliminary numbers). This is the longest stretch of spotless days for the current solar cycle transit SC24-25 (see the SILSO-data at <http://sidc.oma.be/silso/eisnplot> and the plot elsewhere in this Newsletter).



To put this period somewhat in perspective, we have to go back all the way to 2008-2009 (the previous solar cycle minimum) to find spotless periods of comparable duration. The table underneath provides a list with the \*most recent\* stretches of a specific number of spotless days (for 15 days and more; column "Period ISN=0"). There have been of course many more such periods in the past decades (except for 29 days). The previous solar cycle minimum was long and deep, as can be judged from the numerous SC24 entries in the table. Nonetheless, the 6-20 March 2017 spotless stretch wiped off the 21 May-4 June 2008 period from the table.

| Period<br>ISN=0 | Begin       | End         | Solar<br>Cycle |
|-----------------|-------------|-------------|----------------|
| 15              | 6-Mar-2017  | 20-Mar-2017 | 25             |
| 16              | 23-Nov-2009 | 8-Dec-2009  | 24             |
| 17              | 12-Sep-1986 | 28-Sep-1986 | 22             |
| 18              | 8-Mar-2009  | 25-Mar-2009 | 24             |
| 19              | 2-Sep-2009  | 20-Sep-2009 | 24             |
| 20              | 5-Feb-2008  | 24-Feb-2008 | 24             |
| 21              | 23-Dec-1985 | 12-Jan-1986 | 22             |
| 22              | 20-Jan-2009 | 10-Feb-2009 | 24             |
| 23              | 10-Jan-1914 | 1-Feb-1914  | 15             |
| 24              | 8-Jul-1976  | 31-Jul-1976 | 21             |
| 25              | 23-Jun-2008 | 17-Jul-2008 | 24             |
| 26              | 10-Sep-1913 | 5-Oct-1913  | 15             |
| 27              | 13-Dec-2008 | 8-Jan-2009  | 24             |
| 28              | 9-Oct-2007  | 5-Nov-2007  | 24             |
| 30              | 3-Jun-1954  | 2-Jul-1954  | 19             |
| 31              | 21-Jul-2008 | 20-Aug-2008 | 24             |
| 32              | 31-Jul-2009 | 31-Aug-2009 | 24             |

With the solar cycle minimum just starting, many more and much longer spotless periods can be expected. A table with all the spotless periods of 30 or more consecutive days (since 1849) can be found at the dedicated SILSO's Spotless Days page at <http://sidc.oma.be/silso/spotless> The next update of this page is scheduled for early April.

## 2. The hunt for fake flares

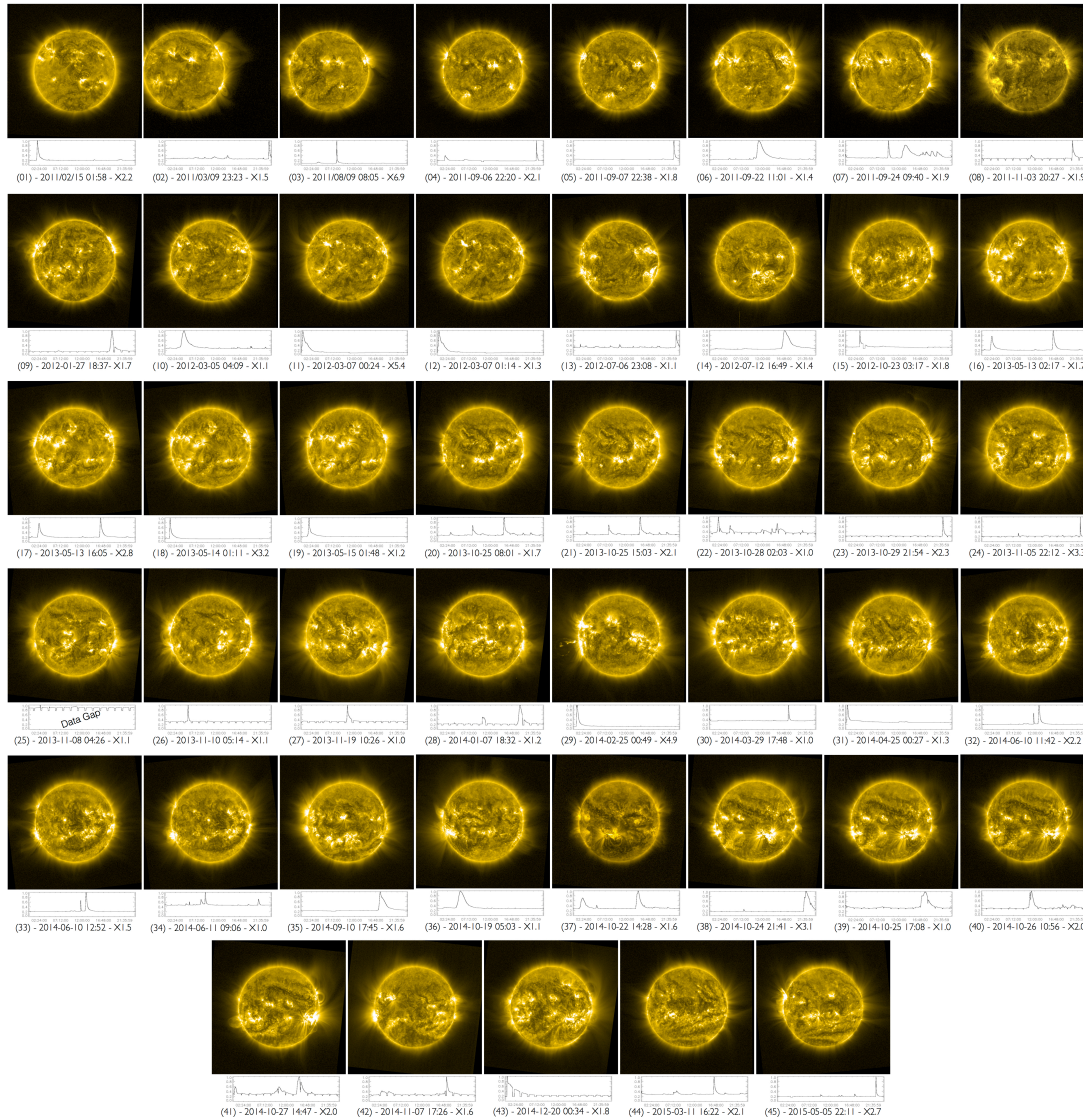
After our ghostbusters action, our people revealed themselves also as excellent hunters ... of false flares. Flares are bursts of solar light and are categorised by how strong they shine in X-rays. American satellites GOES monitor 24/7 the solar X-rays. Based on their measurements, a list of solar flares is put together.

We have an instrument LYRA onboard the ESA micro-satellite PROBA2 that makes similar measurements, only it detects flares with a slightly other energy. Ingolf Dammasch, our LYRA expert, noted that in the GOES list flares were mentioned which did not appear in LYRA observations. Even if LYRA measures slightly different energies than GOES, the observations should give more or less the same result.

Indeed, the automated detection system picked up false flares from the noisy GOES data. Large flares were still identified correctly, the small ones fooled the processing code but not us. So we alarmed the GOES operators.

Ingolf Dammasch is now officially recordholder of catching non-existing flares. A good catch!

Below, find an overview image of the 45 most eXtreme flares that PROBA2 could catch since November 2009 when it took off to space.



<http://www.stce.be/news/370/welcome.html>

### 3. PROBA2 Observations (13 Mar 2017 - 19 Mar 2017)

#### Solar Activity

Solar flare activity fluctuated between low to very low 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 364).

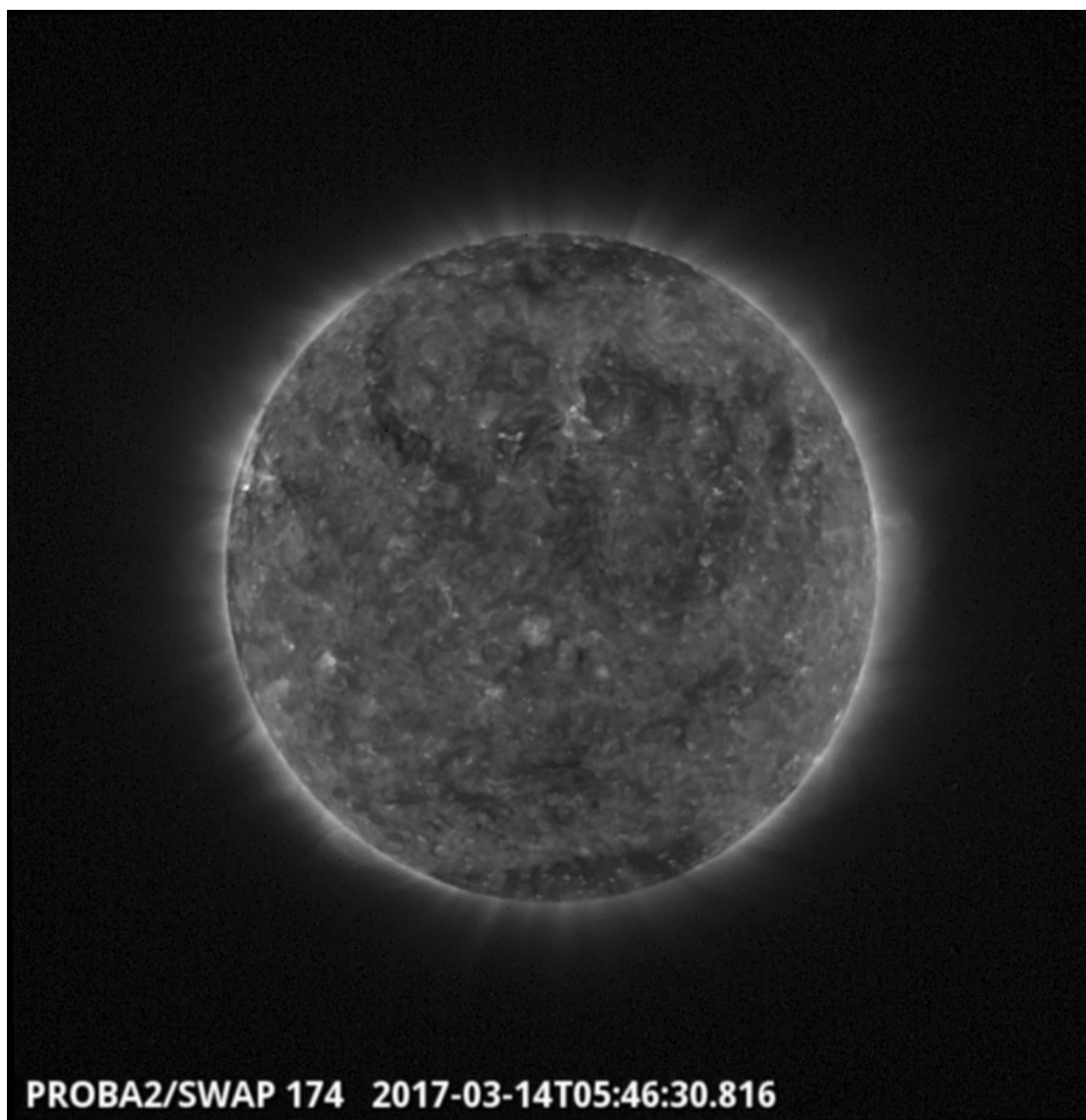
[http://proba2.oma.be/swap/data/mpg/movies/weekly\\_movies/weekly\\_movie\\_2017\\_03\\_13.mp4](http://proba2.oma.be/swap/data/mpg/movies/weekly_movies/weekly_movie_2017_03_13.mp4)

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/>

### **Thursday March 14**

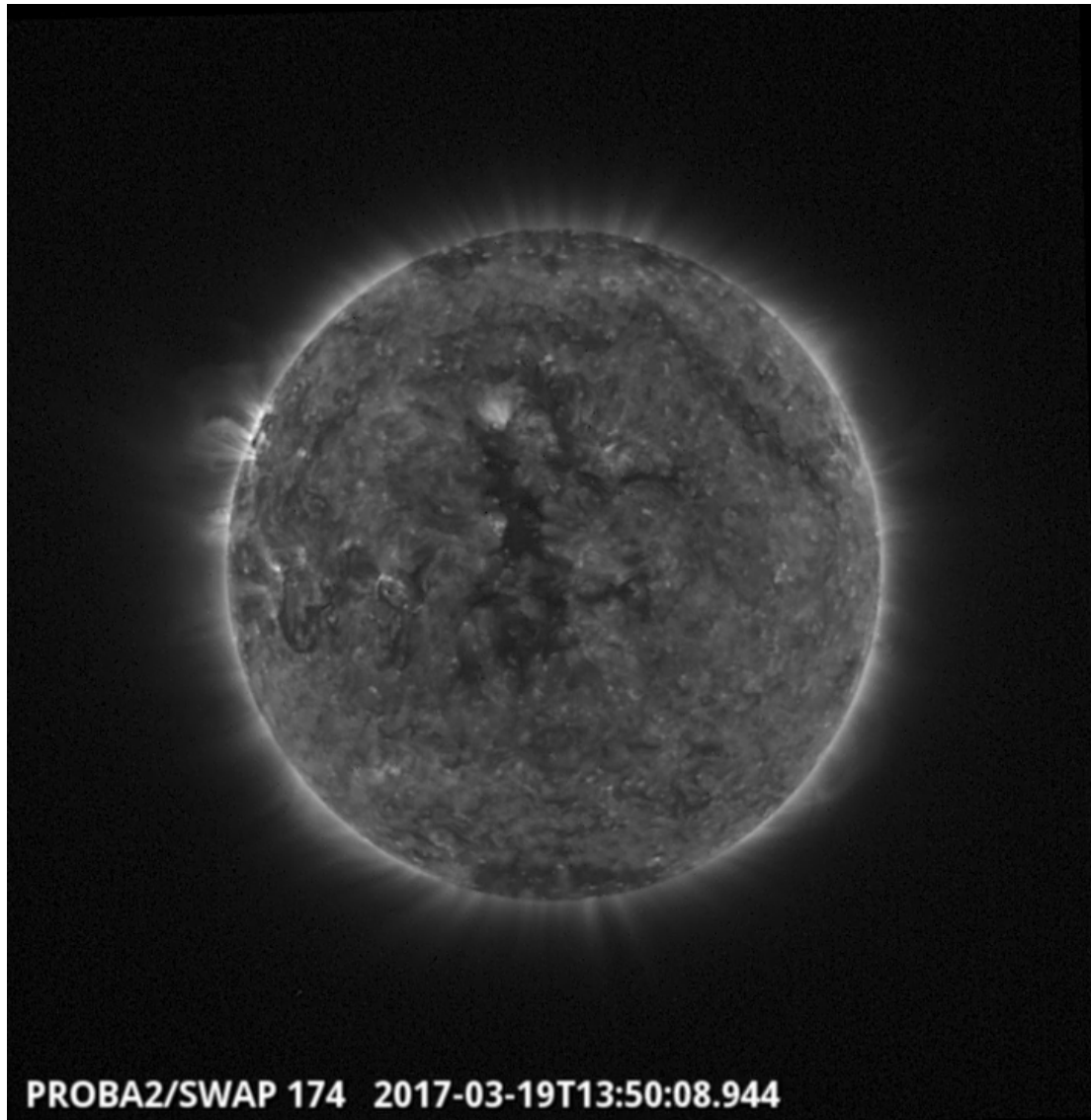


The largest flare of the week was a B2.5, peaking at 05:46 UT on the East Limb.

Find a movie of the event here (SWAP movie)

[http://proba2.oma.be/swap/data/mpg/movies/20170314\\_swap\\_movie.mp4](http://proba2.oma.be/swap/data/mpg/movies/20170314_swap_movie.mp4)

**Sunday March 19**



A large coronal hole passed over the solar disk, on 2013-Mar-19 it was located near the disk centre  
Find a movie of the event here (SWAP movie)  
[http://proba2.oma.be/swap/data/mpg/movies/20170319\\_swap\\_movie.mp4](http://proba2.oma.be/swap/data/mpg/movies/20170319_swap_movie.mp4)

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

### **SOLAR ACTIVITY**

Solar activity was very low. No significant flares have been recorded. No Earth directed Coronal Mass Ejections (CMEs) have been detected. A partial halo CME was visible in SoHO/LASCO C2 images from 20:00 UT onwards on March 13. The ejection was mostly directed towards the North West and had an angular extent of approximately 180 degrees. The event was believed to be back-sided and therefore not influence the Earth.

## GEOMAGNETIC ACTIVITY

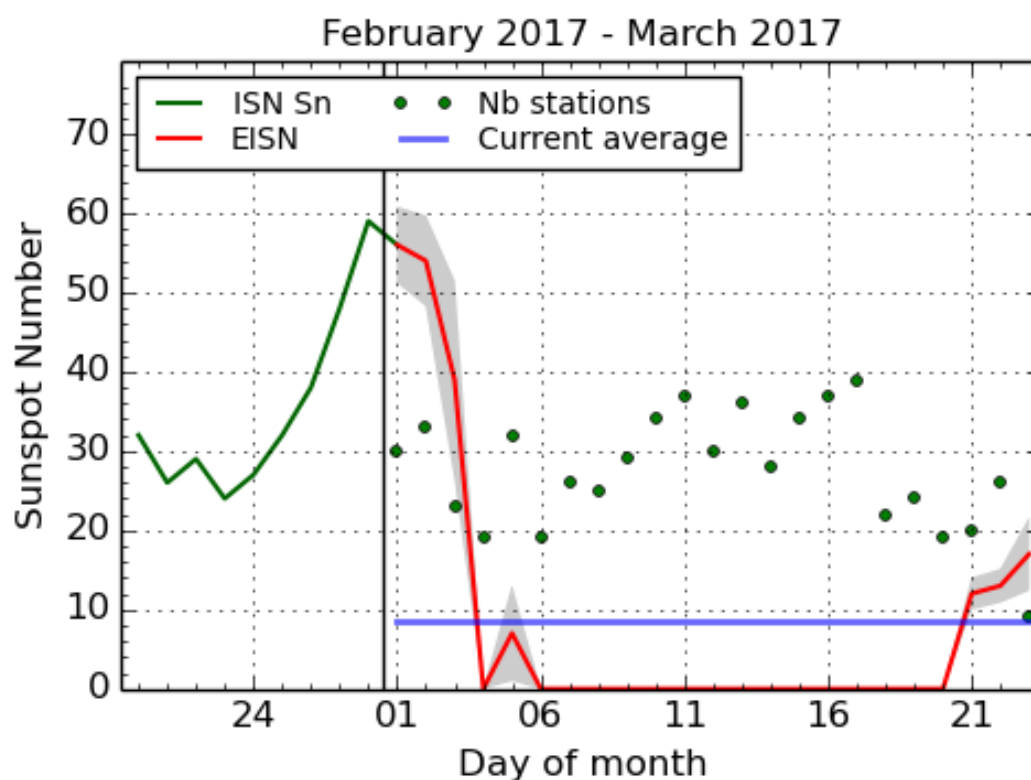
The solar wind speed has fluctuated between 340 and 430 km/s over the past week. The total magnetic field strength has fluctuated between 1 and 10 nT peaking on 15-Mar-2017. The Bz component fluctuated between -5 and +7 nT. Geomagnetic conditions ranged between Kp index 0-4 (NOAA) and local K index 0-3 (Dourbes) over the past week.

Check the space weather briefing from the SIDC, <http://www.sidc.be>

M. J. WEST ☀ 13 MARCH - 19 MARCH 2017

# WEEKLY FORECASTING BRIEFING

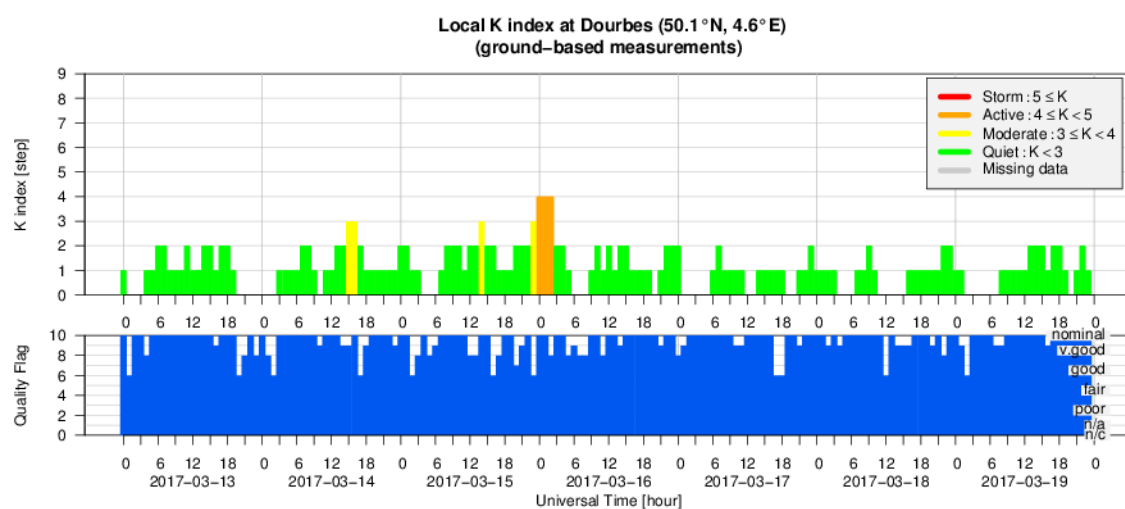
## 5. The International Sunspot Number



SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium, 2017 March 23

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.

## 6. Geomagnetic Observations at Dourbes (13 Mar 2017 - 19 Mar 2017)





## VTEC Time Series



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)

## **8. Future Events**

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

### **International CCMC-LWS Workshop in Cape Canaveral, Florida (USA)**

Start : 2017-04-03 - End : 2017-04-07

The goal of this working meeting is to address the need to quantify and to track progress over time in the field of space weather and to establish internationally recognized metrics that are meaningful to end-users and developers. Defining a set of appropriate metrics is important to track advancements in space weather understanding and predictive capabilities.

This meeting is a part of the unfolding activities of the International Forum for Space Weather Capabilities Assessment that brings together space environment experts, model and application developers, data providers, forecasters and end-users. The goals of this community-wide forum include addressing challenges in model-data comparisons and evaluating the current state of space environment predictive capabilities. Workshop attendance is encouraged but is not a requirement for joining forum teams.

Website:

[http://ccmc.gsfc.nasa.gov/CCMC-LWS\\_Meeting/](http://ccmc.gsfc.nasa.gov/CCMC-LWS_Meeting/)

### **Solar Orbiter Workshop 7: Exploring the solar environs in Granada, Spain**

Start : 2017-04-03 - End : 2017-04-06

This event will be hosted by the Instituto de Astrofisica de Andalucia - CSIC. Please mind that on April 7th the 20th SWT meeting will take place at the same venue.

Website: Unknown

### **URSI General Assembly in Montreal, Canada**

Start : 2017-08-19 - End : 2017-08-26

For the thirty-second time since the inception of URSI, Radio Scientists from across the world will get together for the URSI General Assembly and Scientific Symposium. This triennial gathering will take place from 19th to 26th of August 2017, in Montreal, Canada. This conference is a unique opportunity to learn about recent advances in all fields of Radio Science, as covered by all ten URSI Commissions.

Among the different sessions, please note:

\* 'Radio Science for Space Weather' Conveners: M. Messerotti, V. Pierrard

\* 'Remote Sensing and Modeling of the Earth's Plasmasphere and Plasmopause' Conveners: A. M. Jorgensen, V. Pierrard, B. Heilig

The abstract deadline is 30 January 2017

Website: <http://www.ursi2017.org>

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

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

The Joint IAPSO-IAMAS-IAGA 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 IAGA 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-iaga2017.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/>

## **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/>