

STCE Newsletter

29 May 2017 - 4 Jun 2017



Published by the STCE - this issue : 9 Jun 2017. Available online at <http://www.stce.be/newsletter/>.

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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1. The STCE annual meeting: an impression

The Solar-Terrestrial Centre of Excellence annual meeting is a coming together of people working at the plateau to discover new things.

This year we highlighted an international observation campaign that was intended to squeeze the last drop out of SUMER, an instrument onboard of the 21 years old (!) space weather satellite SOHO. The STCE contributed to this campaign. With the 'lucky imaging' trick applied to our ground based telescopes, we got an amazing view of the solar surface.

And, hot of the press: the Extreme Ultraviolet Imager (EUI) is ready to be mounted on the Solar Orbiter satellite! An interesting story that started 10 years ago.

We presented also the 2017 Dark and Dusty tour through the catacomben of the plateau revealing secret science that you never could think of.

An impression of the annual meeting:



P.S. The presentations will be made available soon.

2. PROBA2 Observations (29 May 2017 - 4 Jun 2017)

Solar Activity

Solar flare activity fluctuated between very low and 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 375):

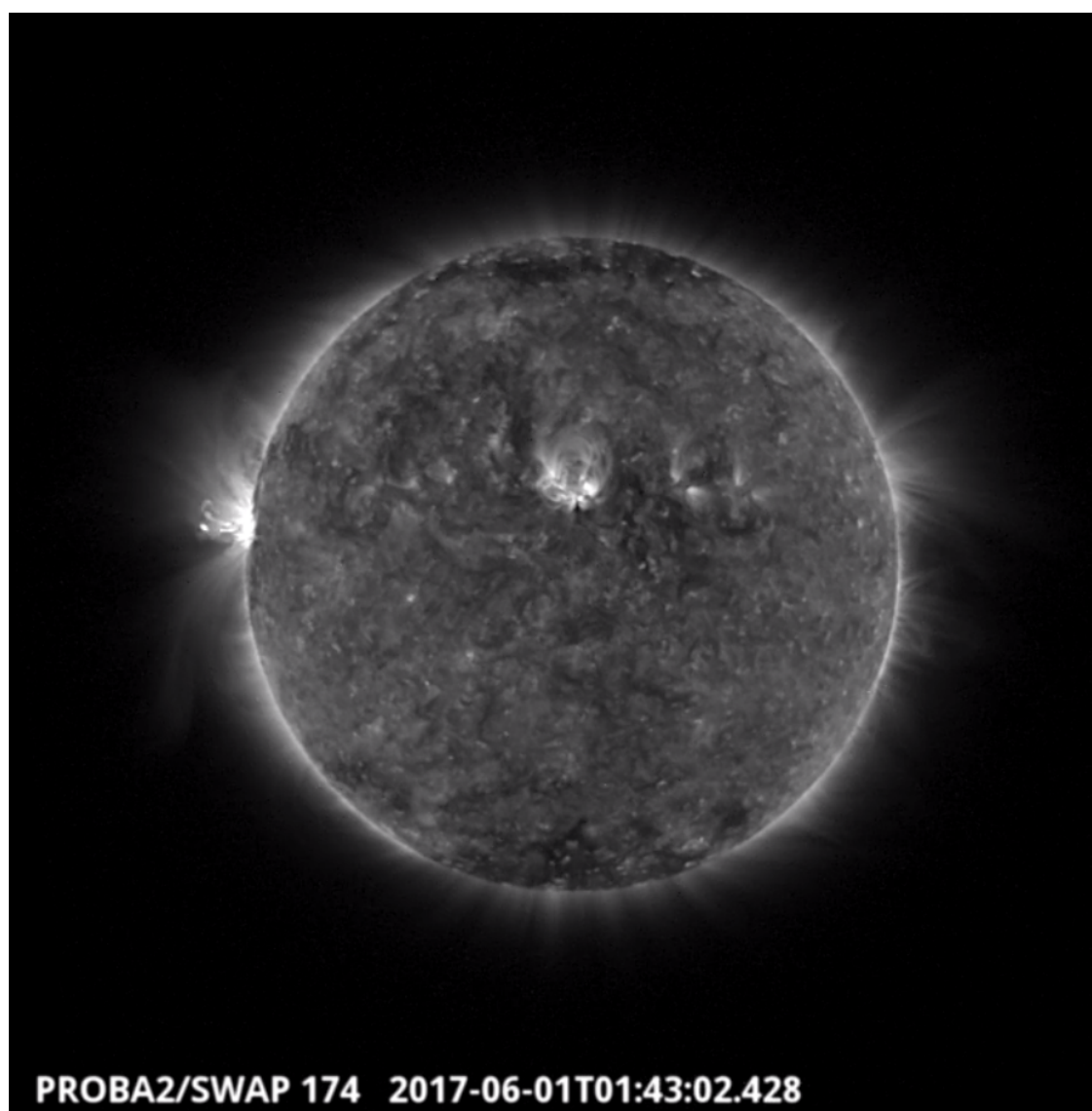
http://proba2.oma.be/swap/data/mpg/movies/weekly_movies/weekly_movie_2017_05_29.mp4

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 Jun 01

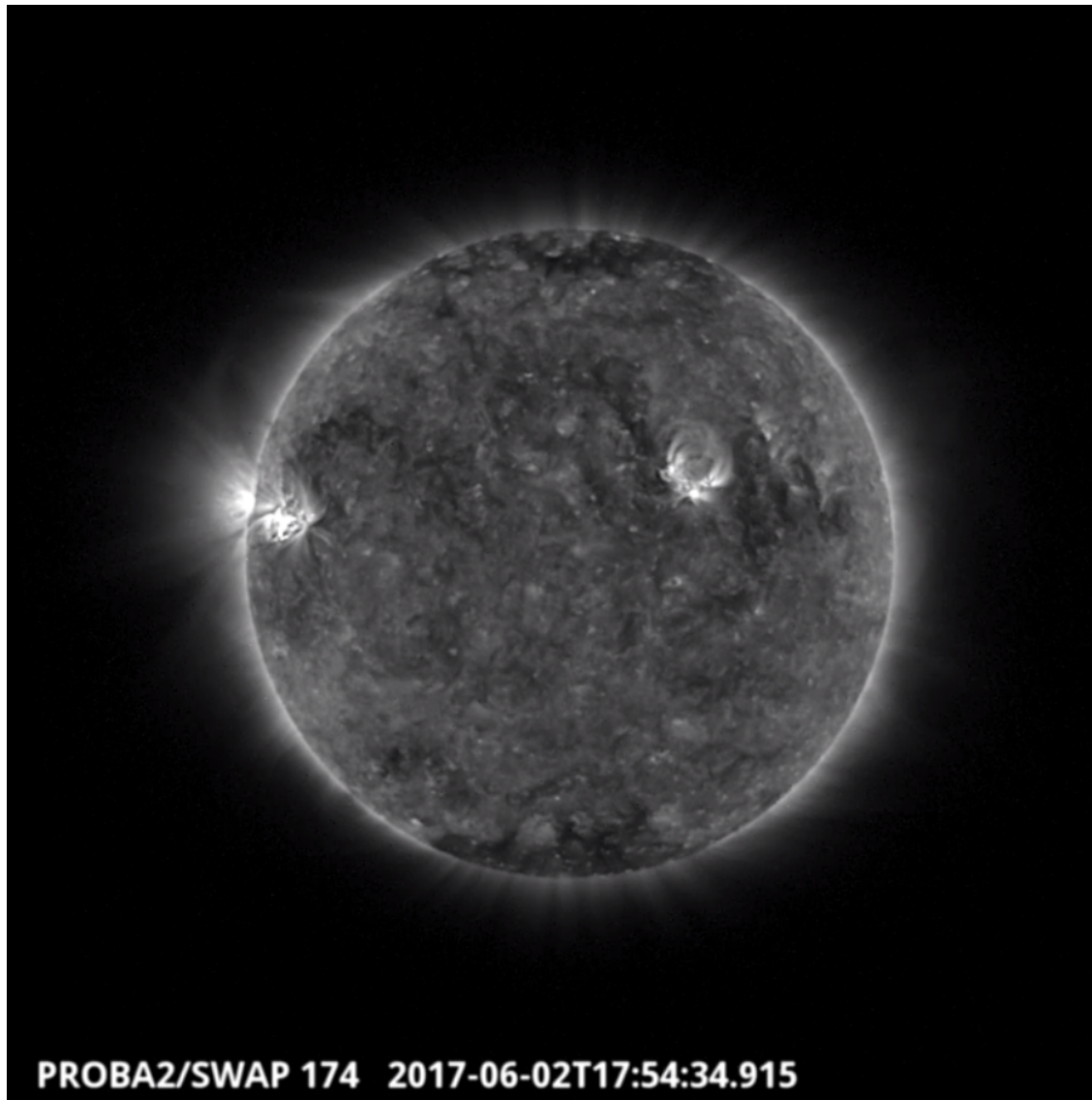


On 2017-Jun-01 NOAA active region 2661 produced multiple c-class flares. A C6.6 flare which corresponded with an eruption is shown on the west limb of the Sun at 01:43 UT in the SWAP image above.

Find a movie of the day's flaring events here (SWAP movie):

http://proba2.oma.be/swap/data/mpg/movies/20170601_swap_movie.mp4

Friday Jun 02



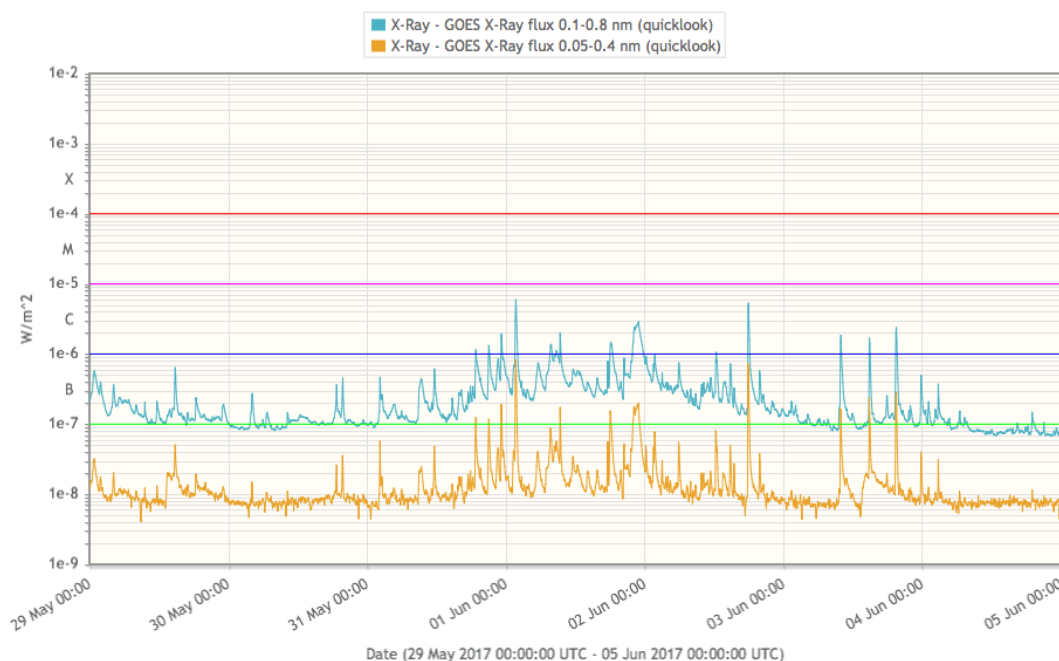
The largest flare of the week (C8.0) occurred on 2017-Jun-02 in the western hemisphere of the Sun, also from NOAA active region 2661, and is shown in the SWAP image above at 17:54 UT.

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

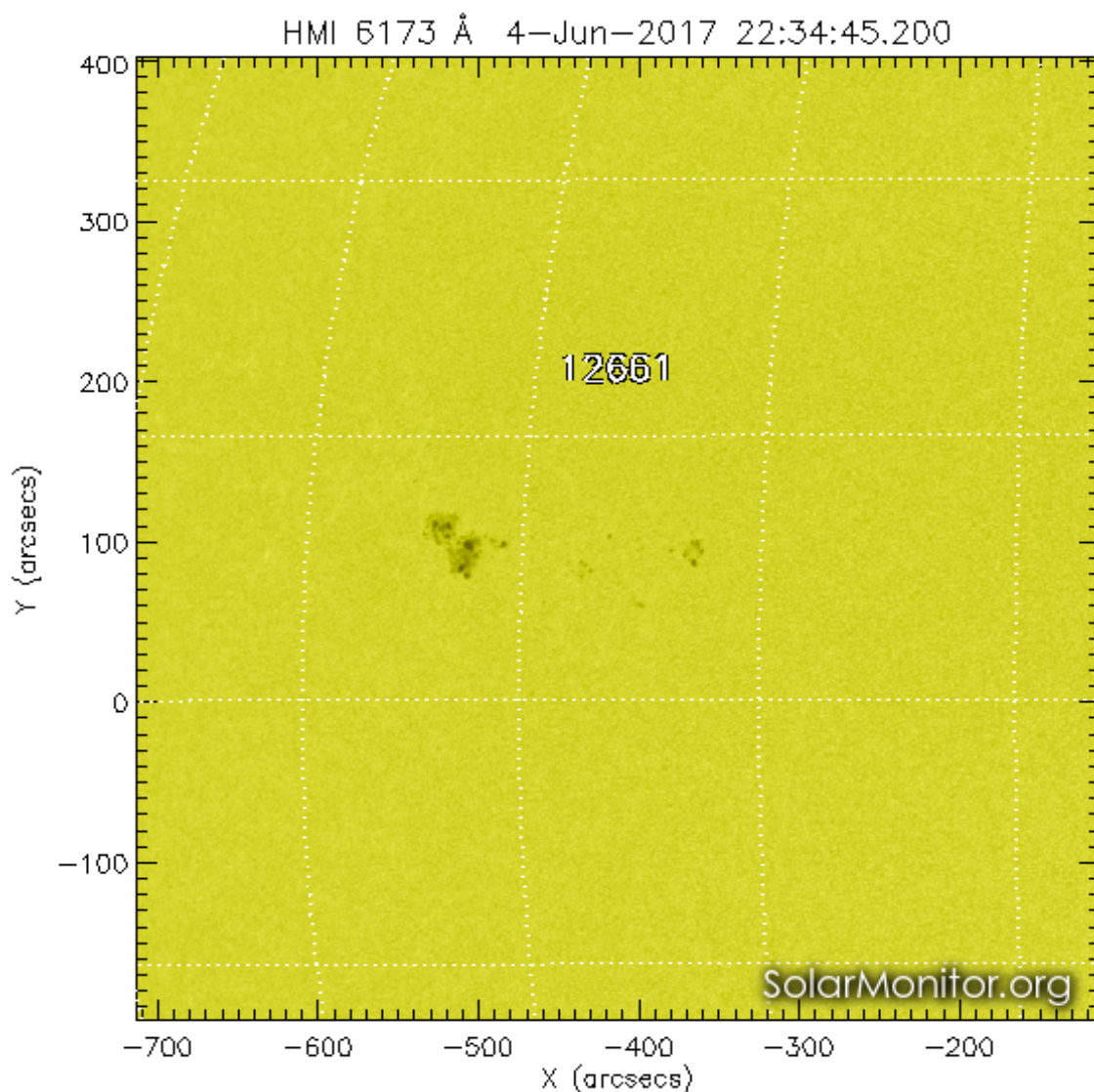
http://proba2.oma.be/swap/data/mpg/movies/20170602_swap_movie.mp4

3. Review of solar and geomagnetic activity (29 May 2017 - 4 Jun 2017)

SOLAR ACTIVITY



Solar activity was initially very low, with NOAA AR 2659, rotating off the visible side of the disk at the start of the week. A new region NOAA AR 2661 then rotated on the disk while producing several C flares over the rest of the week but becoming more quiet towards the end of the week.



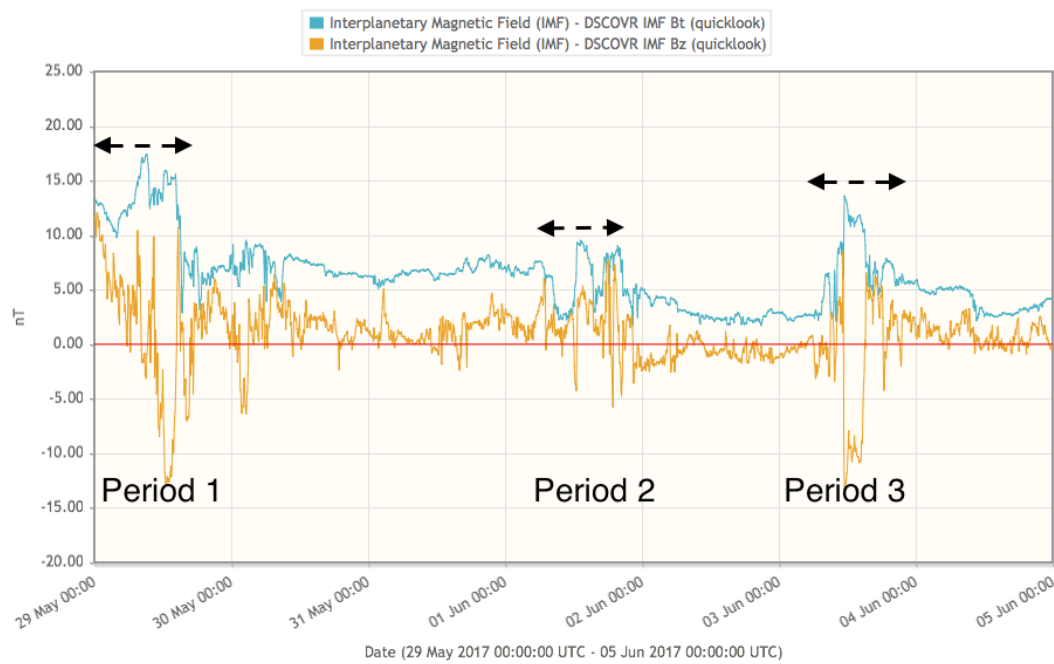
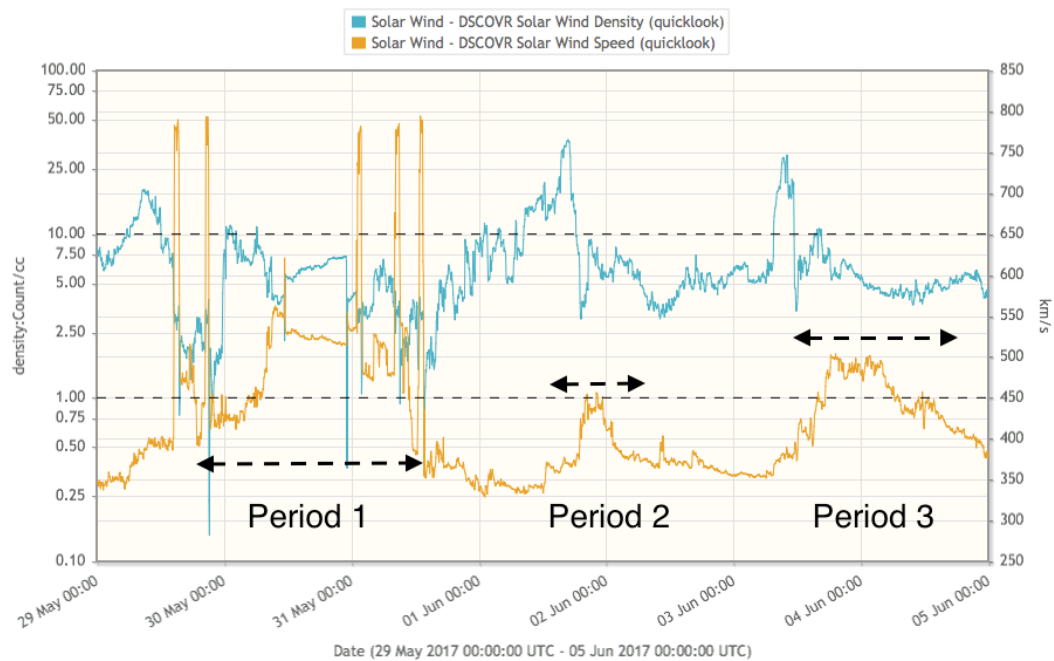
The sunspot associated with the AR 2661 seen by SDO/HMI

Several of the C flares were associated with small CMEs of limited angular width, none of which had any influence on Earth.

Proton flux levels were at background values throughout the week.

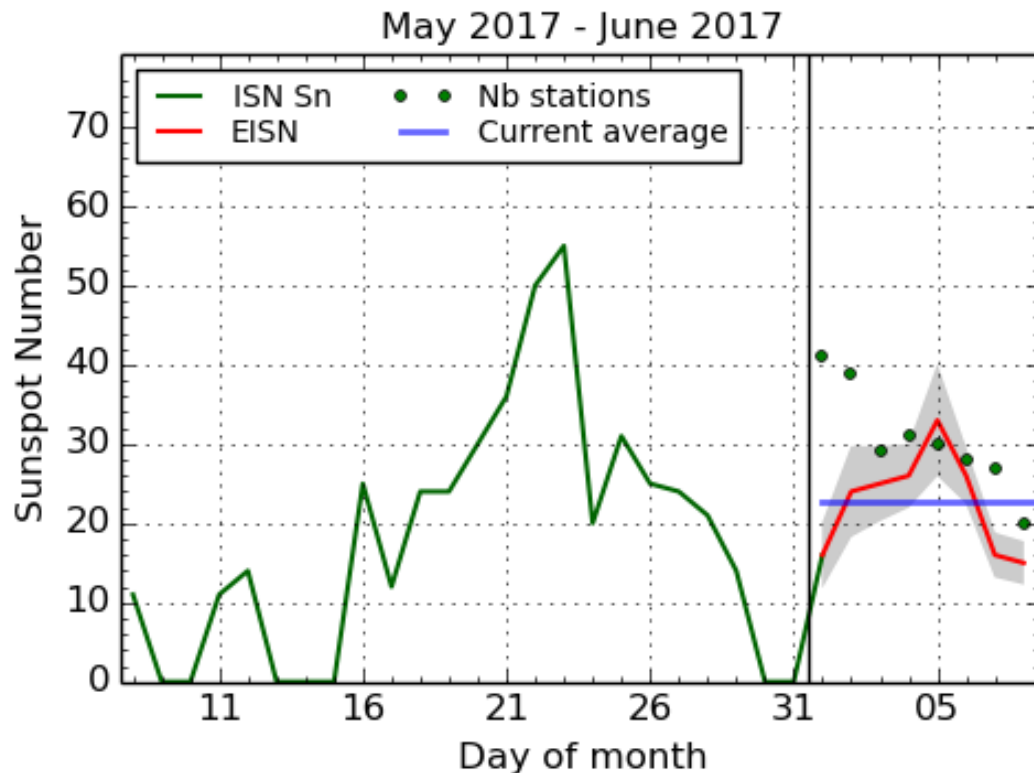
GEOMAGNETIC ACTIVITY

The week started in the wake of the arrival of the May 23 CME, with elevated magnetic field values (17nT) but nominal Solar wind speed. The rest of the week saw the passage of 3 periods of elevated solar wind speed. The first reaching speeds of 560 km/s, the later ones being restricted to peaks of 470 km/s and 500 km/s. All three were related to vaguely defined equatorial coronal holes of limited extent. All three periods also showed an increase of the magnetic field magnitude ahead of the solar wind speed increase, which caused some periods of active geomagnetic conditions.



Otherwise, geomagnetic conditions were quiet to unsettled.

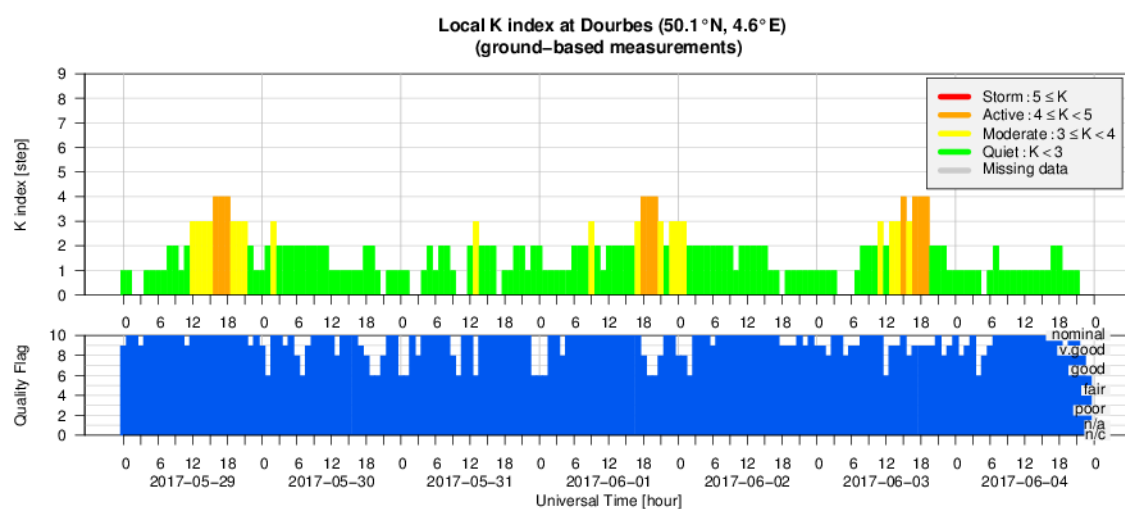
4. The International Sunspot Number



SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium, 2017 June 8

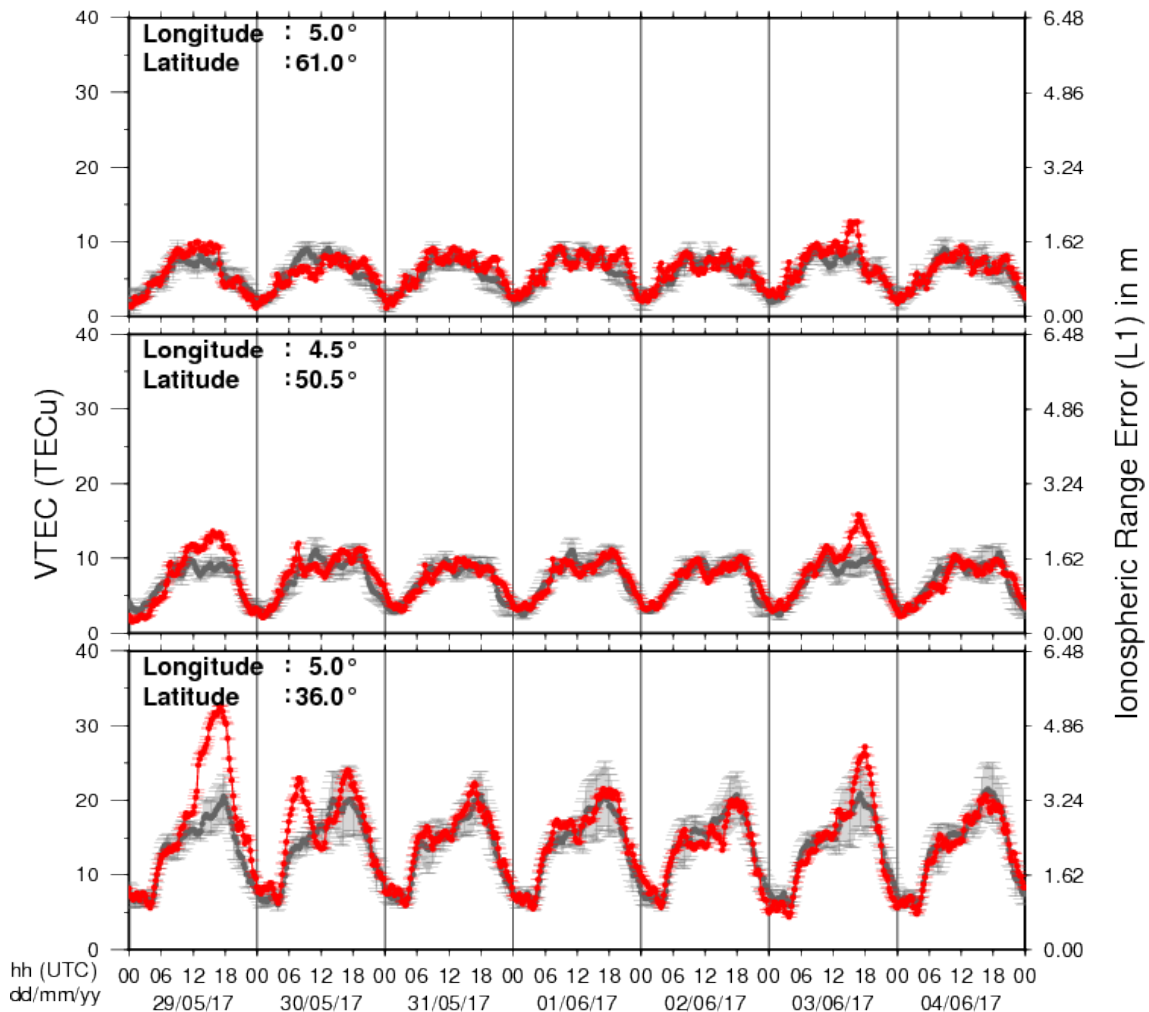
The daily Estimated International Sunspot Number (EISN, red curve with shaded error) derived by a simplified method from real-time data from the worldwide SILSO network. It extends the official Sunspot Number from the full processing of the preceding month (green line). The plot shows the last 30 days (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.

5. Geomagnetic Observations at Dourbes (29 May 2017 - 4 Jun 2017)



6. Review of ionospheric activity (29 May 2017 - 4 Jun 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 for some more explanations ; for detailed information, see http://gnss.be/ionosphere_tutorial.php

7. Future Events

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

United Nations/United States of America Workshop on the International Space Weather Initiative in Massachusetts (USA)

Start : 2017-07-31 - End : 2017-08-04

This workshop marks the 10th anniversary of the International Heliophysical Year, which led to the genesis of the International Space Weather Initiative. It is organized jointly by the Office for Outer Space Affairs, the National Aeronautics and Space Administration (NASA) and Boston College to highlight the achievements made over the past ten years and to show-case the worldwide development of science, capacity building, and outreach.

The UN Workshops on ISWI have been aimed at providing a global forum for space weather experts from developed and developing countries, including representatives of the major instrument operators and data providers. In particular the Workshop will focus on recent advances made in scientific research by utilizing ISWI instrument data in conjunction with space mission data in adding significant new knowledge on space weather phenomena near Earth and interplanetary space.

The workshop will begin with a high level international forum on the economic and societal effects of extreme space weather. This forum will include keynote speakers from major international organizations followed by a panel session to discuss issues and policies for acknowledging space weather as a global challenge.

The workshop is also held in preparation for UNISPACE+50 in 2018, the 50th anniversary of the first UN Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE), held in Vienna in 1968. The three components of the Workshop will also help develop a coherent international policy towards an appropriate response to space weather.

Website: <https://iswi2017.bc.edu/>

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/>

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/>