

STCE Newsletter

12 Jan 2015 - 18 Jan 2015



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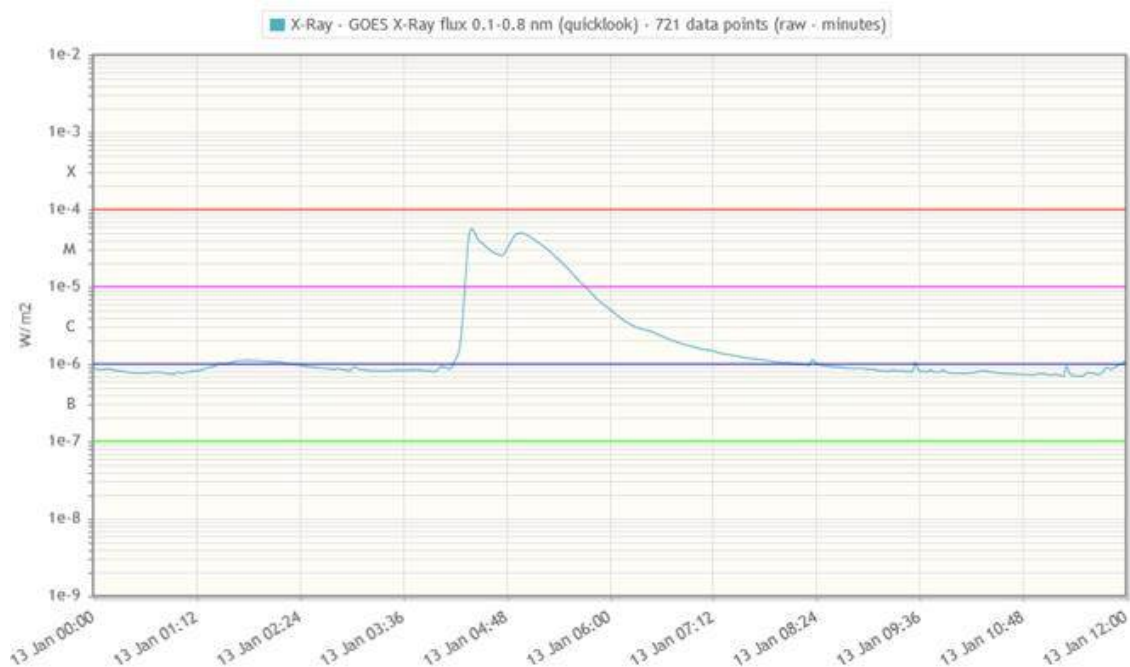
The Solar-Terrestrial Centre of Excellence (STCE) is a collaborative network of the Belgian Institute for Space Aeronomy, the Royal Observatory of Belgium and the Royal Meteorological Institute of Belgium.

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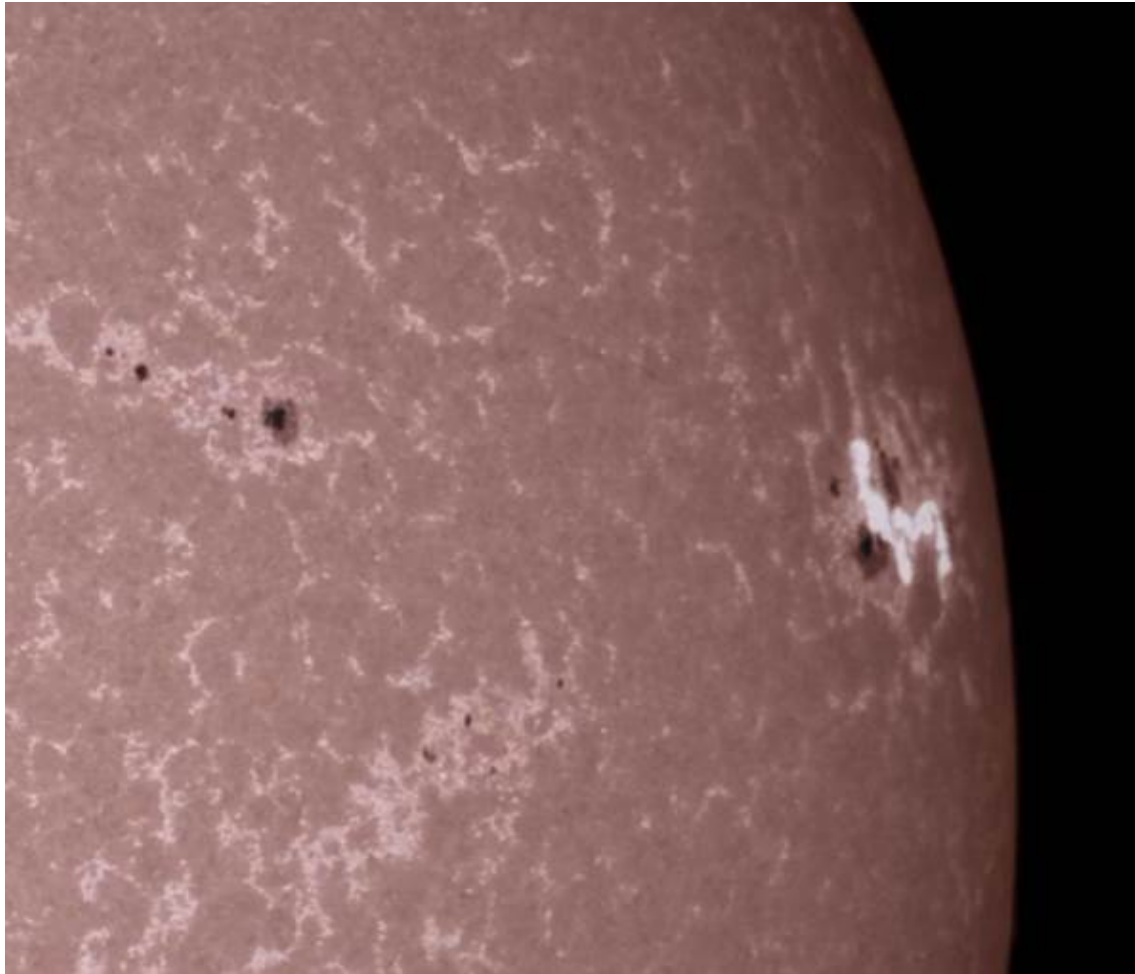
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1. Lovely curves

During the morning hours of 13 January, a rather strong M-class flare took place in active region NOAA 2257, close to the northwest limb. This sunspot group seemed deceptively simple, but harbored some opposite magnetic polarity spots close to each other. That's a configuration that often results in a flare.

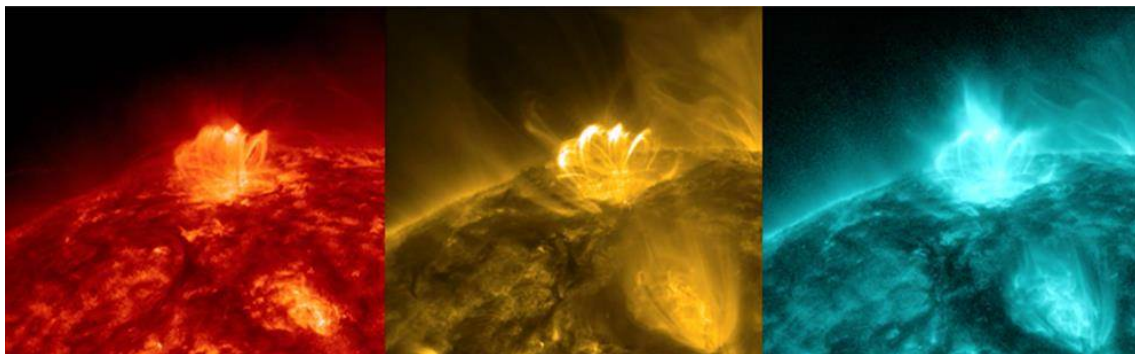


Closer examination of the GOES x-ray curve (image above) revealed that the event actually consisted of 2 M-class flares separated by only 34 minutes: An M5.6 flare peaking at 04:24UT, and an M4.9 flare peaking at 04:58UT. They both took place in the same region. Obviously, such closely time-separated M-class flares do not happen very often, but they are by no means exceptional. For example, on 22 December 2013, there were only 26 minutes between two M1 flares in NOAA 1928. And, though rare, this occasionally happens with X-class flares too, such as the X1-X6 flares on 18 August 1979 whose peaks were also separated by only 26 minutes.

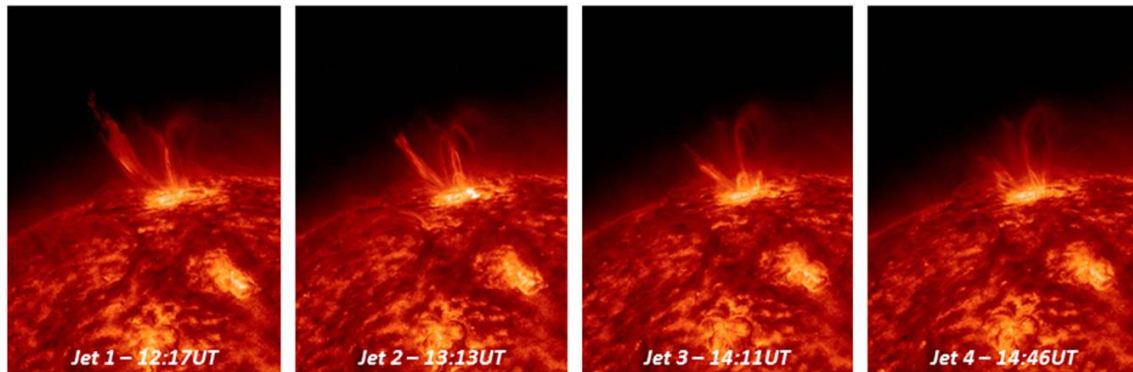


The image above combines a white light image with an SDO/AIA1700 image of the Sun's lower atmosphere. Taken at 04:22UT, it shows the location of the flare ribbons relative to the sunspots. The flare seems to have been confined, i.e. no obvious coronal mass ejection seems to have been associated with this flare.

A compact series of bright post-flare coronal loops ("arcade") quickly developed after the M-class event. The movie at <http://youtu.be/d2MuNgr3lgM> shows the loops in successively hotter temperatures as seen in SDO's filters AIA 304 (about 80.000 degrees), AIA 171 (about 700.000 degrees), and AIA 131 (several million degrees). The images underneath show the loops around 07:04UT in the three filters.



Starting after 12:00UT, some recurring jets (see images underneath) can be seen emanating from the leading portion of NOAA 2257. The jets consist of rather cold plasma (best seen in the "colder" AIA304 filter), recur about every hour, but at decreasing height and intensity. In previous, similar events, these features were thought to have their origin in a reconnection of the restructuring magnetic fields in the Sun's lower atmosphere. With NOAA 2257 so close to the solar limb, confirmation and further details require some more extensive investigation. None of these jets were associated with CMEs.



Credits: Images taken from STAFF (<http://www.staff.oma.be/>), SDO (<http://sdo.gsfc.nasa.gov/>), PROBA2 (<http://proba2.oma.be/ssa>), and Helioviewer (<http://helioviewer.org/>).

2. Workshop - SOLAR/SOLSPEC on ISS: Achievements and prospects

SOLAR/SOLSPEC is an absolute calibrated spectroradiometer measuring the Solar Spectral Irradiance (SSI) from space and is part of the SOLAR payload of the Columbus module on board of the International Space Station (ISS). The SOLAR mission is ongoing since 2008.

The consortium organises a workshop 'Six years of SOLAR/SOLSPEC mission on ISS, Achievements and Prospects' from March 10 to 12, 2015.



Topics:

* The SOLAR/SOLSPEC design typical for a long-term mission, the pre-flight radiometric characterization and absolute calibration and the in-flight performances since 2008.

* Comparison with other instruments and models of the UV, VIS and IR science data.

* Time-resolved SSI data in Chemistry-Climate Models.

* A strategy for the next years and how to handle the demands from the science community: SOLAR/ SOLSPEC – SORCE comparisons, stratospheric ozone modelling, delivery of reference spectra.

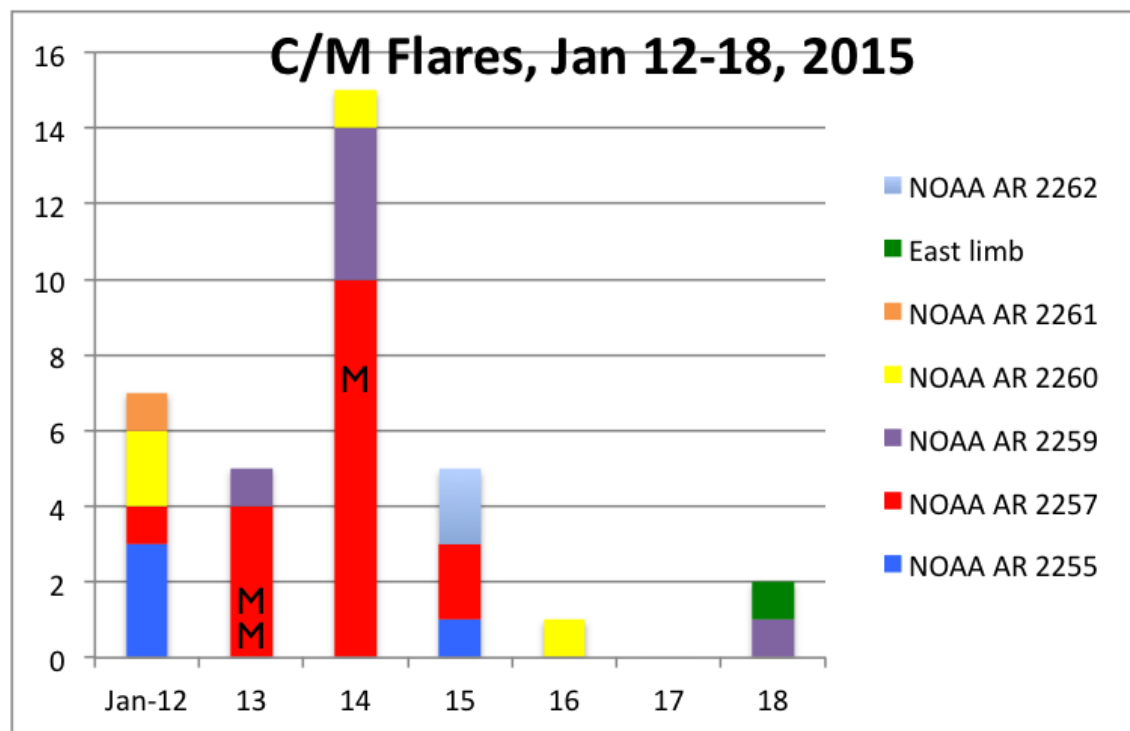
Check

<http://www.stce.be/solspecworkshop2015/>

3. Review of solar and geomagnetic activity

Solar Activity

Solar activity at the beginning of the week was dominated by NOAA AR 2257 (beta-gamma-delta magnetic configuration) that produced three M-class flares: M5.6 at 04:24 UT, M4.9 at 04:58 UT on January 13 and M2.2 at 12:58 UT on January 14. None of these flares were related to CMEs. Only minor C-class flares occurred after January 15.



A partial halo CME originating from NOAA AR 2261 came into the Field of View of LASCO-C2 at 15:36 UT on January 12. It was a faint CME with speed around 1000 km/s with an Earth directed component, but finally did not arrive to the Earth.

Geomagnetic Activity

Geomagnetic conditions ranged from quiet to unsettled the whole week.

4. Noticeable Solar Events (12 Jan 2015 - 18 Jan 2015)

DAY	BEGIN	MAX	END	LOC	XRAY	OP	10CM	TYPE	Cat	NOAA
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13	0413	0424	0438	N6W70	M5.6	2B	290	III/1	50	2257
13	0446	0458	0510		M4.9			VI/2	50	2257
14	1230	1258	1308		M2.2			III/1	50	2257

LOC: approximate heliographic location

TYPE: radio burst type

XRAY: X-ray flare class

Cat: Catania sunspot group number

OP: optical flare class

NOAA: NOAA active region number

10CM: peak 10 cm radio flux

5. PROBA2 Observations (12 Jan 2015 - 18 Jan 2015)

Solar Activity

Solar flare activity fluctuated between quiet 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>

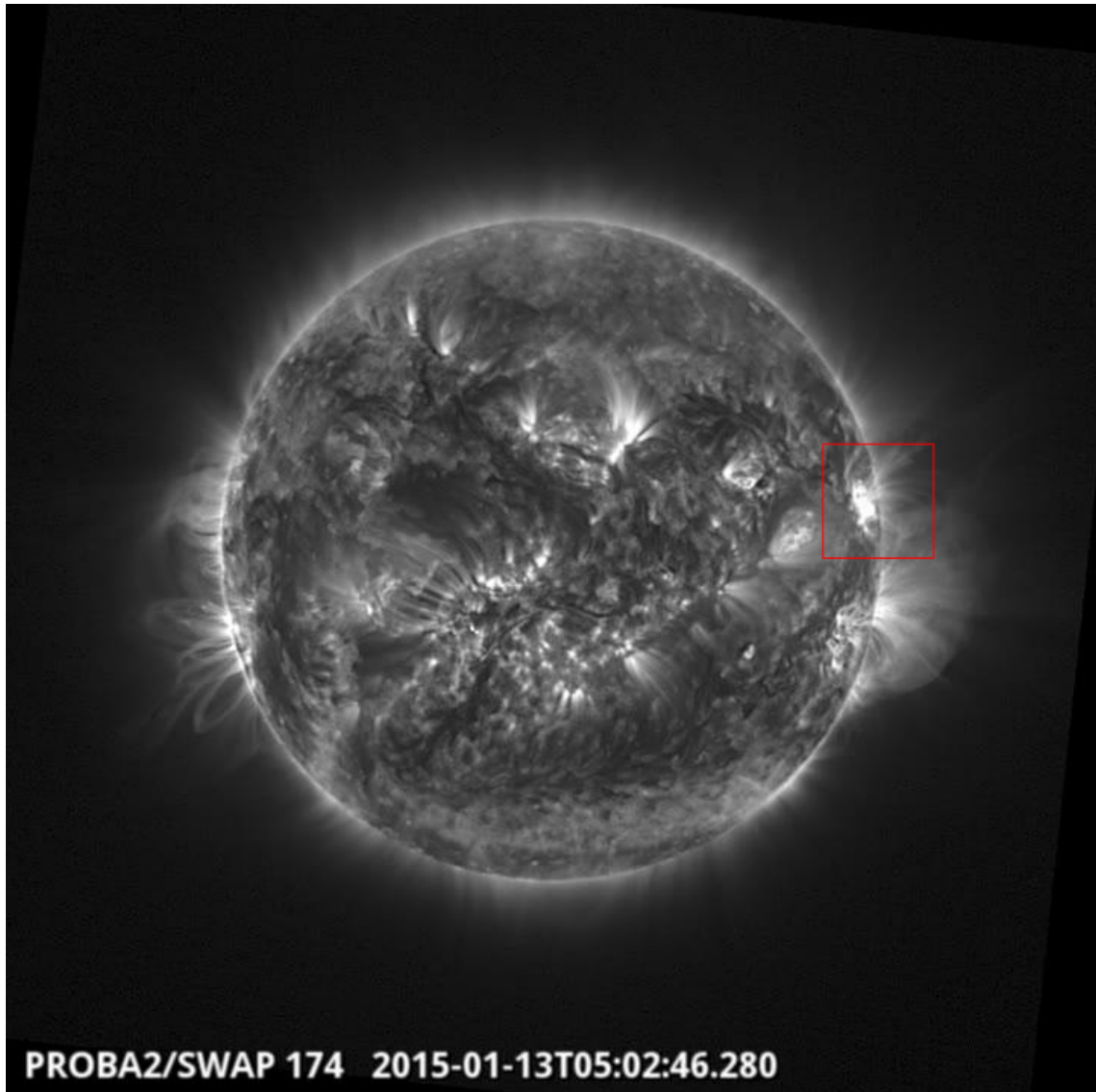
This page also lists the recorded flaring events.

A weekly overview movie can be found here (SWAP week 251).

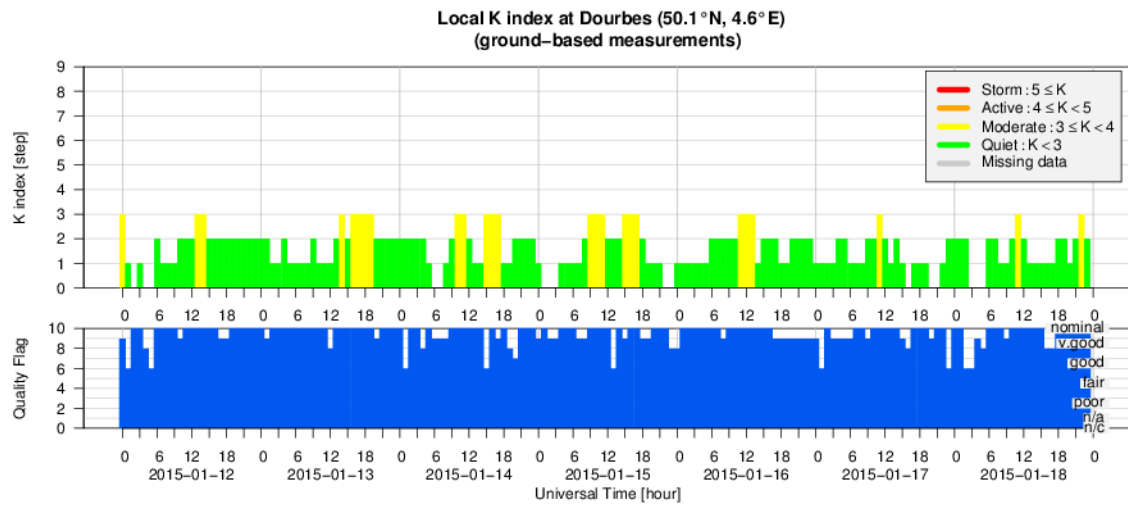
http://proba2.oma.be/swap/data/mpg/movies/weekly_movies/weekly_movie_2015_01_12.mp4

Below we provide SWAP images of the time when a strong Mflare occurred on 2015Jan13.

M4.9 flare peaking around 04h58

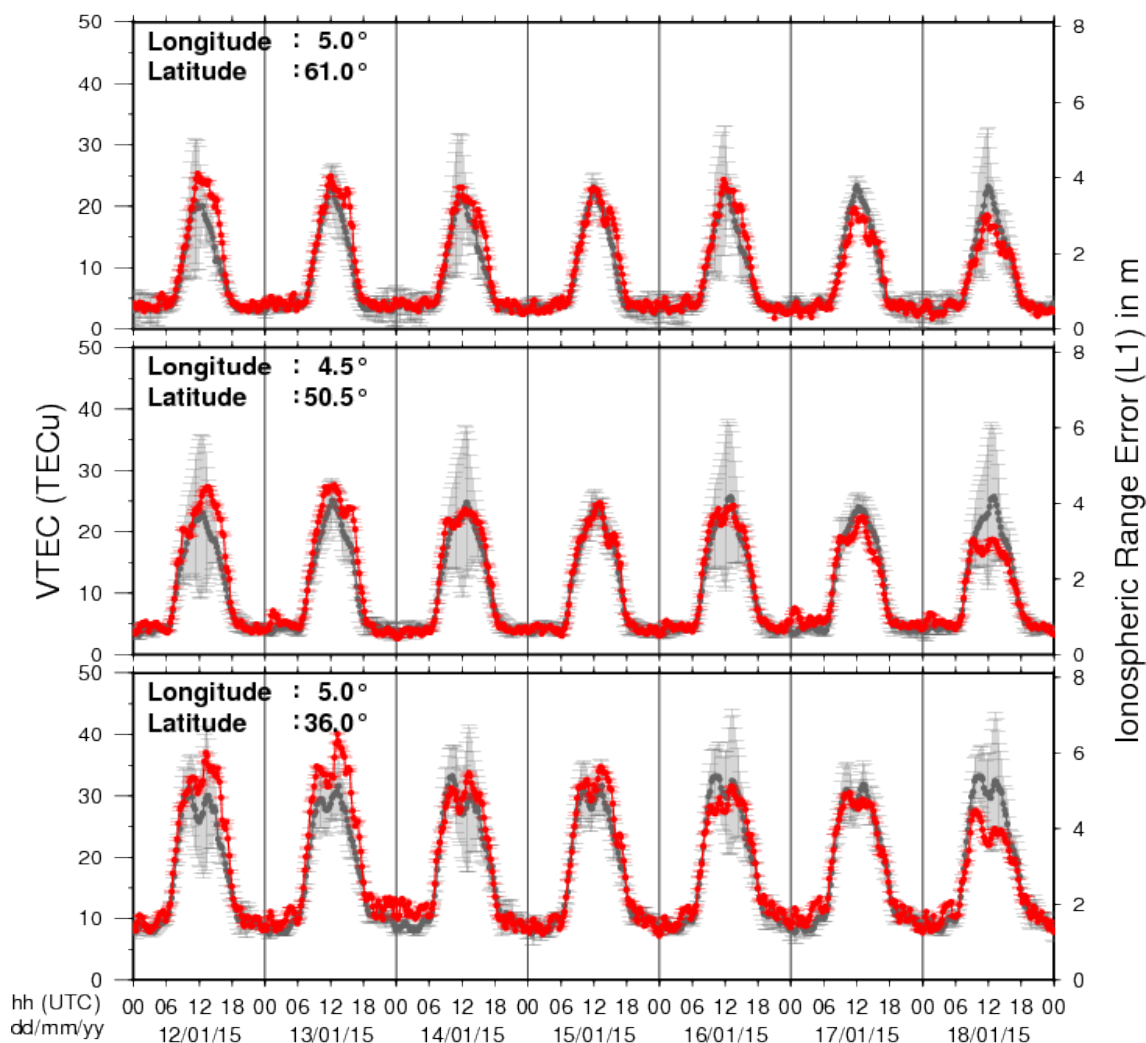


6. Geomagnetic Observations at Dourbes (12 Jan 2015 - 18 Jan 2015)



7. Review of ionospheric activity (12 Jan 2015 - 18 Jan 2015)

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:

- in the northern part of Europe (N61°, 5°E)
- above Brussels (N50.5°, 4.5°E)
- 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

8. New documents in the European Space Weather Portal Repository

See <http://www.spaceweather.eu/en/repository>

9. Future Events

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

Conference on Sun-Climate Connections (SCC 2015) in Kiel, Germany

Start : 2015-03-16 - End : 2015-03-19

This international conference will provide an overview of our current understanding of Sun-Climate Connections starting at processes on the Sun itself over space weather and solar wind towards solar influence on the upper atmosphere down to the ocean. It will also provide insights into the heatedly debated role of the Sun in climate change. In four sessions the various contributions of solar variability influence on Earth's climate will be presented and discussed by bringing together solar physicists, space scientists, atmospheric scientists, climate modellers, and paleoclimatologists.

We expect contributions from scientists participating in SCOSTEP/ROSMIC, SPARC-SOLARIS/HEPPA, the EU cost network TOSCA, as well as any other interested scientists. The conference will last three full days, beginning Monday morning, 16 March 2013. The programme will consist of invited and keynote lectures, a few contributed oral presentations and ample time dedicated to poster sessions. The fourth day will be devoted to public outreach activities as well as panel discussions.

Website: <http://scc.geomar.de/>

URSI AT-RASC 2015 in Gran Canaria, Spain

Start : 2015-05-18 - End : 2015-05-22

URSI AT-RASC 2015 will be the first edition of the newly established triennial URSI Atlantic Radio Science Conference as one of the URSI Flagship Conferences. AT-RASC 2015 will have an open scientific program composed of submitted papers within the domains covered by all ten Commissions of URSI.

Website: <http://www.at-rasc.com/>

Los Alamos Space Weather Summer School, in Los Alamos, NM, USA

Start : 2015-06-01 - End : 2015-07-24

The Space Weather Summer School at Los Alamos National Laboratory, established in 2011 under the founding Director Josef Koller, is dedicated to space weather, space science and applications. Every year we solicit applications for the Los Alamos Space Weather Summer School. This summer school is sponsored and supported by a number of organizations at LANL. This year our top sponsors include the Los Alamos Institute of Geophysics, Planetary Physics and Signatures (IGPPS) and the Laboratory Directed Research and Development Office (LDRD). The summer school brings together top space science students with internationally recognized researchers at LANL in an educational and collaborative atmosphere.

Website:

<http://www.swx-school.lanl.gov/>

Loops7: Heating of the Magnetically Closed Corona in Cambridge, UK

Start : 2015-07-21 - End : 2015-07-23

The conference will review past and recent achievements, as well as future challenges in the field of solar coronal loop physics.

Website:

<http://www.damtp.cam.ac.uk/user/astro/cl7/index.html>

Heliophysics Summer School 2015: Seasons in Space: Cycles of variability of Sun-Planet systems, in Boulder, CO, USA

Start : 2015-07-28 - End : 2015-08-04

Heliophysics is all of the science common to the field of the Sun-Earth connections. This fast-developing field of research covers many traditional sub-disciplines of space physics, astrophysics, and climate studies. The NASA Living with a Star program, with its focus on the basic science underlying all aspects of space weather, acts as a catalyst to bring the many research disciplines together to deepen our understanding of the system of systems formed by the Sun-Earth connection.

Website:

<http://www.heliophysics.ucar.edu/>

34th International Cosmic Ray Conference (ICRC) in The Hague, The Netherlands

Start : 2015-07-30 - End : 2015-08-06

The 34th International Cosmic Ray Conference (ICRC) will be held from July 30 to August 6, 2015, in The Hague, The Netherlands. It is an important and large conference in the field of Astroparticle Physics. The ICRC covers: cosmic-ray physics, solar and heliospheric physics, gamma-ray astronomy, neutrino astronomy, and dark matter physics.

Website: <http://icrc2015.nl>

Ground-based Solar Observations in the Space Instrumentation Era in Coimbra, Portugal

Start : 2015-10-05 - End : 2015-10-09

This CSPM-2015 scientific meeting will cover various aspects of solar dynamic and magnetic phenomena which are observed over the entire electromagnetic spectrum: white-light, H α , Ca II, and radio from ground and in a variety of other wavelengths (white light, UV and EUV, and X-rays) from space. Emphasis will also be placed on instrumentation, observing techniques, and solar image processing techniques, as well as theory and modelling through detailed radiative transfer in increasingly realistic MHD models. The long-term (cyclic) evolution of solar magnetism and its consequence for the solar atmosphere, eruptive phenomena, solar irradiation variations, and space weather, will be in focus. Here, special attention will be devoted to the long-term observations made in Coimbra and also to the results of the SPRING / SOLARNET and SCOSTEP VarSITI studies. In particular, the weak solar activity during the current solar maximum will be discussed. Finally, since this meeting is organised around the 90th anniversary of performing the first spectroheliographic observations in Coimbra, a session will be specially dedicated to new solar instruments (both ground-based and space-borne) that will give access to unexplored solar atmospheric features and dynamic phenomena over the coming years.

Website:

<http://www.mat.uc.pt/~cspm2015/>

41st COSPAR Scientific Assembly in Istanbul, Turkey

Start : 2016-07-30 - End : 2016-08-07

The 41st COSPAR Scientific Assembly will be held in Istanbul, Turkey from 30 July - 7 August 2016. This Assembly is open to all bona fide scientists.

Website:

<https://www.cospar-assembly.org/>