STCE Newsletter

15 Dec 2014 - 28 Dec 2014

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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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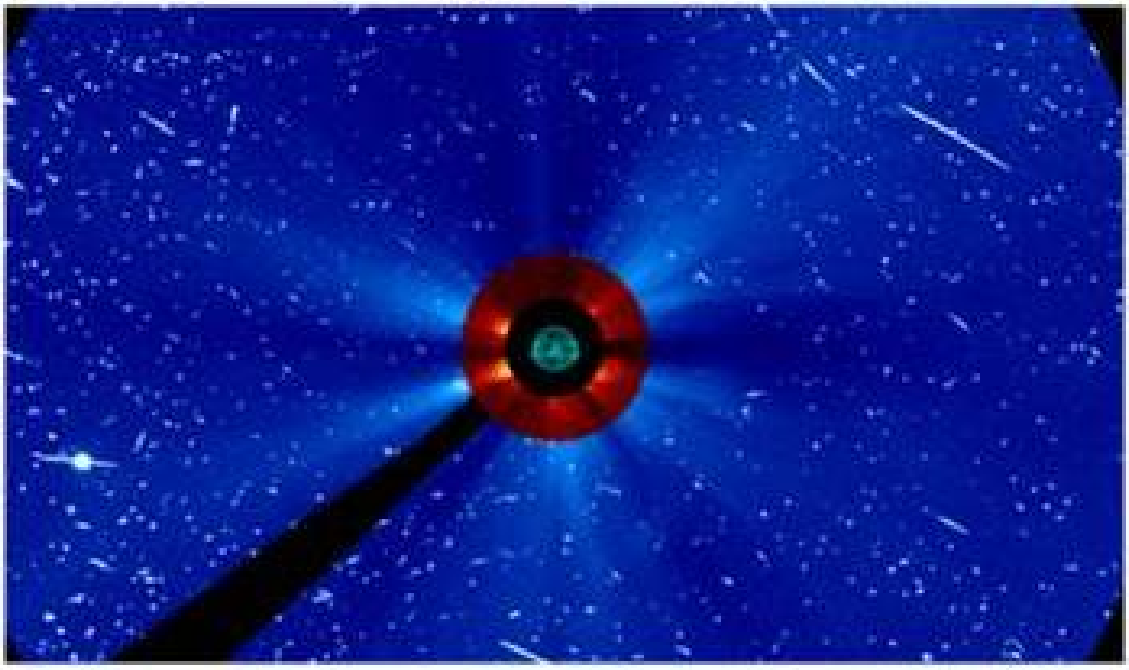
1. The best of ... 2014!

In its New Year's letter for 2014, the Sun promised great solar activity to come (http://www.stce.be/news/231/welcome.html). True to its word, sunspot numbers reached a new monthly high in February 2014, probably indicating the maximum of the ongoing solar cycle. Throughout the year, this increased sunspot activity was accompanied by plenty of strong flares, big sunspot groups and geomagnetic unrest.

A compilation of the most memorable moments of 2014 can be found underneath. Using Helioviewer (http://helioviewer.org/), a MOVIE (https://www.youtube.com/watch?v=dnTMtpNvlyc) was created containing one or more clips of each event. Usually, SDO-images (http://sdo.gsfc.nasa.gov/data/aiahmi/) were used, occasionally supplemented with imagery from STEREO (http://stereo.gsfc.nasa.gov/), PROBA2 (http://proba2.oma.be/ssa), and SOHO (http://sohowww.nascom.nasa.gov/).
Happy reading, and the best wishes for a wonderful New Year!

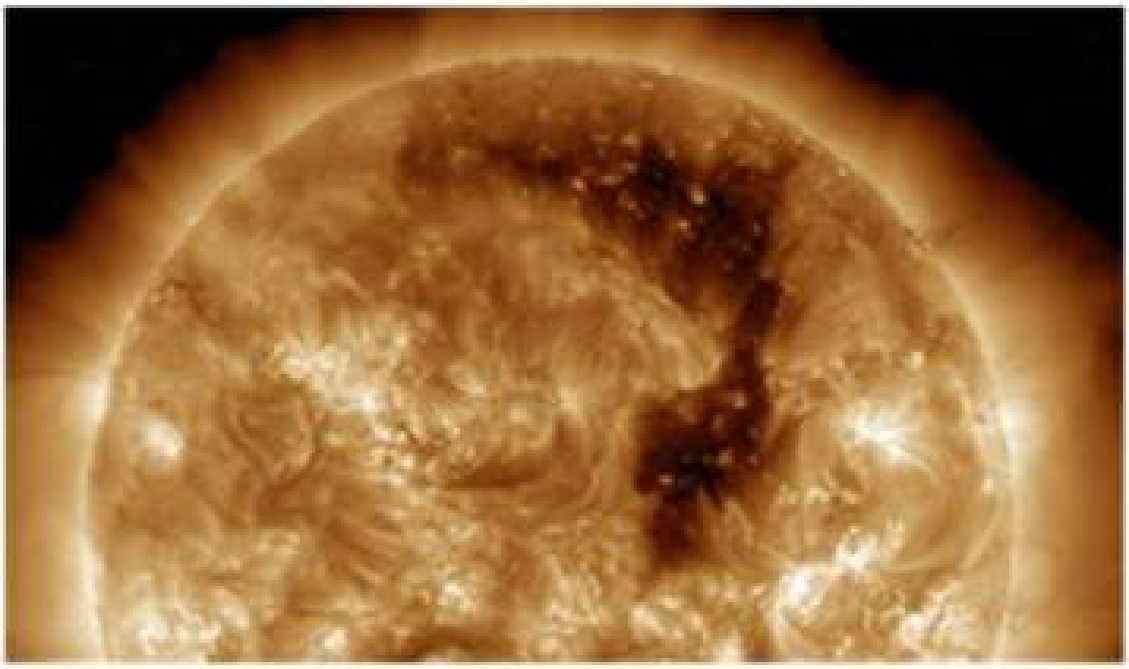
Event 1: 9 January 2014 - Highest proton flux levels



The new year started with one of the biggest sunspot groups of solar cycle 24 (SC24), up to that moment at least. NOAA 1944 had about 9 times the surface area of the Earth, and was quite flare productive too. On 7 January, it was the source of an X1 flare which was accompanied by a proton event that would reach 1030 pfu (particle flux units) two days later. This would become the strongest proton event of 2014, and the only strong solar radiation storm of the year (S3 - see the NOAA scales at http://www.swpc.noaa.gov/noaa-scales-explanation), but still 6 times less intense than the strongest event so far this solar cycle (8 March 2012).

Ref: STCE news item of 16 January 2014 at http://www.stce.be/news/232/welcome.html

Event 2: 13 January 2014 - Highest solar wind speed



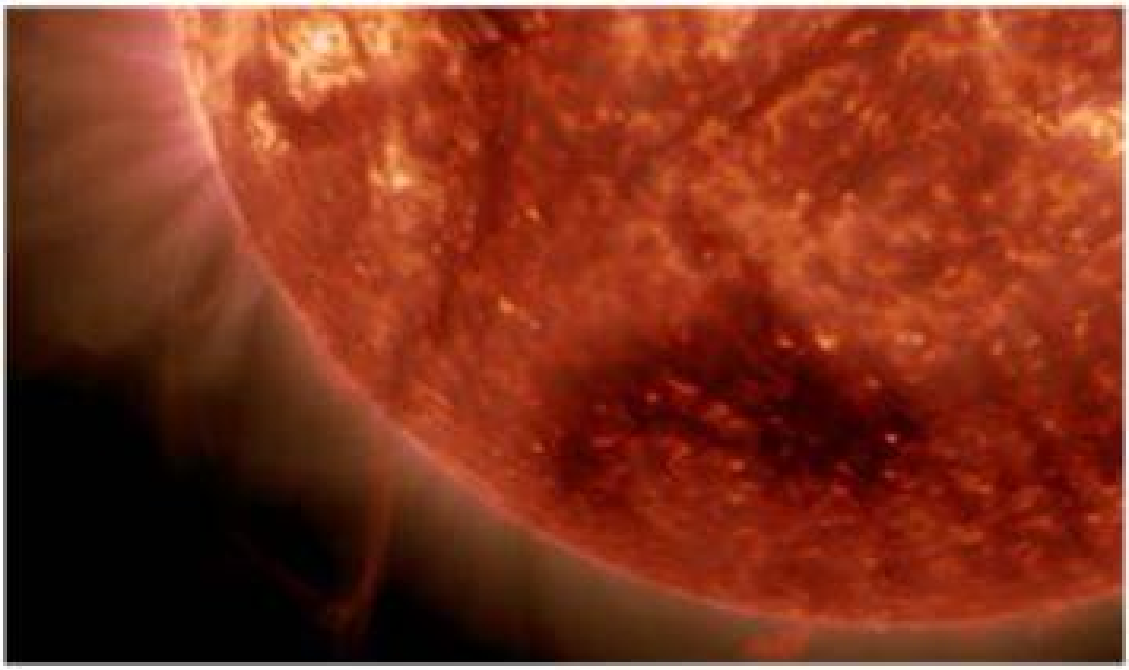
The ACE spacecraft recorded the highest near-Earth solar wind speed for 2014 on 13 January at 06:45UT, with maximum values of 903 km/s (5-minute average). The source of this high-speed stream is a huge trans-equatorial coronal hole (CH) that passed the central meridian on 9 January. According to HEK/Spoca (http://www.lmsal.com/hek/), this CH reached its largest area on 11 January, measuring 188.400 Mm2, the equivalent of nearly 370 times the surface area of the Earth. The passing of the wind stream did not result in any geomagnetic storming, due to its mostly northward directed magnetic field.

Ref: STCE Newsletter of 16 January 2014 at http://www.stce.be/newsletter/pdf/2014/STCEnews20140116.pdf

Event 3: 25 February 2014 - X4.9 flare

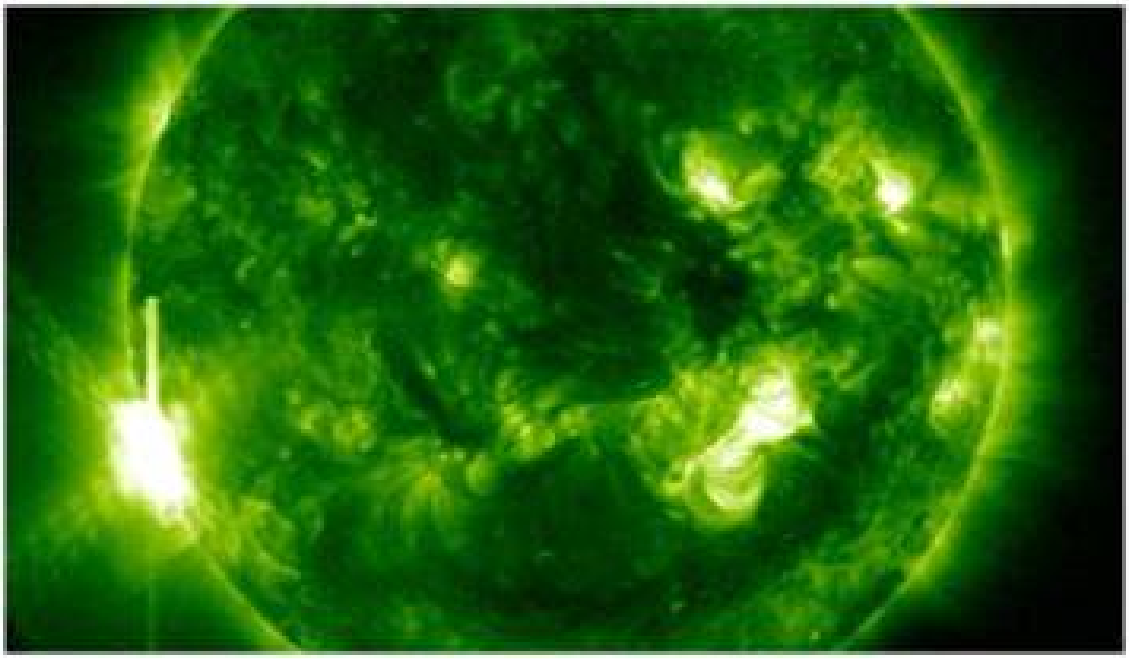
The strongest flare of 2014 took place in NOAA 1990 on 25 February. This active region was the third and last appearance of NOAA 1944. Though the region was still close to the southeast solar limb, the X4.9 flare was accompanied by a small proton event and a relatively fast asymmetric halo coronal mass ejection (CME). The shock from this CME caused a moderate geomagnetic storm on 27 February.
Ref: STCE news item of 25 February 2014 at http://www.stce.be/news/238/welcome.html

Event 4: 4 June 2014 - Filament eruption



A filament with a length of 1.5 times the Earth-Moon distance erupts on 4 June. It is not associated to an obvious flare, but a very nice "canyon-of-fire" can be seen. The associated CME will disturb Earth's geomagnetic field on 7 and 8 June, resulting in a moderate geomagnetic storm. Other geomagnetic storms reaching a similar intensity were the ones from 19 February and 12 September.
Ref: STCE news item of 13 June 2014 at http://www.stce.be/news/255/welcome.html

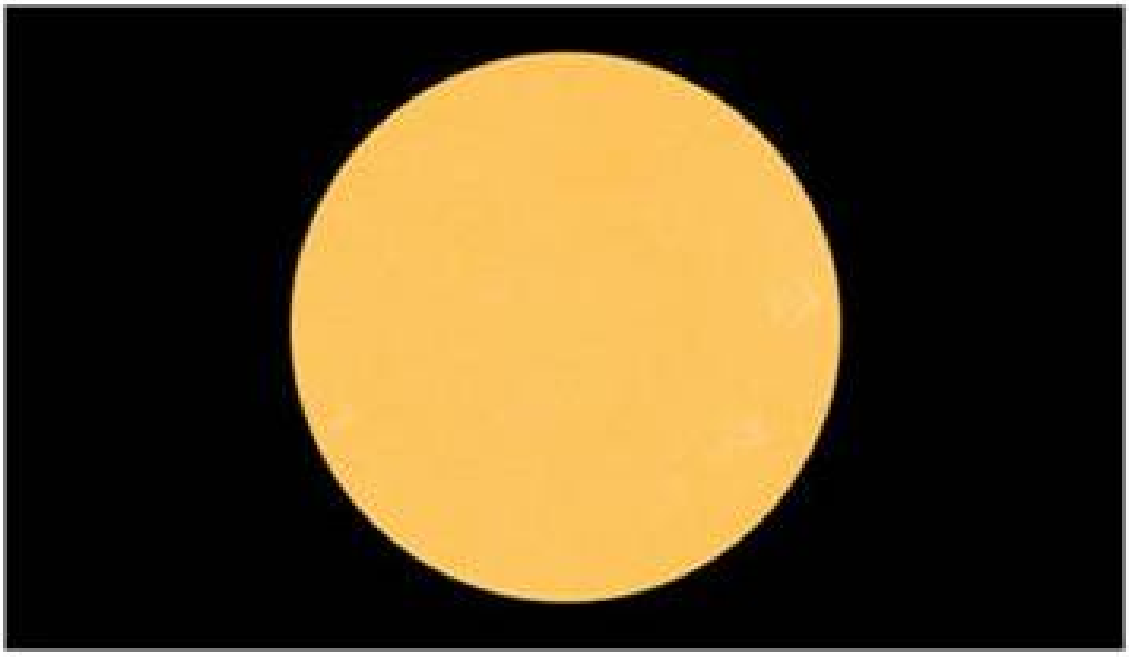
Event 5: 10 June 2014 - 2 X-class flares in 70 minutes



On 10 and 11 June, NOAA 2087 released 3 X-class flares. In particular the first two are interesting, as the peaks of the X2 and X1 flare are separated by only 70 minutes. Also, the X2 flare lasts only 8 minutes, the shortest duration for any X-class flare in 2014. None of these is exceptional, as every solar cycle has had a few of these impulsive X-class flares. According to Cactus (http://www.sidc.oma.be/cactus/), the CME associated to the X1 flare was also one of the fastest in 2014, with a plane-of-the-sky speed of 1531 km/s.

Ref: STCE news item of 18 June 2014 at http://www.stce.be/news/256/welcome.html

Event 6: 17 July 2014 - Spotless Day



Confirmed by SILSO (http://sidc.oma.be/silso/), 2014 had one spotless day, i.e. 17 July. More important was the roller-coaster that the daily sunspot number (SN) displayed during this summer month: from values near 140 around 5 July to zero on 17 July, back to about 100 near the end of the month. Both features (spotless day and the "roller-coaster") are not uncommon for maxima of weak to moderate solar cycles.

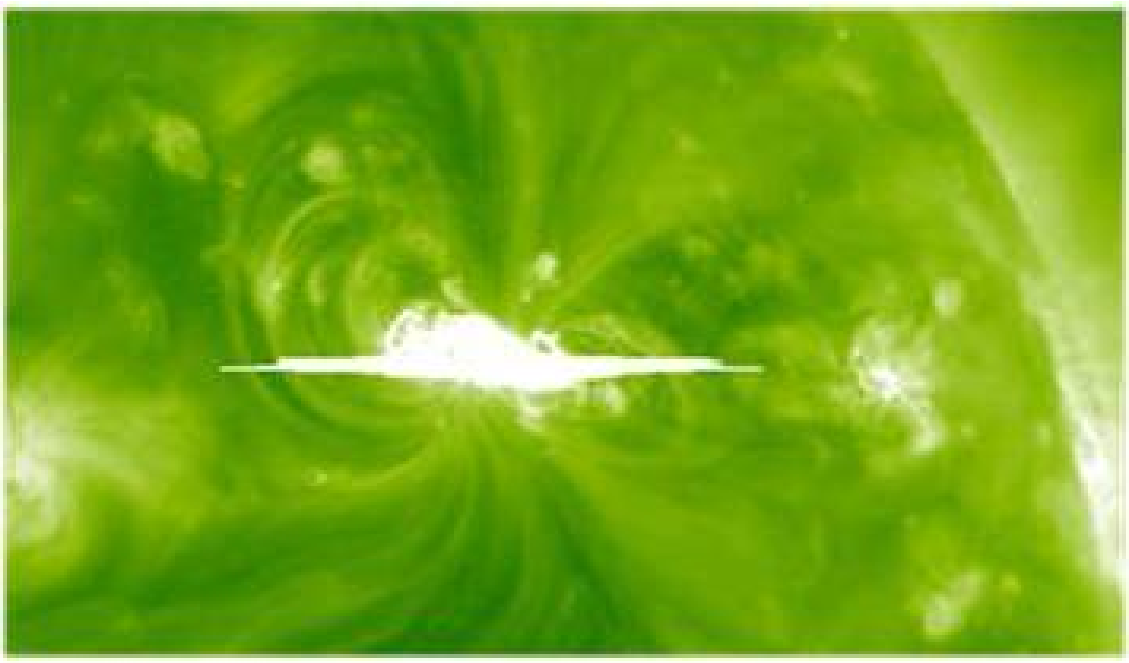
Ref: STCE news item of 31 July 2014 at http://www.stce.be/news/261/welcome.html

Event 7: 24 August 2014 - Parachute CME

On 24 August, a relatively strong flare took place in a rather small sunspot group. Around noon that day, an M5.9 flare happened just to the west of NOAA 2151, a region consisting of a single, simple mature sunspot. The associated CME seemed to be tied to the solar surface at its four outer ends, giving it the outlook of a parachute. Amazingly, though most of the material was ejected into space, some of it reached heights of 4 solar radii before eventually falling back to the solar surface.

Ref: STCE news item of 27 August 2014 at http://www.stce.be/news/264/welcome.html

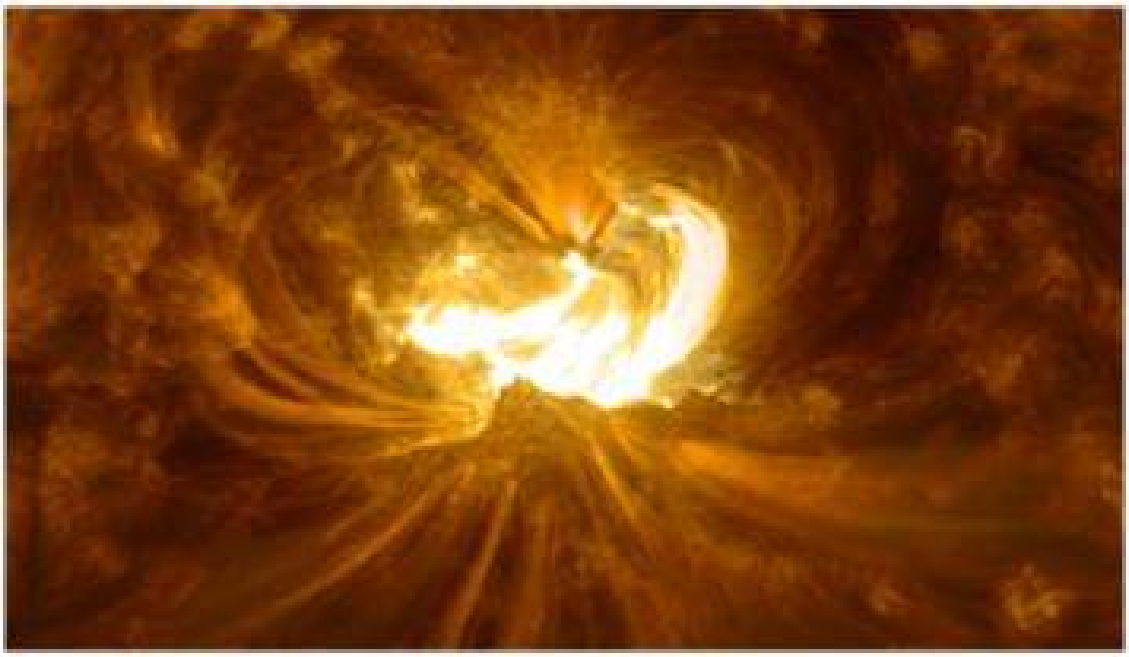
Event 8: 1 September 2014 - Strong backside eruption



On 1 September, STEREO-B observed a strong flare in an active region on the backside of the Sun, estimated to be a low-level X-class flare. The flare is associated to a strong proton flux increase. Amazingly, so many particles were slamming into STEREO-B's camera pixels (creating the white dots in the images) that they saturated the star-trackers onboard the spacecraft, making them lose lock on the Sun for about 4 hours. This resulted in a not correct orientation of the solar images. The large number of particles would also enhance proton fluxes as observed on Earth, for more than a week!

Ref: STCE news item of 9 September 2014 at http://www.stce.be/news/266/welcome.html

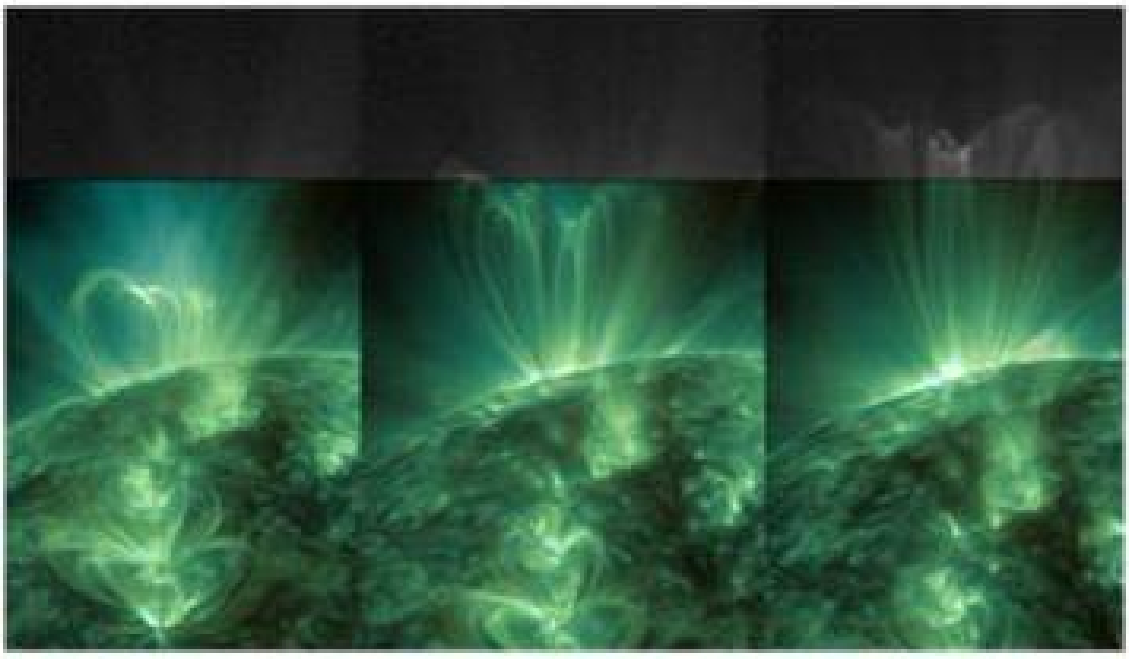
Event 9: 12 September - Major geomagnetic storm



NOAA 2158, responsible for the strong backside event on 1 September, produced a long duration M4 flare peaking early on 9 September, followed by an X1 flare on 10 September. Both are associated to halo CMEs, which arrive at Earth resp. late on 11 September and during the afternoon of 12 September. Initially, the magnetic field of the CME associated to the X1 flare is pointing southward (Bz = -18 nT), resulting in a major geomagnetic storm - probably the strongest of 2014. Then the field turns northward weakening the effects of the passing CME. So far this solar cycle, no extremely severe geomagnetic storm has been observed (Kp = 9).

Ref: STCE news items of 10-11 September 2014 at http://stce.be/news/267/welcome2.html , and of 17 September 2014 at http://www.stce.be/news/268/welcome.html

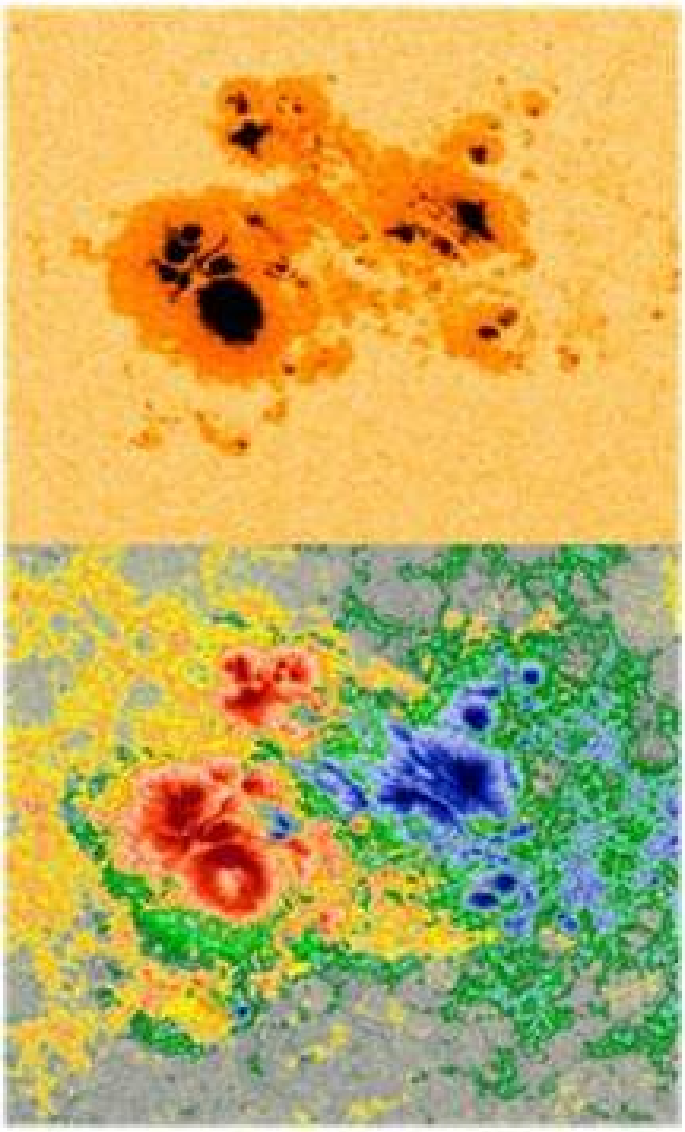
Event 10: 14-16 October 2014 - Huge and long-lasting arcade



Active region NOAA 2192 is still 2 days behind the Sun's southeast limb, when it already produced a complex M2 flare on 14 October. Lasting 5 hours and 12 minutes, it will become one of the longest flaring events in 2014. Following this event, huge post-flare coronal loops develop and continue to grow outside SDO's field-of-view (FOV). PROBA2's wider FOV shows that the loops of this long duration arcade were visible for about 2.5 days (60 hours!), and at their maximum height, they were towering at least 340.000 km above the solar surface. That's close to the average Earth-Moon distance!

Ref: STCE news item of 21 October 2014 at http://www.stce.be/news/274/welcome.html

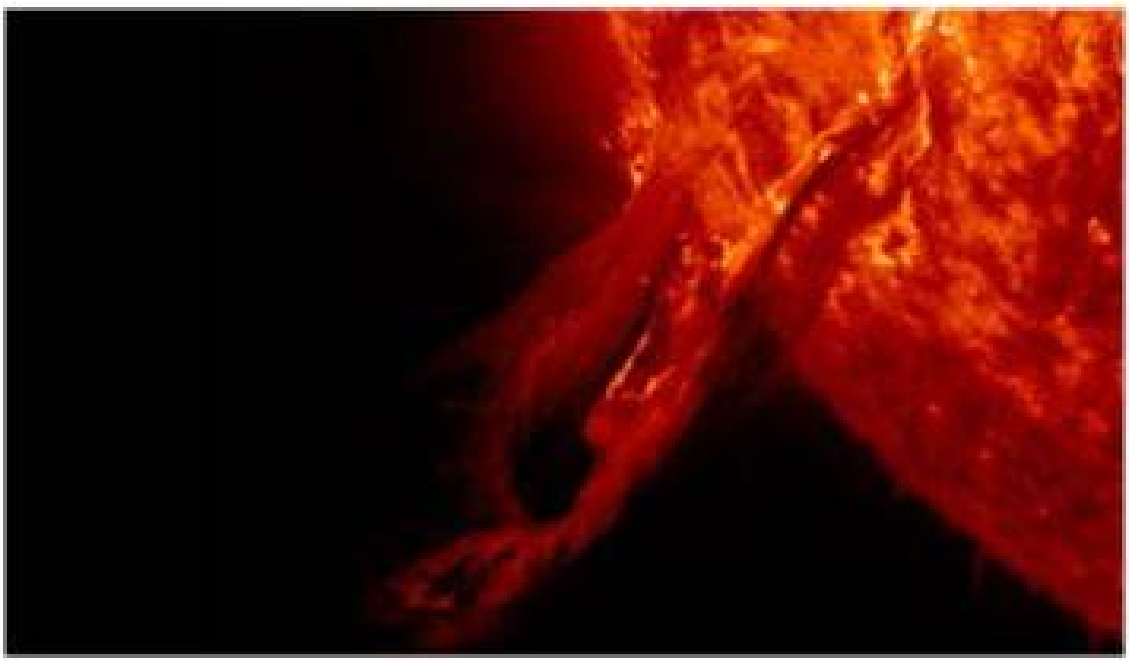
Event 11: 16-30 October 2014 - NOAA 2192



If anything, 2014 will especially be remembered for the giant sunspot group NOAA 2192. With an area of 16 times the surface area of the Earth, this group was the largest since NOAA 6368 in November 1990. It would produce 6 X- and 35 M-class flares during its transit, dwarfing flare activity from any other SC24 sunspot region (so far). Interestingly, no proton events and only one CME were associated to these flares. During its second transit as NOAA 2209, the group had simplified significantly and become much smaller, the main spot looking very much like a bear claw. It produced only 3 M-class flares. The coronal structure towering above the active region can be followed for more than 2 complete solar rotations.

Ref: STCE news items of 29 October at http://www.stce.be/news/280/welcome.html and of 26 November 2014 at http://www.stce.be/news/285/welcome.html

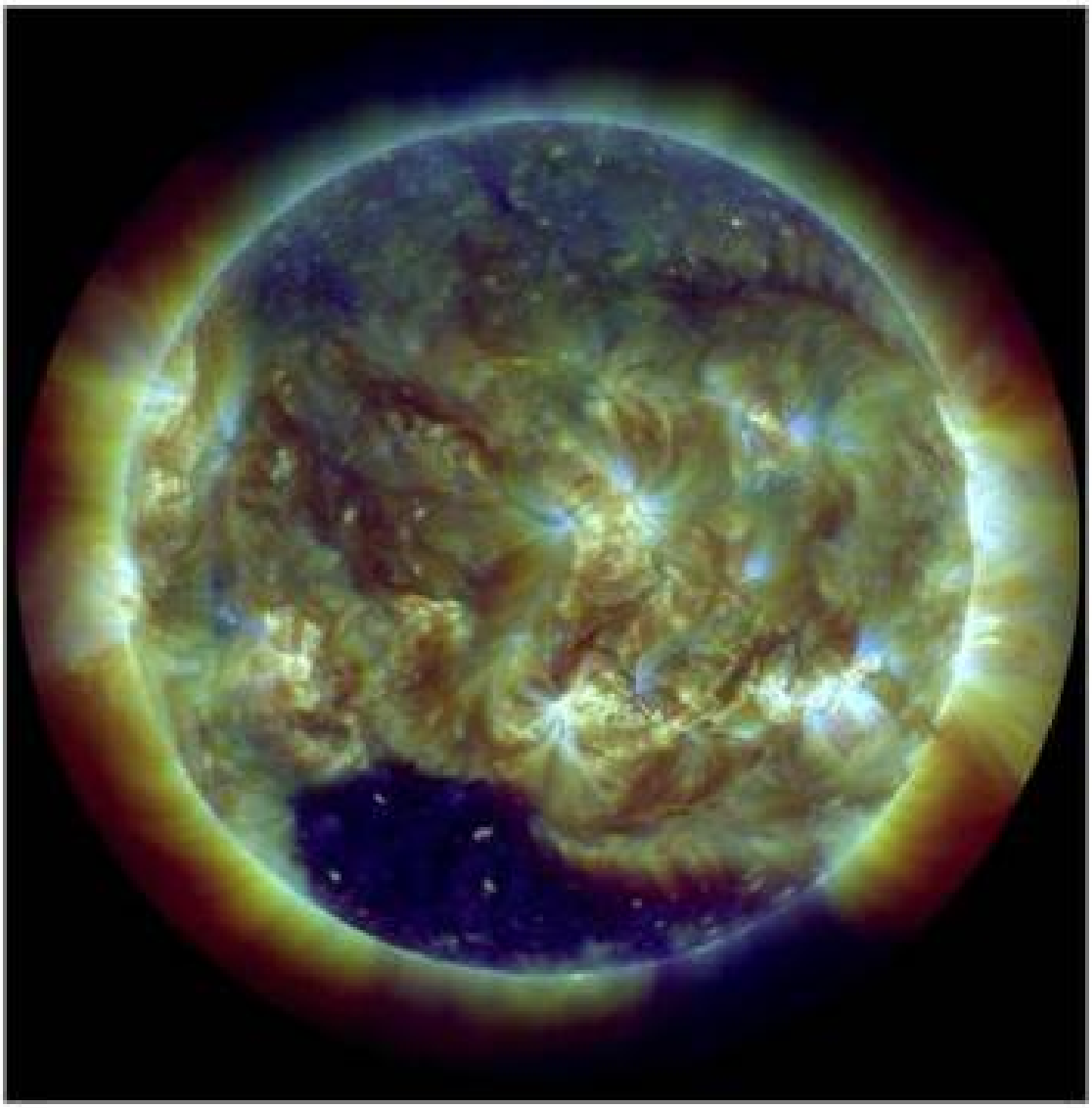
Event 12: 1 November 2014 - The "All Saints" filament eruption



On All Saints day, a solid filament spectacularly erupted near the southeast limb. Far from any sunspot regions, this C2 Hyder flare ("spotless" flare) was associated to a large, but non-Earth directed CME. Particularly striking was the resemblance to another, more potent filament eruption that took place two years earlier, on 31 August 2012.

Ref: STCE news item of 5 November 2014 at http://www.stce.be/news/281/welcome.html

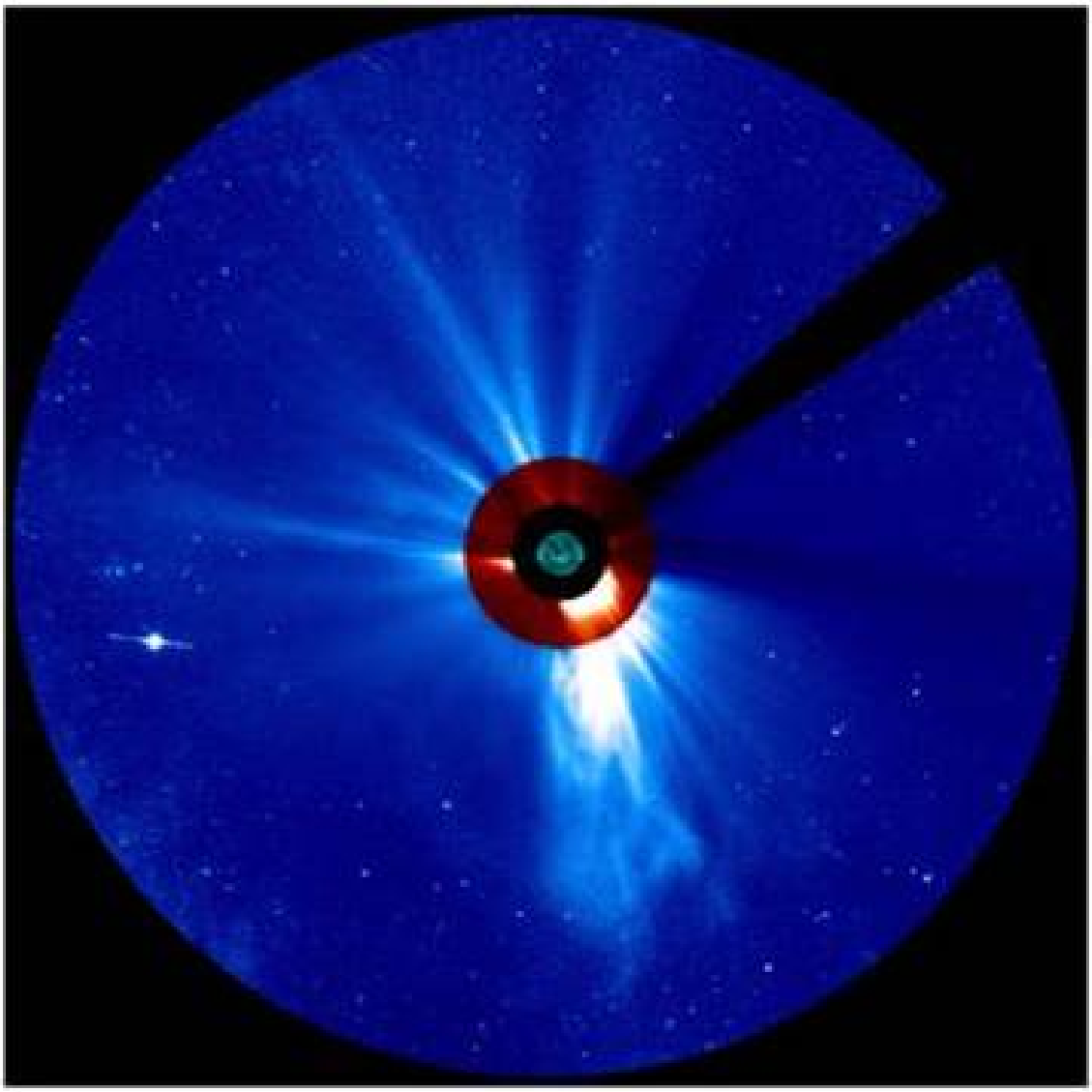
Event 13: 7 December 2014 - Large coronal hole near south pole



The largest coronal hole of the year appears near the Sun's south pole early December. It is so large that the total area of 650 Earths would be needed cover its surface. It extends from the south pole all the way to a latitude of about -30 degrees. That was close enough to the solar equator for its high speed wind stream to cause a minor geomagnetic storm on 7 December, with solar wind speeds up to around 800 km/s.

Ref: STCE Newsletter of 12 December 2014 at http://www.stce.be/newsletter/pdf/2014/STCEnews20141212.pdf

Event 14: 23 December 2014 - Important Forbush decrease

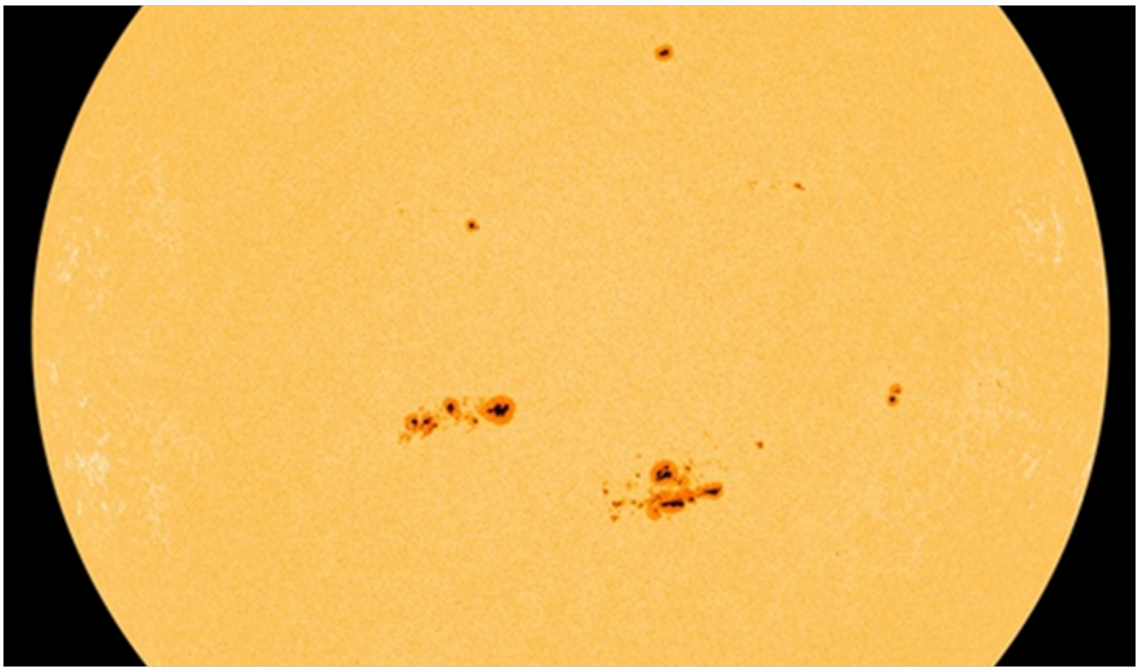


For 6 consecutive days starting on 17 December, the pair of complex sunspot groups NOAA 2241/2242 produced a series of M-class flares culminating in an X1.8 flare on 20 December. The CMEs associated to the strongest of these flares have an Earth directed component, and their passing would result in a minor geomagnetic storm on 22 December. However, the succession of these Earth-directed CMEs also deflected the cosmic rays (high-energetic particles from outside our solar system), and neutron monitors (NM) recorded one of the largest drops in particles reaching Earth (6-8% - Oulu NM at http://cosmicrays.oulu.fi/). This is a so-called Forbush decrease. The December event is similar in intensity than the one from 12-13 September, but of considerably longer duration. The strongest Forbush decrease so far this solar cycle occurred in March 2012 (10-12%).

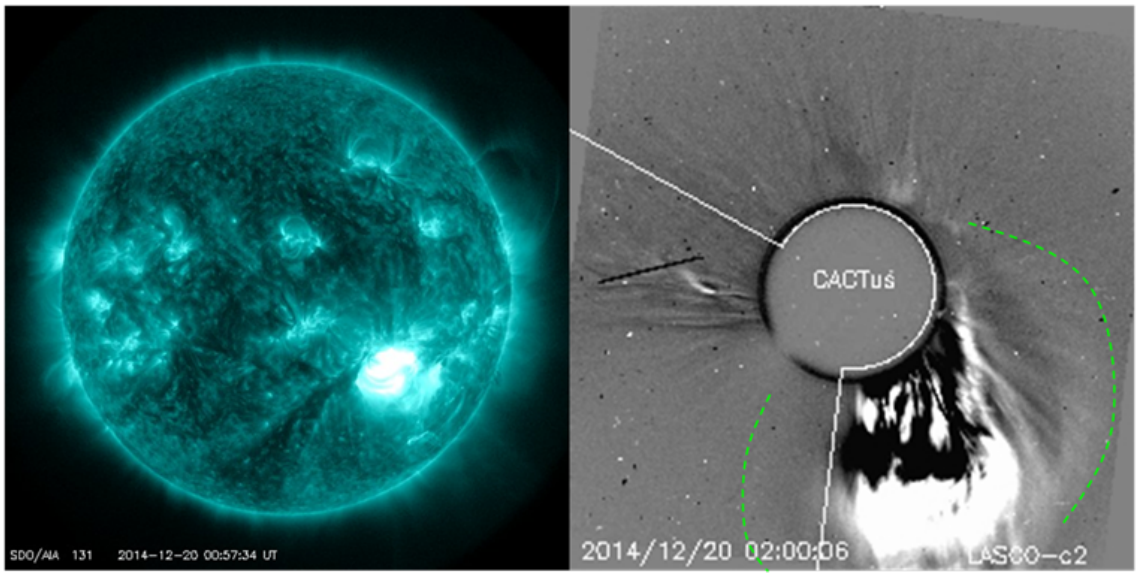
Ref: This just hot off the press!

2. Review of solar activity (15 Dec 2014 - 28 Dec 2014)

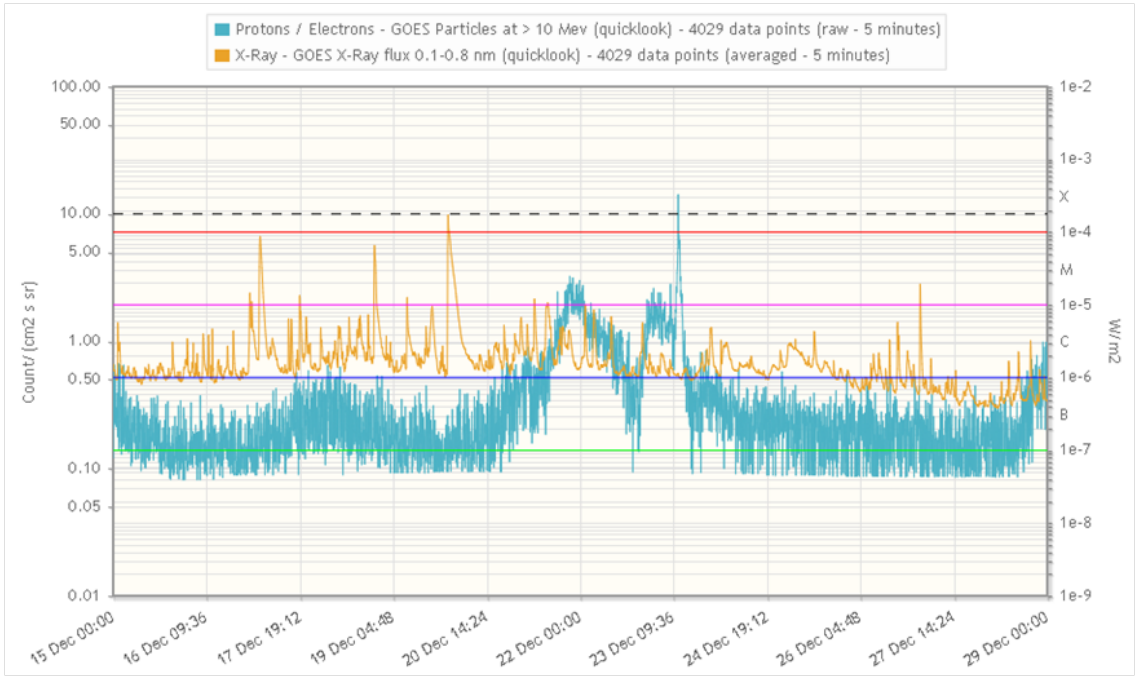
During the week of 15 December, 1 X-, 8 M- and 48 C-class flares were observed. All strong flares, as well as the very large majority of the C-class flares were produced by beta-gamma-delta regions NOAA 2241 and NOAA 2242. At least one strong flare was observed every day from 17-22 December. During the week of 22 December, there were 2 M- and 37 C-class flares, with NOAA 2241/2242 the most flare productive from 22-24 December while rounding the west solar limb. From then on, beta-gamma regions NOAA 2248 and NOAA 2249 took over with a low-level M2 flare from NOAA 2249 on 27 December. The X-ray background flux was above the C1-level from 17-22 and on 24-25 December.



NOAA 2242 released an M8.7 flare on 17 December with peak time 04:51UT, associated to a halo coronal mass ejection (CME) with an estimated velocity of 538 km/s as observed in LASCO C3 images. An M6.9 flare was produced by NOAA 2241, peaking at 21:58UT on 18 December. Also this flare was associated to a halo CME, with an estimated velocity of 590 km/s as measured in LASCO C3 imagery. The strongest event, an X1.8 flare, was released by NOAA 2242 and peaked at 00:27UT on 20 December. This event was associated to a partial halo CME with an angular extent of about 180 degrees, but the bulk was directed towards the southwest. Nonetheless, an Earth directed component with a speed of 1180 km/s was derived from LASCO C3 images.
On 21 December, a relatively faint CME erupted (first measurement in LASCO/C2 at 12:12 UT) and was travelling mainly to the west. The other observed CMEs were too small to have any geo-effective impact.



In response to the flaring activity from active regions NOAA 2241/2242 as well as to the influence of the related CME passages, the greater than 10 MeV proton flux as observed by GOES was enhanced from 20-23 December, with a maximum of 3.2 pfu on 22 December and again on 23 December, staying well below the 10 pfu threshold. Another enhancement started on 28 December and was still in progress by the end of the period.



3. Noticeable Solar Events (15 Dec 2014 - 21 Dec 2014)

DAY	BEGIN	MAX	END	LOC	XRAY	OP	10CM	TYPE	Cat	NOAA
17	0057	0110	0120	S25E10	M1.5	1N				2242
17	0141	0150	0157	S11E33	M1.1	SN		VI/1		2241

17	0425	0451	0520	S20E9	M8.7	2B	3200	II/3IV/1III/2		2242
17	1854	1901	1920		M1.4			I/2I/1/1		2241
18	2141	2158	2225		M6.9	N	2400	I/2V/1TM/1I/2 6	39	2241
19	0931	0944	0954		M1.3	N			38	2242
20	0011	0028	0055	S21W24	X1.8	3B	2300	VI/2II/1	38	2242
21	0718	0732	0751	S21W48	M1.2	1N			38	2242
21	1124	1217	1257		M1.0			VI/2	39	2241

LOC: approximate heliographic location
XRAY: X-ray flare class
OP: optical flare class
10CM: peak 10 cm radio flux
TYPE: radio burst type
Cat: Catania sunspot group number
NOAA: NOAA active region number

4. Noticeable Solar Events (22 Dec 2014 - 28 Dec 2014)

DAY	BEGIN	MAX	END	LOC	XRAY	OP	10CM	TYPE	Cat	NOAA
22	0133	0149	0159	S19W54	M1.0	1F			38	2242
27	0203	0216	0224	S11W48	M2.2	2B				2249

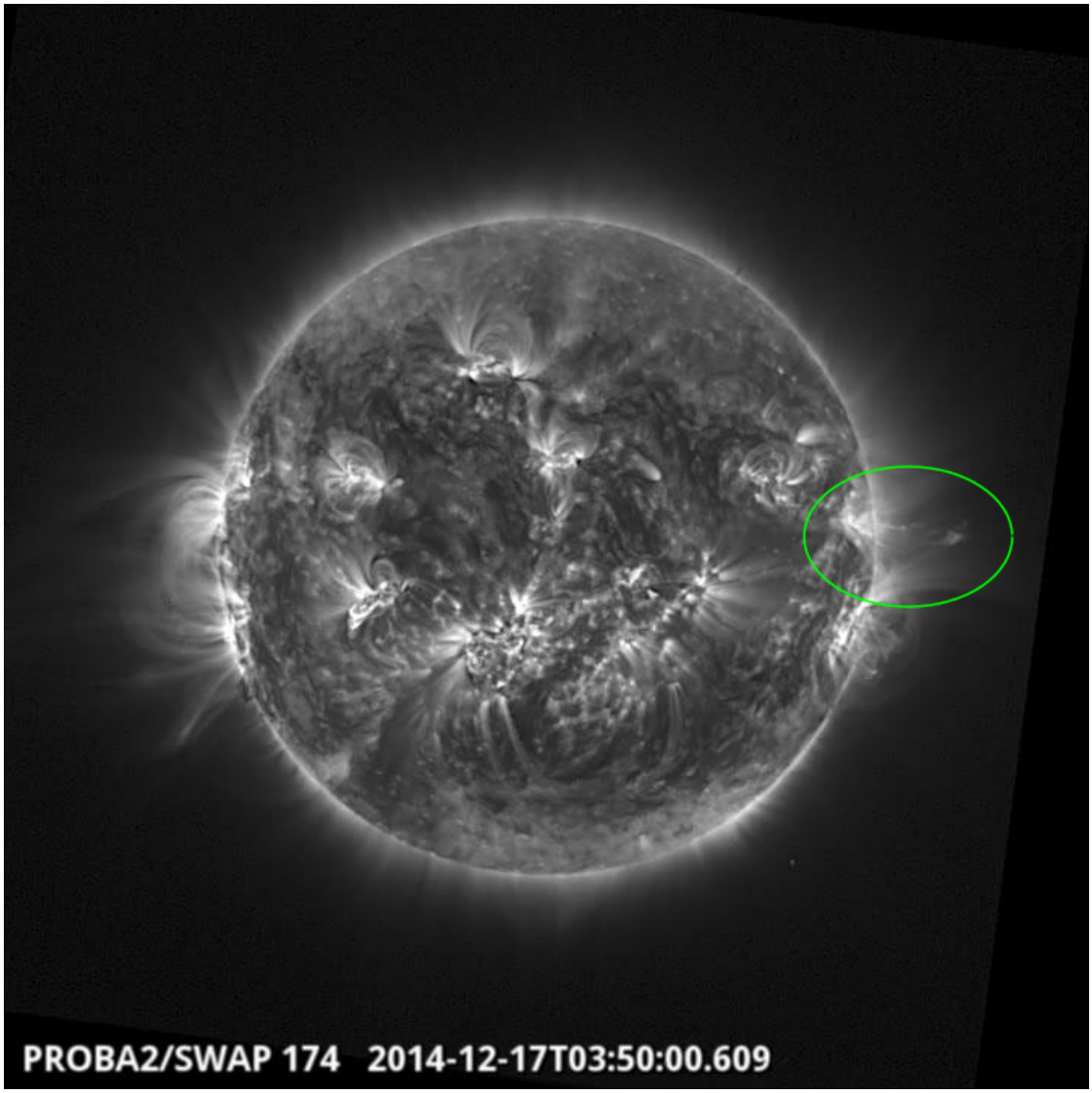
LOC: approximate heliographic location
XRAY: X-ray flare class
OP: optical flare class
10CM: peak 10 cm radio flux
TYPE: radio burst type
Cat: Catania sunspot group number
NOAA: NOAA active region number

5. PROBA2 Observations (15 Dec 2014 - 21 Dec 2014)

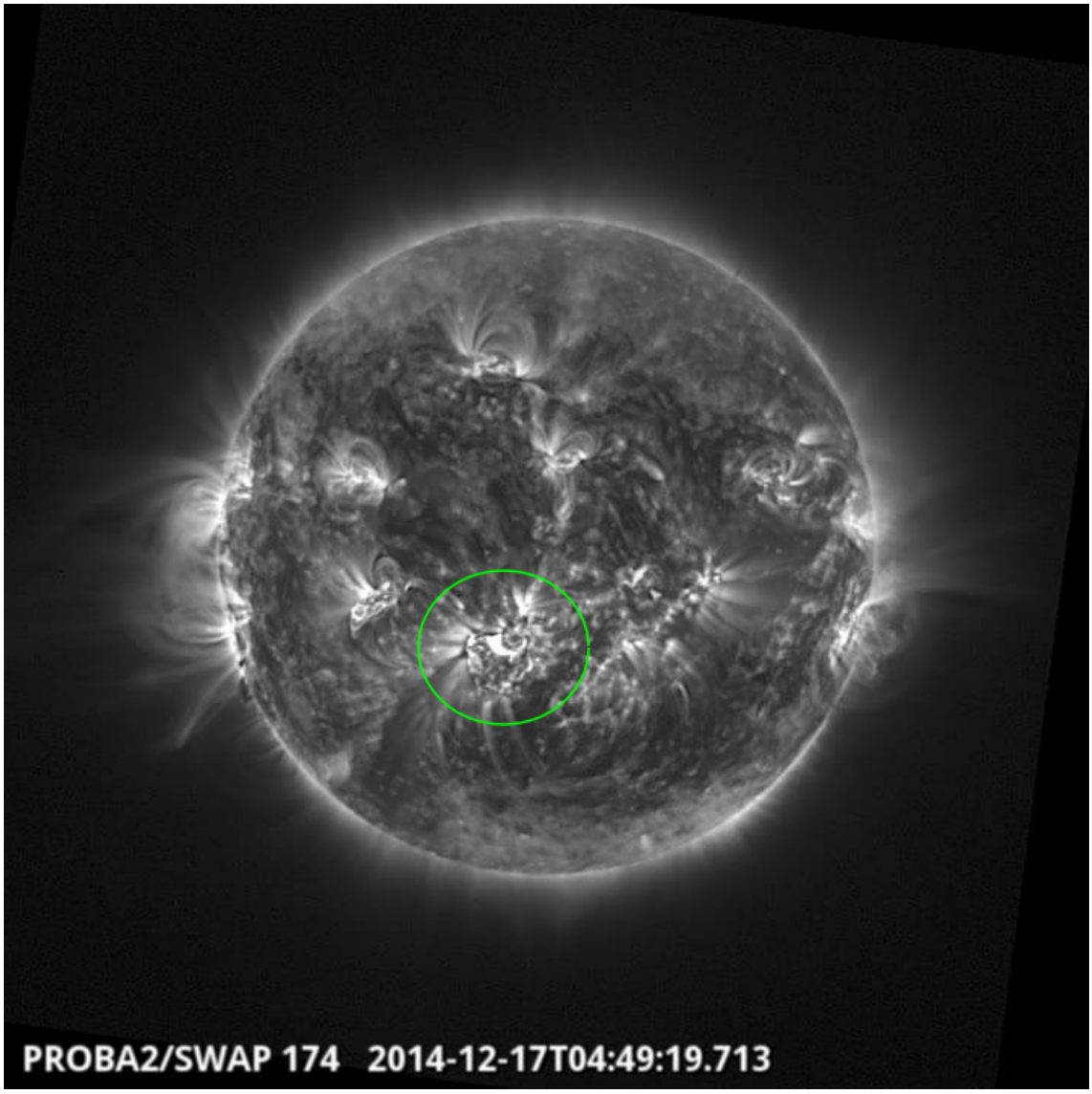
Solar Activity

Solar flare activity fluctuated between low and 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: http://proba2.oma.be/ssa
This page also lists the recorded flaring events.
A weekly overview movie can be found here (SWAP week 247).
http://proba2.oma.be/swap/data/mpg/movies/weekly_movies/weekly_movie_2014_12_15.mp4
Details about some of this week's events, can be found further below.

Wednesday Dec 17

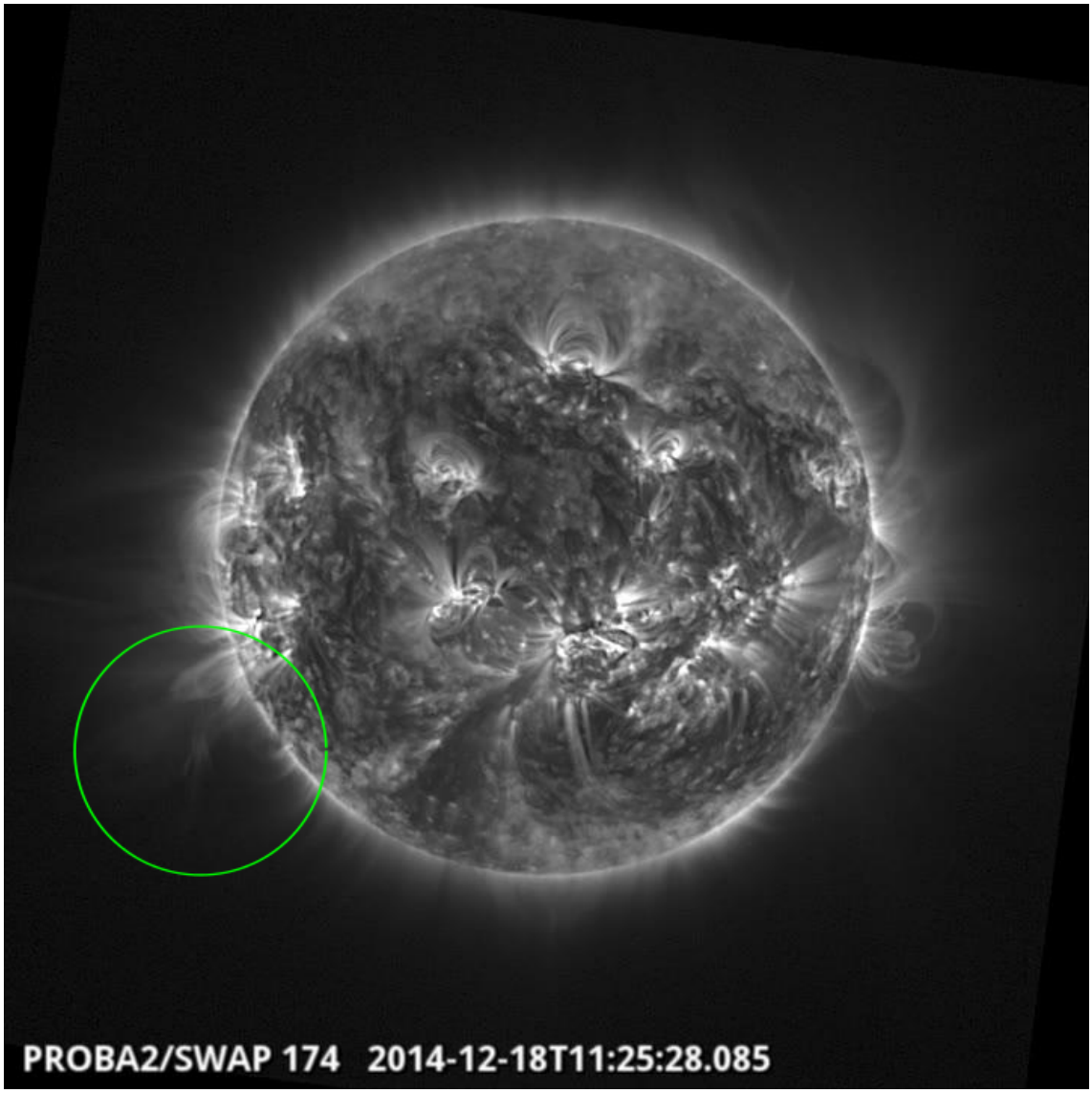


Eruption on the west limb @ 03:50 SWAP image
Find a movie of the event here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/20141217_swap_movie.mp4

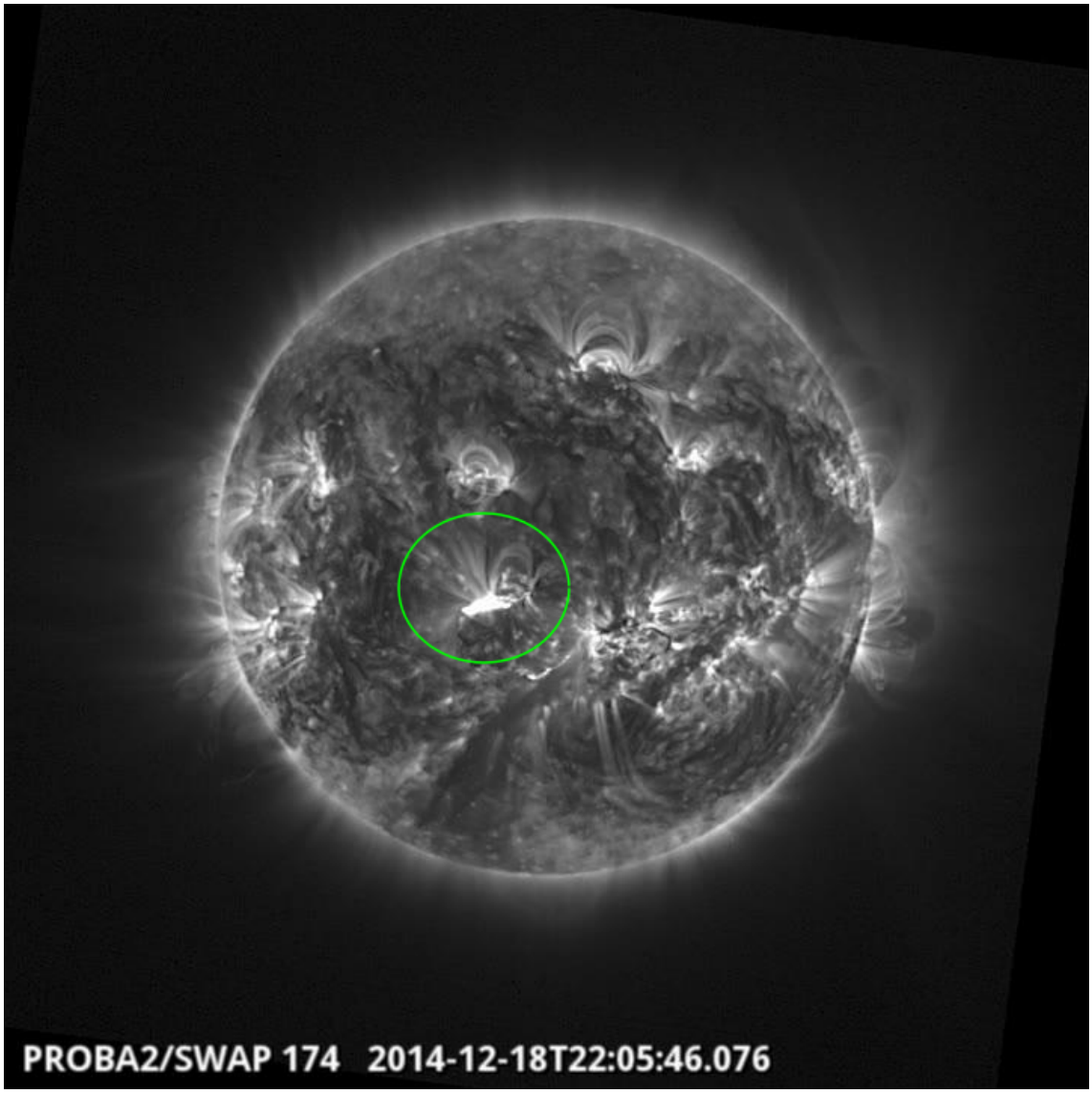


Mflare in the Sun's centre @ 04:49 SWAP image
Find a movie of the event here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/20141217_swap_movie.mp4

Thursday Dec 18

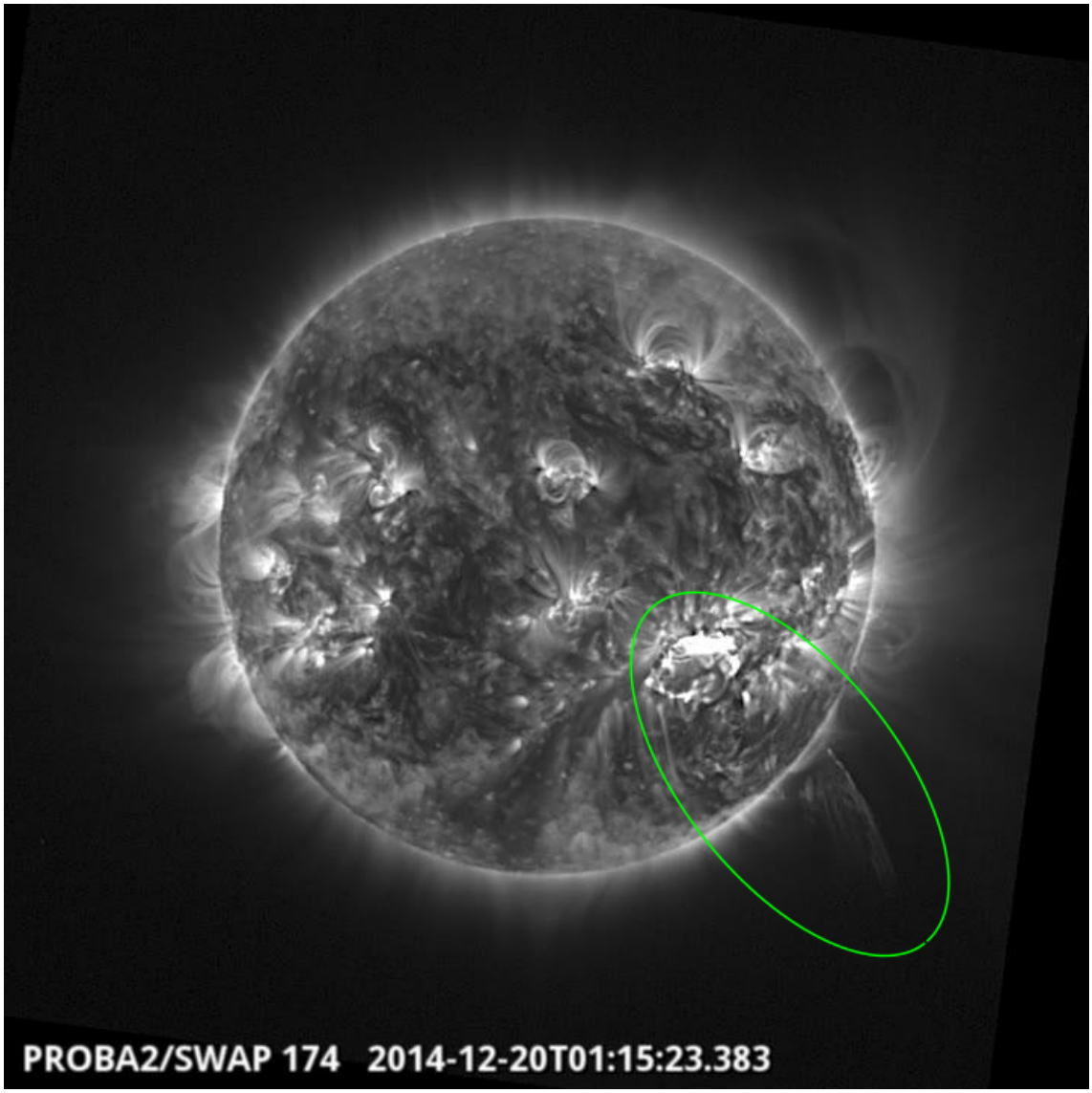


Eruption on the east limb @ 11:25 SWAP image
Find a movie of the event here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/20141218_swap_movie.mp4



Mflare in the Sun's centre @ 22:05 SWAP image
Find a movie of the event here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/20141218_swap_movie.mp4

Saturday Dec 20

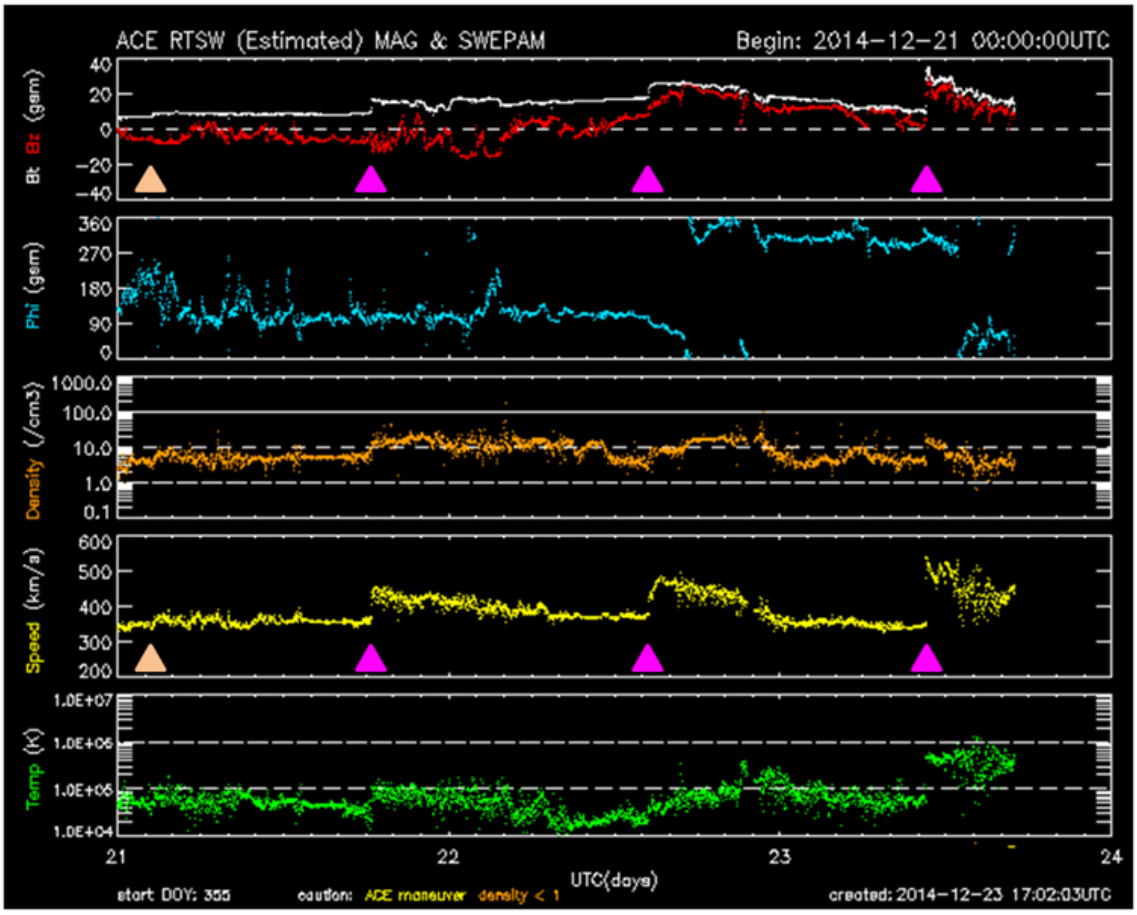


Xflare on the south west quad @ 01:15 SWAP image
Find a movie of the event here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/20141220_swap_movie.mp4

6. Review of geomagnetic activity (15 Dec 2014 - 28 Dec 2014)

Solar wind speed as observed by ACE started the period with nominal values between 330 and 540 km/s. The magnitude of the Interplanetary Magnetic Field (IMF) was stable and varied between 5 and 10 nT. Around 02:30UT on 21 December, the IMF jumped from 6 to 8 nT without a significant jump in solar wind speed. This discontinuity was probably the signature of the arrival of the CME from 17 December. See annotated ACE chart underneath (triangles mark the arrival of the discontinuity and shocks).
ACE observed a shock in the solar wind at 18:25UT on 21 December. Solar wind velocity went from 360 to 440 km/s instantaneously, accompanied by a sudden increase of the solar wind density and temperature. The magnitude of the IMF suddenly increased from 9 to 17 nT. This was probably a

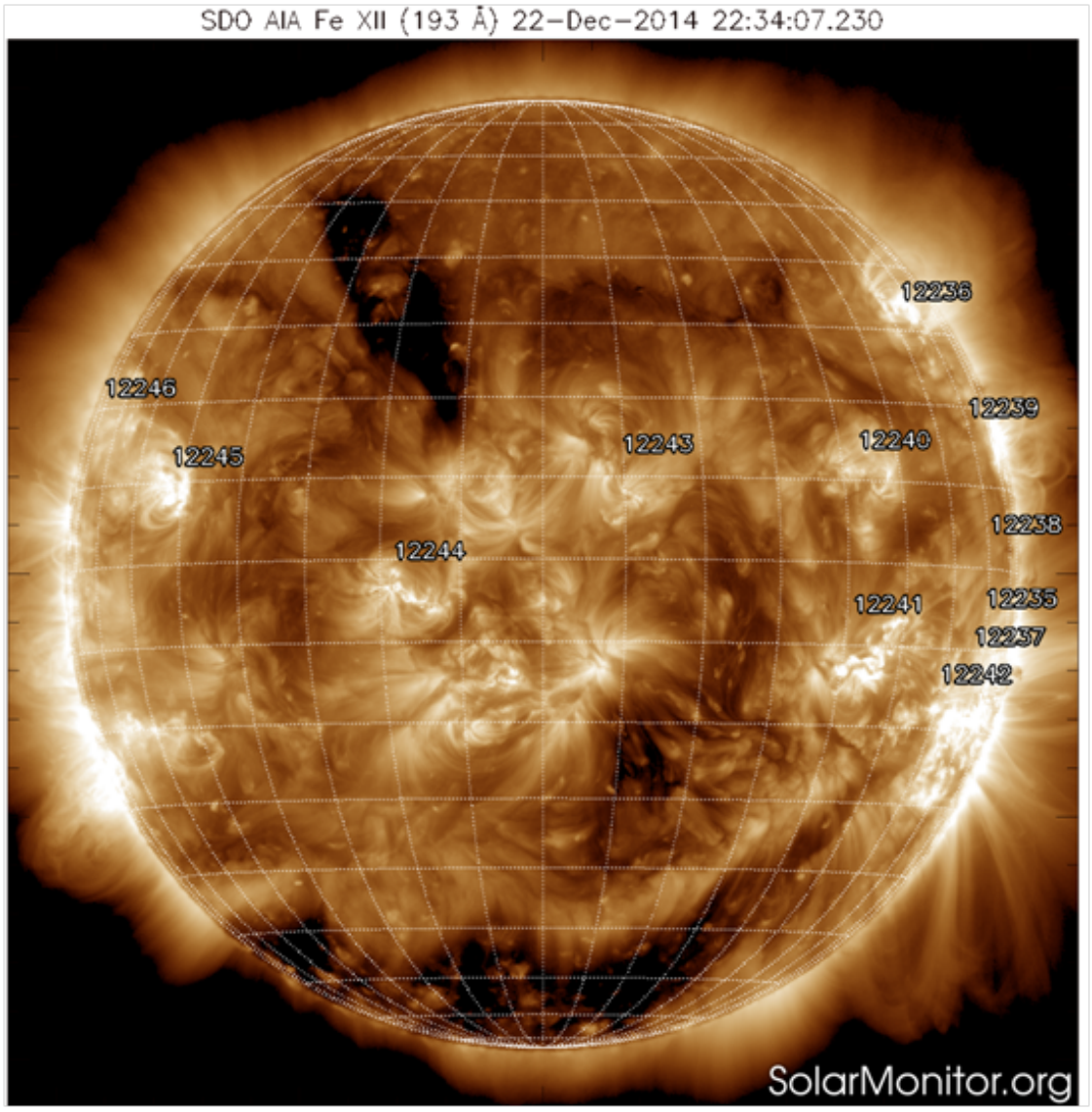
signature of the arrival of the CME from 19 December. Initially, active geomagnetic (Kp=4) conditions were recorded between 18:00-24:00UT on December 21. However, combined with a Bz that was mostly below -15 nT between 00:00-04:00UT on 22 December, the shock caused minor geomagnetic storm (Kp=5) registered between 00:00-06:00UT on 22 December. At Dourbes, K values of 3 to 4 were registered during the same period.
Solar wind measurements revealed the arrival of a second shock at 14:25UT on 22 December, related to the 20 December CME. Solar wind speed increased from 380 to about 460 km/s. Simultaneously, the magnitude of the IMF went from 18 to 26 nT and decreased then later on.
A third shock was recorded at 10:30UT on 23 December, and was associated to the 21 December CME. A sudden increase in solar wind speed occurred, going from 350 to 550 km/s, accompanied by a jump in density and temperature. The IMF magnitude jumped from 10 to 33 nT. Bz was mainly positive on 22 and 23 December, but turned negative near the end of the 23rd. This resulted in active geomagnetic conditions and locally a brief episode of minor storming was recorded.



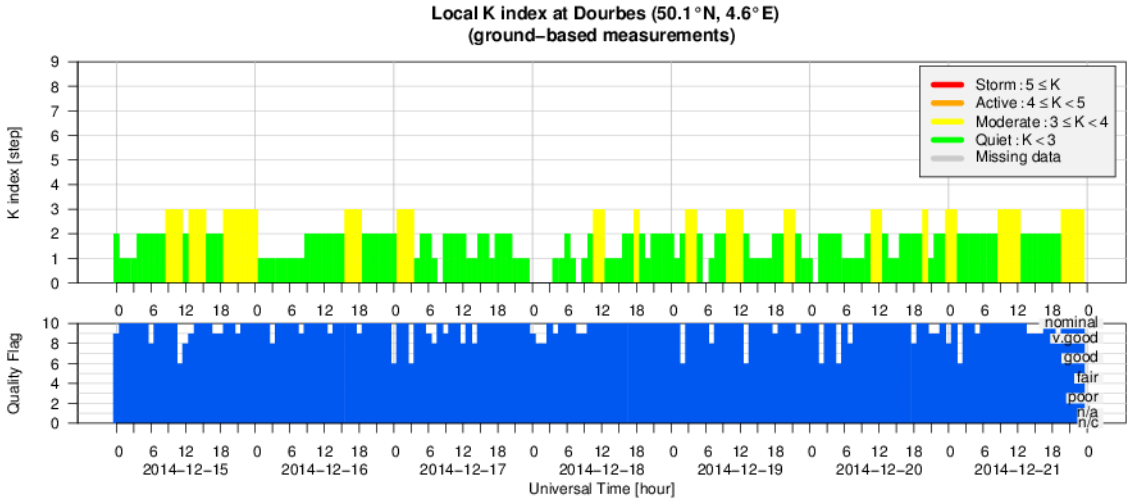
For the remainder of the week (from 24 till late 28 December), the solar wind speed varied mostly between 540 and 350 km/s, in an overall decreasing trend. The IMF magnitude varied between 5 and 13 nT, with a fluctuating, but quite often negative, Bz component. Local geomagnetic activity (Dourbes) showed numerous episodes of active levels (K=4) from 22 till 26 December, with one time slot of minor storm level late on 23 December, in response of CME activity as discussed above. Quiet conditions resumed from then on.

Around 18:00UT on 28 December, the solar wind speed started to increase and was still increasing by the end of the period. This high speed stream (HSS) is likely related to a coronal hole (CH) that crossed

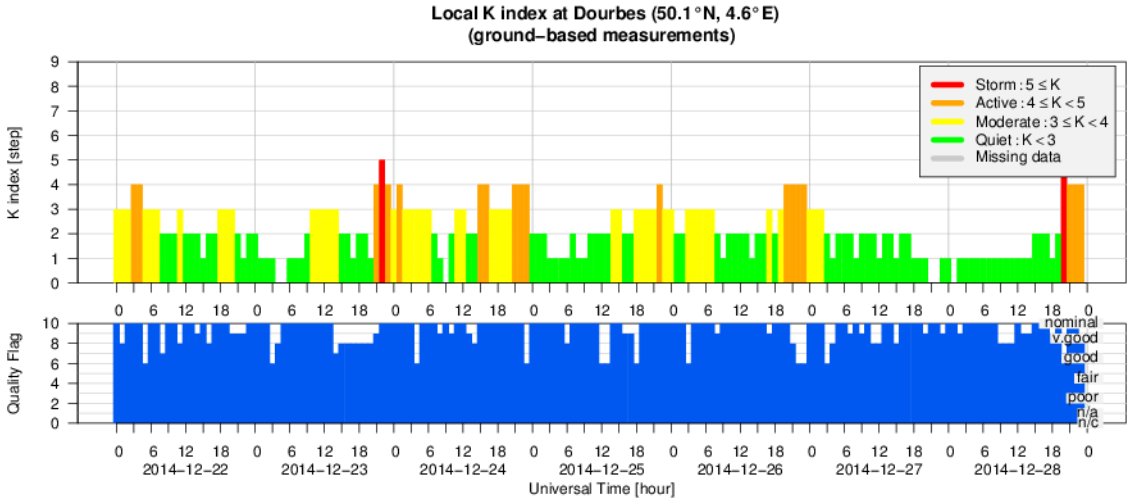
the central meridian on 22-23 December. Active geomagnetic conditions to locally minor geomagnetic storming were observed.



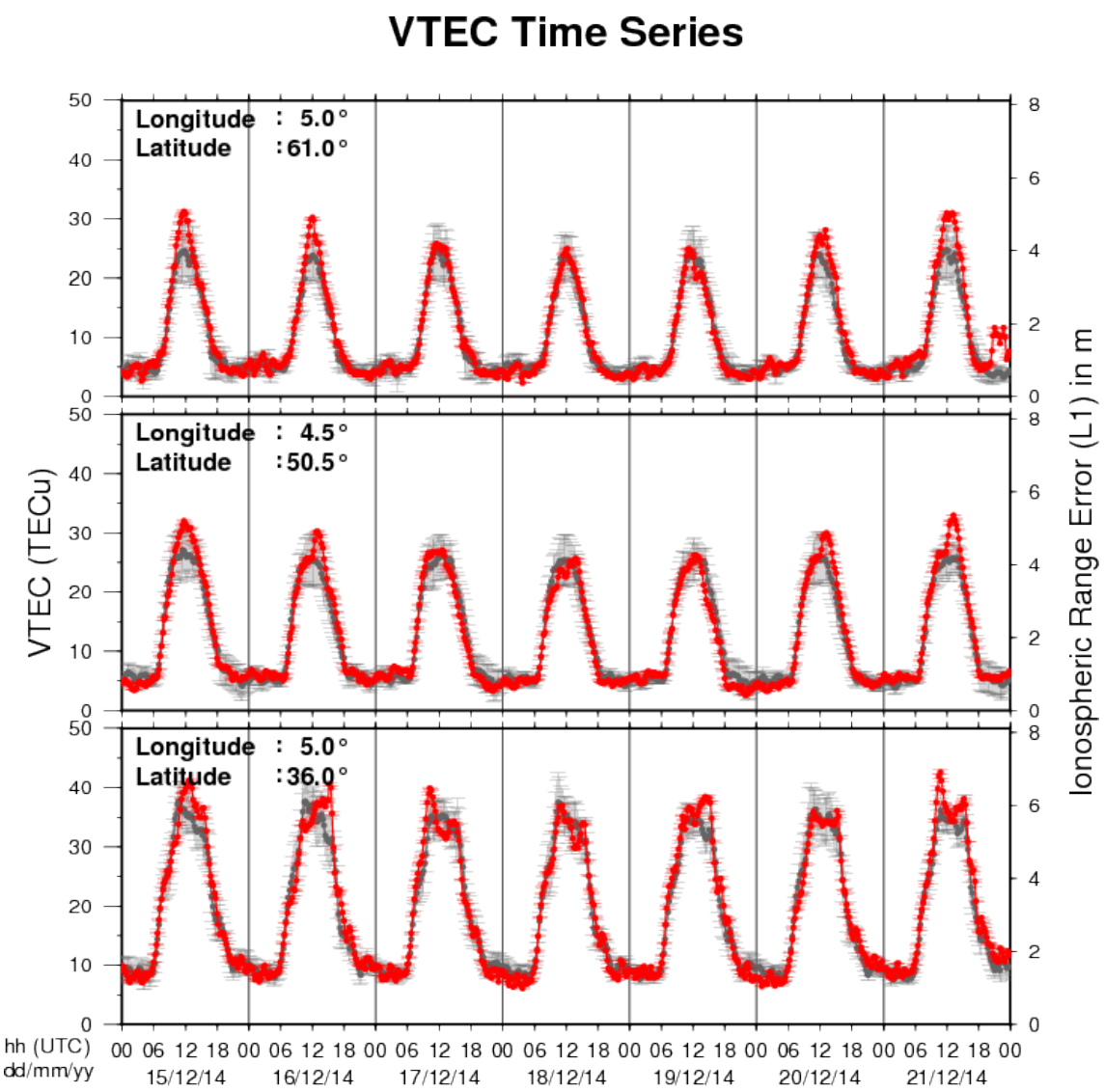
7. Geomagnetic Observations at Dourbes (15 Dec 2014 - 21 Dec 2014)



8. Geomagnetic Observations at Dourbes (22 Dec 2014 - 28 Dec 2014)



9. Review of ionospheric activity (15 Dec 2014 - 21 Dec 2014)

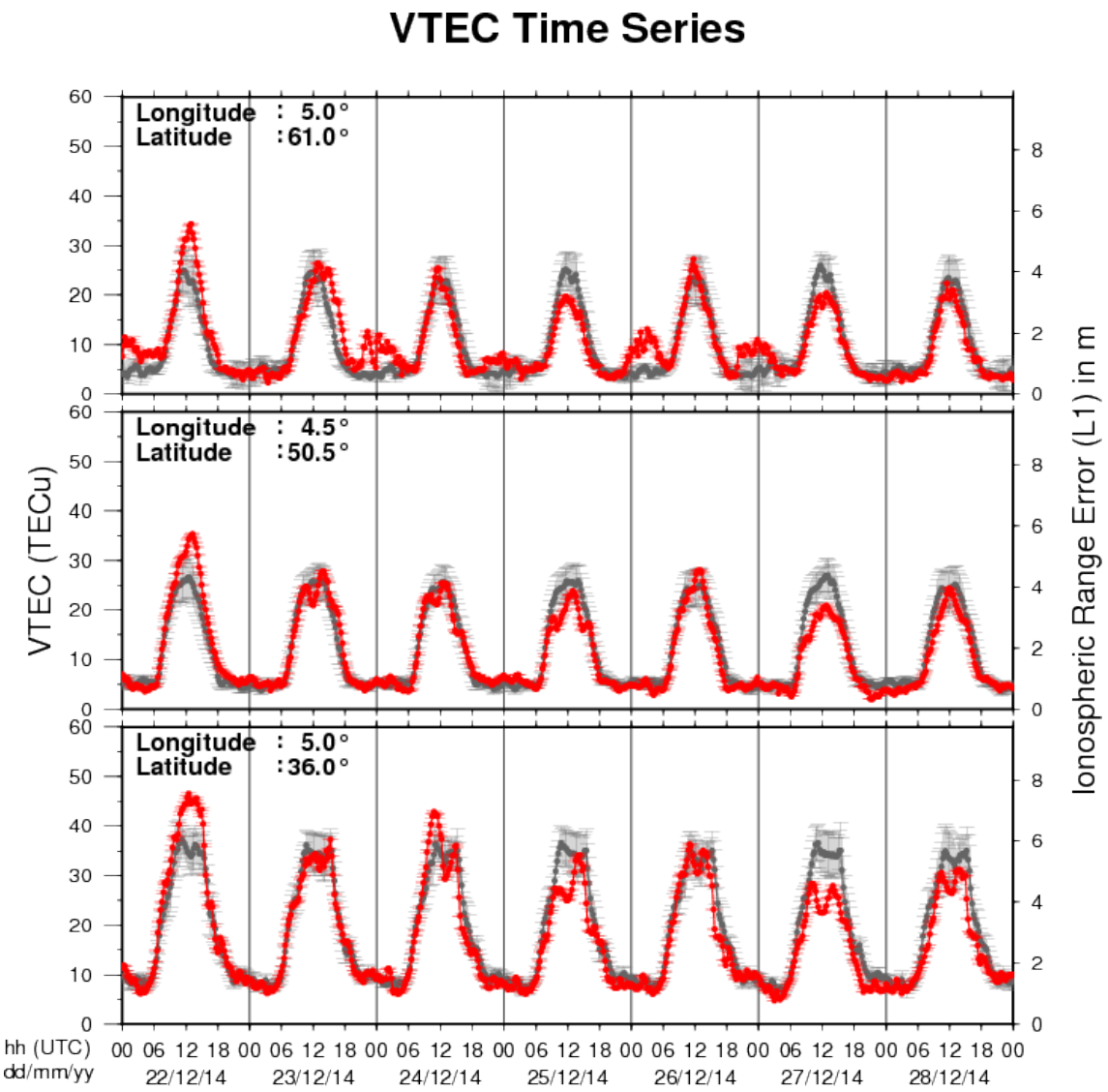


The figure shows the time evolution of the Vertical Total Electron Content (VTEC) (in red) during the last week at three locations:
a) in the northern part of Europe(N61°, 5°E)
b) above Brussels(N50.5°, 4.5°E)
c) in the southern part of Europe(N36°, 5°E)
This figure also shows (in grey) the normal ionospheric behaviour expected based on the median VTEC from the 15 previous days.

The VTEC is expressed in TECu (with 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

10. Review of ionospheric activity (22 Dec 2014 - 28 Dec 2014)



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11. 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 or 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 Schoool 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, Hα, 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/

12. New documents in the European Space Weather Portal Repository

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

eHEROES - Zonnestormen tijdens Zonnecyclus 24

Lecture focusing on the effects of space weather, extreme space weather during SC24, and the space weather forecasting at the Space Pole (RWC Brussels). The lecture was given to the Public Observatory Beisbroek / COZMIX in Beisbroek, Brugge, Belgium. Solar amateur astronomers and public audience, in Dutch, about 35 attendees.
http://www.spaceweather.eu/en/repository/show?id=554

ESWW11 - Flaring activity in NOAA 2158

This presentation was given during the "ESWW11 – Forecaster Forum" splinter on 18 November 2014. It focuses on the forecast and evaluation of the flaring activity in sunspot group NOAA 2158 (September 2014). There were about 70 attendees (scientists).
http://www.spaceweather.eu/en/repository/show?id=555