STCE Newsletter

28 Oct 2013 - 3 Nov 2013

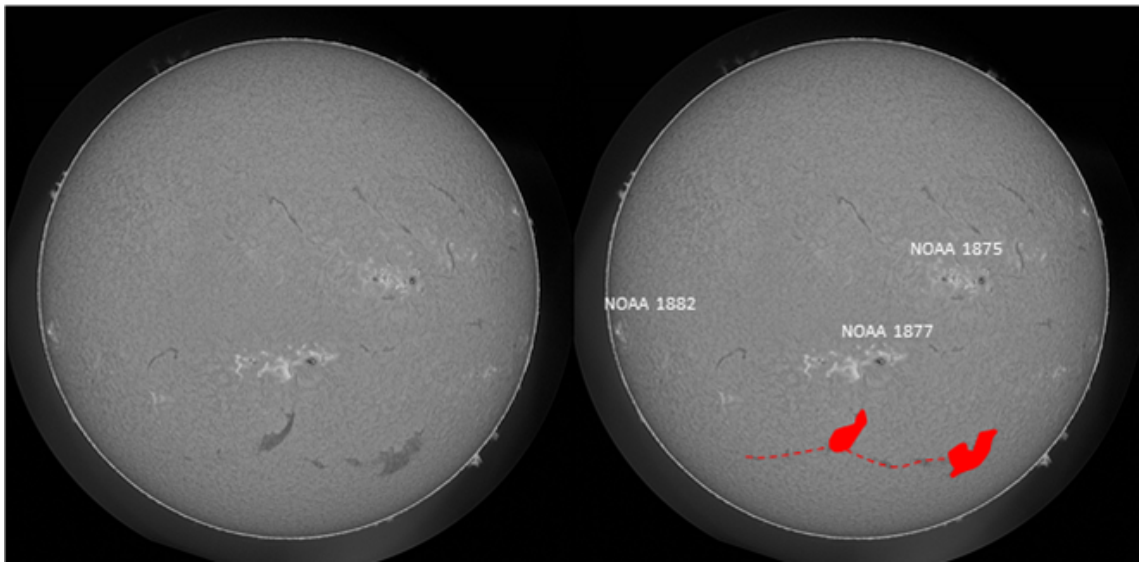
Published by the STCE - this issue : 8 Nov 2013. Available online at http://www.stce.be/newsletter/ .

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.

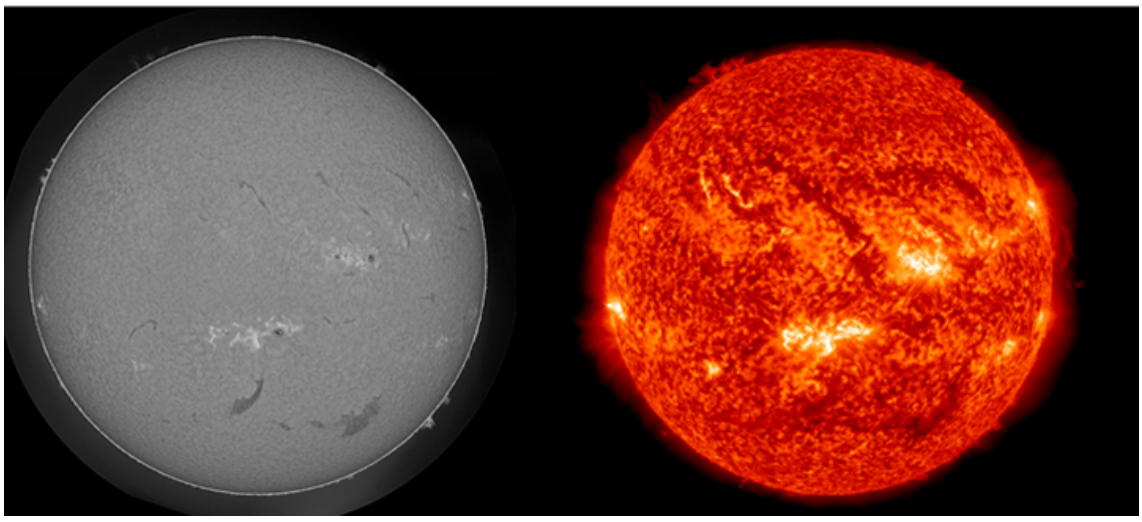
Final Editor : Petra Vanlommel
Contact : R. Van der Linden, General Coordinator STCE,
Ringlaan - 3 - Avenue Circulaire, 1180 Brussels,
Belgium

1. Teambuilding activity for sunspot groups (28 Oct 2013 - 3 Nov 2013)

Every year, many companies organize activities for their personnel in order to have some fun and to strengthen the team spirit. Late October, some sunspot groups got the same idea. However, their idea of a fun team building activity was quite different: Together, they wanted to destroy a nearly million km long solar filament. This spectacular movie at http://www.youtube.com/watch?v=Lecb6oEme5E reveals how they did it.

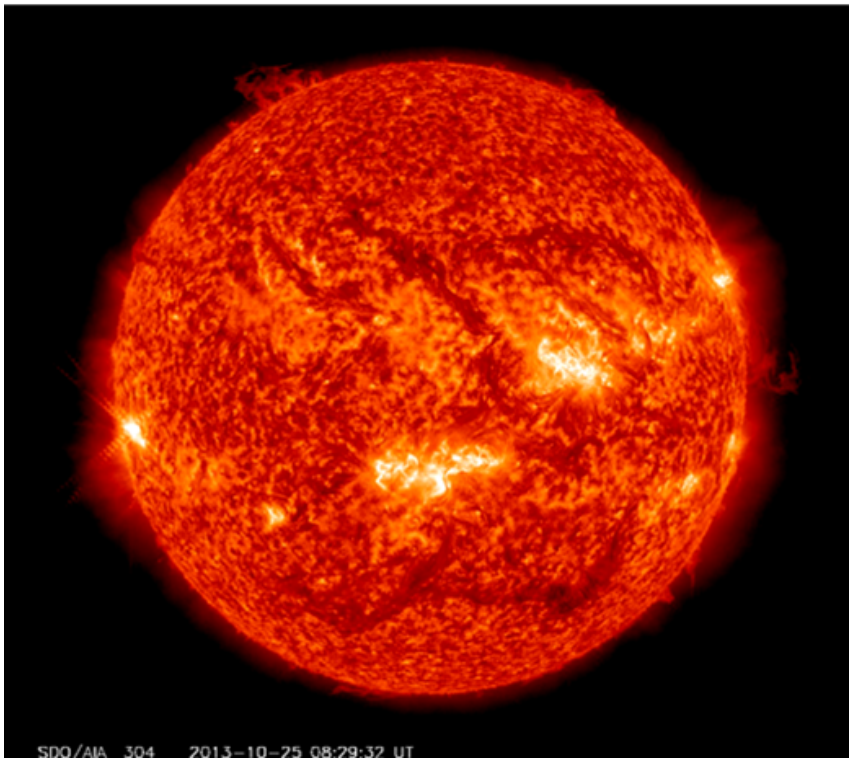


The team of sunspot groups consisted of NOAA 1875, 1877 and 1882. These complex groups (see the previous STCE Newsletter at http://www.stce.be/news/222/welcome.html) produced several strong flares and were certainly up for the job. The unsuspecting victim was a collection of filamentary bits and pieces around two big blobs of "cold" plasma on the southern hemisphere (see annotated H-alpha image above). The small filamentary pieces were better visible in EUV filters such as AIA 304, indicating that they consisted of slightly hotter material than the two H-alpha blobs (see image below).

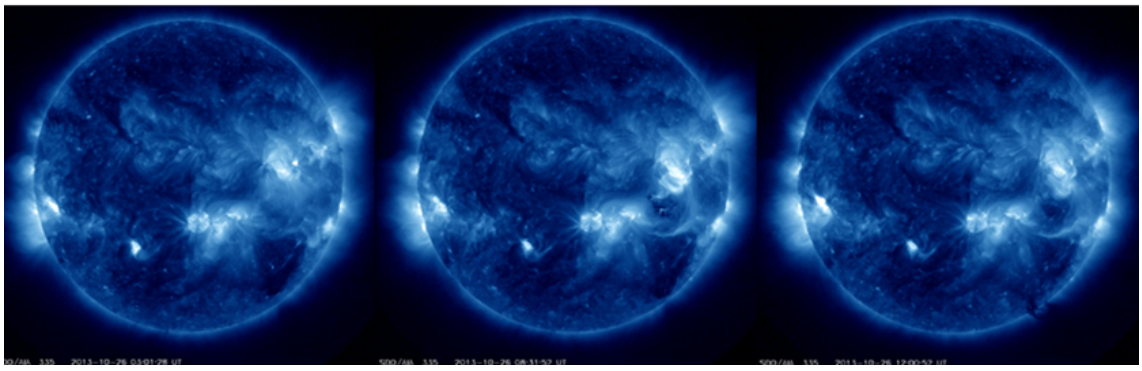


The westward (trailing) part of the filament erupted during the morning hours of 25 October, following the X1.7 flare in NOAA 1882. See the previous STCE Newsletter at http://www.stce.be/news/222/

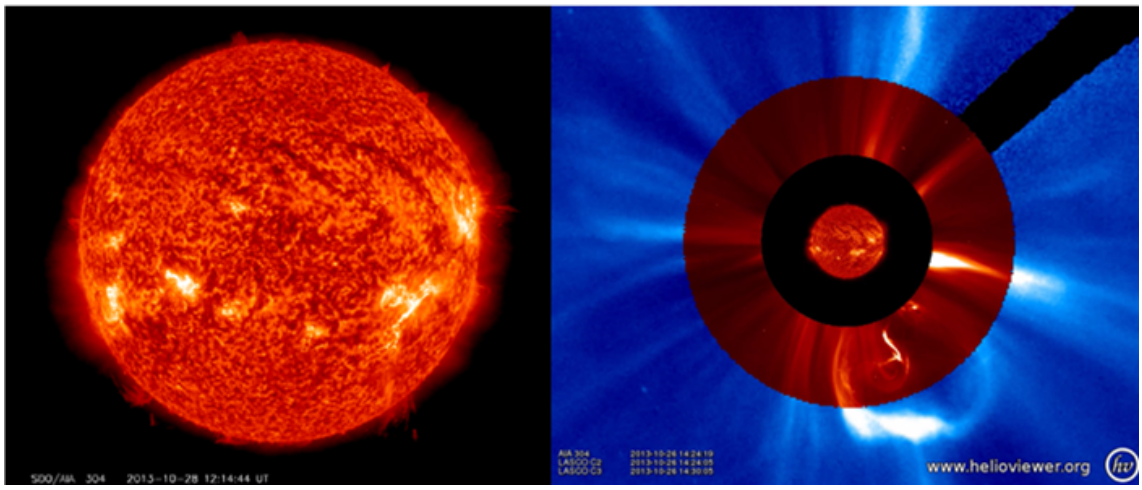
welcome.html for more details on this eruption. Image underneath shows the fading flare in NOAA 1882 simultaneously with the already rising westward part of the filament. Interestingly, this filament eruption did not seem to have produced a (substantial) coronal mass ejection (CME).



NOAA 1875 was more subtle. Instead of brute force, it used several small C-flares to induce a major magnetic restructuring between NOAA 1875 and 1877, including a material ejection and a transient coronal hole. This resulted in the eastern (rightmost) plasma blob to become unstable and erupt starting around 09:00UT on 26 October. It produced a very nice CME with core filament. The magnetic restructuring is best visible in EUV filters showing the million degree hot corona.



Following spectacular X- and M-class flaring activity in sunspot region NOAA 1875 early on 28 October, the magnetic fields around NOAA 1877 became unstable and an M1.4-flare occurred peaking at 11:53UT. The restructuring magnetic fields caused a violent ejection of the remaining filament. Here too, a not-Earth-directed CME could be observed.



Mission accomplished: great teamwork by the sunspot groups resulted in the annihilation of a million km long solar filament!

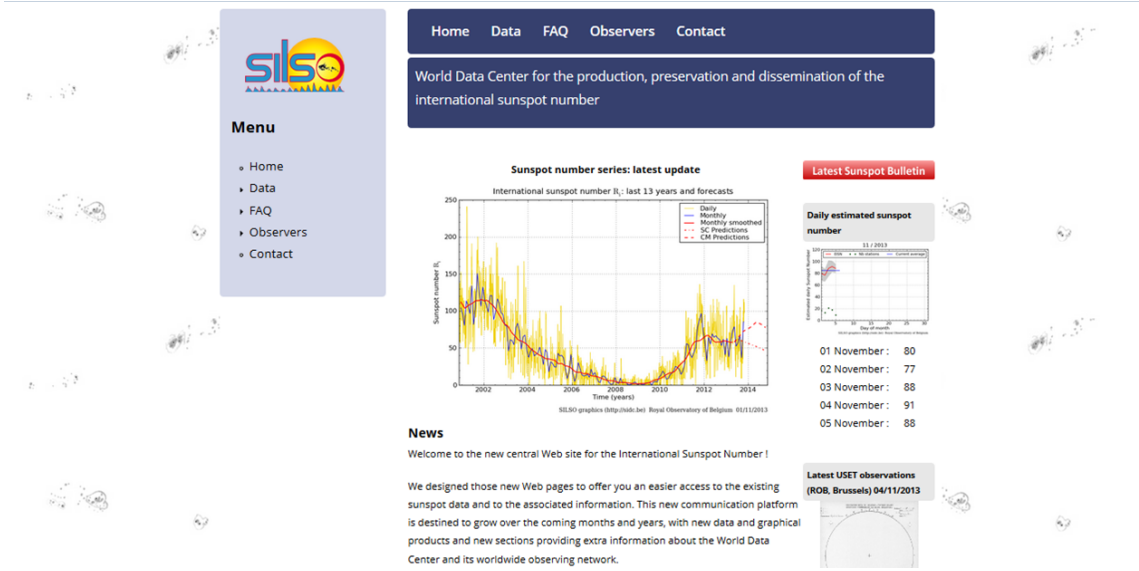
Credits - Images were taken from the GONG H-alpha Network (http://halpha.nso.edu/), SDO (http://sdo.gsfc.nasa.gov/), SOHO (http://sohowww.nascom.nasa.gov/) and Helioviewer (www.helioviewer.org/).

2. The WDC - Sunspot Index becomes SILSO! (28 Oct 2013 - 3 Nov 2013)

Introduction - On 5 November 2013, the new SILSO webpages (WDC Sunspot) at http://www.sidc.be/silso were officially released. Simultaneously, the new name and logo for the WDC were also announced.

From SIDC to SILSO

Over the past two years, a profound modernization of the sunspot index processing has been undertaken. So far, this evolution remained largely invisible to our users but in the coming months, it will lead to improved and expanded data products. Moreover, a full revision of the historical sunspot index series itself is also in preparation, following a series of Sunspot Number Workshops that started in 2011 (http://ssnworkshop.wikia.com/wiki/Home). In view of this major step, we have now created a brand new website that is destined to become the central portal for accessing the sunspot index data and other long-term records of solar activity: http://www.sidc.be/silso.



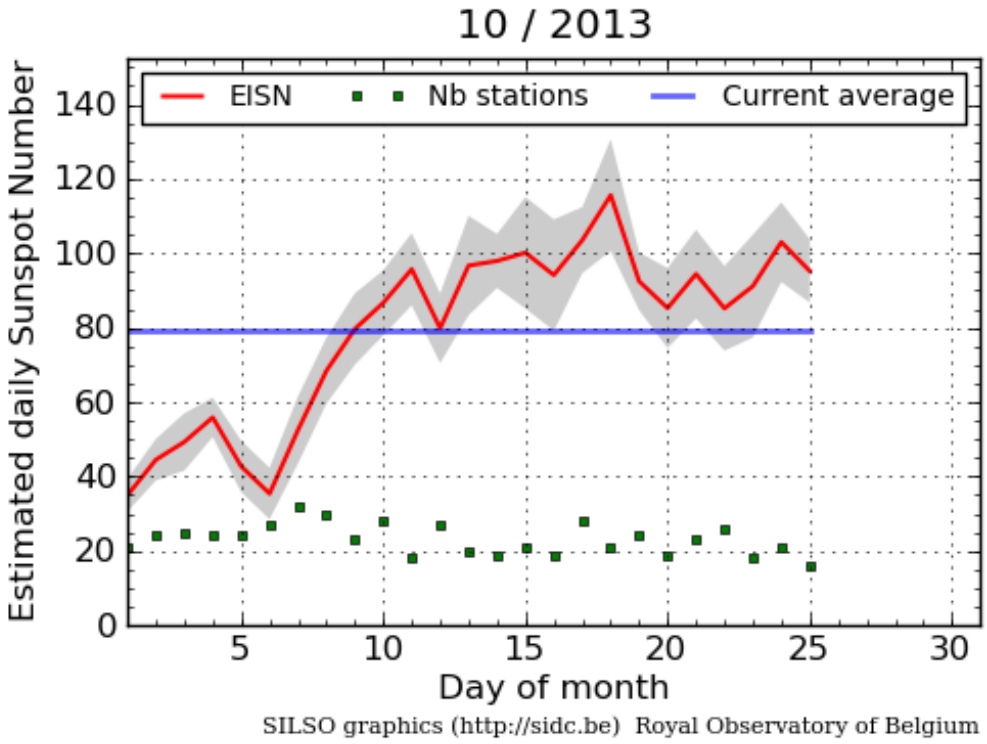
In order to reflect this major milestone and the new scope of our World Data Center (WDC), we also decided to adopt a new name and acronym: SILSO for "Sunspot Index and Long-term Solar Observations", with a new logo.

SILSO also becomes our new official name as member of the ICSU World Data System (http://www.icsu-wds.org/). The WDC-SILSO remains hosted at the SIDC Brussels. Since 1981, the SIDC (originally "Sunspot Index Data Center") evolved to become the overarching name of the current Solar physics team of the Royal Observatory of Belgium ("Solar Influences Data analysis Center"). In the very wide range of activities and projects encompassed by the current SIDC, SILSO now gathers all long-term ground-based services and research activities addressing the specific needs of our users interested primarily in the evolution of solar activity and Sun-Earth relations over long timescales.

The new SILSO Web site

It is thus with pleasure that we publicly release our new SILSO website: http://www.sidc.be/silso We designed those new webpages to provide a user-friendly access to the existing sunspot data and to the associated information. This new communication platform is destined to grow over the coming weeks and months, with new data and graphical products and new sections providing additional information about the World Data Center, its methods and its worldwide observing network.

In order to avoid an abrupt transition for our users, the current initial version still provides our data files in their traditional format, but it already includes various additional features: improved data documentation, a dynamical plot of the latest estimated international sunspot number (EISN) updated every 5 minutes, files in CSV-format (for direct import in your favorite spreadsheet) and a FAQ section.



Please explore the new sections and don't hesitate to make comments and suggestions. New ideas are always welcome and we will strive to implement them while the site is maturing. Our future plans include e.g. SILSO network statistics, error bars on the sunspot numbers and the extension of the group number series (Hoyt and Schatten, 1998).

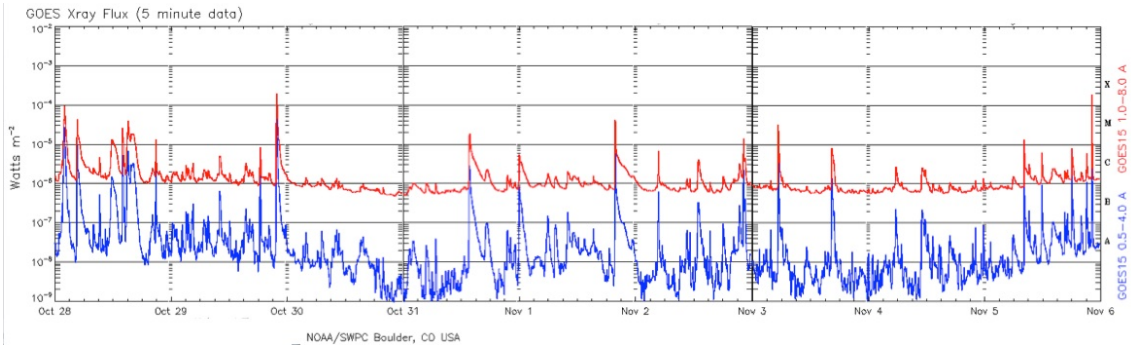
So, please bookmark this new central "Sunspot" website and stay tuned for upcoming changes and new features!

Frédéric Clette
WDC Director
frederic.clette@oma.be

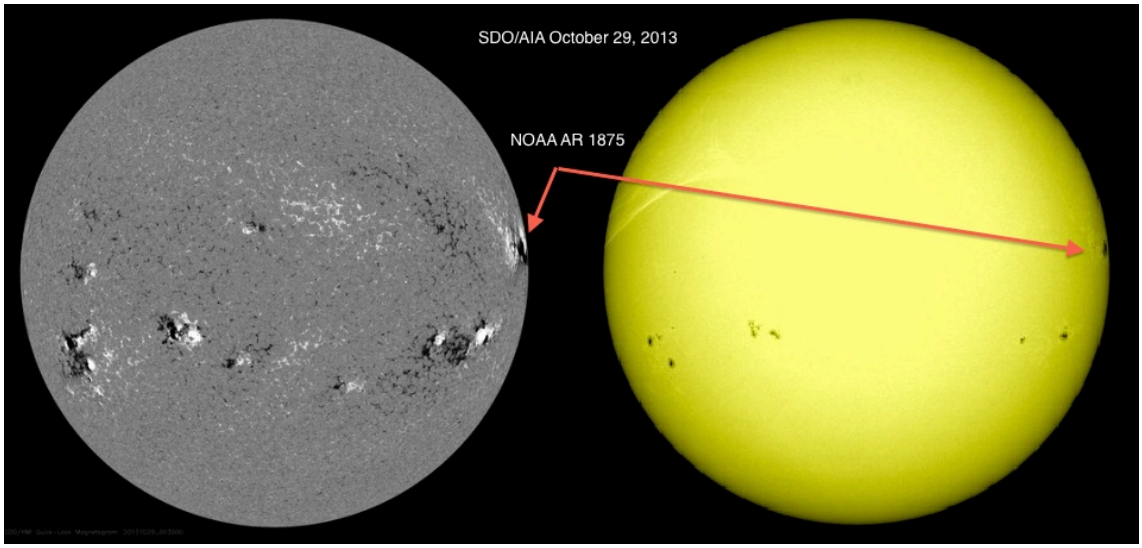
3. Review of solar and geomagnetic activity (28 Oct 2013 - 3 Nov 2013)

SOLAR ACTIVITY

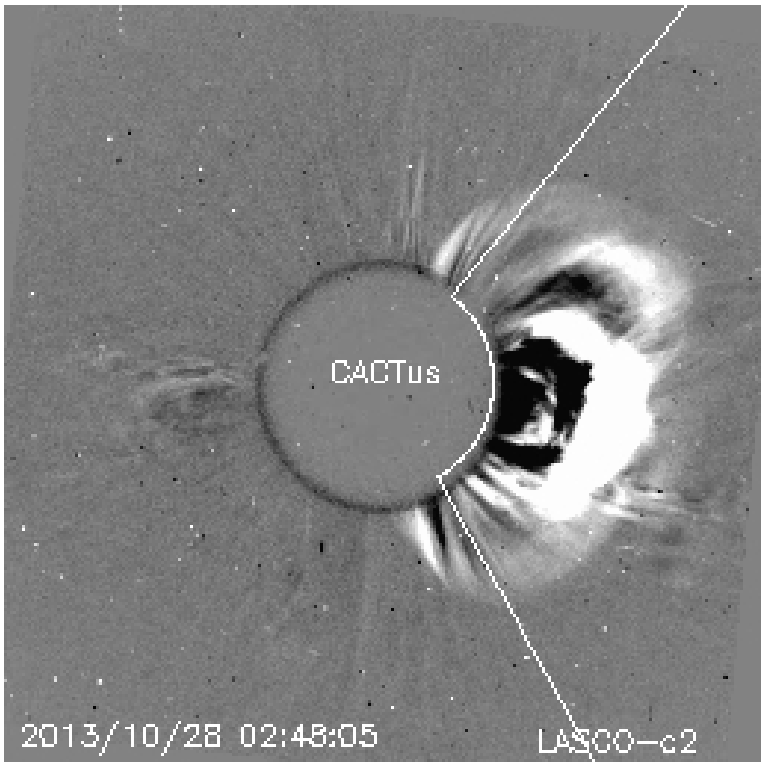
High intensity X-ray flares were observed from October 28 to November 3, in total 2 X and 10 M flares. The X-ray back ground radiation was even in the C-level on October 28 and 29. October 30 was the day with less activity compared to the rest of the week: only C-flares. The X-ray radiation curve peaked again into the M-level from Halloween to November 3: 1 M flare a day.



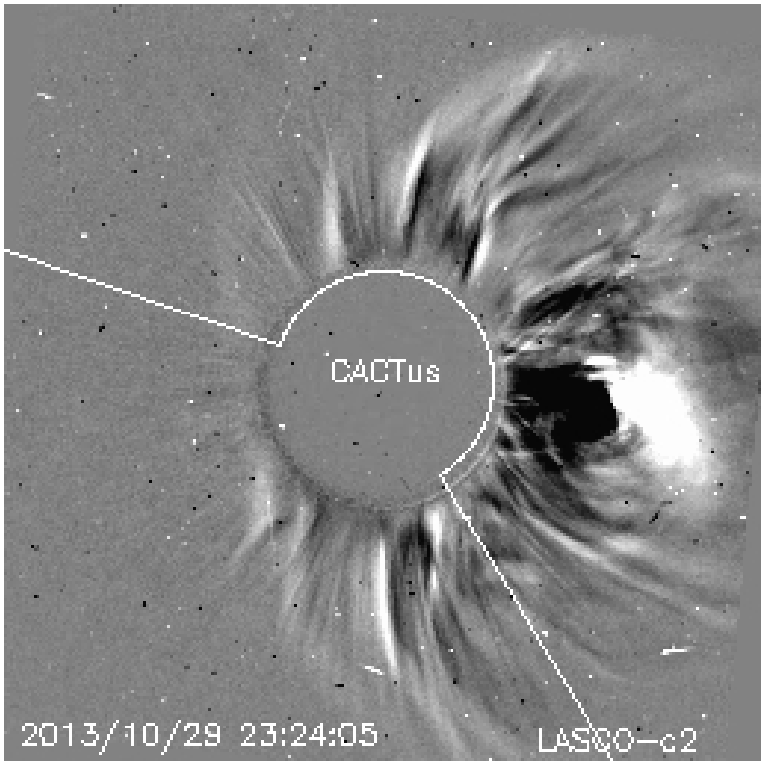
Beta-gamma-delta NOAA AR 11875 was the most active region responsible for 3 M-flares on October 28 and the two X-flares on October 28 and 29.



The October 28 X1.0 flare peaked at 01:41 UT and was associated with a Type II burst (estimated shock speed 700 km/s by Culgoora). The mass ejection linked to this event was visible in LASCO/C2 at 02:00UT. CACTus estimated the speed of the visible front of the plasma structure moving through the LASCO/C2 plane of view to be 753 km/s (check http://sidc.oma.be/cactus/catalog/LASCO/2_5_0/qkl/2013/10/CME0156/CME.html).



Also the October 29 X2.3 flare peaking at 21:54UT was accompanied by a Type II burst (estimated shock speed: 600 km/s by Culgoora). The speed estimated by CACTus based on LASCO/C2 images was 558 km/s. This CME was wider compared to the October 28 CME. (Check http://sidc.oma.be/cactus/catalog/LASCO/2_5_0/qkl/2013/10/CME0189/CME.html)



Once AR 11875 rotated to the far side of the Sun, beta-gamma-delta region NOAA AR 11884 took the lead and produced three M and several C flares.

A few other halo CMEs were registered: the October 28 CME coming into the field of view (FOV) of LASCO/C2 at 15:36 UT (check http://sidc.oma.be/cactus/catalog/LASCO/2_5_0/qkl/2013/10/CME0171/CME.html) and two backsided CMEs on November 2 (in FOV of LASCO/C2 at 5:00 UT and 8:12 UT). All CMEs were associated with an event originating from NOAA AR 11875.

GEOMAGNETIC ACTIVITY

Solar wind data measured by ACE indicated the arrival of a small shock around 7:00 UT On October 29, related to the arrival of the CMEs of October 25. An increase in the solar wind speed and temperature was observed from 22:00 UT on November 2. The geomagnetic influence of these transients was limited; the local K values at Dourbes and NOAA's estimated planetary Kp index were at most 3.

4. Noticeable Solar Events (28 Oct 2013 - 3 Nov 2013)

DAY	BEGIN	MAX	END	LOC	XRAY	OP	10CM	TYPE	Cat	NOAA
28	0141	0203	0212	N4W66	X1.0	2N	120	III/2II/2	16	1875
28	0432	0441	0446	N8W71	M5.1	2B	170	II/3II/2IV/1V	18	1875
28	1132	1153	1239	S16W44	M1.4	2N		VI/1CTM/1	18	1877
28	1400	1405	1412	N6W75	M2.8	1N	55	III/2	16	1875
28	1446	1501	1504	S8E28	M2.7	1N			23	1882
28	1507	1515	1521		M4.4		170	II/1II/2IV/1	23	1882
28	2048	2057	2102		M1.5			V/2III/3	16	1875
29	2142	2154	2201		X2.3			II/1IV/1	16	1875
31	1336	1351	1402		M1.9					1877
01	1946	1953	1958	S11E1	M6.3	1B	290		29	1884
02	2213	2221	2225	S12W11	M1.6	1F			29	1884
03	0516	0522	0526	S12W16	M5.0	2B			29	1884

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 (28 Oct 2013 - 3 Nov 2013)

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 188)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR188_Oct28_Nov03/weekly_movie_2013_10_28.mp4

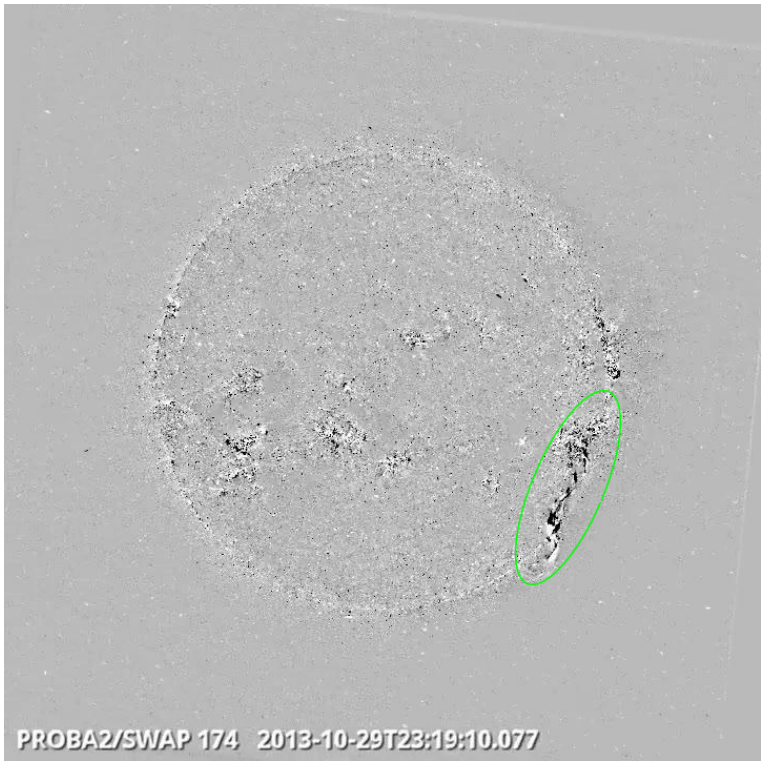
Details about some of this week's events, can be found further below.
The active region NOAA 1875 has been particularly active on Tuesday Oct 28.

Monday Oct 28:

Eruption on the south west quadrant @ 12:00 - SWAP difference image
Find a movie of the events here (SWAP difference movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR188_Oct28_Nov03/Events/20131028_Eruption_SoutWestQuad_1200_swap_diff.mp4
Find a movie of the events here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR188_Oct28_Nov03/Events/20131028_Eruption_SoutWestQuad_1200_swap_movie.mp4

Eruption and EIT wave on the east half @ 15:21 - SWAP difference image
Find a movie of the events here (SWAP difference movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR188_Oct28_Nov03/Events/20131028_EruptionEITwave_SouthEastQaud_1521_swap_diff.mp4
Find a movie of the events here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR188_Oct28_Nov03/Events/20131028_EruptionEITwave_SouthEastQaud_1521_swap_movie.mp4

Tuesday Oct 29:

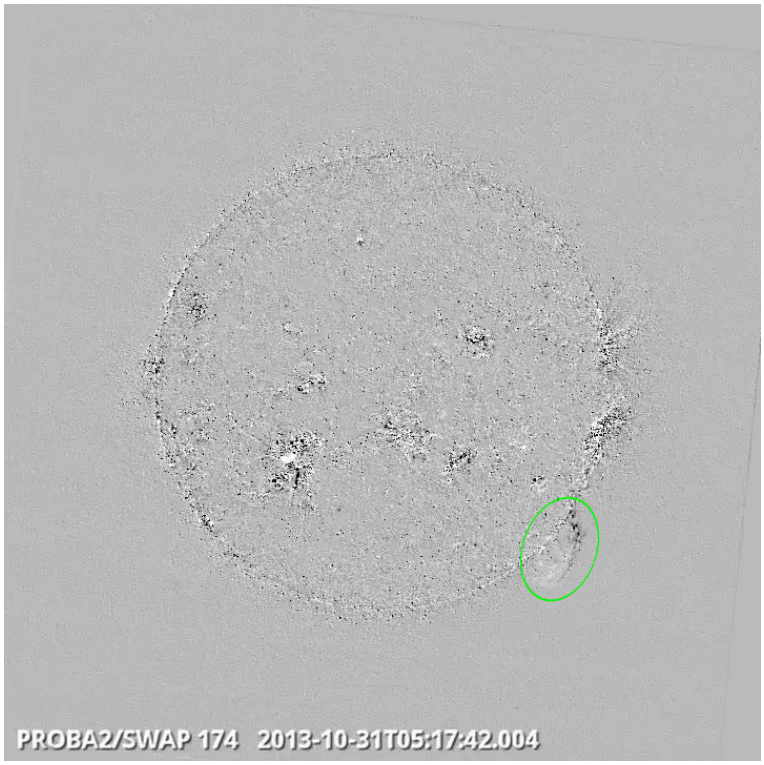


Flow on south west quad @ 23:19 - SWAP difference image
Find a movie of the event here (SWAP difference movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR188_Oct28_Nov03/Events/20131029_Flow_SouthWestQuad_2319_swap_diff.mp4

Wednesday Oct 30:

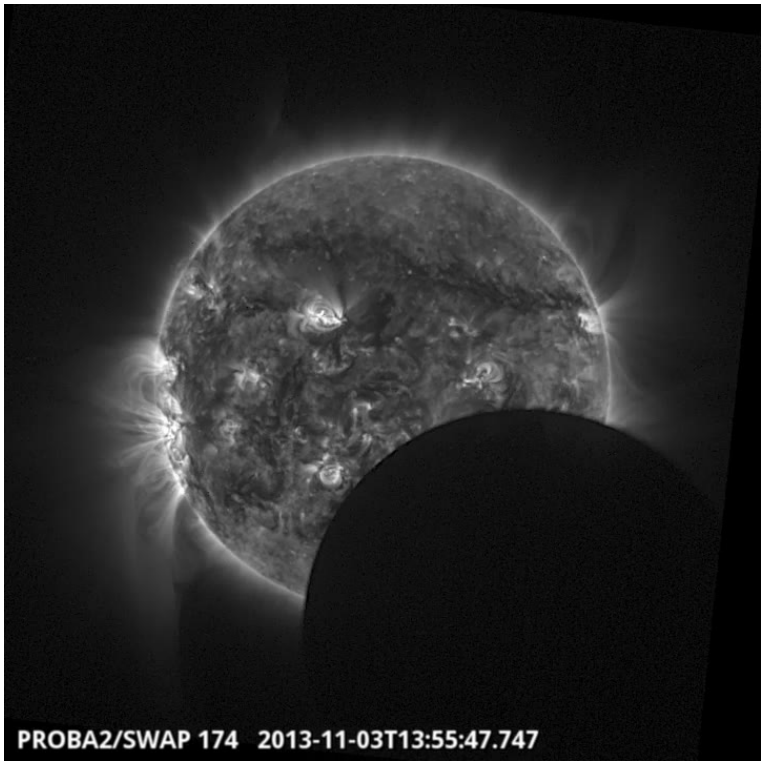
Eruption on south east limb @ 09:48 - SWAP difference image
Find a movie of the event here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR188_Oct28_Nov03/Events/20131030_Eruption_WestSouth_0948_swap_movie.mp4

Thursday Oct 31:



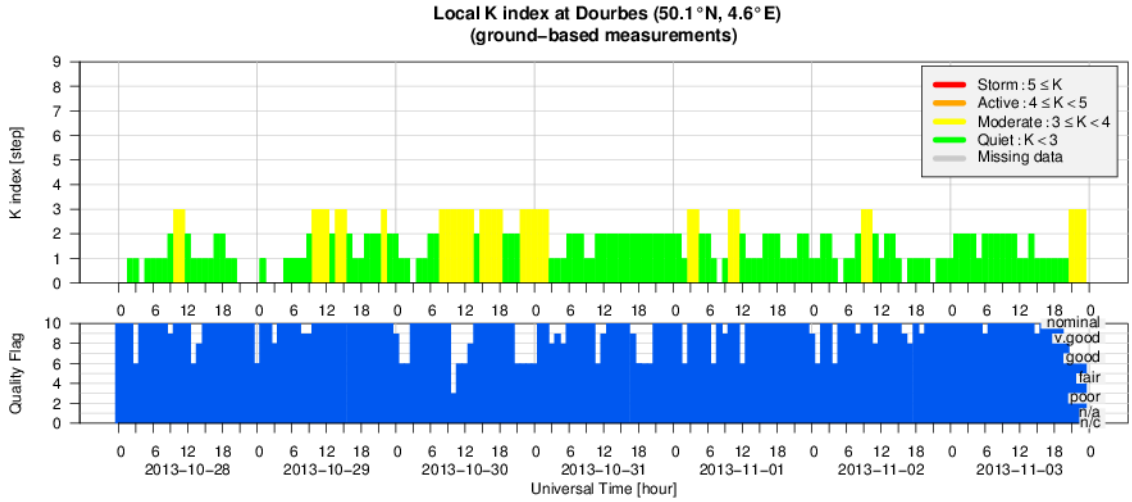
Flow on the south west limb @ 05:17 - SWAP difference image
Find a movie of the event here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR188_Oct28_Nov03/Events/20131031_Flow_SouthWestLimb_0517_swap_movie.mp4

Sunday Oct 03:

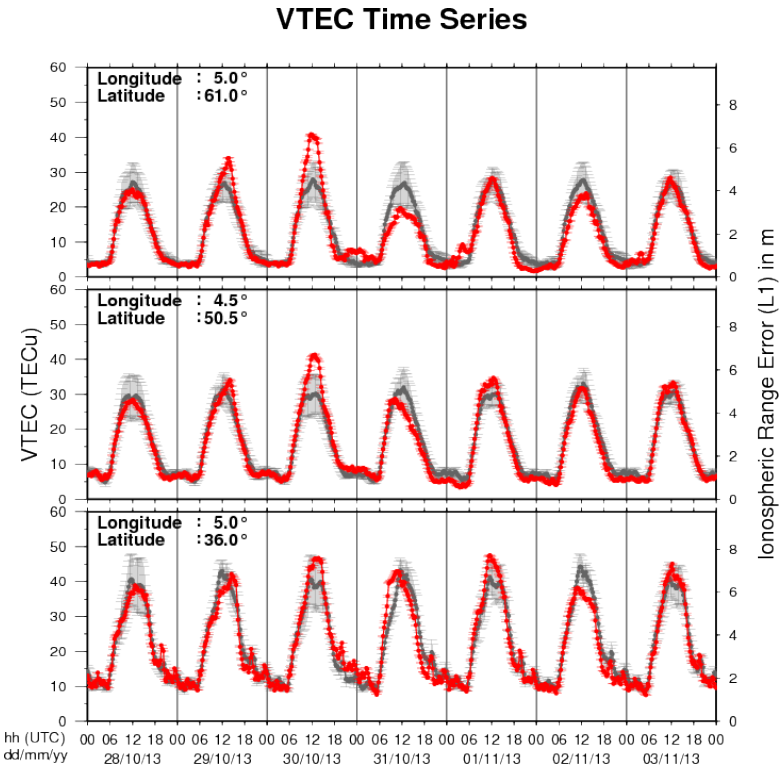


Partial solar eclips @ 13:55 - SWAP difference image
Find a movie of the event here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR188_Oct28_Nov03/Events/20131103_Eclips_1355_swap.mp4

6. Geomagnetic Observations at Dourbes (28 Oct 2013 - 3 Nov 2013)



7. Review of ionospheric activity (28 Oct 2013 - 3 Nov 2013)



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

8. Future Events

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

25th Winter School of Astrophysics: Cosmic Magnetic Fields, in La Laguna, Tenerife, Spain.

Start : 2013-11-11 - End : 2013-11-22

Magnetic fields play an important role in many astrophysical processes. But magnetic are difficult to detect and to model or understand, since the fundamental equations describing the behavior of magnetized plasmas are highly non-linear. Hence, magnetic fields are often an inconvenient subject which is overlooked or simply neglected. Such difficulty burdens the research on magnetic fields, which has evolved to become a very technical subject, with many small disconnected communities studying specific aspects and details.
The school tries to amend the situation by providing a unifying view of the subject. The students would have a chance to understand the behavior of magnetic fields in all astrophysical contexts, from cosmology to the Sun. From star-bursting regions to AGNs in galaxies. The school will present a balanced yet complete review of our knowledge. Extensions into the unknown are also important to indicate present and future lines of research.
The Winter School will bring together in a relaxed working atmosphere a number of the leading scientists in this field, PhD students and recent postdocs. The conditions for a successful interaction will be granted, including two special sessions for those students that want to present their own work.
Website:
http://www.iac.es/winterschool/2013/

7th Hinode science meeting in Takayama, Japan

Start : 2013-11-12 - End : 2013-11-15
Since its launch in Sep-2006, more than 600 refereed papers have been published based on Hinode observations, presenting many new and important findings to the scientific community. However, due to the unexpectedly low levels of solar activity, until now the focus has mainly been on the more quiescent aspects of the solar cycle. With the solar maximum expected this year, through cooperative observations with SDO, IRIS, and ground based observatories, Hinode observations should lead to our understanding of active Sun phenomena, such as solar flares and CMEs, to be greatly improved. Making Hinode-7 an excellent opportunity to discuss solar activity in the current solar cycle and the related science through the use Hinode data, as well as other solar/space weather data. It will also be interesting to use this meeting to broaden our focus to include the solar-stellar connection as a means to deepen our understanding of solar activity.
Momentum is also gaining for Solar-C, which is being developed as an international collaboration between Japan, US and Europe. To further discuss this mission, the Solar-C science meeting will be held on 11-Nov.
Website:
http://www.kwasan.kyoto-u.ac.jp/hinode-7/

Space Weather: the importance of observations in London, UK

Start : 2013-11-13 - End : 2013-11-13
Most space weather occurs due to the Sun's emissions which can affect the Earth's space environment. Modern society is ever more dependent upon ground-based & spaceborne technology which can be vulnerable to space weather. Satellites, GPS, aviation & the electric power industry are all at risk from this & hence space weather is now included on the UK's National Risk Register. It is important to have long-running, continuous observations for forecasting, nowcasting & for research in space weather. This public meeting, held during the peak of the 11 year solar cycle, addresses the deficiency in continuous, long-term observations & how this might be overcome.
Website:
http://www.rmets.org/events/space-weather-importance-observations

International CAWSES-II Symposium in Nagoya, Japan

Start : 2013-11-18 - End : 2013-11-22
This International CAWSES-II Symposium hosted by SCOSTEP (Scientific Committee on Solar-Terrestrial Physics) will provide an excellent opportunity to discuss the scientific accomplishments of CAWSES-II and look forward to SCOSTEP's future programs at a moment toward the end of its five-year period. The symposium will cover the six major themes of CAWSES-II tasks: 1) What are the

solar influences on the Earth's climate?, 2) How will geospace respond to an altered climate?, 3) How does short-term solar variability affect the geospace environment?, 4) What is the geospace response to variable inputs from the lower atmosphere?, 5) Capacity Building, 6) Informatics and eScience. The main functions of CAWSES-II are to help coordinate international activities in observations, modeling, and applications crucial to achieving this understanding, to involve scientists in both developed and developing countries, and to provide educational opportunities for students of all levels. The symposium offers keynotes/lectures that will be interesting for all participants every morning and more specific sessions of presentations in the afternoon. We welcome all those who are involved and/or interested in CAWSES-II to Nagoya in the autumn when we will have the pleasure of being surrounded by beautiful colorful leaves of this season.
Website:
http://www.cawses.org/CAWSES/leaflet_CAWSES-II_120229.pdf

European Space Weather Week in Belgium

Start : 2013-11-18 - End : 2013-11-22
The 10th Edition of the European Space Weather Week will take place on 18-22nd November 2013 in Belgium. The venue will be confirmed early next year, but mark your calendars now for the 10th Anniversary of this growing European event.
The ESWW will again adopt the central aim of bringing together the diverse groups in Europe working on different aspects of Space Weather . This includes but isn't limited to the scientific community, the engineering community, applications developers, service providers and service end users. The meeting organisation will again be coordinated by the Belgian Solar-Terrestrial Centre of Excellence (STCE), ESA and the Space Weather Working Team. The local organisation will be done by the STCE.
Website:
http://www.stce.be/esww10/

1st SPRING Workshop in Freiburg, Germany

Start : 2013-11-26 - End : 2013-11-28
The 1st SPRING (Solar Physics Research Integrated Network Group) workshop is being held from November 26 - 28, 2013 at the scenic Brugger's Hotel Park by Titisee hosted by the Kiepenheuer-Institut fÃ¼r Sonnenphysik in Freiburg, Germany.
The purpose of the workshop is to work on the scientific requirements for a new ground-based network of telescopes for full-disk synoptic observations of the Sun.
The desire for such a new network is motivated by new scientific research directions in solar physics, the requirement of real-time context data for high-resolution solar telescopes, and the need of continuous, long-term, consistent, and reliable solar data as foundation for space weather prediction.
Website:
http://www3.kis.uni-freiburg.de/~mroth/spring.html

Space Weather: a Dialogue between Scientists and Forecasters in London, UK

Start : 2013-12-13 - End : 2013-12-13
The inclusion of space weather in the National Risk Assessment in 2012 means that there is now an urgent need for dialogue between those doing the science of space weather and those using the data to forecast, understand and mitigate the risks.
Since the Sun is currently at the peak of its cycle - a time when space weather events become more frequent - we have a timely opportunity to study how a range of solar activity ultimately lead to magnetospheric, ionospheric and ground level disturbances.
The goal of this meeting is to bring together those working across the broad range of space weather activities in the UK to discuss the current status of observations and recent new advances in the theories and models of the phenomena of space weather.
Website:
http://www.mssl.ucl.ac.uk/~lmg/spaceweather/Overview.html

The Sun: Active and Quiet - 2013 in Moscow, Russia

Start : 2013-12-16 - End : 2013-12-20
Scientific sessions:
Website:
http://tesis.lebedev.ru/workshop2013.html

2014 SORCE Science Meeting in Florida, USA.

Start : 2014-01-28 - End : 2014-01-31
We are pleased to announce the 2014 SORCE Science Meeting, motivated by the NASA/EOS Solar Radiation and Climate Experiment (SORCE). The agenda for this interactive meeting consists of invited and contributed oral and poster presentations concerning variations in the Sun's radiation and in the Earth environment. We encourage your participation and hope that you will share this announcement with colleagues.
Website:
http://lasp.colorado.edu/home/sorce/news-events/meetings/2014-sorce-science-meeting/

Expert Meeting on Improving Space Weather Forecasting in the Next Decade in Vienna, Austria

Start : 2014-02-10 - End : 2014-02-11
The International Space Weather Initiative (ISWI), with the support of the United Nations Committee for the Peaceful Uses of Outer Space, has been very active in promoting the installation of new ground-based instrumentation in non-traditional locations. In particular, there has been substantial progress in the observation of the equatorial ionosphere, solar transients, and energetic particles from space. In the coming decade these observations will become available in real time and will be an important new data source for the forecasting of space weather events. New instruments are either in the process of deployment, or planned over the next decade. Similarly, the International Living with a Star (ILWS) program has been very active coordinating the plans of the world's space agencies in the planning of new space missions, and in the development of space weather modeling and forecasting.
Website:
http://newserver.stil.bas.bg/ISWI/Meetings/Cevents.html#item12

Dynamical Processes in Space Plasmas in Israel

Start : 2014-03-16 - End : 2014-03-22
The meeting brings together scientists working in solar physics, space physics, plasma physics, and astrophysics, in theory, simulations, and experiment. The objective is to report and discuss recent progress in our understanding of the fundamental processes in solar, space, and astrophysical plasmas, in view of heliospheric in-situ and remote sensing measurements (Van Allen Probe, Themis, Cluster, Stereo, SDO, Messenger, Cassini, Venus-Express) and remote sensing astrophysical observations (Chandra, XMM-Newton, Swift and Fermi Gamma-ray Telescope).
Website:
http://physics.bgu.ac.il/~gedalin/Isradynamics2014/

Solar and Stellar Flares, in Prague, Czech Republic

Start : 2014-06-23 - End : 2014-06-27
The meeting in honour of Prof. Zdenek Svestka will cover issues of the physics of solar and stellar flares.
Website:
http://solarflares2014.cz/

40th COSPAR Scientific Assembly in Moscow, Russia

Start : 2014-08-02 - End : 2014-08-10
The 40th COSPAR Scientific Assembly will be held in Moscow, Russia from 2 - 10 August 2014. This Assembly is open to all bona fide scientists.

Website:
http://www.cospar-assembly.org/

International Chapman Conference on Low-Frequency Waves in Space Plasmas on Jeju Island, South Korea

Start : 2014-08-31 - End : 2014-09-05
Low-frequency waves (ULF, ELF and VLF) in space plasmas have been studied for many decades. In our solar system, such waves occur in the magnetospheres of planets and in the solar wind; more recently they have also been confirmed on the Sun. In spite of the great differences in the plasma properties of these regions, the overarching schemes are wave generation, wave propagation, and wave dissipation, which are three fundamental aspects of any kind of waves. A fourth aspect of these waves is their application, either with direct benefit to humans or for scientific pursuit. Therefore, this Chapman conference will provide a forum in which various wave communities can come together and discuss recent achievements of observational, theoretical, and modeling studies.
Website:
http://chapman.agu.org/spaceplasmas/

14th European Solar Physics Meeting in Dublin, Ireland.

Start : 2014-09-08 - End : 2014-09-12
The European Solar Physics Meetings aim to highlight all aspects of modern solar physics, including observation and theory that span from the interior of the Sun out into the wider heliosphere. These meetings provide a broad, yet stimulating, environment for European and international scientists to share their research in solar physics.
The meeting will mostly comprise of contributed talks and poster presentations, with several invited review talks (typically one per session). Posters will be on display for the whole meeting in close proximity to the lecture theatre. Refreshments will be served in the poster viewing area during two dedicated coffee/poster breaks on each full day.
Website: http://www.espm14.ie/

Solar Wind 14 in Weihai, China

Start : 2015-06-22 - End : 2015-06-26
The Fourteenth International Solar Wind Conference will be held for the first time ever in China, from 22 to 26 June 2015, at Weihai in the Shandong province. It will be jointly organized by the School of Earth and Space Sciences of Peking University and the newly-established Institute of Space Sciences of Shandong University. The meeting will take place in the Space Science Building of Shandong University, a venue located within walking distance to the beautiful Weihai International Bathing Beach, one of the most popular scenic areas of northern China.
The conference will cover all aspects of solar wind physics, with invited reviews and contributed papers that examine the current research and outline the future research in all the relevant solar wind fields.
Website: not available yet