STCE Newsletter

21 Oct 2013 - 27 Oct 2013

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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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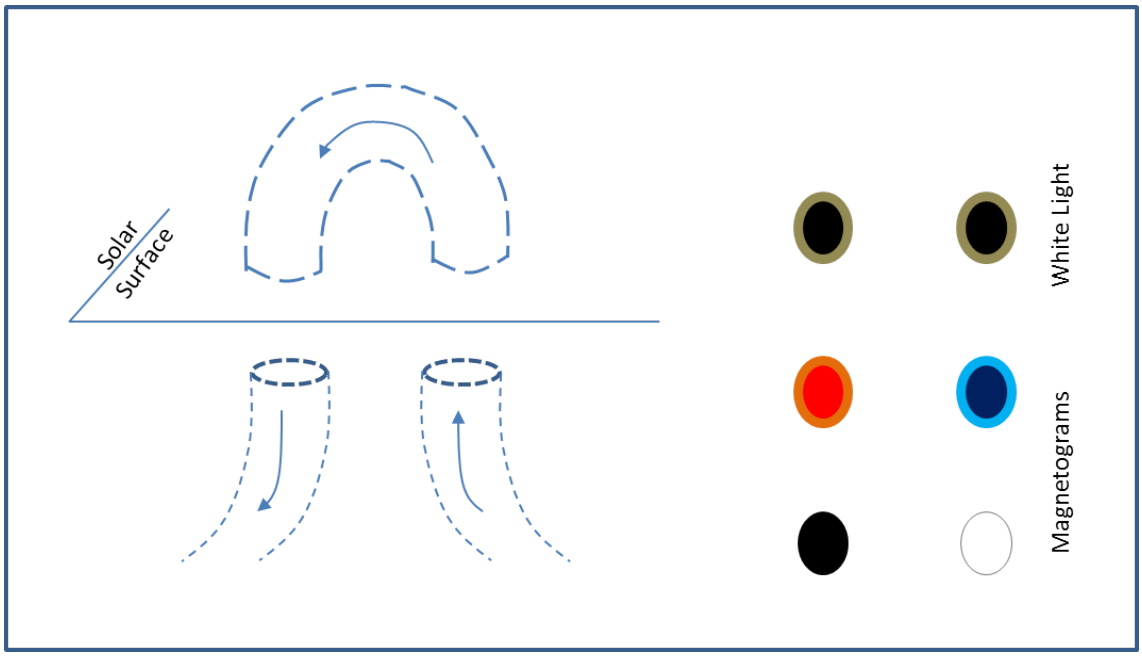
1. Beta-Gamma-Delta (21 Oct 2013 - 27 Oct 2013)

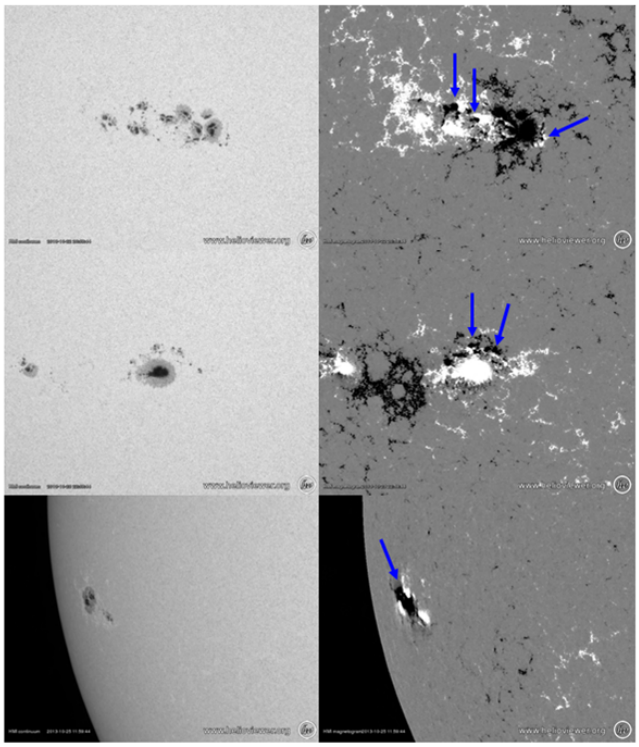
No, Beta-Gamma-Delta (BGD) is not about some high-school prom reunion, but one of the possible magnetic classifications of a sunspot group. These classifications play a major role in determining whether or not a sunspot group is up to significant flare activity.

Sunspots have their origin in magnetic flux tubes breaking through the solar surface. The magnetic disturbances create local cooling (compared to the surroundings), hence sunspots are visible as dark specks on the solar surface. Seen in a magnetogram, spots where the magnetic field (tube) comes out of the surface are often displayed as blue or white. Spots where the field returns into the Sun are usually depicted in red or black.

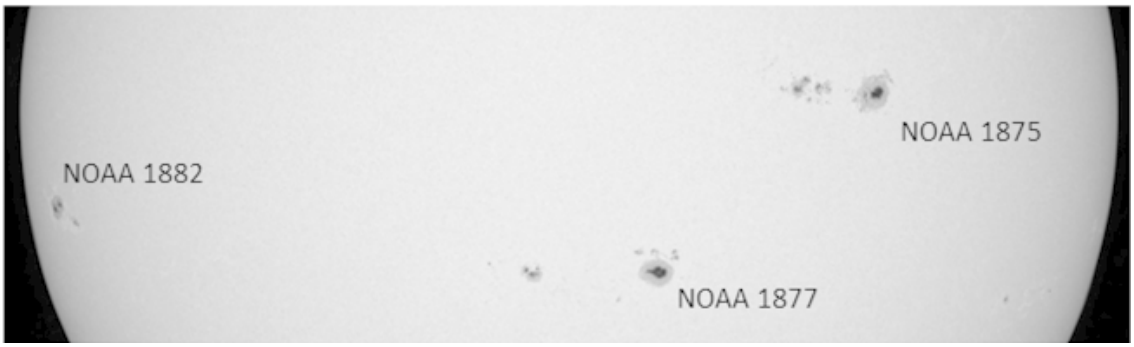


Solar flares on the other hand find their origin in the magnetic reconnection between magnetic fields of opposite polarity that are very close together. The latter specification is required, because otherwise every bipolar sunspot group would produce many and strong flares, which is not what we observe!

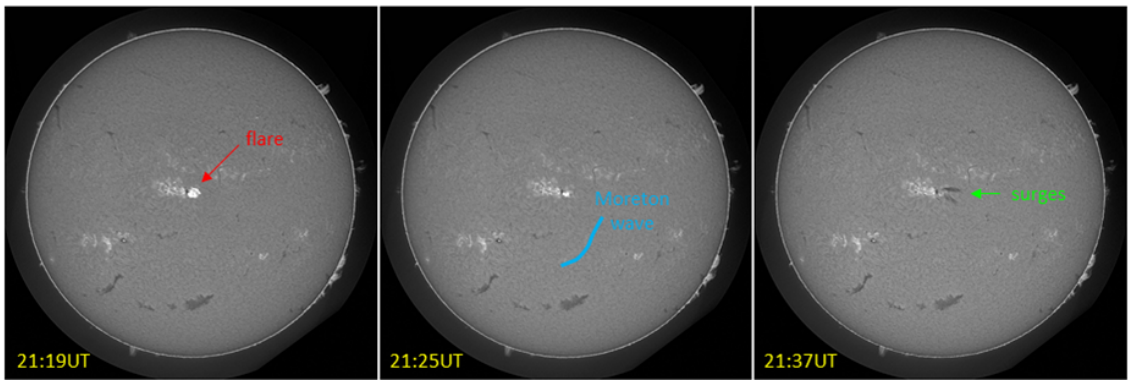
Thus, normal sunspot groups are bipolar and have magnetic polarities that can easily be distinguished (see sketch above right). However, some groups may become quite complex with many sunspots of opposite polarities. At some point, it may become impossible to distinguish it as a bipolar group. When that happens, it gets the "Gamma" classification. This kind of group is quite rare, and usually we get a Beta-Gamma (BG) classification: There's an indication of bipolarity, but no continuous line can be drawn separating spots of opposite magnetic polarities.



The specification "Delta" is given to sunspot groups that contain spots of opposite polarity within the same penumbra and within 2.5 degrees from each other. A few examples have been indicated by blue arrows on the magnetograms of last week's 3 important flaring regions: NOAA 1875 (top), NOAA 1877 (middle), and NOAA 1882 (bottom). NOAA 1875 and 1882 had a BGD classification for most of the time, with the Delta's indicating an increased likelihood on magnetic reconnection between the opposite polarity sunspots, and thus on (strong) solar flares. NOAA 1877 was mostly BG, with an occasional delta.



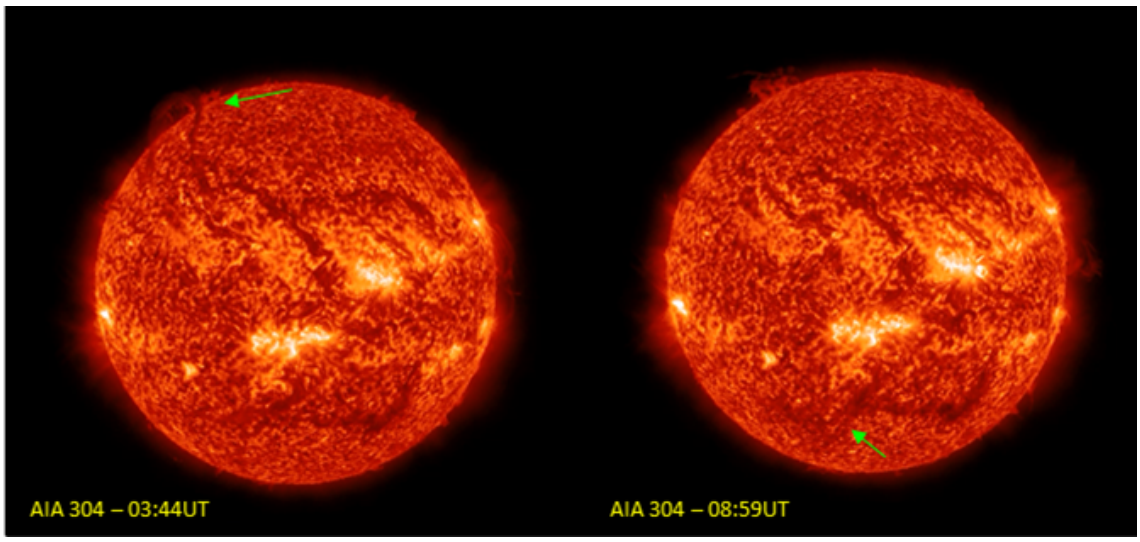
True to the predictions, these sunspot groups produced several strong flares. A movie with the main events can be found at http://www.youtube.com/watch?v=xhx0JlaBXuQ
During the evening hours of 22 October, NOAA 1875 produced a M4 solar flare ("medium class"). The eruption showed some interesting features in H-alpha (chromosphere), such as the ejection of dark ("cold" and dense) material which are probably "surges"; the jury is still out on this one. There's also a shock wave visible precipitating through the Sun's lower atmosphere. This is called a "Moreton wave" and can be seen as a whitish line moving fast (500 km/s) to the bottom right of NOAA 1875.



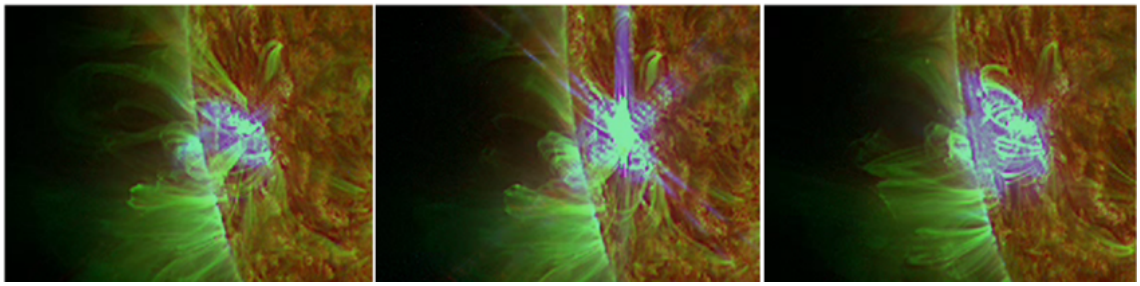
On 24 October, a M9 flare took place in NOAA 1877. Aside the very nice eruption, one could also observe magnetic interactions with NOAA 1879 (to the east; "left" of the flaring region) and material movement across the solar equator towards the trailing part of NOAA 1875.

On 25 October, NOAA 1882 claimed all attention by unleashing 2 X-class solar flares in a single day. These flares belong in the eXtreme class of solar eruptions, and -so far- the ongoing solar cycle had produced only 19 of these strong flares (see this STCE Newsitem at http://stce.be/news/198/welcome.html for an overview).

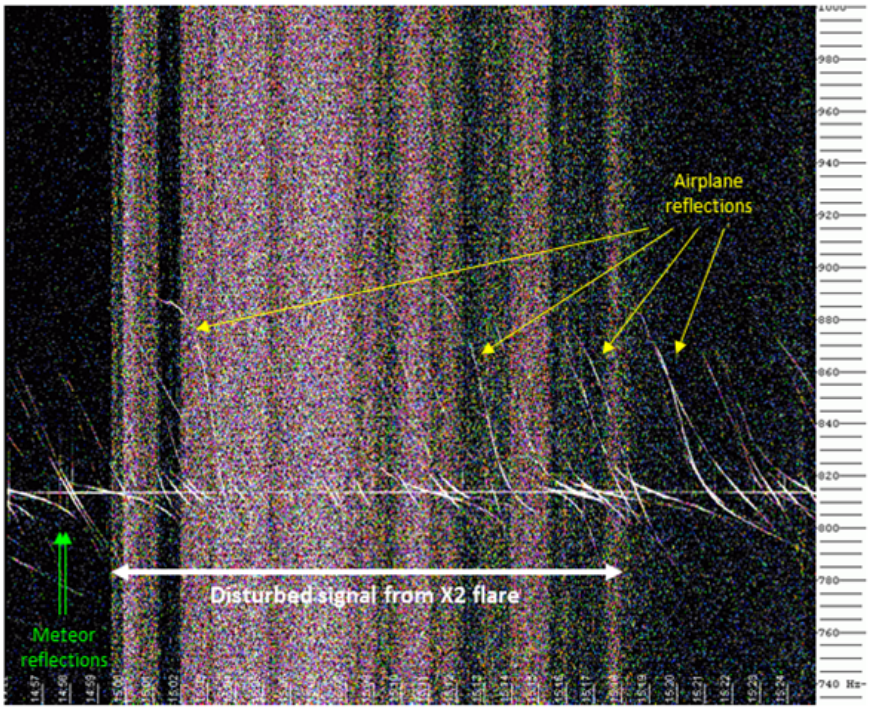
The X1.7 flare peaked at 08:01UT in the trailing part of NOAA 1882, where a strong delta was present. Interestingly, almost immediately following the flare, a filament erupted many 100.000's km further away on the southern hemisphere. This was similar to an earlier eruption in NOAA 1882 that day, when a medium flare around 03:00UT coincided with an ongoing filament eruption on the northern hemisphere. Since the "global" solar eruption event in August 2010, scientists are well aware that magnetic connections between far away regions can exist on the Sun, which can lead to a domino effect of flares and filament eruptions (see this STCE Newsitem at http://stce.be/news/x129x/welcome.html).



The X2.1 flare peaked at 15:03UT in the same area as the X1.7 event. It produced an EIT wave and was a typical example of a solar flare: a reconnecting magnetic loop with material being ejected, the bright flare itself, and the post-flare coronal loops (see image underneath). Not always are all these features so well visible, courtesy SDO!



All this extra x-ray radiation energized the ionosphere, a layer in the Earth's atmosphere that influences radio propagation to distant places on the Earth. Meteor observers using radio equipment were not very happy with last week's activity. Indeed, the extra radiation disturbed the ionosphere at the frequencies observed, and so no reflected signal from meteors could be recorded. See http://www.youtube.com/watch?v=JcmTKL560Wg starting at 03:20 for more info on meteor detection using radio-equipment. In the case of the X2 flare, the disturbed ionosphere did not permit meteor observations for more than 20 minutes. See the annotated radiospectrogram made by Belgian radio astronomer Felix Verbelen.



25 October 2013 *© Felix Verbelen (original recording)*

Credits - Data and imagery were taken from SDO (http://sdo.gsfc.nasa.gov/data/), the GONG H-alpha Network (http://halpha.nso.edu/), PROBA2/SWAP (http://proba2.oma.be/ssa) and (J)Helioviewer (http://www.helioviewer.org/).
More info on the magnetic classification of sunspot groups can be found at NOAA/SWPC (http://www.spaceweather.com/glossary/magneticclasses.html) and STCE (http://www.sidc.oma.be/educational/classification.php#magnetic).
More info on BRAMS (Belgian RAdio Meteor Stations) at http://brams.aeronomie.be/pages/home

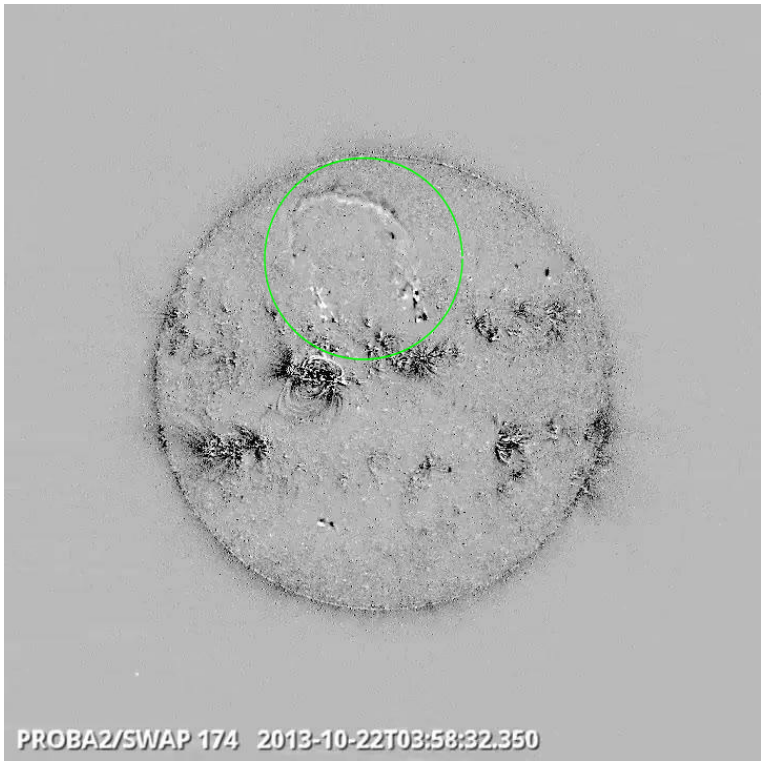
2. PROBA2 Observations (21 Oct 2013 - 27 Oct 2013)

Solar Activity

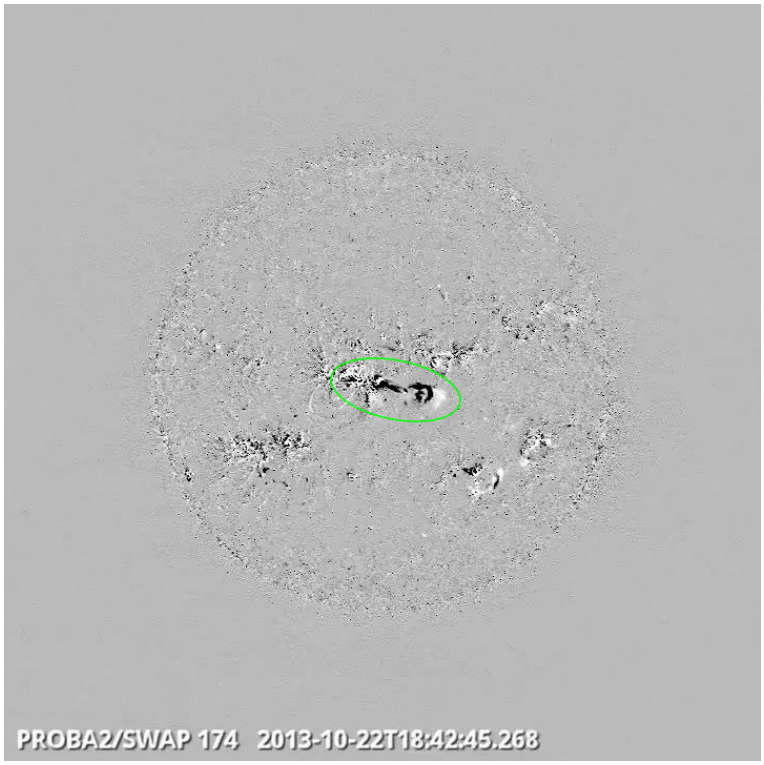
Solar flare activity fluctuated between low and very high during the week.
In order to view the activity of this week in more detail, we suggest to go to the following website from which all the daily (normal and difference) movies can be accessed: http://proba2.oma.be/ssa
This page also lists the recorded flaring events.

A weekly overview movie can be found here (SWAP week 187).
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR187_Oct21_Oct27/weekly_movie_2013_10_21.mp4
Details about some of this week's events, can be found further below.

Tuesday Oct 22:

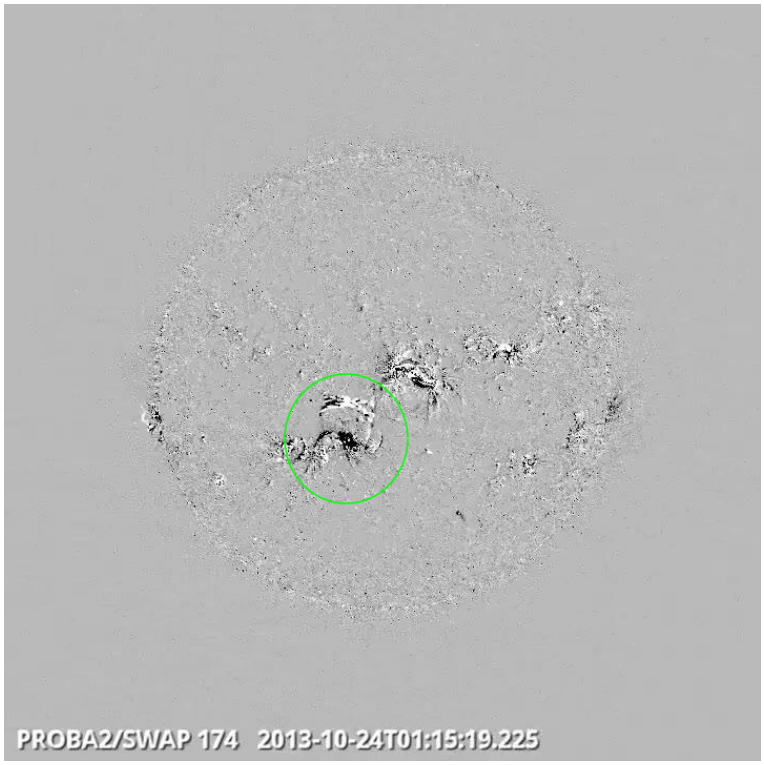


Eruption on the north half @ 03:58 - SWAP difference image
Find a movie of the event here (SWAP difference movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR187_Oct21_Oct27/Events/20131022_Eruption_NorthEastQuad_0358_swap_diff.mp4



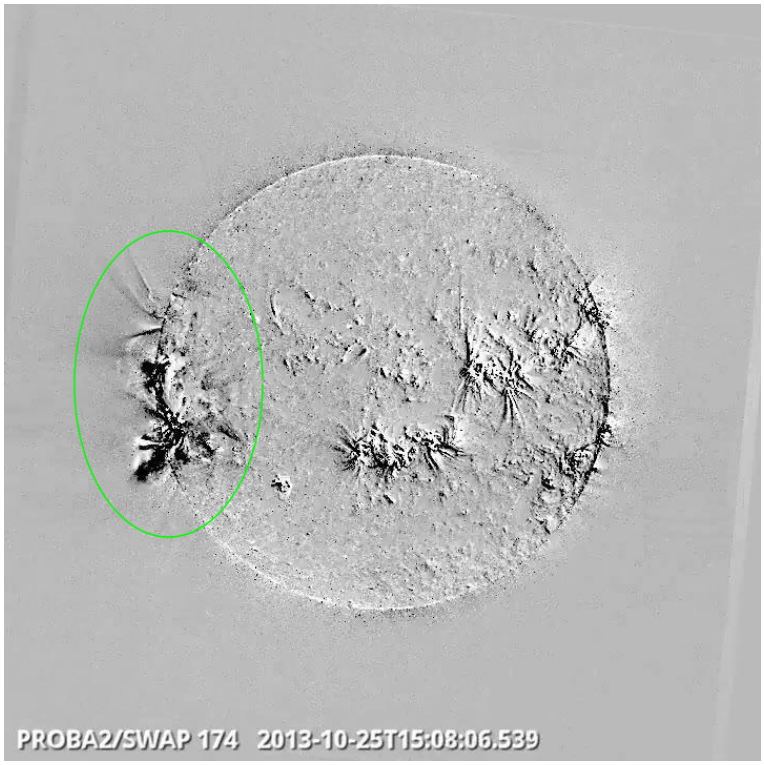
Surge on the centre @ 18:42 - SWAP difference image
Find a 24 hour movie of the event here (SWAP difference movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR187_Oct21_Oct27/Events/20131022_Surge_centre_1200_24HourMovie_swap_diff.mp4
Find a 24 hour movie of the event here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR187_Oct21_Oct27/Events/20131022_Surge_centre_1200_24HourMovie_swap_movie.mp4

Thursday Oct 24:



Failed filament eruption on south east quad @ 01:15 - SWAP difference image
Find a movie of the event here (SWAP difference movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR187_Oct21_Oct27/Events/20131024_FailedEruption_SouthEastQuad_0115_swap_diff.mp4

Friday Oct 25:

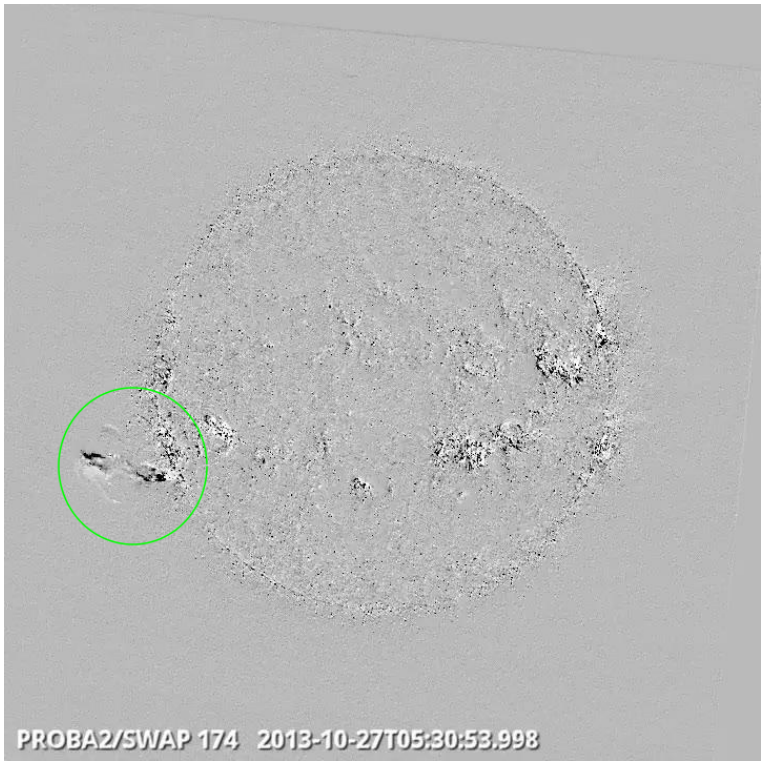


Eruption and eit-wave on east limb @ 15:08 - SWAP difference image
Find a movie of the event here (SWAP difference movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR187_Oct21_Oct27/Events/20131025_EruptionEitWave_EastLimb_1508_swap_diff.mp4

Saturday Oct 26:

Eruption on east limb @ 19:35 - SWAP difference image
Find a movie of the event here (SWAP difference movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR187_Oct21_Oct27/Events/20131026_Eruption_EastLimb_1935_swap_diff.mp4

Sunday Oct 27:



Failed filament eruption on the centre @ 05:30 - SWAP difference image
Find a movie of the event here (SWAP difference movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR187_Oct21_Oct27/Events/20131027_FailedFillamentEruption_EastLimb_0530_swap_diff.mp4
Find a movie of the event here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR187_Oct21_Oct27/Events/20131027_FailedFillamentEruption_EastLimb_0530_movie_diff.mp4

3. Review of solar and geomagnetic activity (21 Oct 2013 - 27 Oct 2013)

SOLAR ACTIVITY

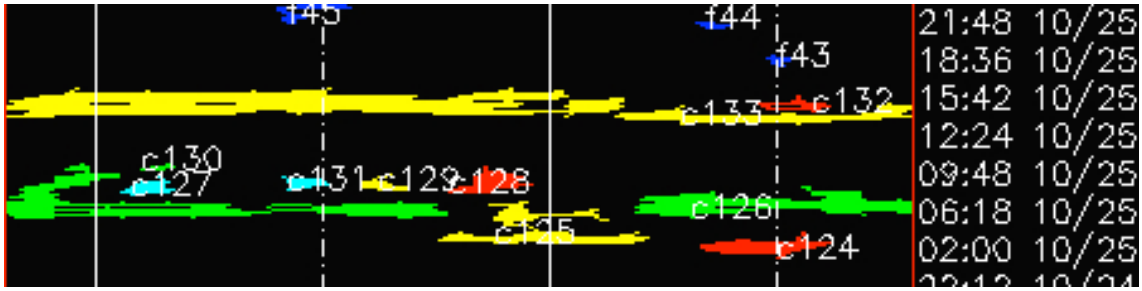
Peaks in solar X-ray radiation

Solar activity was very high during the week of October 21 to 27, 2013 compared to the previous weeks. In total, two X flares, 20 M flares, and 70 C flares were observed. On October 22 and 23, the beta-gamma-delta region NOAA AR 11875 flared several times in the M-level. On October 24, both beta-gamma-delta AR 11875 and 11877 produced M flares. On October 25, new region AR 11882 near the East limb took over the leading role, releasing two X flares and several M flares, while AR 11875 and 11877 kept producing a steady flow of C flares with an occasional M flare. On October 26, new region AR 11884 near the East limb joined the M flaring club.

Ejected Solar Mass

The X1.7 flare of October 25, peak at 08:01UT from source region AR 11882 was associated with a Type II radio burst with estimated shock speed of 1240 km/s as observed by the San Vito solar observatory. A

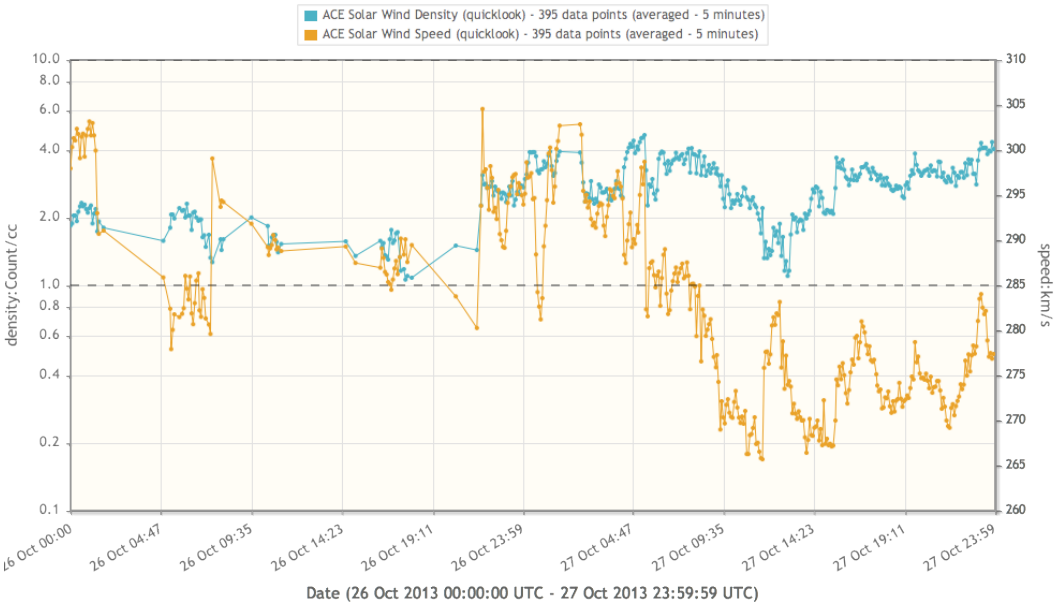
corresponding front sided partial halo CME was registered by LASCO C2 around 8:24UT on October 25, with a plane of sky speed of 739 km/s. The X2.1 flare peaking at 15:03 UT on October 25, also released by AR 11882, was associated with a radio Type II burst with an estimated shock speed of 2078 km/s at Sagamore Hill. A corresponding frontsided partial halo CME was registered by LASCO C2 around 15:12UT on October 25, with a plane of sky speed of 1247 km/s.
Below a snapshot from the CACTus (http://sidc.oma.be/cactus/catalog/LASCO/2_5_0/qkl/2013/10/latestCMEs.html) output. The coloured horizontal lines represent a CME and are chronologically stacked on each other. The length of a line denotes the span width of the CME, while the horizontal position indicates the position of the CME: left/south - west - north - right/east. The green and yellow halo CME's span the complete width.

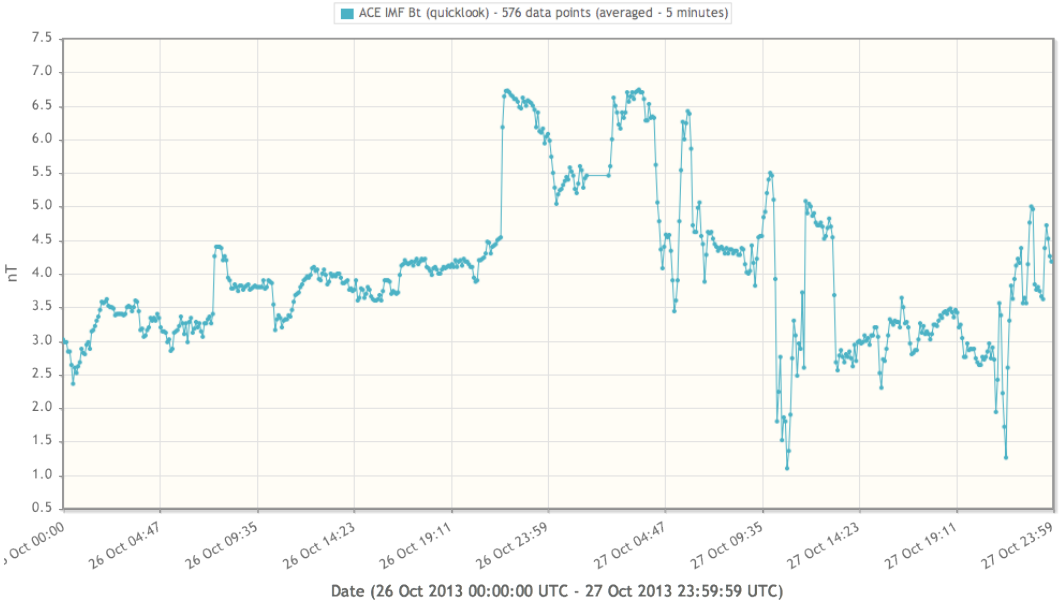


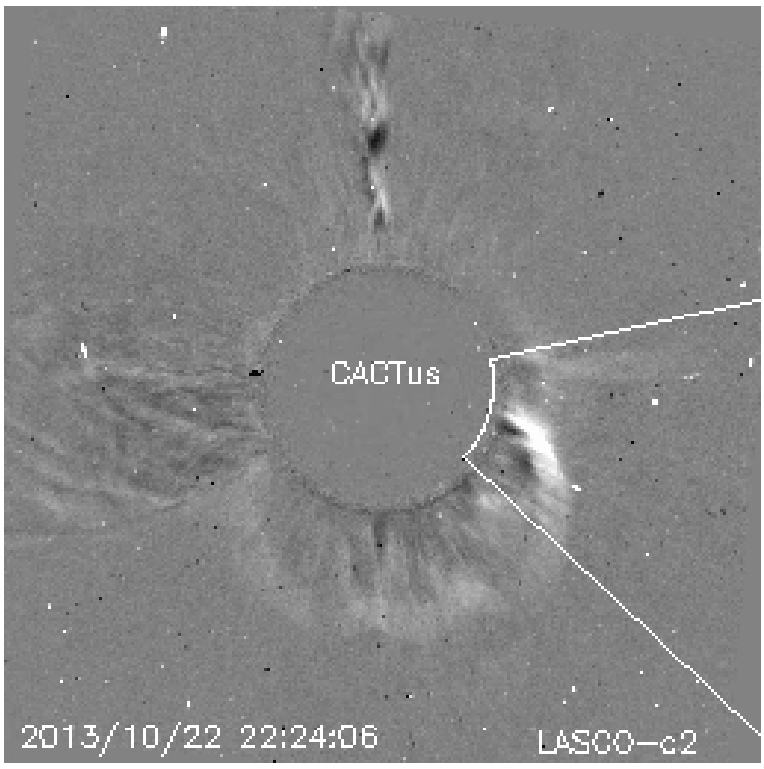
Besides the two mentioned CME's, the week counted several other ones.

GEOMAGNETIC ACTIVITY

ACE observed a small jump in the solar wind at 21:44UT on October 26, which was probably caused by the weak CME of 22:00 UT on October 22, associated to an M4.2 flare released by AR 11875. There were no geomagnetic effects.







Geomagnetic conditions have been quiet throughout the week. The effects of a coronal hole high speed stream on October 22 were very limited, causing a small rise in solar wind speed and Interplanetary Magnetic Field strength, but no geomagnetic effects.

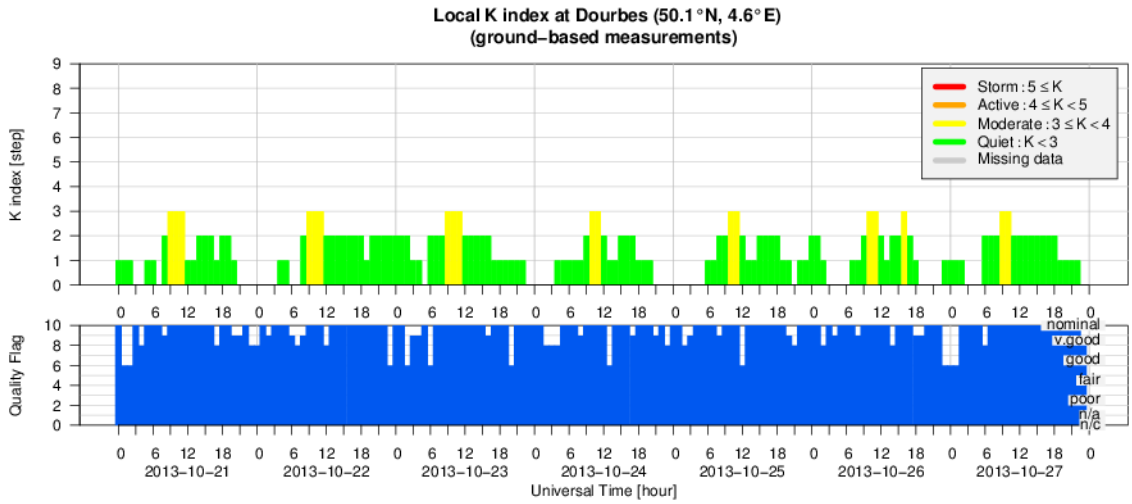
The two CME's mentioned above would arrive on October 29. There was no relevant geomagnetic impact.

4. Noticeable Solar Events (21 Oct 2013 - 27 Oct 2013)

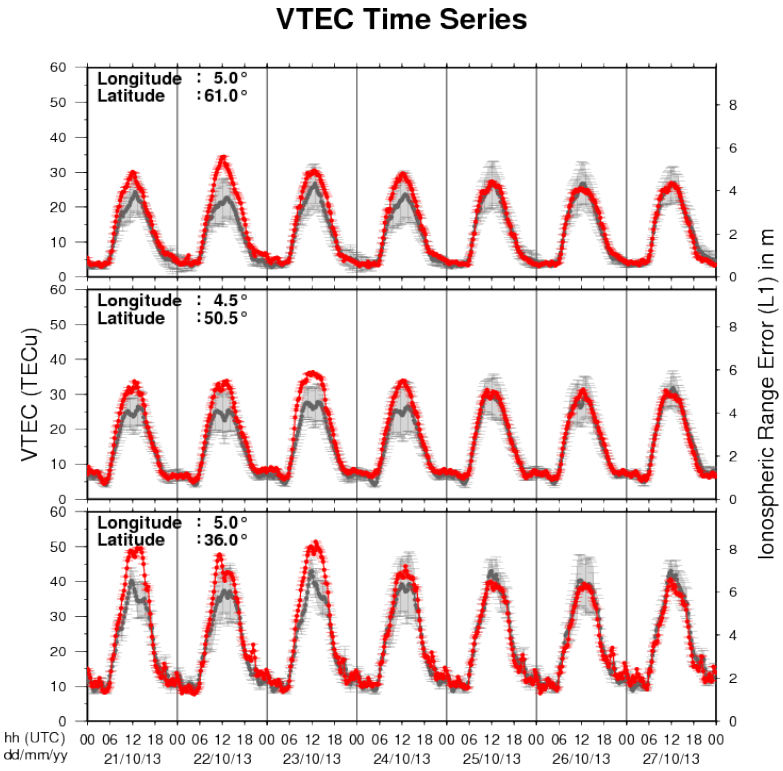
DAY	BEGIN	MAX	END	LOC	XRAY	OP	10CM	TYPE	Cat	NOAA
22	0014	0022	0028	N6E17	M1.0	SF			17	1875
22	1449	1520	1528	N7E7	M1.0	SF			17	1875
22	2115	2120	2122	N4W1	M4.2	1B	220	III/3V/2II/2	17	1875
23	2041	2053	2059		M2.7				16	1875
24	0021	0030	0035		M9.3	N		II/2I/1 1V/1	18	1877
23	2333	2343	2347		M1.4	F			16	1875
23	2358	0008	0016		M3.1				16	1875
24	0959	1009	1017		M2.5	F		II/1	16	1875
24	1030	1033	1037		M3.5		110	V/1II/1	16	1875
25	0248	0302	0312		M2.9			II/1I/2 7V/1	23	1882
25	0753	0801	0809		X1.7		610	II/2I/2 1V/1	23	1882
25	0943	1012	1025		M1.0	F		II/1	23	1882
25	1451	1503	1512		X2.1		370	I/2 2V/2	23	1882
25	1702	1709	1716		M1.3			III/2	23	1882
25	1905	1921	1924	S6E66	M2.3	SF			23	1882
25	2054	2058	2113	S7E64	M1.9	1N		III/2	23	1882
26	0559	0606	0620	S9E61	M2.3	1B		III/2	23	1882
26	0917	0937	0948		M1.5		67	V/3II/2	23	1882
26	1048	1117	1134	S5E58	M1.8	1N	380		23	1882
26	1924	1927	1930	S9E81	M3.1	SF				1884
26	1949	1953	1958	S7E53	M1.0	SF			23	1882
27	1236	1248	1252	N6W63	M3.5	1F		III/1	16	1875

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. Geomagnetic Observations at Dourbes (21 Oct 2013 - 27 Oct 2013)



6. Review of ionospheric activity (21 Oct 2013 - 27 Oct 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

7. 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

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