

# STCE Newsletter

25 Feb 2013 - 3 Mar 2013



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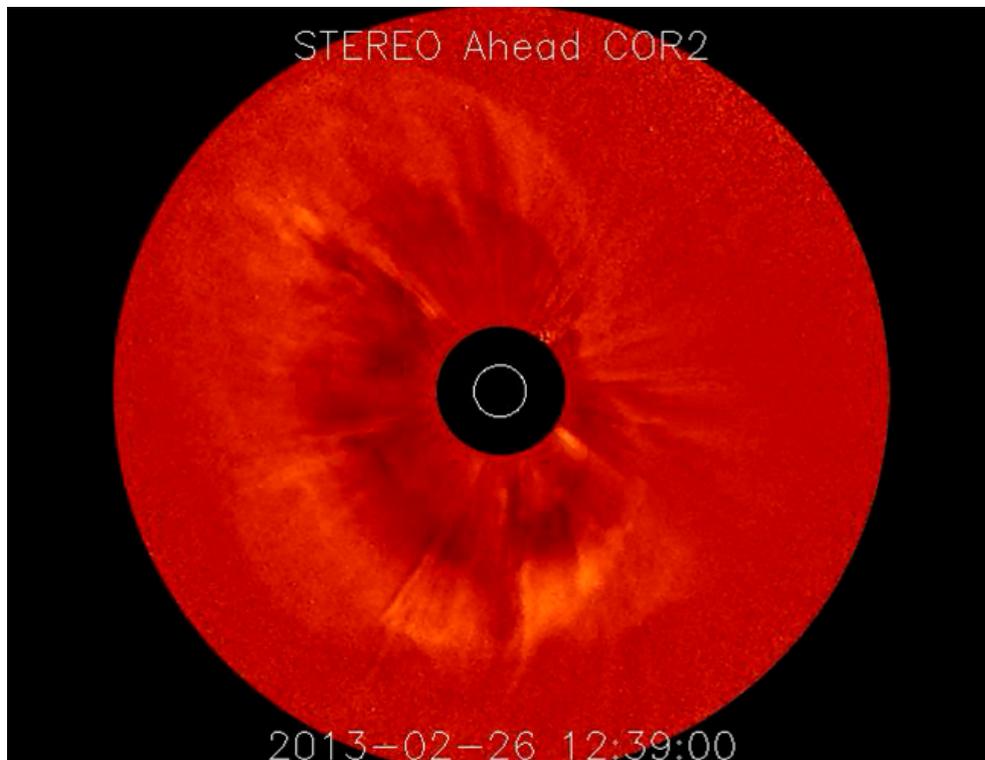
The Solar-Terrestrial Centre of Excellence (STCE) is a collaborative network of the Belgian Institute for Space Aeronomy, the Royal Observatory of Belgium and the Royal Meteorological Institute of Belgium.

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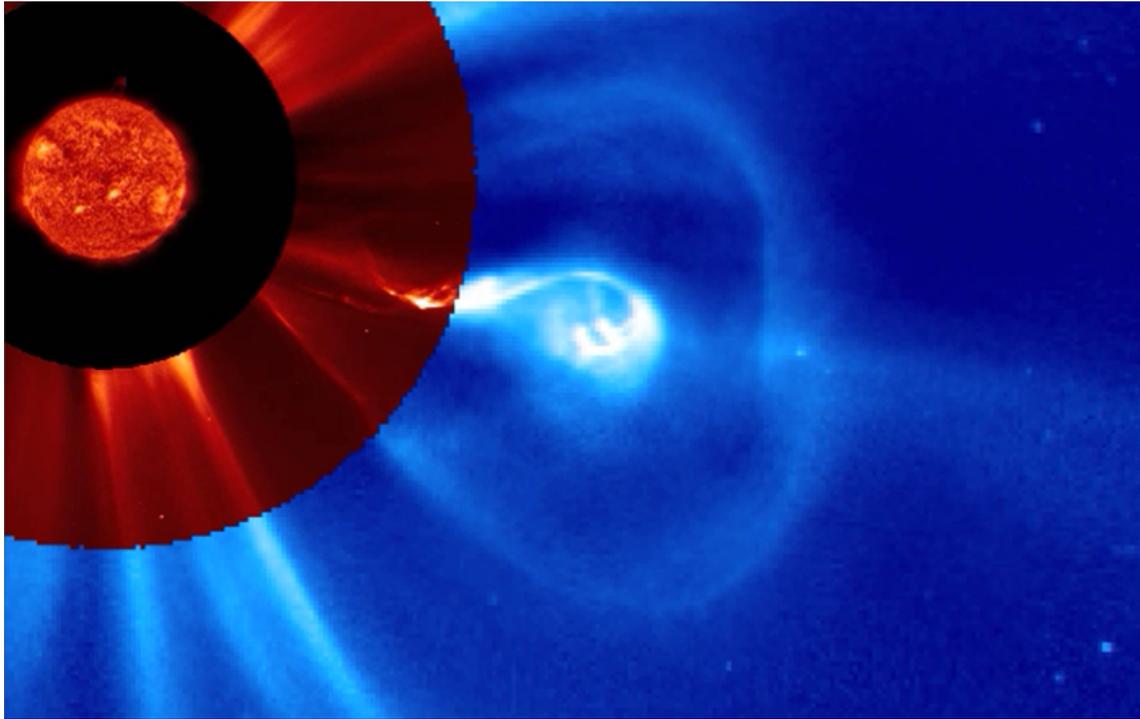
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## 1. 10 Little Indians (25 Feb 2013 - 3 Mar 2013)

During the first two months of 2013, quite a few Coronal Mass Ejections (CMEs) were visible. As an example, this movie (<http://www.youtube.com/watch?v=OpdusEh4pB8>) shows the CME-activity from 23 till 28 February. The 10 most interesting events were numbered and are discussed below.

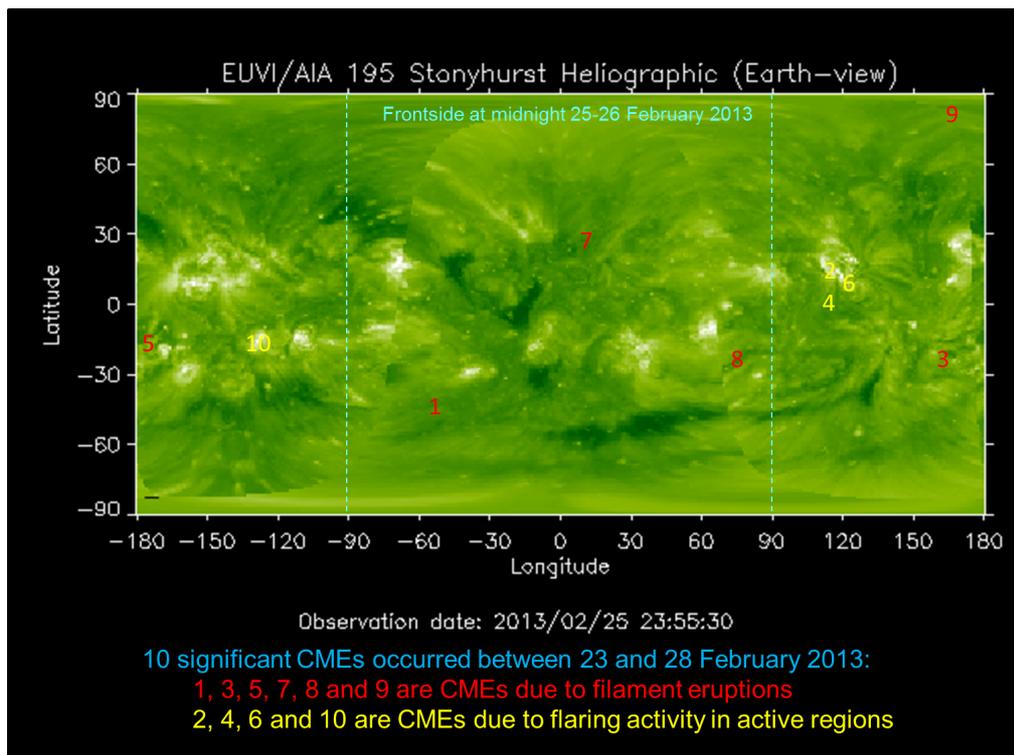


Two CMEs in this list are particularly noteworthy. The first (number "6") occurred during the morning hours of 25 February and was related to flaring activity in active region NOAA 1678 (backside event). As seen from STEREO-A, it concerned a halo CME (see image above). The second CME (number "8") happened a day later during the spectacular eruption of a massive filament near the southwest solar limb (see image below).



It's always nice to try and find the source region of the CMEs. With STEREO-A and -B, SOHO and SDO keeping a permanent eye on the entire Sun and its surroundings, this is not such a challenging task. As it turns out, 6 of the 10 CMEs were due to filament eruptions, while the other CMEs were associated with flaring activity in active regions NOAA 1678 and 1685. Also, as seen from Earth, most of the CMEs originated near the solar limb or on the backside of the Sun.

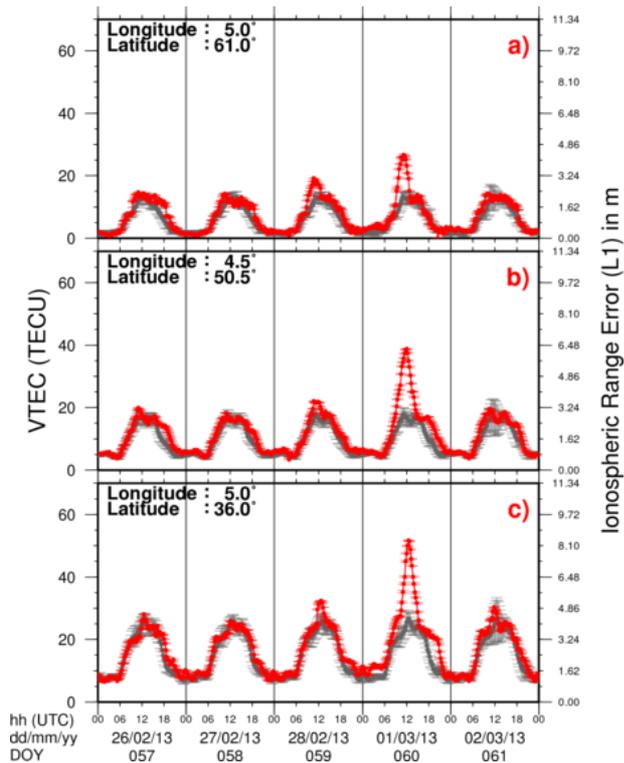
The 10 source regions were plotted in the heliographic map underneath. These maps are compiled from STEREO and SDO imagery, and provide an overview of the entire solar surface in EUV. Only the area between  $-90^\circ$  and  $+90^\circ$  can be seen from Earth. As the Sun rotates, other heliographic longitudes become visible (here: moving from left to right). Red numbers indicate CMEs from filament eruptions, yellow numbers indicate CMEs from flaring activity in active regions (bright). Notice in the second movie (<http://www.youtube.com/watch?v=Ta7Ny6Cdym5>) how the use of the different satellites reveals how all this activity is happening all over the solar surface.



Credits - Images and movies for this topic were taken from SDO (<http://sdo.gsfc.nasa.gov/>), SOHO/Lasco (<http://sohowww.nascom.nasa.gov/>), the STEREO spacecraft (<http://stereo.gsfc.nasa.gov/>), and GOES-15/SXI (<http://www.swpc.noaa.gov/sxi/index.html>).

## 2. Ionospheric event on March 1

The Total Electron Content in the ionosphere was disturbed over Europe during the day of 01/03/2013.

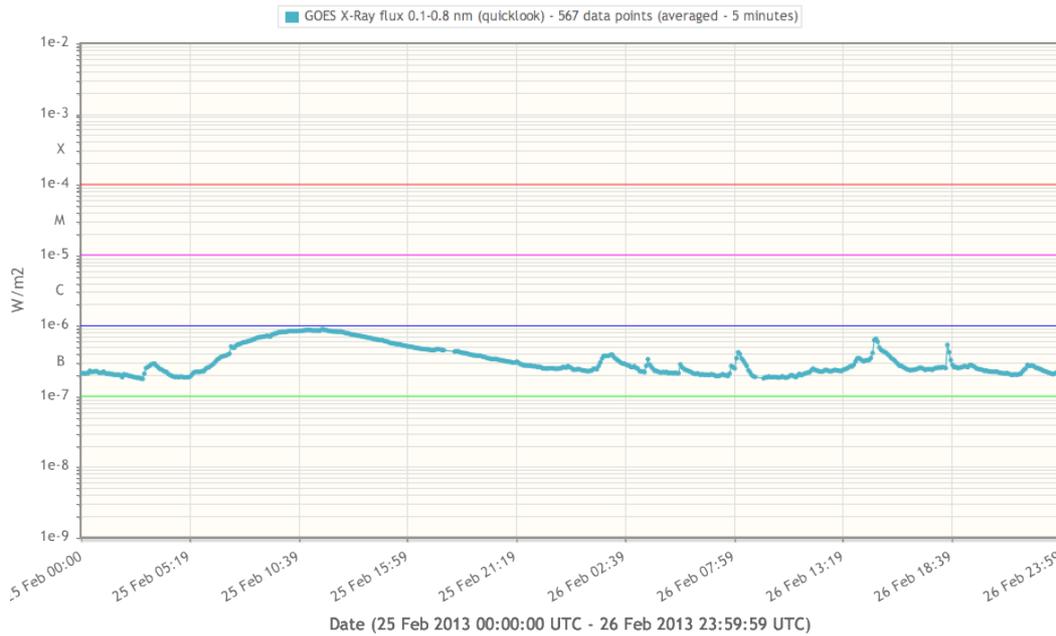


The magnetosphere of the Earth was also disturbed: the planetary index K reached 5, this is a minor geomagnetic storm. The cause was from solar origin and could be traced back to a coronal hole (see section 'Geomagnetic Activity').

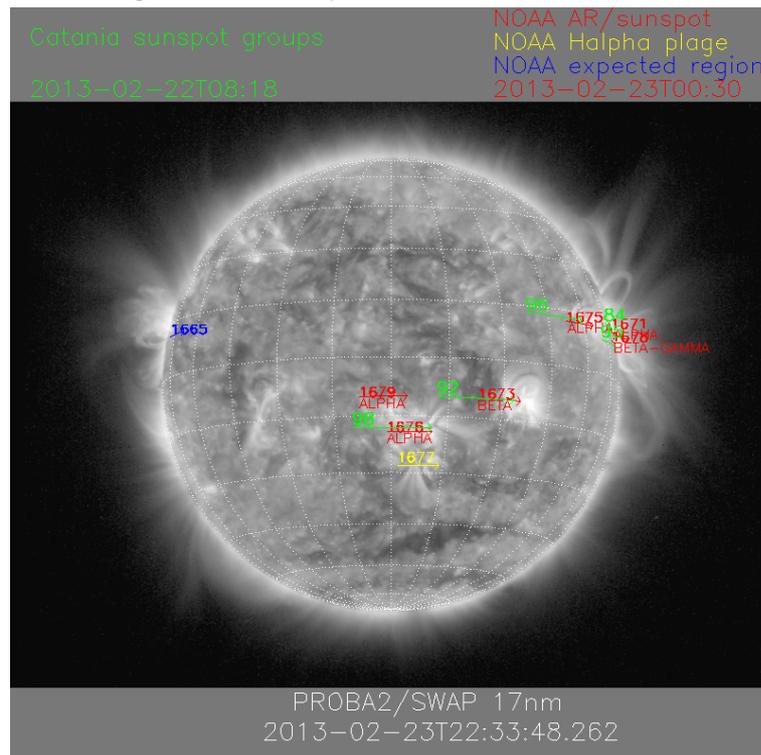
Read more: [http://gnss.be/Atmospheric\\_Maps/ionospheric\\_event\\_01032013.php](http://gnss.be/Atmospheric_Maps/ionospheric_event_01032013.php)

### 3. Review of solar activity (25 Feb 2013 - 3 Mar 2013)

The period started with a peculiar long duration flare on Feb 25: it lasted 18 hours but reached a flat peak only within the B-class. The long duration flare is visible as a flat bump in the GOES X-ray flux data.



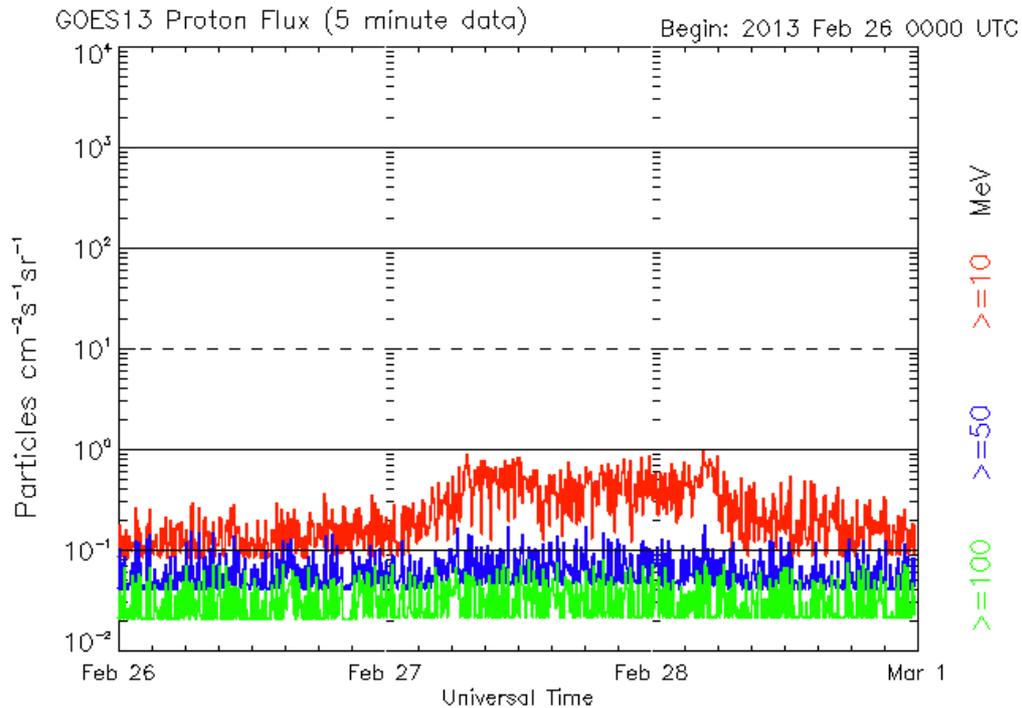
We speculate this flare originated in NOAA AR 1678 (behind the West limb), which had a beta-gamma-delta configuration when it passed over the Solar West limb on Feb 23.



CACTus detected an associated CME (check [http://sidc.oma.be/cactus/catalog/LASCO/2\\_5\\_0/ql/2013/02/CME0093/CME.html](http://sidc.oma.be/cactus/catalog/LASCO/2_5_0/ql/2013/02/CME0093/CME.html)).

Despite the presence of the beta-gamma configuration of NOAA AR 1682 from Feb 26 onwards, no C-class (or larger) flares were recorded up till March 2 when NOAA AR 1681 produced two minor C-flares.

The GOES13 proton flux ( $\geq 10$  MeV) levels increased for 24 hours starting around Feb 27 05:00 UT but did not cross event thresholds.



Updated 2013 Feb 28 23:56:02 UTC

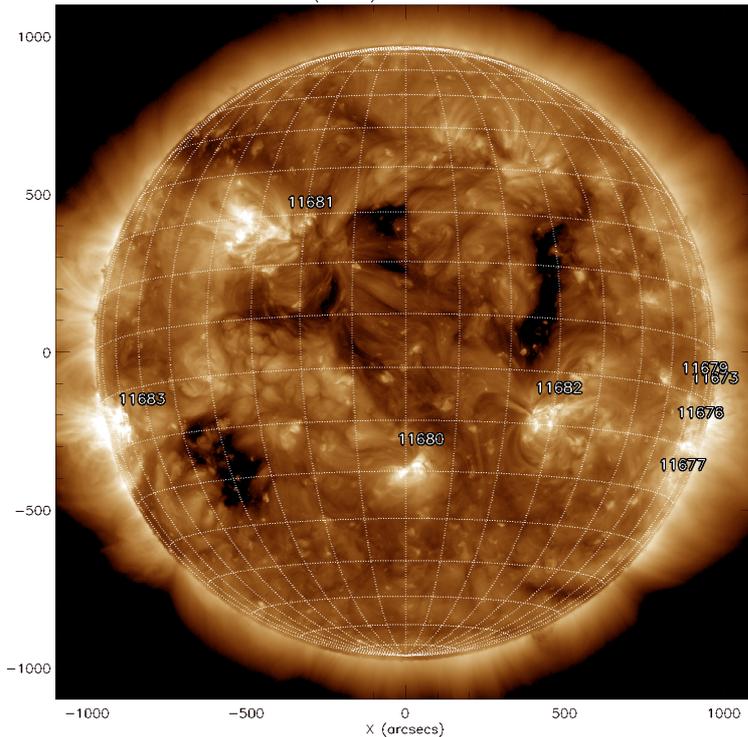
NOAA/SWPC Boulder, CO USA

Similar excursions were seen by the particle monitors onboard ACE and Herschel (SREM). The source of this enhanced proton flux levels could not be identified on the visible side of the solar disc. STEREO-A data however shows considerable activity on Feb 26 and Feb 27 in NOAA AR 1678 (far beyond solar west limb).

#### 4. Review of geomagnetic activity (25 Feb 2013 - 3 Mar 2013)

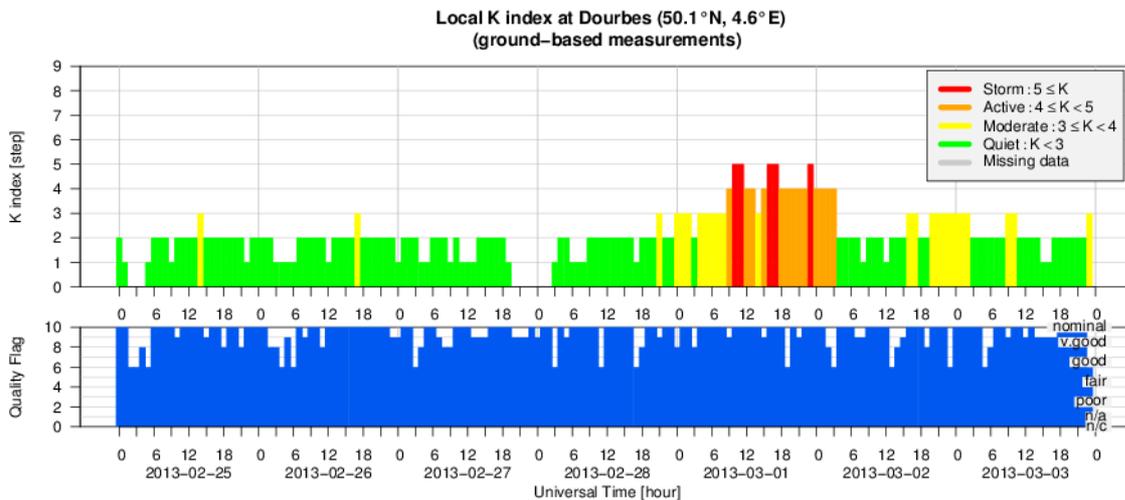
In the beginning of the period, the solar wind speed was low and geomagnetic activity very quiet ( $K_p$  max 2). From Feb 28 onwards, we became under the influence of a fast solar wind stream of a coronal hole in the Northern solar hemisphere. It is the black hole lined next to a line of longitude (connecting one pole with the other).

SDO AIA Fe XII (193 Å) 28-Feb-2013 22:01:30.840



Preceding the peak of the high speed solar wind (600km/s), the density increased and the interplanetary magnetic field turned southward. The consequence was a minor geomagnetic storm (Kp=5) on March 1. This effect was larger than what was predicted (Kp =4) based on the solar wind speed from the previous rotation and from the Wang-Sheeley model (500 km/s only).

## 5. Geomagnetic Observations at Dourbes (25 Feb 2013 - 3 Mar 2013)



## 6. PROBA2 Observations (25 Feb 2013 - 3 Mar 2013)

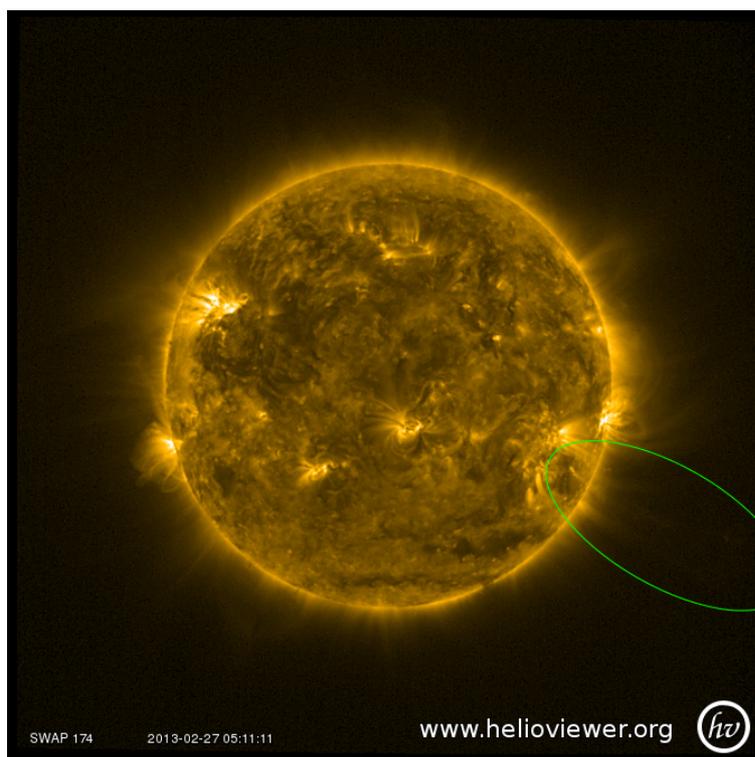
Solar (flaring) activity was very low during the whole week, except for Saturday, when 2 low level C flares originated from AR 11687.

In order to view the activity of this week in more detail, we suggest going 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: [http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR153/2013\\_02\\_25\\_00\\_00\\_31\\_2013\\_03\\_03\\_22\\_56\\_43\\_SWAP\\_174\\_\\_AIA\\_304-hq.mp4](http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR153/2013_02_25_00_00_31_2013_03_03_22_56_43_SWAP_174__AIA_304-hq.mp4) (SWAP174/AIA304 combination; HelioViewer.org).

Details about some of the events in this movie can be found further below.

On Wednesday 27th, an eruption occurred on the South West limb. The ejected material can be followed up to the end of SWAPs Field of View, and it can be seen at the end of the movie mentioned below:



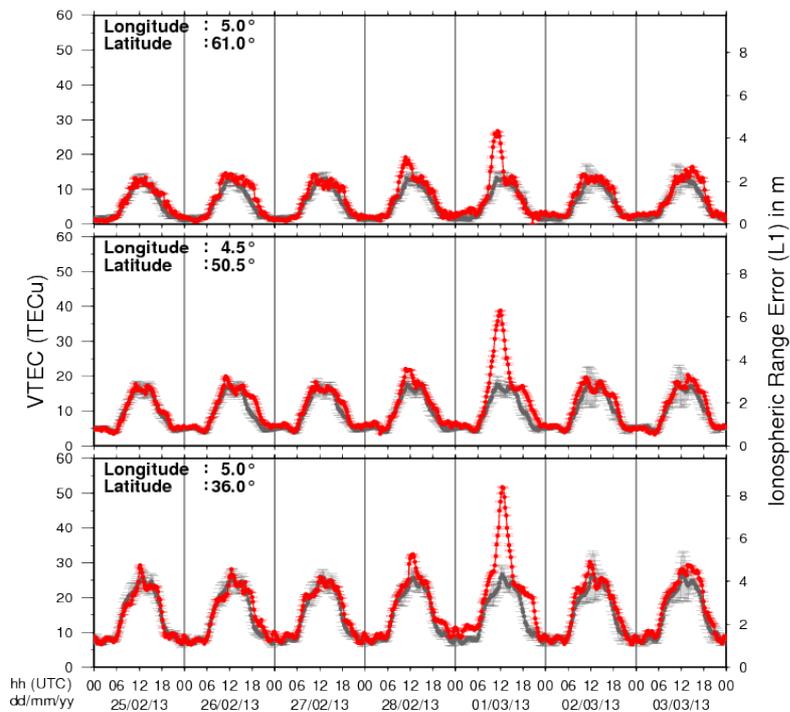
Right before this eruption, a (two?) prominence(s) erupted along the North limb. These could hardly be seen in SWAP, but a movie, showing the prominence's evolution and the subsequent South West eruption can be found here: [http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR153/Events/2013\\_02\\_26\\_12\\_00\\_31\\_2013\\_02\\_27\\_11\\_41\\_19\\_SWAP\\_174\\_\\_AIA\\_304-hq.mp4](http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR153/Events/2013_02_26_12_00_31_2013_02_27_11_41_19_SWAP_174__AIA_304-hq.mp4) (SWAP/AIA304; HelioViewer.com).

On Saturday March 2nd, an eruption occurred along the East limb (slightly North). A SWAP difference movie of this eruption can be found here: [http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR153/Events/SWAP\\_Eruption\\_02Mar13\\_1316\\_DiffMovie.mp4](http://proba2.oma.be/swap/data/mpg/movies/WeeklyReportMovies/WR153/Events/SWAP_Eruption_02Mar13_1316_DiffMovie.mp4).



## 7. Review of ionospheric activity (25 Feb 2013 - 3 Mar 2013)

VTEC Time Series



The figure shows the time evolution of the Vertical Total Electron Content (VTEC) (in red) during the last week at three locations:

- a) in the northern part of Europe(N61°, 5°E)
- b) above Brussels(N50.5°, 4.5°E)
- c) in the southern part of Europe(N36°, 5°E)

This figure also shows (in grey) the normal ionospheric behaviour expected based on the median VTEC from the 15 previous days.

The VTEC is expressed in TECu (with  $TECu=10^{16}$  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](http://stce.be/newsletter/GNSS_final.pdf) for some more explanations ; for detailed information, see [http://gnss.be/ionosphere\\_tutorial.php](http://gnss.be/ionosphere_tutorial.php)

## 8. Future Events

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

### 19th SPINE Meeting, SPIS Final Presentations & SPIS training at ESTEC, The Netherlands

Start : 2013-03-19 - End : 2013-03-21

Between 19 and 21 March 2013, ESTEC will host the 19th SPINE meeting and the final presentations of three activities funded through ESA's TRP (Technology research Programme), developed with the SPIS (Spacecraft Plasma Interaction System) software, followed by training on the SPIS-GEO and AISEPS applications.

During the SPINE meeting on 19th March the intention is to discuss standards in the area of spacecraft plasma interactions, ESA's Technology development plans and new results and current issues in the area of spacecraft plasma interactions. Proposals to make presentations are welcome.

Final presentations will be made on 20th March for the SPIS-GEO, SPIS-Science and AISEPS (Assessment of the Interactions between Spacecraft and Electric Propulsion Systems) studies. A short training course on the new features of SPIS-GEO will follow. On 21th March there will be a whole-day course on AISEPS.

Website:

<http://dev.spis.org/projects/spine/home/meeting/mxix>

### Space Weather Workshop: 'Effects on Aviation - Building a proportionate response in Europe' in K ln, Germany

Start : 2013-03-20 - End : 2013-03-20

The Sun goes through a periodic rise and fall in activity and solar cycles vary in length from 9 to 14 years. Solar maximum or solar max is a normal period of greatest solar activity in the cycle. Recent projections say the next solar max should arrive in the last half of 2013.

For aviation, disturbed ionosphere currents during geomagnetic storms can be the cause of considerable communications and navigation problems. There are measures that can be taken to reduce the risk of aviation infrastructure failures during geomagnetic disturbances.

This workshop, jointly organised by EUROCONTROL and the European Aviation Safety Agency (EASA), is to help aviation, manage the safety risk, increase awareness of the effects and elaborate on possible mitigation actions.

Target audience are representatives of airlines, air navigation service providers (ANSPs), Civil Aviation Authorities (CAAs), airports, military and original equipment manufacturers (OEMs). Through bringing together speakers who are premier specialists in the field from airlines, pilots, ANSPs, research organizations etc.

The workshop will identify priorities, share knowledge and encourage cooperation and harmonisation.

Website:

<http://www.eurocontrol.int/events/space-weather-workshop>

### **1st Solar Probe Plus Workshop in Pasadena, CA (USA)**

Start : 2013-03-26 - End : 2013-03-29

The first Solar Probe Plus Workshop will take place at the Beckman Institute auditorium, California Institute of Technology, Pasadena, from March 26th to 29th, 2013. SPP1 will introduce the Heliophysics community to the mission and prepare for the exciting discoveries that the Solar Probe Plus mission will make. The Workshop will explore the scientific objectives of the Solar Probe Mission and how the direct exploration of the corona and inner heliosphere will lead to advances in our understanding of coronal heating and solar wind acceleration, the magnetic and plasma structure of the heliosphere, and the acceleration of energetic particles at shocks and flares. The workshop will inspire research that will make use of the SPP observations within the context of the NASA Heliophysics Observatory System and identify key areas for preparatory research. Synergistic observations from other ground based and space based assets will also be addressed.

Website:

<http://www.solarprobeplus.org/>

### **European Geosciences Union General Assembly 2013 in Vienna, Austria**

Start : 2013-04-07 - End : 2013-04-12

The EGU General Assembly 2013 will bring together geoscientists from all over the world into one meeting covering all disciplines of the Earth, Planetary and Space Sciences. Especially for young scientists, it is the aim of the EGU to provide a forum where they can present their work and discuss their ideas with experts in all fields of geosciences. The EGU is looking forward to cordially welcoming you in Vienna.

Website:

<http://www.egu2013.eu/home.html>

### **Causes and Consequences of the Extended Solar Minimum Between Solar Cycles 23 and 24 (4CESM) in Key Largo, FL (USA)**

Start : 2013-04-08 - End : 2013-04-12

The most recent solar minimum, solar cycle 23-24 minimum, was unusually long (266 spotless days in 2008, the most since 1913), and the magnetic field at the solar poles was approximately 40% weaker than the last cycle; and unusually complex (the solar wind was characterized by a warped heliospheric current sheet, HCS, and fast-wind streams at low latitudes: the fast-wind threads the ecliptic more commonly in 2008 than 1996.) This complexity resulted in many effects observed from Sun to Earth, with many observations indicating unusual conditions on the Sun, in the heliosphere, and in the magnetosphere, ionosphere, and upper atmosphere of the Earth.

This remarkable set of conditions provide the scientific community with an exceptional opportunity to assess the nature and structure of a very quiet Sun, and an upper atmosphere relatively devoid of solar influences, helping to provide a better understanding of the relative roles of solar activity and internal variability in the dynamics of the Earth's upper atmosphere and ionosphere. Such an understanding requires a multidisciplinary approach.

The main goal of the conference is to bring together the solar, heliospheric, magnetospheric, upper atmosphere, and ionospheric communities to debate and discuss interdisciplinary work and reach a better understanding of the nature and structure of a very quiet Sun, and of an upper atmosphere relatively devoid of solar influences, and in doing so, to help clarify the role of solar activity in the dynamics and variability of the Earth's upper atmosphere and ionosphere relative to the internal variations.

Website:

<http://chapman.agu.org/solarminimum/>

## **The physics of flares in the lower solar atmosphere in London, UK**

Start : 2013-04-12 - End : 2013-04-12

Solar flares are impulsive releases of energy in the Sun's corona and yet it is emission from the lower atmosphere (the photosphere and chromosphere) that contains the bulk of the energy. This radiation also provides some of the best diagnostics of the flaring process. The availability of optical, UV/EUV and hard X-ray observations, made with the current fleet of space-based (SDO, Hinode, RHESSI, etc.) and ground-based (ROSA, IBIS, Big Bear, etc.) observatories, combined with recent developments in flare modelling, presents a timely opportunity to study the cause and effect of energy deposition in the lower solar atmosphere. The combination of multi-wavelength observations with advanced numerical simulations can provide key insights into the processes of particle acceleration, plasma heating, energy transport, and wave propagation.

This Royal Astronomical Society discussion meeting will focus on work investigating the response of the solar and stellar atmospheres during a flare's impulsive phase and we welcome contributions from both observation and theory.

Website:

[http://www.astro.gla.ac.uk/?page\\_id=827](http://www.astro.gla.ac.uk/?page_id=827)

## **Space Weather Workshop 2013 in Boulder, CO (USA)**

Start : 2013-04-16 - End : 2013-04-19

The 2013 Space Weather Workshop will be held April 16 - 19, in Boulder, Colorado. This meeting will bring together the customer, forecaster, vendor, and research communities to focus on the impacts of space weather, on forecasting techniques, and on recent scientific advances in predicting conditions in the space environment.

The program will highlight space weather impacts in several areas, including ionospheric disturbances, geomagnetic storms and their solar drivers, radiation belts, and solar energetic particles. Representatives from industries impacted by space weather will be invited to attend, including those from commercial airline, electric power, satellite operations, and navigation/communication industries.

Website:

<http://www.swpc.noaa.gov/sww>

## **Synoptic Network Workshop in Boulder, USA**

Start : 2013-04-22 - End : 2013-04-24

The workshop is being held to discuss and gather community input on science requirements, capabilities and instrumentation for a next-generation synoptic network of solar observing instruments. It is highly probable that such a network should obtain multi-wavelength data, and the intended targets include space weather, helioseismology and solar magnetic fields.

Website:

<https://www2.hao.ucar.edu/synoptic-network-workshop>

## **Space Weather And Plasma in Space in Tel Aviv, Israel**

Start : 2013-04-28 - End : 2013-05-03

Space weather is a new emerging field of space science focused on understanding societal and technological impacts of the solar-terrestrial relations. The Sun has tremendous influence on Earth's space environment, releases energy in the form of electromagnetic and particle radiation that can damage or destroy satellite, navigation, communication and power distribution systems, influence on atmosphere state, magnetosphere and ionosphere activity. Our workshop IsraSWAPS-2013 will be dedicated to the origin, evolution and predictability of physical processes that lead to the space weather hazards. Particular attention will be devoted to application of plasma physics methodologies and achievements to space weather problems. The meeting will also focus on using of plasma understanding

as a test bed for astrophysics and space physics. Contributions in observations, theory, numerical simulations, and experiment are welcome.

Website:

[http://www.tau.ac.il/institutes/advanced/cosmic/Conferences/20013\\_IsraSWAPS/SWAPS-2013.htm](http://www.tau.ac.il/institutes/advanced/cosmic/Conferences/20013_IsraSWAPS/SWAPS-2013.htm)

### **5th EISCAT\_3D User Meeting in Uppsala, Sweden**

Start : 2013-05-06 - End : 2013-05-08

The 5th EISCAT\_3D User Meeting is intended to focus on data analysis and management, while on Tuesday and Wednesday pre-noon (May 7-8) all science topics to be studied by EISCAT\_3D shall be covered.

Website:

[http://www.space.irfu.se/workshops/EISCAT-3D\\_User2013/](http://www.space.irfu.se/workshops/EISCAT-3D_User2013/)

### **NSO Workshop #27: 50 Years of the Seismology of the Sun and Stars in Sunspot, NM (USA)**

Start : 2013-05-06 - End : 2013-05-10

In the last 50 years, helioseismology has made significant contributions to the knowledge of the Sun's interior physics and has led the way to asteroseismology. We have now reached an era where more sophisticated questions are being asked to understand the subtle properties of the Sun and other stars due to the synoptic and high-resolution observations available from BISON, GONG and space missions such as SOHO , SDO, CoRot and Kepler.

On this occasion, a workshop on the theme of '50 years of the seismology of the Sun and stars' is being organized to reflect the progress that has been made as well as to focus on future goals. We plan to bring together helio- and asteroseismologists, theorists and observers in a journey that will take us from the interior of the Sun and its magnetism towards the structure of distant stars and activity cycles.

Website:

<http://www.nso.edu/workshops/2013>

### **AGU Meeting of the Americas, in Cancun, Mexico**

Start : 2013-05-14 - End : 2013-05-17

Welcome to the Meeting of the Americas, a Joint Assembly that covers topics in all areas of the geophysical sciences. Join your colleagues, including Earth and space scientists, educators, students, and other leaders at the Cancun Center in Cancun, Mexico, 14-17 May 2013 as they connect to present groundbreaking research. Sandy beaches and turquoise waters together with Mexican hospitality make this a unique site for another successful Joint Assembly!

Session 'SH10: Solar eruptions from the photosphere to the heliosphere' focuses on observational, modeling and theoretical studies of coronal mass ejections (CMEs) from their formation and initiation at the Sun to their interaction with the solar wind and other eruptions in the interplanetary medium. We are particularly interested in recent advancements on i) the formation or pre-existence of flux ropes as revealed by numerical simulations and SDO observations, ii) the rotation, expansion, deflection, deformation and deceleration of CMEs as they propagate in the corona and heliosphere as revealed by STEREO, IPS and radio observations and simulations, and, iii) the understanding and predicting of CME geo-effectiveness and how it could be improved by future missions.

Website:

<http://moa.agu.org/2013/scientific-program/sessions/sh10/>

### **SPENVIS User Workshop in Brussels, Belgium**

Start : 2013-05-22 - End : 2013-05-24

The SPENVIS User Workshop will be held at the Royal Library of Belgium, Belgium's national and scientific library. It is one of the most important libraries in Europe since its history goes back to the 15th century. It is located in the heart of Brussels at walking distance from the Central Railway Station.

The main objective of this event is to bring the SPENVIS users together to share their experience and to identify their requirements. The workshop will focus on the current and the forthcoming Next Generation SPENVIS systems.

Topics include:

- \* Current and future SPENVIS overview
- \* Space Radiation Models and their accuracy
- \* Space Environment Effects (charging, SEE, degradation, micro-particle impacts)
- \* Geant4 Tools
- \* Educational use of SPENVIS
- \* SPENVIS and other tools

Website:

<http://www.spervis.oma.be/workshop/2013/>

### **2013 UAHuntsville Space Weather Summer School in Huntsville, Alabama, USA**

Start : 2013-05-29 - End : 2013-06-07

Website:

<http://swssuah2013.pbworks.com/w/page/60509553/FrontPage>

### **Meeting on Solar Wind Turbulence in Kennebunkport, Maine, USA**

Start : 2013-06-04 - End : 2013-06-07

Our goal is somewhat different from more familiar conferences and is designed with the SHINE model in mind. We are inviting very few speakers who we are asking to give review and introductory talks for each topic we hope to discuss. Those invited review talks will be largely non-controversial and focus upon agreed-upon results. They are also likely to contain challenges for the participants to explain. Then, the bulk of the time is left unscheduled and we ask the participants to give short, focused talks that lead to discussion and debate on the fundamental aspects of the subject at hand.

We expect that everyone who attends will have ample opportunity to enter into the debate and we hope to stimulate a lively discussion of fundamental physics.

We hope you will join us. Bring multiple 5-minute talks that attempt to make specific points so you can enter into the debate clearly and propel the discussion forward. No one is expected to be given a large block of time to speak. The goal is meaningful and focused debate. Remember, you may not convince everyone, but there will be many participants who want to understand your point of view. Our goal is to debate and illuminate, providing inspiration to all.

Website:

<http://www-ssg.sr.unh.edu/mag/Kennebunkport2013/Kennebunkport2013.html>

### **Space Climate Symposium-5 in Oulu, Finland**

Start : 2013-06-11 - End : 2013-06-15

Space Climate is an interdisciplinary science that deals with the long-term change in the Sun, and its effects in the heliosphere and in the near-Earth environment, including the atmosphere and climate. A special focus will be on studies of the causes, consequences and implications of the present, unusually low solar activity since solar cycle 23 that, most likely, indicates the imminent end of the Modern Grand Maximum of solar activity. Other topics include solar dynamo, solar irradiance variations, solar wind, geomagnetic field and activity, cosmic rays and cosmogenic isotopes, and solar effects on different layers of the atmosphere and on local and global climate, as well as possible solar effects on human health and on the development of human cultures.

Website:

<http://www.spaceclimate.fi/>

### **ISEST (International Study for Earth-Affecting Solar Transients) Workshop in Hvar, Croatia**

Start : 2013-06-17 - End : 2013-06-20

The workshop is to improve the scientific understanding of the origin and propagation of solar transients, and develop the prediction capacity of these transients' arrival and potential impact on the Earth. This workshop is the activity of the ISEST program in CAWSES-II / Task Group 3. The workshop engages coordinated international activities in observation, theory and modeling, and involves scientists in both developed and developing countries, and provides an online platform for educational opportunities for students.

Website:

<http://spaceweather.gmu.edu/meetings/ISEST/Home.html>

### **SWWT Plenary Meeting**

Start : 2013-06-19 - End : 2013-06-19

The SWWT is a forum open to European experts in a variety of both scientific and application oriented fields relating to space weather. The SWWT plays an important role in advising ESA in space weather strategy and acts as a forum for discussion amongst the European space weather community. The SWWT is responsible for promoting coordinated European space weather activities at both national and industry levels. The SWWT seeks to identify and discuss potential collaborations and/or synergies with other structures or organisations such as the EC FP7 & COST programmes and others.

Each year they organise a Plenary Meeting.

### **Atomic physics, plasma spectroscopy, and space solar physics: Celebrating the achievements of Alan Gabriel at Orsay, France**

Start : 2013-06-20 - End : 2013-06-20

This conference aims at presenting the status of atomic physics, plasma spectroscopy, and solar physics from space, put in the perspective of the achievements made with SOHO and the missions that followed. In addition, our friend and colleague Alan Gabriel will celebrate his 80th birthday. In anticipation of this, it will be an excellent opportunity to celebrate his many (and continuing) contributions to science in various fields. They range from atomic physics and plasma spectroscopy (theta-pinch machine) to solar and space physics - from Skylab, SMM (PI of XRP), Spacelab2, to SOHO (GOLF, CDS, EIT, SUMER) - as well as science management, including RAL (UK), IAS (France), ESA SSWG (and SSAC), NASA/ESA Solar Orbiter/Sentinels.

Presentations addressing new results in atomic physics, plasma spectroscopy and solar physics are welcome, along with reminiscences related to Alan, which are warmly encouraged.

Website:

<http://www.ias.u-psud.fr/AHG/>

### **ILWS Science Workshop in Irkutsk, Russia**

Start : 2013-06-23 - End : 2013-06-29

The 2013 ILWS Science Workshop will take place June 23-29, 2013 in Irkutsk, Russia and will be hosted by the Institute of Solar-Terrestrial Physics of the Russian Academy of Sciences

Website:

[http://en.iszf.irk.ru/ILWS\\_2013](http://en.iszf.irk.ru/ILWS_2013)

### **Asia Oceania Geosciences Society (AOGS) Annual Meeting in Brisbane (Australia)**

Start : 2013-06-24 - End : 2013-06-28

Asia Oceania Geosciences Society (AOGS) was established in 2003 to promote geosciences and its application for the benefit of humanity, specifically in Asia and Oceania and with an overarching approach to global issues.

Asia- Oceania region is particularly vulnerable to natural hazards, accounting for almost 80% human lives lost globally. AOGS is deeply involved in addressing hazard related issues through improving our understanding of the genesis of hazards through scientific, social and technical approaches.

AOGS holds annual conventions providing a unique opportunity of exchanging scientific knowledge and discussion to address important geo-scientific issues among academia, research institution and public.

Recognizing the need of global collaboration, AOGS has developed good co-operation with other international geo-science societies and unions such as the European Geosciences Union (EGU), American Geophysical Union (AGU), International Union of Geodesy and Geophysics (IUGG), Japan Geo-science Union (JpGU), and Science Council of Asia (SCA).

Website:

<http://www.asiaoceania.org/aogs2013/public.asp?page=home.htm>

### **2013 Radiation Belts Workshop at Island of Santorini, Greece**

Start : 2013-06-30 - End : 2013-07-04

The 2013 Radiation Belts Workshop is the first of a series of radiation belt meetings that are planned to be held in the Aegean islands.

As its title conveys, this first workshop includes sessions on radiation belt research and specification. The workshop focuses, in particular, on the properties of low frequency electromagnetic waves and their effects on radiation belts dynamics. The other highlight of the workshop is the ongoing international effort on improvement of the AE9/AP9 Next Generation Radiation Specification Models. These sessions will be complemented with presentations of the progress achieved by a most relevant FP7-Space project titled MAARBLE (Monitoring, Analyzing and Assessing Radiation Belt Loss and Energization).

Website:

<http://space-env.esa.int/indico/conferenceDisplay.py?confId=20>

### **2013 Heliophysics Summer School in Boulder, Colorado (USA)**

Start : 2013-07-12 - End : 2013-07-19

Applications are invited for the 2013 Heliophysics Summer School, which will be held in beautiful Boulder, Colorado. We are seeking students and undergraduate level teachers and instructors to join us this coming summer for a unique professional experience. Students and teachers will learn about the exciting science of heliophysics as a broad, coherent discipline that reaches in space from the Earth's troposphere to the depths of the Sun, and in time from the formation of the solar system to the distant future. At the same time, a goal of the Summer School is for the group of instructors to develop materials from Heliophysics that can be applied in their classes.

The Heliophysics Summer School focuses on the physics of space weather events that start at the Sun and influence atmospheres, ionospheres and magnetospheres throughout the solar system. The solar system offers a wide variety of conditions under which the interaction of bodies with a plasma environment can be studied: there are planets with and without large-scale magnetic fields and associated magnetospheres; planetary atmospheres display a variety of thicknesses and compositions; satellites of the giant planets reveal how interactions occur with subsonic and sub-Alfvenic flows whereas the solar wind interacts with supersonic and super-Alfvenic impacts.

Encompassed under a general title of comparative magnetospheres are processes occurring on a range of scales from the solar wind interacting with comets to the interstellar medium interacting with the heliosphere. The school will address not only the physics of all these various environments but will also go into the technologies by which these various environments are being observed. The program is complemented with considerations of the societal impacts of space weather that affects satellites near Earth and elsewhere in the solar system.

The school will be based on lectures, laboratories, and recitations from world experts, and will draw material from the three textbooks Heliophysics I-III, published by Cambridge University Press.

Several teachers along with about 35 students will be selected through a competitive process organized by the UCAR Visiting Scientist Programs. The school lasts for eight days, and each participant receives full travel support for airline tickets, lodging and per diem costs.

Website:

<http://www.vsp.ucar.edu/Heliophysics/>

### **Space weather summer school in Alpbach, Austria**

Start : 2013-07-16 - End : 2013-07-25

The Summer School Alpbach enjoys 36 years of tradition in providing in-depth teaching on different topics of space science & technology, featuring lectures and concentrated working sessions on mission studies in self-organised working groups. 60 young highly qualified European science and engineering students converge annually for stimulating 10 days of work in the Austrian Alps. 4 teams compete to design a space mission judged by a jury of experts. Students learn how to approach the design of a satellite mission and explore new and startling ideas supported by experts. The Summer School 2013 will focus on Space Weather .

The purpose of the Summer School is to foster the practical application of knowledge derived from lectures, to develop organisational and team-work skills and to encourage creativity. Teams will compete to design the best project, judged by an independent jury. The teams themselves are responsible for the selection of the subject of the project and for the team structure and working methods.

Website:

<http://www.summerschoolalpbach.at/>

### **2013 CISM Summer School, in Boulder, Colorado, USA**

Start : 2013-07-22 - End : 2013-08-02

The CISM Summer School is intended to give students a comprehensive immersion in the subject of space weather: what it is, what it does, and what can be done about it. Space weather is many things: beautiful when seen through the eyes of a sun-viewing telescope, fascinating when studied for its alien worlds of magnetic structures and phenomena, awesome when witnessed as a solar eruption or auroral storm, and devastating to the users of services it disrupts. Space weather links the Sun, the Earth, and the space in between in a branching chain of consequences. Weather systems on the Sun can spawn interplanetary storms of colossal size and energy that envelop the whole planet in electrical hurricanes. Such storms attack high-tech, complex, and expensive technological systems that provide much of the infrastructure that allows modern society to function.

Website:

<https://www2.hao.ucar.edu/docs/2013-cism-summer-school>

### **1st SOLARNET Workshop, 3rd EAST/ATST meeting: 'Synergies between ground- and space-based solar research', in Oslo, Norway**

Start : 2013-08-05 - End : 2013-08-08

The goal of this workshop is to foster collaborations between ground and space solar projects. This workshop is expected 1) to provide a forum to discuss the use of current and future observational solar facilities, and how to optimise their scientific returns; 2) to identify the potentially paradigm-shifting observations that will become possible with the next generation ground- and space-based solar telescopes and their advanced instrumentation; 3) to foster collaborations between researchers working at the development of ground- and space-based projects and creation of synergies between research programs at different wavelength bands.

A workshop webpage and more information will follow shortly - the purpose of this pre-announcement is to enable early bookings in your calendar.

### **XIIIth IAGA Scientific Assembly in Merida, Yucatan, Mexico**

Start : 2013-08-16 - End : 2013-08-31

The Local Organising Committee and the Mexico National Committee of IUGG have the great pleasure to welcome you to the 11th Scientific Assembly of the International Association of Geomagnetism and Aeronomy (IAGA) which is held in Mérida Yucatán, Mexico from 26 to 31 August 2013 with the motto: "Living on a Magnetic Planet". Our Magnetic Planet Capricious (Changeable or Unpredictable) Field.

In order to increase the visibility and attractiveness of IAGA to young researchers, to motivate them to play active role within IAGA and to create (and enhance) their awareness of IAGA and sense of belonging to IAGA, the first IAGA Summer School will be organized just prior the Assembly. The summer school will provide overview of the activities carried out within all the IAGA divisions, with subjects from paleomagnetism and magnetic anisotropy through observatories and geomagnetic field modeling to ionospheric and aeronomic research. At least 20 young scientists from all around the world will be invited

based on the nominations from Working Groups and Divisions. Special call and more information will be published before the end of 2012.

Website: <http://iaga2013.org.mx/>

### **Solar Physics and Space Weather Instrumentation V in San Diego, CA (USA)**

Start : 2013-08-25 - End : 2013-08-29

This conference will focus on instrumentation, observatories, space missions, and programs for observations from the Sun to Earth's upper atmosphere and space environment. The aim is to bring together diverse communities working on all elements of solar physics and space weather instrumentation.

Studying solar phenomena and monitoring space weather requires observations using both space- and ground-based instrumentations covering the different regions of the Sun-Earth system, the Sun, interplanetary medium, magnetosphere, ionosphere, and thermosphere. Papers are solicited concerning all instrumentation-supporting solar physics and space weather. This includes, but is not limited to, concepts, designs, fabrication processes, calibration, data trending, information technologies, solar data mining, instrument modeling, and satellite lifetime prediction modeling. We are also interested in all past, current, and future solar space missions and satellite and ground constellations of space weather instrumentation with a strong focus on Space Situational Awareness.

This conference is intended to provide the solar physics community and that of Earth's space environment with a forum for discussing the latest updates on instrumentation, observation techniques, and programs in their respective fields, and for proposing innovative ideas for future Sun-Earth coordinated observations.

Website: <http://spie.org/op423>

### **7th International Workshop on Solar Polarization in Kunming, China**

Start : 2013-09-09 - End : 2013-09-14

We gain information about the universe through analysis of the spectra from celestial objects. However, while the intensity spectrum represents a scalar quantity but electromagnetic radiation occurs in the form of transverse waves, the polarized spectrum provides us with a 4-vector, the Stokes vector. The increased amount of information space opens new windows to the universe, in particular for the exploration of magnetic fields. It is well recognized that the magnetic field is a primary agent responsible for structuring and the source of all variability on intermediate time scales, which manifests itself in all forms of solar and stellar activity.

It is therefore not surprising that every year there are many scientific meetings organized with the objective of studying the role of magnetic fields in cosmic objects. What is largely missing in these meetings is however an in-depth investigation of the fundamental aspects of how magnetic fields can be determined by the means of spectro-polarimetry, our main gateway to cosmic magnetism. The primary aim of our series of Workshops is to address these fundamental aspects, with less emphasis on the morphological and physical properties of cosmic magnetic fields.

Website: <http://spw7.ynao.ac.cn/>

### **2nd UK-Ukraine meeting on Solar Physics and Space Science (UKU SPSS) in Kiev, Ukraine**

Start : 2013-09-16 - End : 2013-09-20

The meeting will cover a broad range of aspects of solar physics, space science and solar-terrestrial relations. We aim to include every side of solar and space research, including observations, theory, and numerical modelling. The main idea behind the meeting is to treat the entire solar-terrestrial domain as one system, rather than each region independently.

The topics to be covered are:

- \* advanced solar observations
- \* waves and flows in the Solar atmosphere
- \* structure and dynamics of solar magnetic fields
- \* connecting analytical theory and modern numerical simulations to observations

- \* new physics in numerical modelling
- \* linking solar interior with heliosphere
- \* particle acceleration in the Sun and heliosphere
- \* non-linear phenomena in space plasmas
- \* physics of magnetosphere and ionosphere

Website:

[http://swat.group.shef.ac.uk/Conferences/Ukraine\\_UK\\_2013/index.html](http://swat.group.shef.ac.uk/Conferences/Ukraine_UK_2013/index.html)

## **Space science training week: data driven modeling and forecasting in Leuven, Belgium**

Start : 2013-09-16 - End : 2013-09-19

This summer school targets to introduce a generation of young researchers (advanced master students, PhDs, and junior postdoctoral researchers) to the diverse aspects of space weather related research. It will introduce theoretical approaches to space weather and its drivers, present modern solar data analysis tools, and cover state-of-the-art solar and space science simulations. Participants will learn about forecasting aspects and their quality control for space weather events, but also experience hands-on training in scientific proposal writing and receive do-and-don't tips for scientific presentations.

The scientific program is enriched by a public evening lecture on the solar influence on our climate, and the lecturers are invariably expert scientists with international standing.

The school is open to a maximum of 40 participants, and can benefit from its embedding within two international research network activities: an Interuniversity Attraction Pole P7/08 CHARM connecting heliospheric to astrophysical communities with 7 partner institutes, and a European FP7 Project eHeroes with 15 different partner institutes. Participation from outside both network activities is strongly encouraged. Within Belgium, the school links up expertise from universities (KU Leuven, ULB, Gent University) to federal research institutes (the Solar-Terrestrial Centre of Excellence, the Royal Observatory of Belgium and the Belgian Institute for Space Aeronomy).

Website:

<http://stce.be/SpSTraining/>

## **Helicity Thinkshop on Solar Physics in Beijing, China**

Start : 2013-10-27 - End : 2013-10-31

Magnetic helicity has been intensively studied from observational, theoretical, and many other aspects of solar physics. For this meeting we would like to invite solar physicists who are interested in the observational and theoretical studies of the helicity, to encourage thorough discussions on the relevant hot issues. The 1st Helicity Thinkshop was held successfully in 2009, and now the 2nd one will be held on October 27-31, 2013 in Beijing, China.

Website:

<http://sun.bao.ac.cn/meetings/HT2013/>

## **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/>

### **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](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/>

### **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/>

## **9. New documents in the European Space Weather Portal Repository**

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

### **eHEROES - Comparison of MHD Simulations of the Solar Wind with In-Situ Measurements**

Knowledge of the background solar wind is an important input for CME propagation studies. Since in-situ measurements of the background solar wind are only available at 1 AU, we have to rely on heliospheric models to derive the distribution of solar wind parameters in IP space and hence, to do space weather forecasting. We test the performance of the solar wind models ENLIL/MAS, ENLIL/WSA (CCMC) and MAS (Predictive Science) by comparing model results with in-situ measurements from ACE and Wind. For the study we chose the years 2005 and 2007 as a time period with low solar activity. We found that the general structure of the background solar wind is well reproduced by the models. The best model results were obtained for the parameter solar wind speed. However, the predicted arrival times of high speed solar wind streams have typical uncertainties of the order of 1 – 1.5 days.

<http://www.spaceweather.eu/en/repository/show?id=339>

### **eHEROES - Cooling of flare loops of the X1.4 class flare of 22 September 2011**

Coronal mass ejections (CMEs) and flares are transient phenomena with huge energy releases originating from the solar corona. They can immensely influence the conditions of the heliosphere and the space weather at Earth. We investigate the evolution of the X1.4 class flare observed on 22 September 2011 that was also connected with a CME and a coronal wave event. From Earth, the event was observed on the solar limb and thus allows measurements of the height of the loops tops and obtaining the height-time curve of the evolving loops. Identifying and tracking loop tops in different wavelengths covering a wide temperature range further allows to derive the cooling rate of flare loops. For the multi-wavelength study, we use SDO/AIA data as well as H-alpha data from the Kanzelhöhe Observatory.

<http://www.spaceweather.eu/en/repository/show?id=423>

### **eHEROES - Evolution of CMEs in the inner heliosphere – observations versus models**

With the SECCHI instrument suite aboard STEREO, coronal mass ejections (CMEs) can be observed from multiple vantage points during their entire propagation all the way from the Sun to 1 AU. The propagation behavior of CMEs in the interplanetary space is mainly influenced by the ambient solar wind flow. CMEs that are faster than the ambient solar wind get decelerated, whereas slower ones are accelerated until the CME speed is finally adjusted to the solar wind speed. On a statistical basis, empirical models taking into account the drag force acting on CMEs, are able to describe the observed kinematical behaviors. For several well observed events, we aim to do a comparative study showing the kinematical evolution of CMEs derived from remote sensing and in situ data, as well as from empirical models using 2D and 3D input parameters. From this we will be able to obtain the distance regime at which the solar wind drag force is dominating the CME propagation. We present the first steps in the analysis as well as first results.

<http://www.spaceweather.eu/en/repository/show?id=424>

### **Background solar wind modeling and its relevance for the propagation of interplanetary coronal mass ejections**

The background solar wind (SW) characteristic is a key ingredient for the study of CME propagation in interplanetary (IP) space, in particular for the prediction of interplanetary coronal mass ejection (ICME) arrival time and arrival speed at Earth. Since in-situ measurements of the background solar wind are only available at 1 AU, one has to rely on heliospheric models and/or empirical relationships to derive the SW distribution in IP space. We tested different empirical and MHD models to predict the SW characteristics at 1 AU, including MAS/MAS, MAS/ENLIL, WSA/ENLIL, and an empirical model based on the size and

location of coronal holes (CH) on the Sun. The modeled SW parameters were compared with in-situ measurements from ACE and Wind at 1 AU for a year of low ICME activity during the last solar minimum.  
<http://www.spaceweather.eu/en/repository/show?id=425>

### **eHEROES - Effects of the background solar wind speed modeled with ENLIL on the propagation behavior of CMEs**

<http://www.spaceweather.eu/en/repository/show?id=426>

### **eHEROES - Propagation behavior of interplanetary CMEs: driving versus drag force**

<http://www.spaceweather.eu/en/repository/show?id=427>

### **STCE Annual Report 2011**

The STCE Annual Report 2011 is a compilation of the activities done in 2011 within the frame of the STCE. This report has an obviously different style compared to the previous editions. This is because it is now targeting a more general public. Hence, it presents only a selection of the 2011-activities in easy-to-digest summaries. These summaries emphasize the intense collaboration between the institutes at the Space Pole, as well as with our external partners. We hope you enjoy this new style report, which features articles on the evolution of the solar activity, the 8th European Space Weather Week, Solar Orbiter, the Heliophysics Event Knowledge database, user applications for the monitoring of the solar radiation and the ionosphere,... just to name a few. Happy reading!

<http://www.spaceweather.eu/en/repository/show?id=428>