STCE Newsletter

31 Dec 2012 - 6 Jan 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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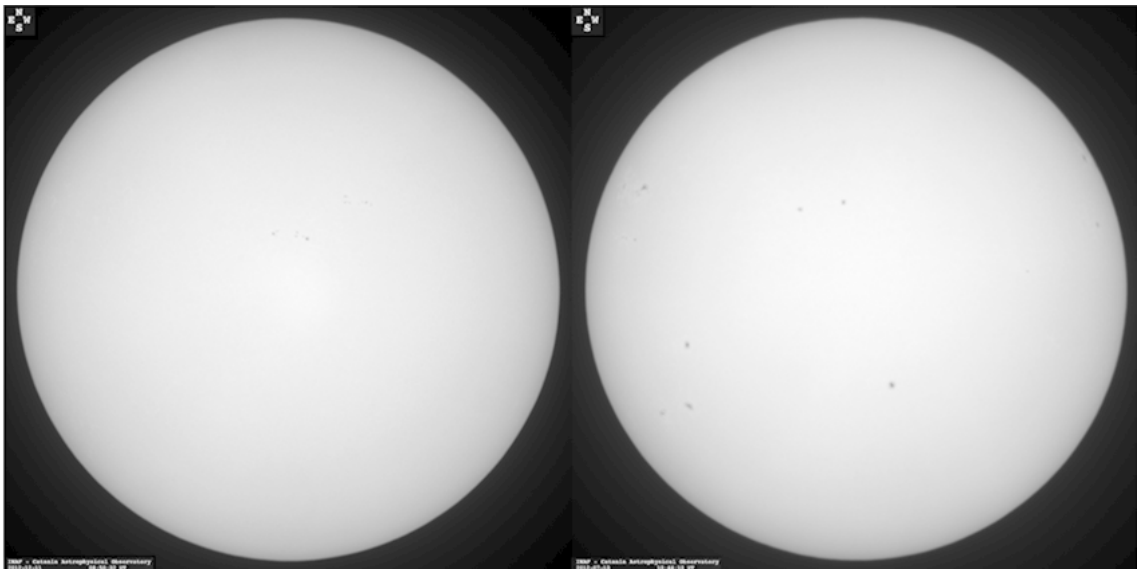
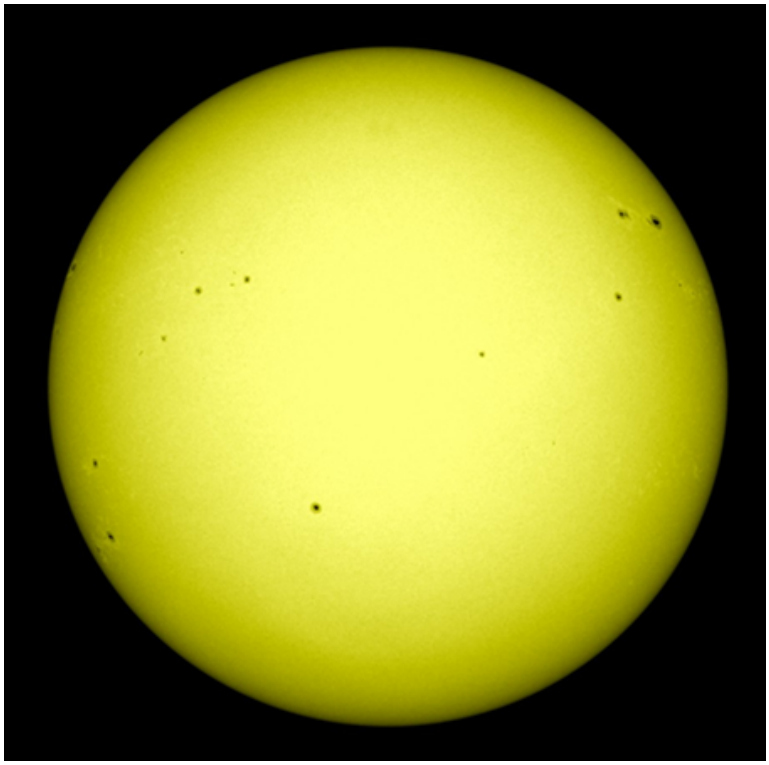
1. Sunspots galore

The SIDC (http://www.sidc.oma.be/index.php) sunspot bulletin for December 2012 reported a monthly provisional international sunspot number of only 40.8. That is the lowest since February 2012 (32.9). Solar flare activity was in proportion, with no medium flares (M-class) and several days with not even small flares (C-class).
However, it seems that the Sun has taken the New Year's resolution to be more active in 2013. Indeed, during the first week of January, the Sun gradually got freckled with sunspot groups. The difference with just one solar rotation ago is remarkable, as shown by the Catania images (http://web.ct.astro.it/sun/) underneath. The left image shows the Sun on 11 December 2012, while the right one depicts the Sun on 7 January 2013.



A small movie at http://www.youtube.com/watch?v=zMRYc6PyGWg was created using SDO/AIA4500 images (http://sdo.gsfc.nasa.gov/). It shows the sunspot activity from 1 till 7 January 2013. From 4 January onwards, about a dozen of sunspot groups could be observed. Though most of these sunspot groups were well visible, they were also quite simple and relatively small. The *combined* area of all visible sunspot groups was also smaller than some of the big sunspot groups that have already appeared during this solar cycle. Hence, except for an impulsive M-flare on 5 January, these small and simple sunspot groups did not show much significant flaring activity.
This was also the case for NOAA 1640, the biggest group of the pack (top right group in SDO-image underneath). Interestingly, this quite inactive group appeared at heliographic latitude +28°. One has to go back already to January 2012 to find a group of similar size at such elevated latitude (NOAA 1402).



Though a dozen of sunspot groups may have been quite uncommon during this solar cycle so far, the number is by no means exceptional. Indeed, during strong cycles, there may be around 20 sunspot groups visible for days in a row, with usually some big and complex groups too. This was the case for example during several days in 1989, the maximum year of solar cycle 22.

2. The STCE and the EGU general assembly 2013

European Geosciences Union, General Assembly 2013 and the STCE

The EGU General Assembly brings together scientists covering all disciplines from the Earth, Planetary and Space Sciences.
Norma Crosby is the Programme Group Chair of the section Solar-Terrestrial Sciences, subdivided in Solar Physics, Magnetosphere, Heliosphere and Ionosphere.

ST5.1 session: Space Weather and its Effects on Terrestrial and Geo-Space Environments: Science and Applications

This session is convened by Hanna Rothkaehl.
Viviane Pierrard from the STCE and Jean Lilenstein are co-convening.

This session gathers together scientists with expertise in the field of solar-terrestrial physics that deal with the effects of space phenomena on the geo-space. Effects range from those observed on spacecraft, all the way down to Earth, Earth's climate, to other Solar system bodies and include technological systems, human health and life in space. This session aims at merging new and existing methods of observations and diagnostics of solar system habitats.
We welcome theoretical and observational, as well as applied (effects on terrestrial and geo-space environments) contributions, on all aspects of space weather.

The conveners emphasise on results of ongoing European and other funded Space Weather projects. This year, part of the session will be devoted to 'Operational tools for Space Weather and Forecasters in Space Weather'.
This session is supported by the journal 'Space Weather and Space Climate': http://www.swsc-journal.org

Link for abstract submission: http://meetingorganizer.copernicus.org/EGU2013/session/12612

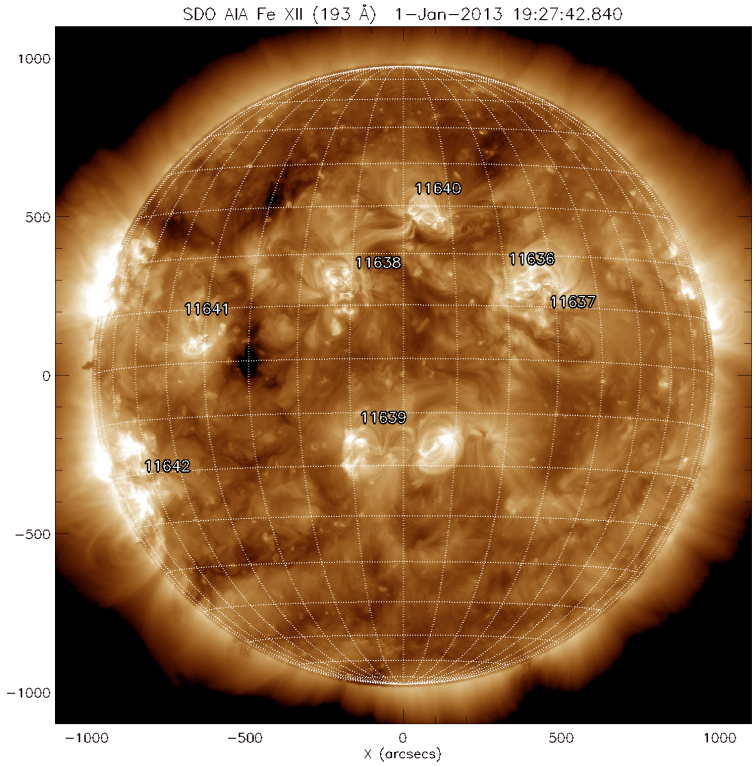
Link with the STCE

Viviane Pierrard is responsible for the STCE workgroup Fundamental Science. She is eager to understand and in a next step, predict the behaviour of the space in the Earth's environment. Our space environment, including for example the radiation belts, is strongly influenced by the solar wind. The solar wind ejects gusts of energetic solar plasma in the Earth's magnetosphere initiating several physical processes that influence the Earth and its climate.

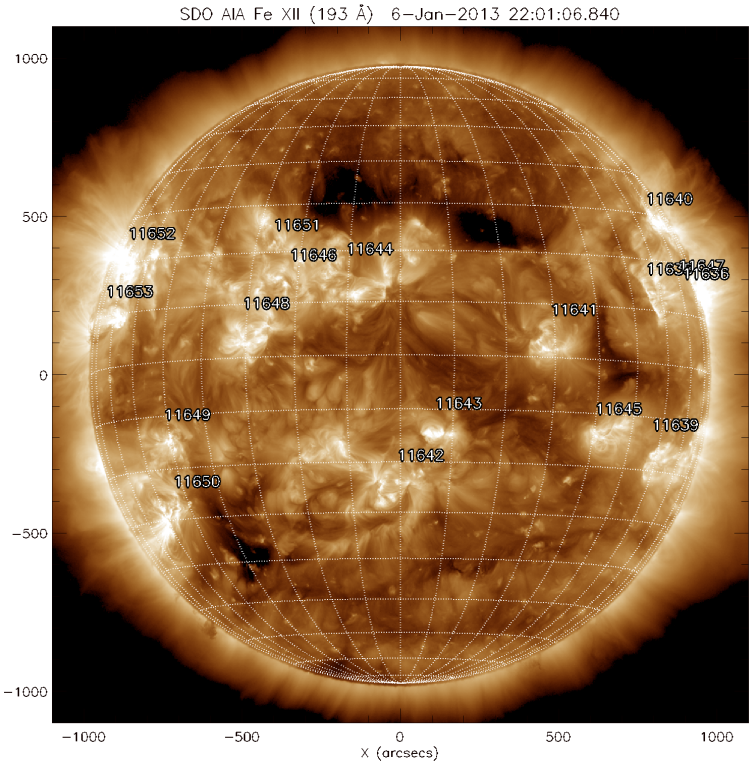
3. Review of solar and geomagnetic activity (31 Dec 2012 - 6 Jan 2013)

Solar Activity

The week was marked by several small C-class flares originating mostly from NOAA AR 1640. In the picture of Dec 31, 2012, NOAA 1640 is situated just next to the central meridian, in the northern hemisphere.



There was one M-class flare (M1.7), from NOAA AR 1652, peaking at 09:31 UT on January 5. NOAA 1652 was located at the east limb, northern hemisphere at the time of the M-flare. No Earth directed CMEs were observed.



Geomagnetic Activity

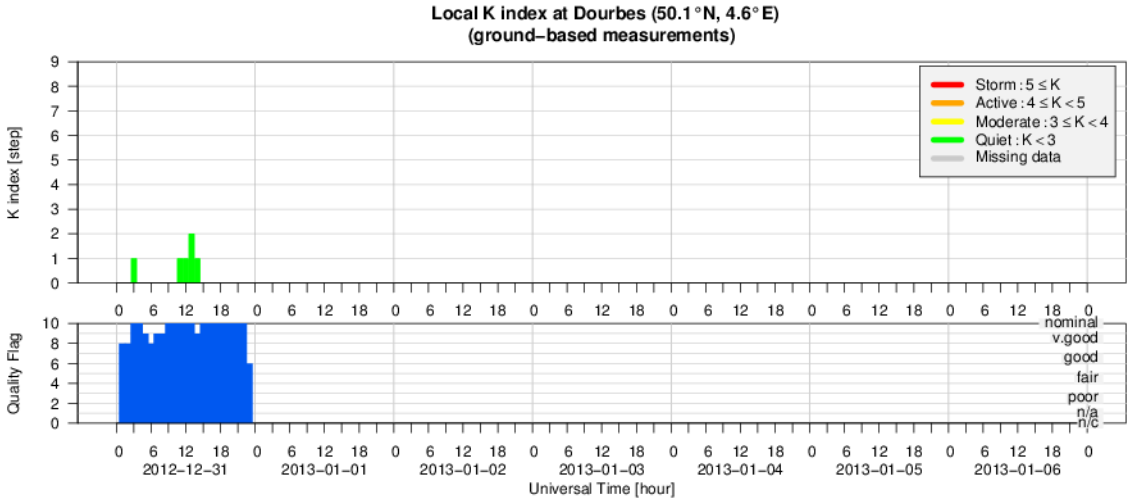
Geomagnetic conditions were quiet the full week.

4. Noticeable Solar Events (31 Dec 2012 - 6 Jan 2013)

DAY	BEGIN	MAX	END	LOC	XRAY	OP	10CM	TYPE	Cat	NOAA	NOTE
5	0926	0931	0934		M1.7		0			1652	

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 (31 Dec 2012 - 6 Jan 2013)



6. PROBA2 Observations (31 Dec 2012 - 6 Jan 2013)

Solar (flare) activity evolved from *very low* on Monday to *low* until Saturday. A sizeable active region (AR11652) rounded the East limb on Jan 3rd and the back-ground EUV radiation started increasing significantly. Flare activity increased to *moderate*, when the region generated a (single) M1.7 flare.

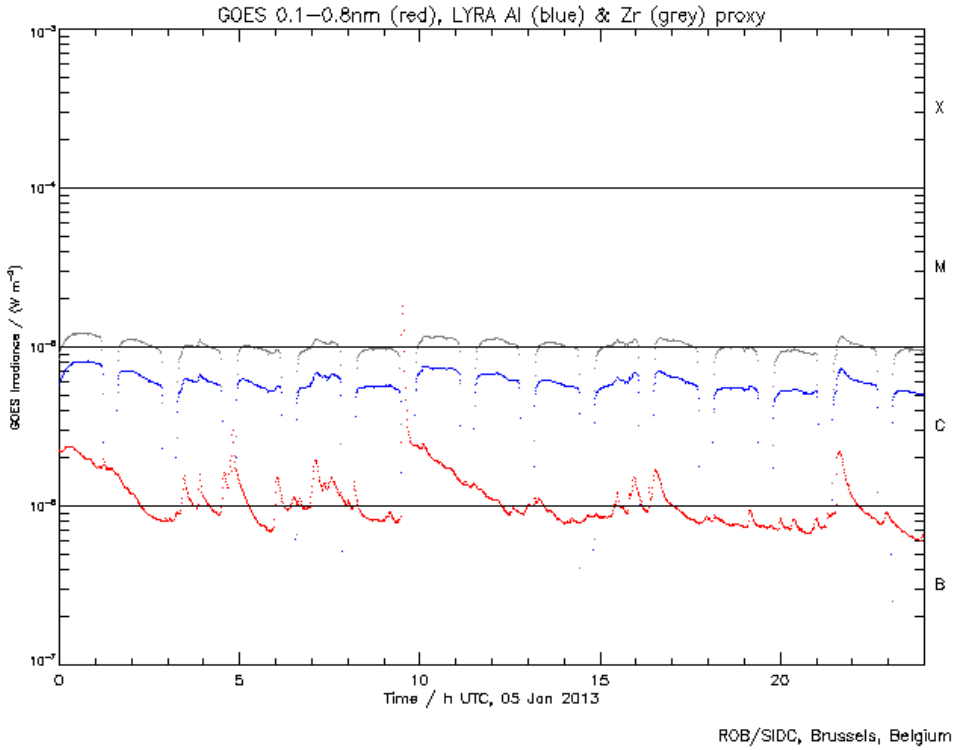
In order to view the activity of this week in more detail, we suggest to go to the following website from which all the daily (normal and difference) movies can be accessed: http://proba2.oma.be/ssa.
This page also lists the recorded flaring events.

A weekly overview movie can be found here (SWAP174/ AIA304 combination; HelioViewer.org): http://proba2.oma.be/swap/data/mpg/movies/campaign_movies/2012_12_31_00_00_31_2013_01_06_22_55_55_SWAP_174__AIA_304-hq.mp4.
Some details about the events in this movie can be found further below.

In this movie, the swirling higher altitude movements of the magnetosphere and the impacts of the eruptions on it, can be seen throughout the week, both on the East and West side of the Sun.

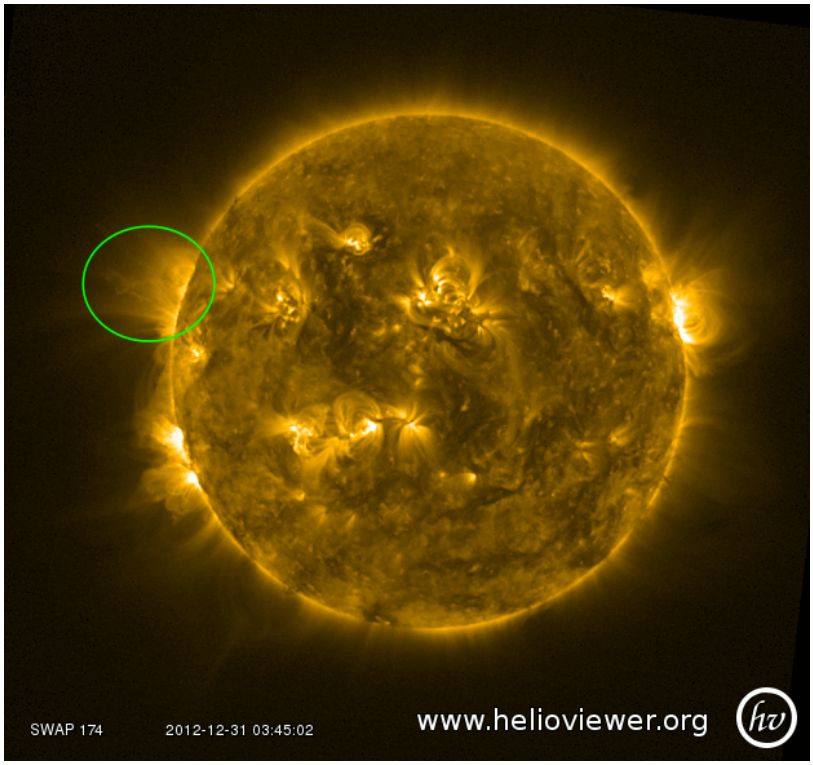
The M1.7 flare on Saturday occurred during a SWAP/LYRA occultation and could therefore not be seen by our instruments.

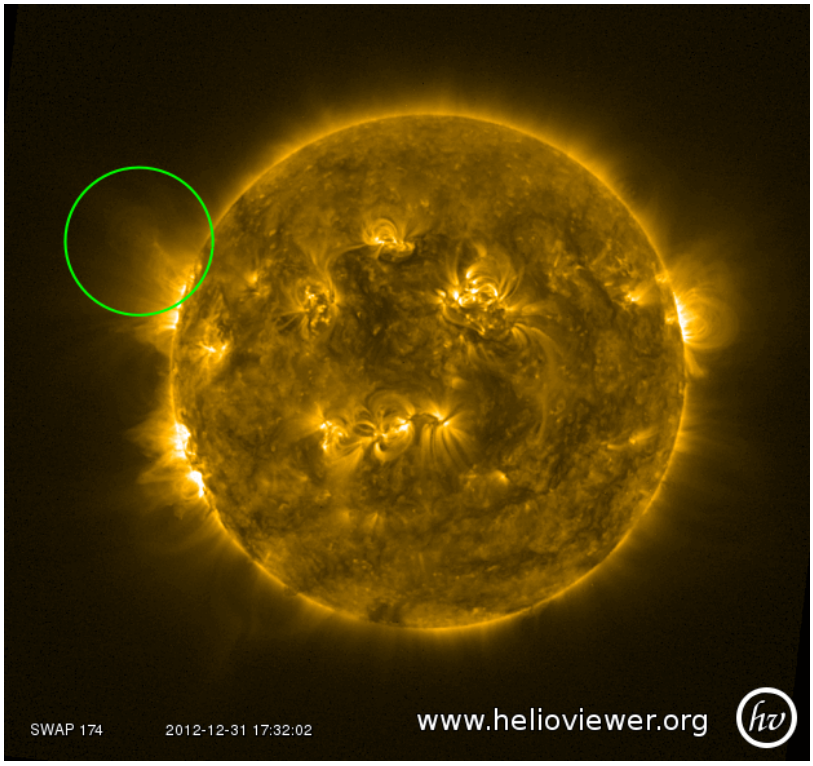
Below is shown a plot of the GOES, LYRA Al and Zr channels with associated colors. The M1.7 flare occurred at 9:26 (see Red GOES plot), after the start of a PROBA2/LYRA occultation.



During this week, several prominence eruptions occurred, some of them seen by SWAP, some of them not.

Below are two eruptions from the (to be) AR11652 while it is still behind the East limb. Both occurred on December 31st. The pictures were taken at 03:45 and 17:32 respectively.


SWAP 174
2012-12-31 03:45:02
www.helioviewer.org


SWAP 174
2012-12-31 17:32:02
www.helioviewer.org

7. Future Events

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

2nd annual SWIFF meeting

Start : 2013-01-14 - End : 2013-01-16
SWIFF (Space Weather Integrated Forecasting Framework), a project funded by the European Commission through the Framework Program 7, aims to develop mathematical models and computational methods especially designed to handle the multiple physics and the multiple scales characteristic of space weather phenomena (for more information see). SWIFF Project reaches two years on January 31, 2013. Hence, the aim of the Conference will be to review the progress in those two years and plan for the next last year of activity.
http://www.swiff.eu/
Meeting Registration - DEADLINE EXTENDED until December 30: deadlines for meeting registration and abstract submission are now extended until December 30, 2012!
Registration Fee is â‚¬140.00, including: access to all sessions, coffee breaks, and the Social Dinner. The Social Activity (visit to the Egyptian Museum) and lunches are not included in the fee. We kindly ask you to pay the registration fee via the on-line form as soon as possible. Late (on-site) registrations and payments will also be accepted (via credit card only), but we kindly ask you to make the fee payment before the deadline of December 30. Official receipts of Registration Fee payments will be provided at the Meeting desk.
During the registration, we ask you to preliminary state if you intend to participate also to the Social Activity and/or to the Social Dinner, just to have a first idea of the total number of people. Payment for the Social Activity (approximately â‚¬12, depending on the final number of participants) will be required on-site (by cash only). Receipts will be provided.
For any further information please contact the Scientific Organizing Committee (swiff2_soc@oato.inaf.it) or the Local Organizing Committee (swiff2_loc@oato.inaf.it).
Website:
http://swiff2.oato.inaf.it/

Solar ALMA workshop in Glasgow (UK)

Start : 2013-01-14 - End : 2013-01-17
The Atacama Large Millimeter/submillimeter Array (ALMA), an international partnership of Europe, North America and East Asia in cooperation with the Republic of Chile, is the largest astronomical project in existence.
The workshop aims to bring together the ALMA-minded solar community to discuss solar observational issues with ALMA, solar science and planned observations with ALMA, and the planning of solar ALMA observations.
Th workshop is hosted by Astronomy & Astrophysics Group, and will take place in School of Physics and Astronomy, University of Glasgow, Room 323, Kelvin Building.
Website:
http://www.astro.gla.ac.uk/~eduard/solarALMA/

Understanding the Dynamics of the Sun using Helioseismology and MHD Simulations in NASA Ames Research Center, CA (USA)

Start : 2013-02-04 - End : 2013-02-08
Helioseismology provides tools for imaging structures and mass flows below the solar surface, and is becoming an essential technique for understanding the dynamics of solar activities and developing physics-based forecasts of the solar cycle, emerging active regions and energy release events. A better understanding is needed to unravel the effects of the complex interactions of solar oscillations with the turbulent magnetized plasma on global and local helioseismology diagnostics. These effects are particularly challenging in regions of strong magnetic fields. Numerical simulations of solar MHD waves

and turbulent dynamics give important insights into the complicated wave and turbulence physics, and provide synthetic data for verification and validation of helioseismology methods and results.
The goals of this workshop are to discuss and stimulate further development of helioseismology methods, solar interior models, and realistic numerical simulations. These goals are particularly important for analysis of the continuous data flow from the Solar Dynamics Observatory, development and verification of helioseismology methods, and for theoretical interpretation of observations and inversion results.
Website:
http://sun.stanford.edu/LWS2013/

AFFECTS User Workshop in Brussels, Belgium

Start : 2013-02-28 - End : 2013-02-28
On February 28th, 2013 the AFFECTS team organises an international user workshop at the Royal Observatory of Belgium in Brussels.
At the workshop there will be a demonstration of all AFFECTS space weather products:
* Near real time dimming and EIT wave detection
* 3D CME analysis tool
* Coronal analysis tool
* CME & solar wind arrival and impact forecast tool
* Flare, CME , geomagnetic, auroral, ionospheric forecasts & alerts
* Forecast of perturbed TEC
* Solar activity and space weather timelines viewer
To register, please send an e-mail incl. your full name, institution, e-mail and (institutional) address to . DÃ¶rte Dannemann
Website:
http://www.affects-fp7.eu/news-events/user-ws/

9th GEANT4 space users' workshop in Barcelona, Spain

Start : 2013-03-04 - End : 2013-03-06
Geant4 Space Users' Workshop -G4SUW- is focused on new results on space radiation interaction with components, sensors and shielding analysis, as well as on Geant4-based tools and developments applicable to space missions.
The Geant4 particle transport toolkit is jointly developed by a world-wide collaboration and is intended for a wide range of applications in HEP, medical field, and space physics and engineering. In recent years, space and astrophysics has become a significant user category, with applications ranging from instrument and detector response verification to space radiation shielding optimization, component effects, support of scientific studies, and analysis of biological effects.
Main topics for next G4SUW will include:
* Single Event Effects (SEE) simulation.Geant4-TCAD coupling.
* Microdosimetry.
* Planetary exploration applications.
* Space electronics and science detectors.
* Simulation of astronaut radiation hazards.
* Interfaces and tools to space environment analysis tools such as SPENVIS.
* Cosmic ray magnetospheric propagation analysis.
* Large-scale simulations requiring event biasing and/or GRID capabilities.
* General shielding optimization applications.
Website:
http://www.inta.es/g4suw2013/index.html

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/

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

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

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/

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

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/

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/

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: not yet available

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/

8. New documents in the European Space Weather Portal Repository

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

Effects of the ionosphere on RF systems topical working group

http://www.spaceweather.eu/en/repository/show?id=408

eHEROES - De Zon en PROBA2

A presentation given during the open doors of the public observatory Urania, Hove. 60 people participated and were instructed about our Sun, Space Weather and how PROBA2 operates as a satellite monitoring space weather. The latest scientific outcome of SWAP and LYRA, two scientific space weather instruments onboard of PROBA2 was presented.
http://www.spaceweather.eu/en/repository/show?id=409

ESWW9-splinter: Space Weather Working Team/SWWT

ESWW9 Splinter wrap up of the Space Weather Working Team.
http://www.spaceweather.eu/en/repository/show?id=410

ESWW9-splinter: Education, Outreach and Emerging Markets

Splinter wrap up of the SWWT Topical Working Group 'Education, Outreach and Emerging Markets Topical Working Group.
http://www.spaceweather.eu/en/repository/show?id=412

ESWW9-splinter: PROBA2/SWAP and LYRA Science Meeting

Splinter wrap up of the PROBA2/SWAP and LYRA Science Meeting
http://www.spaceweather.eu/en/repository/show?id=413

Panel on Space Weather: report 2004

http://www.spaceweather.eu/en/repository/show?id=414

Panel on Space Weather: report 2006

http://www.spaceweather.eu/en/repository/show?id=415

Panel on Space Weather: report 2008

http://www.spaceweather.eu/en/repository/show?id=416

Panel on Space Weather: report 2010

http://www.spaceweather.eu/en/repository/show?id=417

Panel on Space Weather: report 2012

http://www.spaceweather.eu/en/repository/show?id=418

ESWW9-splinter: Ionospheric Effects Working Group Splinter Meeting

http://www.spaceweather.eu/en/repository/show?id=407

ESWW9-splinter: Atmospheric Effects

ESWW9 Splinter wrap up of the SWWT topical group 'Atmospheric Effects'.
http://www.spaceweather.eu/en/repository/show?id=411