STCE Newsletter

16 Mar 2015 - 22 Mar 2015

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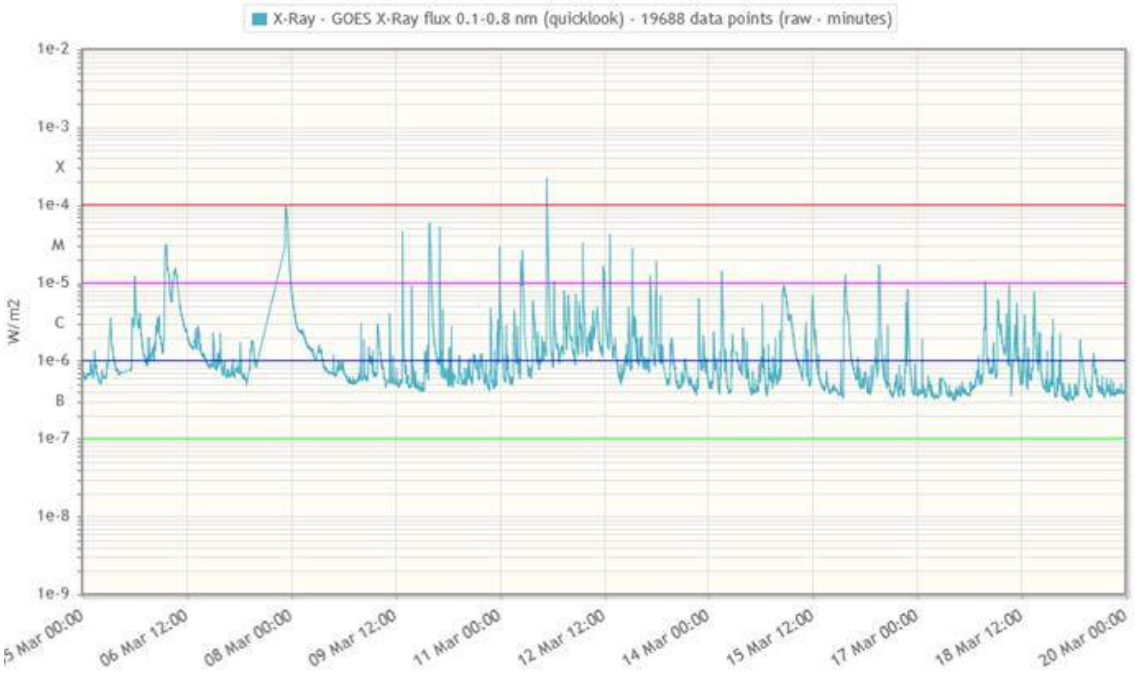
The Solar-Terrestrial Centre of Excellence (STCE) is a collaborative network of the Belgian Institute for Space Aeronomy, the Royal Observatory of Belgium and the Royal Meteorological Institute of Belgium.

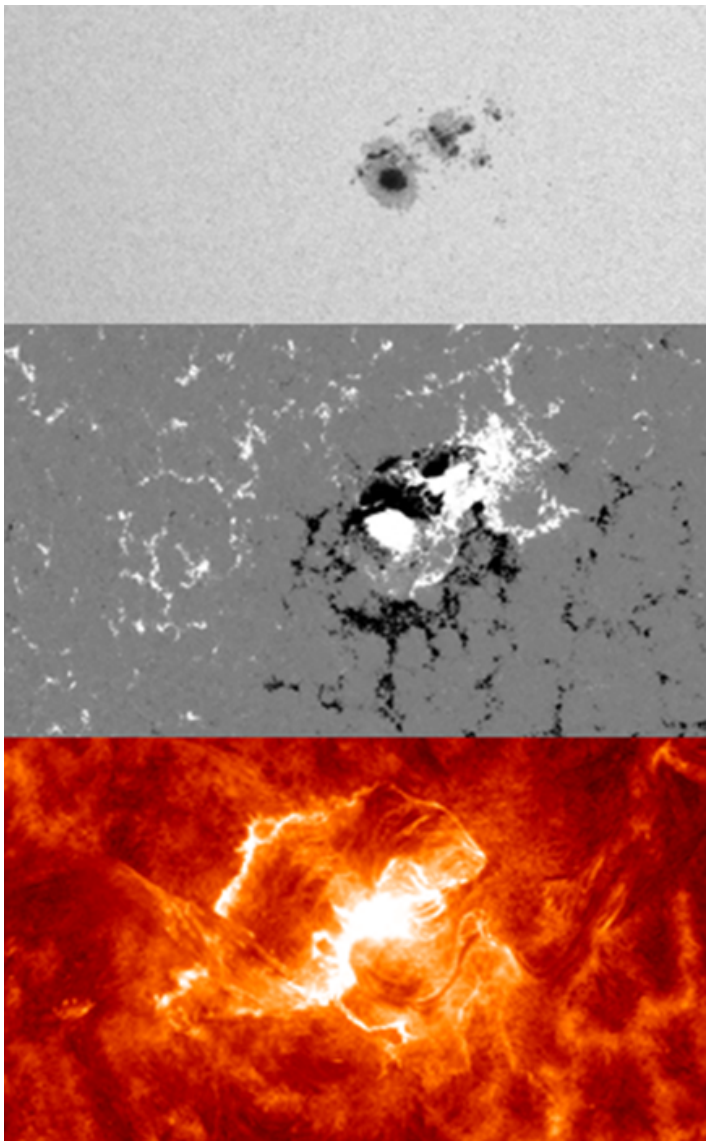
Final Editor : Petra Vanlommel
Contact : R. Van der Linden, General Coordinator STCE,
Ringlaan - 3 - Avenue Circulaire, 1180 Brussels,
Belgium

1. NOAA 2297 targets Earth

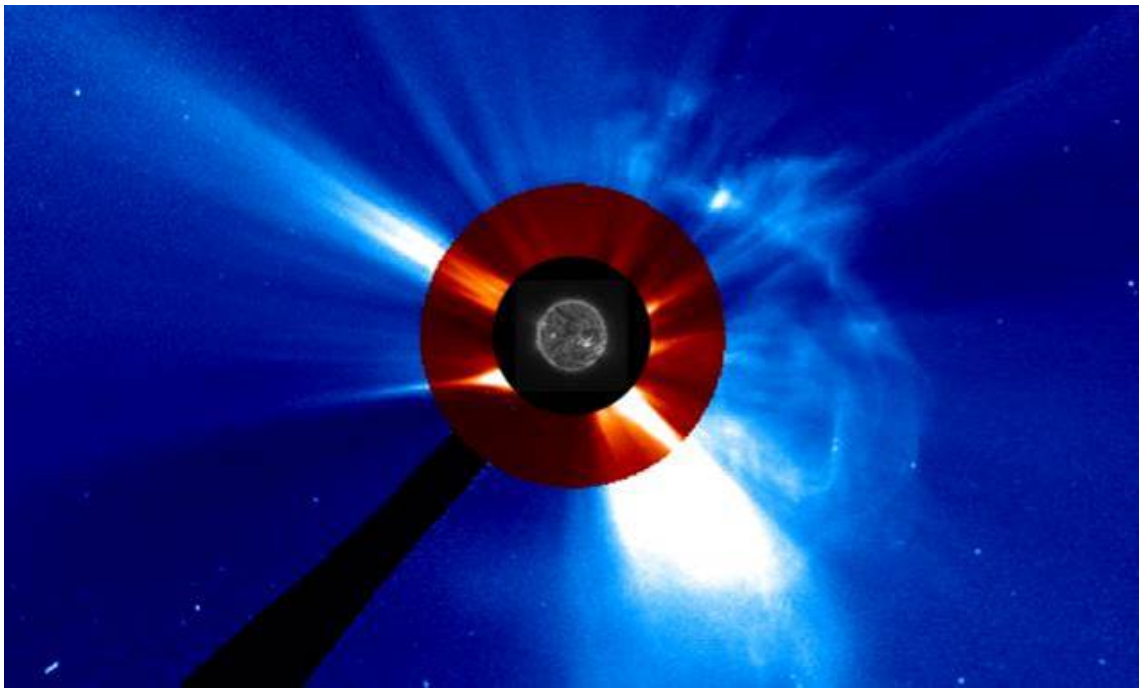
Over the last 2 weeks, solar activity was dominated by the small but complex sunspot group NOAA 2297. Under its dictatorship, no less than 97 "common" C-class flares, 23 "medium" M-class flares and 1 "extreme" X-class flare were produced. This makes it one of the most flare productive groups of the current solar cycle so far, very comparable to e.g. NOAA 1515 from July 2012 (see Note 1).



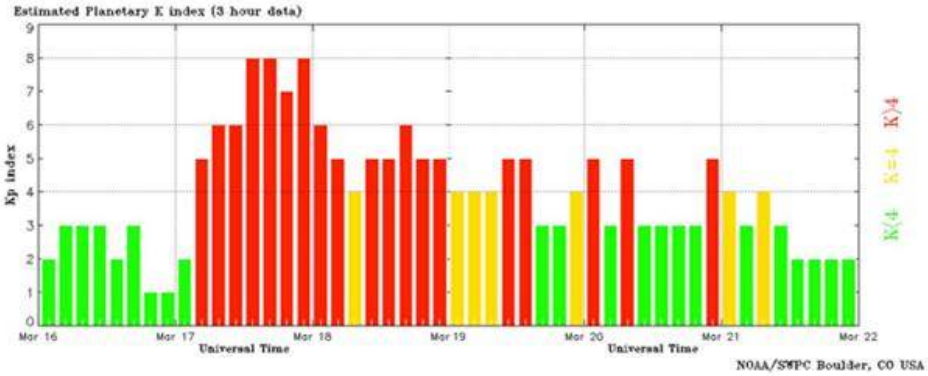
NOAA 2297 produced its strongest flare on 11 March. Peaking at 16:22UT, the X2.1 event lasted only for 18 minutes. At the time, NOAA 2297 was a very compact, but also very complex sunspot group displaying multiple delta structures, i.e. sunspots with opposite magnetic polarity within the same penumbra. A coronal mass ejection (CME) was associated with this flare, but, as can be seen in the extreme ultraviolet (EUV) picture underneath at 16:32UT, most of the material was ejected to the east (left) and not to the Earth.

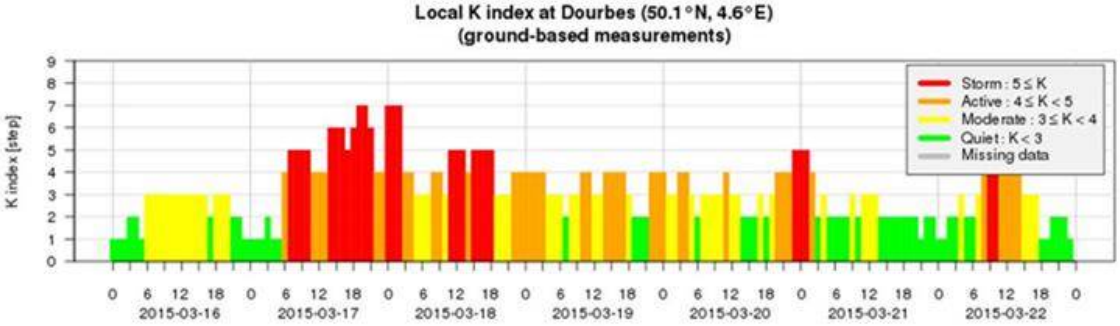


However, the most interesting event in this region took place early on 15 March, when NOAA 2297 produced a long duration C9.1 flare peaking at 02:13UT. This relatively modest flare was accompanied by a mild proton enhancement. Most importantly, also an asymmetric partial halo CME was observed that had a plane of the sky speed of 700 km/s. Though the bulk of this CME seemed to be directed away from Earth, a glancing blow was expected. A movie on NOAA 2297's evolution, the C9 flare and the associated CME can be seen at http://youtu.be/s7USVXBDlO8



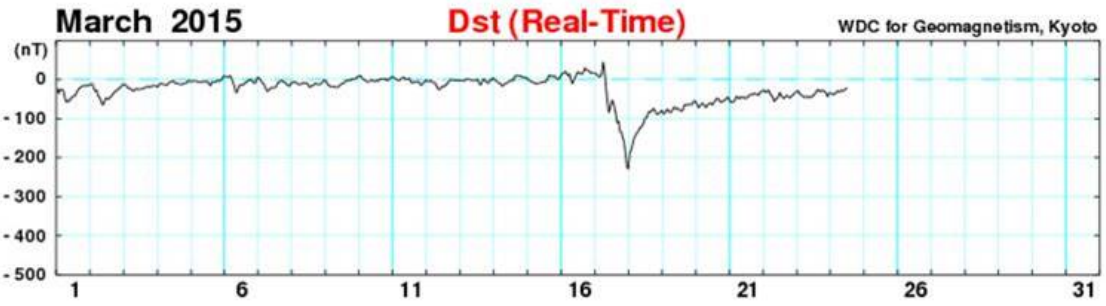
The ACE satellite observed a shock in the solar wind parameters shortly after 04:00UT on 17 March, which is only 50 hours after the flare. Solar wind speed jumped from 400 km/s to slightly above 500 km/s, then gradually increased over the next few hours to a maximum of nearly 700 km/s. Except for a brief interruption between 09:00 and 11:00UT, the vertical component of the interplanetary magnetic field was consistently southward at about -20 nT from around 05:00UT till 23:00UT. This resulted in a severe geomagnetic storm (Kp = 8; see Note 2) lasting most of the second half of 17 March. Also Dourbes recorded a strong (K = 7) geomagnetic storm.





The evaluation of the strength of a geomagnetic storm is based on the Dst index, short for Disturbance storm time (see Note 3). It is expressed in nanoteslas (nT) and is based on the average value of the horizontal component of the Earth's magnetic field measured hourly at four near-equatorial geomagnetic observatories. Because it measures a depression of the horizontal component, the Dst index during geomagnetic storms is actually negative. Dst-values between -50 and -100nT are usually associated with moderate geomagnetic storms, and values of -100 nT or less with intense storms. So far this solar cycle, we only had a handful of such intense storms, with 25 October 2011 (-134nT), 17 March 2013 (-132nT), and 09 March 2012 (-131nT) as some well-known examples.

However, the 17 March 2015 storm really dwarfs these storms, as the provisional Dst-value for that day reached -228nT, making this by far the strongest geomagnetic storm so far during SC24. In fact, we have to go back all the way to 15 May 2005 (maximum Dst of -247nT) to find an even stronger geomagnetic storm. Nonetheless, to put things in perspective, during the very intense geomagnetic storms of 28-29 October 2003 and 13-14 March 1989, Dst-values of resp. -383nT and -589nT were recorded (source: Kyoto World Data Center)!



As could be expected from such strong storms, aurora were visible from countries well south of the normal polar light regions. So no surprise, but still quite rare, that polar lights were photographed

and reported from France (Vosges, Picardie,...), Germany, the Czech Republic, and the middle of Russia. Underneath a screenshot from a movie made by Vincent van Leijen from the northern part of the Netherlands (https://www.flickr.com/photos/fotovins/16839832726/). There have also been some reports on issues with GPS signals and with (amateur) radio communication bands.

Note 1: More info on the flare-abundant active region NOAA 1515 is in the news items at http://stce.be/news/147/welcome.html from 6 July 2012 and at http://stce.be/news/148/welcome.html from 10 July 2012.
Note 2: More info on the Kp-index is in this news item from 26 March 2014 at http://stce.be/news/243/welcome.html
Note 3: More info on the Dst-index and data can be found at INGV (http://roma2.rm.ingv.it/en/themes/23/geomagnetic_indices/27/dst_index), at NOAA (http://www.ngdc.noaa.gov/stp/GEOMAG/dst.html), at the Kyoto WDC (http://wdc.kugi.kyoto-u.ac.jp/dstdir/dst2/onDstindex.html), and at the SWRI/Image (http://pluto.space.swri.edu/image/glossary/dst.html).
Credits: Imagery for the movie was taken from SDO (http://sdo.gsfc.nasa.gov/), PROBA2 (http://proba2.oma.be/ssa), and SOHO (http://sohowww.nascom.nasa.gov/).

2. ESWW12 - 3 Calls

12th European Space Weather Week, 23-27 November 2015, Belgium

The ESWW is the main annual event in the European Space Weather calendar. The agenda will be composed of plenary/parallel sessions, working meetings and dedicated events for service end-users. 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 is not limited to the scientific community, the engineering community, applications developers, service providers and end-users.

Contributions to the sessions

Following an excellent response to the call for session proposals issued in January, the Programme Committee is pleased to invite contributions to a list of sessions, addressing a wide range of scientific and application related themes. Each session is split into a poster and oral part. The poster programme emphasizes discussion and interaction between people. The oral part will consist of both invited and contributed papers.

The full session list is presented on http://www.stce.be/esww12/program/sessions.php
Deadline for submissions is May 13, 2015.

Working Meetings

Key parts of the European Space Weather Weeks are the working meetings. These meetings provide the opportunity for participants to meet in smaller groups and address key issues in a style that complements the sessions. A working meeting aims at active participation or interaction between the participants. The participants work and discuss on a predefined theme or problem heading towards an outcome or target. A working meeting is a 1.5-hour informal afternoon meeting with NO poster contributions. The conveners provide a title and abstract, those are put online. The title will appear in a handy printed program booklet. Working Meetings are open to the ESWW11 participants.

Submission will be open via the Conference Website http://www.stce.be/esww12/ from April 1, 2015.
Deadline for submissions is May 13,2015.

Business Meetings

The European Space Weather Week is also the place to organize private Business Meetings. ESWW provides a room, projection material, lunch or coffee if needed. The organizers invite the participants

and are asked to cover rental expenses of the room used. These Business Meetings will not appear in the published program.

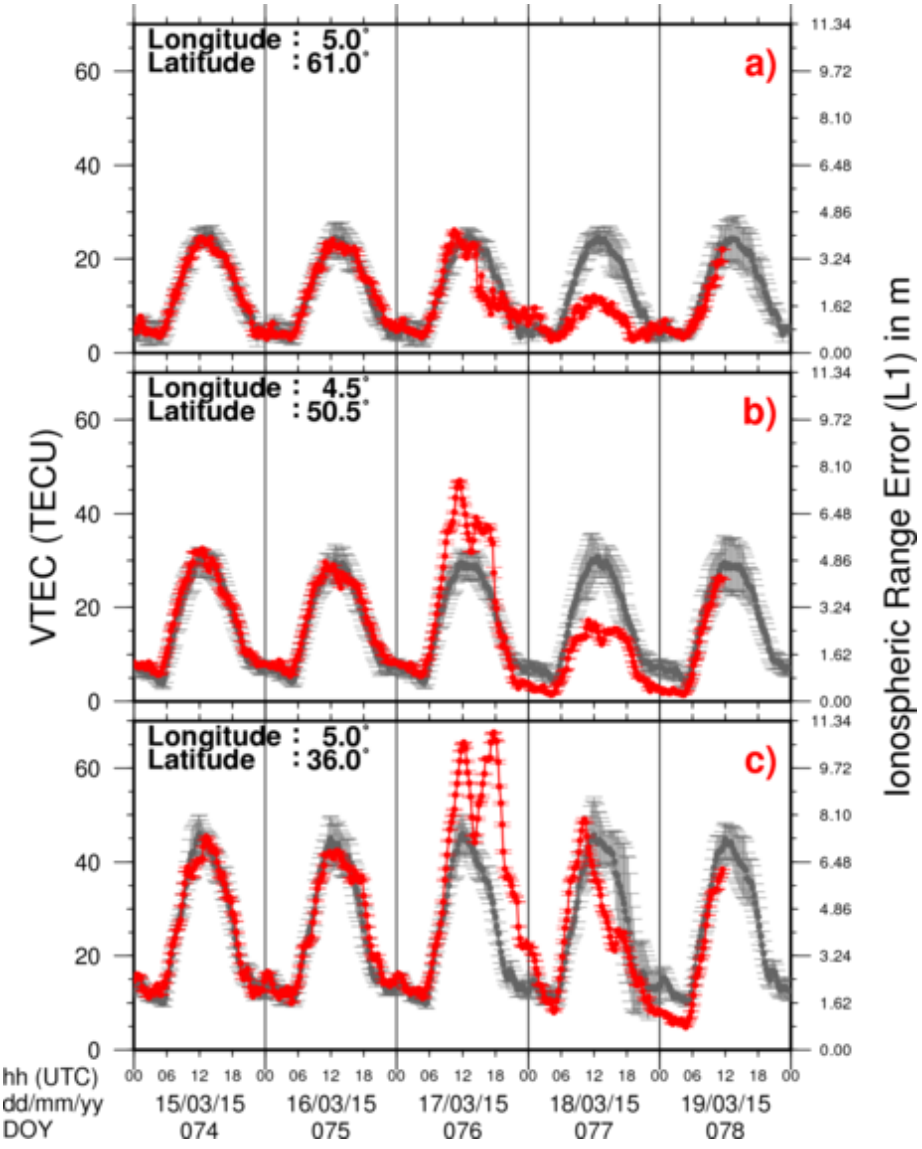
Requests can be sent to petra.vanlommel@oma.be
Rooms are allocated upon availability.

Looking forward,

Mauro Messerotti (Chair, PC), Alexi Glover (Vice Chair, PC), Ronald Van der Linden (Chair, LOC)

3. Solar material impacting the ionosphere

On March 17, the space weather forecaster sent out an alert to warn for the impact of a solar magnetic cloud. Indeed, the cloud caused the largest geomagnetic storm of this solar cycle. The impact was also seen in our earth atmosphere as a dramatic increase in free electrons (Vertical Total Electron Content, VTEC) above southern and middle Europe and a decrease above northern Europe. The following day, the VTEC remained low above northern and middle Europe.

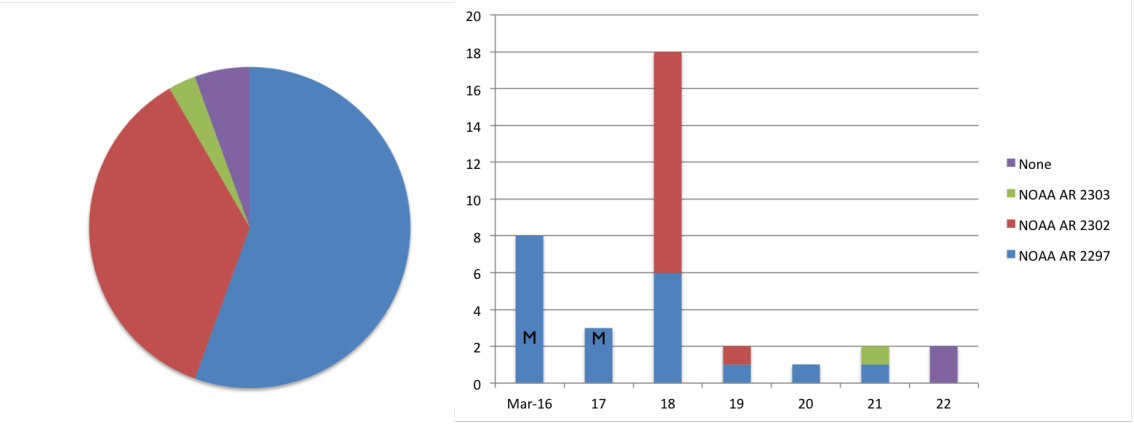


Check
http://gnss.be/Atmospheric_Maps/ionospheric_event.php?date=2015-03-17

4. Review of solar activity

Solar activity has been low to moderate. The week was initially dominated by NOAA AR 2297 (magnetic configuration beta-gamma-delta throughout the week) as it continued its journey over the western hemisphere to depart around the limb later in the week. Two M1 flares originated from this region with the largest an M1.6 peaking at 10:58UT March 16. Several additional high class C flares were produced by this region. NOAA region 2302 located around the same longitude as 2297 but in the northern hemisphere, was the source of most flaring activity in the time frame of March 18 to March 20/21 midnight. The strongest flare from this region was a C9.3 flare peaking at 07:51 March 18. Very many more C flares were observed from this region decreasing in magnitude over the mentioned time frame with NOAA 2297 causing two other high level C flares in between. With both these regions departing over the western limb, and the rest of the disc largely devoid of significant active regions flaring activity was mostly quiet over the weekend apart from a C1 flare originating from beyond the north-eastern limb.

Distribution of C and M flares, March 16 – 22, 2015



The left chart gives an overview of the total number of flares per NOAA AR region for the indicated week. *None* indicates that the flaring did not have a NOAA numbering. The right chart gives an overview of the flaring activity per NOAA AR per day.

However, over the course of the weekend several new regions developed on disc although most seem to have rather simple magnetic configurations. The most complex region on disc (beta-gamma) is NOAA region 2305 which rotated on disc in the southern hemisphere, although it has yet not produced any significant flaring. In addition to the CME of early March 15 (previous reporting period) NOAA 2297 produced another partial halo CME as it was located right on the western limb. It was predicted not to have any possible influence on Earth although in retrospect it is not excluded that the disturbed solar wind conditions (see below) observed over the weekend are related to this event.

5. Noticeable Solar Events (16 Mar 2015 - 22 Mar 2015)

DAY	BEGIN	MAX	END	LOC	XRAY	OP	10CM	TYPE	Cat	NOAA
16	1039	1058	1117	S17W39	M1.6	2N			1	2297
17	2249	2334	2348	S21W56	M1.0	2N	110	III/1II/2	1	2297

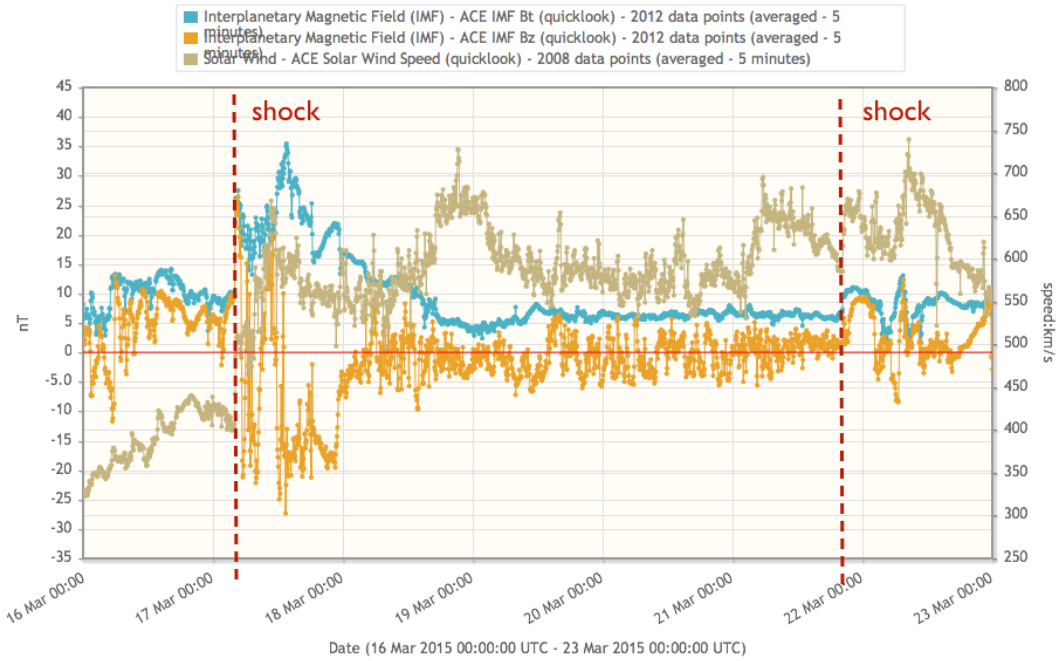
LOC: approximate heliographic location
XRAY: X-ray flare class
TYPE: radio burst type
Cat: Catania sunspot group number

OP: optical flare class
10CM: peak 10 cm radio flux

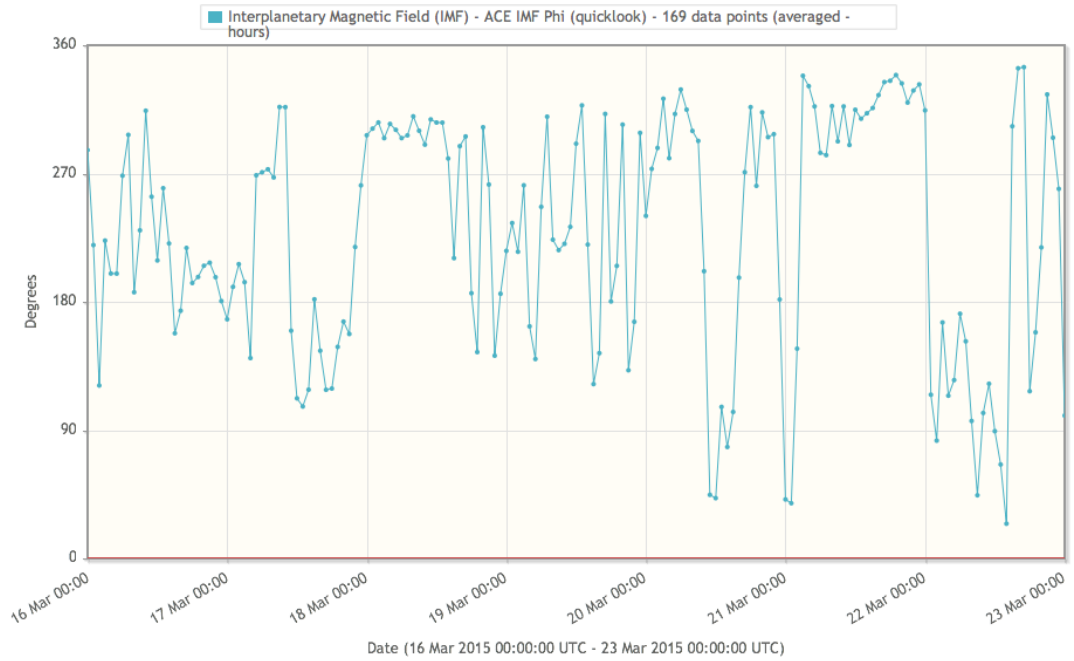
NOAA: NOAA active region number

6. Review of geomagnetic activity

The solar wind conditions were dominated by the arrival of the March 15 CME causing the largest geomagnetic storm of the cycle. On March 17, around 04:00UT, the solar wind speed jumped abruptly from around 410 km/s to over 500 km/s. The total interplanetary magnetic field (IMF) increased from 8-10 nT to 24-28 nT. The speed continued to increase and reached around 11:00UT that day a peak of more than 670 km/s. The IMF peaked at 35 nT. Bz was predominantly negative during the event, attaining peaks down to -27 nT. Severe geomagnetic storm conditions were recorded at the planetary level (Kp reaching 8), strong geomagnetic storm conditions were measured in Dourbes (K Dourbes 7).

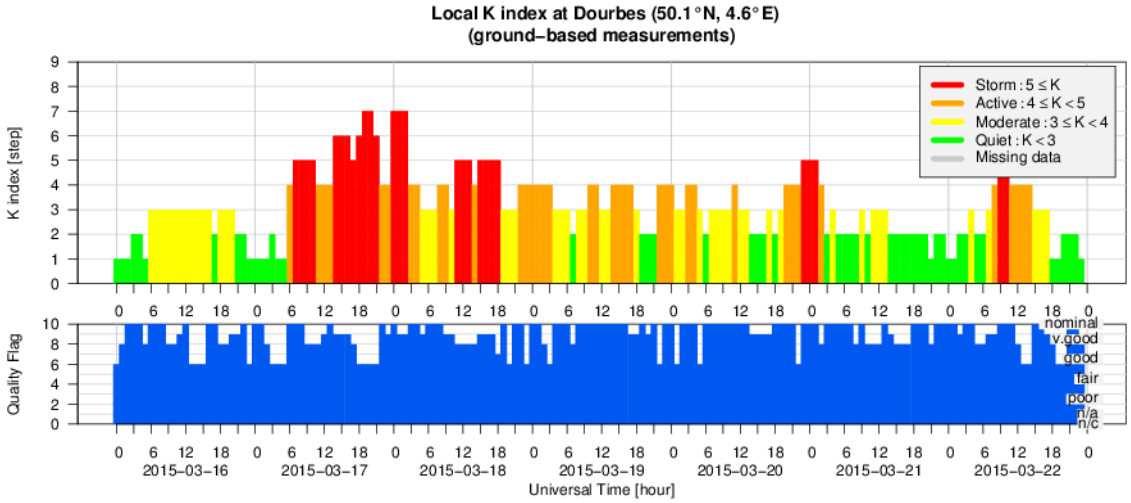


Agitated solar conditions lasted throughout most of the week when the declining CME effects transitioned into high speed stream influence from a southern polar coronal hole, with speeds reaching over 750 km/s and magnetic field on average around 6.5 nT. The high speed stream influence was expected to subside and transition into the influence of an equatorial coronal hole with positive polarity.

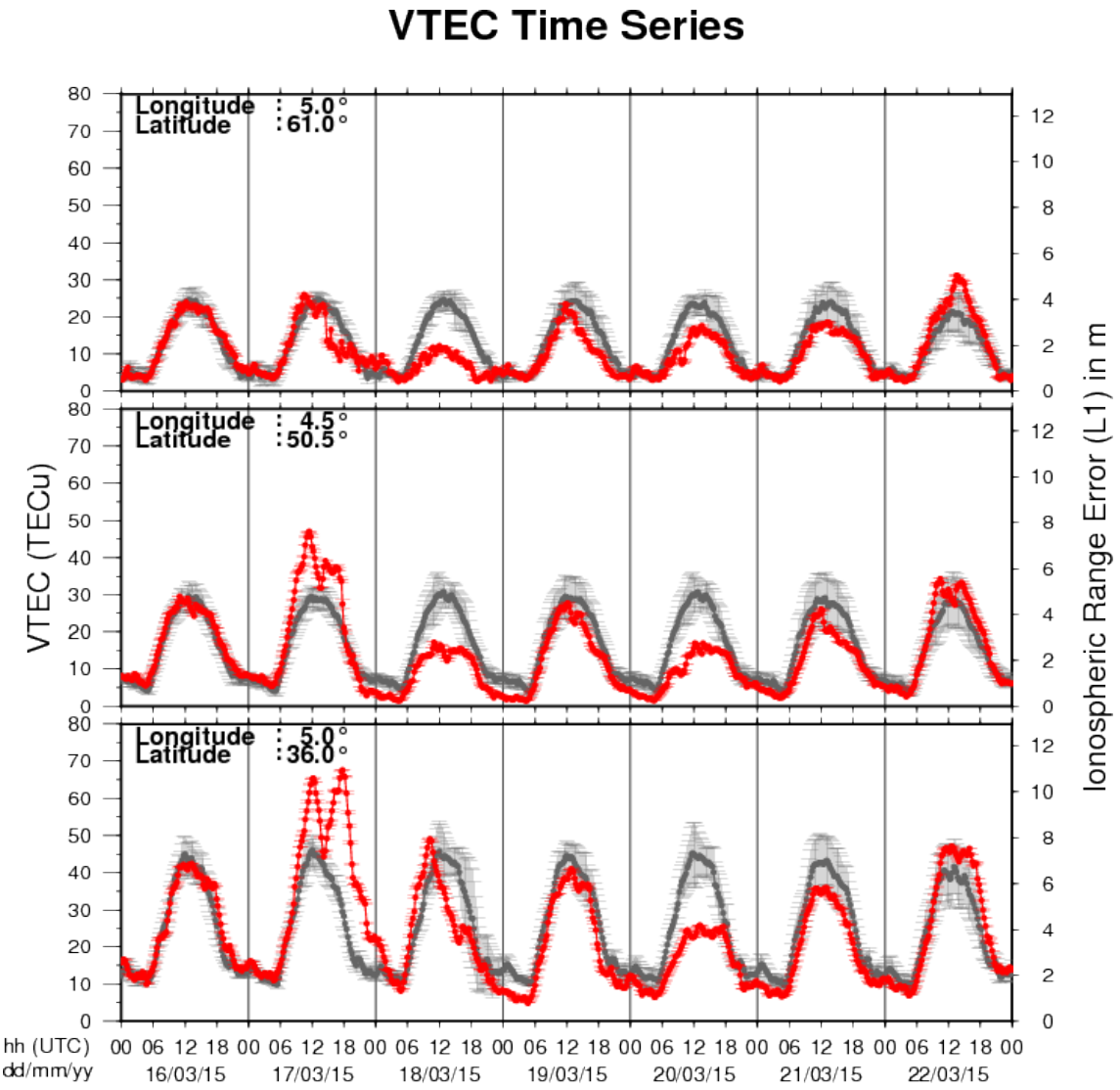


A small shock was observed in the solar wind around 20:25 UT on March 21. The solar wind speed increased suddenly from around 580 km/s to around 650km/s while the IMF jumped from 6-7 nT to 10 nT. On March 22, between 01:00 and 02:00 UT, the magnetic field angle phi rotated into a positive sector with the IMF first dipping down and later reaching a maximum of 13-14 nT after 7:00UT with Bz reaching -9nT. The magnetic field angle phi rotated back into the negative sector before settling in the positive sector corresponding to a high speed stream early March causing a minor geomagnetic storm. The signature seemed to correspond to an interplanetary coronal mass ejection, but no source was identified.

7. Geomagnetic Observations at Dourbes (16 Mar 2015 - 22 Mar 2015)



8. Review of ionospheric activity (16 Mar 2015 - 22 Mar 2015)



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

9. Future Events

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

Space Weather Workshop in Boulder, USA

Start : 2015-04-13 - End : 2015-04-17
Space Weather Workshop is an annual conference that brings industry, academia, and government agencies together in a lively dialog about space weather. What began in 1996 as a conference for the space weather user community, Space Weather Workshop has evolved into the Nation's leading conference on all issues relating to space weather.
The conference addresses the remarkably diverse impacts of space weather on today's technology. The program highlights space weather impacts in several areas, including communications, navigation, spacecraft operations, aviation, and electric power. The presentations and discussions at the Space Weather Workshop also focus on identifying the highest priority needs for operational services that can guide future research and identifying new high-value capabilities that can be transitioned into operations. The conference fosters communication among researchers, space weather service providers, and users of space weather services.
This year also marks the 50th anniversary of daily space weather forecasting, so please join us in celebrating this important milestone!
Website:
http://www.swpc.noaa.gov/content/annual-meeting

VarSITI-SCOSTEP conference in Kazrin and Tel Aviv, Israel

Start : 2015-04-28 - End : 2015-05-01
At present, solar researches and study of active late-type stars achieve a significant advance thanks new observational facilities and progress of the theory. The problems of an evolution of activity at the billion year-time-scales start to be discussed. Superflares were detected on stars younger than the Sun, and the frequency of superflares occurrence was evaluated. The first hypotheses were proposed for evaluation of flare activity level and expected stellar wind fluxes at the epoch when the regular cycle on the Sun was only established. Now it is a time to discuss further directions of perspective investigations which are essential for evaluation of space factor affecting on geo- and bio-sphere in those epochs and space weather forecast.
Website:
http://www.tau.ac.il/institutes/advanced/cosmic/Conferences/2015-VarSITI_Superflares/VarSITI-2015_ISR.html

Space Weather And Plasma in Space in Kazrin and Tel Aviv, Israel

Start : 2015-05-02 - End : 2015-05-08

URSI AT-RASC 2015 in Gran Canaria, Spain

Start : 2015-05-18 - End : 2015-05-22
URSI AT-RASC 2015 will be the first edition of the newly established triennial URSI Atlantic Radio Science Conference as one of the URSI Flagship Conferences. AT-RASC 2015 will have an open scientific program composed of submitted papers within the domains covered by all ten Commissions of URSI.
Website: http://www.at-rasc.com/

Heliospheric Imaging - A new era of space science and space weather observations in GÃ¶ttingen, Germany

Start : 2015-05-19 - End : 2015-05-22
The HELCATS project (see http://www.helcats-fp7.eu/) is providing revolutionary new insights into solar wind structure through combining the comprehensive analysis of heliospheric imaging observations from the NASA STEREO spacecraft, in concert with associated remote-sensing and in-situ measurements, with a thorough assessment of appropriate techniques and models. The project recognises that the advent of wide-angle imaging of the inner heliosphere has revolutionised the study of transient and quasi-stationary structures in the solar wind, in particular Coronal Mass Ejections (CMEs) and Co-rotating Interaction Regions (CIRs). Prior to the development of wide-angle imaging of the inner heliosphere, signatures of such solar wind features could only be observed within a few solar radii of the Sun, and in the vicinity of a few near-Earth and interplanetary probes making in-situ measurements of the solar wind. Heliospheric imaging has, for the first time, filled that vast and crucial observational gap.
We will debate, in particular, the emotive issue of how we associate CMEs with related phenomena observed, for example, on the Sun or in-situ. How do we define (without bias and the need for assumptions such as the relationship between flares and CMEs), a standard set of 'rules', both temporal and spatial, for making such associations? Such standards are crucial when forward and backward-projecting data.
Website:
http://www.affects-fp7.eu/helcats-meeting/

MHD waves and instabilities in the solar atmosphere in Budapest, Hungary

Start : 2015-05-25 - End : 2015-05-29
25-27 May 2015: BUKS 2015 - MHD waves: Observational aspects from ground to space - MHD waves: Theory - where are we? - MHD instabilities
27-28 May 2015: Ruderman Honorary meeting - Theory of linear MHD waves - MHD waves instabilities - Non-linear waves in plasmas
29 May 2015: Joint BUKS/Ruderman's conferences excursion - Boat excursion to Szentendre, Visegrad and Esztergom
Website:
http://swat.group.shef.ac.uk/Conferences/BUKS_2015/index.html

Solar Influences on the Magnetosphere, Ionosphere and Atmosphere in Sunny Beach, Bulgaria

Start : 2015-06-01 - End : 2015-06-05
Check the website for more information.
Website:
http://ws-sozopol.stil.bas.bg/

Los Alamos Space Weather Summer School, in Los Alamos, NM, USA

Start : 2015-06-01 - End : 2015-07-24
The Space Weather Summer School at Los Alamos National Laboratory, established in 2011 under the founding Director Josef Koller, is dedicated to space weather, space science and applications. Every year we solicit applications for the Los Alamos Space Weather Summer School. This summer school is sponsored and supported by a number or organizations at LANL. This year our top sponsors include the Los Alamos Institute of Geophysics, Planetary Physics and Signatures (IGPPS) and the Laboratory Directed Research and Development Office (LDRD). The summer school brings together top space science students with internationally recognized researchers at LANL in an educational and collaborative atmosphere.
Website:
http://www.swx-school.lanl.gov/

RadioSun4 Workshop & Summer School in Irkutsk, Russia

Start : 2015-06-08 - End : 2015-06-12
The RadioSun Workshop and Summer School 2015 is the fourth international academic seminar supported by the International Research Staff Exchange Scheme of the Seventh Fromework Programme of the European Union (FP7-IRSES-295272-RADIOSUN). The aims of this project are to establish close research interaction and collaboration between the key EU and non-EU research groups involved in the research of the Sun in the radio band; qualitatively advance our knowledge of the physical processes operating in the solar atmosphere, the basic mechanisms responsible for its evolution and dynamics and its effect on the Earth; and provide younger researchers with extensive training in relevant research techniques and with universal transfer.
Website:
http://www2.warwick.ac.uk/fac/sci/physics/staff/research/davidpascoe/radiosun

Solar dynamo frontier workshop in Boulder, CO (USA)

Start : 2015-06-09 - End : 2015-06-12
The last five years have seen substantial progress in our understanding of the solar dynamo, fueled by continuing advances in observations and modeling. With the launch of NASA's Solar Dynamics Observatory (SDO) in 2010 came an unprecedented window on the evolving magnetic topology of the Sun, highlighting its intricate 3D structure and global connectivity. The Helioseismic Magnetic Imager (HMI) instrument on SDO in particular has provided potentially transformative yet enigmatic insights into the internal dynamics of the solar convection zone that underlie the dynamo. Attempts to detect subsurface convective motions from helioseismic inversions have yielded only upper limits on the large-scale convective amplitude, challenging our understanding of global solar convection. Yet, potential signatures of giant cells have been detected in photospheric Dopplergrams. Estimates of the meridional flow from HMI and complementary instruments (SOHO/MDI and GONG) have been equally tantalizing and enigmatic. Several disparate techniques, including local and global helioseismic inversions and correlation tracking of surface features, have yielded evidence of a multi-cellular meridional flow but they differ on the detailed flow structure and amplitude. This multi-cellular meridional flow has potentially profound implications for flux-transport dynamo models that previously assumed a very different structure with a single circulation cell per hemisphere.
Website:
https://www2.hao.ucar.edu/Workshop/Solar-Dynamo-Frontiers

National Astronomy Meeting 2015 in Llandudno, UK

Start : 2015-07-05 - End : 2015-07-09
We would like to invite you to submit contributed abstracts to the parallel session "The science of space weather: progressing our understanding" at the 2015 UK National Astronomy Meeting from 5-9 July (http://nam2015.org). The abstract-submission deadline is 1 April 2015. Observers, modellers, and theoreticians are all welcome. We also welcome participation from end users interested in how the science of space weather is advancing.
The science of space weather: progressing our understanding
The goal of this session is to provide an opportunity to discuss the scientific research that underpins space weather and how a new generation of operational space weather measurements could best be utilised to further progress our understanding. Specific topics are likely to include 1) gaps in our understanding of space weather and how to resolve them, 2) new space and ground-based data that are needed, 3) new science that can be carried out with the operational space weather measurements being planned today.
This session is motivated by the fact that the UK has a strong heritage in the science of the coupled Sun-Earth system, from both an observational and theoretical perspective. This research is increasingly being applied to the area of space weather monitoring and forecasting, a topic that is now nationally recognised as an important natural hazard for the UK (highly ranked in the National Risk Register) and the subsequent opening of the Met Office Space Weather Operations Centre in 2014.

Up until now, both the research and the space weather monitoring and forecasting have utilised mainly data from instrumentation (both space- and ground-based) designed to answer pertinent scientific questions, though some operational instruments (e.g. the X-ray and particle detectors on NOAA's GOES spacecraft) are also widely exploited for scientific use. However, there is now growing interest in deploying more instruments, in space and on the ground, designed to support operational space weather services. Such operational measurements can facilitate new science, as demonstrated by the extensive research use of GOES data, but it is important that the limitations imposed by operational needs are discussed.
Website: http://nam2015.org/

CISM Space Weather Summer School in Boulder, CO, USA

Start : 2015-07-13 - End : 2015-07-24
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/Events/2015-CISM-Summer-School

Loops7: Heating of the Magnetically Closed Corona in Cambridge, UK

Start : 2015-07-21 - End : 2015-07-23
The conference will review past and recent achievements, as well as future challenges in the field of solar coronal loop physics.
Website:
http://www.damtp.cam.ac.uk/user/astro/cl7/index.html

Heliophysics Summer Schoool 2015: Seasons in Space: Cycles of variability of Sun-Planet systems, in Boulder, CO, USA

Start : 2015-07-28 - End : 2015-08-04
Heliophysics is all of the science common to the field of the Sun-Earth connections. This fast-developing field of research covers many traditional sub-disciplines of space physics, astrophysics, and climate studies. The NASA Living with a Star program, with its focus on the basic science underlying all aspects of space weather, acts as a catalyst to bring the many research disciplines together to deepen our understanding of the system of systems formed by the Sun-Earth connection.
Website:
http://www.heliophysics.ucar.edu/

34th International Cosmic Ray Conference (ICRC) in The Hague, The Netherlands

Start : 2015-07-30 - End : 2015-08-06
The 34th International Cosmic Ray Conference (ICRC) will be held from July 30 to August 6, 2015, in The Hague, The Netherlands. It is an important and large conference in the field of Astroparticle Physics. The ICRC covers: cosmic-ray physics, solar and heliospheric physics, gamma-ray astronomy, neutrino astronomy, and dark matter physics.
Website: http://icrc2015.nl

SOLARNET III / HELAS VII: The Sun, the stars, and solar-stellar relations, in Freiburg (Germany)

Start : 2015-08-31 - End : 2015-09-04
The purpose of this conference is to discuss the latest questions and results in solar and stellar physics. Solar and stellar seismology will be one particular focus but contributions on all aspects of solar-stellar relations will be welcome. We aim to establish links and synergies between the day- and night-time fields of astrophysics.
Website:
http://www.iac.es/congreso/solarnet-3meeting/

1st Joint Solar Probe Plus-Solar Orbiter Workshop, in Florence (Italy)

Start : 2015-09-02 - End : 2015-09-04
The Workshop will address how the joint 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 SO and 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/2015/

International Workshop and School on Solar System plasma in Mamaia, Romania

Start : 2015-09-06 - End : 2015-09-13
The International Workshop and School on solar system plasma turbulence, intermittency and multifractals (STORM 2015) focus on the quantitative experimental, theoretical and numerical investigation of turbulence, intermittency, fractal/multifractal features, waves and coherent structures interaction, criticality and non-linear cross-scale coupling. As widely documented by in-situ satellite measurements and remote or ground-based observations, turbulence, intermittency and dynamical complexity are quite ubiquitous processes observed in the dynamics of solar, planetary and interplanetary plasmas, as well as in the dynamical evolution of proxies linked to magnetospheric and ionospheric variability.
Unfolding the spatio-temporal structure of magnetic field and plasma fluctuations from experimental observations and numerical simulations provides further insight on the structure of plasma turbulence and intermittency. On the theoretical side, the understanding of such complex dynamical behavior cannot be simply surmised from the basic fluid/kinetic equations, but instead requires novel theoretical, experimental and data analysis approaches. The workshop is a forum to present and discuss latest results in these fields. The purpose of the school is to give to a young audience of Graduate, Ph.D. students, and postdoc scientists, which ideally represents the next generation of scholars in the physics of space plasmas, an overall view of both theoretical and data analysis tools apt to fully exploit unique and unprecedented observations that will be provided by future upcoming mission like Solar Orbiter and Solar Probe Plus.
Website:
http://www.spacescience.ro/conferences/storm2015/

RADECS-2015 in Moscow, Russia

Start : 2015-09-14 - End : 2015-09-18
The aim of RADECS conferences is to provide an annual European forum for the presentation and discussion of the latest advances in the field of radiation effects on electronic and photonic materials, devices, circuits, sensors, and systems. The scope of the conference encompasses technological processes and design techniques for producing radiation tolerant systems for space, aeronautical or terrestrial applications, as well as relevant methodologies for their characterization and qualification. The

conference features a technical program, an Industrial Exhibition, and one day tutorial or "short course" on radiation effects. The technical program includes oral and poster sessions and round tables.
Website:
http://www.radecs2015.org/

Heliospheric physical processes for understanding Solar-Terrestrial Relations in L'Aquila, Italie

Start : 2015-09-21 - End : 2015-09-26
A good understanding of solar-terrestrial processes is fundamental to modelling the influence of solar variability on the Earth's environment and climate. To capture all the physical aspects of the solar wind-magnetosphere-ionosphere-atmosphere interaction, and also the impact of solar variability on climate, the Sun-Earth system has to be studied as a whole. The main purpose of this school is to provide graduate, PhD students and also young post-doc researchers with a global view of the main physical processes by which solar variability affects the Earth's environment. In addition, an overview of different data analysis and methods for describing solar-terrestrial relations will be given. The school will provide a mix of lectures and activities requiring students participation.
Website:
http://www.cifs-isss.org/

Ground-based Solar Observations in the Space Instrumentation Era in Coimbra, Portugal

Start : 2015-10-05 - End : 2015-10-09
This CSPM-2015 scientific meeting will cover various aspects of solar dynamic and magnetic phenomena which are observed over the entire electromagnetic spectrum: white-light, Hα, Ca II, and radio from ground and in a variety of other wavelengths (white light, UV and EUV, and X-rays) from space. Emphasis will also be placed on instrumentation, observing techniques, and solar image processing techniques, as well as theory and modelling through detailed radiative transfer in increasingly realistic MHD models. The long-term (cyclic) evolution of solar magnetism and its consequence for the solar atmosphere, eruptive phenomena, solar irradiation variations, and space weather, will be in focus. Here, special attention will be devoted to the long-term observations made in Coimbra and also to the results of the SPRING / SOLARNET and SCOSTEP VarSITI studies. In particular, the weak solar activity during the current solar maximum will be discussed. Finally, since this meeting is organised around the 90th anniversary of performing the first spectroheliographic observations in Coimbra, a session will be specially dedicated to new solar instruments (both ground-based and space-borne) that will give access to unexplored solar atmospheric features and dynamic phenomena over the coming years.
Website:
http://www.mat.uc.pt/~cspm2015/

Third Remote Sensing of the Inner Heliosphere and Space Weather Applications Workshop in Morelai, Michoacan (Mexico)

Start : 2015-10-19 - End : 2015-10-23
The workshop aims to gather experts from the various fields of remoteÂ sensing observations of the inner heliosphere, including whiteÂ light, EUV, and radio observation, together with modellers in order to tackle key outstanding science and spaceÂ weather operational issues, establish closer working relations, and devise the best ways to move the field forward as a whole. In addition, the science learned from remote Âsensing observations is critical to improving our capabilities of spaceÂ weather forecasting. The workshop aims to look at ways in which we can more easily and efficiently share and access the various types of data between individual groups and subÂcommunities and to officially launch the IPS Common Data Format v1.0 (IPSCDFv1.0) now in use. It also aims to allow investigations into ways in which we model the inner heliosphere looking at the advantages and disadvantages of the available modelling, updates on present and future remoteÂsensing capabilities, and investigating further the ways in which these data sets all complement each other and are necessary to gain knowledge and understanding of

the fundamental physical processes that occur within the inner heliosphere. These are critical processes that are key to both Heliophysics science as well as to spaceÂweather operations and forecasting.
Website:
http://www.sciesmex.unam.mx/workshop2015/

2015 Sun-Climate Symposium in Savannah, Georgia, USA

Start : 2015-11-10 - End : 2015-11-13
Observations of the Sun and Earth from space have revolutionized our view and understanding about impacts of solar variability and anthropogenic forcing on Earth climate. For more than three solar cycles since 1978, the total and spectral solar irradiance (TSI and SSI) and global terrestrial atmosphere/surface have been observed continuously, enabling unprecedented quality data for Sun-climate studies. The primary objective of this symposium is to convene climate scientists, solar physicists, and experimentalists together for a better understanding how Earth climate system changes and responds to solar variability.
Website: http://lasp.colorado.edu/home/sorce/news-events/meetings/2015-sun-climate-symposium/

41st COSPAR Scientific Assembly in Istanbul, Turkey

Start : 2016-07-30 - End : 2016-08-07
The 41st COSPAR Scientific Assembly will be held in Istanbul, Turkey from 30 July - 7 August 2016. This Assembly is open to all bona fide scientists.
Website:
https://www.cospar-assembly.org/

10. New documents in the European Space Weather Portal Repository

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

STCE - Space weather science, infrastructure, services and products: SW events and impact

Presentation given during a users' visit about the STCE operational space weather services and products.
http://www.spaceweather.eu/en/repository/show?id=558

STCE - Space weather science, infrastructure, services and products: Service Centers

Presentation given during a users' visit about the STCE operational space weather services and products.
http://www.spaceweather.eu/en/repository/show?id=559

STCE - Space weather science, infrastructure, services and products: Operational Software and Products

Presentation given during a users' visit about the STCE operational space weather services and products.
http://www.spaceweather.eu/en/repository/show?id=560

STCE - Space weather science, infrastructure, services and products: SW forecast

Presentation given during a users' visit about the STCE operational space weather services and products.
http://www.spaceweather.eu/en/repository/show?id=561

STCE - Space weather science, infrastructure, services and products: SEP

Presentation given during a users' visit about the STCE operational space weather services and products.
http://www.spaceweather.eu/en/repository/show?id=562

STCE - Space weather science, infrastructure, services and products: Ionospheric event

Presentation given during a users' visit about the STCE operational space weather services and products.
http://www.spaceweather.eu/en/repository/show?id=563

eHEROES - De verschillende vormen van zonneactiviteit en hun invloed op de mens en zijn technologie

Invited review submitted to the journal Revue E. This article is the first in a series of 3 articles. De Zon, Helios, Sol, ... er bestaan vele namen voor die gele bol die dagelijks ons hemelgewelf doorkruist en onze warmte- en lichtbron bij uitstek is. Dankzij satellietwaarnemingen hebben we onze ster leren kennen als een dyna- misch en explosief hemelobject dat aan de basis ligt van het zogenaamde ruimteweer dat een belangrijke impact heeft op onze technologie.
http://www.spaceweather.eu/en/repository/show?id=564

eHEROES - Onderzoek naar de zonnecorona

On the occasion of the solar eclipse of March 20, 2015, we contributed to the March 2015 edition of the amateur astronomer journal 'Zenit'. We highlighted the outcome of LASCO onboard of SOHO and focussed on the role of the STCE on space missions like PROBA2, PROBA3 and Solar Orbiter. The text is written in Dutch.
http://www.spaceweather.eu/en/repository/show?id=565

STCE - De verschillende vormen van zonneactiviteit en hun invloed op de mens en zijn technologie

e Zon, Helios, Sol, ... er bestaan vele namen voor die gele bol die dagelijks ons hemelgewelf doorkruist en onze warmte- en lichtbron bij uitstek is. Dankzij satellietwaarnemingen hebben we onze ster leren kennen als een dyna- misch en explosief hemelobject dat aan de basis ligt van het zogenaamde ruimteweer dat een belangrijke impact heeft op onze technologie. Bijdrage aan een editie 'Zonnestormen en hun impact op elektrische netten' van het Revue E tijdschrift - 130ste jaargang - nr 2-2014(juin/juni 2014)
http://www.spaceweather.eu/en/repository/show?id=566

STCE - Earth’s magnetosphere and ionosphere

The Earth’s magnetic field creates a cavity in interplanetary space, called the magnetosphere. Physical processes in this region of space determine how mass and energy from the solar wind reach the ionosphere, the partially ionized upper atmosphere. Magnetosphere and ionosphere are strongly coupled. Together, they modulate the impacts of solar activity on man and technology. This paper presents a brief overview of the magnetosphere-ionosphere system under quiet conditions, followed by a summary of the most important dynamic effects during disturbed conditions. Contribution to the edition 'Zonnestormen en hun impact op elektrische netten' van het Revue E tijdschrift - 130ste jaargang - nr 2-2014(juin/juni 2014)
http://www.spaceweather.eu/en/repository/show?id=567

STCE - The Geomagnetic Field: an Actively Changing Global Phenomenon

The Earth’s magnetic field varies on a wide range of timescales, from long time trends caused by internal processes to rapid fluctuations caused primarily by solar events. Nowadays, the magnetic field is continually being monitored by worldwide networks of observatories. Different indices have been developed to characterise the magnetic activity, and various services exist to alert users in case of a

magnetic disturbance. Contribution to the edition 'Zonnestormen en hun impact op elektrische netten' van het Revue E tijdschrift - 130ste jaargang - nr 2-2014(juin/juni 2014)
http://www.spaceweather.eu/en/repository/show?id=568

SOLSPEC - On solar radius measurements during the rising phase of solar cycle 24

Presentation given at the workshop Six Years of SOLAR/SOLSPEC mission on ISS - Achievements and prospects.
http://www.spaceweather.eu/en/repository/show?id=569

SOLSPEC - The COSIR Model and the Solar Cycle 24

Presentation given at the workshop Six Years of SOLAR/SOLSPEC mission on ISS - Achievements and prospects.
http://www.spaceweather.eu/en/repository/show?id=570

SOLSPEC - The future life of SOLAR ISS data, long term preservation and distribution

Presentation given at the workshop Six Years of SOLAR/SOLSPEC mission on ISS - Achievements and prospects.
http://www.spaceweather.eu/en/repository/show?id=571

SOLSPEC - B.USOC SOLAR Operations, Concept and Services

Presentation given at the workshop Six Years of SOLAR/SOLSPEC mission on ISS - Achievements and prospects.
http://www.spaceweather.eu/en/repository/show?id=572

SOLSPEC - General description of SOLAR/SOLSPEC

Presentation given at the workshop Six Years of SOLAR/SOLSPEC mission on ISS - Achievements and prospects.
http://www.spaceweather.eu/en/repository/show?id=573

SOLSPEC - History of the SOLSPEC instrument

Presentation given at the workshop Six Years of SOLAR/SOLSPEC mission on ISS - Achievements and prospects.
http://www.spaceweather.eu/en/repository/show?id=574

SOLSPEC - SOLAR/SOLSPEC IR status

Presentation given at the workshop Six Years of SOLAR/SOLSPEC mission on ISS - Achievements and prospects.
http://www.spaceweather.eu/en/repository/show?id=575

SOLSPEC - SORCE - Spectral Irradiance Monitor

Presentation given at the workshop Six Years of SOLAR/SOLSPEC mission on ISS - Achievements and prospects.
http://www.spaceweather.eu/en/repository/show?id=576

SOLSPEC - Seven years of SOLAR/SOLSPEC on ISS

Presentation given at the workshop Six Years of SOLAR/SOLSPEC mission on ISS - Achievements and prospects.
http://www.spaceweather.eu/en/repository/show?id=577

SOLSPEC - Comparison of SOLSPEC and SORCE SOLSTICE in the Ultraviolet

Presentation given at the workshop Six Years of SOLAR/SOLSPEC mission on ISS - Achievements and prospects.
http://www.spaceweather.eu/en/repository/show?id=578

SOLSPEC - Absolute radiometry, status of our knowledge Sovim on SOLAR_ISS

Presentation given at the workshop Six Years of SOLAR/SOLSPEC mission on ISS - Achievements and prospects.
http://www.spaceweather.eu/en/repository/show?id=579

SOLSPEC - Using SSI to understanding the effect on stratospheric ozone

Presentation given at the workshop Six Years of SOLAR/SOLSPEC mission on ISS - Achievements and prospects.
http://www.spaceweather.eu/en/repository/show?id=580

SOLSPEC - The Future of SSI UV Measurements with the Dual Solar Spectral Irradiance Monitor on the ESA-CAS Small-size Mission SU

Presentation given at the workshop Six Years of SOLAR/SOLSPEC mission on ISS - Achievements and prospects.
http://www.spaceweather.eu/en/repository/show?id=581

SOLSPEC - workshop presentation

Presentation given at the workshop Six Years of SOLAR/SOLSPEC mission on ISS - Achievements and prospects.
http://www.spaceweather.eu/en/repository/show?id=582