

STCE Newsletter

1 Jun 2015 - 7 Jun 2015



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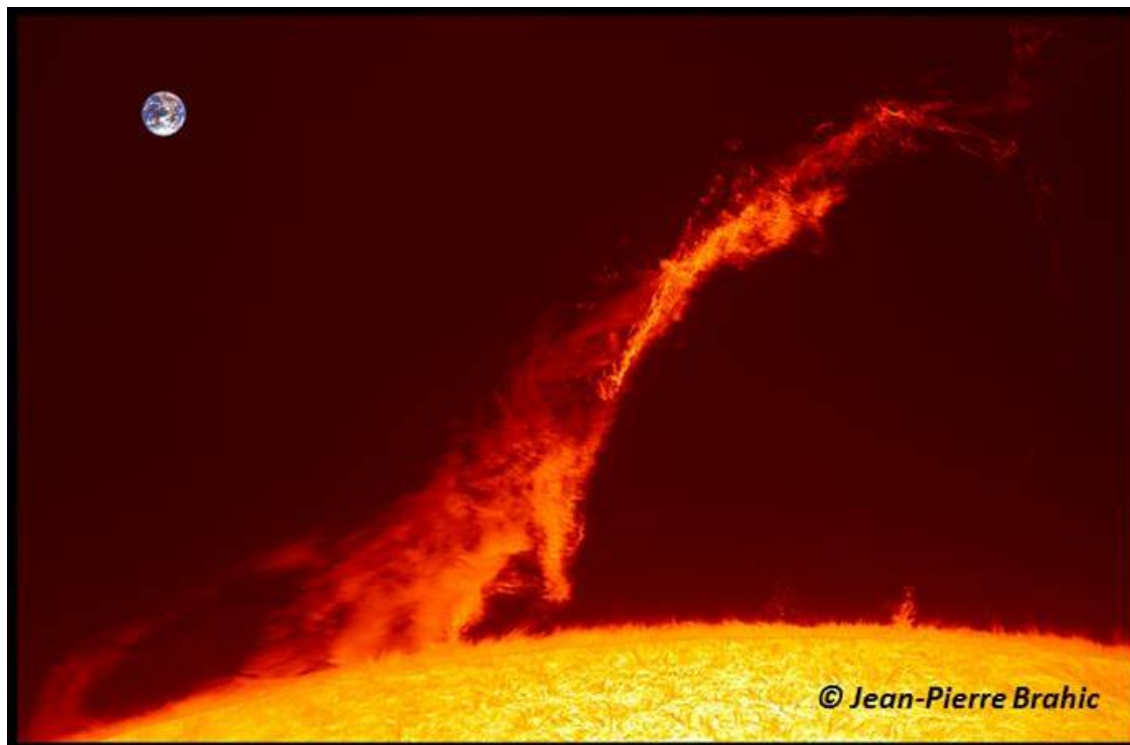
The Solar-Terrestrial Centre of Excellence (STCE) is a collaborative network of the Belgian Institute for Space Aeronomy, the Royal Observatory of Belgium and the Royal Meteorological Institute of Belgium.

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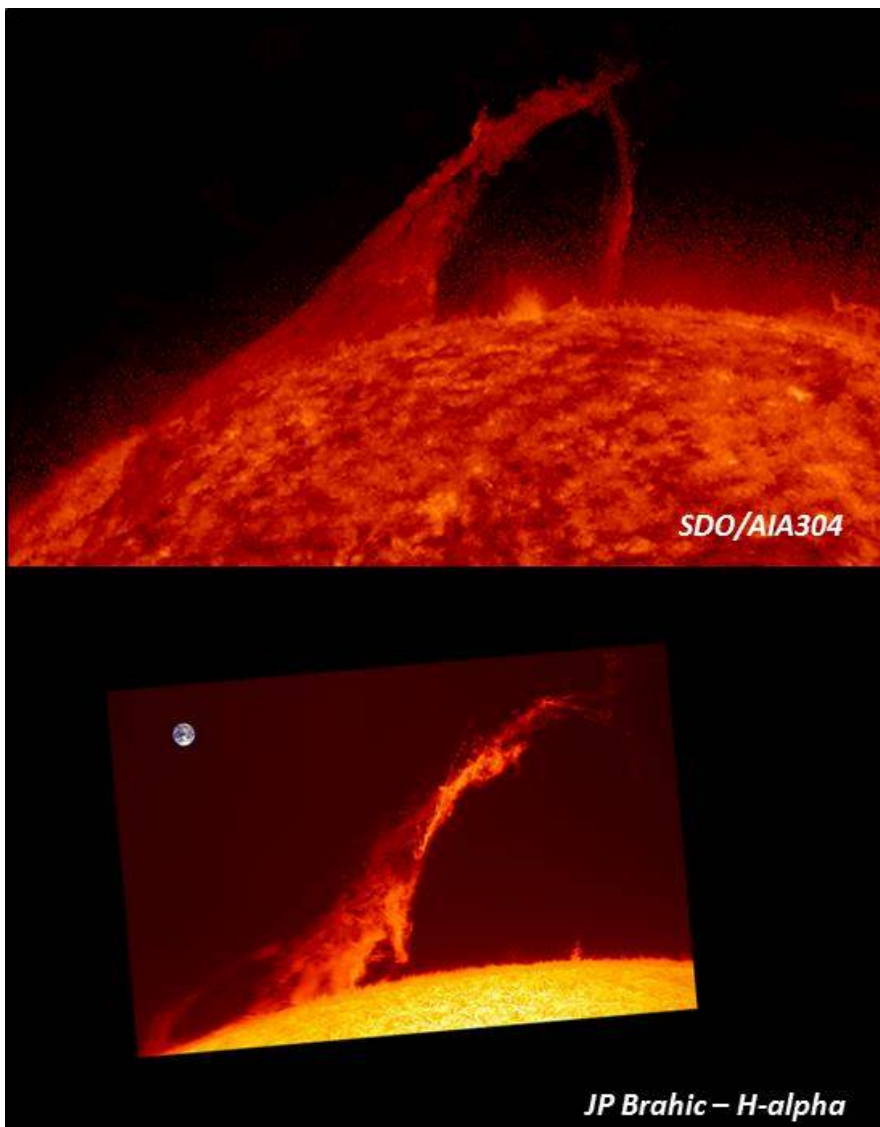
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1. Filament eruption

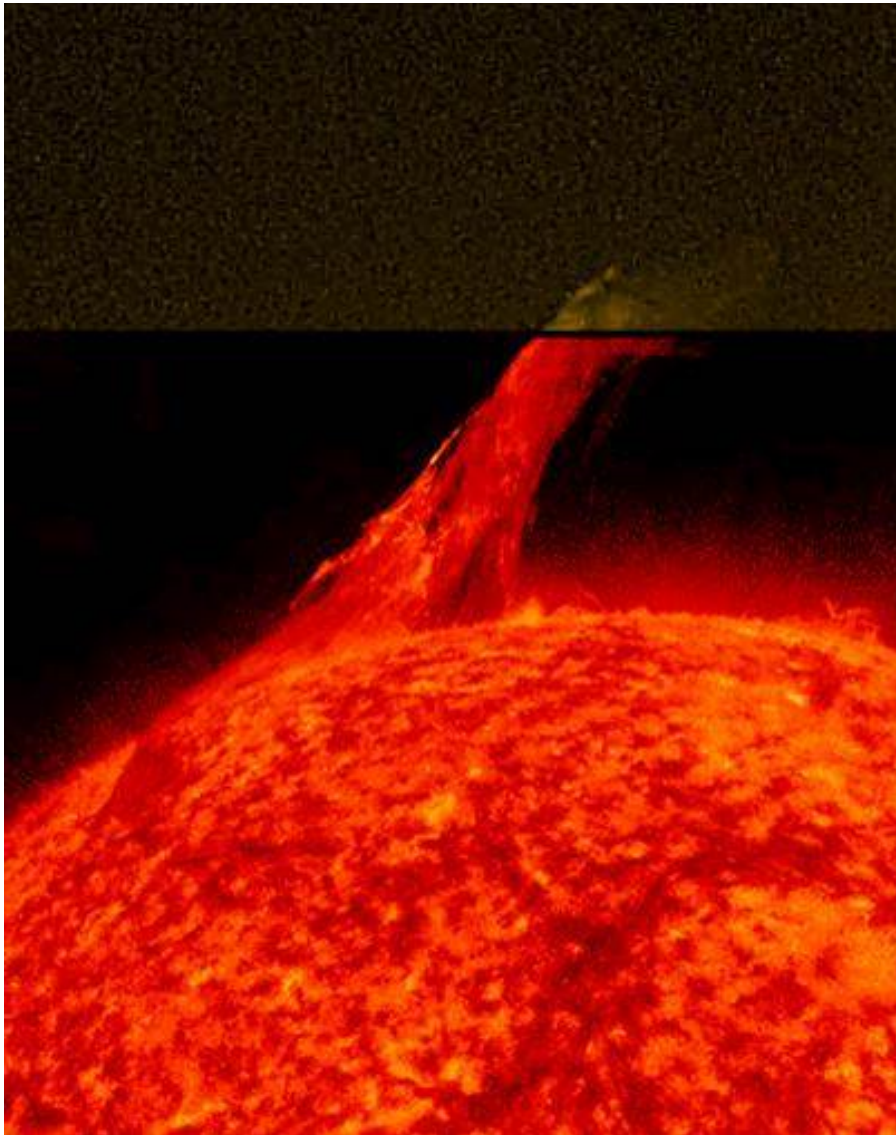
A very nice filament eruption occurred near the north-western solar limb during the morning hours of 3 June 2015. It concerned the long filament already mentioned in the previous news item of 27 May 2015 (see <http://www.stce.be/news/309/welcome.html>), when it was still in the north-eastern quadrant.



Some amateur solar observers were able to capture impressive images of this eruption in H-alpha, a filter providing a view of the "cold" (about 10.000 degrees) inner solar atmosphere. Jean-Pierre Brahic (France) was able to make the extraordinary snapshot shown above at 07:37UT. The full-resolution image can be found at <http://www.astrosurf.com/ubb/Forum3/HTML/044169.html> . A side-by-side comparison with SDO/AIA 304 (extreme ultraviolet at 80.000 degrees) reveals some subtle differences (image below).



The filament rose even further until it reached a height of over 200.000 km about 30 minutes later. It towered so high above the solar surface, that it got out of SDO/AIA's field-of-view (FOV). Fortunately, PROBA2/SWAP was able to capture the eruption in its full extent with its wider FOV camera (see below; image taken at 07:57UT). Most of the material fell back on the Sun, but a narrow coronal mass ejection (CME) was associated to this eruption, moving in the west-south-western direction with a plane-of-the-sky speed of nearly 700 km/s. It was not aimed at our planet. A movie of the event can be found at <https://youtu.be/Tp7qlfk6MJU> .



Credits - Images were taken from SDO (<http://sdo.gsfc.nasa.gov/data/aiahmi/>), PROBA2 (<http://proba2.oma.be/ssa>), SOHO (<http://sohowww.nascom.nasa.gov/home.html>), and J.-P. Brahic (<http://jp-brahic.chez-alice.fr/>).

2. We present to you

a brand new ESWW-poster, twelfth edition!

This time focussing on the humans behind our answer to space weather impacts.



November 23 - 27, 2015
Oostende, BELGIUM



FORUM ON SPACE WEATHER
SCIENCE - INSTRUMENTATION & OBSERVATION - DATA HANDLING AND EXPLOITATION -
SERVICES & APPLICATIONS

www.stce.be/esww12

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3. PROBA2 Observations (1 Jun 2015 - 7 Jun 2015)

Solar Activity

Solar flare activity fluctuated between very low and low during the week.

In order to view the activity of this week in more detail, we suggest to go to the following website from which all the daily (normal and difference) movies can be accessed:

<http://proba2.oma.be/ssa>

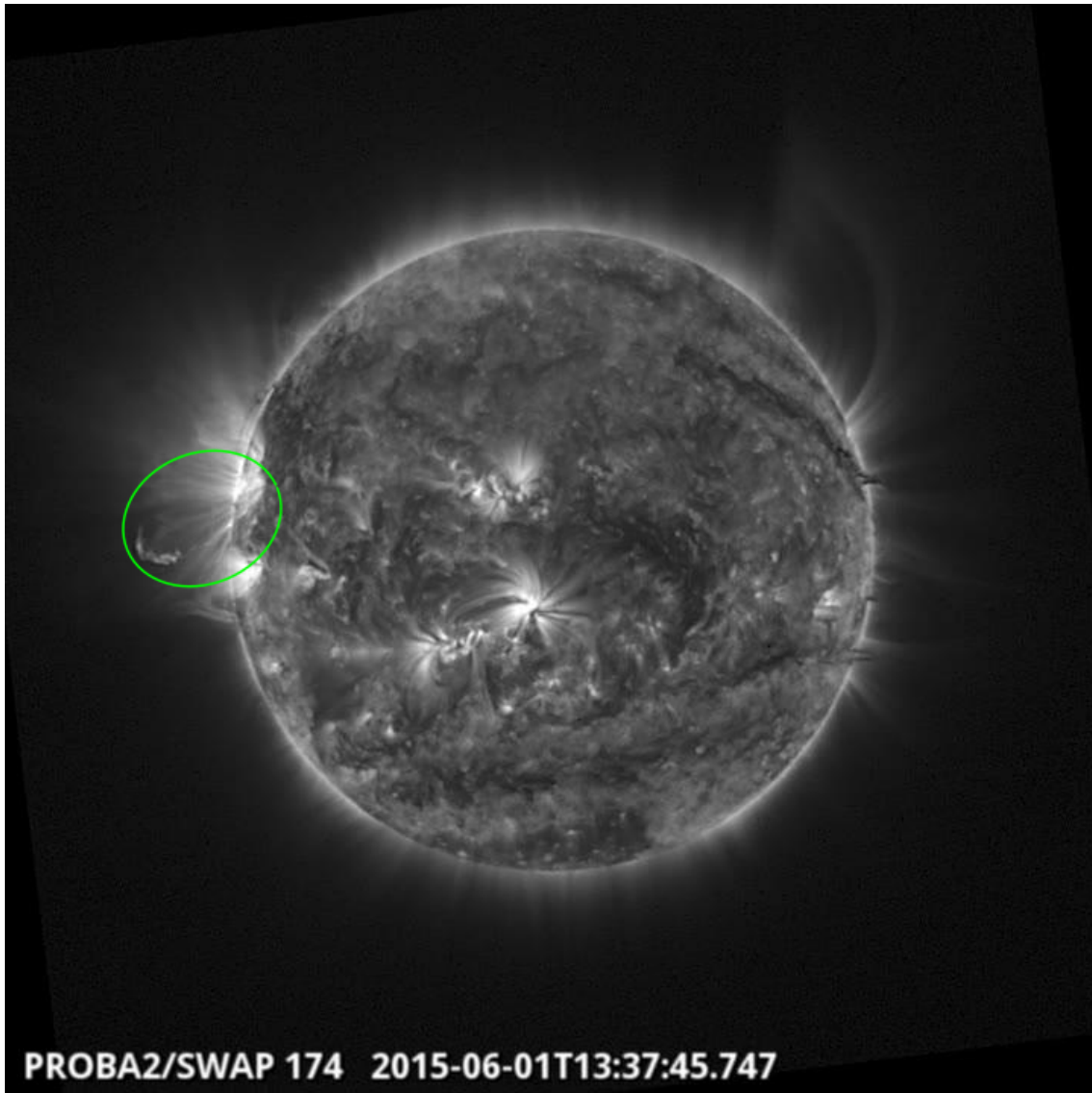
This page also lists the recorded flaring events.

A weekly overview movie can be found here (SWAP week 271).

http://proba2.oma.be/swap/data/mpg/movies/weekly_movies/weekly_movie_2015_06_01.mp4

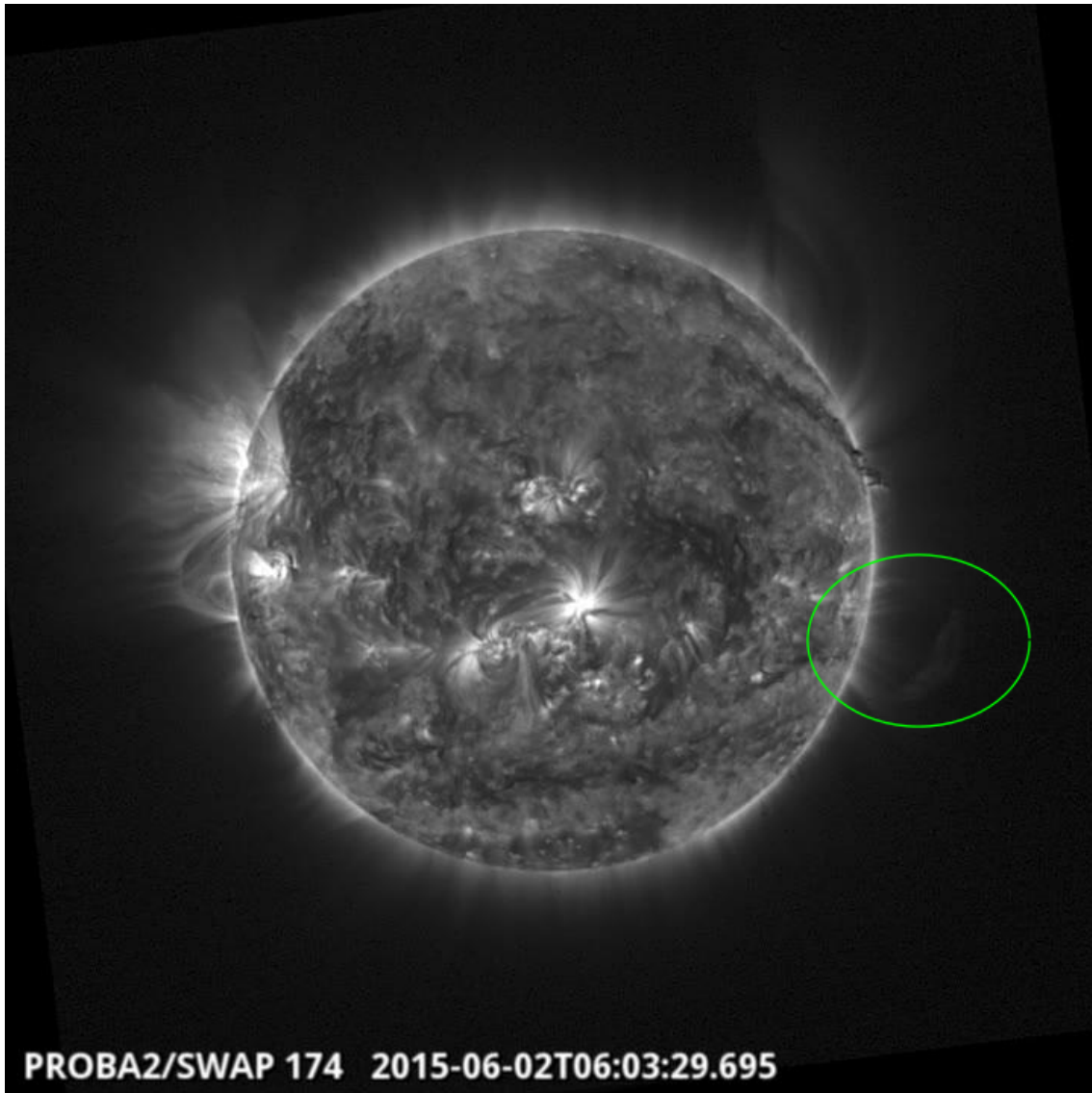
Details about some of this week's events, can be found further below.

Monday Jun 01

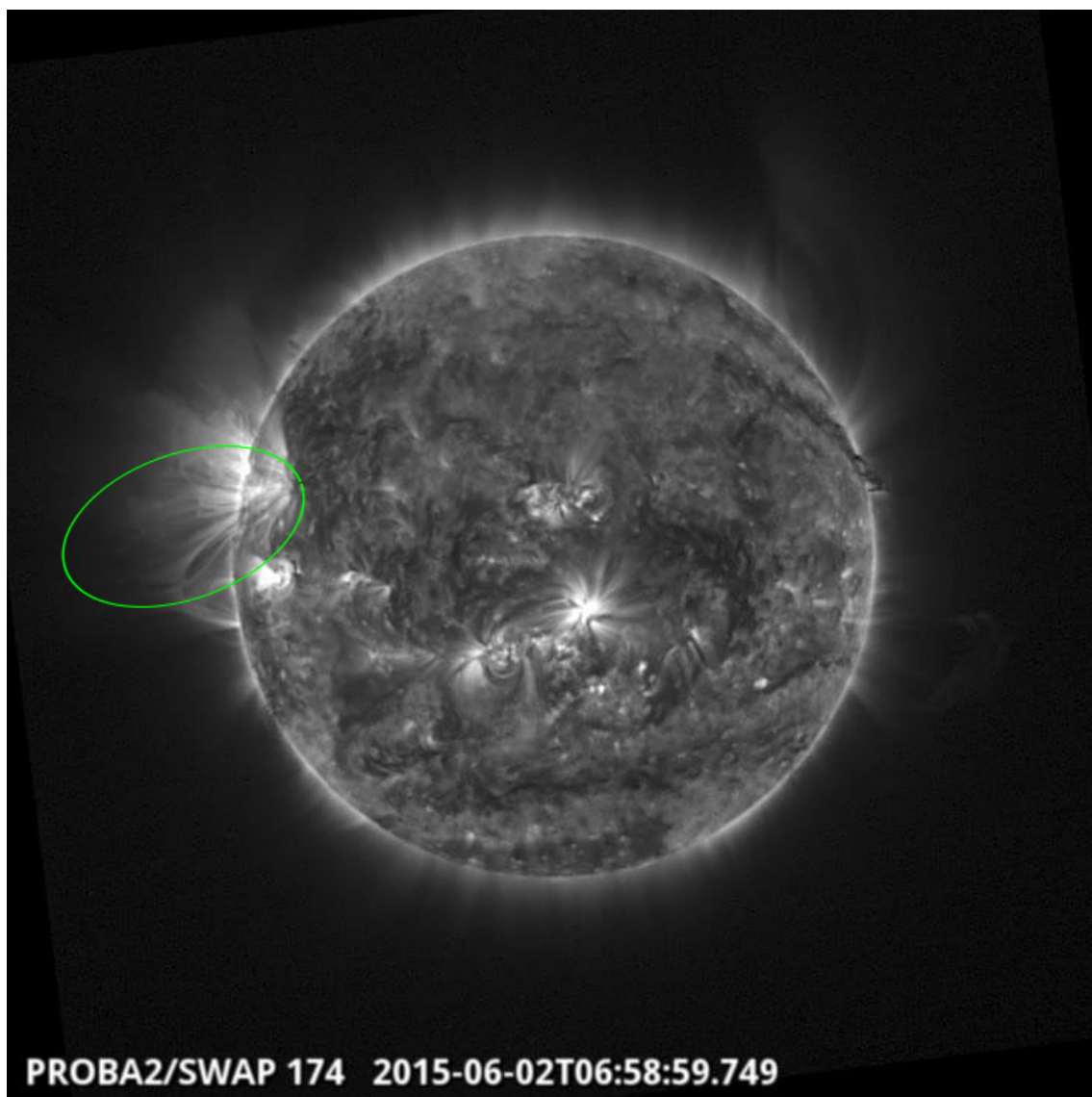


Eruption on the east limb @ 13:37 SWAP image
Find a movie of the events here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/20150601_swap_movie.mp4

Tuesday Jun 02

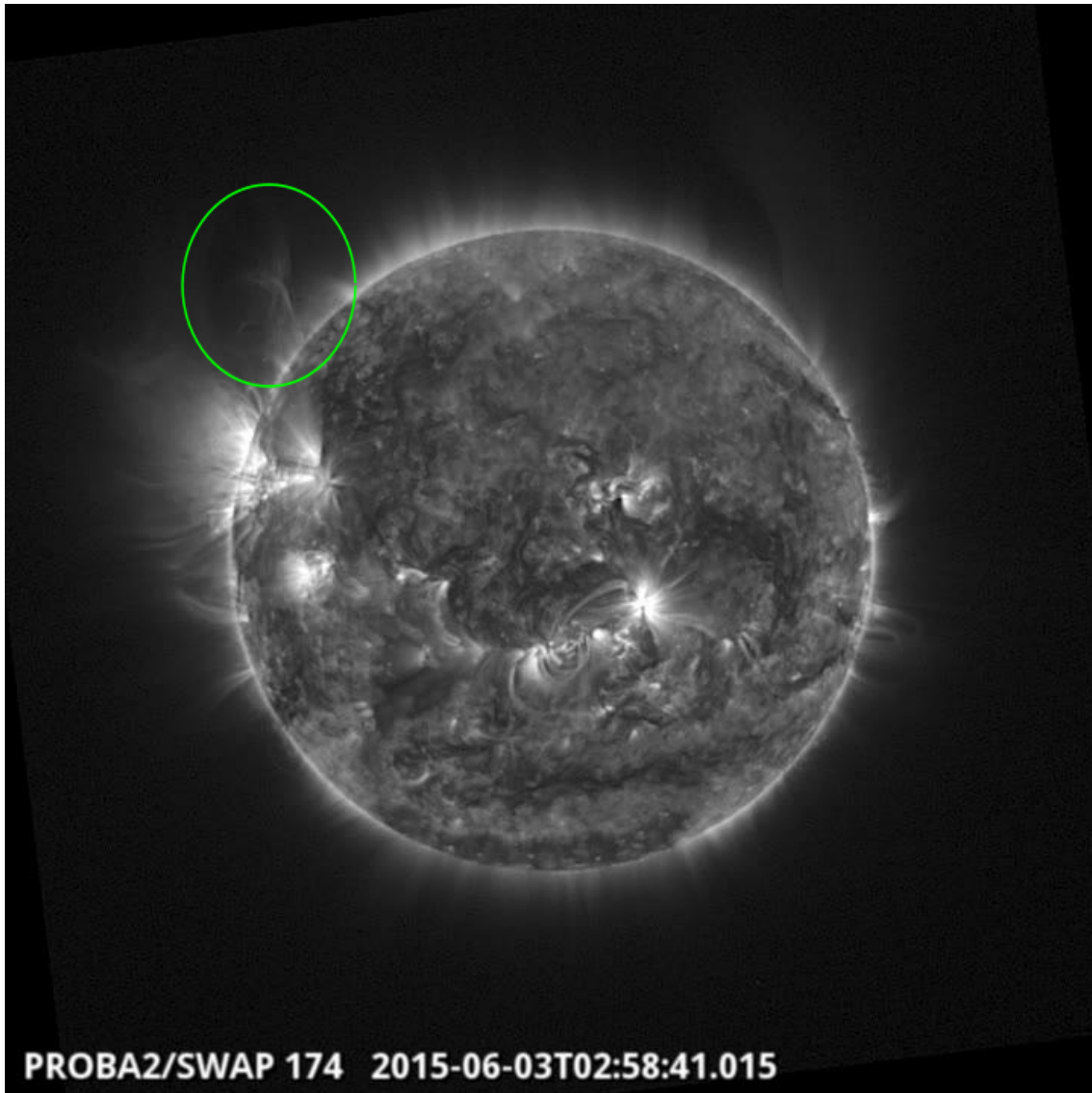


Eruption on the west limb @ 06:03 SWAP image
Find a movie of the events here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/20150602_swap_movie.mp4

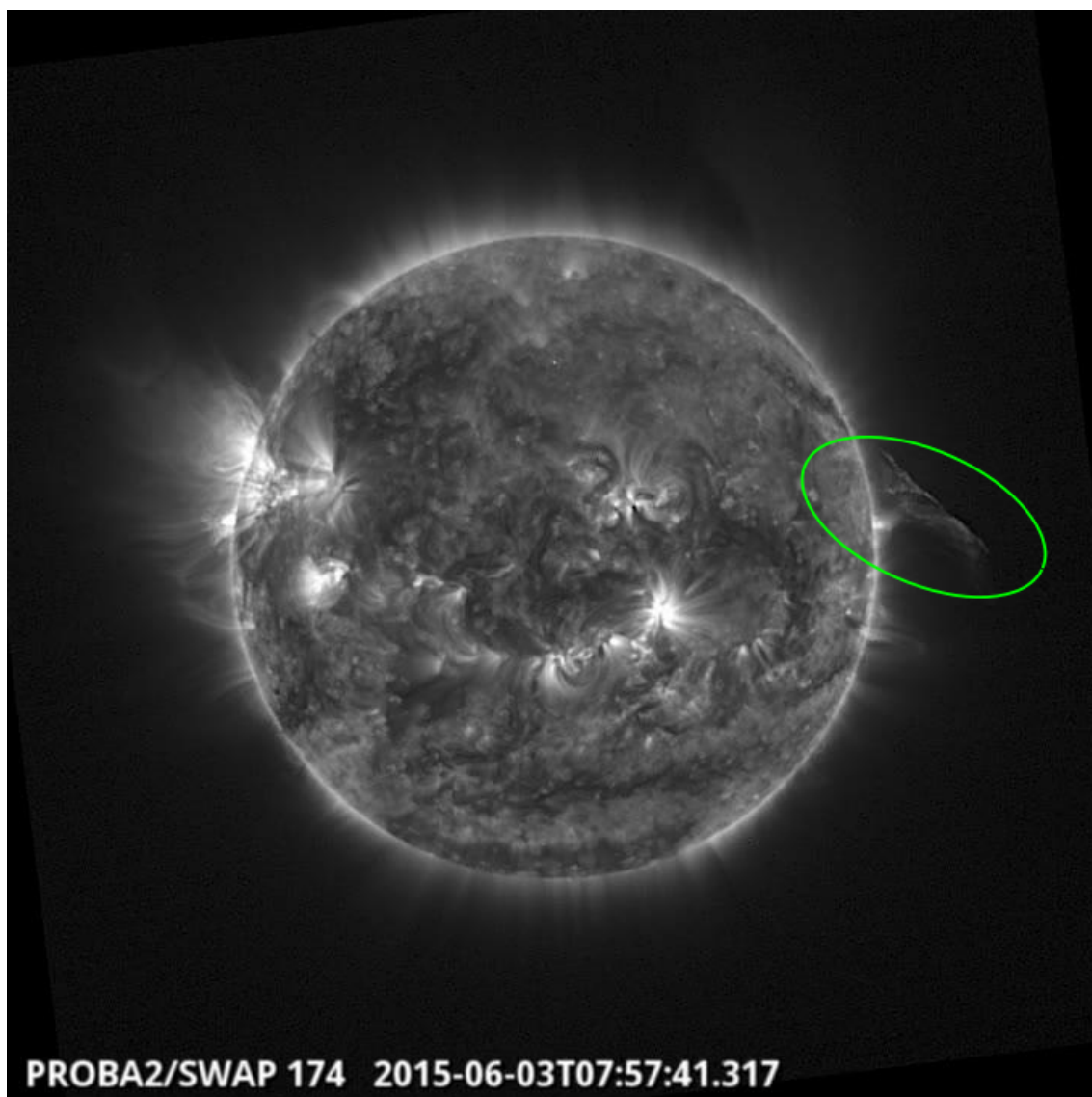


Eruption on the east limb @ 06:58 SWAP image
Find a movie of the events here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/20150602_swap_movie.mp4

Wednesday Jun 03



Eruption on the east limb @ 02:58 SWAP image
Find a movie of the events here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/20150603_swap_movie.mp4

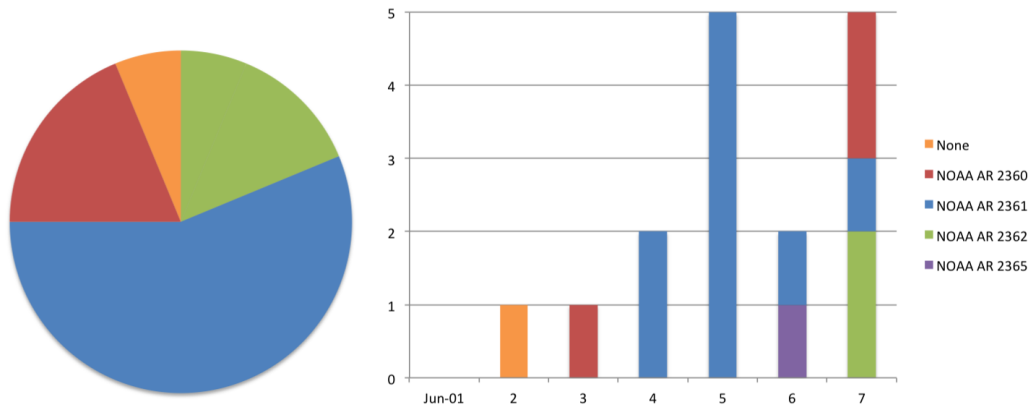


Failed eruption on the west limb @ 07:57 SWAP image
Find a movie of the events here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/20150603_swap_movie.mp4

4. Review of solar activity (1 Jun 2015 - 7 Jun 2015)

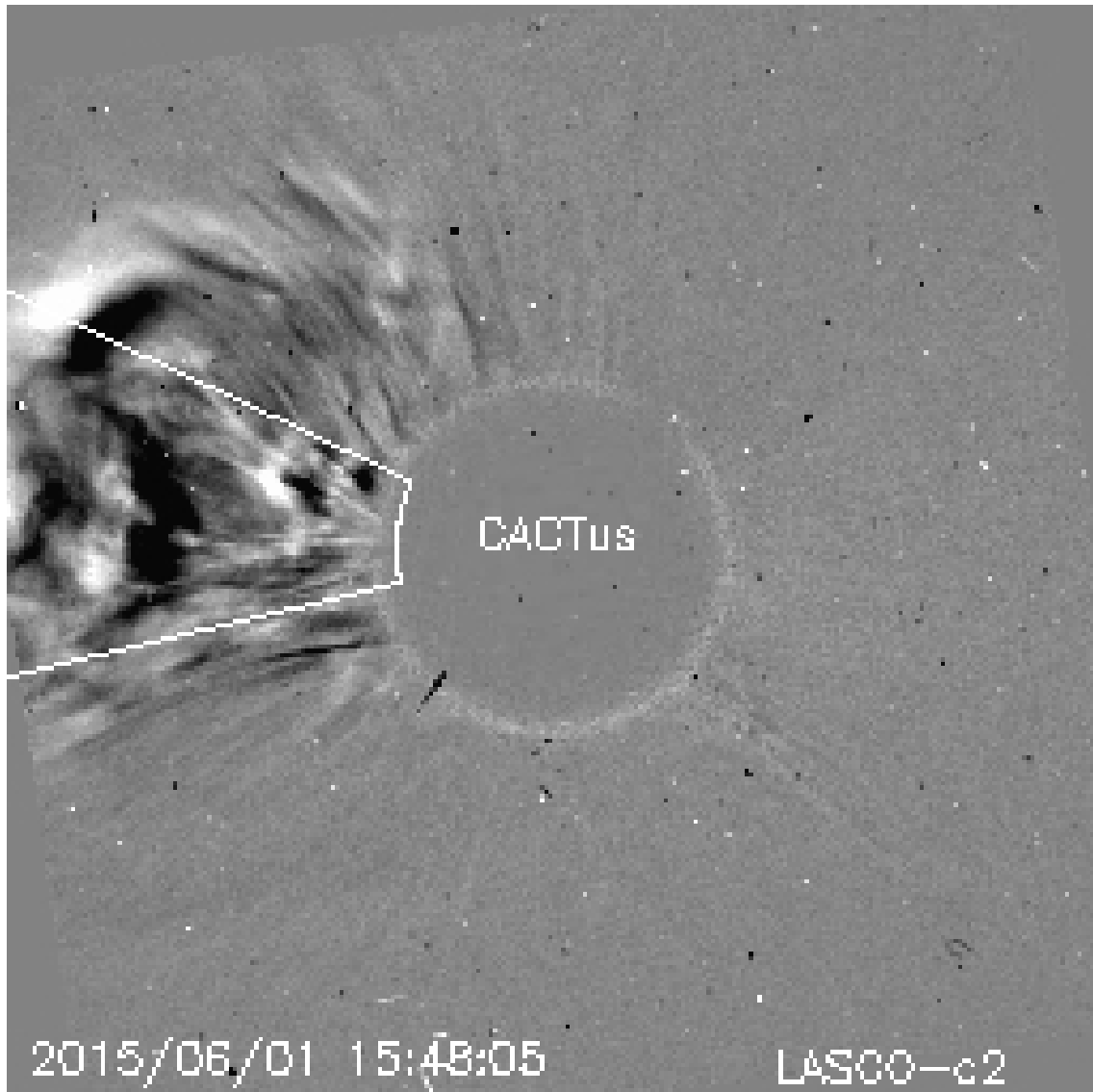
Twelve active regions were observed during the week, with NOAA AR numbers 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366. The flaring activity was on the low C-level throughout the most of the week. The only exception was the C8.1 flare peaking at 09:47 UT on June 4 in the NOAA AR 2361 (Catania sunspot group 80). It was associated only with a weak and narrow CME.

Distribution of >B flares, June 1 – 7, 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 flare site is not linked with one particular active region. The right chart gives an overview of the flaring activity per NOAA AR per day.

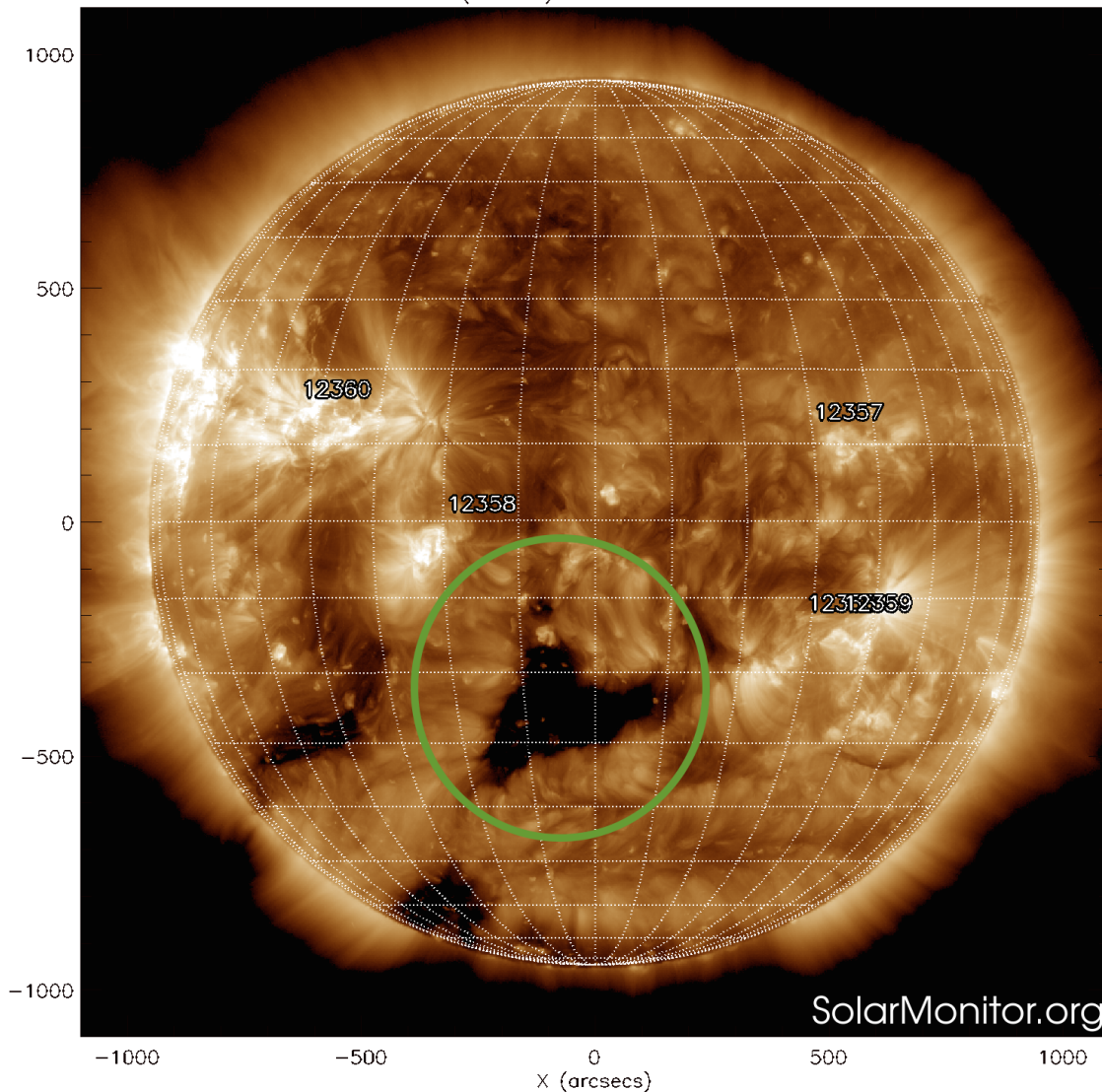
A partial halo CME was detected by SOHO/LASCO on June 1. It first appeared in the LASCO C2 field of view at 13:48 UT and had the angular width around 200 degrees.



SDO/AIA observations of associated coronal dimmings and an EIT wave demonstrate that the CME originated from behind the north-east solar limb, so it did not have any geoeffective consequences.

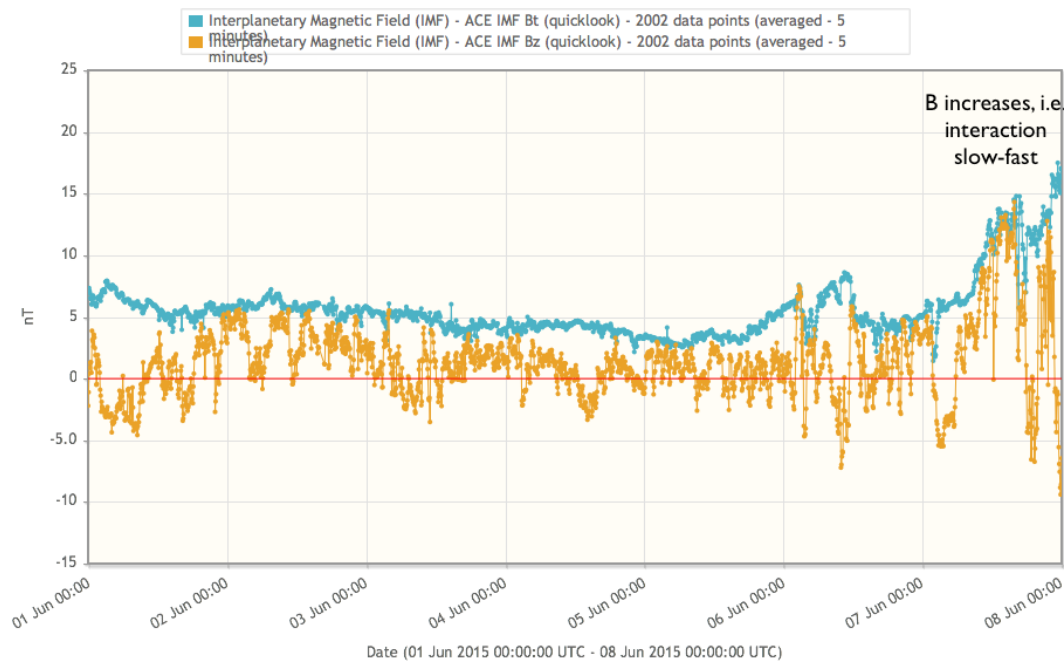
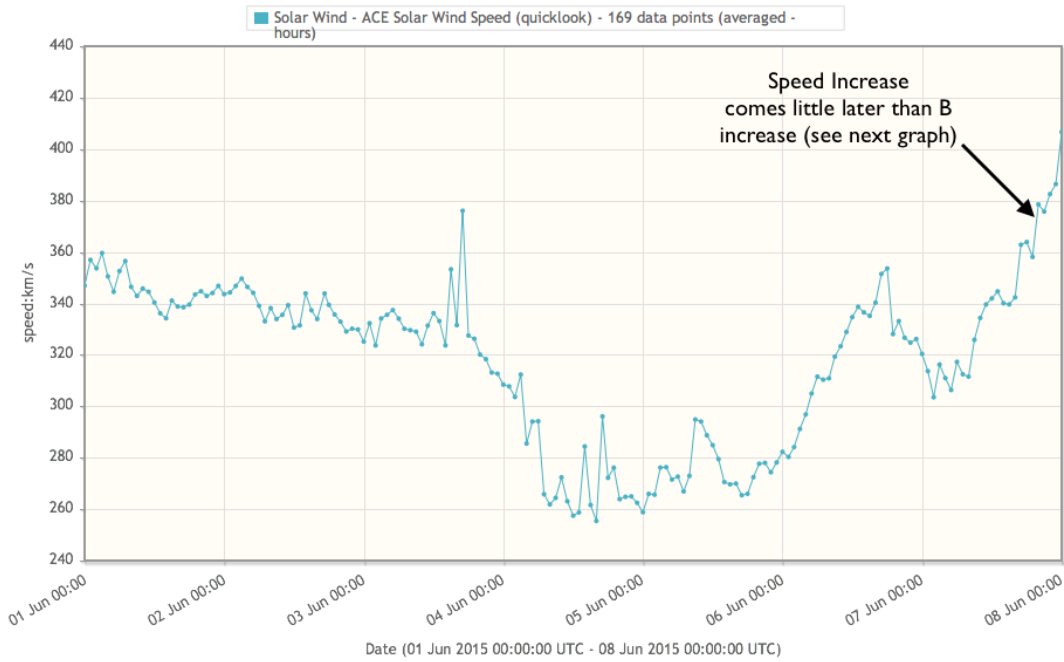
A small low-latitude coronal hole in the southern hemisphere reached the solar central meridian on June 4 - see the green circle in the SDO/AIA picture below. The associated fast solar wind flow arrived at the Earth early on June 8 (see below).

SDO AIA Fe XII (193 Å) 4-Jun-2015 23:34:42.840



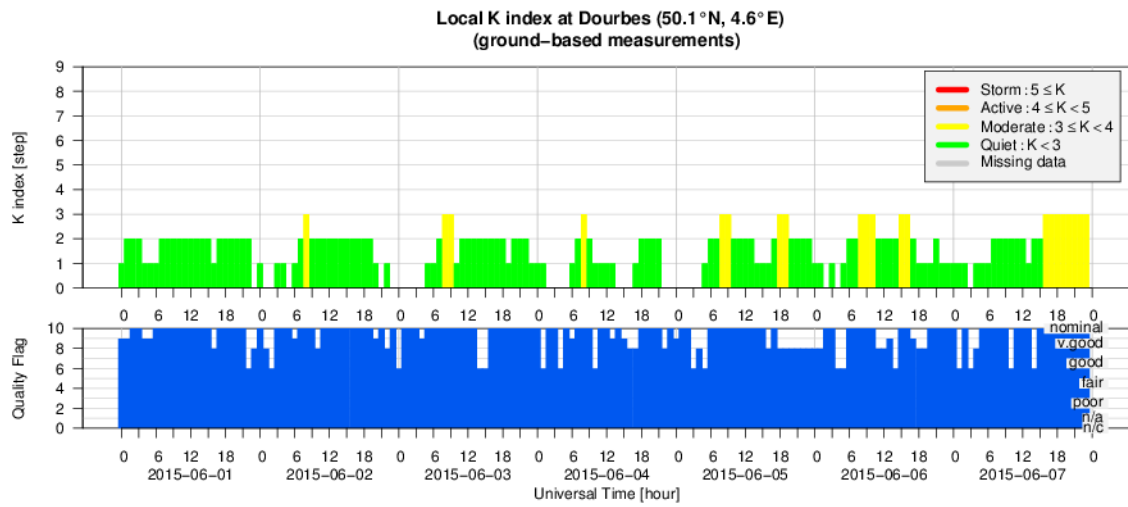
5. Review of geomagnetic activity (1 Jun 2015 - 7 Jun 2015)

During the most of the week the Earth was situated inside a slow solar wind flow (see first graph), and the geomagnetic conditions were quiet. On June 7 the interplanetary magnetic field magnitude (see second graph) started to increase steadily in association with the sector boundary crossing that occurred around 02:00 UT on that day. This indicated the arrival of the interaction region between the slow and fast solar wind flows, with the fast flow emanating from the low-latitude coronal hole in the southern hemisphere (see above).



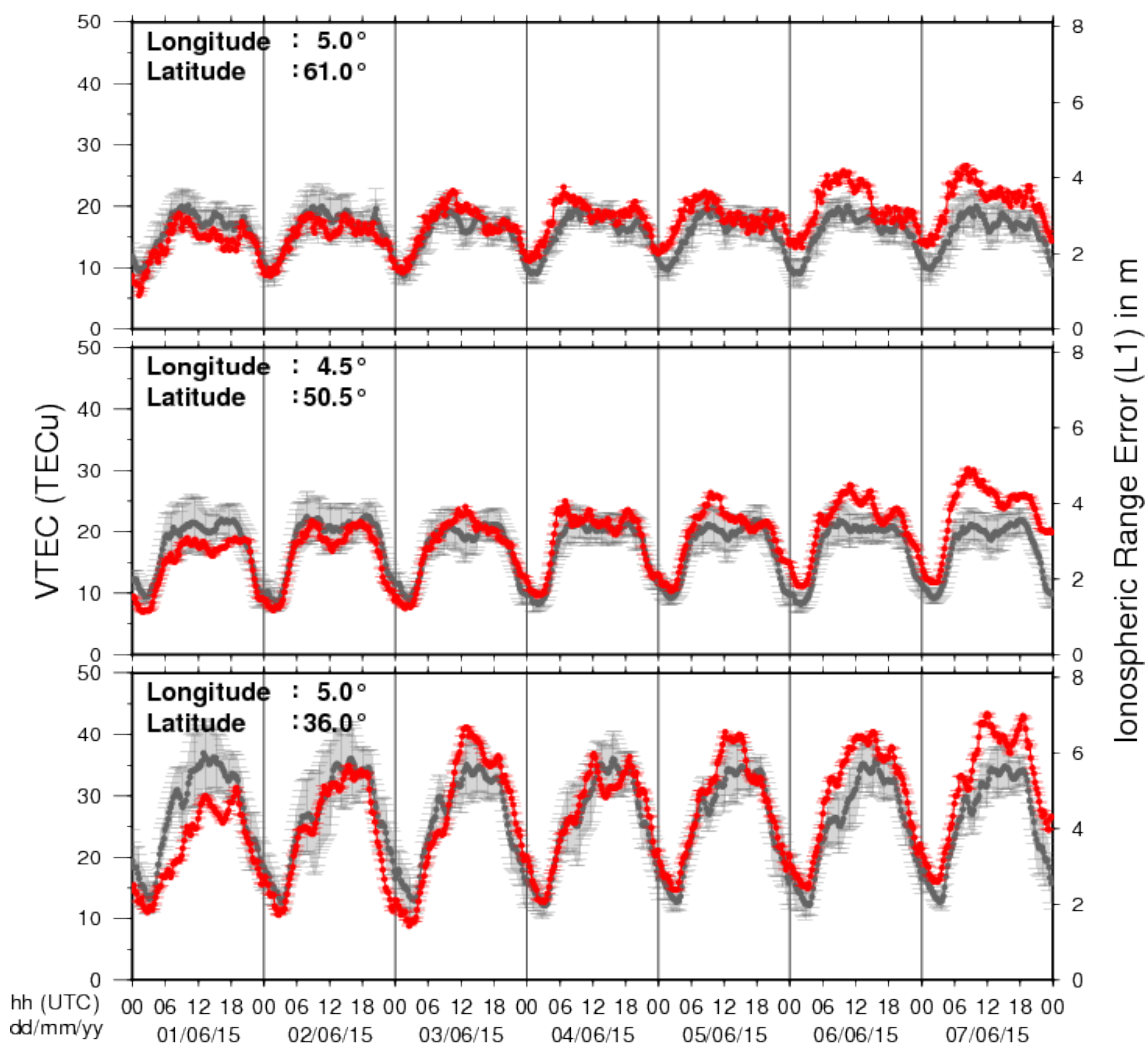
The geomagnetic conditions remained on the quiet to unsettled levels due to low solar wind speed. The corresponding fast flow arrived at the Earth on June 8 (outside of the reported period).

6. Geomagnetic Observations at Dourbes (1 Jun 2015 - 7 Jun 2015)



7. Review of ionospheric activity (1 Jun 2015 - 7 Jun 2015)

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:

- in the northern part of Europe (N61°, 5°E)
- above Brussels (N50.5°, 4.5°E)
- 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 $\text{TECu} = 10^{16}$ electrons per square meter) and is directly related to the signal propagation delay due to the ionosphere (in figure: delay on GPS L1 frequency).

The Sun's radiation ionizes the Earth's upper atmosphere, the ionosphere, located from about 60km to 1000km above the Earth's surface. The ionization process in the ionosphere produces ions and free electrons. These electrons perturb the propagation of the GNSS (Global Navigation Satellite System) signals by inducing a so-called ionospheric delay.

See http://stce.be/newsletter/GNSS_final.pdf for some more explanations ; for detailed information, see http://gnss.be/ionosphere_tutorial.php

8. Future Events

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

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 School 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.space-science.ro/conferences/storm2015/>

3rd UK-Ukraine-Spain meeting on solar physics and space science in Lviv, Ukraine

Start : 2015-09-07 - End : 2015-09-11

The meeting will cover various aspects of solar physics and space weather related processes. The special emphasis will be paid to progress in data-driven simulations and high-resolution spectropolarimetry as powerful diagnostic techniques to unravel information about magnetic fields in the photosphere and chromosphere of the Sun.

Website:

http://sbg.group.shef.ac.uk/Conferences/Ukraine_UK_2015/index.html

Summer School on Computational Solar and Astrophysical Modeling in Juelich, Germany

Start : 2015-09-14 - End : 2015-09-18

This summer school will acquaint a generation of young researchers (advanced master students, PhDs, and junior postdoctoral researchers) to modern open-source software efforts adapted to High Performance Computing platforms, with a deliberate focus on hands-on sessions. In these sessions, participants will work with three different open-source software packages, learn about their typical applications and evaluate their performance aspects on massively parallel systems.

Website:

http://www.fz-juelich.de/ias/jsc/EN/Expertise/Workshops/Conferences/CSAM-2015/_node.html

Hinode 9 - International Science Meeting in Belfast, UK

Start : 2015-09-14 - End : 2015-09-18

Hinode is a solar satellite funded jointly by JAXA, NASA, ESA and STFC/UKSA that has entered its ninth year of operations. It has had a major impact across many areas of solar physics and facilitated many fundamental discoveries. These findings are documented in over 850 papers in the refereed literature and hundreds of papers in conference proceedings. With 96 refereed publications in 2013 and more than 81 papers in 2014, Hinode has remained scientifically highly productive. A non-exhaustive list indicates over 100 students globally who are undertaking or have completed PhDs using Hinode data. With the Solar Orbiter on the horizon, there is a good chance that the two missions will operate at the same time. The meeting will help the solar physics community to maximise the science return from the Orbiter.

Website:

<https://star.pst.qub.ac.uk/wiki/doku.php/public/hinode9/start>

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/>

Multi-wavelength Studies of the Solar Atmosphere: Celebrating the Career of Costas Alissandrakis in Ioannina, Greece

Start : 2015-09-21 - End : 2015-09-24

On the occasion of the forthcoming retirement of Prof. Costas Alissandrakis, we organize an international solar physics conference as a tribute to his career. Speakers will address the present state of knowledge of topics that include: The quiet Sun; Coronal/chromospheric heating; Solar magnetic fields; Active regions; Flares; Coronal mass ejections; and Shocks.

Website: <http://solar15.uoi.gr/>

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-iss.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, H α , 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/>

AMS-02 Energetic Particle Workshop in Hawaii, USA

Start : 2015-10-18 - End : 2015-10-24

The workshop aims to bring together experts in the field of cosmic rays and solar energetic particles with an additional focus on their propagation inside the heliosphere and their interaction with the magnetosphere. The talks will present the most recent results related to solar energetic particles (SEPs), solar modulation, space radiation and related phenomena.

Website:

<http://www.phys.hawaii.edu/ams02/pages/workshop.php>

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 remote sensing observations of the inner heliosphere, including white light, EUV, and radio observation, together with modellers in order to tackle key outstanding science and space 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 sensing observations is critical to improving our capabilities of space 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 subcommunities 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 remote sensing 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 space weather operations and forecasting.

Website:

<http://www.sciesmex.unam.mx/workshop2015/>

12th Potsdam Thinkshop in Potsdam, Germany

Start : 2015-10-26 - End : 2015-10-29

In the tradition of the series of »Potsdam Thinkshops«, we invite instrument specialists, observers, modellers, and theorists to exchange ideas, to stimulate discussion, to initiate future collaborations among participants, and to attract new users of instruments by showcasing the capabilities. The aim is to make progress towards a comprehensive description of solar eruptive events effectively aggregating their global properties as well as their highly dynamic fine structure.

Website:

<https://thinkshop.aip.de/12/cms/>

SEST/MiniMax Workshop in Mexico City, Mexico

Start : 2015-10-26 - End : 2015-10-30

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. 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://cintli.geofisica.unam.mx/congreso/>

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/>

European Space Weather Week in Ostend, Belgium

Start : 2015-11-23 - End : 2015-11-27

The European Space Weather Week (ESWW) is the European forum for Space Weather users, forecasters, scientists and the involved industries, as proven by the high attendance to the ESWW 11 in November 2014.

The ESWW 12 will be held in Belgium in November, 23-27, 2015 and its organisation has already started and is benefiting from the experience and inputs from the past editions.

Website: <http://stce.be/esww12/>

AGU Chapman Conference on Currents in Geospace and Beyond in Dubrovnik, Croatia

Start : 2016-05-22 - End : 2016-05-27

Electric currents are fundamental to the structure and dynamics of space plasmas, including our own near-Earth space environment (also called "geospace"). This recognition is one of the great achievements in space research, going back to the beginning of the last century. With the current multi-spacecraft missions, such as Cluster, THEMIS and Swarm, we have unprecedented opportunities to unravel many of the intriguing puzzles about electric currents.

The conference will provide a forum in which various space science communities can come together to discuss recent achievements of observational, theoretical, and modelling studies. The emphasis will be on cross-disciplinary science sessions.

Website:

<http://chapman.agu.org/spacecurrents/general-informationabout-conference/>

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.cospas-assembly.org/>

IAU Symposium 327: Fine Structure and Dynamics of the Solar Atmosphere in Cartagena de Indias, Colombia

Start : 2016-10-09 - End : 2016-10-13

The scientific goal of this symposium is to discuss recent results on the processes shaping the structure of the solar atmosphere and driving plasma eruptions and explosive events. Activity of the solar atmosphere entails numerous multi-scale processes. State-of-the-art solar instrumentation is revealing the dynamics of the Sun with unprecedented temporal and spatial resolutions. Together with advanced numerical simulations these investigations are making new steps in our understanding of the complex dynamical structure of the solar atmosphere.

Major unsolved problems of astrophysics such as how the solar corona is heated and how the solar wind and heliosphere are powered have their roots in the origin of small-scale magnetic fields constituting the Sun's 'magnetic carpet' in the photosphere and appearing as 'magnetic canopy' in the chromosphere.

Website:

<http://www.iau.org/science/meetings/future/symposia/1160/>