STCE Newsletter

6 Oct 2014 - 12 Oct 2014

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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. Looking back on the Open Door 2014

This year, the Belgian Institute for Space Aeronomy (BISA) celebrates its 50th anniversary. On that occasion, an Open Door was organized during the weekend of 11 and 12 October (http://50.aeronomie.be/index.php). Despite the bad weather on Saturday, an estimated 7000 people visited the Space Pole. This can be considered as a big success. The STCE participated extensively with numerous activities.

The Solar Dome

An estimated 2000 people visited the Solar Dome. About 10 scientists took turns in guiding groups of about 15 people each. First, there was a short explanation on the sunspot number, the solar cycle and solar eruptions. Then, in a separate room, a short demo was given on the solar images taken by the solar telescopes at Uccle. Obviously, the highlight of the tour was the visit of the solar telescopes and -weather permitting- realtime observation of the Sun and the sunspots on a projected solar image. The tours lasted 10-12 minutes and were mostly given in French and Dutch, but there were also a few tours in English and even Spanish, courtesy of our visiting international scientists. Quite a few people stayed after the tour asking additional questions to the tour guides.

The STCE/ROB tent

In this tent, scientists gave talks during the entire open door weekend. Each lecture lasted for about 20 minutes and was followed by a 5-minute Q-and-A-session. Emphasis was on solar activity and its

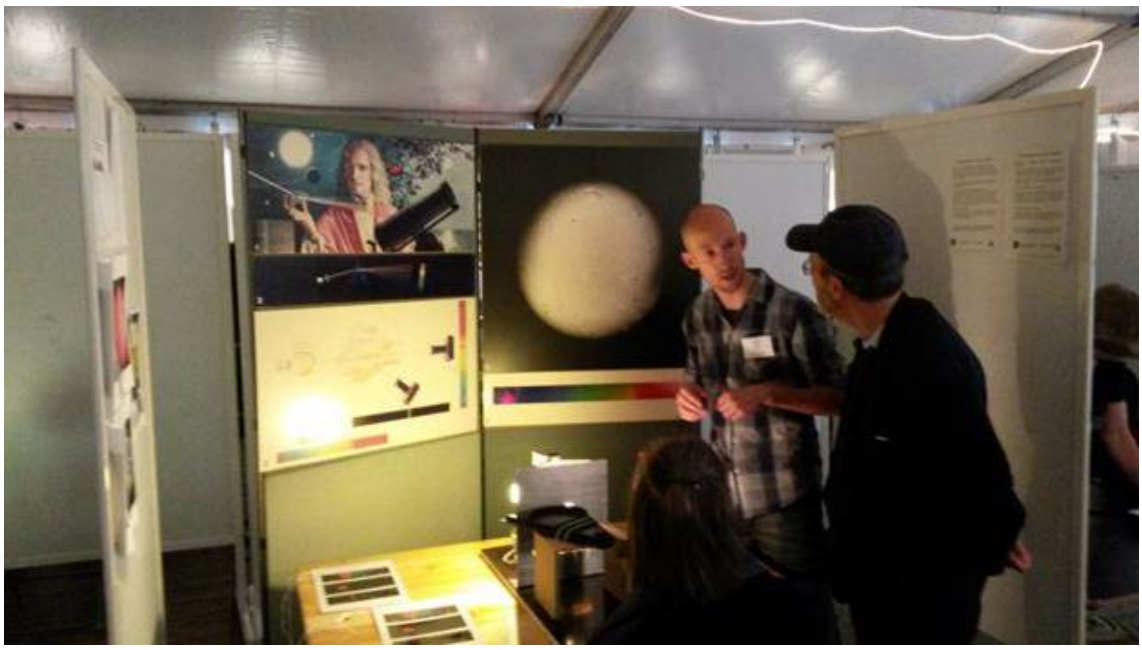
influence on Earth, but also other themes were addressed such as the planets, earthquakes (seismology) and the ionosphere. Links to the various presentations can be found at the end of this Newsletter ("New documents in the ESWP repository"), or directly at the repository of the European Space Weather Portal (http://www.spaceweather.eu/en/repository). An estimated total of 350 visitors attended the lectures, with the lectures in French drawing the largest audiences - often a full house!

The SSCC and P2SC room

The SSCC-room hosts the European coordination centre for space weather SSCC. Experts explained the functioning of the centre and gave an overview of their daily activities. Co-located was the PROBA2 Science Centre from which all the operations of the PROBA2 satellite are managed. There was a life-size scale model of the PROBA2 satellite, and hundreds of posters and bookmarks were handed out to the enthusiast crowd. Some kids got so inspired, they started themselves giving explanations to other visitors!

The "educative" tent

In this tent, numerous experiments were presented by the three institutes. The STCE participated in two experiments. The Planeterrella experiment focused on the research on polar lights. Some technical issues got resolved just in time, and visitors were able to enjoy the soft-pinkish glow of the simulated aurora. There was also a set-up on solar spectroscopy, with a run-of-the-mill spectroscope introducing the visitors to the solar spectrum and in what domains of solar research it is actually used. Though the experiments got a lot of competition from the nearby weather balloon launches, they were continuously visited by a very interested audience.

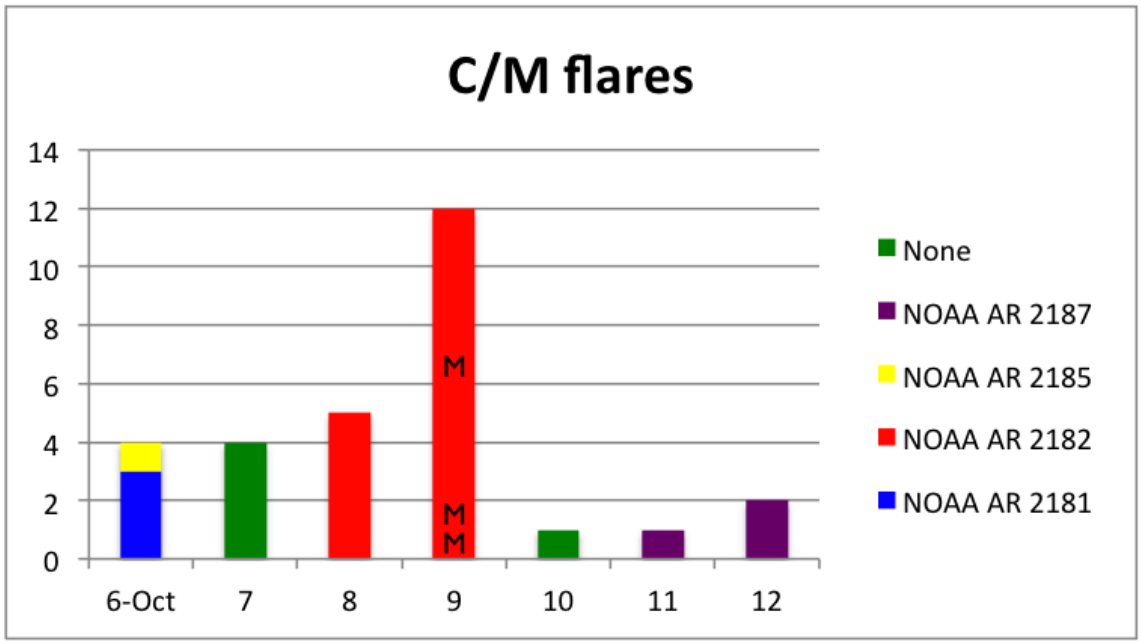


The Open Door 2014 was a big success. This would not have been possible without the efforts of all the speakers, guides, and other experts patiently explaining and answering all the questions from the audience. But also the IT-specialists, the helpdesks, and all -and there were many- involved in the

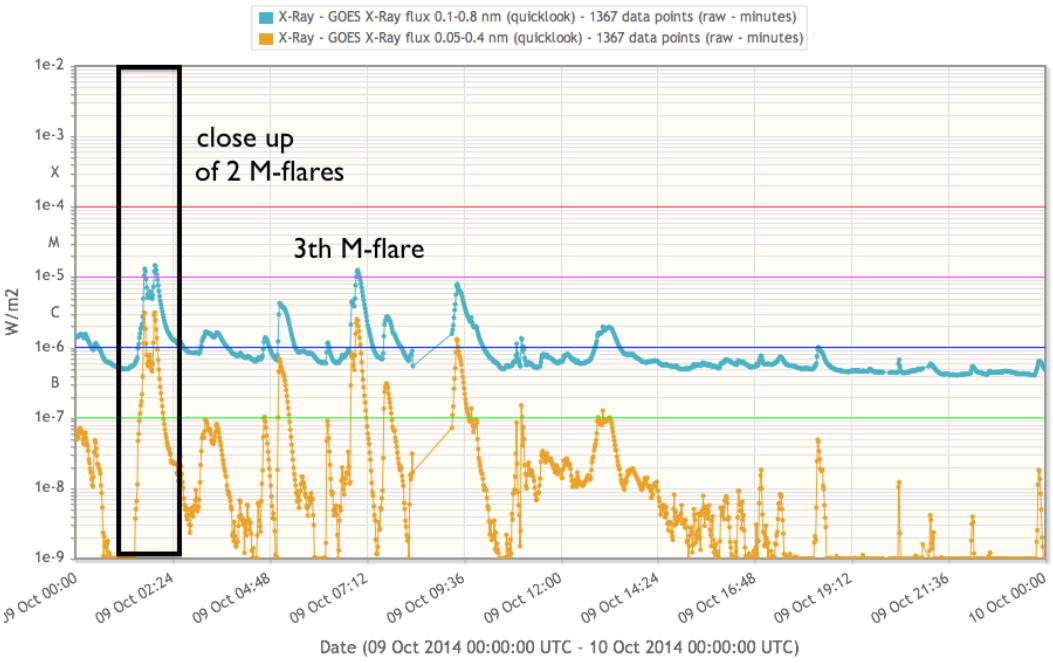
logistics and practical organization of the event played a very important role. If "No juice, no party!" is really true, then the thousands of "Thank you's" and smiles from happy visitors certainly testify of the success of this year's Open Door.

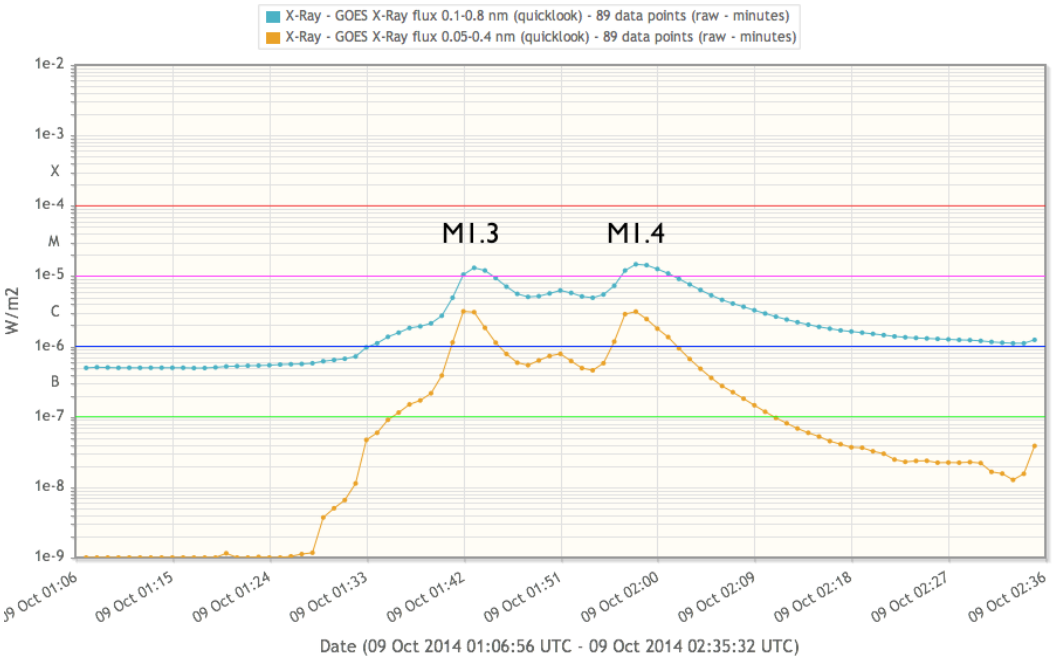
2. Review of solar activity (6 Oct 2014 - 12 Oct 2014)

During this week 3 M-class flares and 26 C-class flares were reported by GOES.

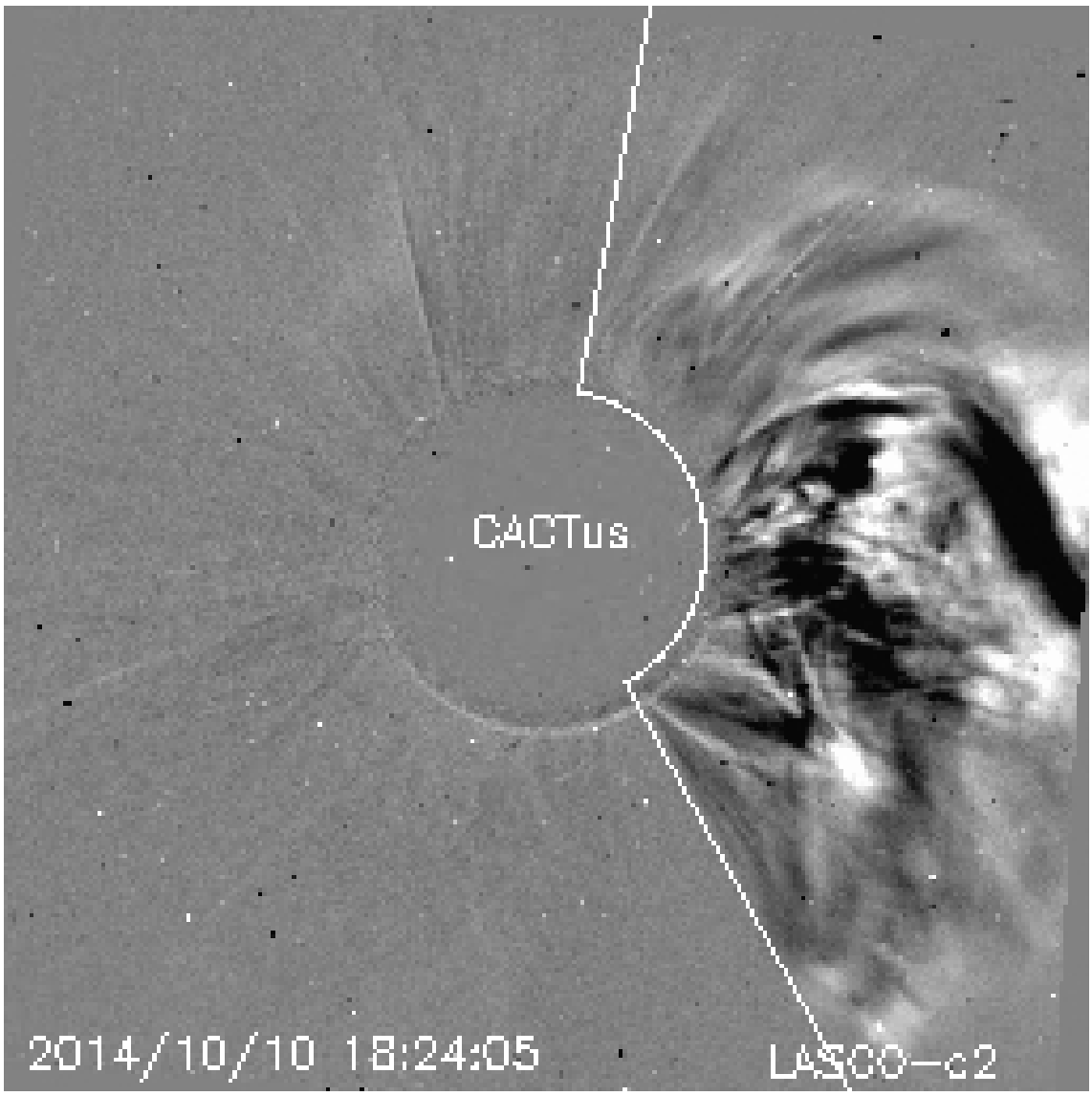


The strongest flare of the week was the M1.4 flare (peaking at 01:58 UT) on October 09. A few minutes before the peak of the M1.4 flare, the first of this serie of 3 M-flares peaked. The flare was comparable: M1.3. These confined flares (without associated CME) originated from the Catania sunspot group 67 (NOAA AR 2182) which was the source of all three M-class flares and numerous C-class flares. In a close up of the x-ray flux at the time of the M1.3 and M1.4 flare, you see that both occurred closely to each other in time.





A partial halo CME was seen on October 10, it came into the field of view of SOHO LASCO C2 at 16:12 UT. The CME was associated with the long duration C3.0 flare (peaked at 16:47 UT) which occurred in between two active regions, NOAA AR 2184 and 2182, and with the concurrent eruption of a large filament (situated at about S30 W45). In the above chart, the flare is represented by the green October 10 block representing source regions with no active region number. The angular width of the CME was about 200 degrees and its projected speed was 400 km/s (reported by the CACTUS software). The bulk of the CME mass was ejected south-west from the Sun-Earth line.



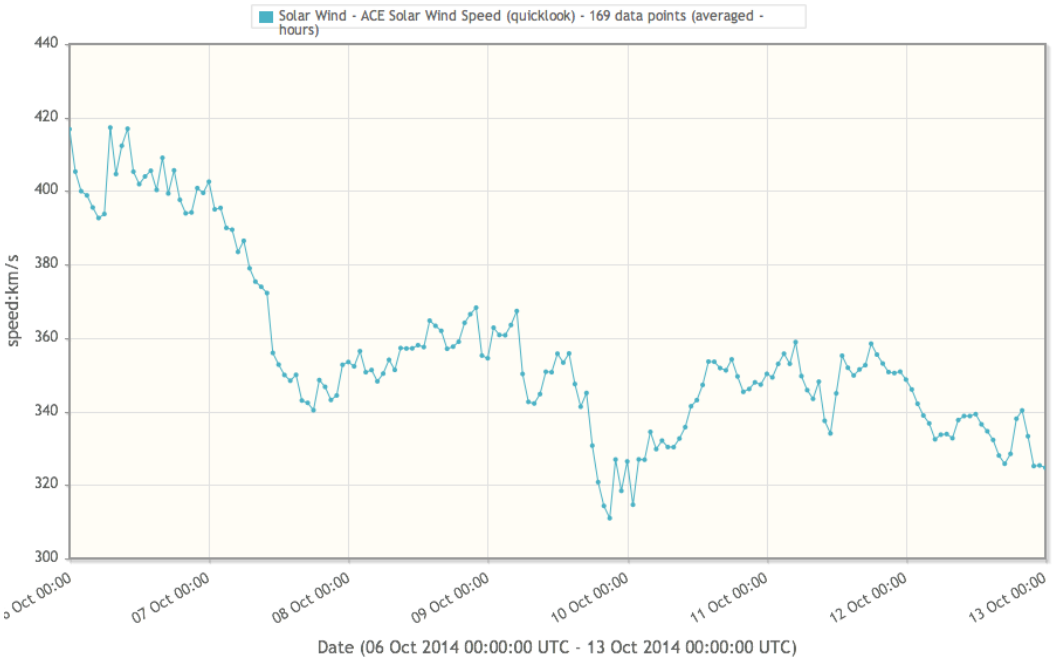
3. Noticeable Solar Events (6 Oct 2014 - 12 Oct 2014)

DAY	BEGIN	MAX	END	LOC	XRAY	OP	10CM	TYPE	Cat	NOAA
09	0130	0143	0147		M1.3	F			67	2182
09	0154	0158	0202		M1.4				67	2182
09	0648	0659	0706		M1.2	N			67	2182

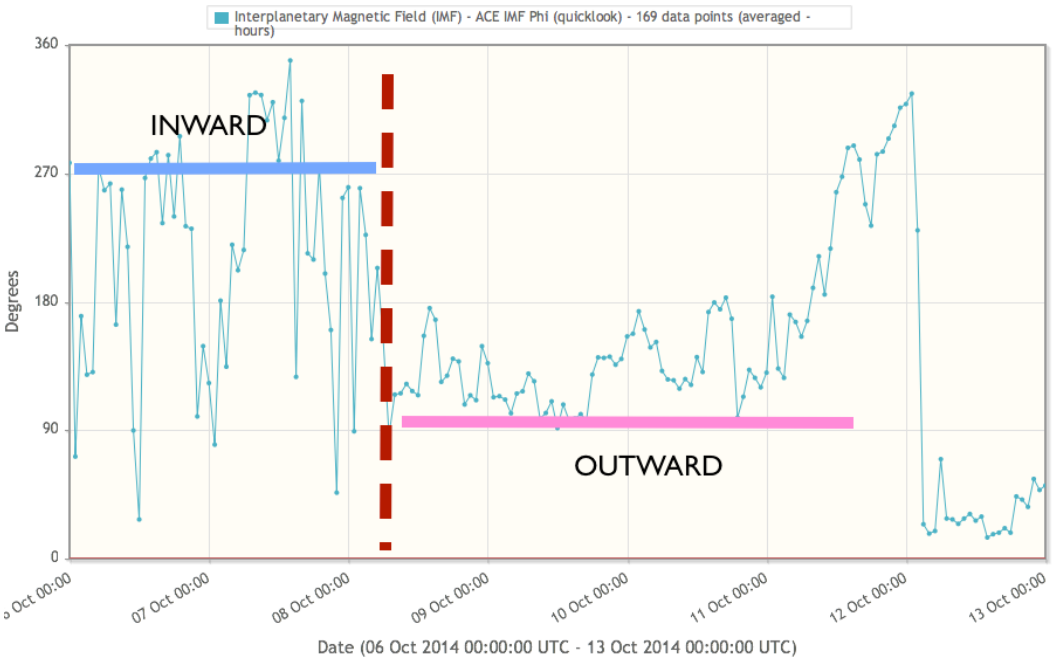
LOC: approximate heliographic location
XRAY: X-ray flare class
OP: optical flare class
10CM: peak 10 cm radio flux
TYPE: radio burst type
Cat: Catania sunspot group number
NOAA: NOAA active region number

4. Review of geomagnetic activity (6 Oct 2014 - 12 Oct 2014)

The solar wind speed decreased from slightly above 400 km/s on October 06 to 340 km/s on October 07. The remaining days, the solar wind speed stayed around 350 km/s.

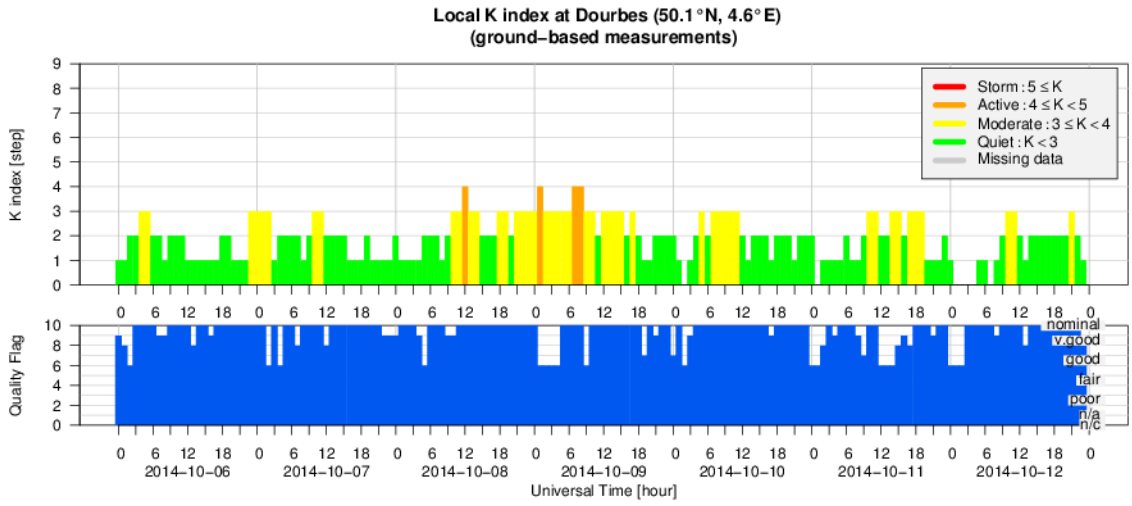


Due to the sector change on October 08 at about 05:30 UT, the interplanetary magnetic field magnitude was slightly elevated, up to the values of about 10 nT. The elevated value of the interplanetary magnetic field, which persisted during almost three days, was probably due to the sector change.

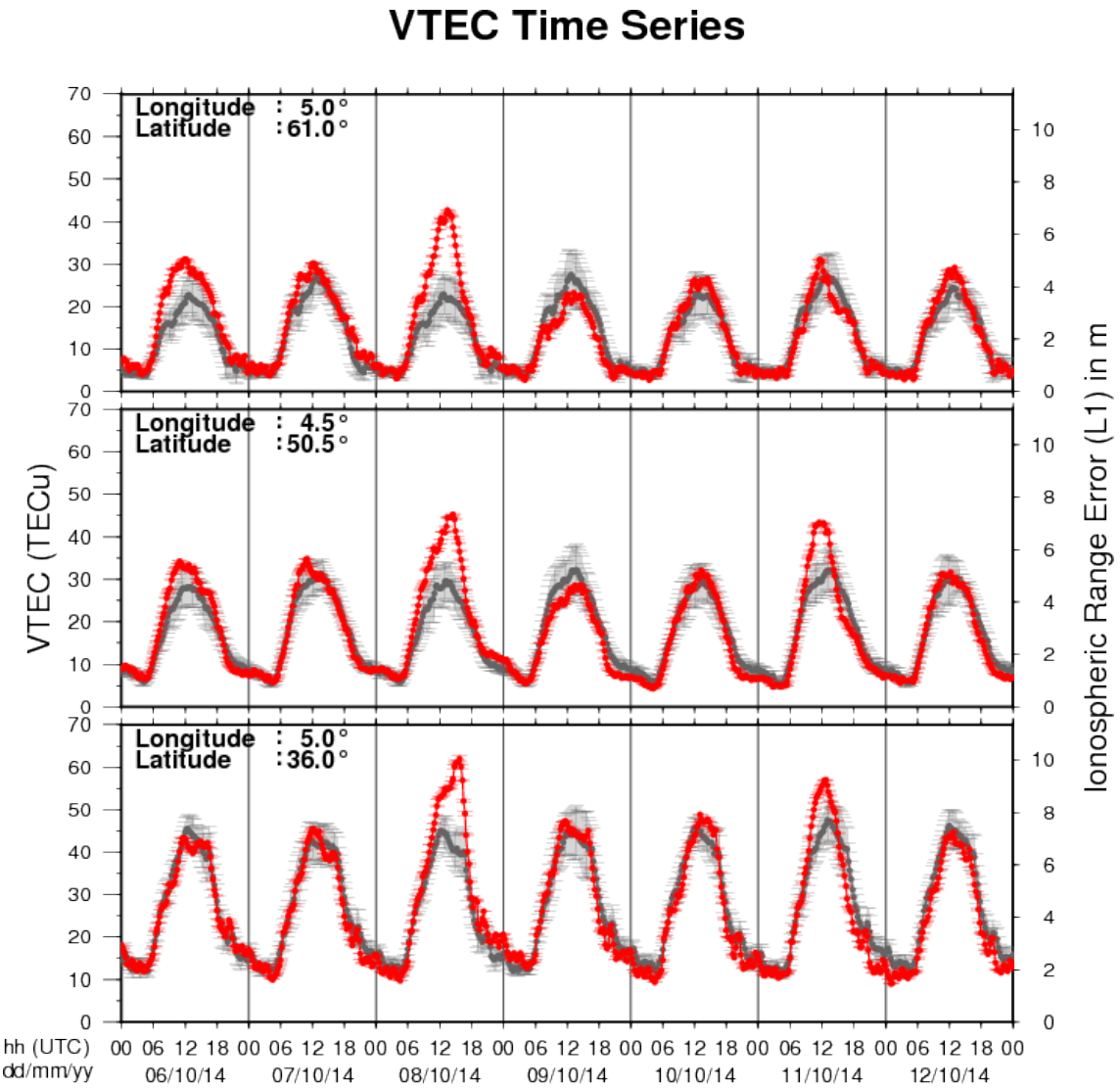


The Bz component of the interplanetary magnetic field had numerous long lasting intervals of negative values (about -7 nT), starting from the morning of October 08 until the noon on October 11. Due to the negative values of the Bz component we had quiet to active geomagnetic conditions on October 08 and October 09 (K=4 reported by local station at Dourbes and Kp=4 reported by NOAA) and quiet to unsettled geomagnetic conditions during the rest of the week.

5. Geomagnetic Observations at Dourbes (6 Oct 2014 - 12 Oct 2014)



6. Review of ionospheric activity (6 Oct 2014 - 12 Oct 2014)



The figure shows the time evolution of the Vertical Total Electron Content (VTEC) (in red) during the last week at three locations:
a) in the northern part of Europe(N61°, 5°E)
b) above Brussels(N50.5°, 4.5°E)
c) in the southern part of Europe(N36°, 5°E)
This figure also shows (in grey) the normal ionospheric behaviour expected based on the median VTEC from the 15 previous days.

The VTEC is expressed in TECu (with TECu=10^16 electrons per square meter) and is directly related to the signal propagation delay due to the ionosphere (in figure: delay on GPS L1 frequency).
The Sun's radiation ionizes the Earth's upper atmosphere, the ionosphere, located from about 60km to 1000km above the Earth's surface.The ionization process in the ionosphere produces ions and free electrons. These electrons perturb the propagation of the GNSS (Global Navigation Satellite System) signals by inducing a so-called ionospheric delay.

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

7. Future Events

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

2014 Conference on Big Data from Space (BiDS '14) in Frascati, Italie

Start : 2014-11-12
This conference aims to bring together researchers, engineers, users in the area of Big Data in the Space sector.
The focus is on the whole data lifecycle, ranging from data acquisition by spaceborne and ground-based sensors to data management, analysis and exploitation in the domains of Earth Observation, Space Science, Space Engineering, Space Weather, etc.
Special emphasis will be put on highlighting synergies and cross-fertilization opportunities from domains like Climate Change, Solid Earth Science, Planetary Sciences, Life Science, Astrophysics, High Energy Physics, Social Sciences, etc.
We expect this conference to:
* contribute towards a common "Big Data from Space" scientific and programmatic framework
* widen competences and expertise of universities, labs and industrial actors
* foster networking of experts and users towards better access and sharing of data, tools and resources
* leverage innovation, spin-in, spin off of technologies, and business development arising from research and industry progress
Website:
http://congrexprojects.com/2014-events/BigDatafromSpace/objectives

European Space Weather Week in LiÃ¨ge, Belgium

Start : 2014-11-17 - End : 2014-11-21
The 11th Edition of the European Space Weather Week will take place on 17-21nd November 2014 in Liège, Belgium.
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 is coordinated by the Belgian Solar-Terrestrial Centre of Excellence (STCE), ESA and the Space Weather Working Team. The local organisation is done by the STCE.
Website:
http://www.stce.be/esww11/

2014 AGU Fall Meeting in San Fransisco, USA

Start : 2014-12-15 - End : 2014-12-19
The AGU Fall Meeting is the largest worldwide conference in the geophysical sciences, attracting more than 22,000 Earth and space scientists, educators, students, and other leaders. For 46 years, energized and passionate Earth and space scientists from around the world gather at the AGU Fall Meeting to connect with colleagues, broaden their knowledge base, and embrace the joy of science. The 2014 meeting takes place Monday 15 - Friday 19 December 2014.
Several sessions about space weather are foreseen:
*
When and Why Does Space weather Forecasting Fail?
*
Addressing Operational Space Weather Needs
*
Near Real Time Data for Earth Science and Space Weather Applications

*
Understanding Hemispheric Asymmetry and Space Weather
*
Connection of Solar Events With the Variability of Space Environments
*
Bz from the Sun to the Earth: Observations and Modeling
*
Solar Sources and Heliospheric Consequences of Coronal Mass Ejections in Solar Cycle 24
*
Advances in Ionospheric Forecasting - Modeling, Observations, and Validation
Abstract Submission Deadline: August 6, 2014
Website:
http://fallmeeting.agu.org/2014/

Measurement Techniques for Solar and Space Physics, in Boulder, CO, USA

Start : 2015-04-20 - End : 2015-04-24
This gathering was born out of the desire to collect in one place the latest technologies required for advancement of science in the discipline of Solar and Space Physics. In doing so, it was recognized that the two 1998 volumes of 'Measurement Techniques in Space Plasmas' (Particles and Fields) have been a valuable reference and resource for advanced students and scientists who wish to know the fundamentals of measurement techniques and technology.
Website:
https://mtssp.msfc.nasa.gov/

26th General Assembly of the International Union of Geodesy and Geophysics (IUGG) in Prague, Czech Republic

Start : 2015-06-22 - End : 2015-07-02
We invite contributions on novel inversion methods with application across the geosciences. Of particular interest are 3D imaging, joint inversion of geodetic, geophysical and geochemical datasets, and multi-disciplinary interpretation approaches such as integration of gravity, EM and seismic data or thermo-mechanical modelling studies constrained by physical parameters.
Modelling of Space Weather Effects: Solar, Magnetospheric and Earth Resistivity Constraints (IAGA, IAMAS)
In this symposium we welcome contributions on all aspects of the modelling of space weather and its effects, from the Sun to Earth. This includes the modelling of the various interactions between travelling solar storms and the solar wind, magnetosphere, ionosphere and solid Earth and the validation of models through measurements. Contributions on models developed to aid end-users, such as satellite and power grid operators, survive the impact of space weather are also encouraged.
Website:
http://www.iugg2015prague.com/joint-inter-association-symposia.htm#JA

8. New documents in the European Space Weather Portal Repository

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

STCE - Pourquoi mesurer la pesanteur g?

Presentation, in French given at the open doors of the Space Pole, Brussels, Belgium, 2014
http://www.spaceweather.eu/en/repository/show?id=542

STCE - Waarom meten we de valversnelling g?

Presentation, in Dutch given at the open doors of the Space Pole, Brussels, Belgium, 2013.

http://www.spaceweather.eu/en/repository/show?id=543

STCE - Pourquoi Vénus est-elle si différente de la Terre?

Presentation, in French given at the open doors of the Space Pole, Brussels, Belgium, 2014
http://www.spaceweather.eu/en/repository/show?id=544

STCE - Pourquoi installer des stations GNSS en Antarctique?

Presentation, in French given at the open doors of the Space Pole, Brussels, Belgium, 2014
http://www.spaceweather.eu/en/repository/show?id=545

STCE - L'exploration de la planète Mercure

Presentation, in French given at the open doors of the Space Pole, Brussels, Belgium, 2014
http://www.spaceweather.eu/en/repository/show?id=546

STCE - De zon bestuderen met PROBA2, hoe ontwerp en lanceer je een satelliet?

Presentation, in Dutch given at the open doors of the Space Pole, Brussels, Belgium, 2014
http://www.spaceweather.eu/en/repository/show?id=547

STCE - Les grands tremblements de terre de nos régions et leurs conséquences sur le bâti

Presentation, in French given at the open doors of the Space Pole, Brussels, Belgium, 2014
http://www.spaceweather.eu/en/repository/show?id=549

STCE - Seismologie in België

Presentation, in Dutch given at the open doors of the Space Pole, Brussels, Belgium, 2014
http://www.spaceweather.eu/en/repository/show?id=548

STCE - Ruimteweer: de impact van zonnestormen op aarde

Presentation, in Dutch given at the open doors of the Space Pole, Brussels, Belgium, 2014
http://www.spaceweather.eu/en/repository/show?id=550

STCE - Seismologie in België

Presentation, in Dutch, given at the open doors of the Space Pole, Belgium, 2014
http://www.spaceweather.eu/en/repository/show?id=551