STCE Newsletter

16 Dec 2013 - 22 Dec 2013

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

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1. Review of solar and geomagnetic activity (16 Dec 2013 - 22 Dec 2013)

Solar Activity

During the first half of the week, the X-ray flux peaked in the C-level, with a C4.0 flare as strongest one. From the end of December 19 onwards, the X-ray flux level increased and several C- and M-flares occurred. In total 51 C-flares and 8 M-flares were observed during the week. NOAA active region (AR) 1928 was responsible for most of the flares. The strongest flare was a M3.5 flare with peak on December 19 at 23h19 UTC, originating from NOAA AR 1934.

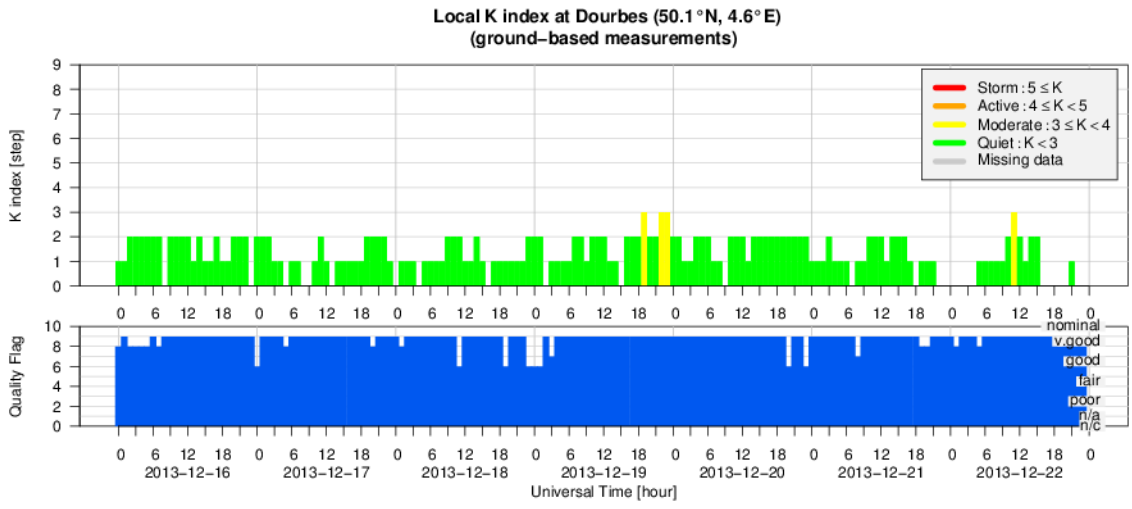
A CME, associated with a C3.1 long-duration flare, was observed in LASCO/C2 (first measurement on December 16 at 21h27 UTC). The CME was travelling to the west with an estimated speed of 650 km/s, but did not arrive at Earth.

A coronal hole reached the central meridian on December 22, located in the north hemisphere at a latitude of 25 to 50 degrees.

Geomagnetic Activity

During the full week we were inside a slow solar wind stream. The solar wind speed, measured by ACE, slowly decreased from 450 km/s to 300 km/s. The interplanetary magnetic field (IMF) was stable around a magnitude of 5 nT. The Bz-component of the interplanetary magnetic field varied from -6 to +5 nT. Geomagnetic conditions were mostly quiet (K Dourbes less than 3) with unsettled levels (K Dourbes equal 3) only during a few time slots.

2. Geomagnetic Observations at Dourbes (16 Dec 2013 - 22 Dec 2013)



3. Noticeable Solar Events (16 Dec 2013 - 22 Dec 2013)

DAY	BEGIN	MAX	END	LOC	XRAY	OP	10CM	TYPE	Cat	NOAA
19	2306	2319	2326		M3.5					1934
20	1135	1157	1207		M1.6					1934
22	0805	0811	0818	S20W49	M1.9	SF			87	1928

22	0833	0837	0841	S17W52	M1.1	SF		87	1928
22	1424	1438	1448	S18E44	M1.6	1F			1934
22	1506	1512	1519	S19W56	M3.3	1N		87	1928
22	2123	2208	2213	S17W58	M1.6	SN		87	1928
22	2344	0003	0005	S17W60	M1.3	SF	III/1	87	1928

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. Future Events

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

EGU General Assemby in Vienna, Austria

Start : 2014-04-27 - End : 2014-05-02
The EGU General Assembly 2014 will bring together geoscientists from all over the world to one meeting covering all disciplines of the Earth, planetary and space sciences. The EGU aims to provide a forum where scientists, especially early career researchers, can present their work and discuss their ideas with experts in all fields of geosciences.

5. New documents in the European Space Weather Portal Repository

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

eHEROES - CMEs in the inner heliosphere – propagation and interaction with the solar wind

http://www.spaceweather.eu/en/repository/show?id=485

eHEROES - Evolution of the flare loop system of the X1.4 class flare of 22 September 2011

CMEs and flares are transient phenomena with huge energy releases originating from the solar corona. We investigate and analyze the evolution of the X1.4-class flare/CME event of 22 September 2011 that produced a distinct system of flare loops. Viewed from Earth, the event was observed on the solar limb, enabling us to derive height-time curves of the evolving loops. For a continuous tracking of the loop system in high-temporal resolution EUV data using SDO/AIA data, we developed a method that automatically detects the height of the loop tops over a given reference point by analyzing the intensity profile perpendicular to the solar limb. With this method, we measure the height-time profiles of the loop system in the different wavelength channels over a time period of 12 hours after the flare onset. We identify characteristic features in the height-time curves which stem from a non-uniform growth of the flare loop system related to the ongoing magnetic reconnection process. We put special focus on the early phase of the event for which we compare the growth of the loop system with the kinematics of the associated CME and aim to connect the physics behind the rapid growth of the loop system with changes in the kinematical behavior of the CME or enhanced soft X-ray flux.
http://www.spaceweather.eu/en/repository/show?id=486