

STCE Newsletter

25 Jan 2016 - 31 Jan 2016



Published by the STCE - this issue : 4 Feb 2016. Available online at <http://www.stce.be/newsletter/>.

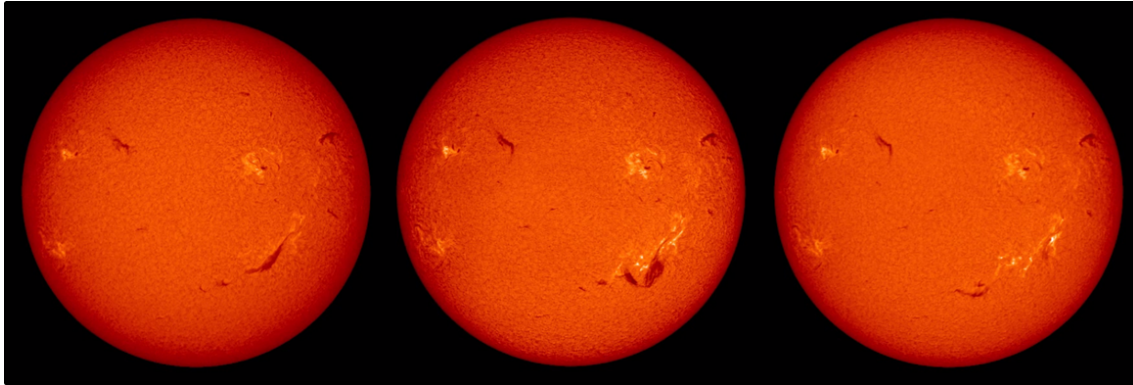
The Solar-Terrestrial Centre of Excellence (STCE) is a collaborative network of the Belgian Institute for Space Aeronomy, the Royal Observatory of Belgium and the Royal Meteorological Institute of Belgium.

Content	Page
1. A filament erupts	2
2. PROBA2 Observations (25 Jan 2016 - 31 Jan 2016)	5
3. Review of solar activity	10
4. The International Sunspot Number	14
5. Review of geomagnetic activity	14
6. Geomagnetic Observations at Dourbes (25 Jan 2016 - 31 Jan 2016)	16
7. New documents in the European Space Weather Portal Repository	16
8. Future Events	16

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

1. A filament erupts

Solar filaments are clouds of charged particles ("plasma") above the solar surface squeezed between magnetic regions of opposite polarity. Being cooler and denser than the plasma underneath and their surroundings, they appear as dark lines when seen on the solar disk and as bright blobs when seen near the solar limb (then they are called "prominences"). Special filters are required to observe these features, and one such a filter is the Hydrogen-alpha (H-alpha) line in the red part of the solar spectrum.

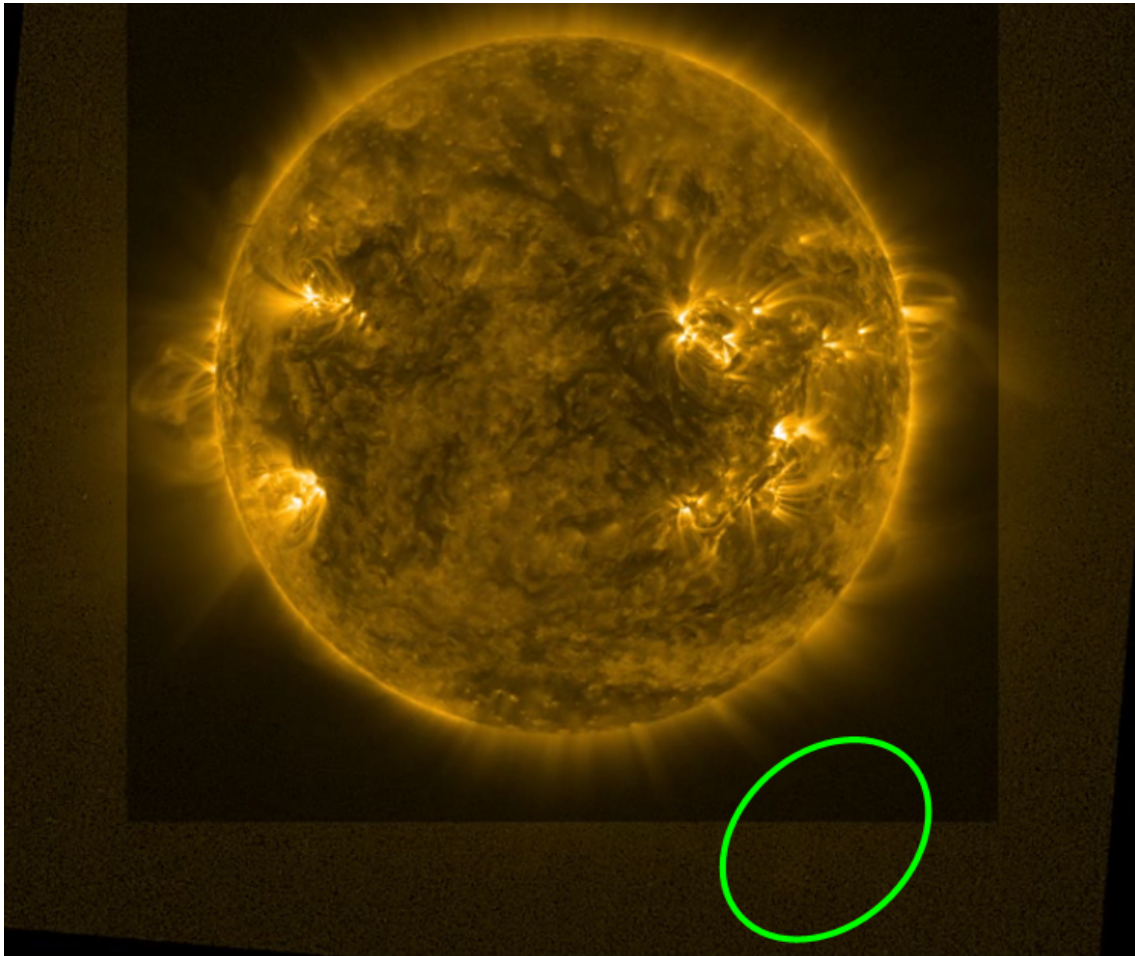


26 Jan 2016 – 12:12UT

26 Jan 2016 – 17:35UT

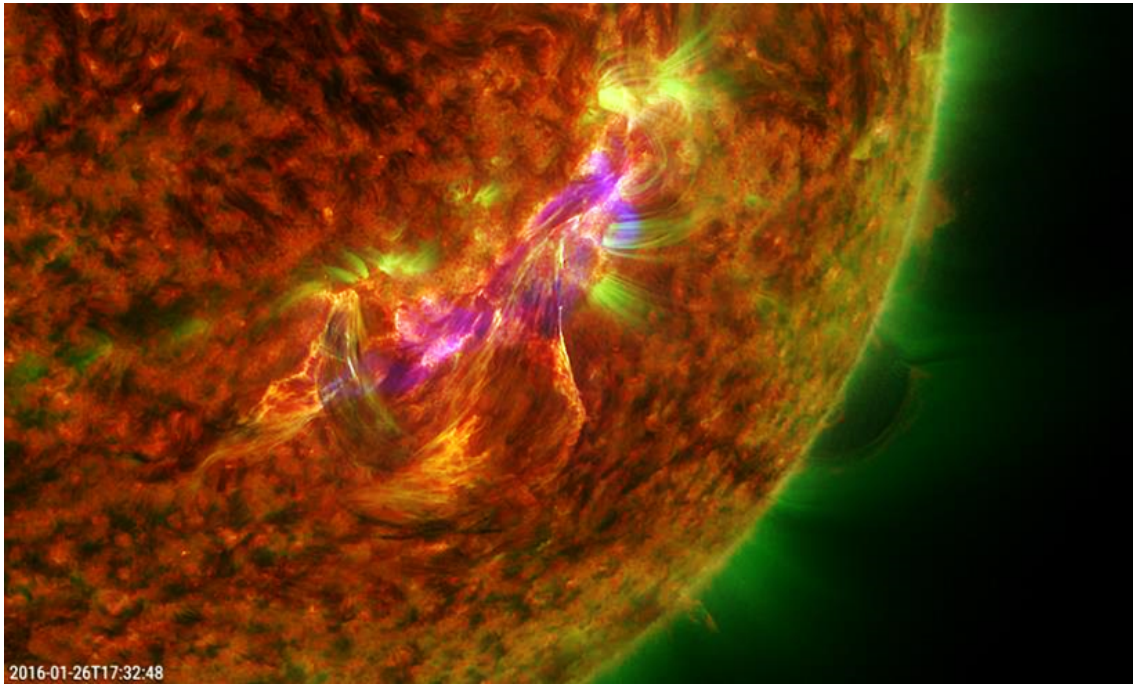
26 Jan 2016 – 18:07UT

Long filaments are known to eventually erupt, as the surrounding magnetic fields usually become unstable at some point. This is certainly the case when the filament borders active regions, where dynamic magnetic fields often are at work. No surprise then that space weather forecasters had their eyes on a 30-40 degrees long filament once it had rounded the solar southeast limb on 19 January. Finally, during the afternoon of 26 January, it erupted quite spectacularly. This "Disappearing Solar Filament" (also called "Disparition Brusque") can be seen in the H-alpha images above from the GONG H-alpha Network, showing that the filament took only about 1.5 hours to erupt. Many observers who had followed the source filament for nearly a week, had the impression as if something was missing on the Sun as its southern hemisphere suddenly looked particularly empty in H-alpha.

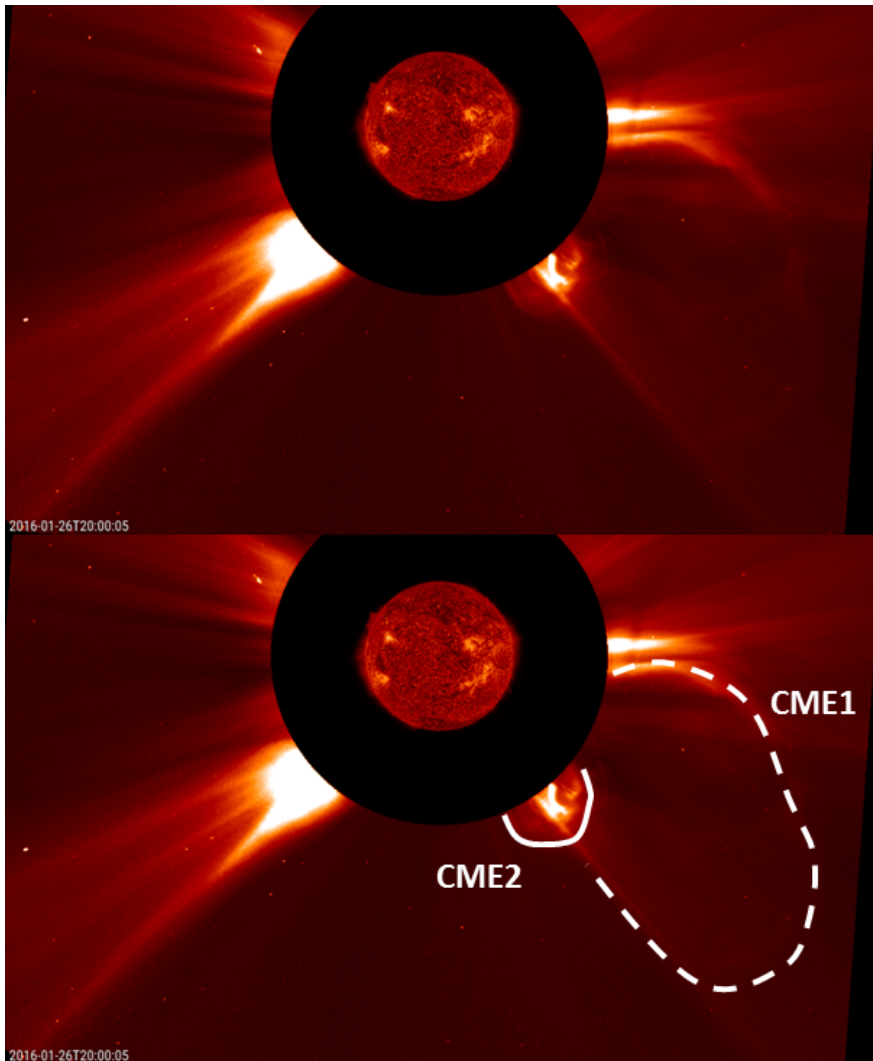


The movie at <https://youtu.be/foVQE5sDFIs> shows the eruption of the filament in H-alpha. The next clip combines extreme ultraviolet (EUV) images from SDO/AIA 171 and PROBA2/SWAP of the eruption, with SWAP's wider field-of-view allowing to trace the ejected material as it leaves the Sun (annotated by the green ellipse in the above picture, taken at 19:06UT).

The next clip then shows another EUV combination, this time from SDO/AIA filters showing the eruption in "cool" (80.000 degrees; red), "medium" (700.000 degrees; green), and "hot" (several million degrees; blue) temperatures. The eruption was accompanied by a minor C1-flare only, and no proton event was associated with it. The image underneath shows the eruption in full progress at 17:32UT. The clip also shows that a significant part is falling back to the solar surface, with some cold (darkish) plasma floating in the solar atmosphere and to the west.



The last clip shows a combination of SDO EUV images with coronagraphic imagery from SOHO/LASCO. There seems to be two coronal mass ejections (CMEs). The second CME first seen at about 19:53UT seems definitely to belong to the eruption of the filament. It is however not clear if the faint CME first seen at 18:42UT belongs also to this filament eruption or if it was related to a small eruption in NOAA 2488 (northern hemisphere) around 15:20UT, or even a backside event (Stereo-A images lacking). However, careful analysis revealed that both CMEs were not directed to Earth.



26 Jan 2016 – 20:00UT

Credits - Data and imagery for the movie clips were taken from the GONG H-alpha network (<http://halpha.nso.edu/>), SDO (<http://sdo.gsfc.nasa.gov/data/>), SOHO/LASCO (<http://sohowww.nascom.nasa.gov/>), PROBA2 (<http://proba2.oma.be/ssa>) and (J)Helioviewer (<http://helioviewer.org>).

2. PROBA2 Observations (25 Jan 2016 - 31 Jan 2016)

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>

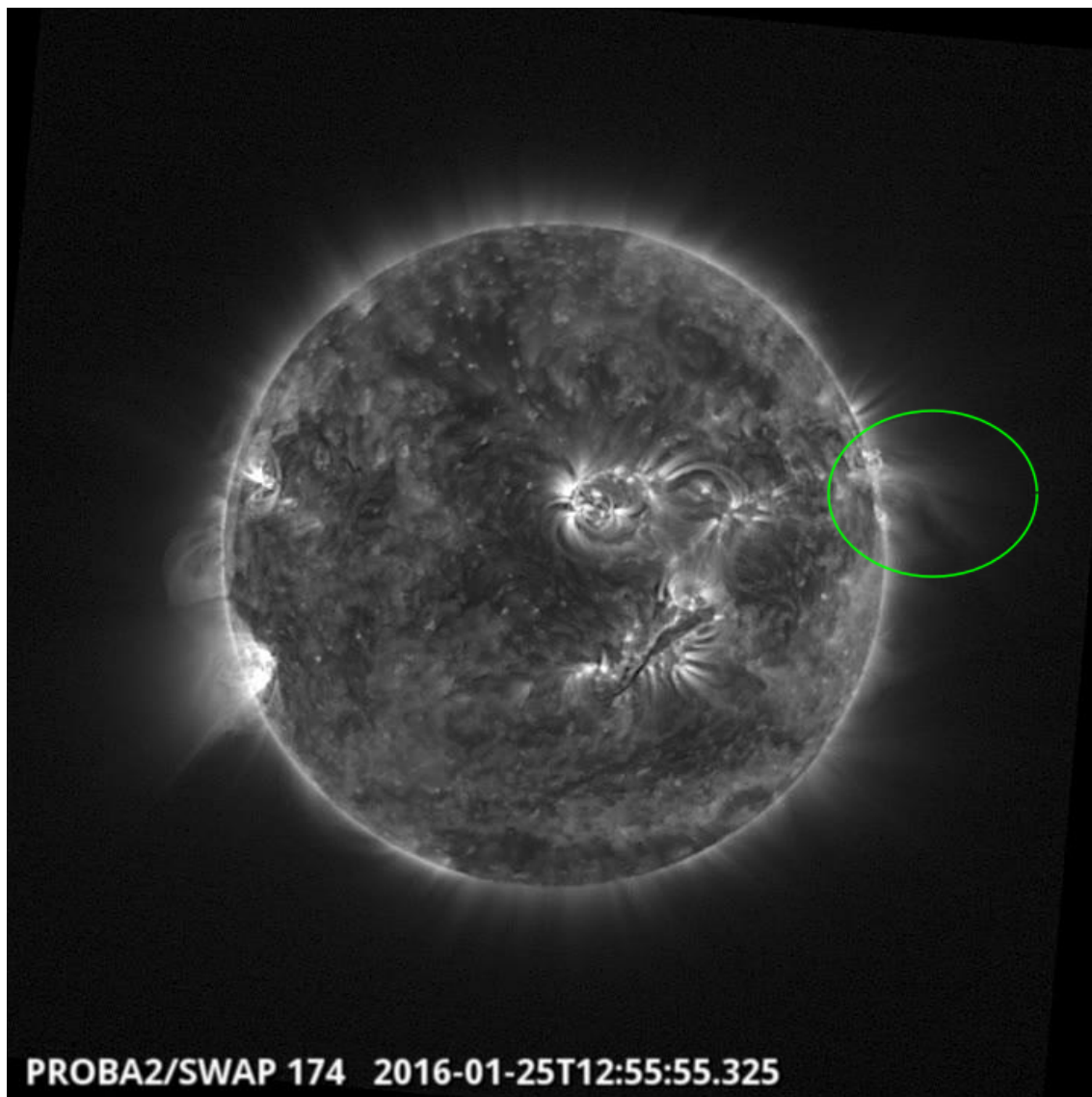
This page also lists the recorded flaring events.

A weekly overview movie can be found here (SWAP week 305).

http://proba2.oma.be/swap/data/mpg/movies/weekly_movies/weekly_movie_2016_01_25.mp4

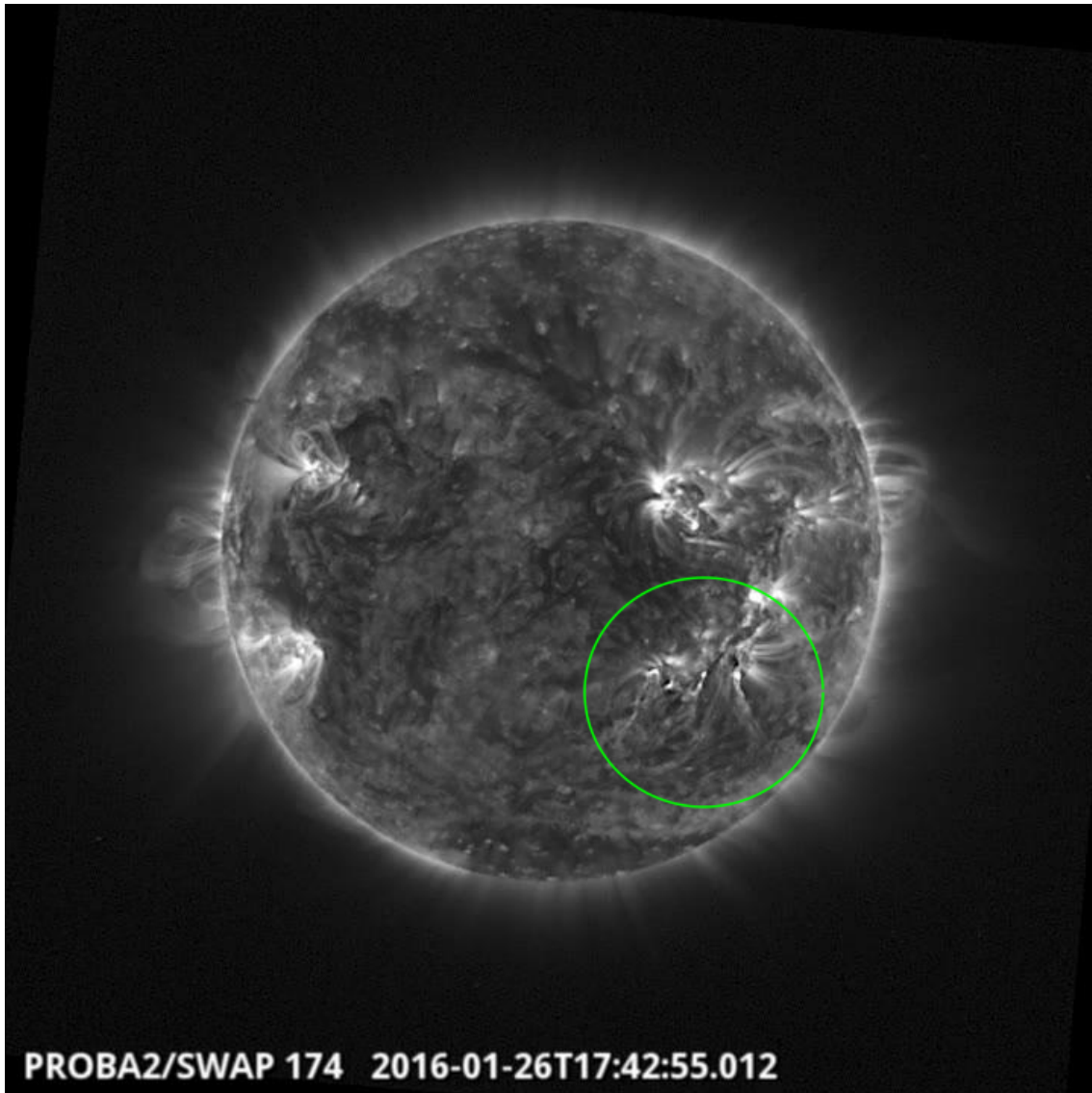
Details about some of this week's events, can be found further below.

Monday Jan 25



On 2016Jan25 SWAP observed an eruption on the West limb at 12:55 UT
Find a movie of the event here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/2016/01/20160125_swap_movie.mp4

Tuesday Jan 26

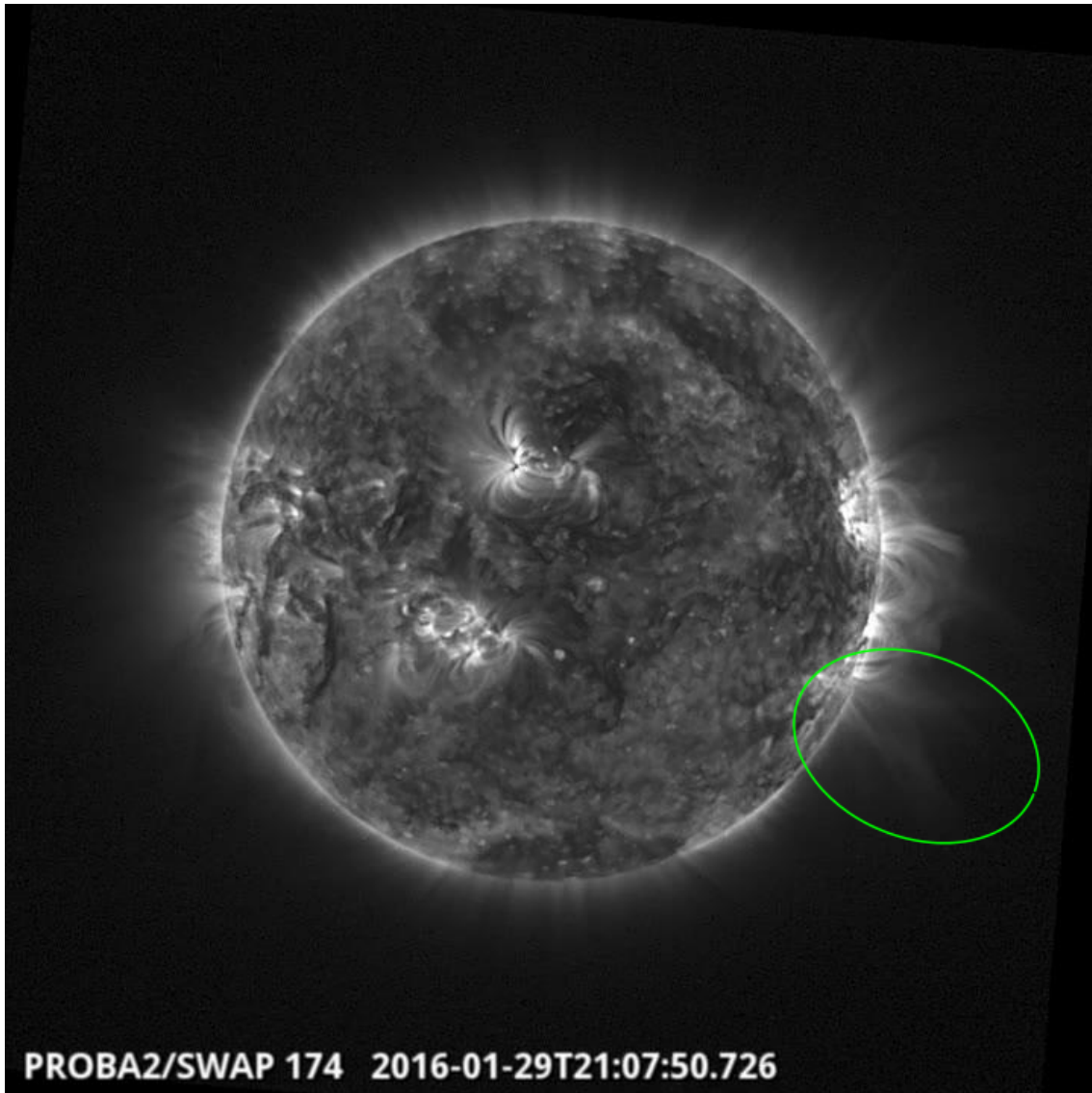


On 2016Jan26 SWAP at 17:42 UT SWAP observed a filament eruption in the Southeast quadrant

Find a movie of the events here (SWAP movie)

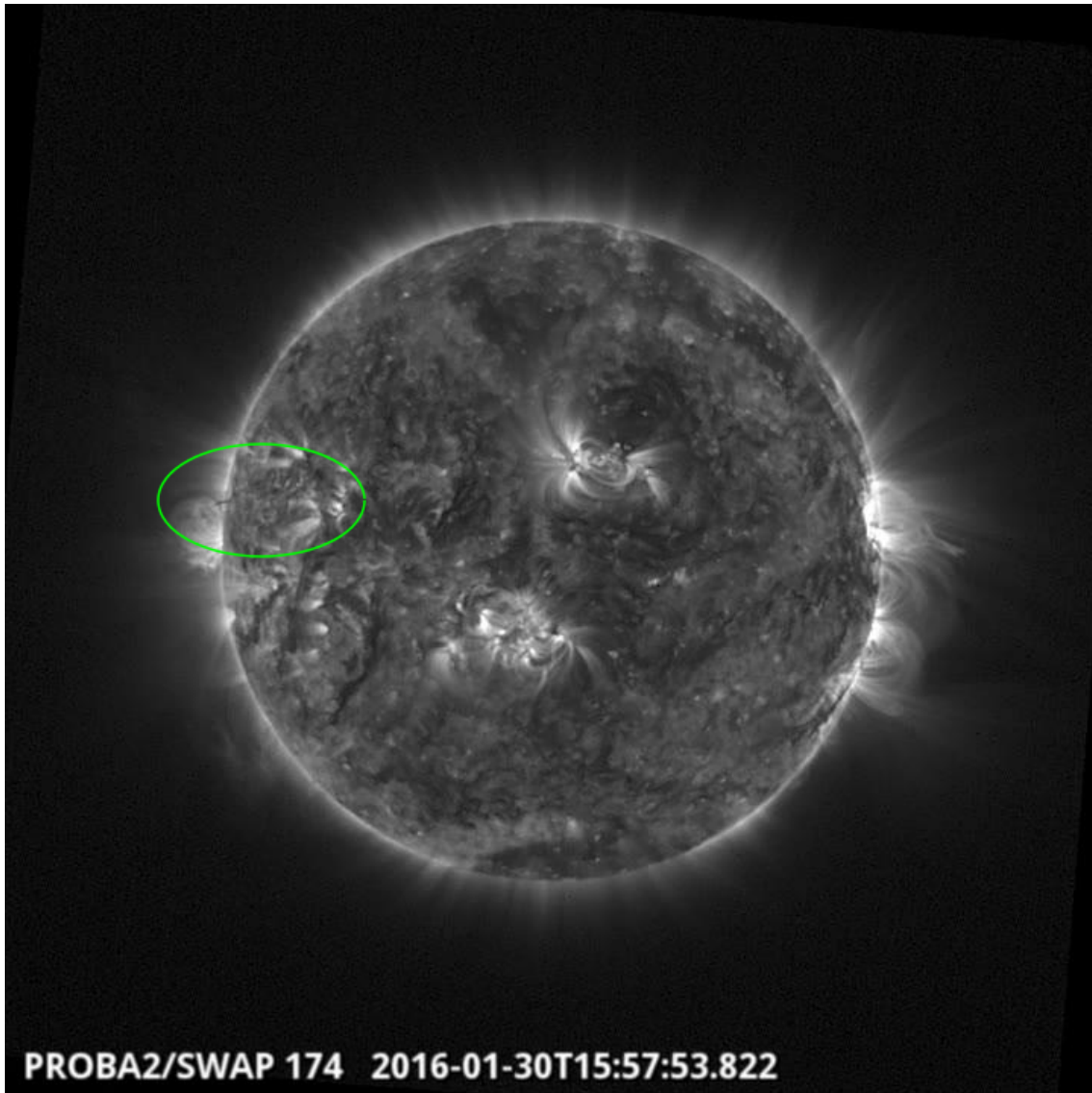
http://proba2.oma.be/swap/data/mpg/movies/2016/01/20160126_swap_movie.mp4

Friday Jan 29



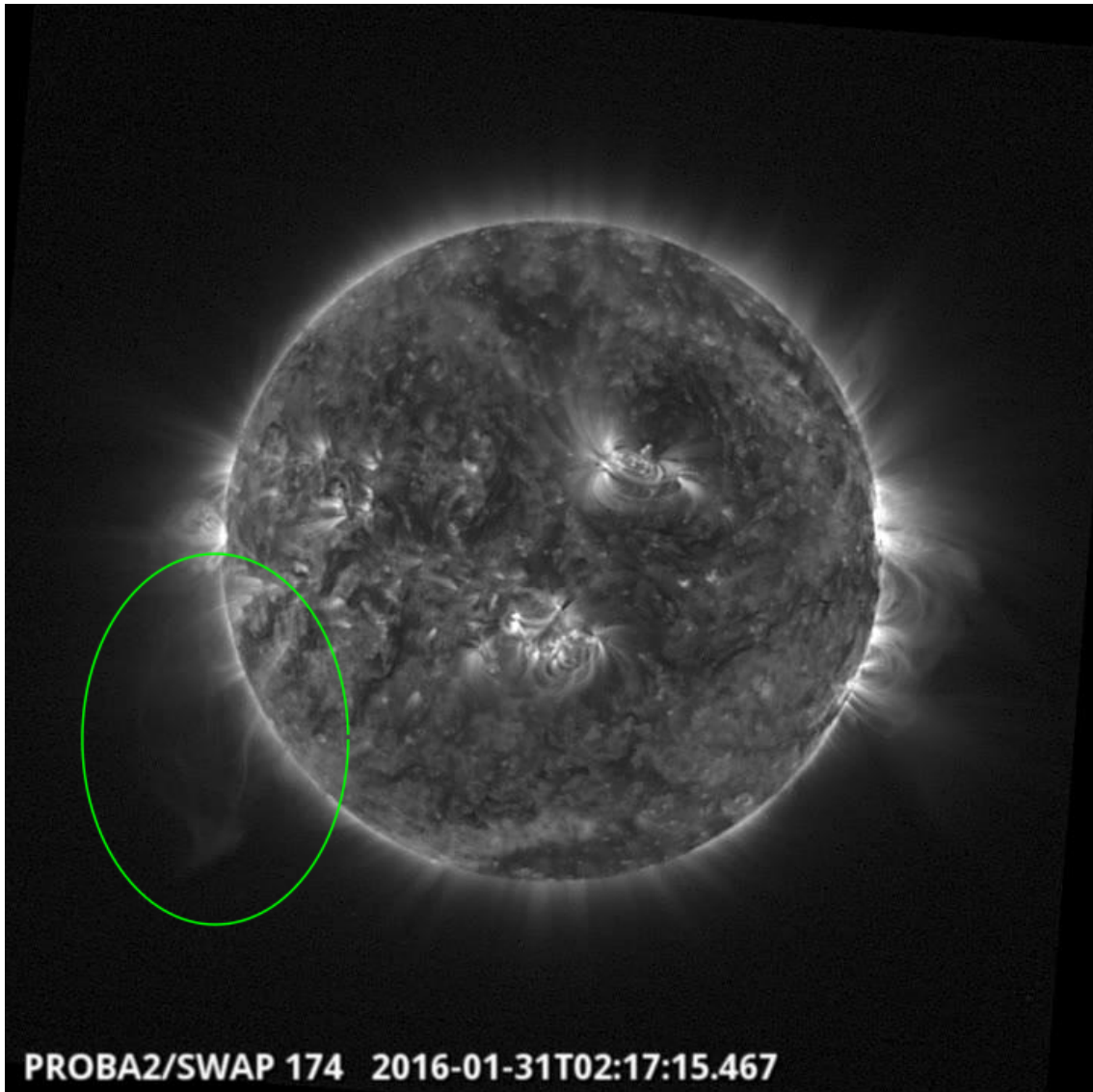
On 2016Jan29 at 21:07 UT SWAP observed a small filament eruption on the West limb, followed by a set of extensive post eruption loops
Find a movie of the events here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/2016/01/20160129_swap_movie.mp4

Saturday Jan 30



At 15:57 UT on 2016Jan30 SWAP observed a small prominence eruption on the East limb
Find a movie of the events here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/2016/01/20160130_swap_movie.mp4

Sunday Jan 31

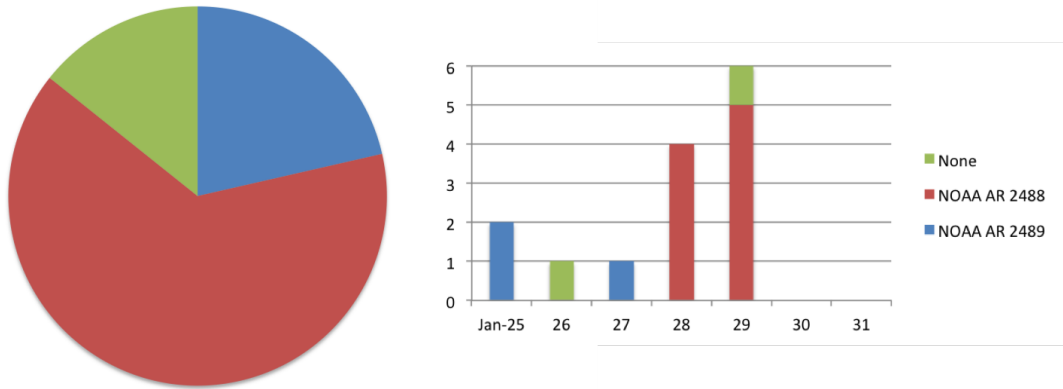


On 2016Jan31 at 02:17 UT SWAP observed a slow eruption on the East limb
Find a movie of the events here (SWAP movie)
http://proba2.oma.be/swap/data/mpg/movies/2016/01/20160131_swap_movie.mp4

3. Review of solar activity

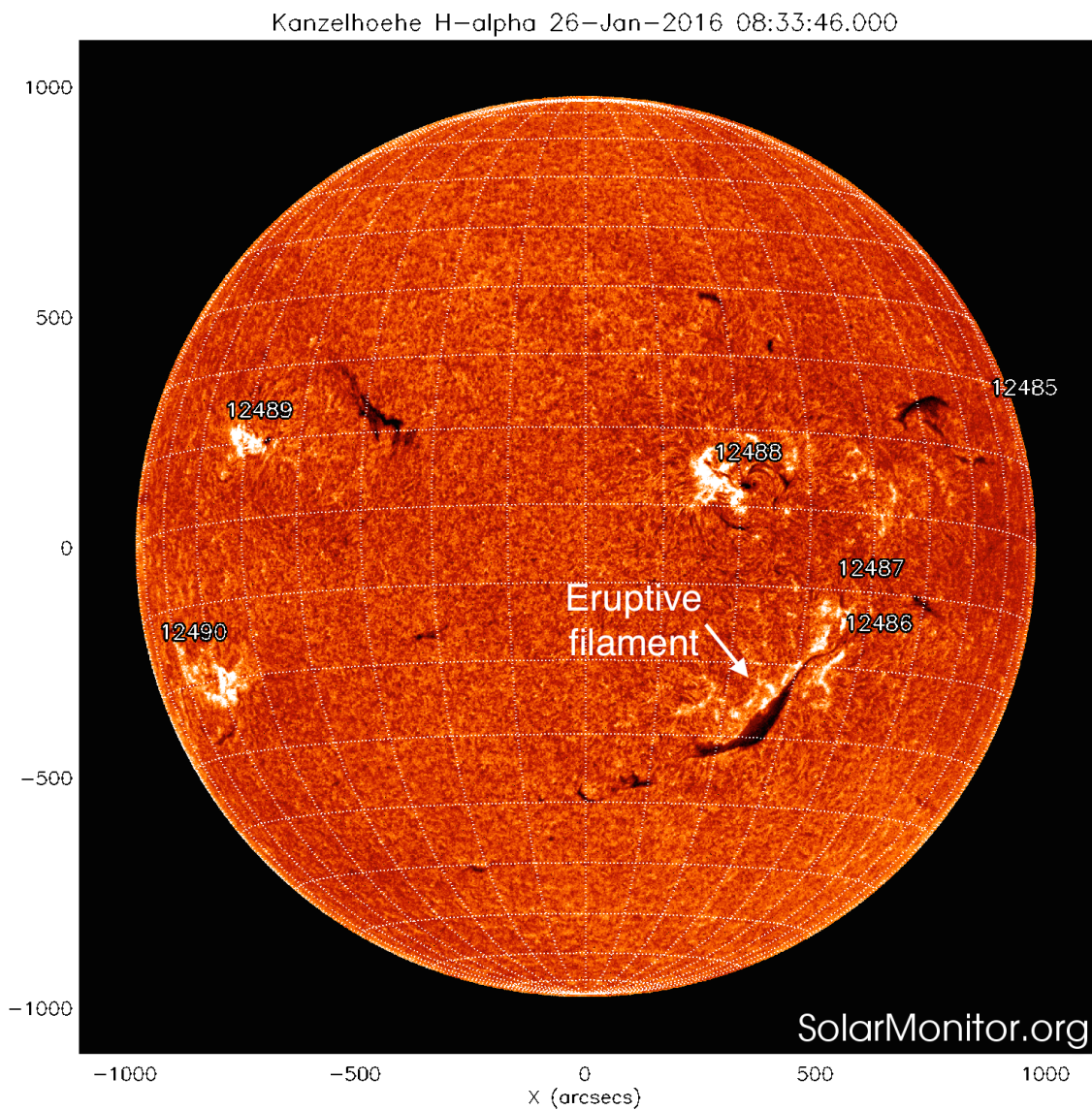
Solar activity has been very low throughout the week, with the Sun producing a few C-class flares and several B-class flares. An overview of the >B9.9 flares is given in the chart below.

Distribution of >B flares, Jan 26 – 31, 2016



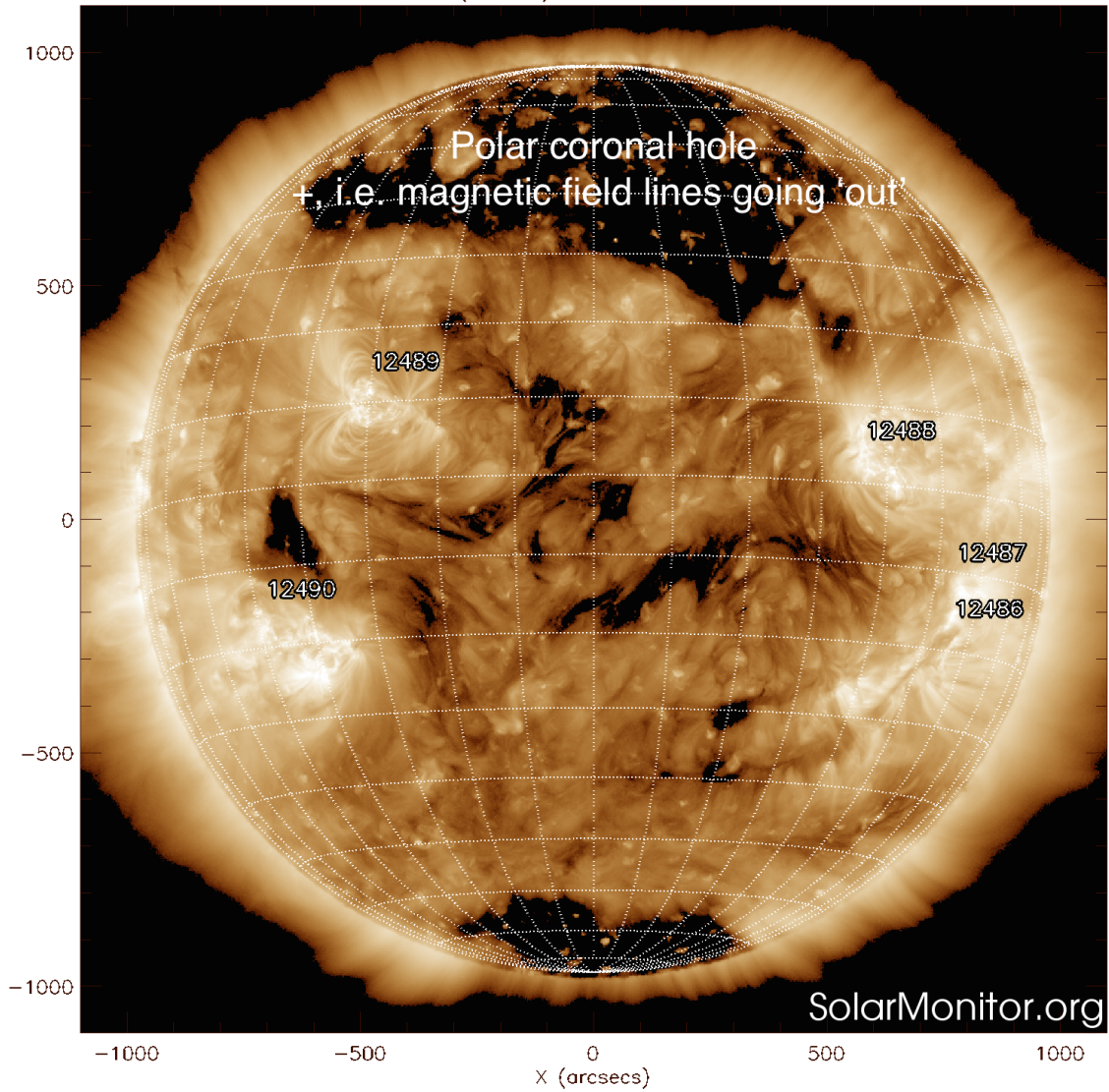
The left chart gives an overview of the total number of flares per NOAA AR region for the indicated week. *None* indicates that the flare site is not linked with one particular active region. In this particular case, the flare not linked with an NOAA AR on January 26 is associated with a filament eruption. The same region flared again on January 29. The right chart gives an overview of the flaring activity per region per day.

The most energetic flare was a C9.6-class flare peaking at 12:02 UT on 28-Jan-2016 produced by NOAA Active Region (AR) 2488. AR 2488 was the most active region throughout the week, producing several C-class flares. AR 2489 also produced several B-class flares.



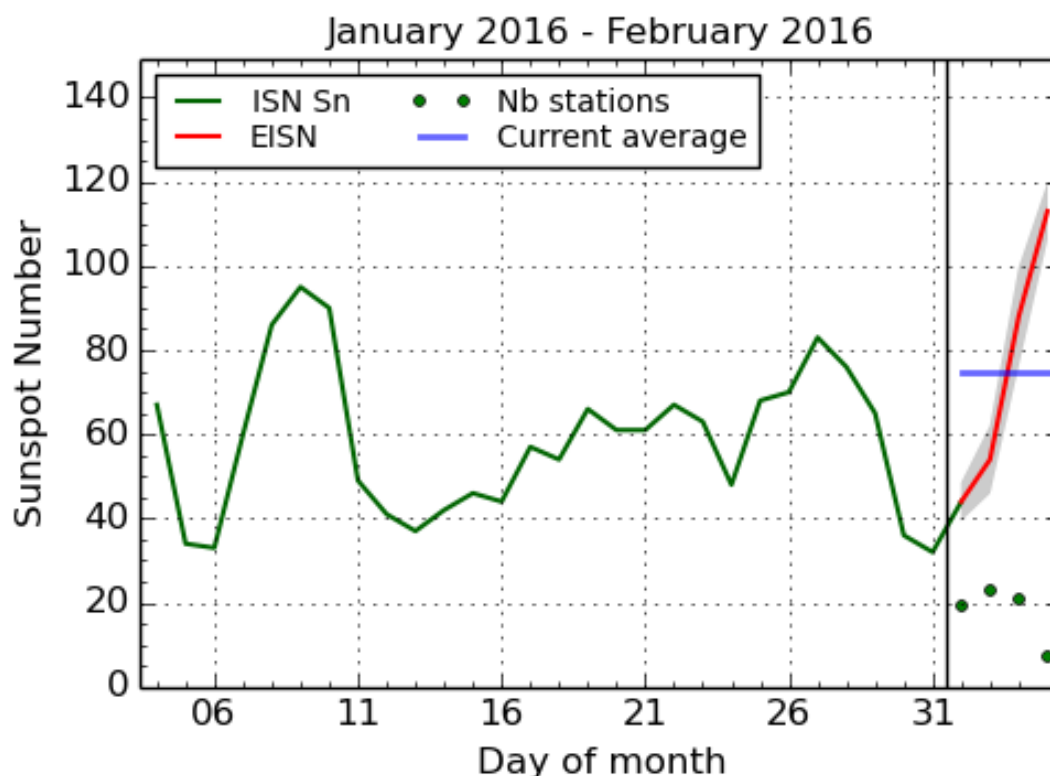
A filament channel, located next to ARs 2486 and 2487 (see Kanzelhoehe H-alpha image above) , erupted several times through the week, producing several Coronal Mass Ejections (CMEs), none of which interacted with the Earth. Several small CMEs were also seen off of the West solar limb, but none travelled along the Sun-Earth line. There were no strong or Earth-directed CMEs observed.

SDO AIA Fe XII (193 Å) 27-Jan-2016 21:43:29.840



There was one large positive polarity Northern polar coronal hole.

4. The International Sunspot Number

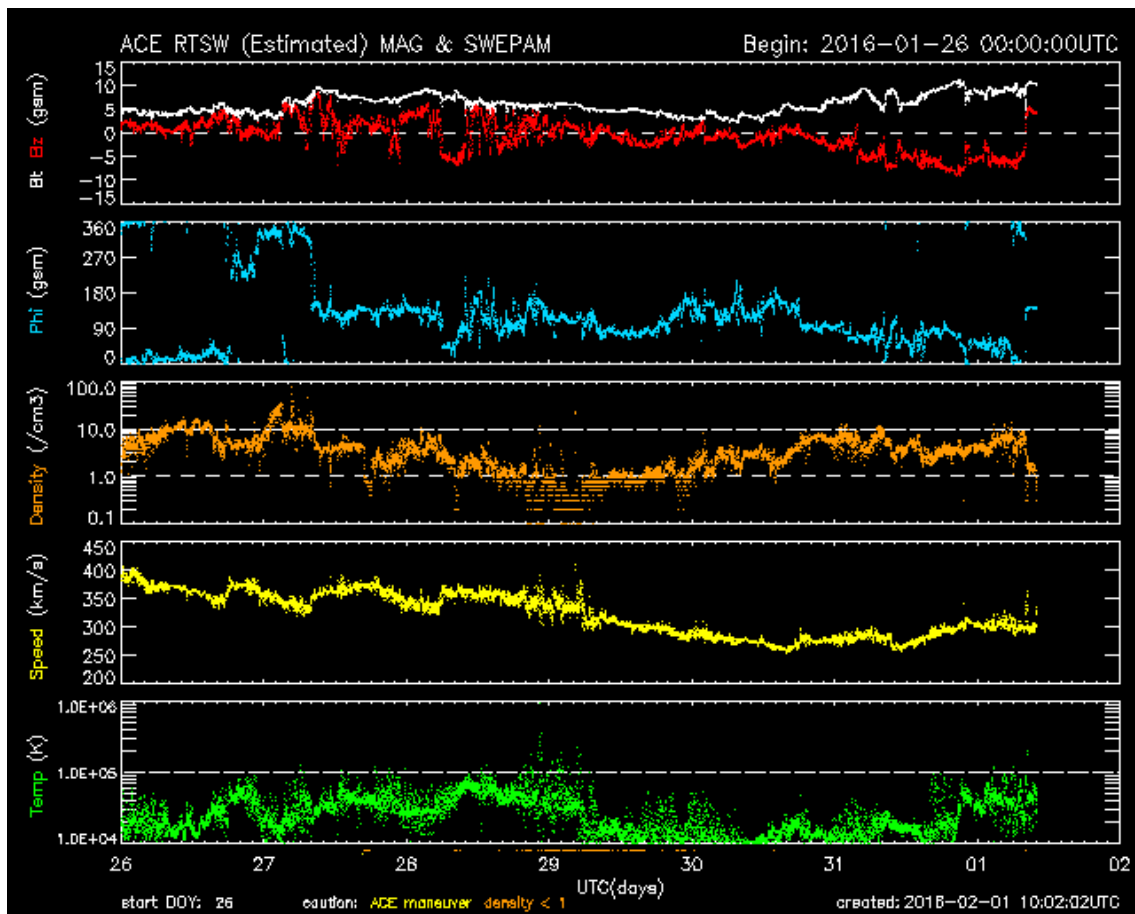


SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium, 2016 February 4

The daily Estimated International Sunspot Number (EISN, red curve with shaded error) derived by a simplified method from real-time data from the worldwide SILSO network. It extends the official Sunspot Number from the full processing of the preceding month (green line). The plot shows the last 30 days (~ one solar rotation). The horizontal blue line shows the current monthly average, while the green dots give the number of stations included in the calculation of the EISN for each day.

5. Review of geomagnetic activity

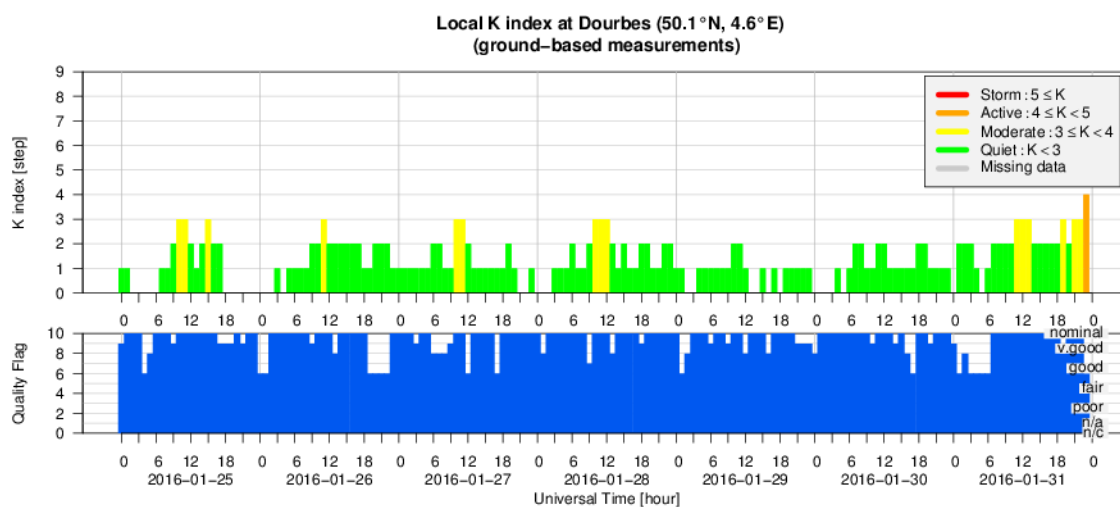
Activity in the geomagnetic environment was low over the past week.



The solar wind speed steadily decreased from around 500 km/s to around 260 km/s, with some small fluctuations. The total magnetic field strength fluctuated between 5 and 10 nT, peaking on 27-Jan-2016 and again on 31-Jan-2016. The Bz component was mainly positive for the first few days of the week, and then fluctuating around 0 nT between 27-Jan-2016 and 30-Jan-2016, before becoming steadily more negative on 31-Jan-2016, finishing the week at -10 nT. There was one large positive polarity polar coronal hole that moved through the Western hemisphere through the week. The fast solar wind emanating from this hole impacted Earth from 2-Feb-2016.

Geomagnetic conditions ranged between Kp index 0-3 (NOAA) and local K index 0-3 (Dourbes) over most of the past week, with activity peaking once at Kp = 4 and K = 4 around 19:00 UT on 25-Jan-2016.

6. Geomagnetic Observations at Dourbes (25 Jan 2016 - 31 Jan 2016)



7. New documents in the European Space Weather Portal Repository

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

eHEROES - Final Report

The final report of the FP7 project eHEROES, Environment for Human Exploration and RObotic Experimentation in Space.

<http://www.spaceweather.eu/en/repository/show?id=598>

8. Future Events

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

The Scientific Foundation of Space Weather

Start : 2016-06-27 - End : 2016-07-01

Website:

<http://www.issibern.ch/program/workshops.html>