

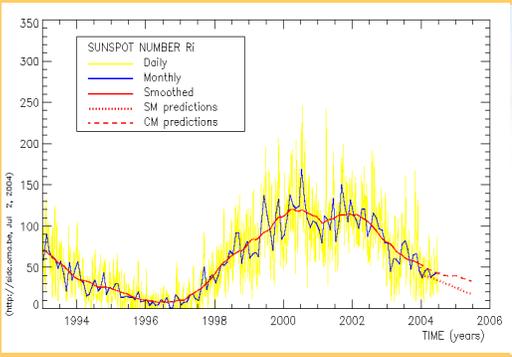


# The SIDC project: a comprehensive operational space weather service in Belgium

R. Van der Linden, D. Berghmans, E. Robbrecht, P. Vanlommel, F. Clette, B. Nicula, A. Zhukov, L. Wauters, R. Warnant, E. Pottiaux, S. Lejeune, A. Barre, M. Bavier, H. Nebdi, J.-C. Jodogne, J. Rasson, K. Stegen, D. Heynderickx, M. Roth, J. De Keyser, M. Kruglanski, J.-P. Henry, J.F. Marche



<http://sidc.oma.be>



### GENERAL SETTING

SIDC = Research institute  
 + WDC Sunspot Index (1981)  
 + FAGS Data Analysis Service (1981)  
 + ISES RWC BELGIUM (2000)  
 + SDA of the ESA Space Weather Applications Pilot Project (2003)

Core products:  
 monthly sunspot bulletin + quarterly SIDC news  
 + daily URSIGRAMS + related bulletins  
 + enhanced and tailored services



Distribution of observers contributing to the SIDC in 2003

Within the ESA Pilot Project for Space Weather Applications: partnership for a further development into a solar activity and space weather monitoring, alerting and forecasting center

### Partners for ESA Pilot Project

Belgian Institute for Space Aeronomy  
 D. Heynderickx, M. Roth, K. Stegen, M. Kruglanski, J. Dekeyser

Royal Observatory of Belgium (SIDC + GPS)  
 R. Van der Linden, D. Berghmans, E. Robbrecht, P. Vanlommel, L. Wauters, F. Clette, P. Cugnon, A. Zhukov, B. Nicula, R. Warnant, E. Pottiaux, S. Lejeune, A. Barre

Royal Meteorological Institute  
 H. Nebdi, J.-C. Jodogne, J. Rasson

Our prime tasks: alerting and informing the scientific and technological communities, informing and interacting with the general public.

### Third Very large X-ray burst in less than one week!!!

Press release on the X10 flare (09/10) [Netherlands - Euzenat](#)  
 Press release on the X17 flare (29/09) [Netherlands - Euzenat](#)

Three major flares from the same output group

For the third time this week, a major flare erupted from the same output group (Catania 75, NOAA 6080). The flare first reached an X-ray level of X10, peaking at 20-40 CT on 29/09. Shortly after a CME (Carnegie X-ray Emission) was visible in LASCO C2 at 20:54 UT. It was moving directly to the earth with an estimated speed of about 1000 km/s. This is slightly slower than the previous one (212 km/s) but still due to very fast for a CME. The geomagnetic storm related to the X10 started last evening at about 6 CT. It is still going on. We already were informed that the CPE measurements were highly disturbed. As a bonus, also aurora have been seen!

The green oval in the image refers to EIT on SOHO. The active region 6080 produced the 3 flares in single rotation (3x eastward) strength to 100%. You can click on the flares to see a movie.

We use an X10-SOHO image showing the magnetic field structure. Black and blue areas show areas of magnetic opposite polarity. Red: the region part of the magnetic field is the same as the one that caused the flare. X-ray flares: It has a size which is 15 times the size of the earth. The higher part of the solar circle (black) is on the picture to indicate it.

The high energy proton fluxes all have exceeded the threshold of 10. In addition, the flux was detected on earth. This graph is made with data measured by the GOES stations.

Our central EPO product: **Solar Highlights**  
<http://sidc.oma.be/html/solarhighlights.html>

- A story of the Sun intended for the general public.
- Images / movies / Short texts
- English + French + Dutch
- When special events happen
- Downloadable package

### Products currently available in the SIDC project

#### 1. Solar Weather Reports (daily, weekly, monthly)

**For professional use**

- Solar activity, Geomagnetic activity, Solar protons
- Daily indices: sunspot index, 10 cm flux, Ap index,
- Noticeable events: M or X flares

**For general public**

- Daily solar weather talk, based on the Daily Solar Weather Report.
- Summaries of solar and geomagnetic activity

#### 4. Real-time alert messages

**PRESTO** (Human-generated description of important space weather events)

**Fast alerts** (Automated alerts for: DOUBTES K-index, CACTUS, GPS-RTK, FLARES)

**All-quiet 'alerts'** (Configurable thresholds)

Alerts via: Email and/or SMS

#### 5. GPS services (ROB GPS section) <http://gpsatm.oma.be>

GOAL: near real-time assessment and forecast of the influence of Space Weather and ionospheric conditions on the precision of GPS positioning:

- deviations between Klobuchar model and "real" TEC and estimated error of GPS positioning without DGPS correction: [website](#)

- estimated error on DGPS positioning: [website](#)
- estimated perturbation of RTK positioning: [website](#) + alerts (e-mail, sms)
- MAK model for short-term K-index forecast: [website](#) + alerts (e-mail, sms)

See poster by R. Warnant at this conference.

#### 2. CACTUS: computer Aided CME detection

<http://sidc.oma.be/cactus>

Automatically tracks CMEs in LASCO images

- Provides near-real-time output
- Estimates speed & size
- 94% success rate (in 5-day test case)

2003/10/28 11:30

#### CACTUS OUTPUTS

Latest CMEs detected by Cactus

+ e-mail alerts for halo CMEs (da>180)

See poster by E. Robbrecht at this conference.

#### 6. Space Weather Yellow Pages

<http://www.oma.be/NEEDLE/swpp>

Centralised data retrieval system ...

... which enables the user to ...

- Level 1: ... FIND files with measurements of physical quantities
- Level 2: ... RETRIEVE files with measurements of physical quantities
- Level 3: ... IDENTIFY and RETRIEVE resources associated with a physical quantity

See poster by P. Vanlommel at this conference.

#### 3. Solar Weather Browser

<http://sidc.oma.be/SWB>

- Near-real-time images
- combine with overlay
- Save images with overlays as png
- Cycle through images
- Dynamical interface
- simple and portable!!!

A simple tool for easy visualisation of important Space Weather data.

Current image selection: EIT, GOES12/SXI, MDI magnetogram, GONG magnetogram, GONG white light, USET white light, Catania H $\alpha$ .  
 Current overlays: rotation grids, NOAA regions, CME detections, McIntosh classifications (from Catania), SolarSoft events.  
 Future additions: H $\alpha$  links, metadata ...  
 See poster by D. Berghmans at this conference.

#### 7. Forecast evaluation: an important activity!

<http://sidc.oma.be/html/SWAPP/qualitycontrol/qualitycontrol.html>

See poster by P. Vanlommel at this conference.