



The SIDC Space Weather Application Pilot Project: quality control of space weather forecasts



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GENERAL SETTING

The 'Solar Influences Data analysis Center', SIDC has built an extended research and service center concerning solar activity and space weather monitoring. We reach industrial, commercial, scientific entities, amateur associations, as well as the general public.

In the framework of the ESA Space Weather Applications Pilot Project (SWAPP, since 2003), we enlarged our list of services with several products.

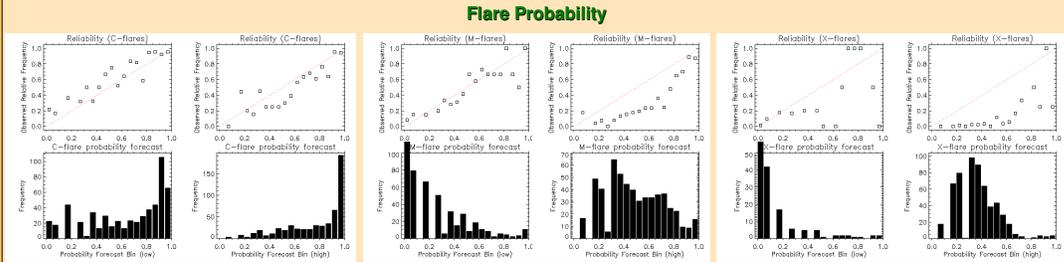
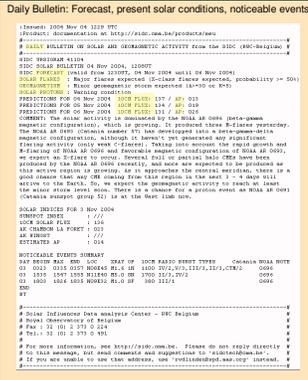
We guarantee a daily forecast and alert service in case of disturbed space weather conditions. Beside this 24 hour, 7 days a week service, we offer a monthly sunspot bulletin and quarterly SIDC news.

See poster by R. Van der Linden at this conference for a general overview of SWAPP

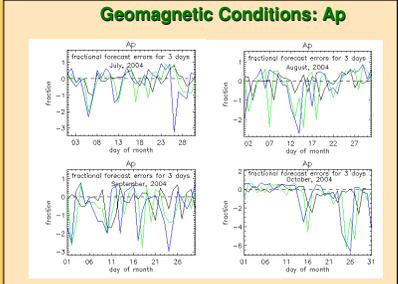
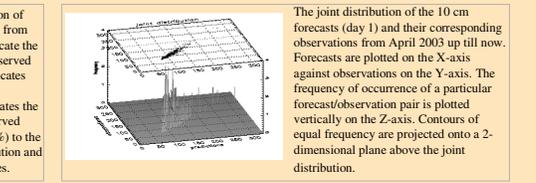
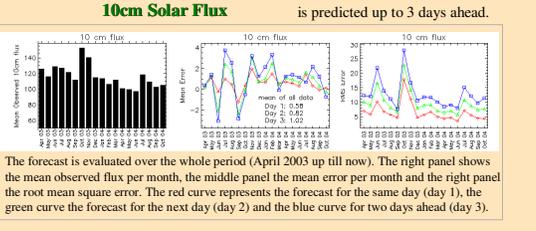
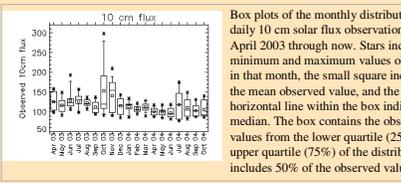
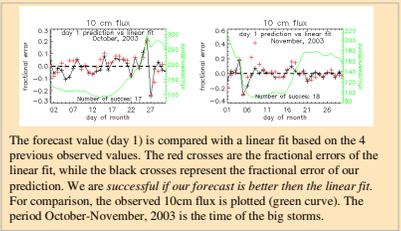
This poster: QUALITY CONTROL

The evaluation of our forecast is an important activity as it gives information about the capability and limitations. This quality control serves as a basis to adapt and sharpen our forecasting methods in order to offer a useful and effective service to our clients.

We present here some statistics and verification indices used to evaluate our flare forecast, 10cm flux and geomagnetic disturbance predictions and compare with other prediction methods.

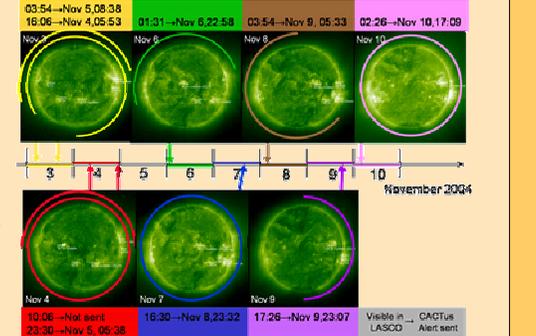


Each day a global C, M and X-flare probability (an interval) is predicted. The top panel plots the observed relative frequency of C, M or X flare days against their corresponding forecasts, grouped in 5% bins: n/d with d the number of days a particular probability for a C, M or X flare was forecast, n the number of those days a C, M or X-flare actually occurred. The red dashed line represents the perfect correspondence. Points below this diagonal indicate an overestimation, while points above the diagonal indicate an underestimation within that bin. The lower panel shows the number of the forecasts in each bin. Since the probability forecast is an interval, each plot is doubled: lower limit and upper limit of the interval. The data used cover the period from April 2003 until now.



The Ap index is a measure for the disturbance of the geomagnetic field over the globe. The 'p' stands for planetary as Ap is a mean of several stations world-wide measuring the variation of the geomagnetic field. In the above figures, the fractional forecast error of the Ap index is plotted for each day of a particular month.

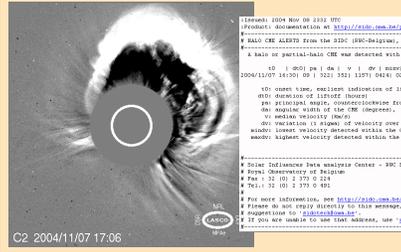
CME Alert
The SIDC developed the CACTus (Computer Aided CME Tracking) software to automatically detect CMEs in LASCO images. An alert is sent in case of a (partial or full) halo CME, the precursor of possible geomagnetic disturbances.
Sunspot group 61 (NOAA 0696) fired a series of violent halo CMEs in the beginning of November 2004. The geomagnetic field was seriously messed up when they arrived at Earth. This period, CACTus turned out to be crucial. The right figure shows the time, angular width and direction of these CMEs and the corresponding time when an email alert was sent by the SIDC.
A. Zhukov will go into more detail of this turbulent period in his talk on Tuesday, Nov 30 in the splinter session 'Nov 04, Space Weather Activities'.



A global overview and more graphs are shown on our website:

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

Follow the link 'quality control'



The email-alert sent on Nov 8, 2004 at 23:32UT. The email is a warning for possible geomagnetic and ionospheric disturbances. A 'presto' is sent afterwards by the forecaster to give additional information.

See poster by E. Robbrecht at this conference for more information on CACTus