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HTML presentation of the Debrecen Photoheliographic Data sunspot catalogue

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Abstract. The Debrecen Photoheliographic Data (DPD) catalogue contains daily data for the sunspot groups as well as each spot in them. Parallel to the measurements we created a user-friendly web-presentation of DPD. The aim was to create a site that facilitates to survey the daily full-disc observations as well as the group and sunspot data. With the help of this presentation one can browse among the data in the DPD graphically. After choosing the date one can find the computer drawing of the solar disk and a full-disk magnetic observation. The NOAA sunspot group numbers of the sunspot groups on the drawings are linked and after clicking it the digitized photographic image of the sunspot group appears with its numerical data of the DPD. It can be used via Internet connection (http://fenyi.solarobs.unideb.hu/DPD/index.html) or in off-line mode after retrieving the files from this site.

Key words. Sun: sunspots

1. Introduction

The Debrecen Photoheliographic Data (DPD) (Győri et al. 2004, 2005) is a catalogue of positions and areas of sunspots for every day.

Daily routine observations white-light full-disk observations are taken both at the Heliophysical Observatory of the Hungarian Academy of Sciences (Debrecen, Hungary) and its Gyula Observing Station (150 km from Debrecen), and the archives comprise more than 100,000 plates covering almost five decades.

The catalogue is mainly compiled by using these archives, but the DPD achieves full yearly coverage with the help of several cooperating observatories.

The DPD catalogues are divided into two parts. The numerical part contains area and position data for the sunspot groups as well as for each spot in them. The second part contains the CCD scans of all the active regions that were found on the photographic plates. Every measured spot is marked with the same number in the picture as in the numerical catalogue. The images are given in FITS and JPG format.

The aim of the present project is to create an HTML presentation of DPD that facilitates to survey the daily full-disc observations as well as the group and sunspot data. With the help of this presentation one can browse among the data in the DPD graphically.

This graphic presentation of the sunspot data makes easier the use of DPD. For example it makes easier to find some special sunspot

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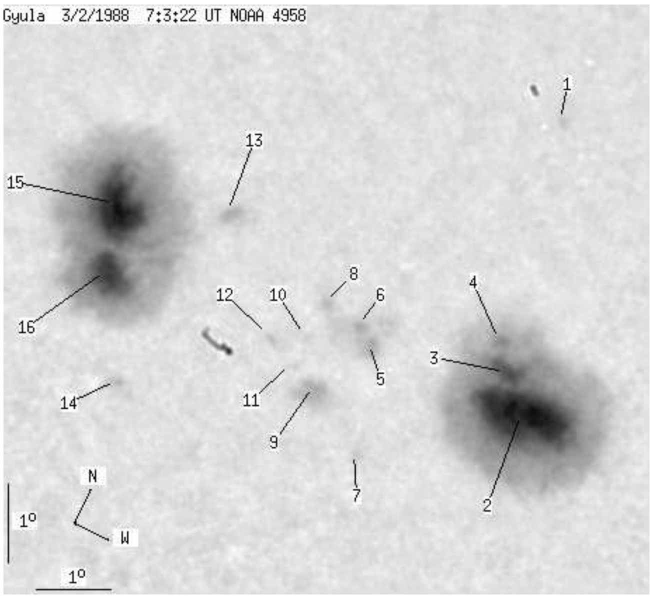

Fig. 1. The NOAA 4958 sunspot group in March 2, 1988 as given by DPD. Every numbered part of this active region was measured. This image is not for measurement purpose.

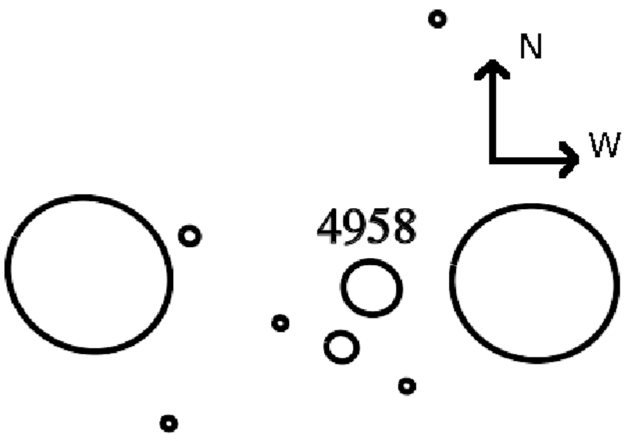

Fig. 2. The representation of NOAA 4958 sunspot group by ellipses in March 2,1988 as was drawn on the solar disk in the HTML catalogue.

groups, bipolar or complex groups. It also may help in matching the data of different sunspot group reports. Several observatories use their own group numbers (e. g. Yunnan, Rome, observing stations of Solar Data-Solnechnie Dannie). These may need to be matched to the generally used NOAA group numbers when one wants to compare the data e. g. Baranyi et al., 2001, Mező et al., 2005) Identifying the sunspot groups in the different sunspot group reports is more straightforward visually.

2. The structure of the HTML catalogue

The web location of the pages of the HTML catalogue on the site of the Debrecen Heliophysical Observatory is http://fenyi.solarobs.unideb.hu/DPD/. After choosing the link to a given date one can find the computer drawing of the solar disk and a magnetic observation for that date. The spots are plotted as ellipses corresponding to the areas and position that the spots have. The NOAA sunspot group numbers of the sunspot groups on these drawings are linked to the sunspot group data pages, and after clicking them the digitized photographic image of the sunspot group appears with its numerical data of the DPD.

One can also directly type the requested date (1988-10-12) in the location bar of the web browser and find the solar disk drawing (site/DPD/1988/1012). The site means here http://fenyi.solarobs.unideb.hu. The group data page is also directly browsable writing the group number after the date (site/1988/1007/5175.html).

The HTML catalogue also works without internet connection. It is a simple hierarchical file system. Every year has its own directory and in it every day has also its own directory and finally the directories of days contain the pages of the sunspot groups. Downloading these files from the site one can navigate offline in the HTML catalogue with any web browser. It will be soon downloadable as a single tar zipped file at the website of the Debrecen Heliophysical Observatory.

2.1. The drawing of the solar disk

The solar disk is represented by a circle. Its center point has 0 longitudinal distance from the Sun's central meridian and 0 heliographic latitude. The spots reconstructed from the data of the DPD as a circle in the tangent plane of the hemisphere at the point that has the spherical coordinates of the reconstructed spot. The radius of the circle was determined from the corrected penumbra area of the spots. The umbra of spots was not plotted. These circles of the spots were projected onto the plane of the solar disk representation. After this projection the spots finally were represented by ellipses.

The drawing of the solar disk is an image map: every NOAA sunspot group number is linked to the related group data page. There are links also the previous and the next day. After clicking to the NOAA sunspot group number the group data page is coming up.

2.2. The group data page

This page shows the CCD scan of the spot group in JPG format and its resolution. It is easy to follow the development of the spot group on the consecutive days with the help of the links above the group's image. The page also displays the data table of the group and also the data table of every marked spot on the group's image.

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