

Proposed Contribution to the Analysis of the SDO/HMI Images by the Heliophysical Observatory at Debrecen

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Abstract. The software called “Sunspot Automatic Measurement” (SAM) automatically determines the borders of the sunspots (Győri 1998, 2003) after correction for limb darkening and flat field. From the image, an iso-intensity contour set is produced. The penumbra border of a sunspot is the first (counted from the photosphere) contour having a local maximum in averaged gradient along contour (AGAC) and the umbra border is the contour having the global maximum in AGAC. The area is the number of the pixels inside the border and the position is the center of gravity of pixels inside the border weighted by their intensities. The SAM can be applied to any full disk digitized solar image if the orientation of the image is known or can be derived from the image itself. SAM has been modified in order to measure the MDI 1024×1024 pixels full disk intensity images (Győri et al. 2006). The evaluation of the Ic images with the new type of magnetograms is in progress, and the new data will be published for the whole SOHO era within the EU “SOTERIA” (2008-2011) project (<http://soteria-space.eu/>). The time cadence of SOHO/MDI Debrecen Sunspot Data (SDD) is about one observation/hour when Hourly Data Sets allow it. The set of images contains the Ic images with the nearest magnetograms selected after using quality-filters and time sequence criteria. The Ic images are enlarged (3x) so that the precision of fit of contours can be increased. The SDD catalog will contain the position and (umbral and whole) area data for each spot ordered into groups. The magnetograms enable us to add information about the magnetic field of sunspot umbrae and penumbrae which are averaged within the umbral and penumbral contours. Mean values of the line-of-sight magnetic field are published if intensity images and magnetograms are available within 50 min. The images of sunspot groups with the numbers of spots will be also published. The same method will be used for the HMI and HINODE images. This will allow us to evaluate sunspot evolution obtained from high resolution images.