## Sun observations with NIKON D5300 and TAMRON SP 70-300mm F/4-4.5

Grischa Hahn, 2019-05-12

- The NIKON D5300 has a GPS sensor. Switch it on.
- For Sun observation use two ND filters (ND 3.0 + ND32 = 15 aperture steps) on the front of the lens.
- Use a tripod with 3-axis head (e.g. MANFROTTO MH804-3W).
- Use a cable remote release.





1<sup>st</sup>) Double exposure of the object with fixed camera with 2 - 2.5 minutes time difference:

 $2^{nd}$ ) Make immediately after  $1^{st}$ ) 30 single shots with fixed camera with ~2 seconds time difference. Do not move the tripod between  $1^{st}$ ) and  $2^{nd}$ ). Do not tilt the camera between  $1^{st}$ ) and  $2^{nd}$ ). Only adjust horizontal and vertical angle to move the object in the middle of the image.

3<sup>rd</sup>) Cut the images from 2<sup>nd</sup>) but do not rotate.

Open WinJUPOS.

Load the JPG from 1<sup>st</sup>) into "Image measurement ". Date, time and the geographic position of the shot will be automatically adopted from the EXIF data of the JPG. Define the "Equatorial vector ":



Click two points in the first and the second image of the object.



Save the vector with "Adj. / Outline frame / Equatorial adjustment / Save equatorial vector ".

Load first image from 2<sup>nd</sup>). Date, time and the geographic position of the shot will be automatically adopted from the EXIF data of the JPG.

Switch "Adj. / Draw outline frame "= ON. Be sure that the N pole of the outline frame is up. Use [Tab] if necessary. Call "Adj. / Outline frame / Automatic detection ". You get following result:



Load the saved vector with "Adj. / Outline frame / Equatorial adjustment / Load equatorial vector ". Call "Adj. / Outline frame / Equatorial adjustment / Rotate outline frame to equatorial vector ". This function needs correct Date, time and the geographic position. Now you get a full adjusted outline frame:



Now you have a correct defined "Image measurement". Save the settings (\*.ims).

Measurements of Sun images								۲	ages				
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Here a comparison to <u>https://solarmonitor.org</u> (left):

## Image stacking

To improve the image quality, you can stack and sharpen all the images from 2<sup>nd</sup>). I recommend AutoStakkert! and Registax.

Alternatively you can transfer the Image measurement setting from the first image of 2<sup>nd</sup>) to all other. Call "Misc. / Create settings files (\*.ims) for an image stack" and choose all the other images. Additionally 29 ims files will be created. If you have JPGs with GPS data, you get file names like these:

🔇 2019-04-17-1534.4.ims

2019-04-17-1534.5\_DSC\_1755.ims
 2019-04-17-1534.5\_DSC\_1756.ims
 2019-04-17-1534.5\_DSC\_1757.ims
 2019-04-17-1534.6\_DSC\_1758.ims
 2019-04-17-1534.6\_DSC\_1759.ims
 2019-04-17-1534.6\_DSC\_1760.ims
 2019-04-17-1534.7\_DSC\_1761.ims
 2019-04-17-1534.7\_DSC\_1763.ims
 2019-04-17-1534.7\_DSC\_1763.ims

After that start "De-rotation of images..." and add all the ims files:

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	835        pixels          PNG - Portable Network Graphics (48 bit)         Image orientation <ul> <li>North at top</li> <li>South at top</li> </ul> ✓ Stretch luminescence to maximum dynamic range	Setting	gs Reset Save (F2) Load (F3)				



Left a single original image; right the stacked / de-rotated image