

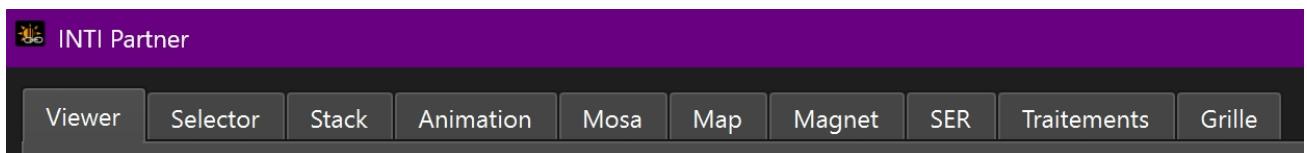
User manual

INTI Partner V1.x

INTI Partner is a set of applications grouped together in a single software package for using spectroheliography images.

The images may come from software other than INTI, such as the Sunscan or JSolex application, or another spectroheliograph other than Sol'Ex. However, for certain functions, information in a log file created by INTI or Sunscan will be

Sunscan or JSolex, or from a spectroheliograph other than Sol'Ex. However, for certain functions, information contained in a log file created by INTI or Sunscan will be required.



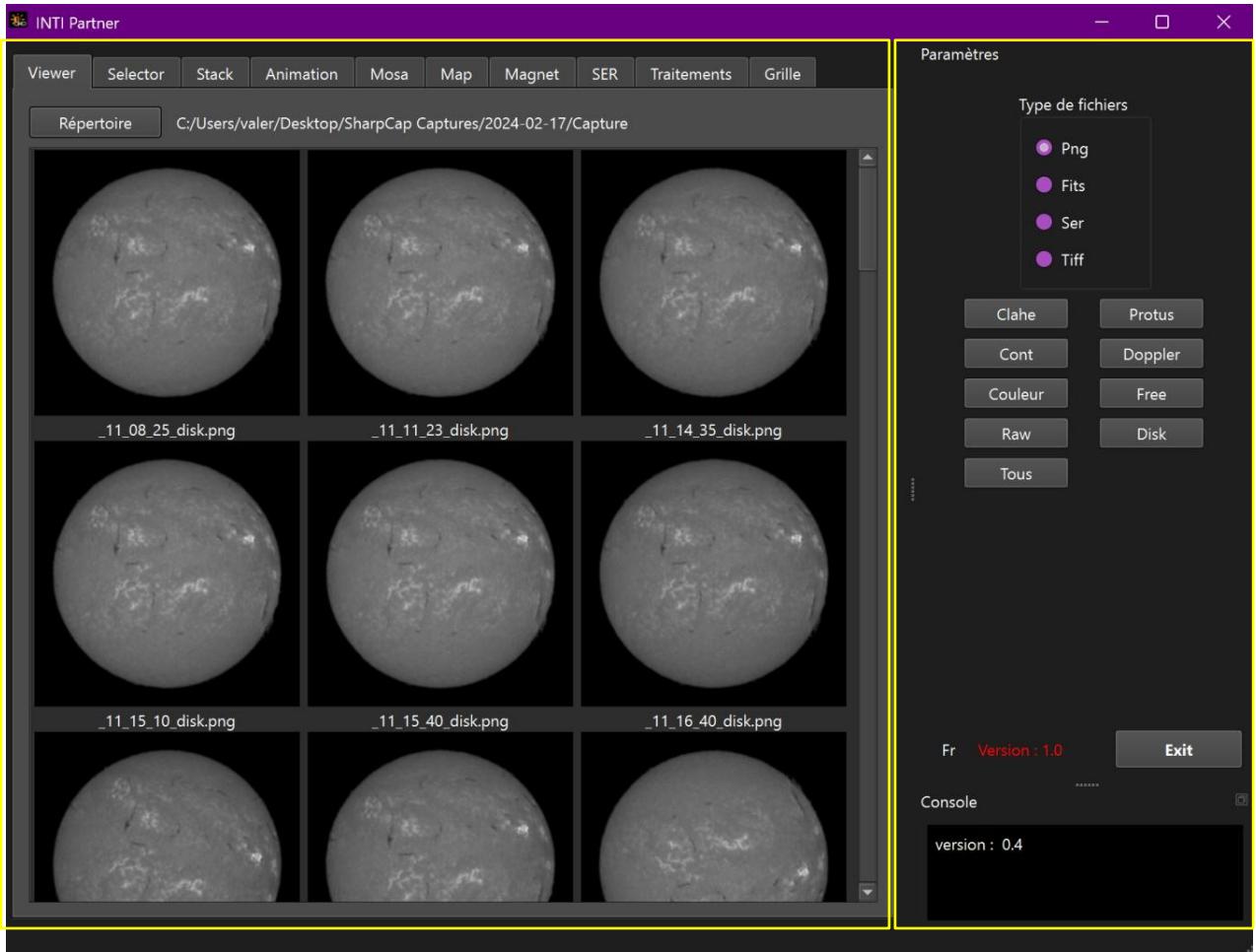
- **Viewer:** visualization of a set of images or all images in a directory in thumbnail form
- **Selector:** facilitates the selection of the best images from an observation session by comparing them two by two
- **Stack:** corrects distortions in a series of images before summing to increase image quality.
- **Animation:** creating an animation from a series of images
- **Mosa:** creation of a composite image from several partial images of the Sun
- **Map:** "spectro-localization" of a region of the solar spectrum within the solar spectrum
- **SER:** display of frames from a SER file with correspondence in the spectroheliographic image, display of the spectral profile
- **Processing:** additional image processing
- **Grid:** application of a coordinate grid known as Stonyhurst and other annotations such as a distance scale or a scaled Earth

Installation

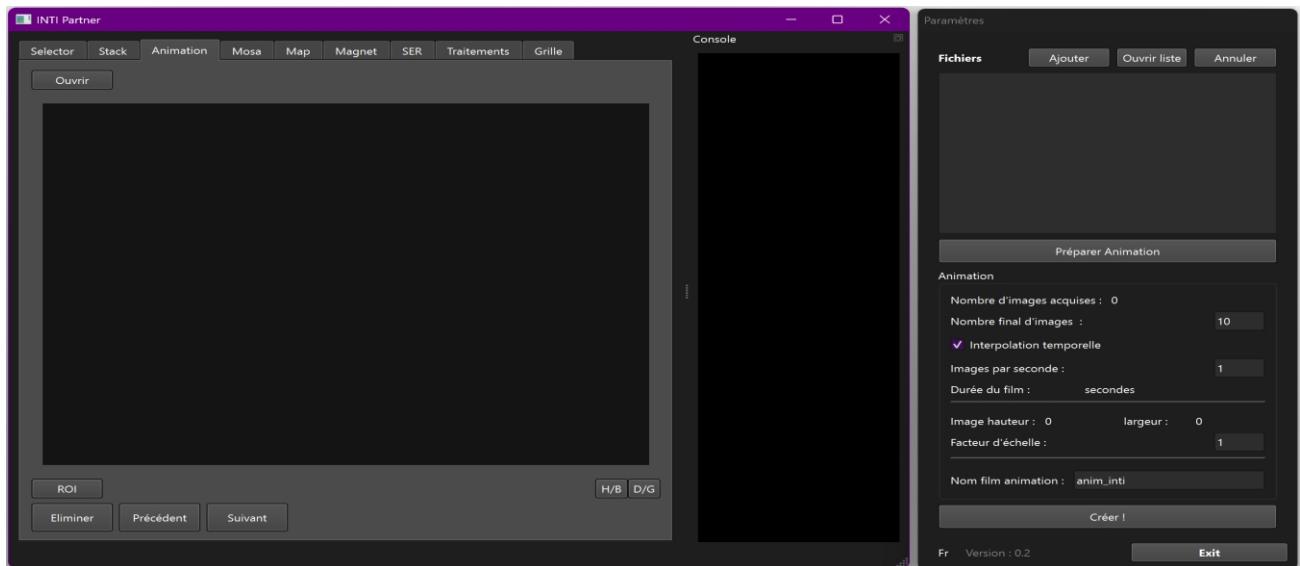
Unzip the INTI_partner.zip file, which can be downloaded from xxx

General overview

When launched, the window below appears. It consists of a tabbed area and a panel on the right with two blocks (docks): Settings and Console



The window can be enlarged. The two docks can be independently enlarged, placed on the left or bottom, or even detached as independent windows. To re-dock floating panels, double-click on their title bar.



The style of the interface depends on the system style. In the above case: Windows 11 style, Dark mode.

The application remembers your interface layout for the next launch, as well as the last active tab.

Language management

To change the default language from French to English, click on the "Fr" button, then restart the application.

Version check

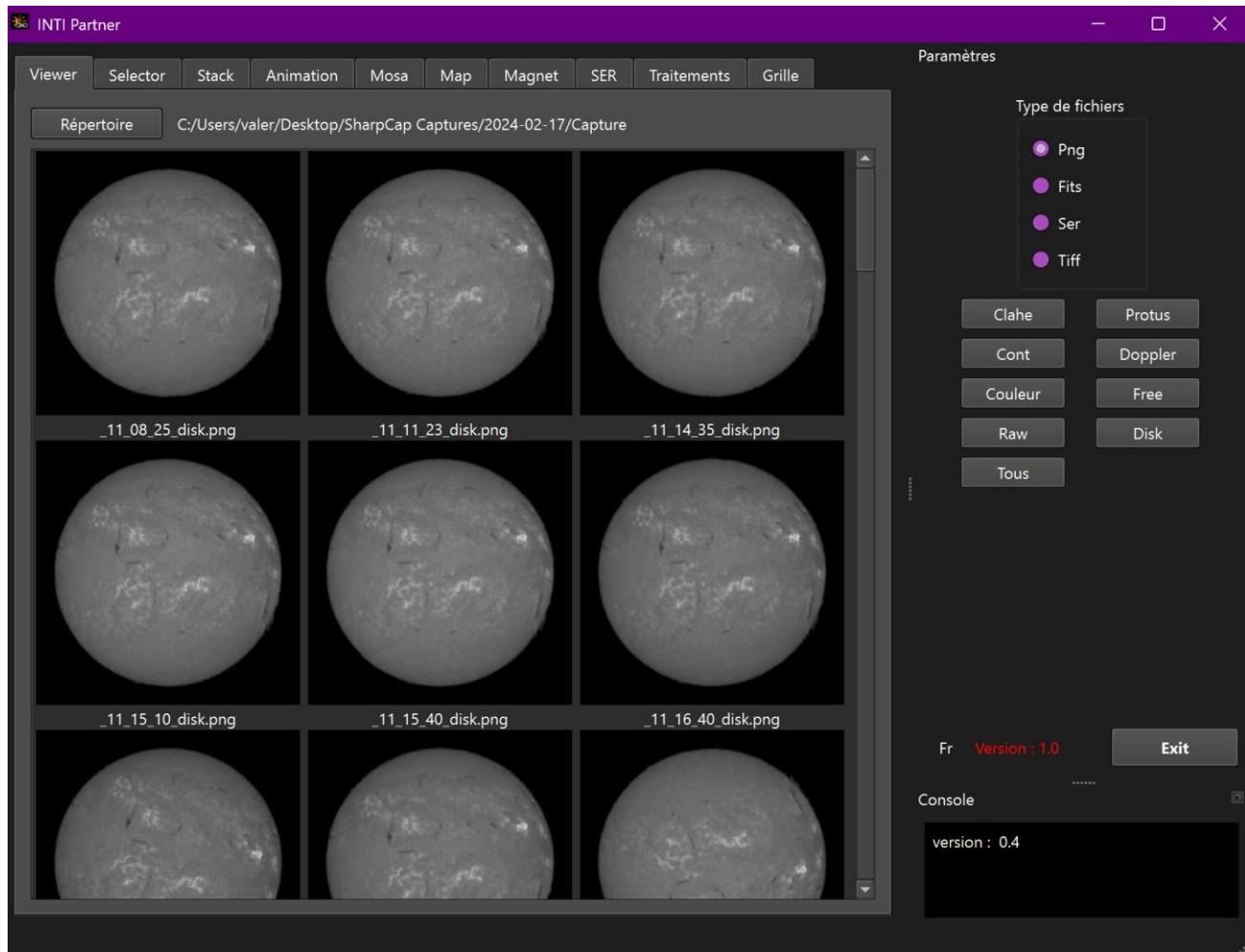
If you have an internet connection, the application checks the current version number on the website . If the version is different, the version color will change to red.

Tabs

Each tab corresponds to an application, associated with its settings block or "dock" on the right side of the application window.

Viewer

The Viewer application works like a file explorer with png file display, fits and SER in thumbnail form.

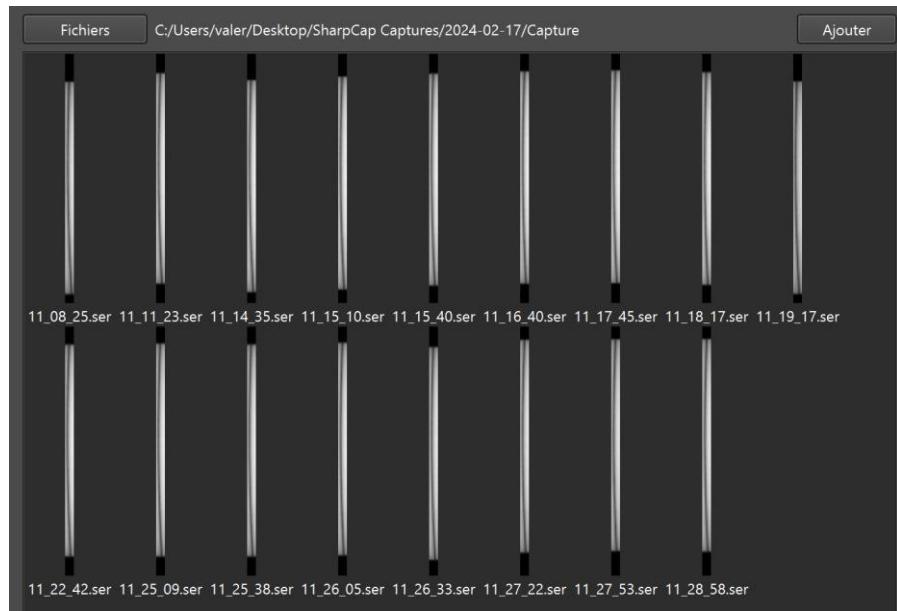


The "directory" button allows you to select the directory to explore. You can then sort files by type

- PNG files: files with the suffix "*_disk" are displayed by default
- FITS file
- SER file: the frame in the middle of the video file is used as a thumbnail
- TIFF file

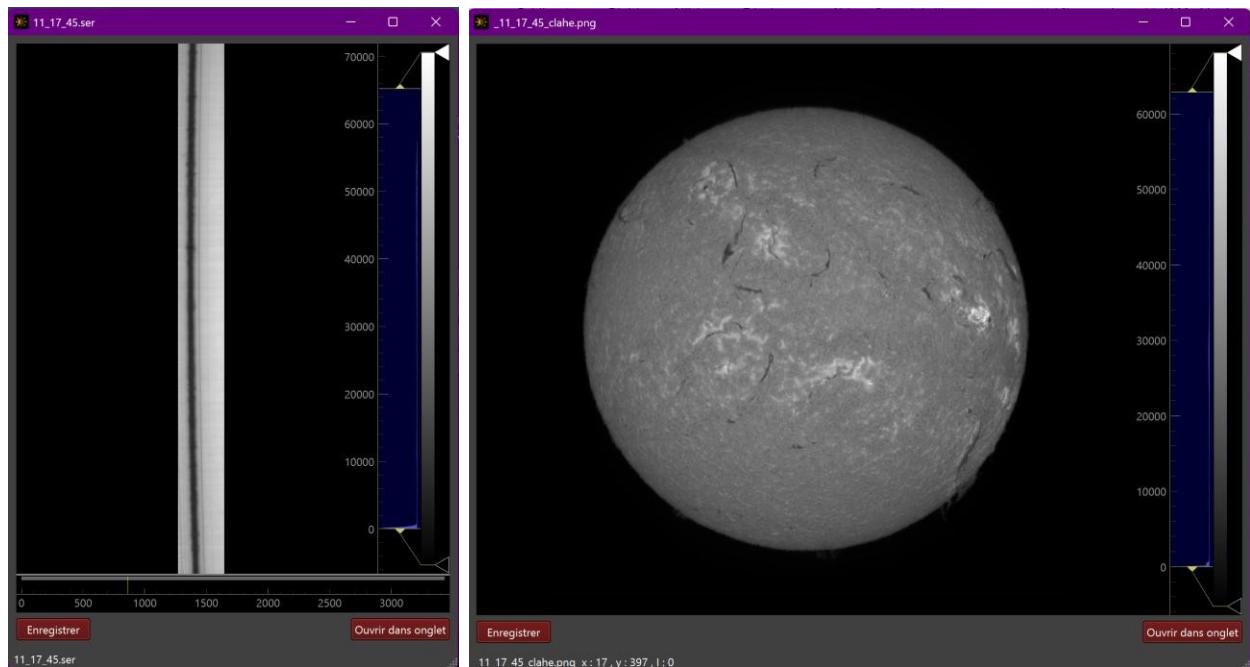
An additional sorting key can be used:

- Clahe: extension *_clahe, automatically searches in the Clahe subdirectory if No files found in the working directory.
- Cont, Doppler, Color: continuum images *_cont, Doppler images *_doppler, colorized images *_color
- Free: image extension *_free such as helium or corona images
- Raw: image extension *_raw, automatically searches in the subdirectory Complements if no files are found in the working directory.
- All: all files with the extension defined in "file type"



To display all Ser files, select the ser type. Right-clicking allows you to either launch inti or just open inti with the file name. Close Inti to continue on Inti_partner.

Double-click on one of the thumbnails to view the file in a separate window, where you can adjust the zoom, thresholds, or choose the frame of a ser file.



On the left, viewing a ser file with a slider to change the frame – on the right: viewing a png file with the pixel intensities under the mouse

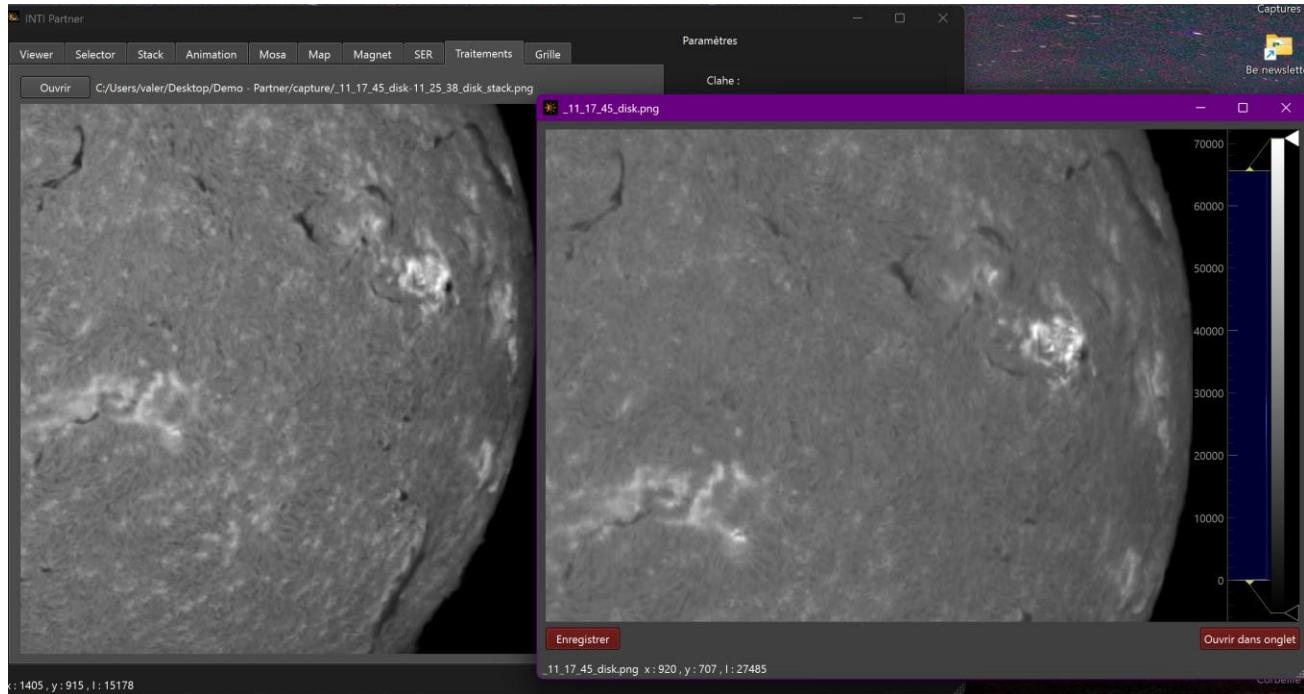
If you change the zoom or thresholds, you can save the new image as a PNG file using the "Save" button.

Click on the "Open in tab" button to display the file in the "ser" tab for a ser file or the "Processing" tab for a png or fits file.

On a SER thumbnail, right-clicking gives access to an additional menu with the "Open INTI" command, which allows you to open INTI with the file name without launching the

processing to allow verification of the default settings, or start processing directly with the "Process with INTI" command. If you have changed the path to Inti after defining it for the first time, you can change it with "Change INTI directory."

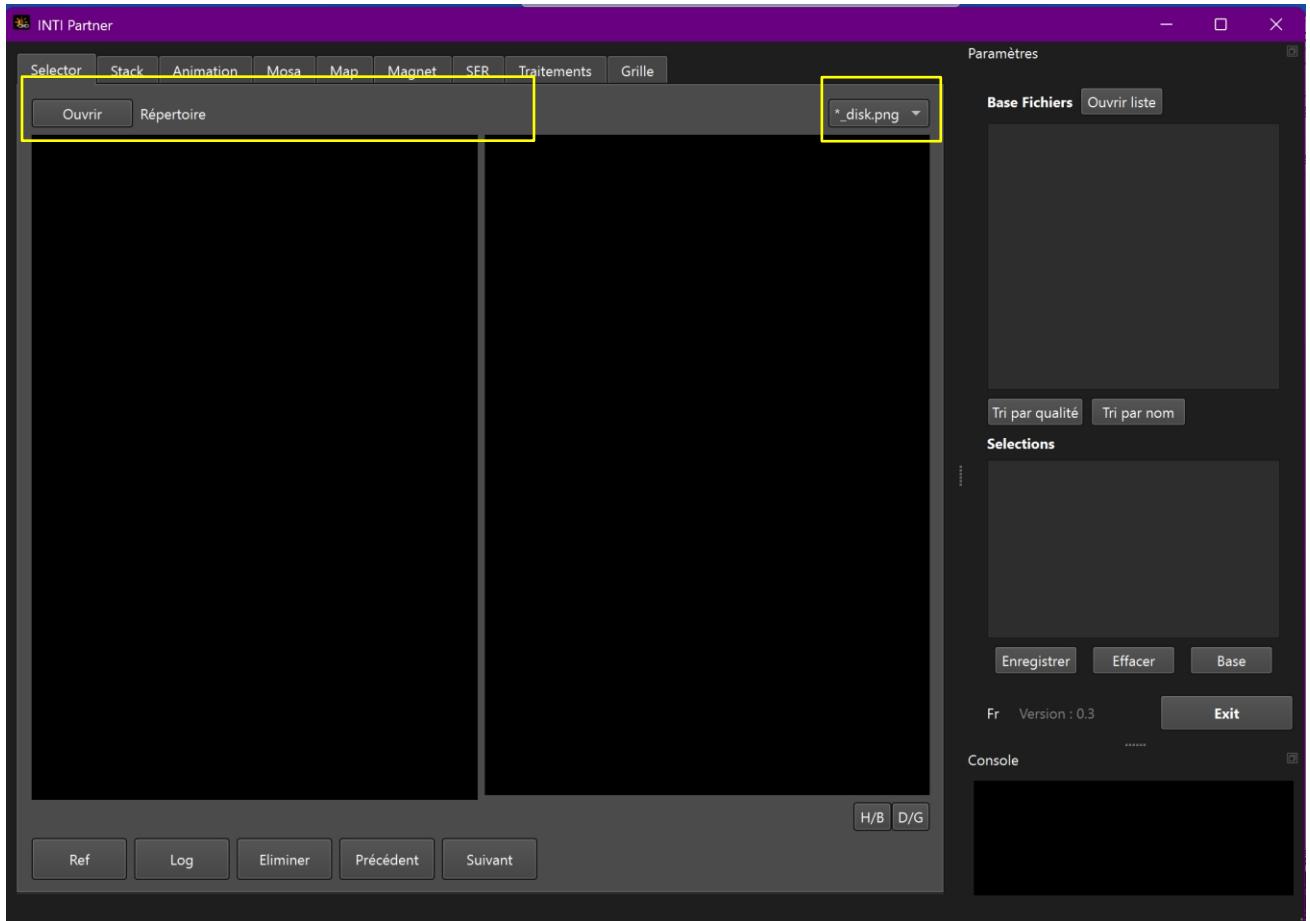
You can keep the image window open and browse other tabs. For example, you can view an image in the processing tab while keeping the Viewer floating window open to compare two files, regardless of their name, extension, or directory.



Selector

The Selector application allows you to display all PNG images in the same directory and compare them to a selected reference image in order to select the best image(s) by comparison and save their names in the "Selections" list.

A suffix filter must be applied, such as *_disk.png, *_protus.png, *_clahe.png, *_cont.png, *_free.png, *_raw.png, or *.png.



The list of image names is displayed in the dock on the right in the "File Base" area.

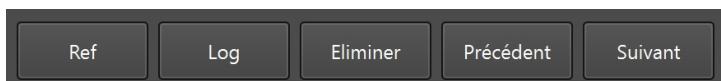
The first image is displayed on the left, the second on the right.

You can flip the image on the right vertically or horizontally using the buttons.



Please note that the PNG image is automatically updated on your disk.

Navigation buttons



The "Previous" and "Next" buttons allow you to display the previous image or the in the image area on the right.

If you want to keep the image on the right as the new reference image, use the "Ref" button to transfer it to the left area. To save its name in the "Selections" list "Selections" list, use the "Log" button.

The "Log" button allows you to save the name of the image by adding it to the "Selections" list. "Selections"

The names of selected images are stored in the Selections list in the dock.

To remove an image from the list, display the image on the right and click on the "Delete" button.

Quality criteria

_11_14_35_disk.png 578

Below each image, the name of the image and a number representing a quality criterion are displayed. This criterion is indicative and is calculated at the center of the image over an area of 400 pixels, based [onhttps://pyimagesearch.com/2015/09/07/blur-detection-with-opencv/](https://pyimagesearch.com/2015/09/07/blur-detection-with-opencv/)

```
img2=cv2.medianBlur(img2, 5)
dst= cv2.Laplacian(img2, cv2.CV_64F, 3)
var=dst.var() ** (1/2)
```

It is possible to sort the list of files according to this quality criterion or to return to a sequence ordered by file name.

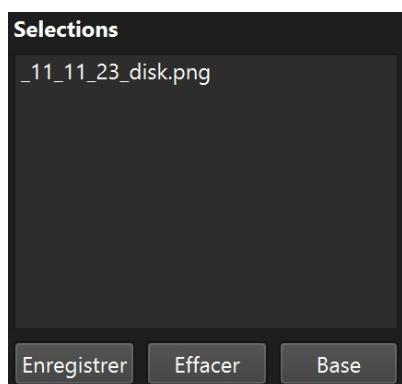
Tri par qualité Tri par nom

Saving and recalling a list of the best images

It is sometimes difficult to judge the best image in a series. Selecting a sub-list can be a step toward making an initial selection. You can then save this initial selection with the "Save" button

The "Clear" button clears the sorting list

The "Base" button replaces the main file list with this new list to start the sorting process again.

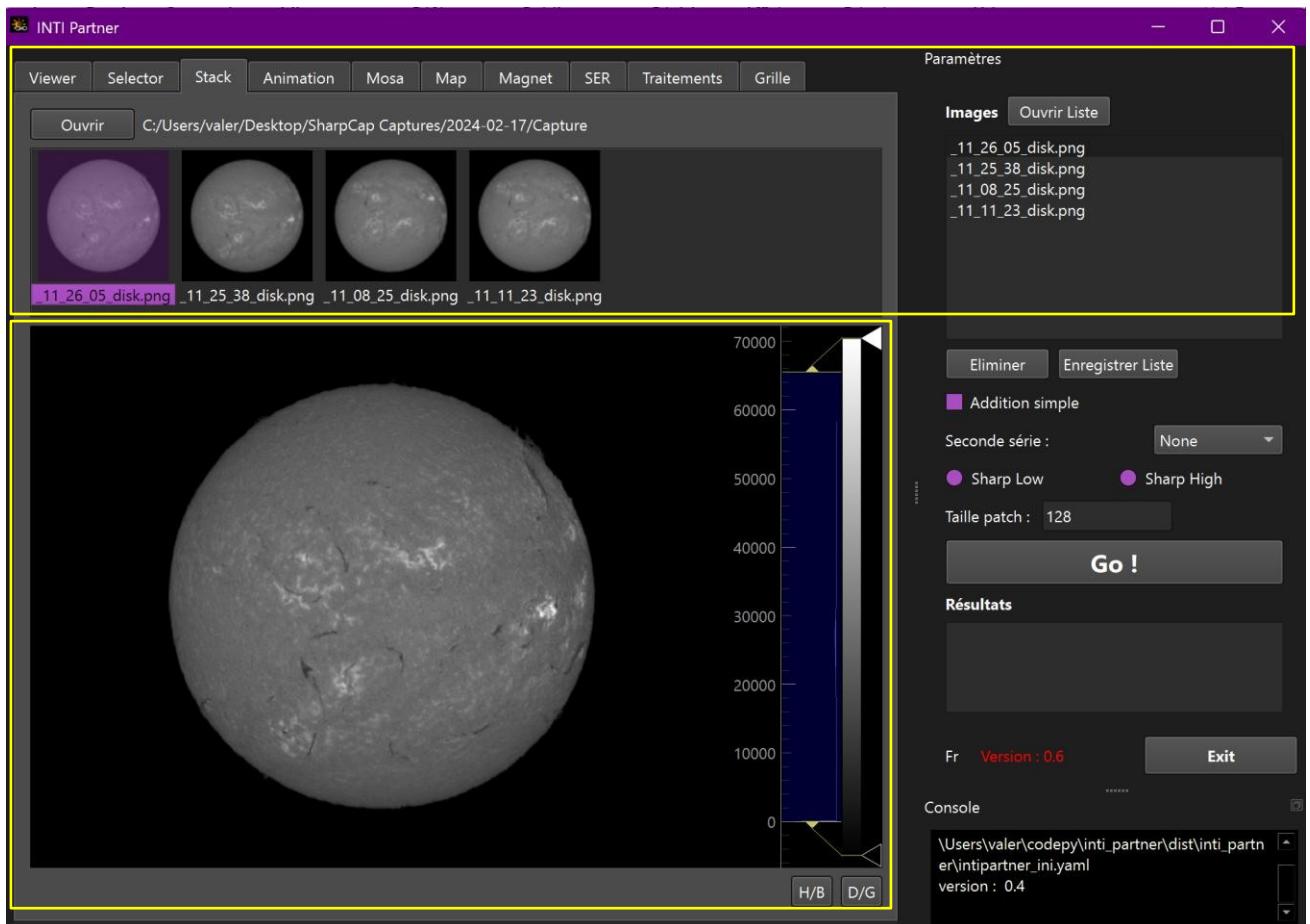


To recall a sorting list, use the "Open list" button in the main File Base list area.

Base Fichiers Ouvrir liste

Stack

The Stack application allows you to combine a series of images either by simple addition or after a distortion correction calculation. The name "Stack" is the English translation of empilement. The purpose of this operation is to improve image quality by reducing noise. However, it should be used sparingly, on images of acceptable quality and not covering an unreasonable period of time, i.e., not affected by the rotation of the sun, and not showing major local variations on the sun's surface such as flares or protuberances.



The "Open" button allows you to select the png files to be "stacked" - the Images list in the dock on the right contains the file names and a preview is also displayed in the upper area of the application section.

You can navigate through the images using the arrows or the mouse, and even remove an image from the list using the "Remove" button. The selected image is displayed in the main image area.

You can then change the thresholds with the mouse by moving the cursors on the histogram to the right, reverse the orientation with the "H/B" and "L/R" buttons, and view the intensity of the pixel under the mouse at the bottom left.

The mouse can also be used to pan/zoom the image with the left mouse button.

The right mouse button displays a context menu that allows you to return to Display the entire image centered with "view all" and also export the image in png format with "export."

The 'Open list' button allows you to recall a list of images already sorted with Selector, for example. The 'Save list' button allows you to save the current list if, for example, images have been removed.

Simple stacking

Click on the "Simple addition" box. You can then choose the enhancement filter. Click on "Go!"



Stacking with distortion correction

The "Dedistord" algorithm was written by Christian Buil. It calculates the distortion matrix by patch size defined by the value in the "Patch size" field for each image starting from the first image. The matrix thus calculated is then applied to correct each of the images, with the first image being the reference image.

These distortion matrices can only be calculated on images with good contrast. This is not the case for protuberance images or continuum images, but we will see how this limitation can be overcome.

To stack images with distortion correction, check the "Simple addition" box. It is not checked. Select the strength of the enhancement filter and click "Go!"

Once the calculation is complete, the result images are displayed in the dock list.
"Results"



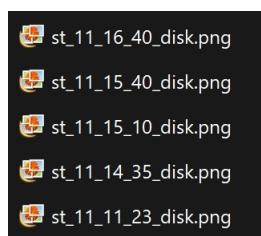
The first image is the reference image, the single image.

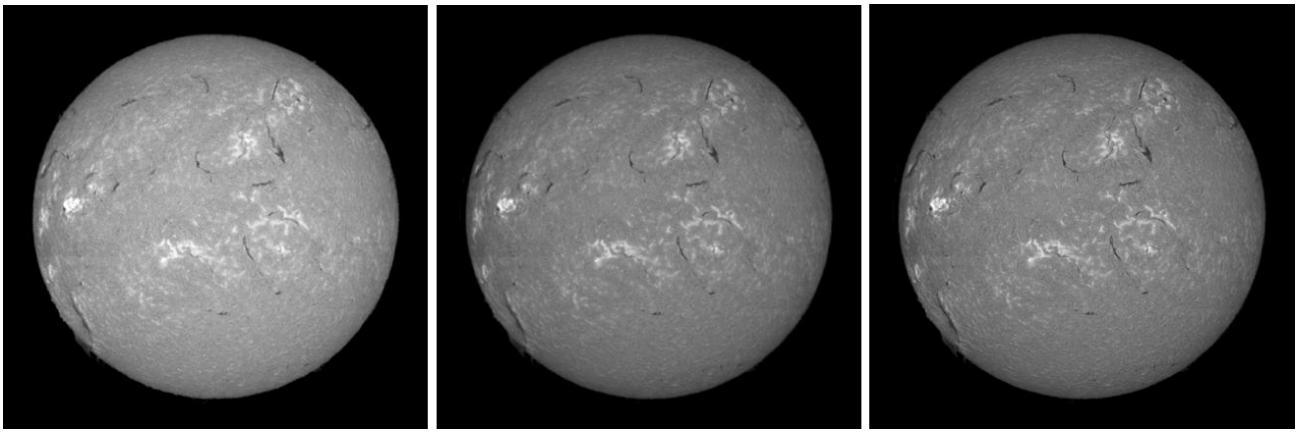
The image xx_stack.png is the result after correction and addition and without enhancement.

The image xx_stack_sharp.png is the stacked image with the enhancement filter applied at the selected level.

These images are saved in the starting image directory.

The single images corrected for distortion before stacking are also saved with the prefix "stxx.png" in a subdirectory called "stack."



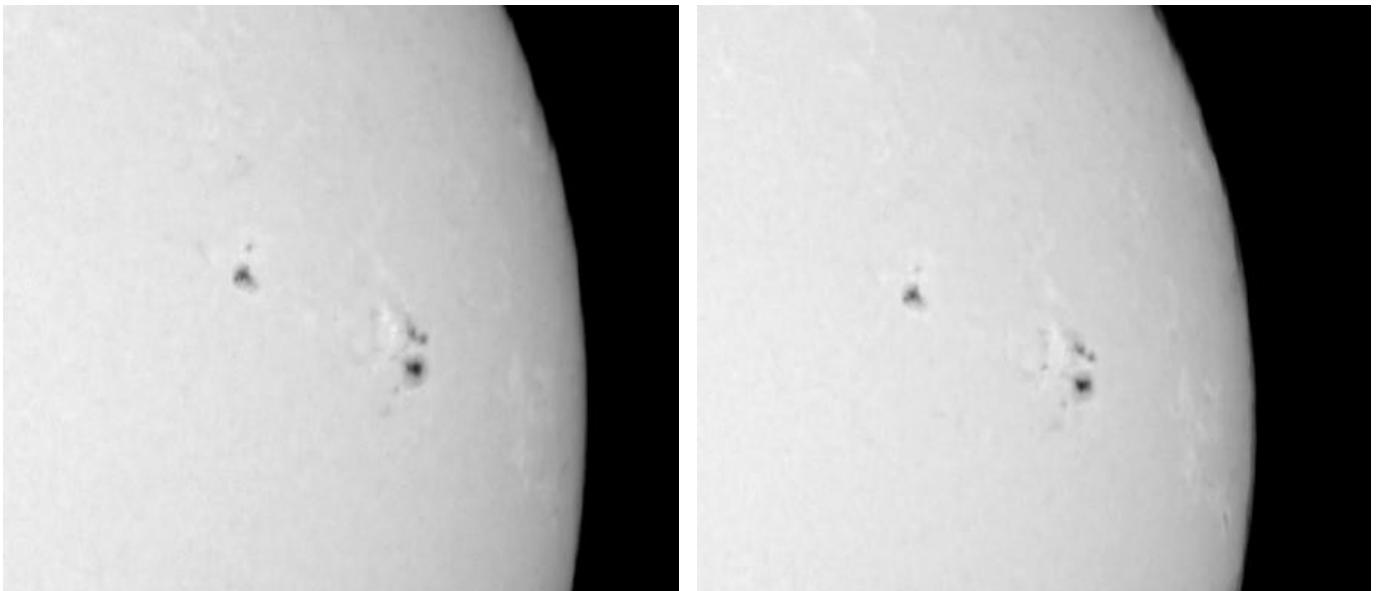


From left to right: single image, stacked image, stacked image with "Low" enhancement filter

Stacking of continuum images

When calculating the distortion of the image series, the correction matrices are stored. They can therefore be applied to a series of "secondary" images to produce a stacked image despite their low contrast.

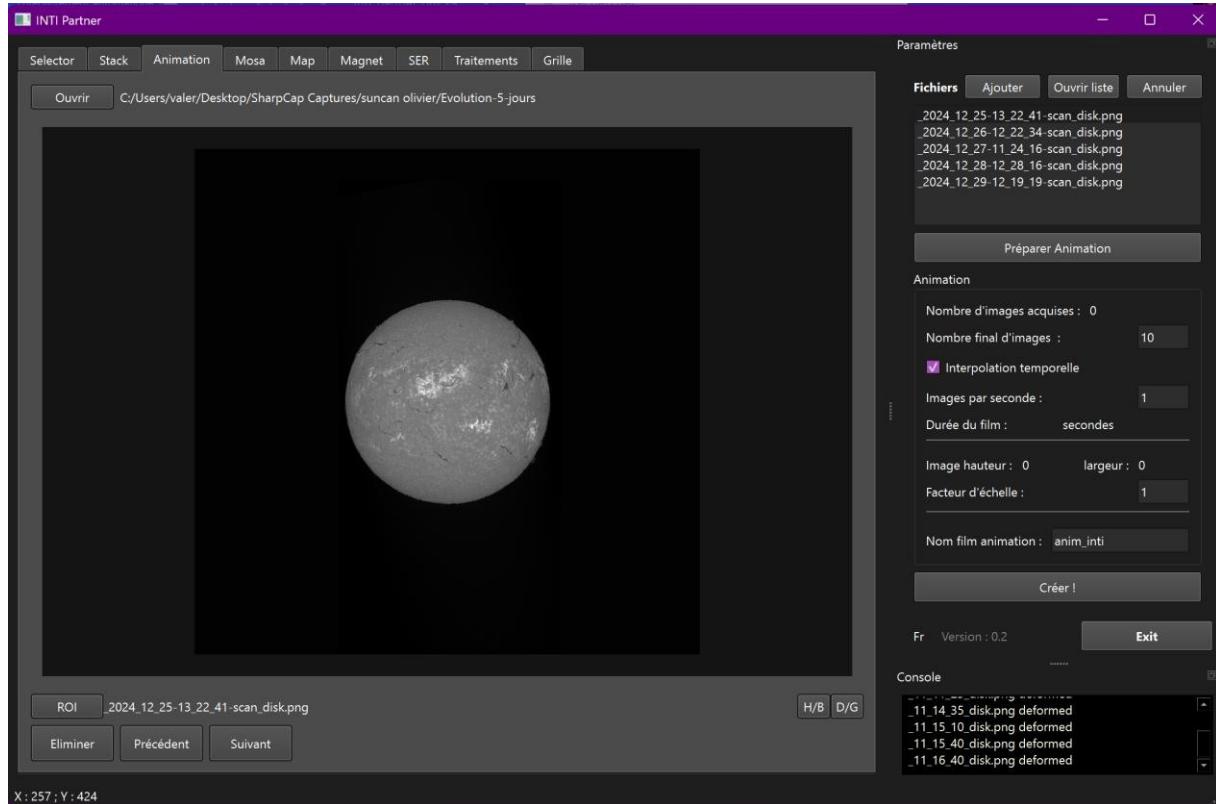
To do this, select the image series suffix "_cont." You must first generate these images with INTI. Remember that the continuum image is not systematically generated by INTI in the General tab, but it will be in the Doppler-Continuum tab.



From left to right: single continuum image, stacked continuum image with enhancement filter (details)

Animation

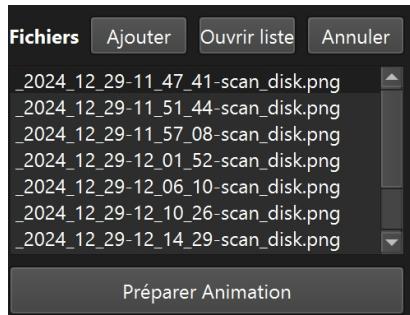
The Animation application allows you to create the equivalent of a movie from a series of images.



The animation produced is available in GIF and MP4 formats.

Two types of interpolation are available: simple interpolation, which does not take into account the date the image was taken, and temporal interpolation, in which each image is inserted at the time it was taken and the temporal sequence is therefore resampled from this temporal sequence, which is not evenly spaced over time.

The "Open" button allows you to select images from the series; the name of each file is displayed in the "Files" list in the dock. Files can be added using the "Add" button. "Add" button. You can also open a file from an already sorted image list.



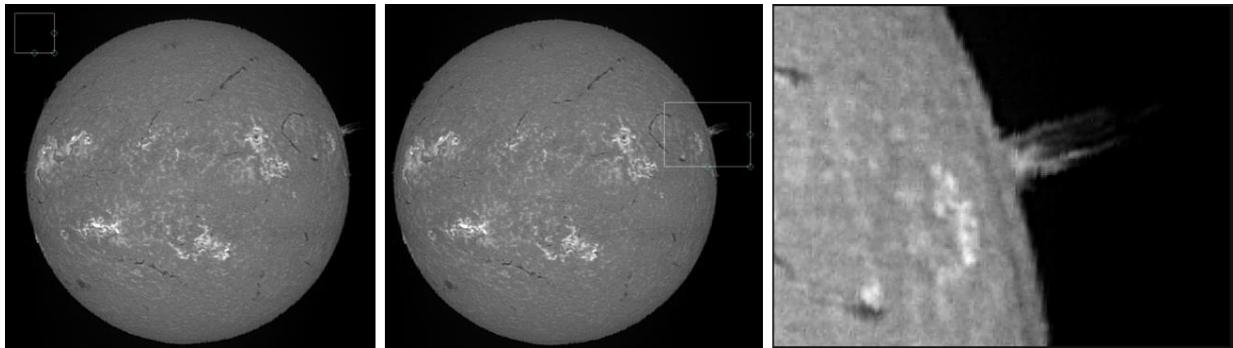
Each image in the series is displayed in the image area of the application. You can zoom in using the mouse wheel and move the image using the left mouse button. You can also navigate through the series using the "Previous" and "Next" buttons, or remove an item from the list.



At this stage, you can define an area of the image called "ROI" (Region Of Interest) to crop the images before animation. This is very useful for zooming in on a protuberance or tracking the evolution of a flare in an active area.

However, you can choose not to apply an ROI and create an animation from the entire image. You must be careful with the size of the image, however, as interpolation can be significant for images larger than 1024x1024 in temporal interpolation.

Click on the "ROI" button—a small square will appear on the image. Use the mouse to move it and enlarge it to the desired size using the handles on the right and bottom.

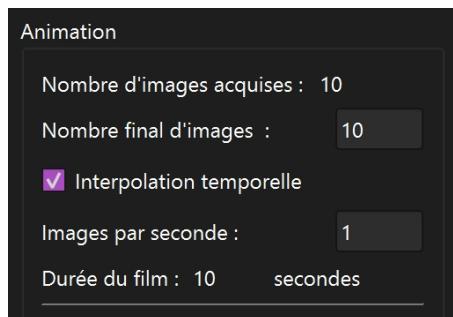


To generate images of the ROI area or full images and extract the date and time information, click on the "Prepare animation" button.

The image list for the series is then replaced by the ROI images if this option is enabled. The number of images in the series is updated in the Animation section of the dock.

Animation settings

Important: you must press "Enter" to validate each change of value in the editable fields.



Specify the total number of images to be generated for the animation. A value greater than the number of images will create intermediate images by interpolation.

If the Time Interpolation box is checked, each image in the native series will be placed in the sequence at the exact time the shot was taken.

For example, if the image sequence was acquired at 11:12:00, 11:14:00, 11:15:00, 11:15:30 and 11:17, i.e., 5 images, and 10 images are requested, then the 10 images will be interpolated from the native images but all resampled at times (11:17) – (11:12), i.e., 5 minutes in total divided by 10, thus spaced 30 seconds apart, i.e., the sequence 11:12, 11:12:30, 11:13, 11:13:30, 11:14, 11:14:30, 11:15, 15:30, 11:16, 11:16:30, 11:17, with the interpolated images shown in blue.

If time interpolation is not enabled, the sequence will be: 11:12, [11:13](#), 11:14, [11:14:30](#), 11:15, [11:15:15](#), 15:30, [11:16](#), 11:17

For large time differences, or even date differences, it is however recommended not to activate time interpolation because the calculation time required does not really contribute to the fluidity of the animation. Similarly, it is not always useful to create intermediate images. If you specify the same total number of images as the number of images in the series, no interpolation will be necessary.

You can then choose to speed up or slow down the animation by specifying the number of frames per second. If you specify 2 frames per second for 10 frames, the total duration of the animation will be 5 seconds.

Images par seconde :	1
Durée du film :	10 secondes

You can also choose to change the size of the final image using the scale factor.

Image hauteur :	120	largeur :	187
Facteur d'échelle :	1		

And choose the name of the animation file, which will be named anim_name.mp4 and anim_name.gif.

Nom film animation :	anim_inti
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Before creating the animation, you can display an ROI again. In this case, it will be used to calculate an average value in this region and normalize the image intensities to this average. This will correct any differences in brightness between images. If none

Finally, click on the "Create" button to generate the animation.

Créer !

Once the animation has been created, the mp4 file will be displayed in the application area. Click on the "Play" button to replay the animation. The display is adjusted to the size of the screen.



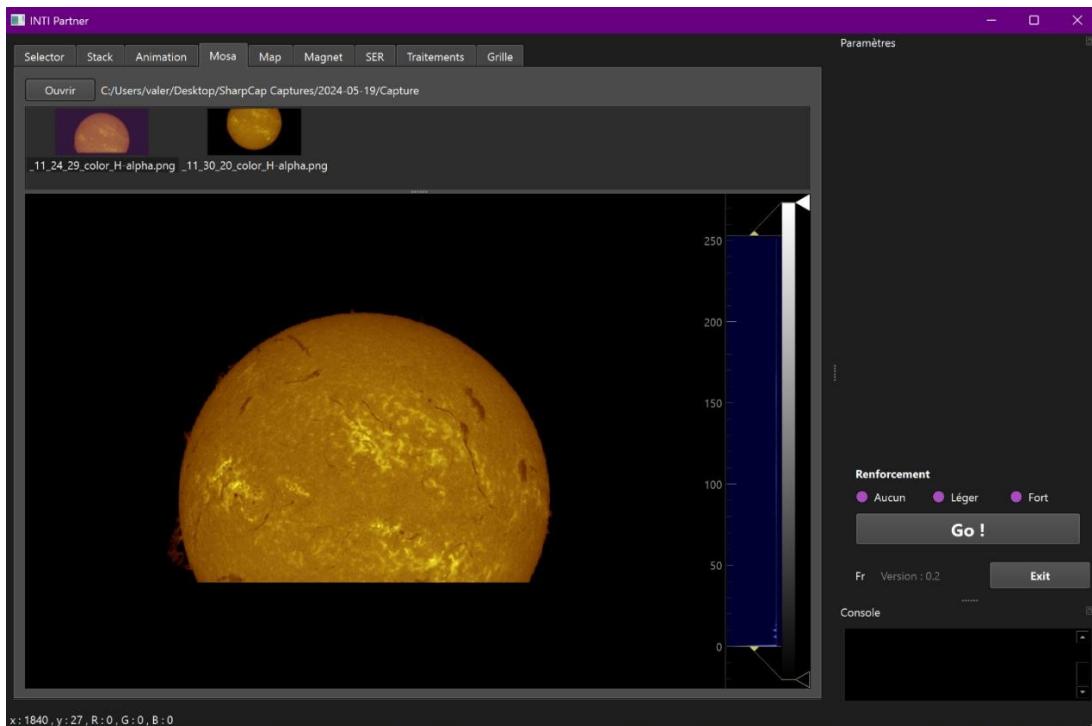
If the size of the images to be interpolated is large, the calculation time may be significant. A warning message is displayed, which you can choose to ignore if you accept a long calculation time. If not, reduce the image size with an ROI.

The individual images created for the animation are saved in the subdirectory.

"animation" created in the starting image directory with "fr" as the prefix and the frame number.

Mosa

The Mosa application allows you to assemble several images with overlapping areas to create a composite or mosaic image. This application is used to create an image of the entire sun from partial disk images acquired with a long focal length.

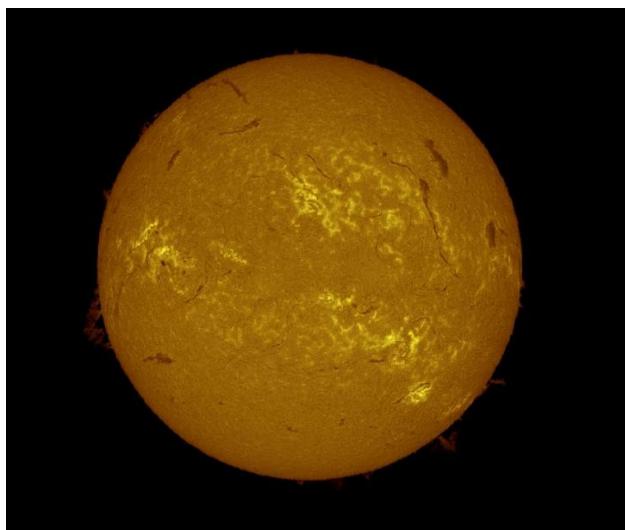


The "Open" button allows you to select the images to be assembled. These images can be in black and white or color png format, or in fits format. For png files, the INTI xx_log.txt file must be present in order to read the geometric information about the position of the solar disk in the image.

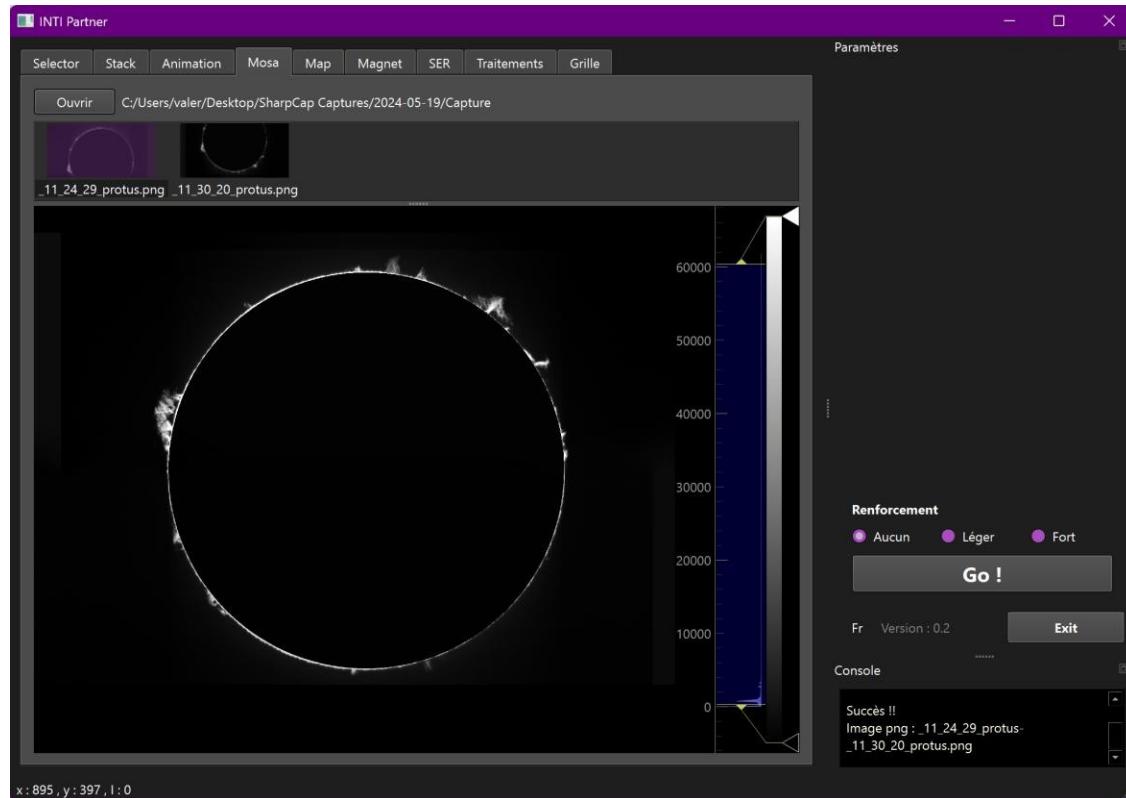
A preview of each image is displayed in the upper area. You can click on the preview to view the image in the main image area. The intensity readings under the mouse are displayed at the bottom left, and you can also use the mouse to move/zoom in on the image.

If desired, select the application of a enhancement filter, then click "Go!"

The resulting image will be displayed in the main image area.



By using the *_log.txt file for each png image, it is also possible to assemble protuberance images or continuum images.



Map

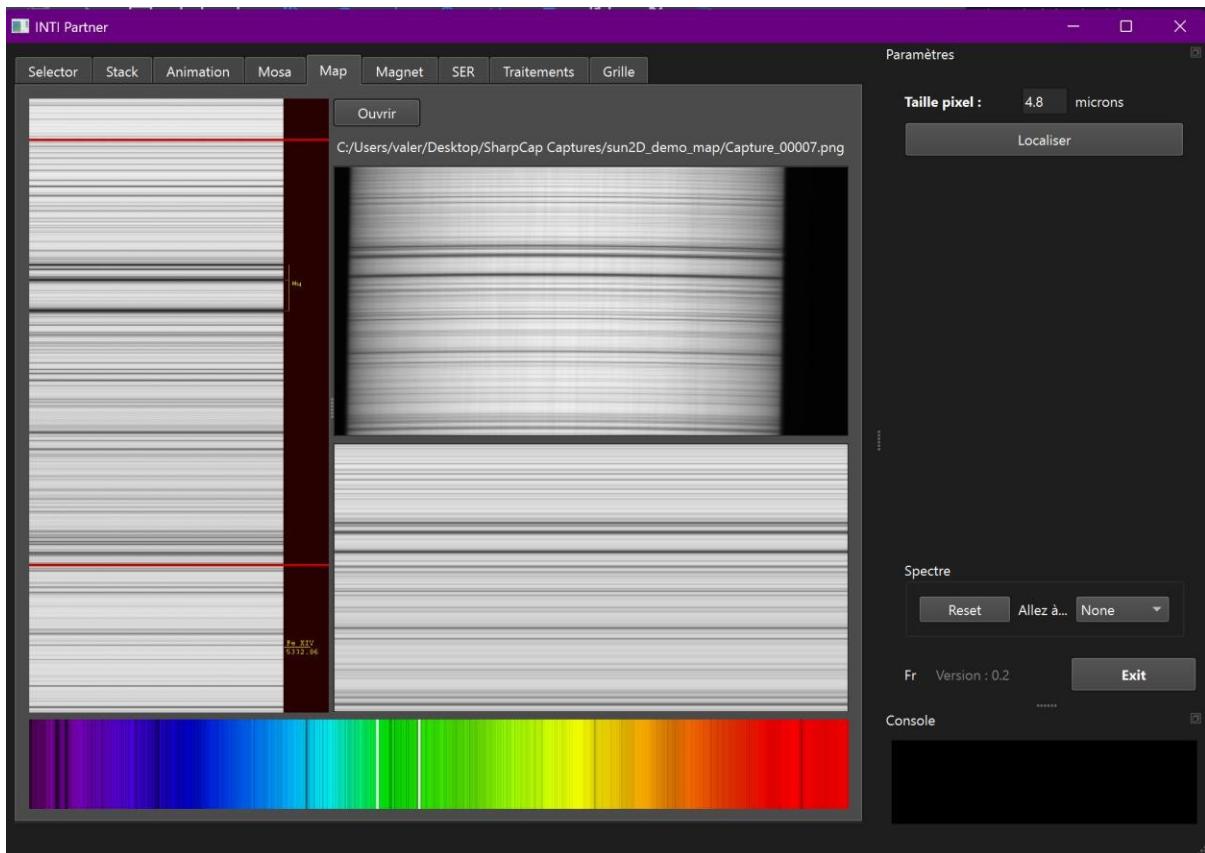
One of the advantages of the Sol'Ex spectroheliograph is that it allows you to change the orientation of the grating and thus move across the entire spectrum. You can position yourself on remarkable lines and obtain a monochromatic image in the line of your choice.

But it is not always easy to find your way through the forest of lines in the solar spectrum... the spectrum is black and white, and above all, the excellent spectral resolution of the Sol'Ex/Sunscan only gives access

only a limited portion of the solar spectrum, even in "full frame" on the acquisition camera.

The big question then is: "Where am I in the solar spectrum?" or "Is it really the H-alpha line that I see?"

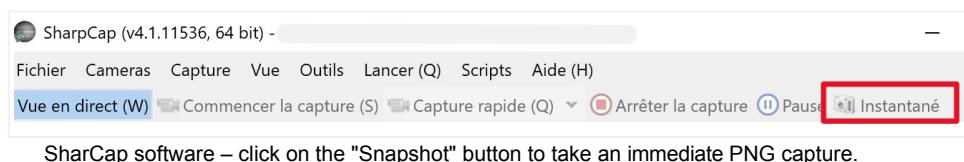
The Map application uses the fixed geometry of the Sol'Ex/Sunscan to locate an image of a wide-field spectral zone in the solar spectrum in order to identify the target spectral region.



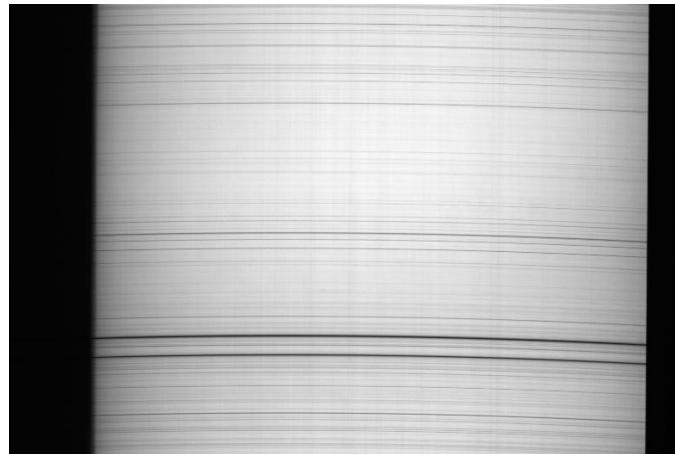
The image area on the left shows the solar spectrum as a whole, with some notable spectral lines annotated. The left mouse button can be used to move and zoom.

The lower image area contains a false-color image of the solar spectrum.

To identify the spectral range targeted by your Sol'Ex, you must first acquire a full-frame png image, a single image. Note the binning value, as this will affect the equivalent pixel size, which is necessary for automatic localization.



Be careful not to saturate the image, not to be in ROI mode, and not to place a filter such as an H-alpha filter at the entrance to the Sol'Ex. You will obtain a png image as shown below, which you will save.



For a Sunscan, save with "snapshot," apply a pixel size of 4.0, and invert top/bottom.

The "Open" button allows you to load the black and white png image of the targeted spectral region.

It is necessary to specify the pixel size of the image to be located, taking into account the binning if applied.

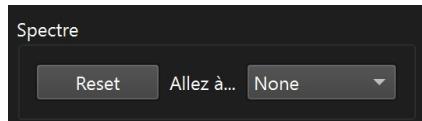


Click on the "Locate" button

The application will position the solar spectrum on the left over the identified area and a white rectangle will be positioned over the colored solar spectrum. The "recognized" image is displayed below the original image.

It is also possible to select one of the notable lines using the drop-down box.

"Go to..." to position the left solar spectrum on this remarkable line.

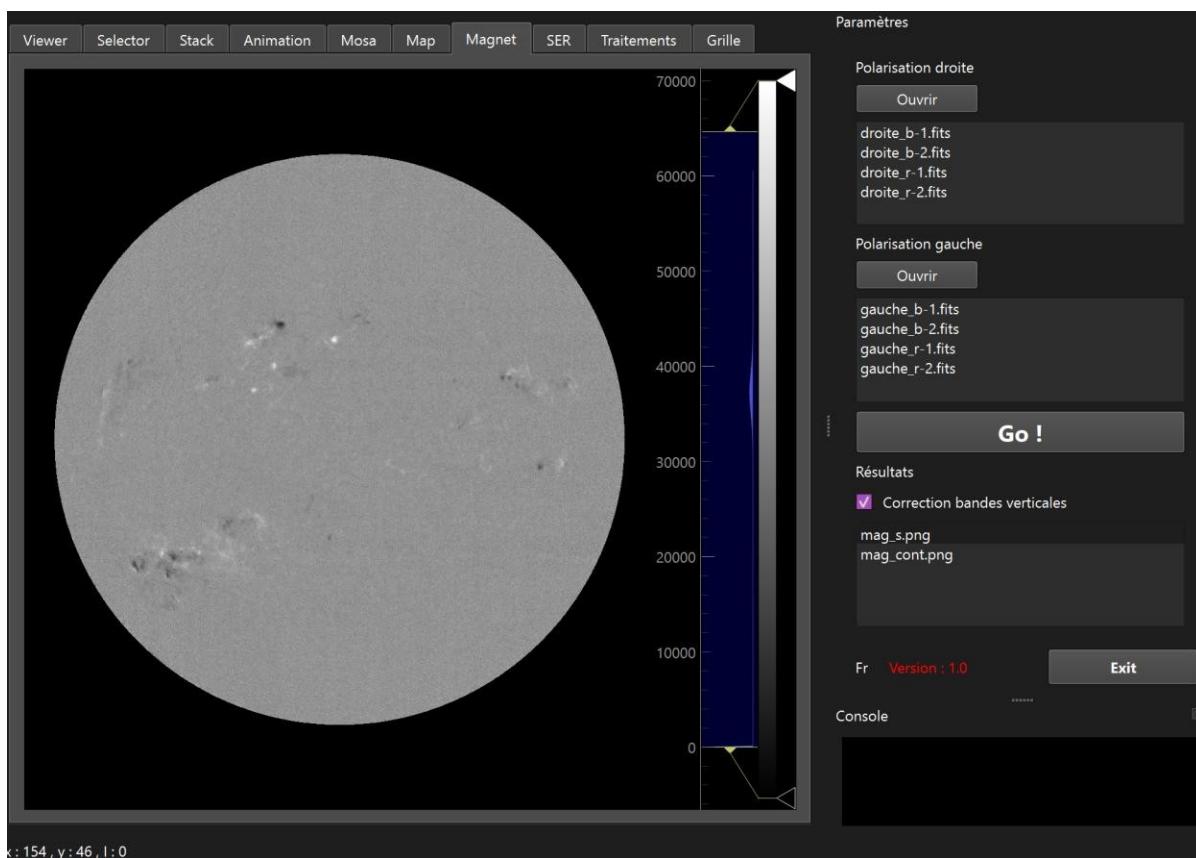


The notable lines are:

Elements	Wavelength	Applications
Ca II K	3933.7 Å.	Calcium image
Ca II H	3969 Å	Calcium image
H beta	4860 Å	
Mg triplet	5167.33, 5178.68, 5183.61 Å	
Fe XIV	5302.86 Å	Solar corona
He I D3	5875.62 Å	Helium image
Na D1,D2	5889.95, 5895.924 Å	
Fe I	6173 Å	Magnetogram
Fe I	6302 Å	Magnetogram
Fe X	6374.56 Å	Solar Corona
H-alpha	6562.53 Å	H-alpha image

Magnet

The Magnet application is a complement to the INTI application for creating magnetogram images from polarization fits images on Zeeman-sensitive lines generated by INTI.



Acquisitions Olivier Aguerre, two scans in each polarization, processed by INTI magnetogram tab

Refer to the observation sheet: http://valerie.desnoux.free.fr/inti/INTI_image_magetrogramme_V3.pdf

Once processing with INTI is complete, the polarization files are saved to disk, and for each polarization there should be one blue wing image and one red wing image.

Use the "Open" button in the list of right-polarized images in the dock. Select the blue "-b" and red "-r" wing files. Do the same for the left-polarized images.

You may only have one set of images, but you can also have several sequences to improve image quality. The summation will be performed automatically. However, the application will check the consistency of the names.

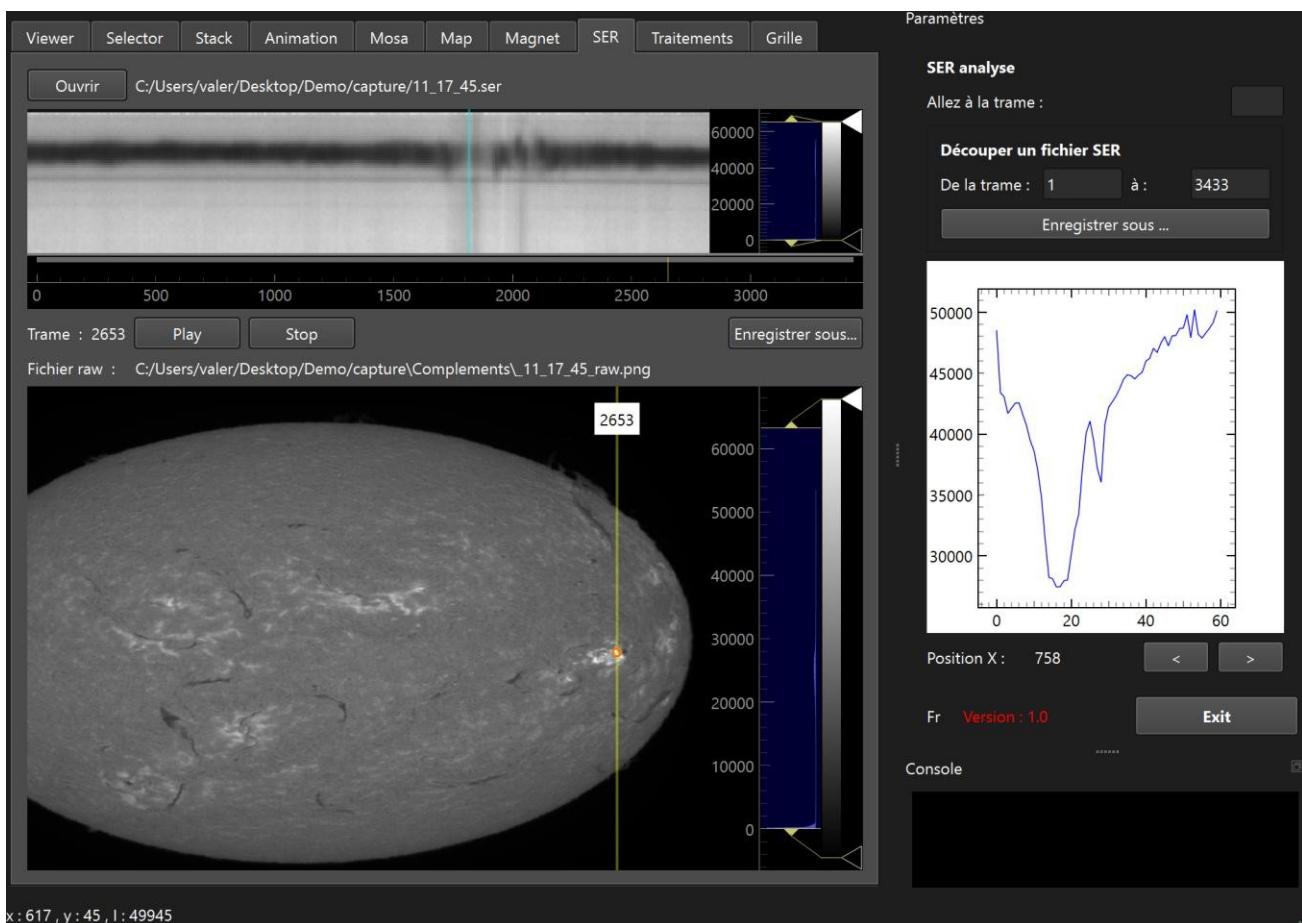
Enable vertical band correction using the checkbox. Start calculating the magnetogram using the "Go!" button.

The magnetic field image and the continuum image are generated and their names are displayed in the results list.

The magnetic field image is displayed in the main image area. You can move and zoom in on the image with the left mouse button.

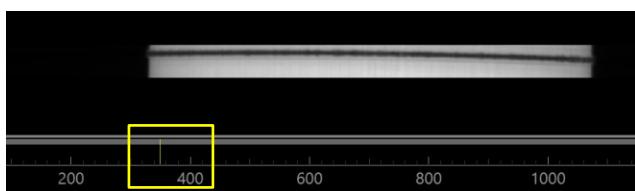
SER

The SER application allows you to view a SER video file and match the spectral line profile of interest with the raw image produced by INTI.



Load the SER file using the "Open" button.

The display is set to the first quarter of the SER file. The frame may be black, but below the image there is a control that allows you to move a small vertical cursor on the horizontal axis, the frame number axis.



You can use the left mouse button to move and zoom in on the image. The display thresholds can be adjusted using the histogram sliders on the right.

If the image "_raw.png" is present in the "complements" directory of the SER file directory, it will automatically be displayed in the lower image area.

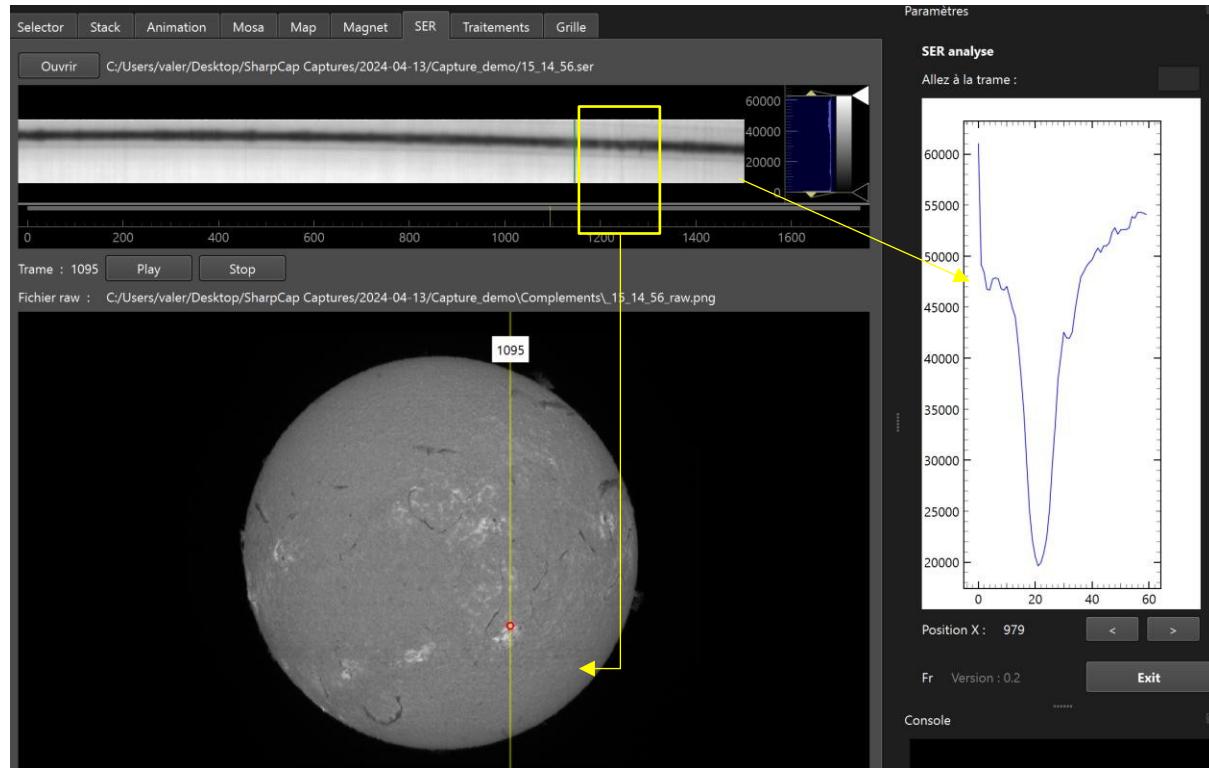
"complements" directory, it will automatically be displayed in the lower image area. You can move and zoom in on the raw image.

A yellow vertical slider is positioned on the column of the image produced by the active frame of the SER file displayed. You can use the mouse to move this line and see the corresponding frames in the SER file area.

You can also click on the displayed grid. A small vertical cyan cursor will appear on the grid. The position in the corresponding raw image is indicated by a small red circle, and the spectral profile is displayed in the profile area on the right side of the dock.

If you move the cyan cursor along the line, you will see the spectral profile change. If it is not visible after zooming or panning the frame, click on the frame to return it to the position of the mouse.

You can set the values of the profile axes using the context menu by right-clicking and selecting X axis or Y axis.

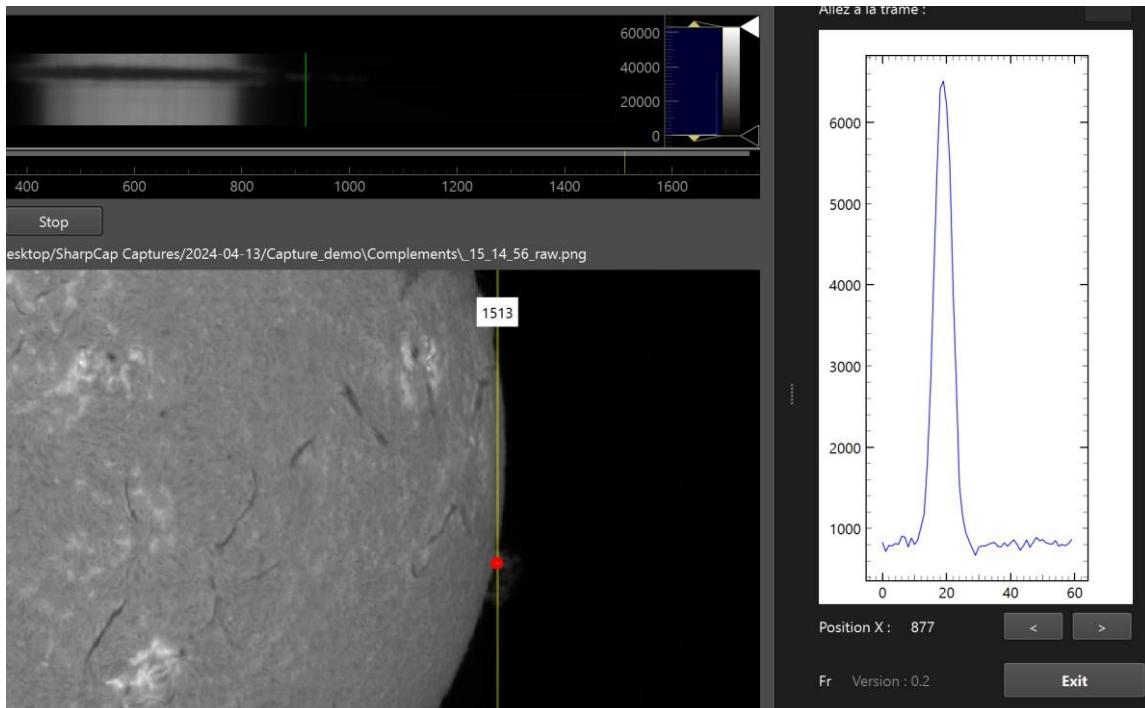


To move within the grid, you can also use the buttons below and see the spectral profile change across the height of the disk.

Position X : 989



Below is an example of a line inversion at the edge of the disk, indicating the presence of a protuberance.



Trim function

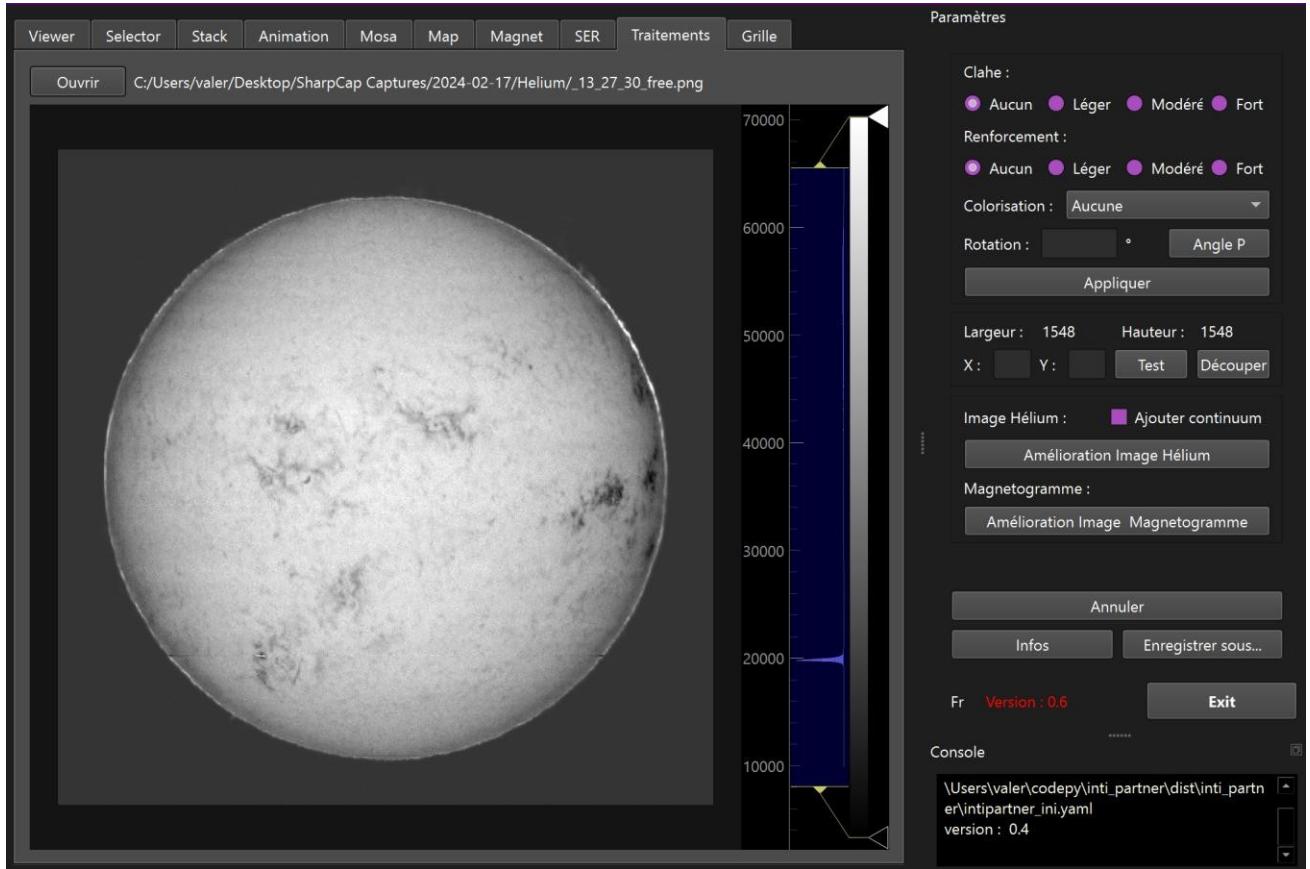
It is also possible to remove frames at the beginning or end of the video and save the modified SER file. To do this, specify the start and end frame numbers, then click on the "Save as..." button.



Note: The "raw" images from the Sunscan application are not "raw" images but images that have already been circularized and without enhancement.

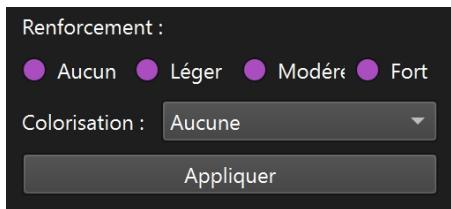
Processing

The Processing application offers the possibility of applying some basic post-processing to a solar image, such as enhancement or colorization. It also offers correction of bands of non-uniformity on processed images such as helium images or magnetogram images, a cropping function, and the subsequent application of a rotation, such as the P angle.



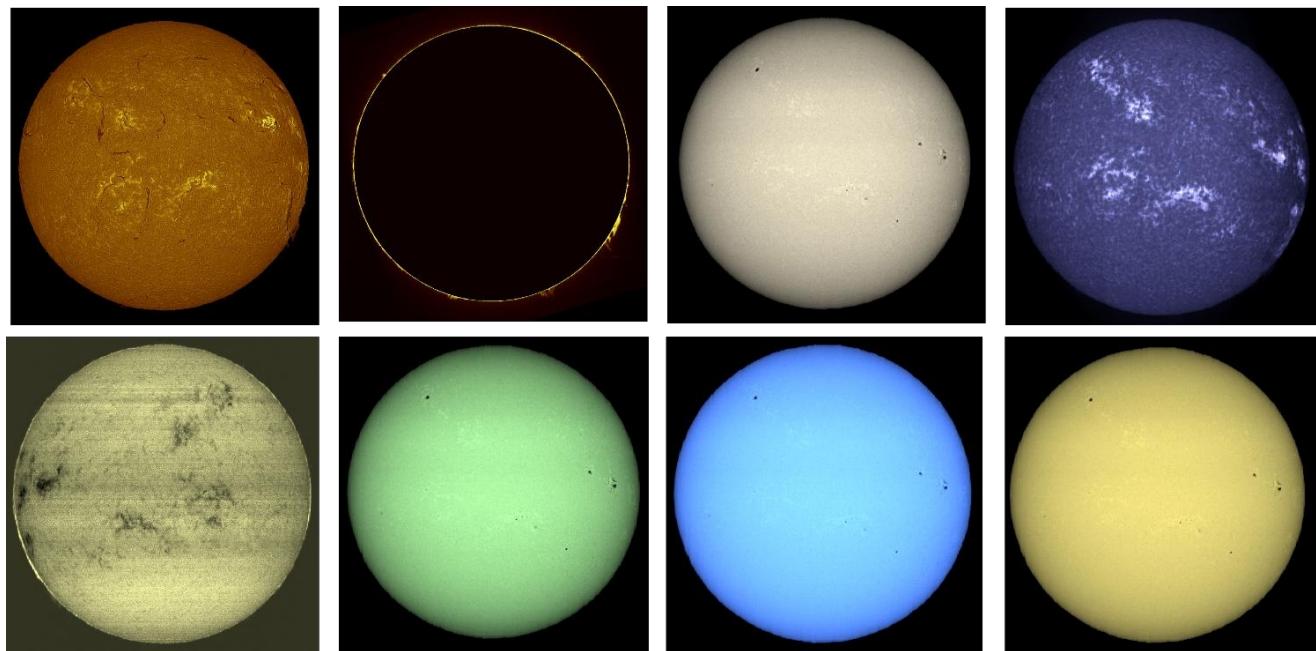
Load the image to be processed using the "Open" button—png and fits formats are accepted.

Enhancement and colorization



Choose the strength of the enhancement filter. Select the color to be applied from the "Colorization" drop-down list. Leave it on "None" if you do not want to apply colorization.

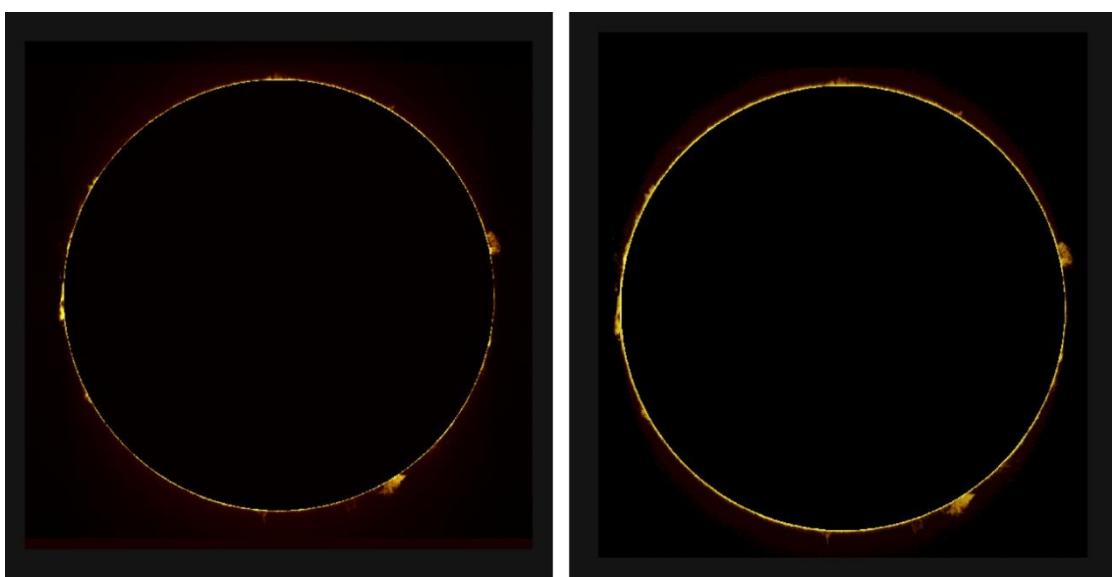
The available colors are chosen based on the main lines: H alpha, Calcium, Pale (for the continuum, for example), Helium (orange line D3), Magnesium (triplet in green), H beta (light blue), Sodium (yellow-orange).



To cancel the processing and return to the original image, click on the "Cancel" button, and to save the result, click on the "Save as..." button.



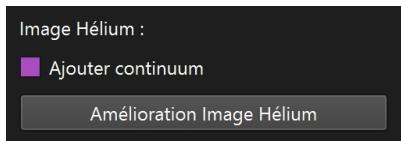
It is possible to process images not generated by INTI in this application.



From left to right: identical SER file, protus image generated by INTI and colorized by Inti_partner – protus image generated by JSolex and colorized by Inti_partner

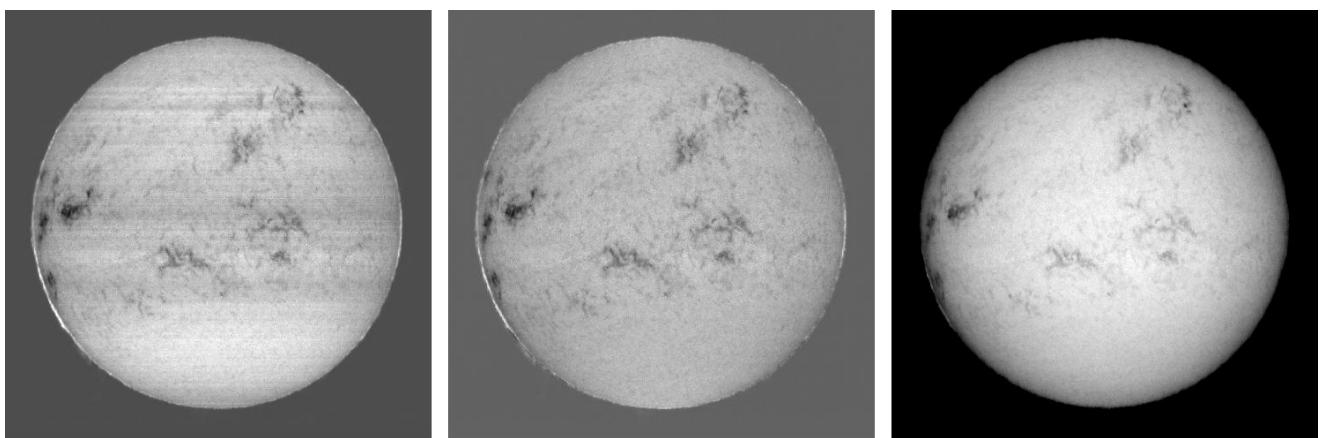
Helium image enhancement

The basic Helium image generated shows a number of bands of non-uniformity related to the image subtraction process. A new "flat" correction can be applied during post-processing. This function is available as an option in INTI 6.4 and above.



Load the image into the main area, click on "Helium Image Enhancement."

If the format is a fots format, the "Add continuum" box combines the continuum image with the helium line image, but only if the xx_sum.fits file was saved when the images were generated with INTI.



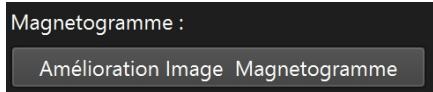
From left to right: single helium line image generated by INTI, image with helium image enhancement, image with enhancement and combination with continuum image.

Similarly, the Cancel button returns you to the original image, and the "Save As..." button saves the image in 16-bit png format.

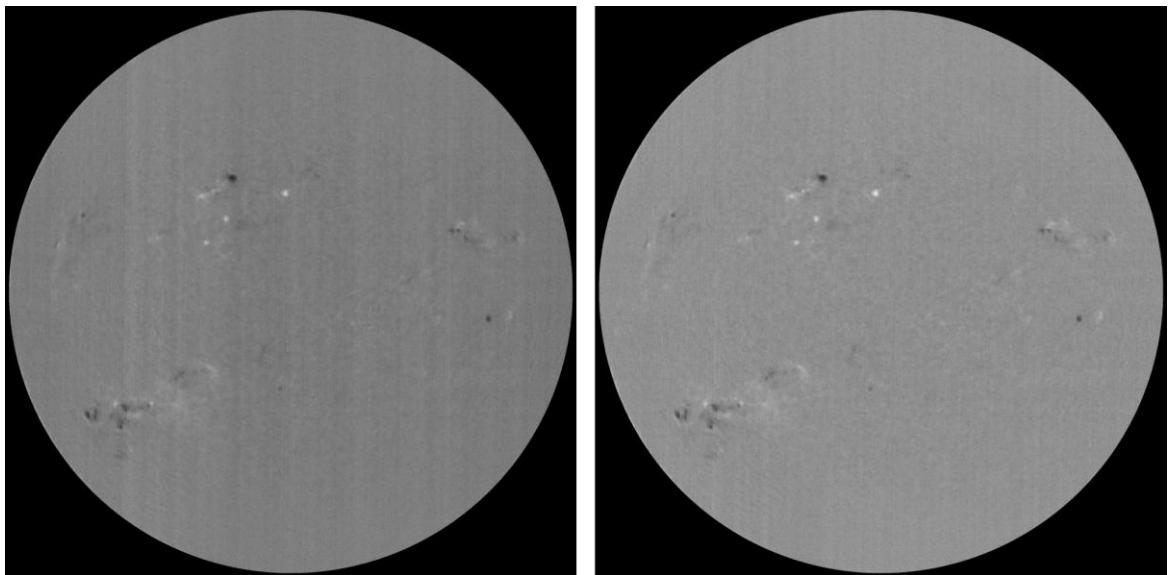
The saved image can then be reloaded to apply enhancement and colorization processes.

It is also automatically loaded into the Grid tab so that you can continue to enhance the image with annotations, distances, etc.

Image Enhancement Magnetogram



The correction is similar to a "non-uniformity" correction as in INTI or Helium image correction, but on vertical bands.

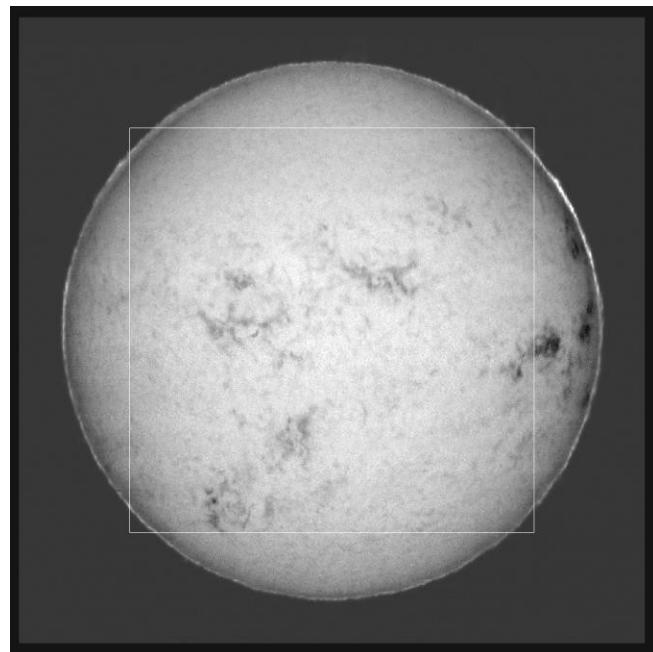


Before/After improvement – Images Olivier Aguerre

Image cropping

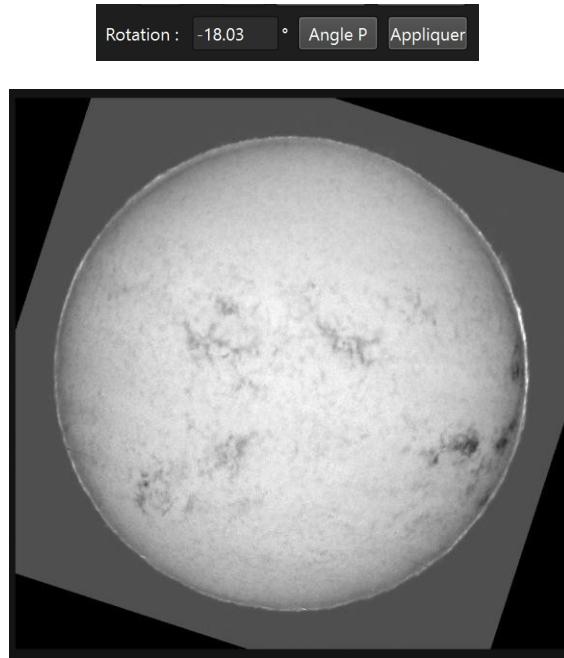
It is possible to recrop the image by specifying the x and y values that redefine the image dimensions. The "Test" button displays a white rectangle that simulates the future image. Then click on "Crop" to perform the operation.

Largeur :	1548	Hauteur :	1548
X:	1000	Y:	1000
		Test	Découper



Rotation

If angle P was not applied when the image was generated, it can be applied retrospectively by clicking on the "Angle P" button and then "Apply," or by applying an angle whose value is entered manually in the field.



To calculate the P angle, the application uses the keyword "DATE-OBS" from the header for a fits file or the information in the log.txt file for a png file.

Display image information

To display either the header or the log file associated with the file, click on the "info" button.

Left: log.txt file content

```
C:/Users/valer/Desktop/SharpCap Captures/2024-02-17/Capture/11_08_25.ser
Largeur et hauteur des trames SER : 1548,60
Nombre de trames : 3448
SER date UTC :"2024-02-17T10:08:25.6455697"
SER date local :"2024-02-17T11:08:25.6455697"
Image moyenne - Limites verticales y1,y2 : 57 1370
Coef a*x2,b*x,c :3.7576e-05 -6.6311e-02 46.86

...image centre...
Limites verticales y1,y2 : 55 1372
Angle de Tilt : -0.7284
Facteur d'échelle SY/SX : +0.5763
Final SY/SX :+1.000
Angle P utilisé: -18.0
Centre xc,yc et rayon : 969 736 667
Centre xcc,yc et rayon : 795 795 667
Coordonnées y1,y2 et x1,x2 disque : 136,1448 136,1453
```

Right: FITS file header content

```
SIMPLE : True
BITPIX : 16
NAXIS : 2
NAXIS1 : 1590
NAXIS2 : 1590
BIN1 : 1
BIN2 : 1
EXPTIME : 0
DATE-OBS : 2024-02-17T10:08:25.6455697
OBSERVER :
INSTRUME :
SITELONG : 0.0
SITELAT : 0.0
OBJNAME : Sun
CONTACT :
WAVELNTH : 0
PHYSPARA : Intensity
WAVEUNIT : -10
INTL_XC : 795
INTL_YC : 795
INTL_R : 667
CENTER_X : 795
CENTER_Y : 795
SOLAR_R : 667
INTL_Y1 : 136
INTL_Y2 : 1448
INTL_X1 : 136
INTL_X2 : 1453
FILENAME : _11_08_25_Manual_20240217_100825.fits
SEP_LAT : -6.9
SEP_LON : 323.0
SOLAR_P : -18.0
CAR_ROT : 2281.0
BSCALE : 1
BZERO : 32768
```

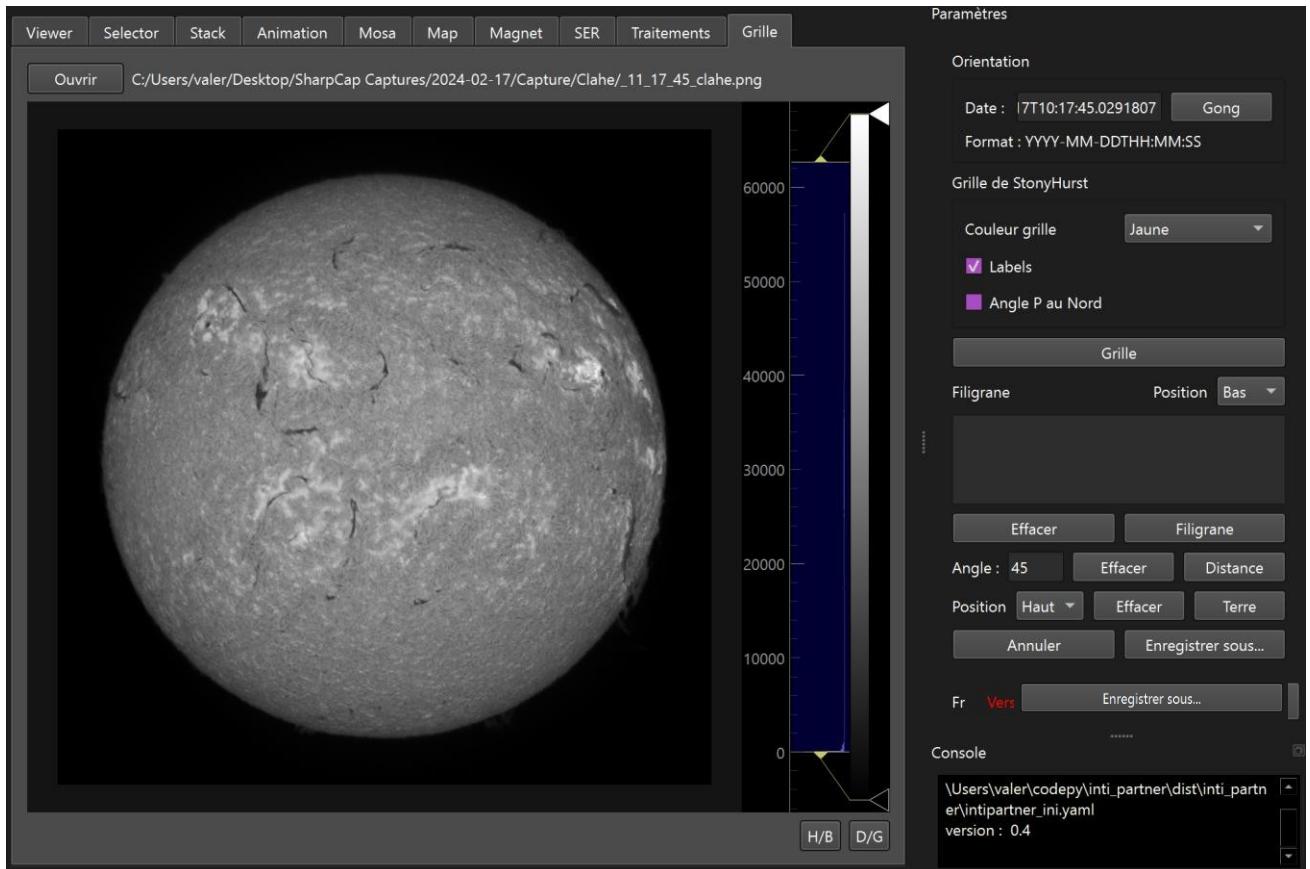
Left: log.txt file, right: FITS file header

Grid

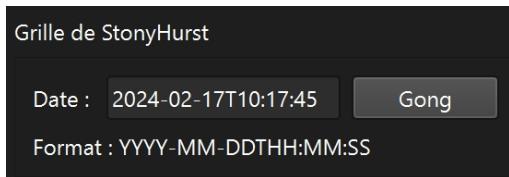
The Grid application allows you to add annotations to a png or fits image.

Helio-centric coordinate grid

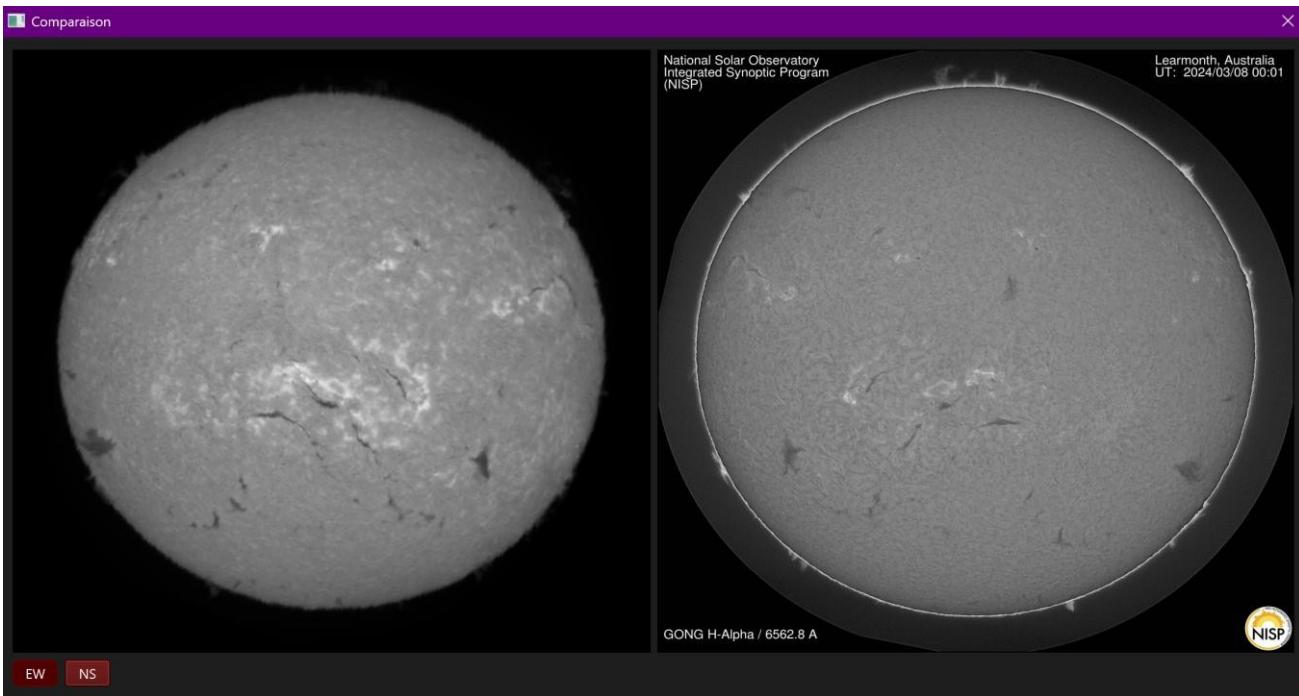
It allows you to create a heliocentric coordinate grid known as Stonyhurst for images in FITS or PNG format using the log.txt file. This function is available in INTI but as an option. The application allows you to regenerate a grid and reuse image orientations without reprocessing in INTI.



Load the FITS image using the "Open" button—the date extracted from the FITS header or the _log.txt file is displayed in the date field of the dock.



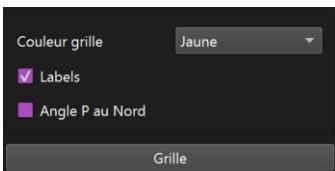
The first step is to check the north-south and west-east orientation of the solar disk. This is because inversions (camera, scanning direction) may occur during acquisition. The "Gong" button can be used to display a professional image that complies with orientation conventions. By comparing the two images, you can determine whether H/B or D/G inversions need to be applied using the corresponding buttons.



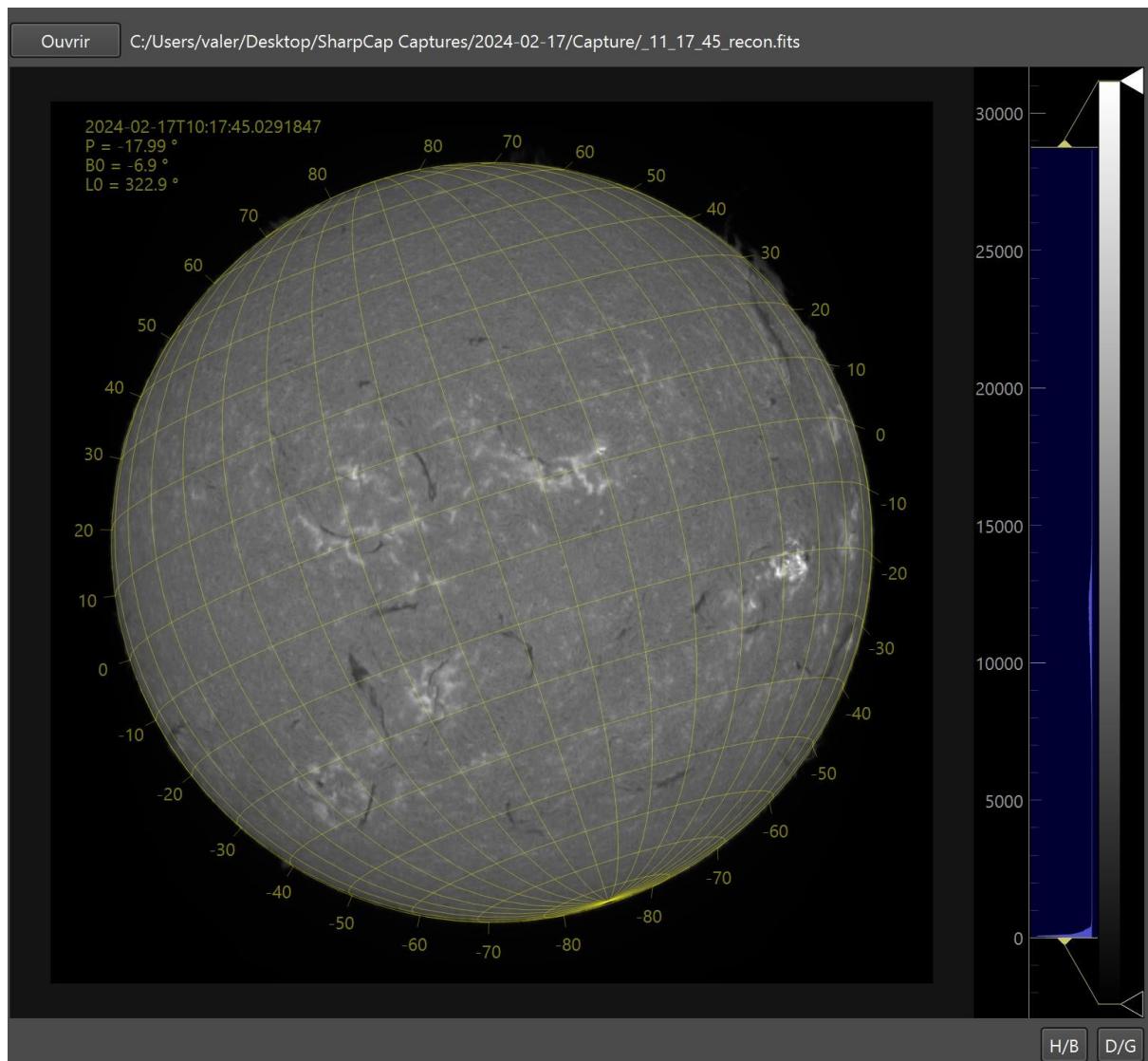
In the example above, a L/R inversion is necessary.

Please note: the orientation must be corrected in INTI in order to have the P angle referenced in relation to correctly oriented axes. The Gong option only allows you to check the correct orientation for the correct calculation of the grid. To do this, go to the viewer, find the SER file and right-click "Open inti". You can then rework the image generation.

Calculate and display the Stonyhurst grid using the "Grid" button.



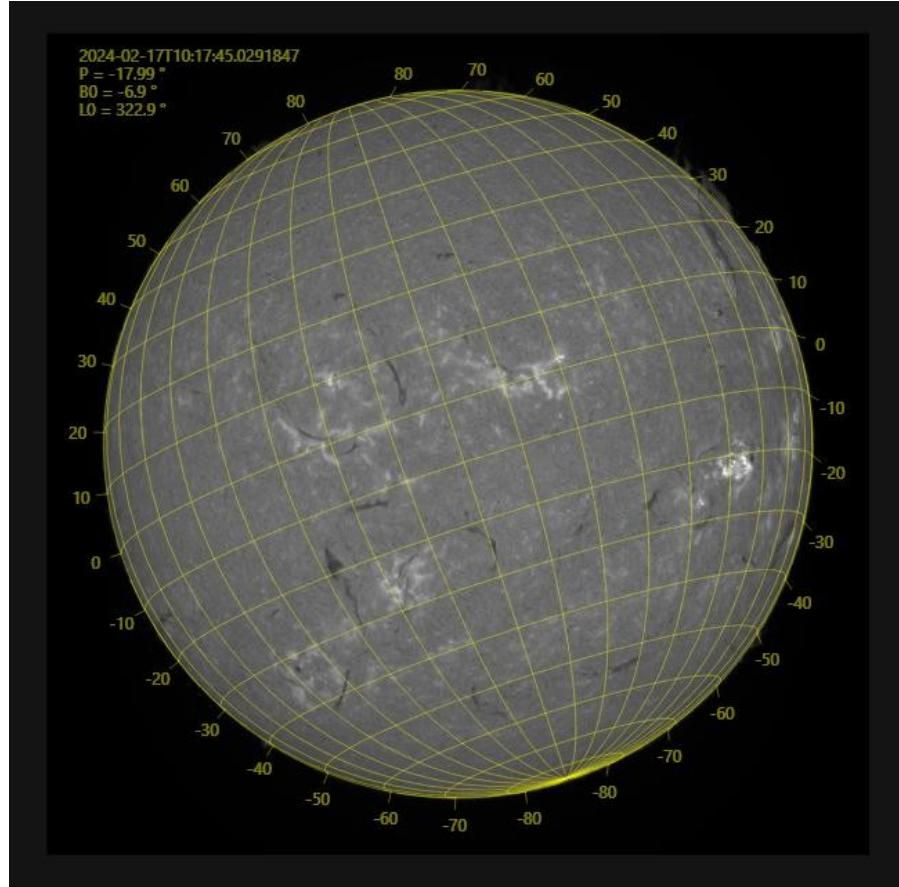
The color of the grid can be changed to yellow, black, or white depending on the contrast of the solar disk. You can also choose not to display the labels, i.e., the heliographic latitudes.



The grid is oriented towards the solar heliocentric pole, defined by angle P, calculated by the application or applied using the "Apply" button. If the image was created in INTI with a correction of angle P that places the solar north at the top, instead of the celestial north, then you should check the "Angle P to North" box so that the angle adjustment is not applied twice.

The information P (solar north pole), B0 (heliocentric latitude of the apparent center of the solar disk), and L0 (longitude of the central meridian) are calculated and placed in an inset at the top right.

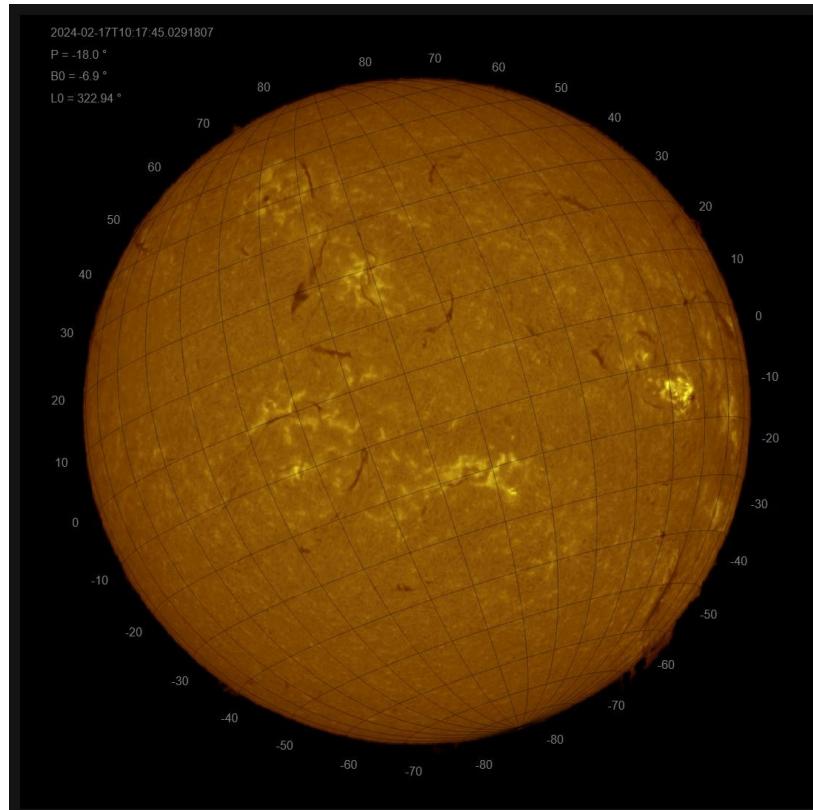
To return to the original image, click on the "Cancel" button.



Note: FITS images from applications other than INTI must provide the following keywords in the FITS header

the keywords for DATE-OBS, CENTER_X, CENTER_Y, SOLAR_R in the format defined by the FITS standard.

INTI Partner can apply a grid to color images if the _log.txt file is present. See the section on log file management.



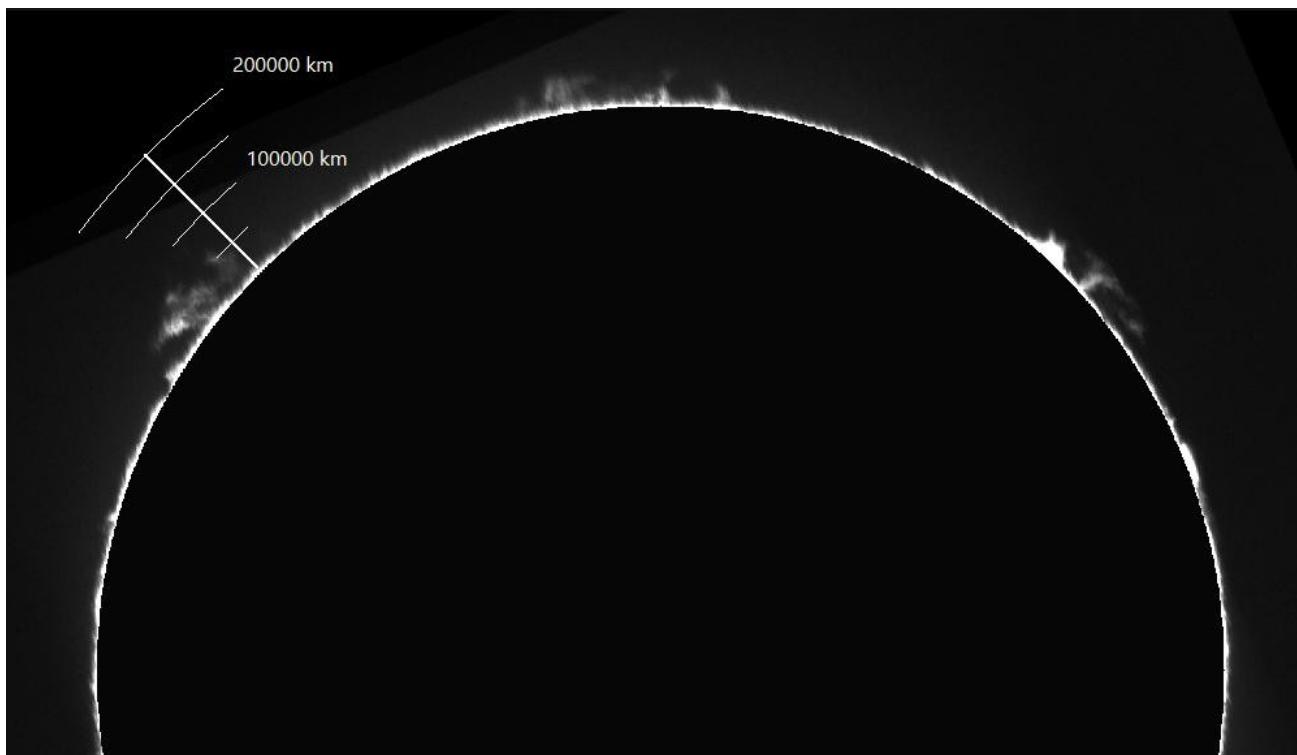
Watermark text

In the "watermark" text box, you can enter a few lines to annotate the image. You can choose to position it at the bottom or top of the image, but it will always be placed on the left. The position is selected using the small "position" drop-down box.



Distance scale

A scale graduated in km of distance above the solar disk can be displayed at the desired angle.



To do this, enter the angle measured at 0 at the top and positive to the right. Or a negative angle from the top to the left. Click on Distance to display the scale. And Clear to erase it.

The image shows a row of three buttons. From left to right: 'Angle : -45', 'Effacer', and 'Distance'. The 'Angle : -45' button is highlighted with a red border, indicating it is active or selected.

Earth to scale

You can also display an image of the Earth at the scale of the solar disk at the top or bottom right. Since the diameter ratio is around 110, the image will necessarily be very small...

Select the Top or Bottom position from the drop-down box, and click on Earth.

Position Haut ▾ Effacer Terre

Click on Earth to display the image and on Clear to remove the display.

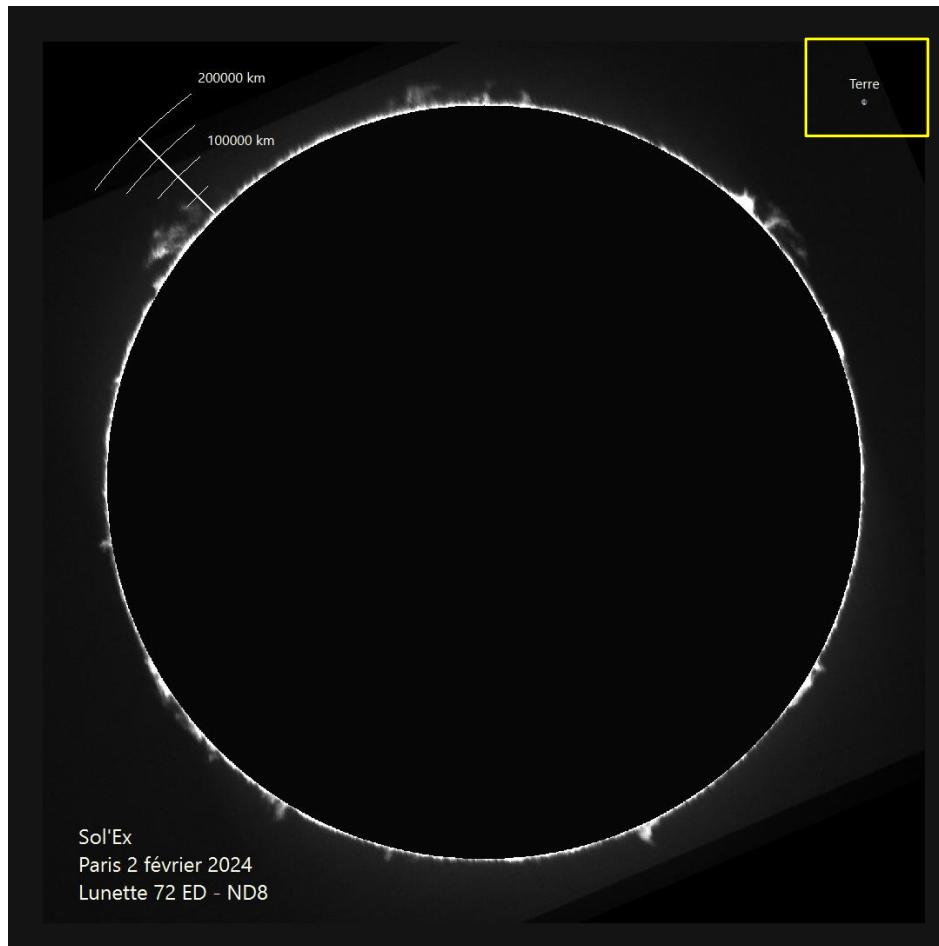
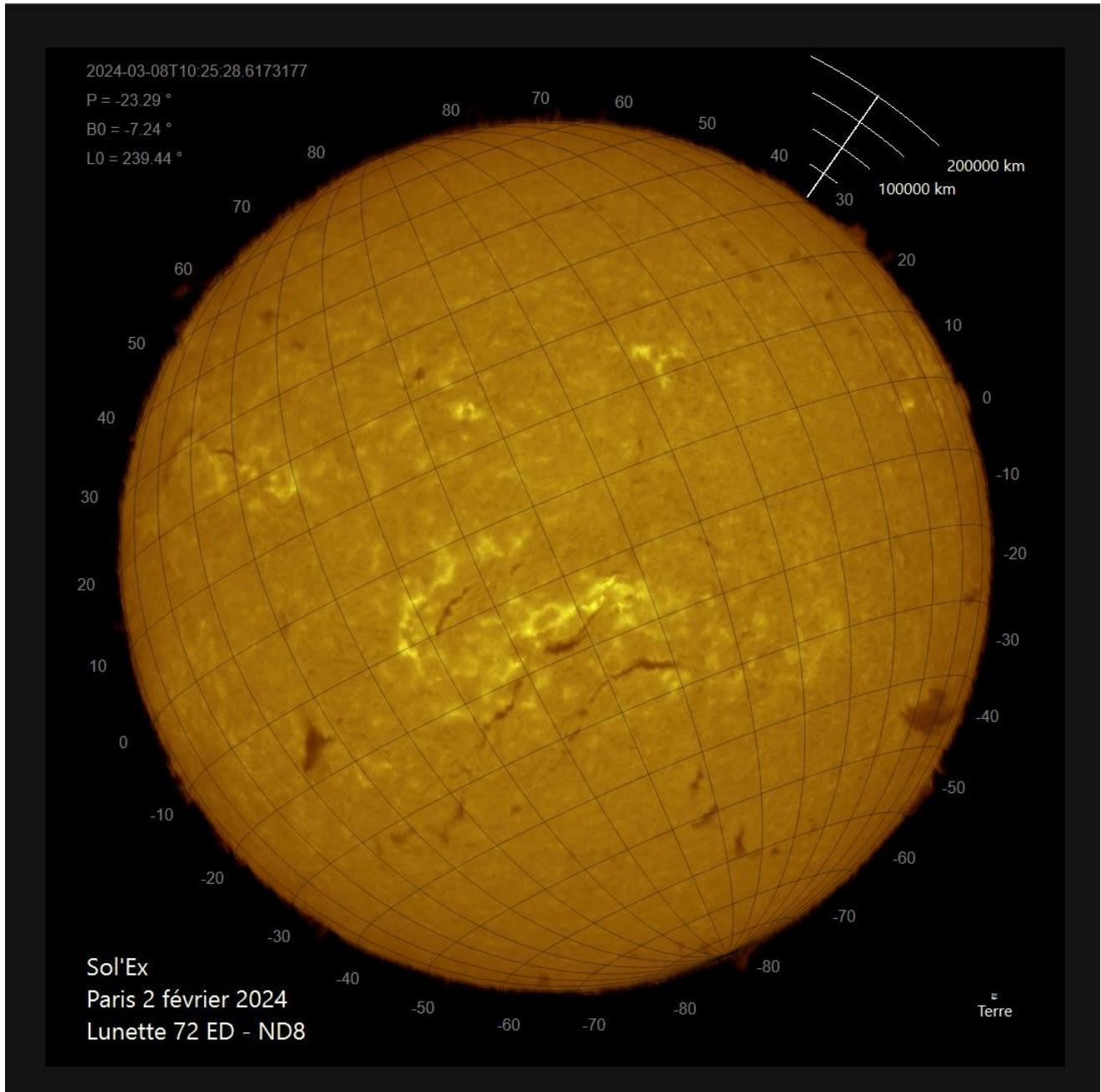


Image of Earth scaled to the size of the Sun

You can save the annotated image using the "Save As" button.



Using log.txt files

PNG images do not have the ability to save parameters in a header like a FITS file. However, information such as the date, center coordinates, and disk diameter are very useful for enriching images.

For each scan processed, INTI generates a file named nomduscan_log.txt that contains these parameters in plain text. Inti Partner can then use them.

During processing, Inti Partner generates additional files, such as a stacking image or a backup of a post-processed image in the processing tab. To keep track of the geometry settings, Inti Partner then copies the log file of the base image with the name of the new saved file.

For a stacked image result, Inti Partner duplicates the log file of the first scan with the name of the stacked image result.

For a post-processed image, it extracts the base name of the image and duplicates the log file with the

name of the new file you are saving. If you reload the post-processed file into the grid tab, you will then have the information you need to apply a grid or a distance.

It is not currently possible to retrieve log information in the case of magnetogram processing. INTI saves the various blue and red wing polarization files without associating them with a log file.

The minimum information to be included in a log file, which could be generated by other software or edited manually, is:

```
SER UTC date: "2024-12-25T13:27:27.000"  
Center xcc, ycc, and radius: 550 550 410  
Disk coordinates y1, y2, and x1, x2: 142.962 142.962
```

The coordinates y1, y2, and x1, x2 are only used by the mosaic application. For other functions, this line must be present but the values are irrelevant. The

log.txt file is used in:

- Animation tab: Time interpolation
- Processing tab: Rotation, Angle P, Info
- Grid tab: Grid, distance
- Mosaic tab: Mosaic assembly