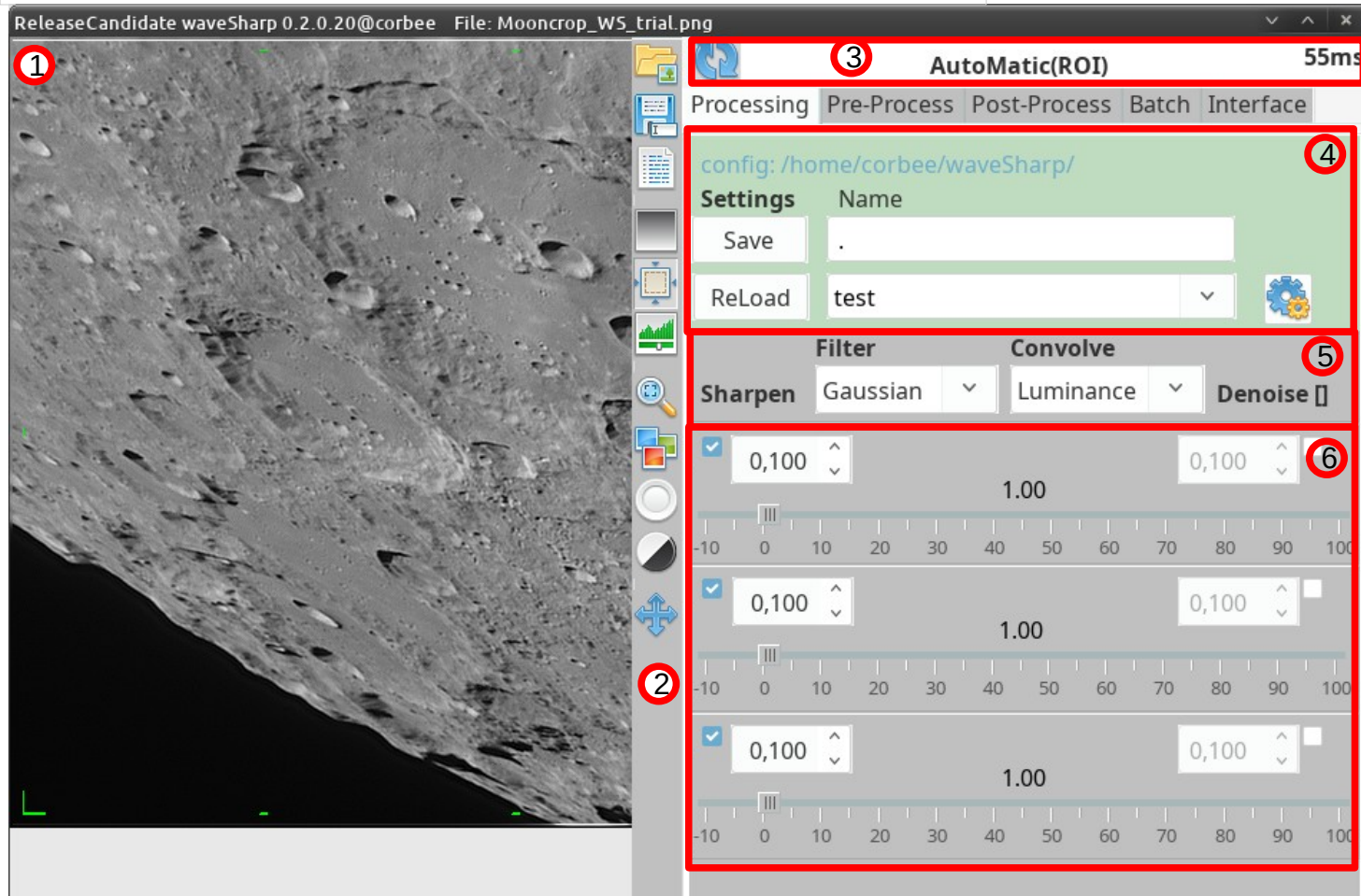


MAIN INTERFACE v 0_2



- 1) Image
- 2) Toolbar
- 3) Processbar
- 4) Presets
- 5) Filter/Convolve
- 6) Sharpen/Denoise layers

Image ROI

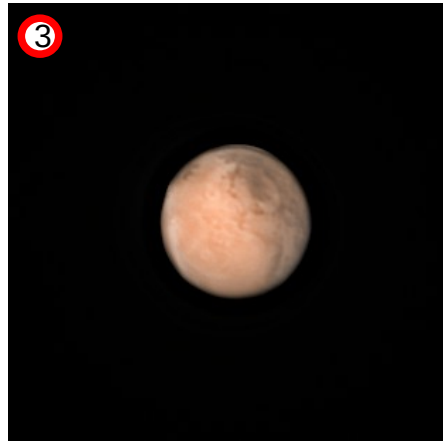
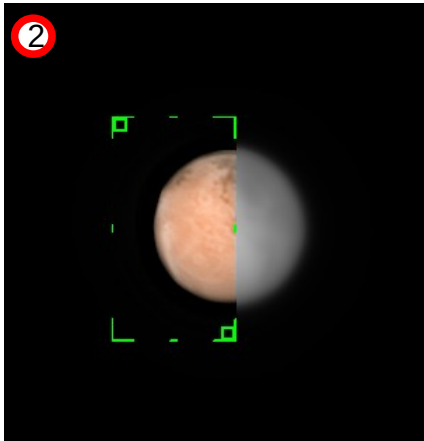


Setting the **ROI** (region of interest) during processing can be done in multiple ways.

In this example(1) the application detected a bright area (planet) surrounded completely with dark pixels. It then sets the processing ROI directly around this with a margin.

The user can control the ROI by dragging the upper-left or lower-right green squares. During dragging the image will not update but when you release the ROI will be updated.

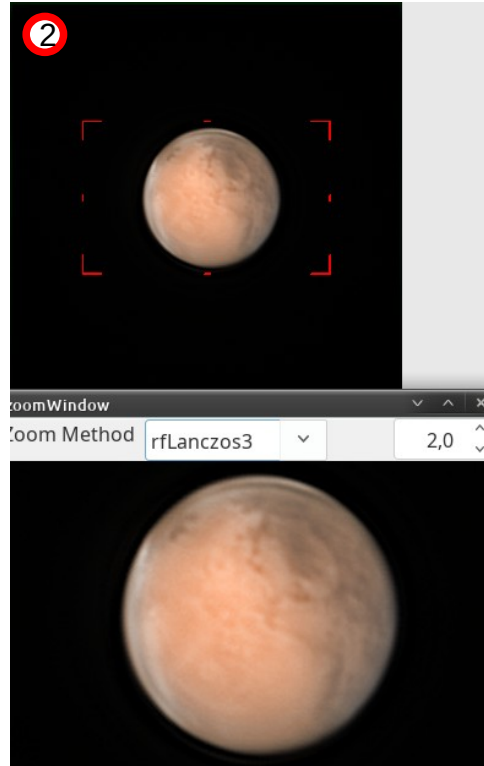
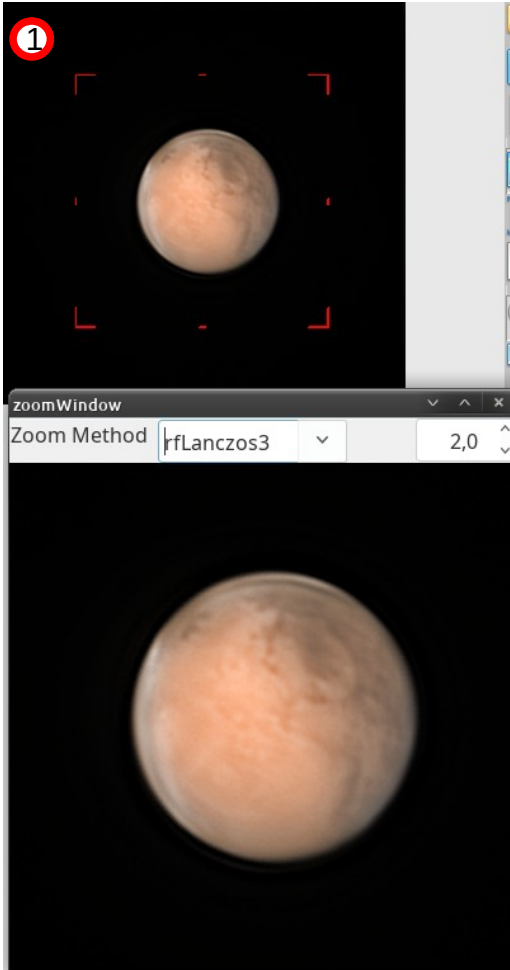
You can also set the corners of the ROI by holding down the the CTRL key. A click with the LEFT mouse button sets the top-left corner. A click with the RIGHT mouse button sets the lower-right corner.



A smaller ROI will result into a faster response of waveSharp when sharpening the image. Especially for larger images the use of an ROI is recommended setting up sharpening/histogram.

You can at any time switch between ROI and the full image (see 2/3) using the ROI button in the toolbar.

Image ZOOM



Setting the Zoom window

By default (1) the zoom window will be set to the middle of your image and will be a square of 400x400 pixels.

You can set the method (Lanczos/Cosine/Mitchell) used to zoom in/out and the scale (between 0.5x and 8x). The smallest scale you can use can be limited by the size of the image you are zooming in. If your image is 100x100 pixels and your zoomwindow is at the default 400x400 pixel size you cannot zoom below of 4x.

You can however change the shape and size of your zoomwindow.

In image 2 the zoomwindow was resized and the zoom-area is also shows this directly.

Toolbar




- 1) **Open File Dialog** : load a PNG or TIFF file
(additionally images can be directly dropped onto wavesharp)
- 2) **Save File Dialog** : save a file as PNG or TIFF
- 3) **Recently loaded files** : the 10 most recently used files/directories
- 4) **Colour or BW processing** : switch between BW and colour processing
- 5) **ROI (region of interest)** : use the ROI during processing and or saving
- 6) **Show Histogram**: opens a histogram window
- 7) **Select Zoom area**: opens a fixed 2x zoom window
- 8) **RGB align**: opens a toolwindow
- 9) **Select whitepoint** : allows selecting a part of the image as a base for RGB-colour-balancing
- 10) **Show darks/highs**: shows pixels that are too dark/too bright(outside the 0..65535 range) after sharpening to show details
- 11) **move image**: allows moving a larger image around with a mouse

PRESETS

config: /home/corbee/waveSharp/

Settings	Name
Save	.
ReLoad	test



This group of controls allows you to use presets for the sharpening/denoise operations. Every preset contains all settings of the filtersizes/sliderpositions and the filterstyle (Gaussian/ZeroGauss/Bilatera;) and Convolverstyle (Luminance/RGB). Selecting a preset will directly process the image.

The **SAVE** button will save a preset using the provided name (currently “.”) in the **NAME** field next to it.
The **RELOAD** button will process using the preset shown in the field to its right. This field has a dropdown which allows you to select from the currently known presets.

If a preset is available with the name “**mydefault**” that will always be used when a new image is loaded.

If a preset is available with the name “**lastused**” that will have the settings when you last closed the application.

On the top-left you see a directory-name, that is where the INI-files of waveSharp are stored. You can click on the link to open that directory.

The cog-wheel on the bottom-right allows you to reset all processing settings to defaults (filters/sliders).

Filter setup

	Filter		Convolve	
Sharpen	Gaussian	▼	Luminance	▼
Denoise <input type="checkbox"/>				

This control allows you to select which type of filter is used and which method is used to convolve (sharpen) the image.

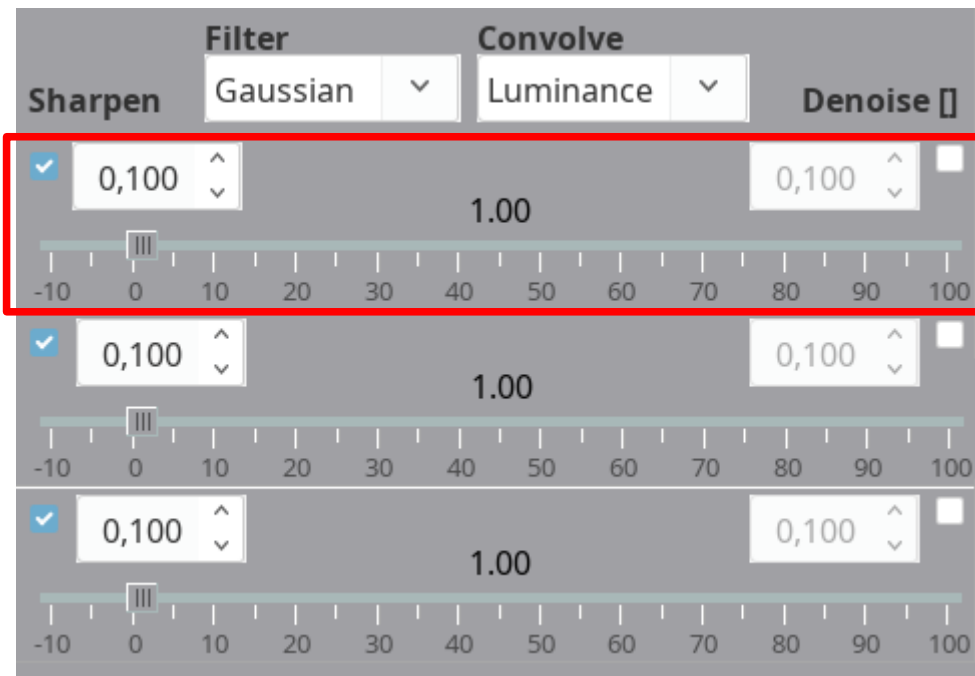
Filter is either Gaussian (RegiStax6 style), ZeroGauss or Bilateral (both new in WS).

Convolve is either Luminance or RGB. Luminance will sharpen the luminance(brightness) of the image but won't change the recorded colours. RGB (as used in RegiStax6) will sharpen each layer separately which will have effects on the colours of the final image.

The Luminance can be derived in two ways, HSL or CIELAB. This is controlled by a setting on the “pre-process” tab.

In waveSharp Luminance is the preferred mode as it only uses the luminance to sharpen the image without altering the original colours.

Gaussian/ZeroGauss Filters



This is the main processing part. The three identical layers have controls for sharpening (checkbox and a filter) and denoising (checkbox and filter). The filters are only active when the checkbox is active. By default all denoise-filters are OFF. Functionality is not different from RegiStax.

The spinners(default 0.100) / slider(default 1.00) also can be controlled using the thumbwheel of your mouse. The slider moves at 0.5 steps using the thumbwheel. Spinners move at 0.02 using the thumbwheel and 0.1 using the arrows next to the spinner. You can also manually enter a value in the textfield of the spinner.

RightClick on the slider will reset its position to the default.

Bilateral Filter

The screenshot shows the 'Filter' and 'Convolve' sections of the waveSharp software. The 'Filter' dropdown is set to 'Bilateral'. The 'Convolve' dropdown is set to 'Luminance'. The 'Denoise' checkbox is unchecked. Below these, there are three identical rows for different layers. Each row has a 'Bilateral Filter' checkbox (checked), a 'Threshold' input field (set to 0), and a 'Bilateral' checkbox (checked). The 'Bilateral' checkbox is checked for the first two layers and unchecked for the third. Each row also has a '1.00' label and a slider bar ranging from -10 to 100.


The **Bilateral** filter is a special version of the default **Gaussian** filter. This filter can prevent the halos/ringing that normally show up during sharpening at areas of an image with strong gradients. This technique is well known and documented.

The implementation of the **Bilateral** in waveSharp is slightly different implemented.

Bilateral is by default only setup to be used on the 1st layer of the image (checkbox) but you can use all layers with it. The gaussian filtersetting (on the left of each layer) and the denoise (on the right) function as normal.

The additional **Bilateral Filter** setting controls the “width” of the bilateral effect. By default this starts at 1 which is nearly always too small. You can increase the width until you start to see only a gaussian-sharpened image. When the width is set high the bilateral operates like a normal gaussian filter.

The **Threshold** controls on which pixels bilateral is used. Its default setting of 0 means that the bilateral filter will only be active is the pixel is on a gradient that is lower than zero. That means the pixel is brighter than its neighbours. If you put threshold above zero that means pixels that are brighter than their neighbours are also affected by the bilateral. The intensity difference between neighbouring pixels is used to control the gaussian.

Default directory
 
Colour settings

ColourWeights

☒ Default☐ User

RGB	Weight
Red	299
Green	587
Blue	114

Luminance Model

☒ HSL☐ CIELAB**When loading**Hold all settings ☐

Reduce Image brightness (%)

0



Pad Edge (black pixels)

0



Flip Image

☐ X-axis☐ Y-axis

Rotate Image

☒ 0☐ 90☐ 180☐ 270**Rotate after loading**☐ keep rotation setting

Angle: 0.0

PREPROCESS

This tab has controls that are used before/during the loading of an image.

Default Directory(S): This selects a directory that will be used at startup.

Colour Weights(S): When sharpening using the luminance with the HSL colour-model we convert RGB values to Luminance based on weights.

Luminance Model(S): When sharpening using Convolve=Luminance and/or when changing saturation in the histogram RGB values have to be converted to luminance. Two colour-models are available for this: HSL and CIELAB. HSL will use user-defined colour-weights if set.

Hold all Settings: When this is active the processing/histogram settings will not reset to default at the load of a new image.

Reduce brightness: When loading an image that is relatively bright sharpening might lead to overlit areas that cannot be resolved properly. To counter this an image can be loaded at a lower maximum brightness, this does NOT have any effect on sharpening.

Pad Edge : This will add black pixels on all edges and increase the dimensions.

Rotate/Flip when loading(S): Images can be prerotated or flipped around the axis, the dimensions of the image will follow the rotation.

Rotate after loading: This will rotate the image inside its view (no change in image dimensions)

(S): setting is automatically stored

Processing

Pre-Process

Post-Process

Batch

Interface

Options

Edge (pixels)

Trim

▼

0

^

▼

Resize

Scale Image(%)

Image (width)

100,00

^

▼

0

^

▼

ResizeMethod

☒ Bicubic

☐ Lanczos

Save

☐ use ROI

☐ resize

☐ Trim or Fill

POSTPROCESS

This tab has controls that are used when saving an image.

Edge: Edge can be set to either **TRIM** or **FILL**. When set to **TRIM** this will remove pixels on the edge of an image(shrinking). When setting this will be shown on screen as a dark-gray edge around the image. When set to **FILL** the image will keep the same dimensions but the pixels on the edge will be set to black.

Resize: When saving an image this setting allows the image to be scaled from 25% to 400% of the original image. The width of the resulting image can also be controlled directly by the Image-width field. Two methods for resizing are available, bicubic and lanczos(3).

Saveing:

Setting any of the Resize or Edge controls will automatically set the **resize** or **Trim/Fill** checkbox. But they can be still controlled by checking/unchecking.

When you select **use ROI** the trim/fill setting will deactivate and vice versa.

If you change the **use ROI** or **resize** settings this is mimicked on the batch processing control.

BATCH

Batch processing will use all settings from sharpening/histogram on each image.

Processing Pre-Process Post-Process Batch Interface

1 Select Batch **3** Test Batch(not s g)

2

- ☒ 2022-12-17-0140_4_mars_lapl6_ap29.png
- ☒ 2022-12-17-0146_4_mars_lapl6_ap29.png
- ☒ 2022-12-17-0152_4_mars_lapl6_ap29.png
- ☒ 2022-12-17-0205_6_mars_lapl6_ap29.png
- ☒ 2022-12-17-0211_6_mars_lapl6_ap29.png

Files selected (18)

Save Batch Processed

postFix **4**

subDirectory

☐ use ROI **5**

☒ resize **6**

Save Batch PNG **6**

Create Animation

animated FPS **7**

☐ use ROI

☐ reverse at end

width (pix)

GifColours **8**

9 GIF **9** APNG

filesize ()

1) Select Batch: This opens a dialog where files can be selected.

2) Filelist : This shows the selected files. You can inspect the images by stepping through them and select/unselect the checkmarks.

3) Test Batch: This allows you to test-run the batch process on all the files without already saving them. Each processed image will be shown on screen.

4) postfix/subDirectory: The processed files will be saved with a postfix added to the original name and inside a sub-directory of the original files.

5) use ROI/resize: you can crop (ROI) or resize the image during batch processing. The crop will be at the same location for each image and resize is uses the settings from the post-process section

6) Save Batch: You can save each image as a PNG/TIFF or keep the original format (can be mixed).

7) 8) 9) Animations

Animations can be created directly from the files in the batchlist and will use the processing/histogram settings. Animations can be reduced in filesize by using ROI and/or setting the width of the animation-image.

Animations can also be reversed at the end to allow a “continous” loop.

For GIF the no of colours used in the animation can be changed to limit the filesize, a value lower than 128 will lead to a very limited colourset.

Interface



☐ use MenuBar

Tools

cISilver

Settings

cIMoneyGreen

Processing Tab

cISilver

Check for a new version

☐ Never

☒ Always

☐ Daily

Reset Configuration storage

INTERFACE

The Interface Tab has several controls that allow the user to modify parts of the interface. These settings are automatically stored when leaving the application.

Use MenuBar(S): by default waveSharp does not use a menubar. If you select this checkbox a menubar will appear on the top that has the file open/save options and recent files options.

Tools/Settings/Processing Tab(S)

The buttons of these controls allow the user to set the colours of parts of the interface. Click on the button to the right of the control to select a colour.

Check for a new version (S)

This control will check for the latest available version of waveSharp on the repository. By default this is OFF, but you can set it to

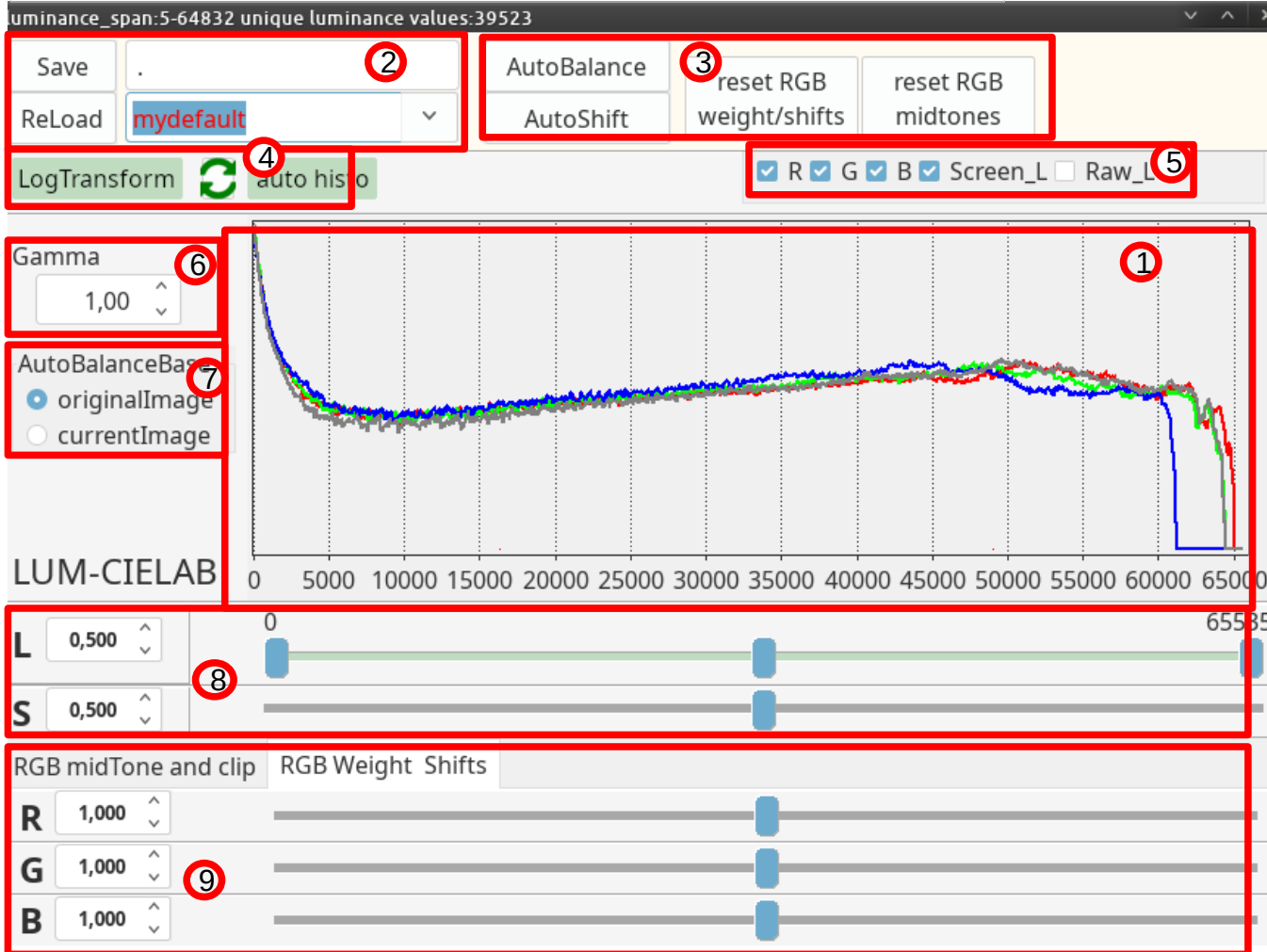
- always: checks at each startup of waveSharp
- daily: checks at the first startup of waveSharp each day

Reset Configuration Storage (S)

This allows you to set the default storage (seen in the processing tab) for configuration files.

(S): setting is automatically stored

HISTOGRAM



1) Histogram. Can show RGB (coloured lines) and Luminance (gray).

2) Settings. You can save the settings of most of the controls (except lo-hi clipping). Functionality is alike the settings on the MAIN window.

3) 7) Colour Balancing: this works in conjunction with (7). When you press **AutoBalance** the application will try to create a white-balance for the image.

4) Histogram updates. These control how the histogram is updated.

5) channels: The histogram can show RGB, and the Luminance on screen(Screen_L) and the raw luminance.

6) Gamma: A simple gamma control

8) Luminance and Saturation. These controls have a spinner (left) and a slider. The slider has a middle thumb and L also has a hi-lo thumb.

9) RGB. The RGB section has many controls that allow shaping the image/histogram

Save		
ReLoad	mydefault	▼

This group of controls allows you to use presets for histogram operations. Every preset contains most of the settings (but no clipping values).

The **SAVE** button will save a preset using the provided name (currently “.”) in the **NAME** field next to it.

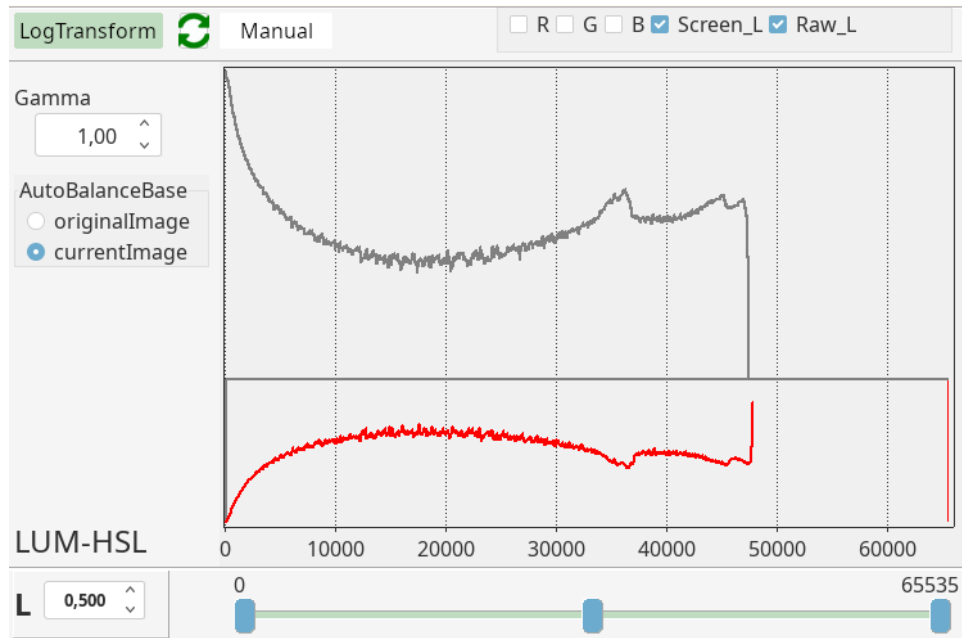
The **RELOAD** button will process using the preset shown in the field to its right. This field has a dropdown which allows you to select from the currently known presets.

If a preset is available with the name “**mydefault**” that will always be used when a new image is loaded.

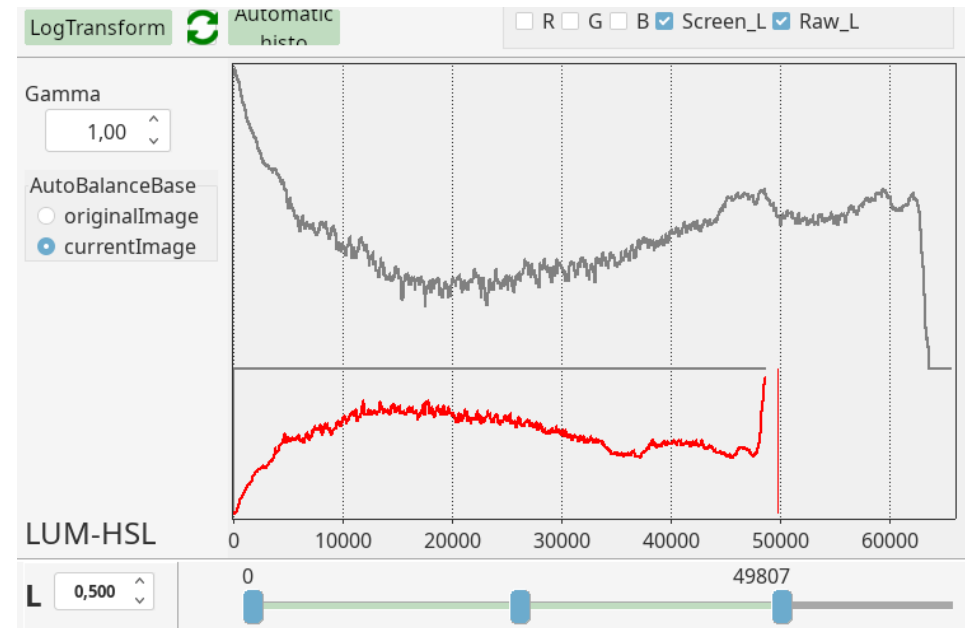
LogTransform		auto histo
--------------	------------------------------------------------------------------------------------	------------

These 3 buttons control how the histogram appears. By default histograms are shown “**logTransformed**”, clicking this button will switch to “**Linear**”.

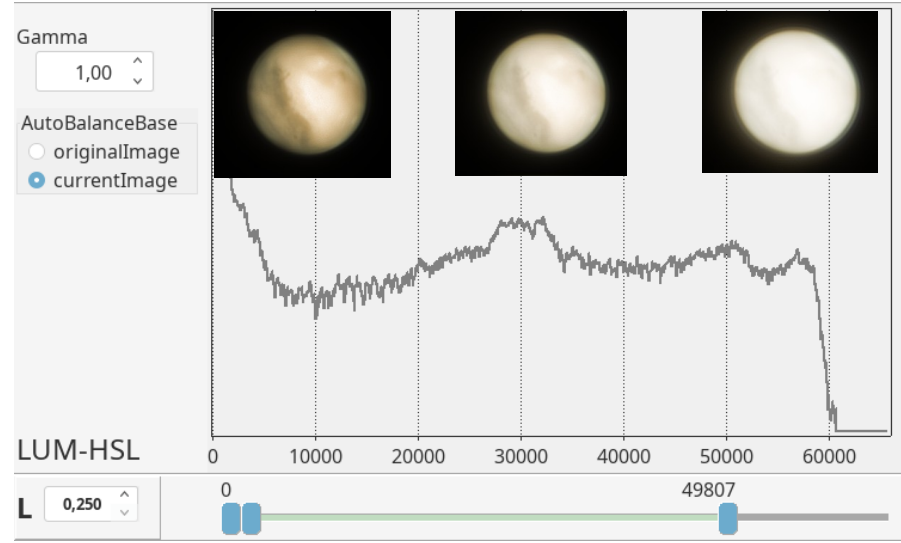
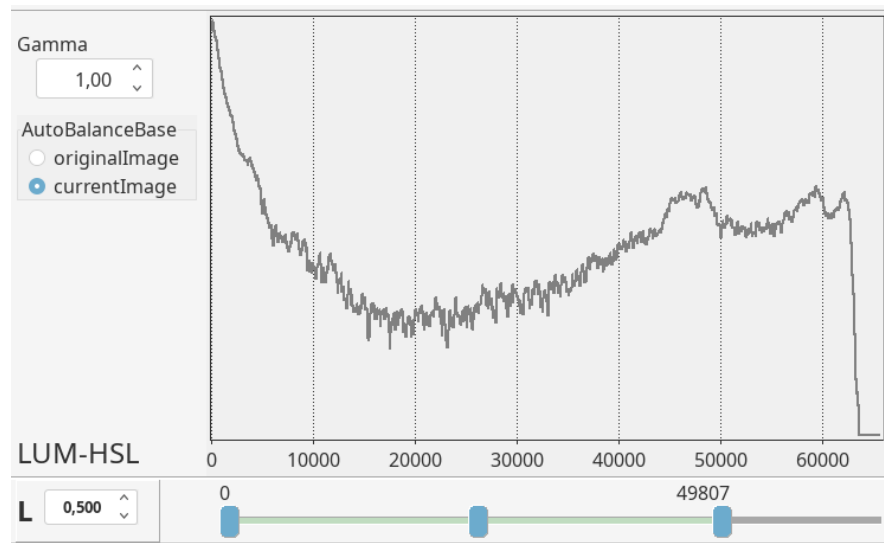
Also by default histograms are recalculated automatically. When pressing the “**Auto histo**” button this becomes grayed and recalculations are manual. The button in the middle can be pressed at all times to recalculate the histogram.



The controls on the top allow looking at the different colour channels and the luminance of the image. This shot shows both the luminance of the visible image and the raw image (from sharpening). This is before any sharpening and the curves are thus equal. Notice that the raw luminance is shown with a negative axis and at half the height of the screen luminance.

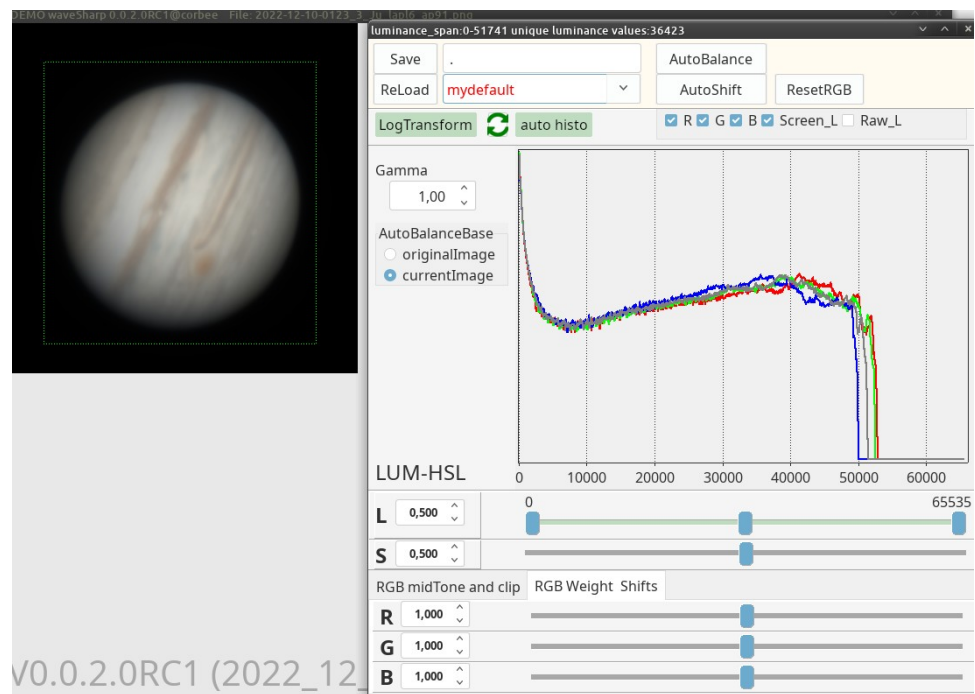
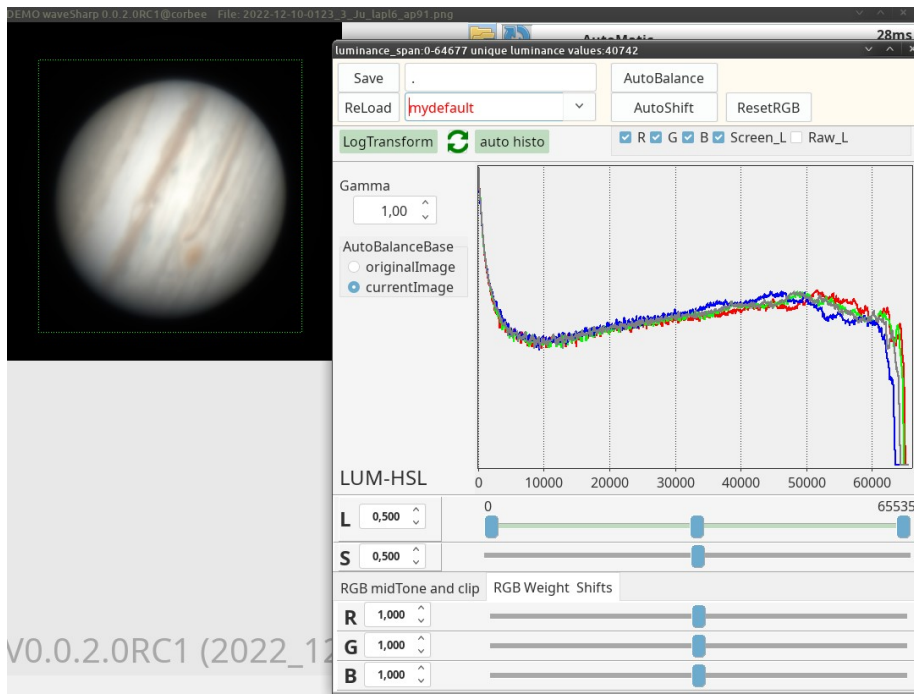


In this image the luminance values have been “clipped”. The highest luminance value (the vertical line in the raw_L graph) is just above the maximum value. This has increased the luminance of the image on screen to be close to the maximum value that can be displayed on screen. The left/right thumbs of the luminance slider allow clipping the image to a section of the available luminance values. The labels above the thumbs will show the actual clipping values.



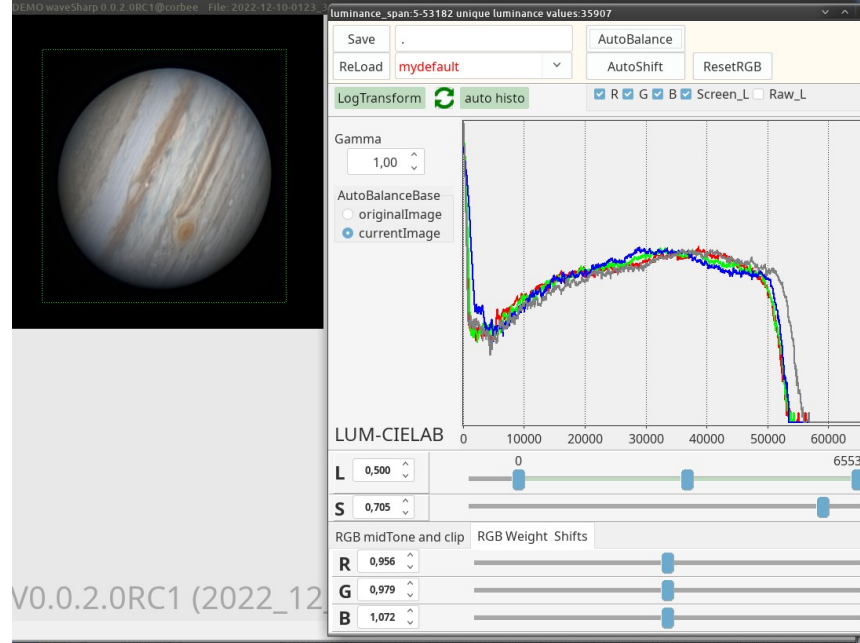
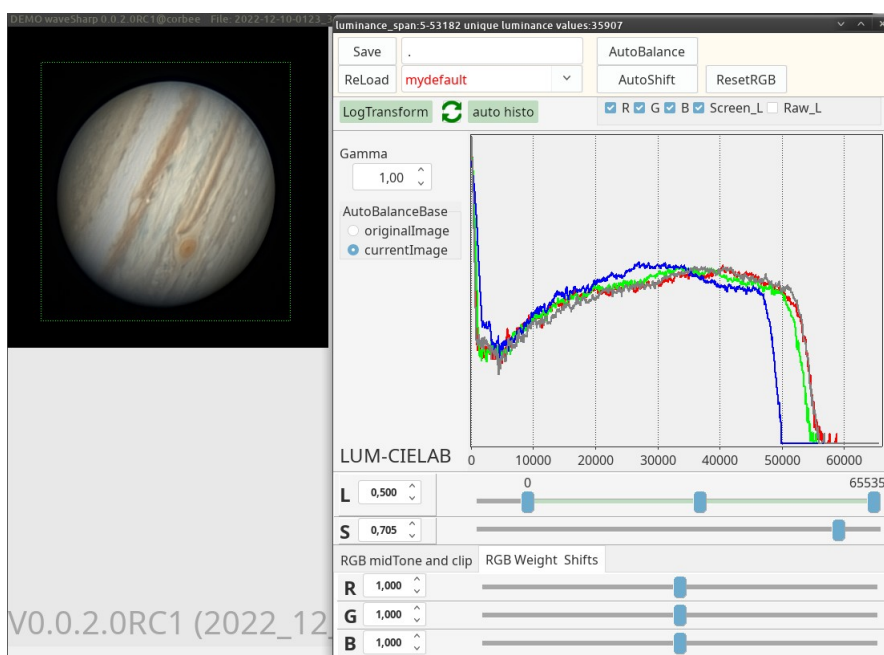
Warning: these are just examples to show the functionality of the controls, most of the time using the extreme values of a slider isn't a good way to enhance images.

This example shows how the midTone position can change the appearance of an image/histogram. On the left is the default histogram with midtone at 0.5. Shifting the midtone to the far left(0.25, either by setting the spinner or the middle thumb of the slider) will darken the average of the image (see leftmost image of mars) but the histogram still uses the same span of image intensities. The two other images show the midtone at 0.5 (default, unaltered histogram) and 0.75(brighten the average).



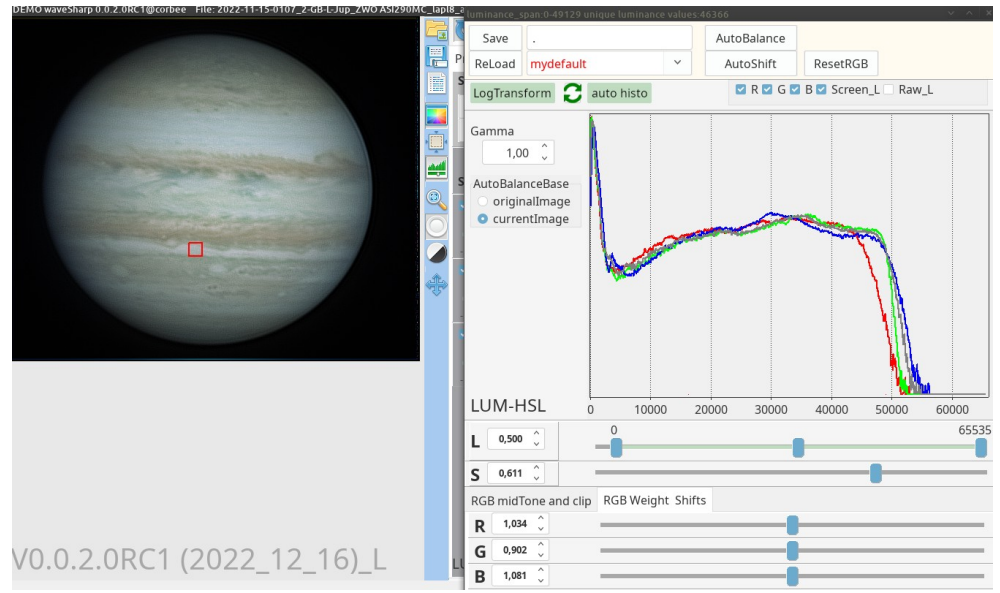
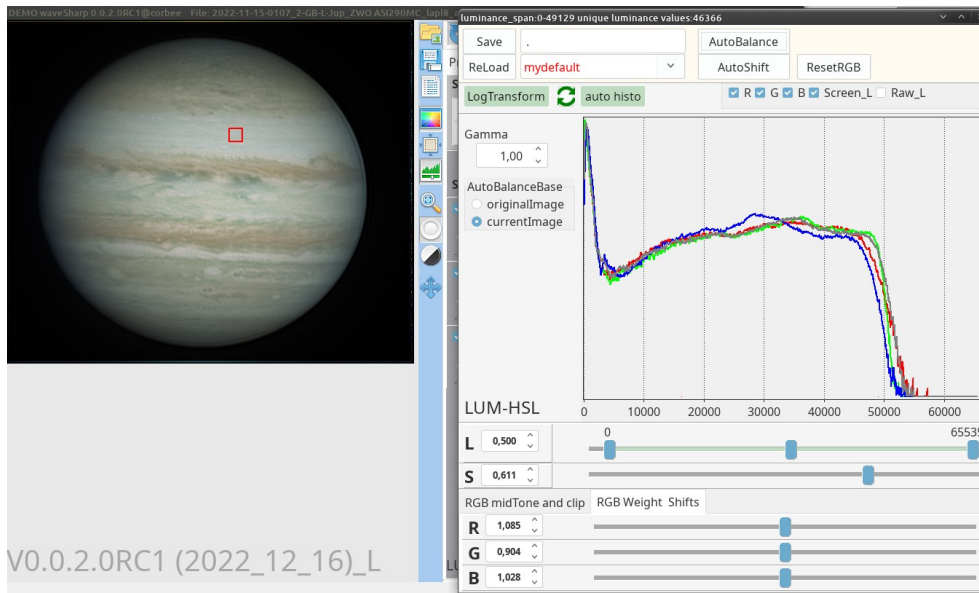
Reduce brightness at load

On the Luminance conversion tab we have a setting that allows (only when loading a new image) to reduce the brightness of an image. This can come in handy when the stacked image is close to full brightness. In these cases using sharpening will brighten the image further without an option to prevent overlit sections of the image. This control allows you to reduce the image brightness. The example above shows an image loaded without reducing brightness (left) and with the control set to 20%. Although the image on the right looks dimmer at the screen this can be easily changed by using the luminance rightmost thumb of the slider.



Automatic Colour Balance

After changing the saturation of an image (and all other settings of the colour-sliders) you can use AutoBalance to estimate “weights” for the RGB channels that will remove a colour-cast from the image. The histogram on the right clearly shows how the different colours now have more overlap than before. This procedure is NOT failsafe, if your image should be looking on average for instance a bit “reddish” (like mars) using Autobalance might give odd results. You can use resetRGB to set the colourweights back to the normal position.



Whitepoint colour-balance

Another way to get an estimate for a colour-balance is to use the whitepoint control (white circle in the toolbar below the zoom-icon). When this control is active you can click on the image to set a box in an area that should appear “white/gray”. Using the pixelvalues of that area the application will estimate a new colour-balance by changing the weights for RGB (see lowerleft values). You can change the area by simply clicking at a different spot.

The thumbwheel of your mouse can be used to increase/decrease the size of this area, make sure you are not ON the box itself when you do that.