

OCTExplorer 3.8.0

User Manual

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Requirements

- **OS: Microsoft Windows**
 - Windows 7 or above recommended
 - Other OSs are not supported.
- **Minimum hardware**
 - Screen resolution: 1024 x 768 pixels
 - Memory size: 4 GB

Installation

- **64-bit version:**
 - Run 'OCTExplorer-3.8.0-x64-Setup.exe'.
- **32-bit version:**
 - Does not support it because more than 2 GB memory is required to segment retinal layers.

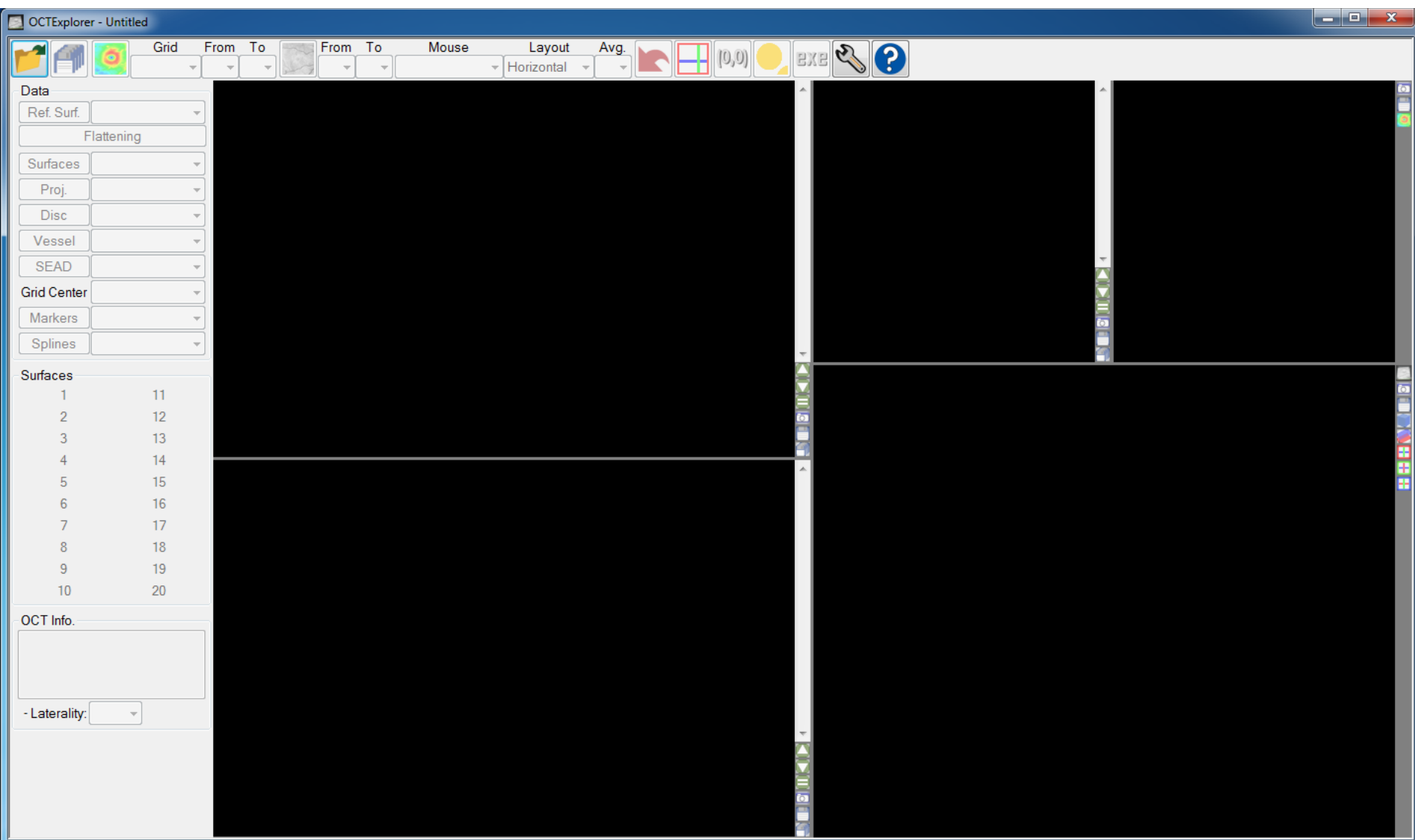
License



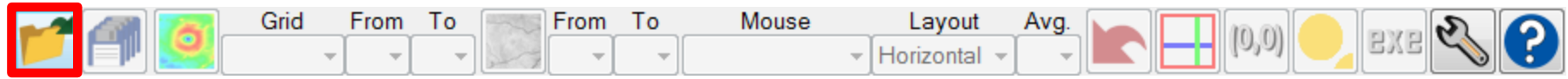
OR

- Free of charge for research use

Appearance



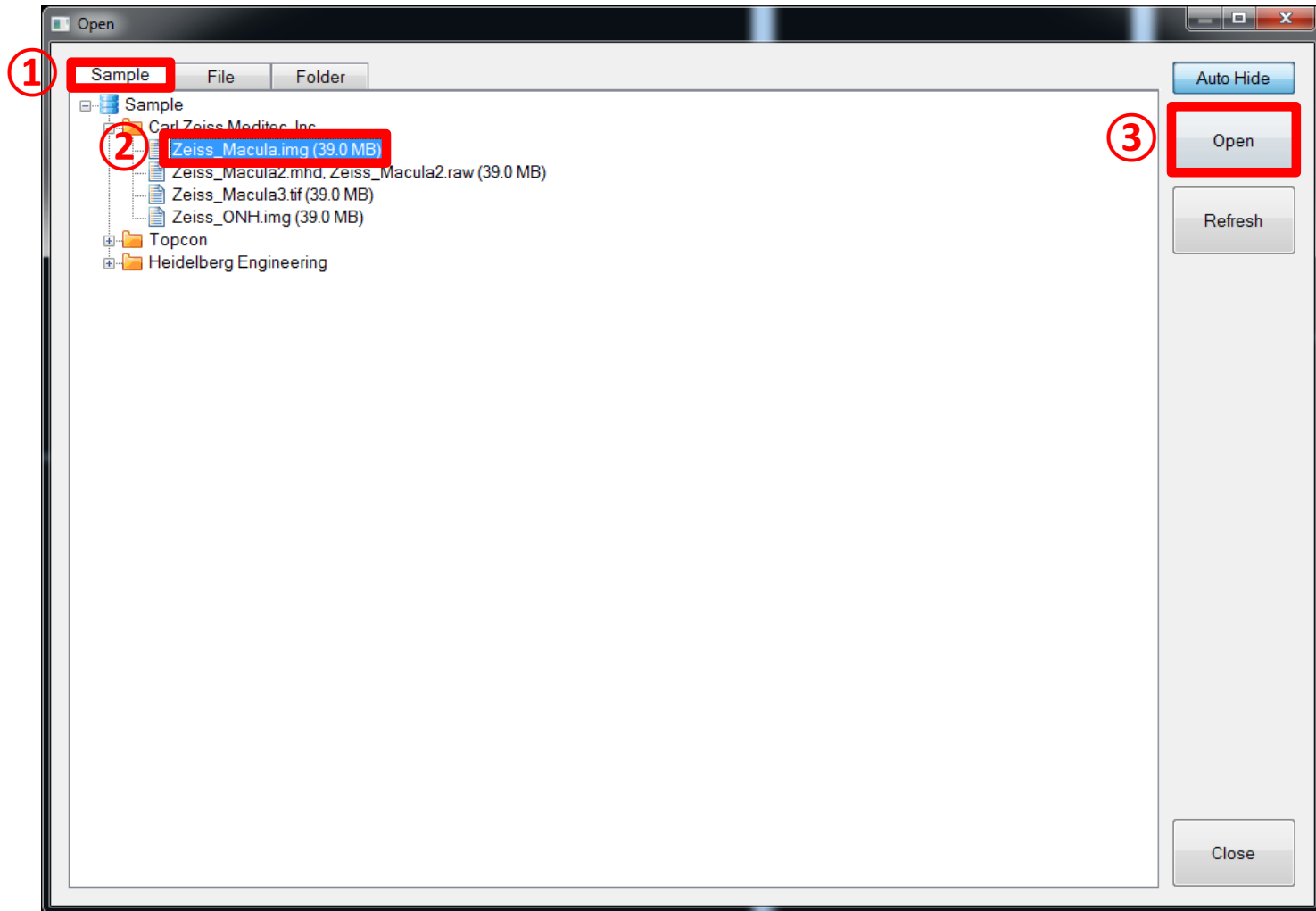
Opening OCT Scans



- **Supported OCT scans**

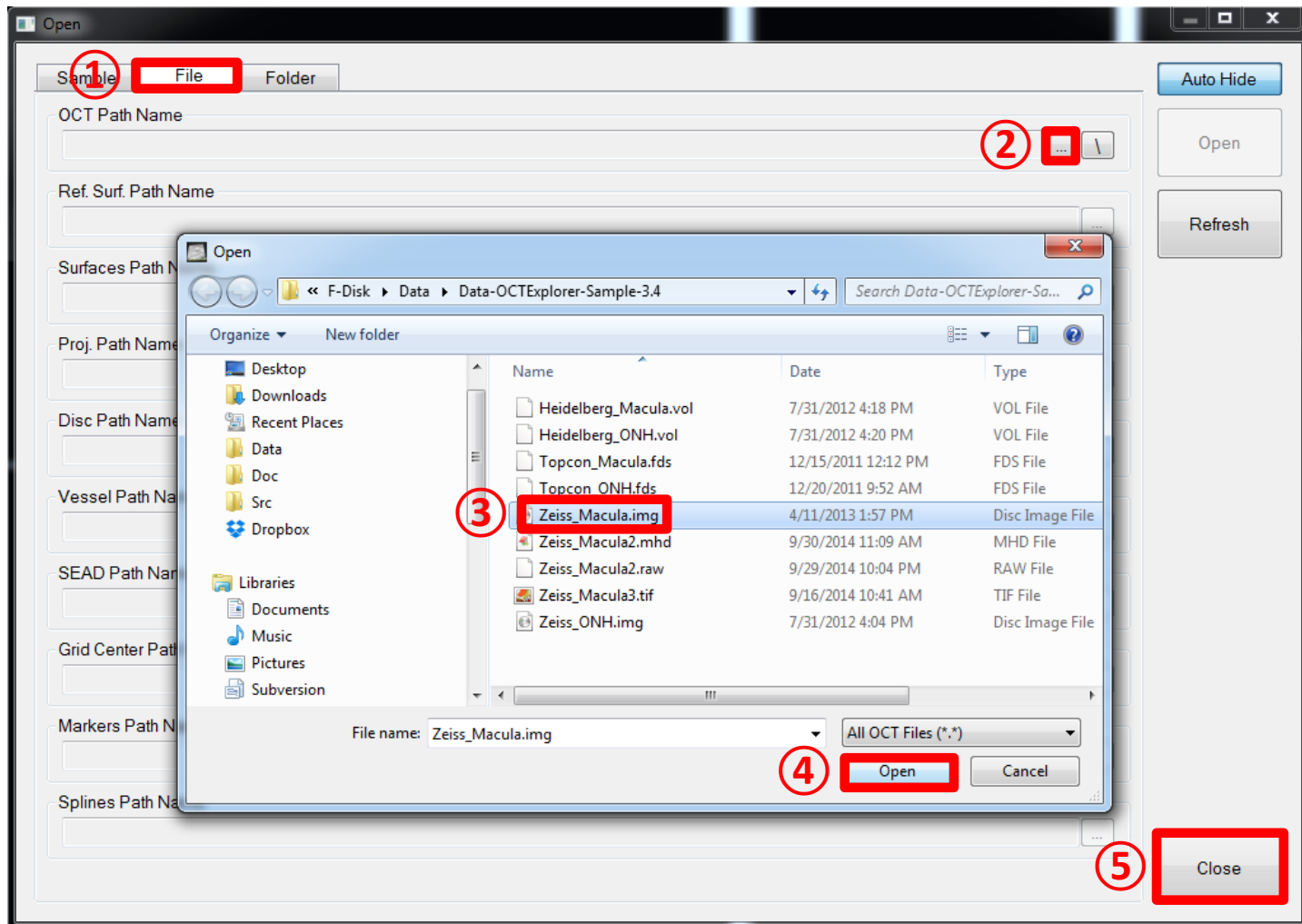
- Carl Zeiss Meditec, Inc. (‘.img’ exported from research browser)
 - Please contact this company to get the research browser.
- Topcon (‘.fds’)
- Heidelberg Engineering (‘.vol’)
 - Please contact this company for file conversion from ‘.E2E’ to ‘.vol’.
- Optovue, Inc. (‘.OCT’)
- Bioptigen, Inc. (‘.OCT’)
- Optos plc (‘.dicom’)
- Canon, Inc. (‘.ScanParameters.dat’)
- Iowa DICOM (‘.DICOM’)
- Vienna DICOM (‘.dcm’)
- MetaImage (‘.mhd’, ‘.mha’)
- Analyze (‘.hdr’)
- NIFTI (‘.nii’, ‘.nii.gz’)
- 3D TIFF (‘.tif’, ‘.tiff’)
 - 8-bit (grayscale, 0 ~ 255), 16-bit (grayscale, 0 ~ 65535), 24-bit (RGB, 0 ~ 255), 32-bit (RGBA, 0 ~ 255)
- Image sequence consisting of B-scan images (‘.tif’, ‘.tiff’, ‘.bmp’, ‘.jpg’, ‘.jpeg’, ‘.gif’, ‘.png’)
 - TIFF: 8-bit (grayscale, 0 ~ 255), 16-bit (grayscale, 0 ~ 65535), 24-bit (RGB, 0 ~ 255), 32-bit (RGBA, 0 ~ 255)
 - Others: 8-bit (grayscale, 0 ~ 255), 24-bit (RGB, 0 ~ 255), 32-bit (RGBA, 0 ~ 255)

Opening Remote Sample OCT Scans

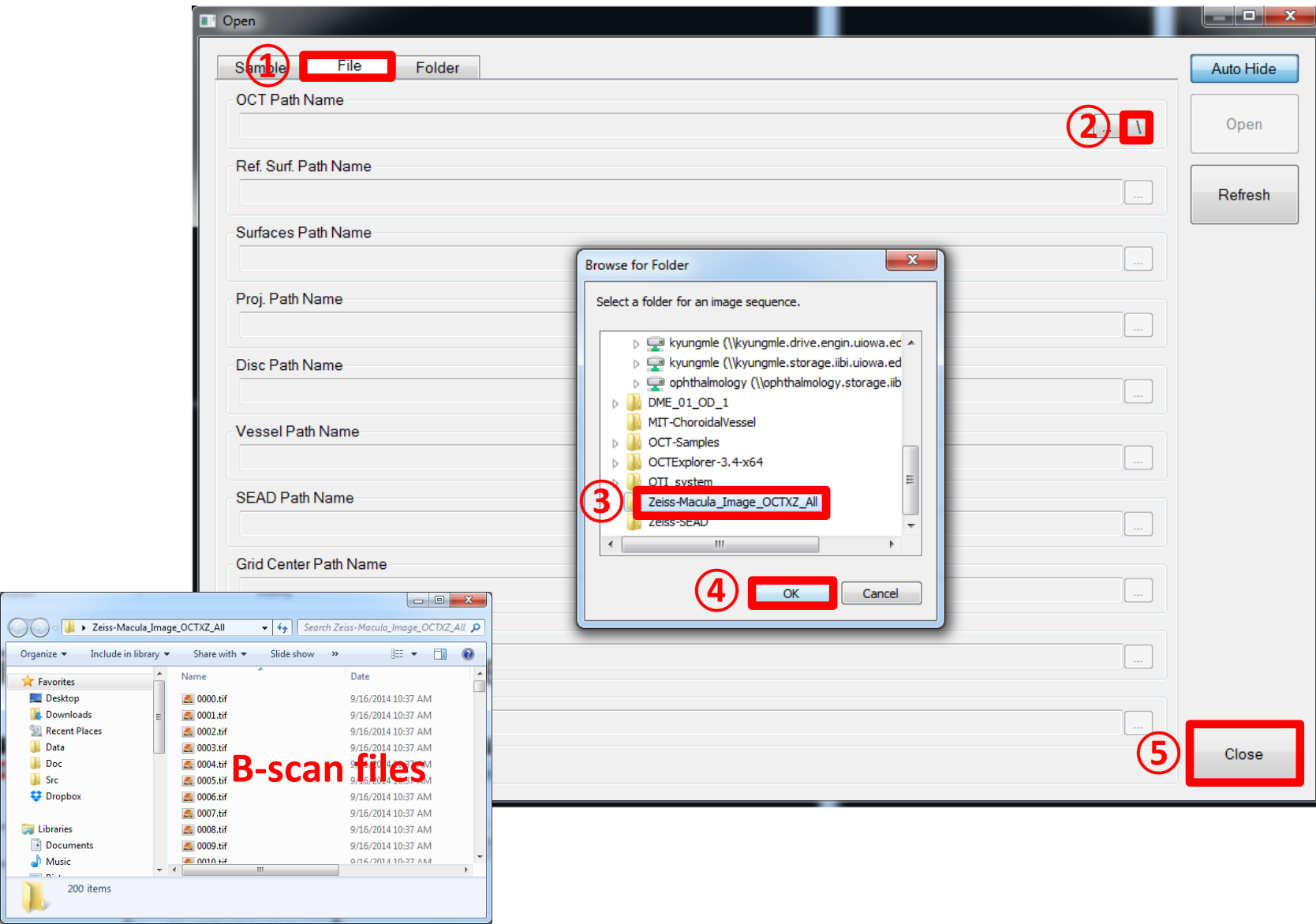


If you cannot open sample OCT scans, please see slide 44 (Options).

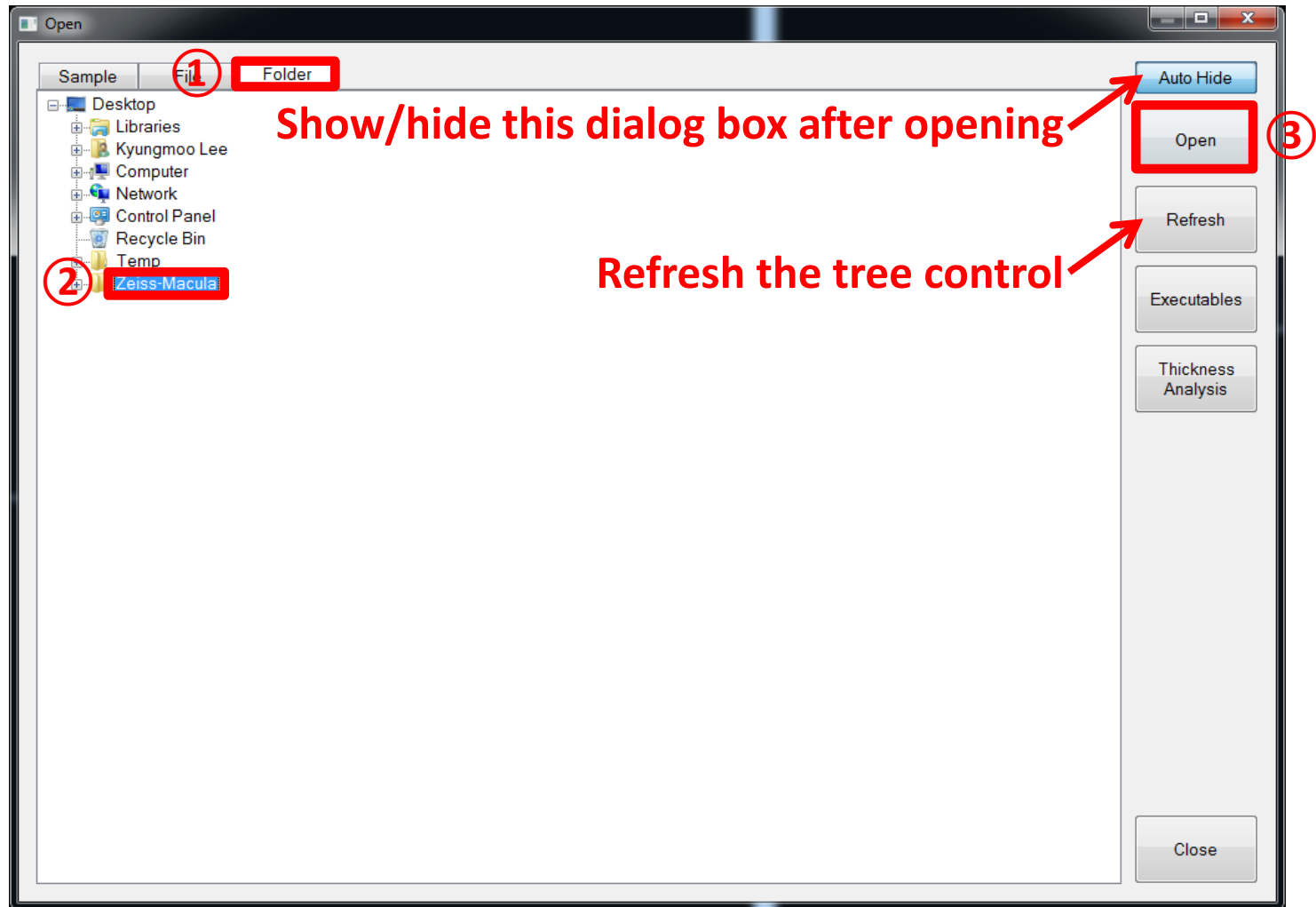
Opening Local OCT Scans



Opening Local Image Sequences



Opening Local Folders Including OCT Scans



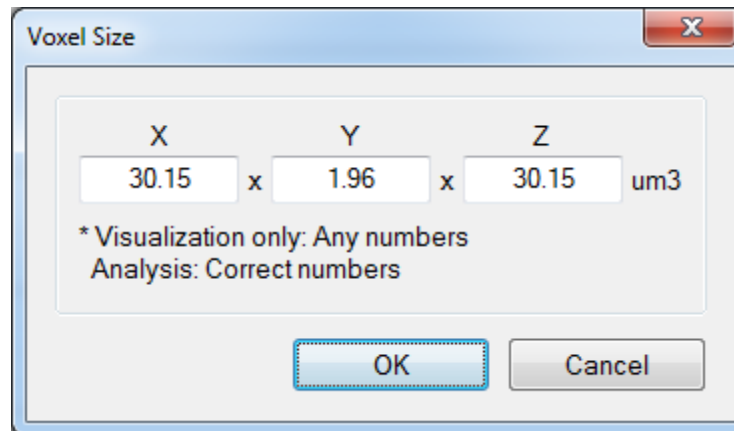
Opening Local Folders Including OCT Scans

- File names

- Surfaces : '*_Surfaces_*.xml'
- Reference surface: '*_RefSurf_*.xml'
- Projection image : '*_Proj_*.tif, tiff, bmp, jpg, jpeg, gif, png'
- Disc image : '*_Disc_*.tif, tiff, bmp, jpg, jpeg, gif, png'
- Vessel volume : '*_Vessel_*.mhd'
- SEAD volume : '*_SEAD_*.mhd'
- Grid center : '*_GridCenter_*.xml'
- Markers : '*_Markers_*.xml'
- Splines : '*_Splines_*.xml'

Voxel Size

- Please input the voxel size to open TIFF OCT scans and OCT image sequences.



A screenshot of a software dialog box titled "Voxel Size". The dialog has a light blue header bar with a close button (X) in the top right corner. The main content area is white and contains three input fields labeled "X", "Y", and "Z" above them. The "X" field contains the value "30.15", the "Y" field contains "1.96", and the "Z" field contains "30.15". These fields are separated by "x" characters, and the unit "um3" is displayed to the right of the "Z" field. Below the input fields, there is a note: "* Visualization only: Any numbers" and "Analysis: Correct numbers". At the bottom of the dialog, there are two buttons: "OK" and "Cancel".

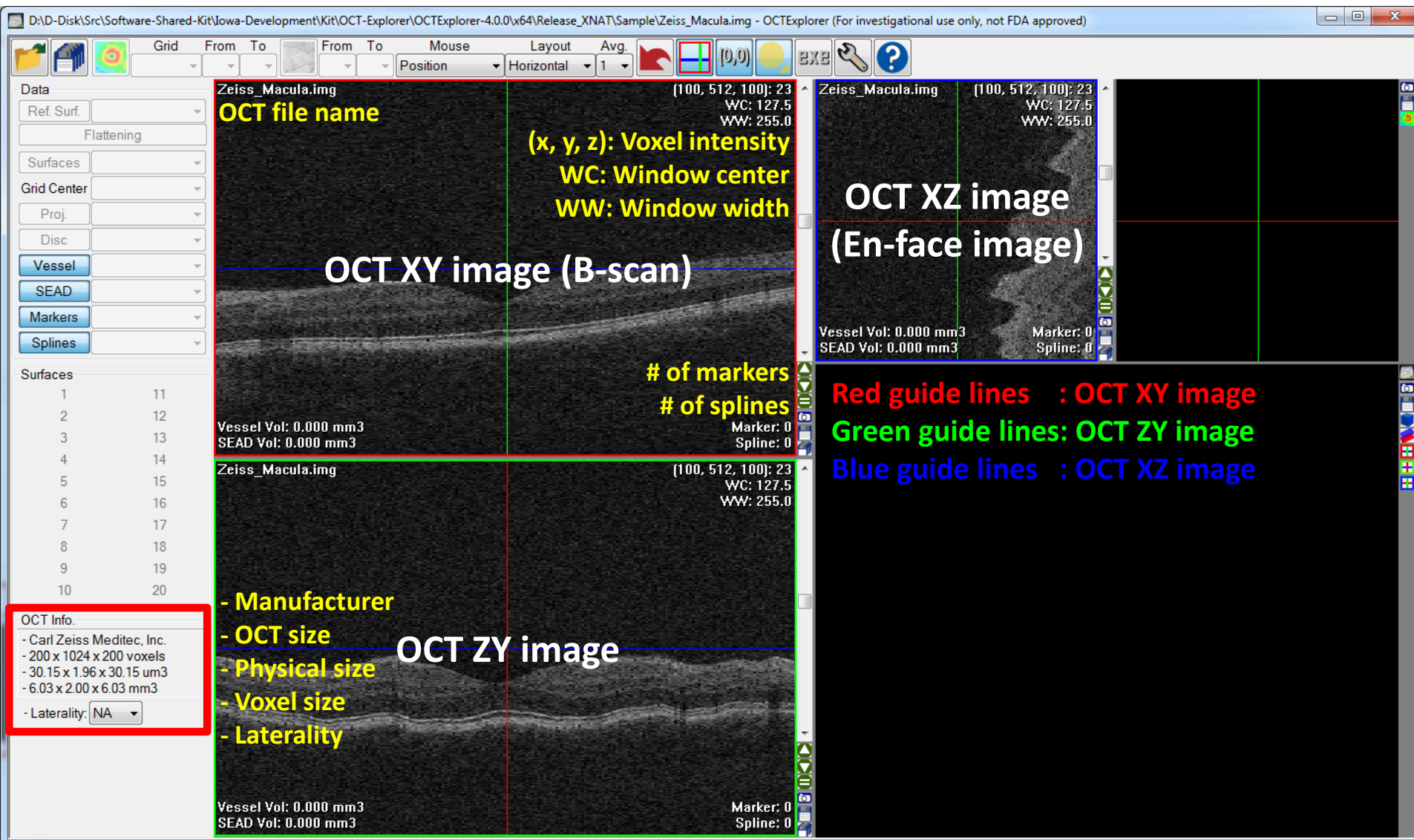
X	Y	Z
30.15	1.96	30.15

um3

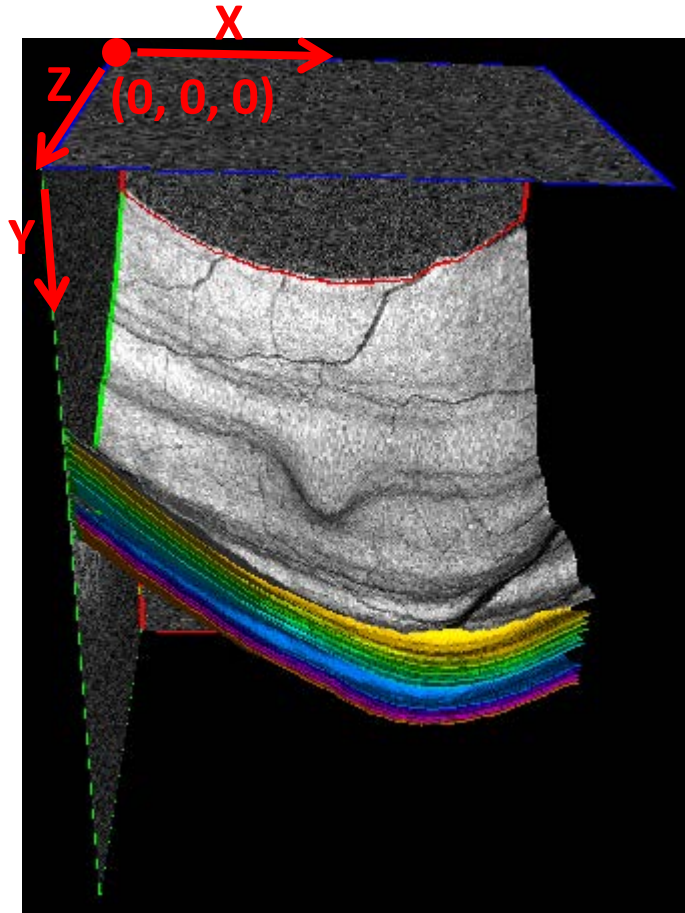
* Visualization only: Any numbers
Analysis: Correct numbers

OK Cancel

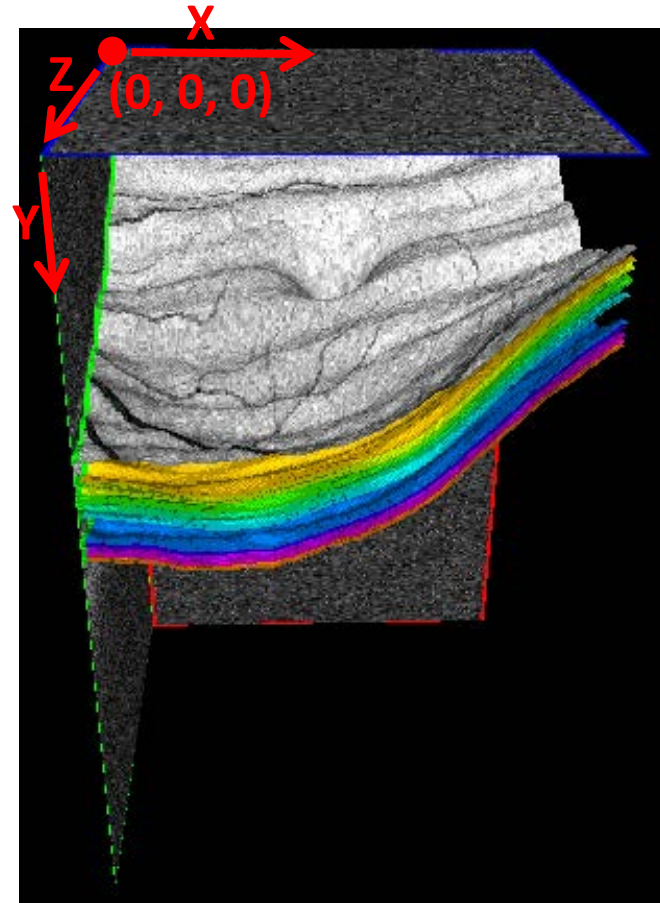
After Opening an OCT Scan



Orientation



OD

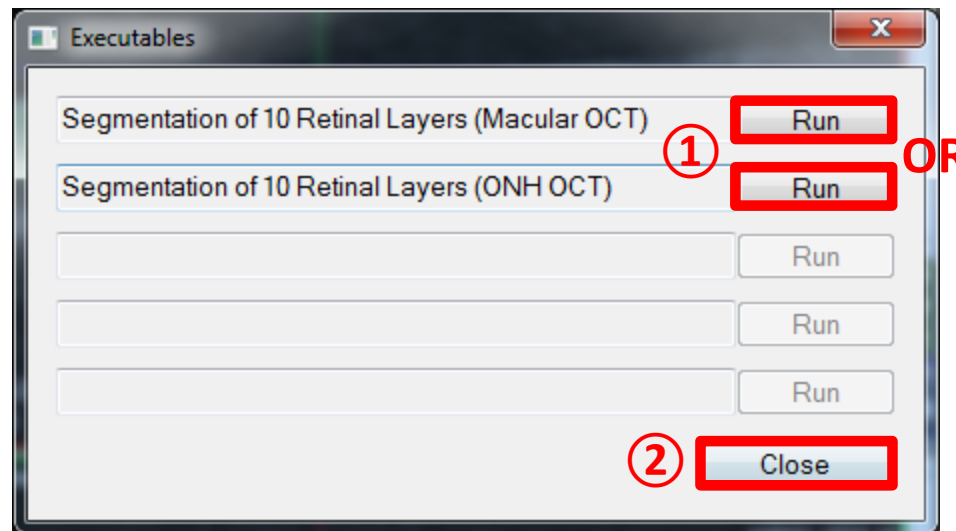
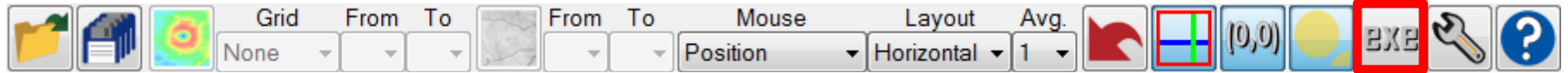


OS

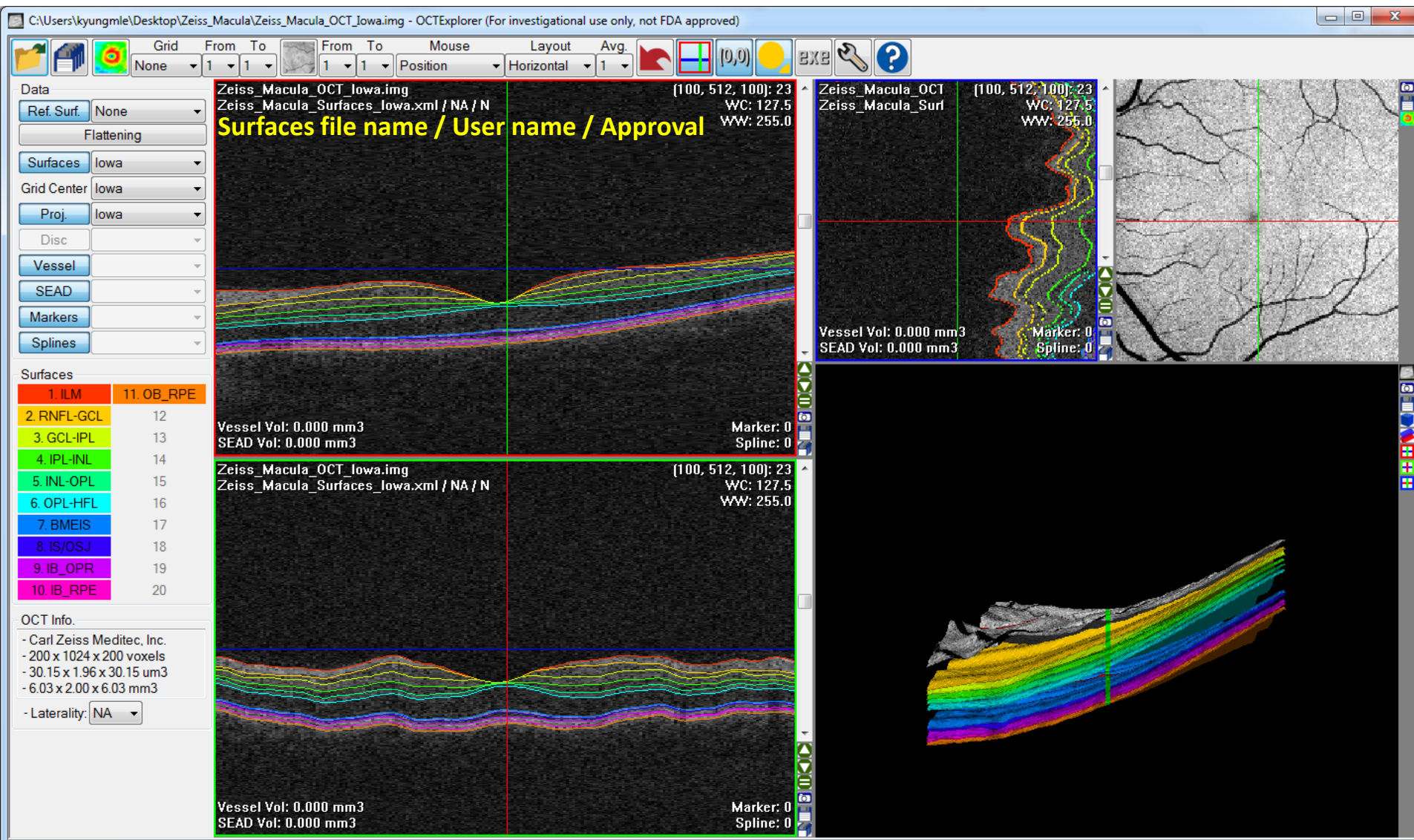
Saving Files



Retinal Layer Segmentation



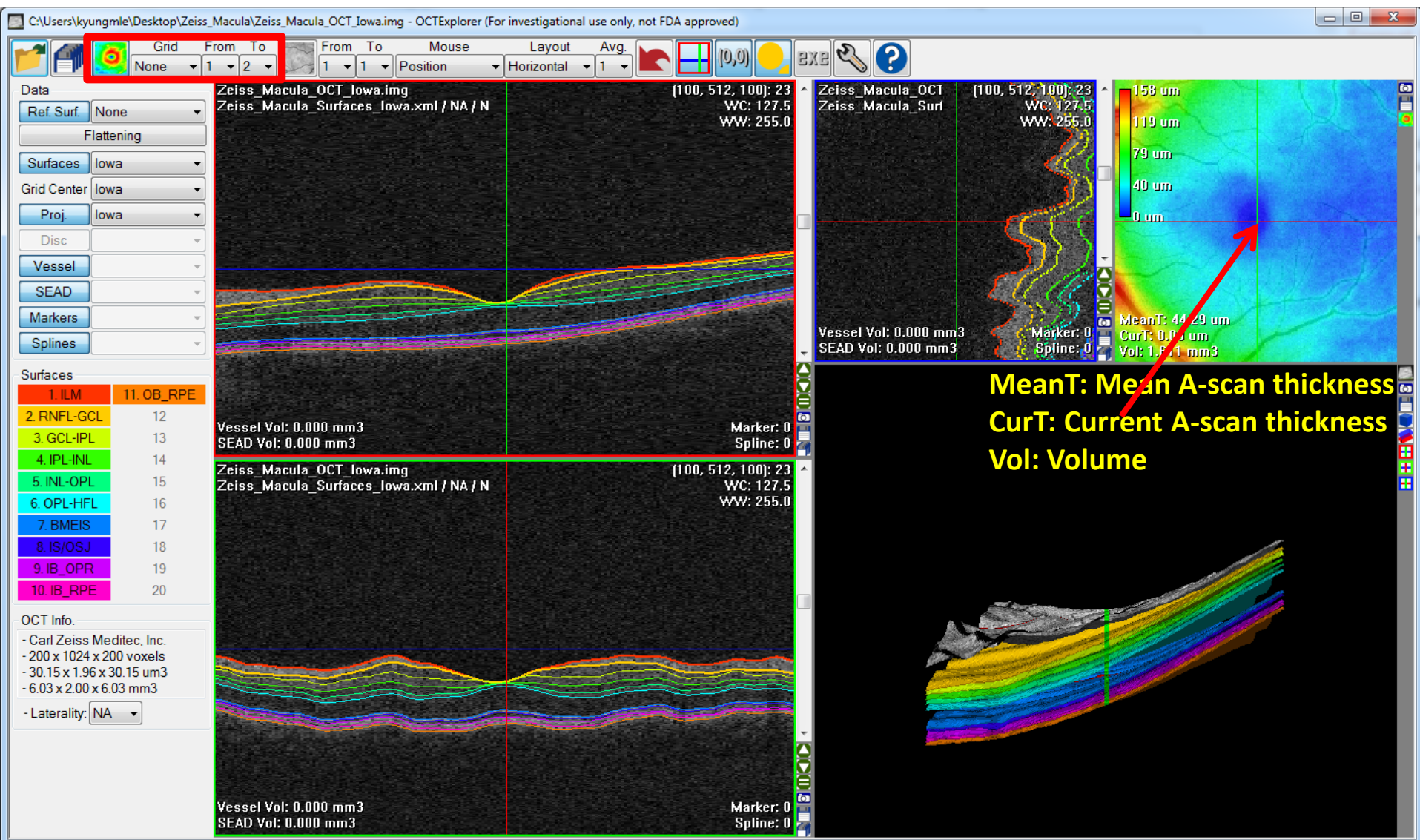
After Retinal Layer Segmentation



Retinal Surface Names

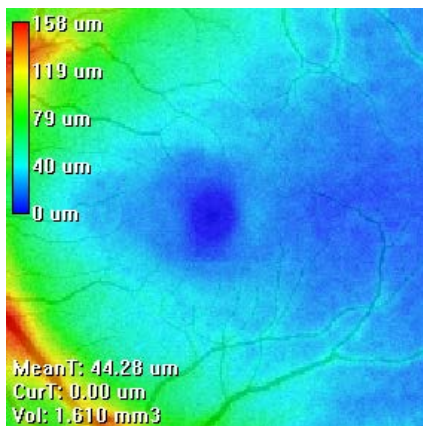
1. ILM (**ILM**)
2. RNFL-GCL (**RNFL-GCL**)
3. GCL-IPL (**GCL-IPL**)
4. IPL-INL (**IPL-INL**)
5. INL-OPL (**INL-OPL**)
6. OPL-Henle fiber layer (**OPL-HFL**)
7. Boundary of myoid and ellipsoid of inner segments (**BMEIS**)
8. IS/OS junction (**IS/OSJ**)
9. Inner boundary of OPR (**IB_OPR**)
 - OPR: Outer segment PR/RPE complex
10. Inner boundary of RPE (**IB_RPE**)
11. Outer boundary of RPE (**OB_RPE**)

Retinal Layer Thickness

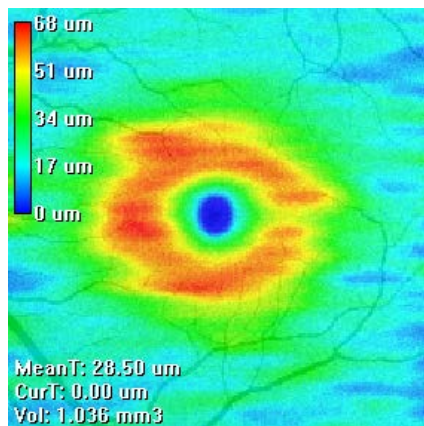


Retinal Layer Thickness

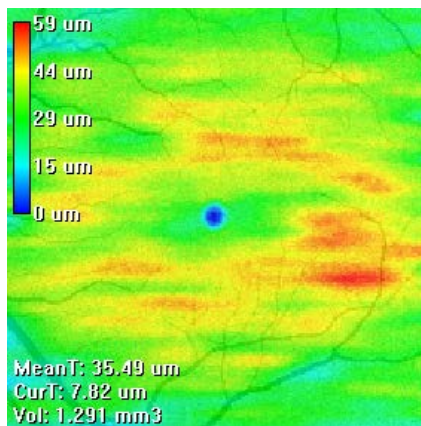
- From 1, To 2: RNFL
- From 2, To 3: GCL
- From 3, To 4: IPL
- From 4, To 5: INL
- From 5, To 6: OPL
- From 6, To 7: ONL
- From 7, To 8: IS/OS
- From 8, To 9: Outer segment
- From 9, To 10: OPR + Subretinal virtual space
- From 10, To 11: RPE
- From 1, To 11: Total retina



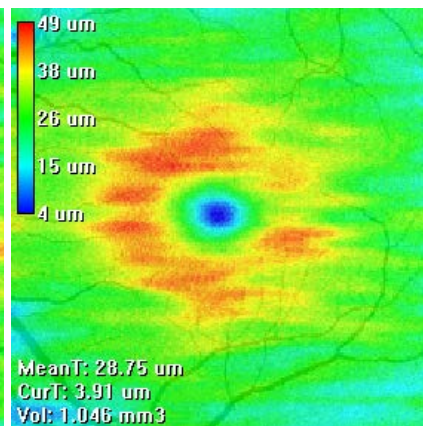
From 1, To 2



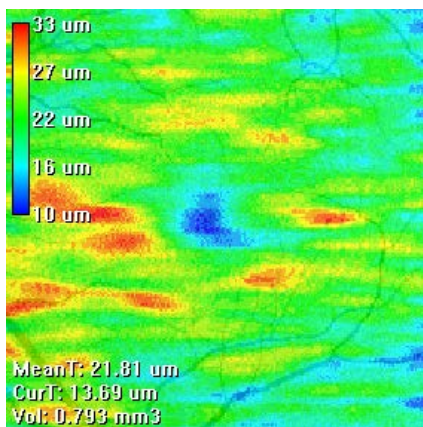
From 2, To 3



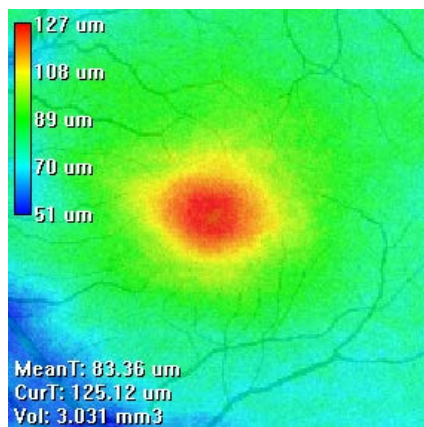
From 3, To 4



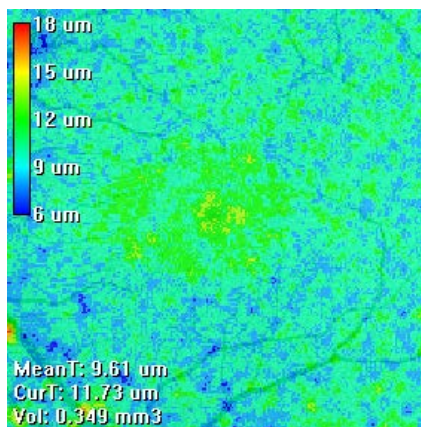
From 4, To 5



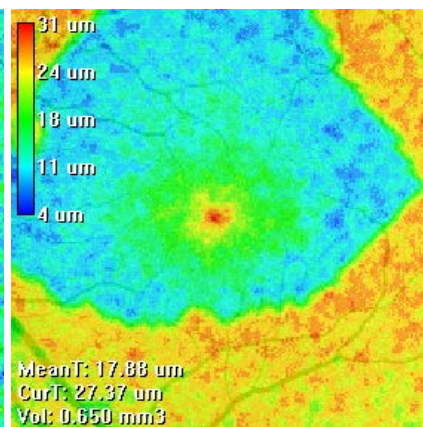
From 5, To 6



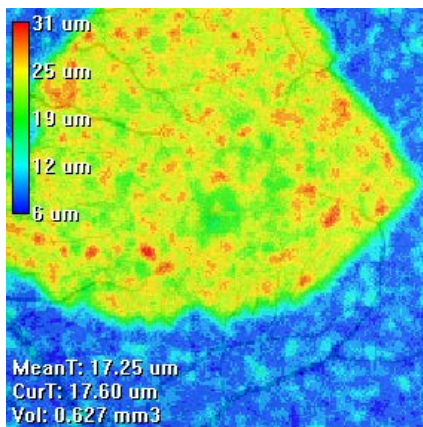
From 6, To 7



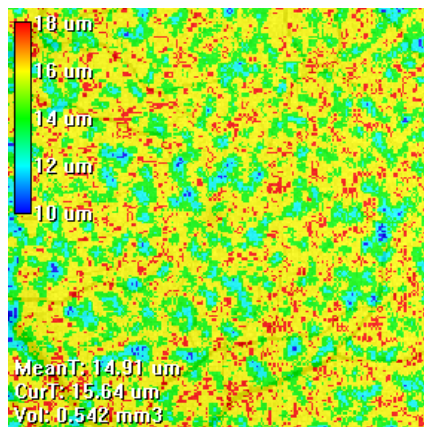
From 7, To 8



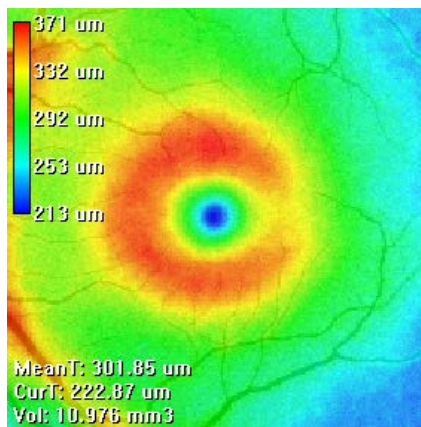
From 8, To 9



From 9, To 10



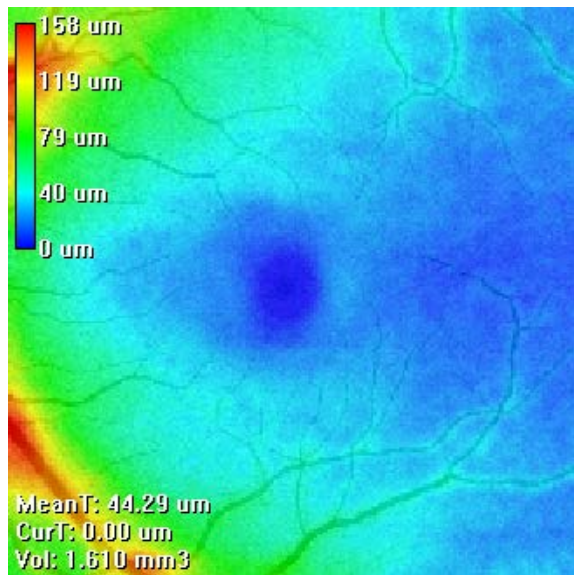
From 10, To 11



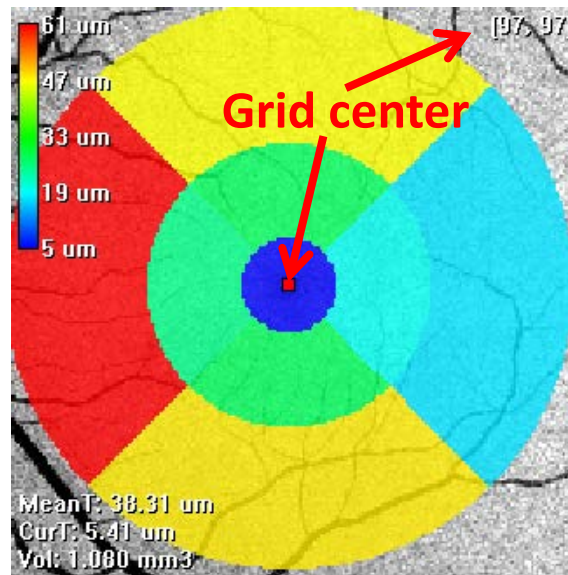
From 1, To 11

Retinal Layer Thickness

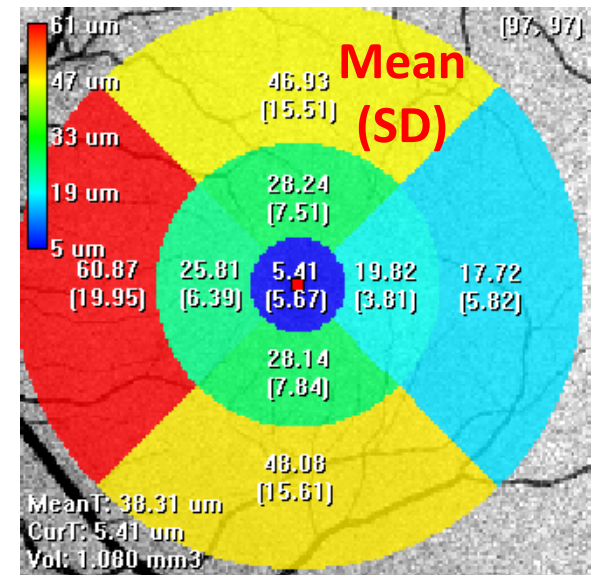
- **Grid:** None, Quality, Quantity



None

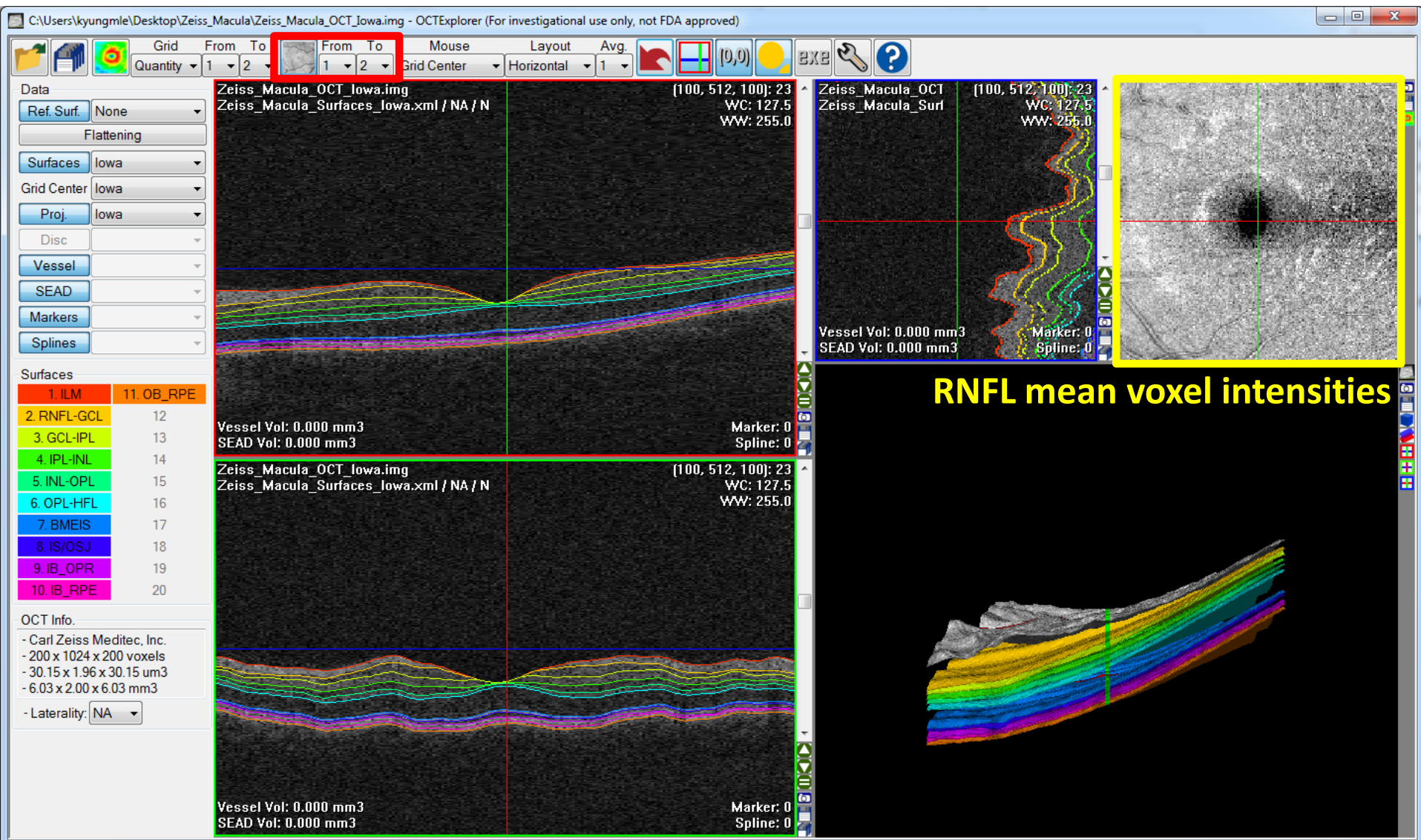


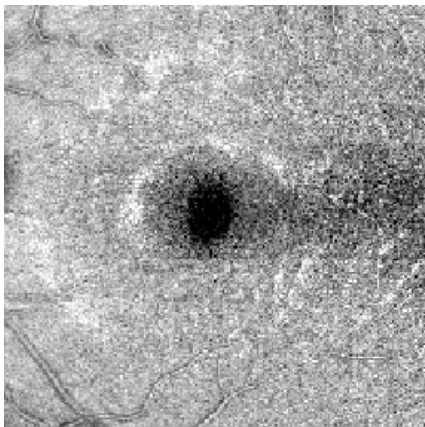
Quality – ETDRS grid



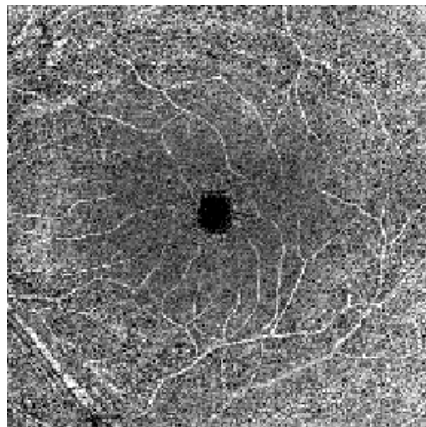
Quantity – ETDRS grid

Creating Projection Images

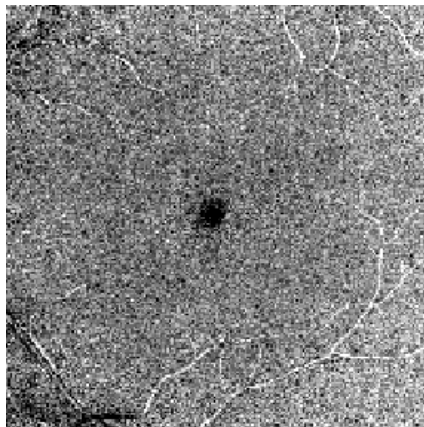




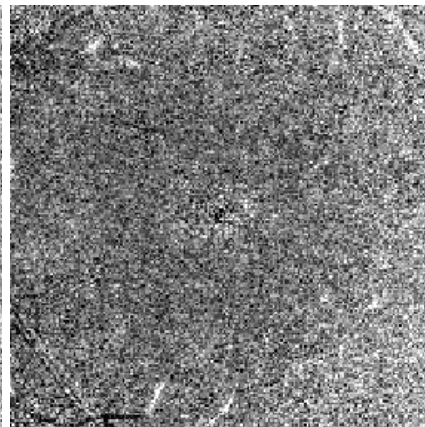
From 1, To 2



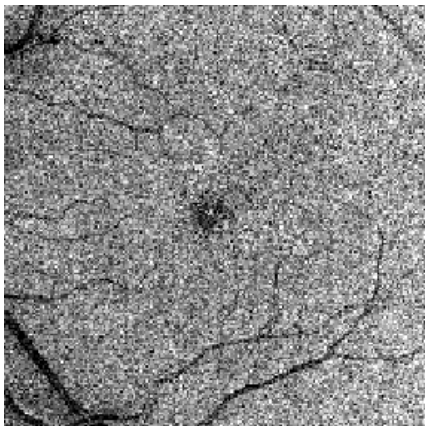
From 2, To 3



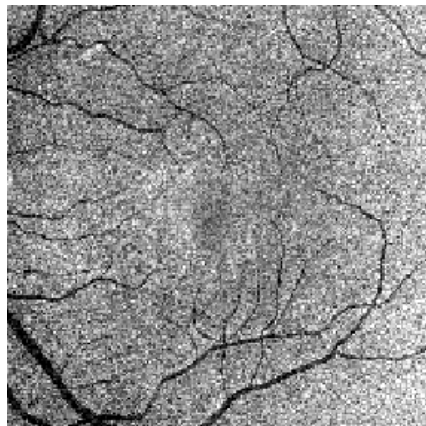
From 3, To 4



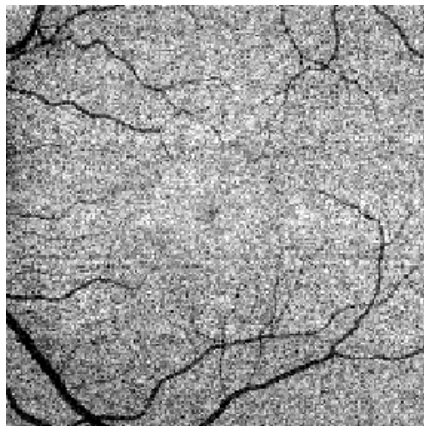
From 4, To 5



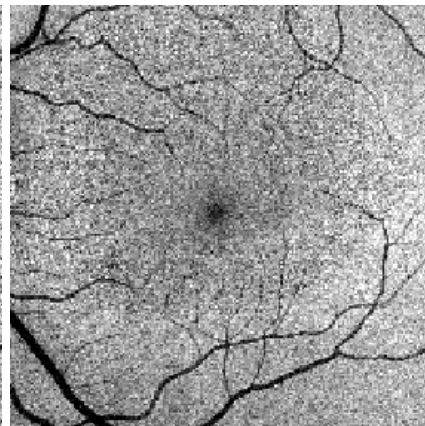
From 5, To 6



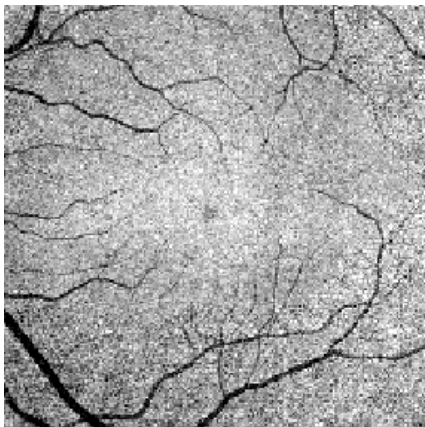
From 6, To 7



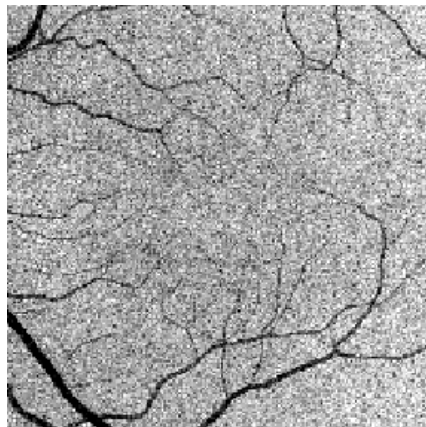
From 7, To 8



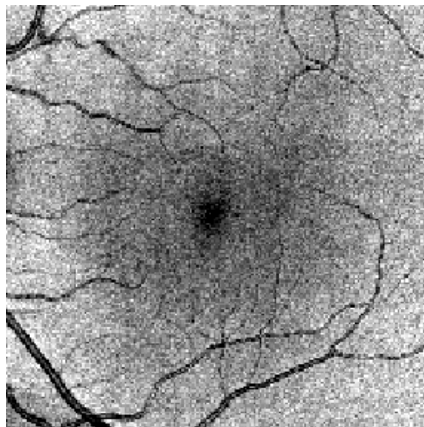
From 8, To 9



From 9, To 10



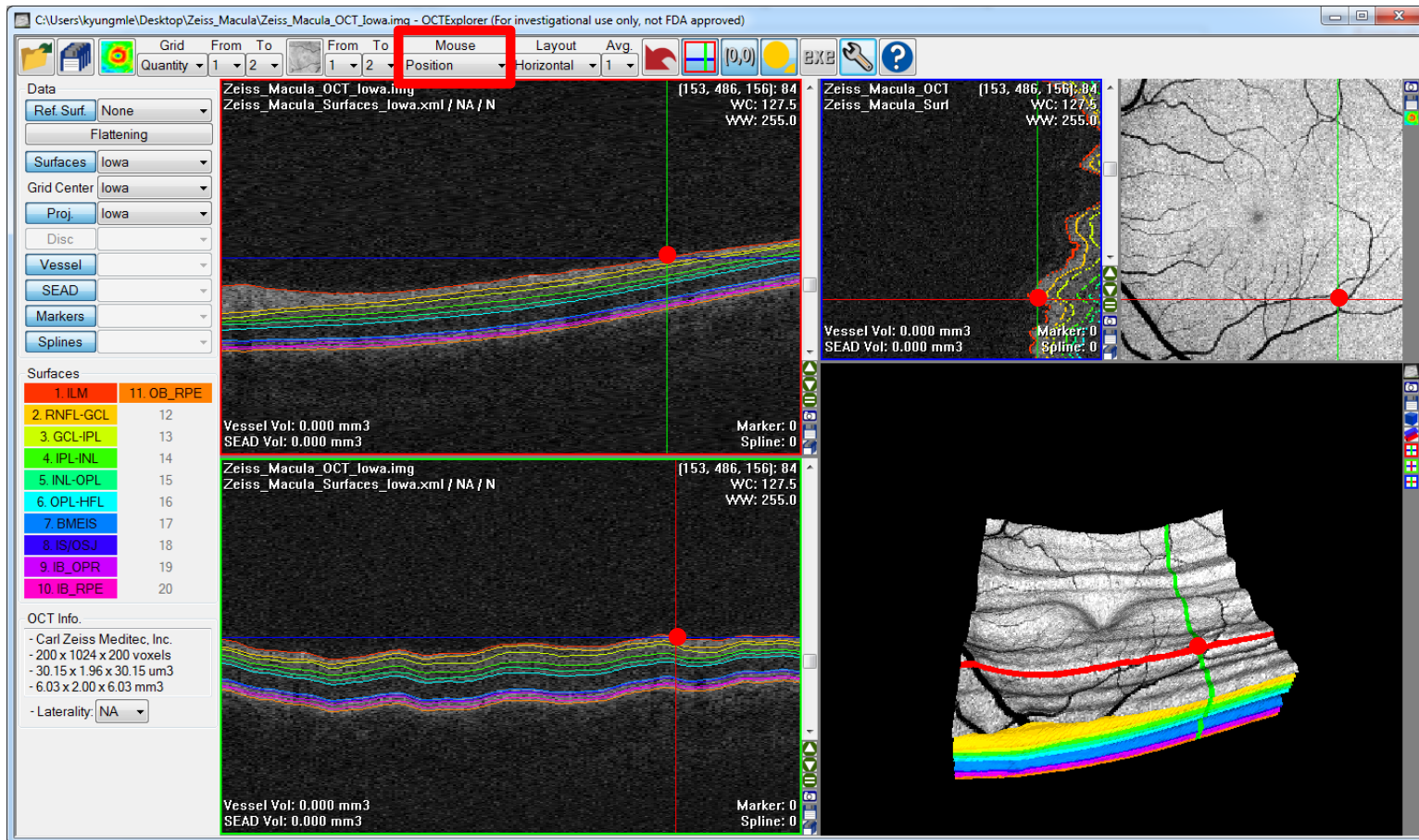
From 10, To 11



From 1, To 11

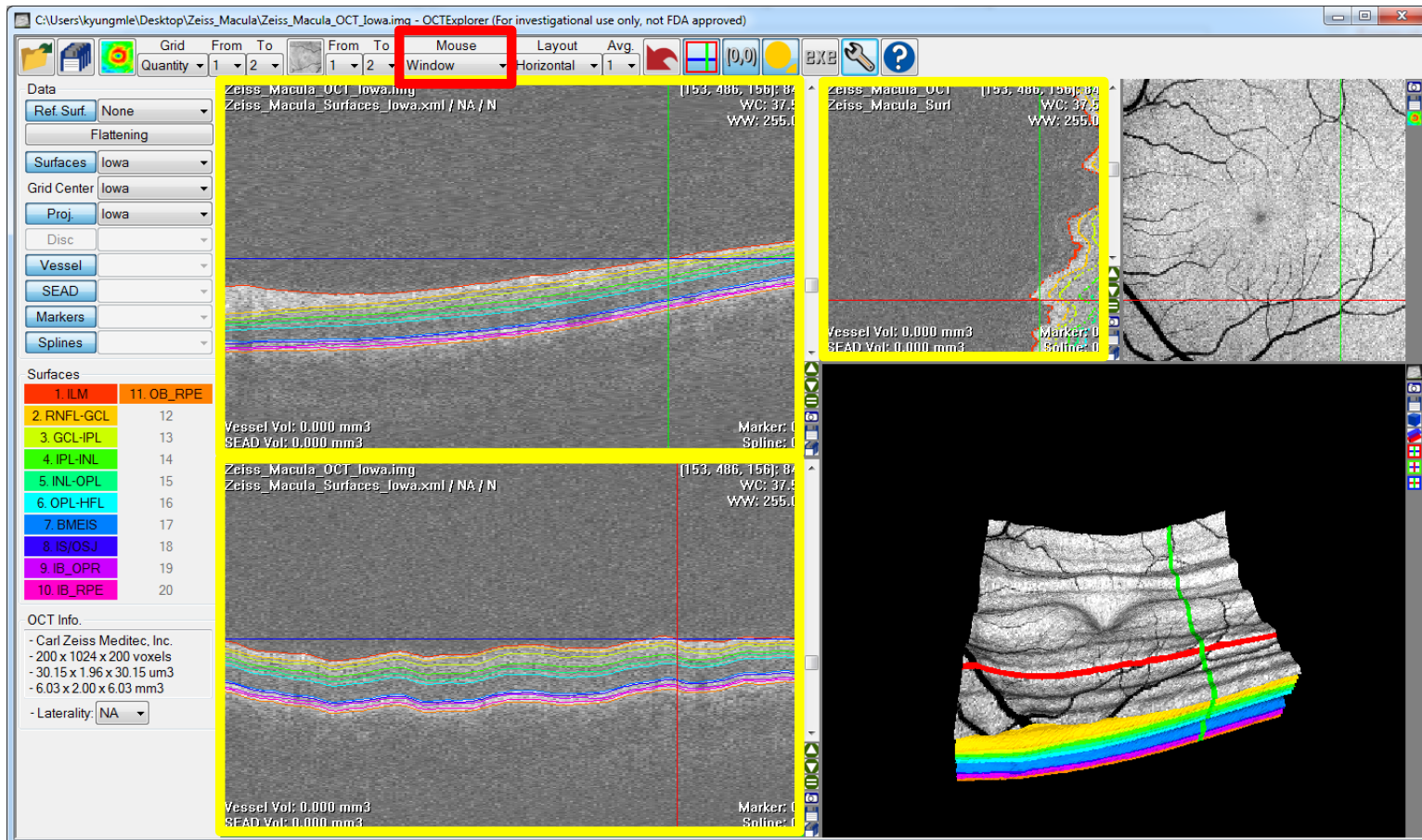
Mouse – Position

- Left mouse button click



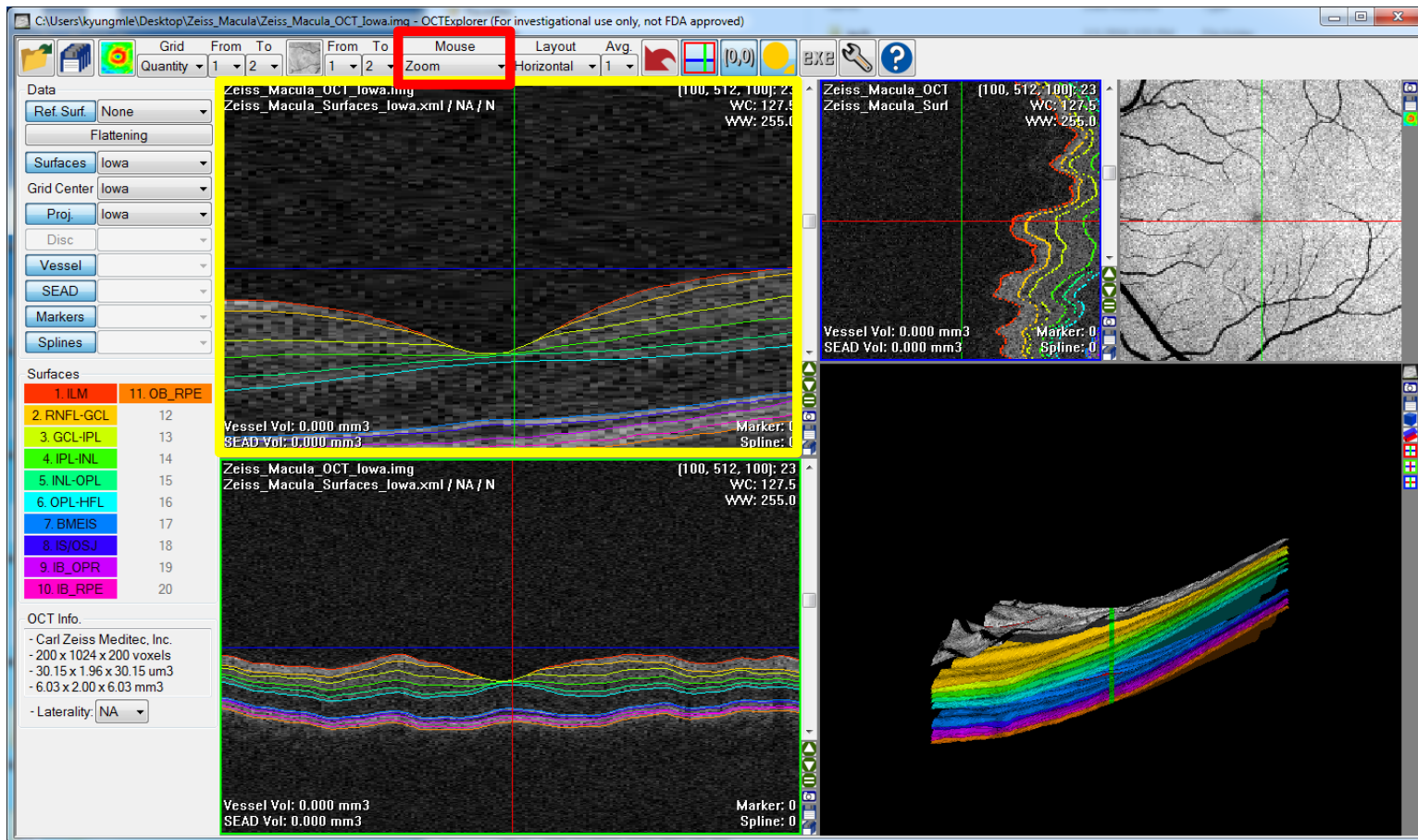
Mouse – Window

- Left mouse button drag
 - Left/right: Window center (WC)
 - Up/down: Window width (WW)



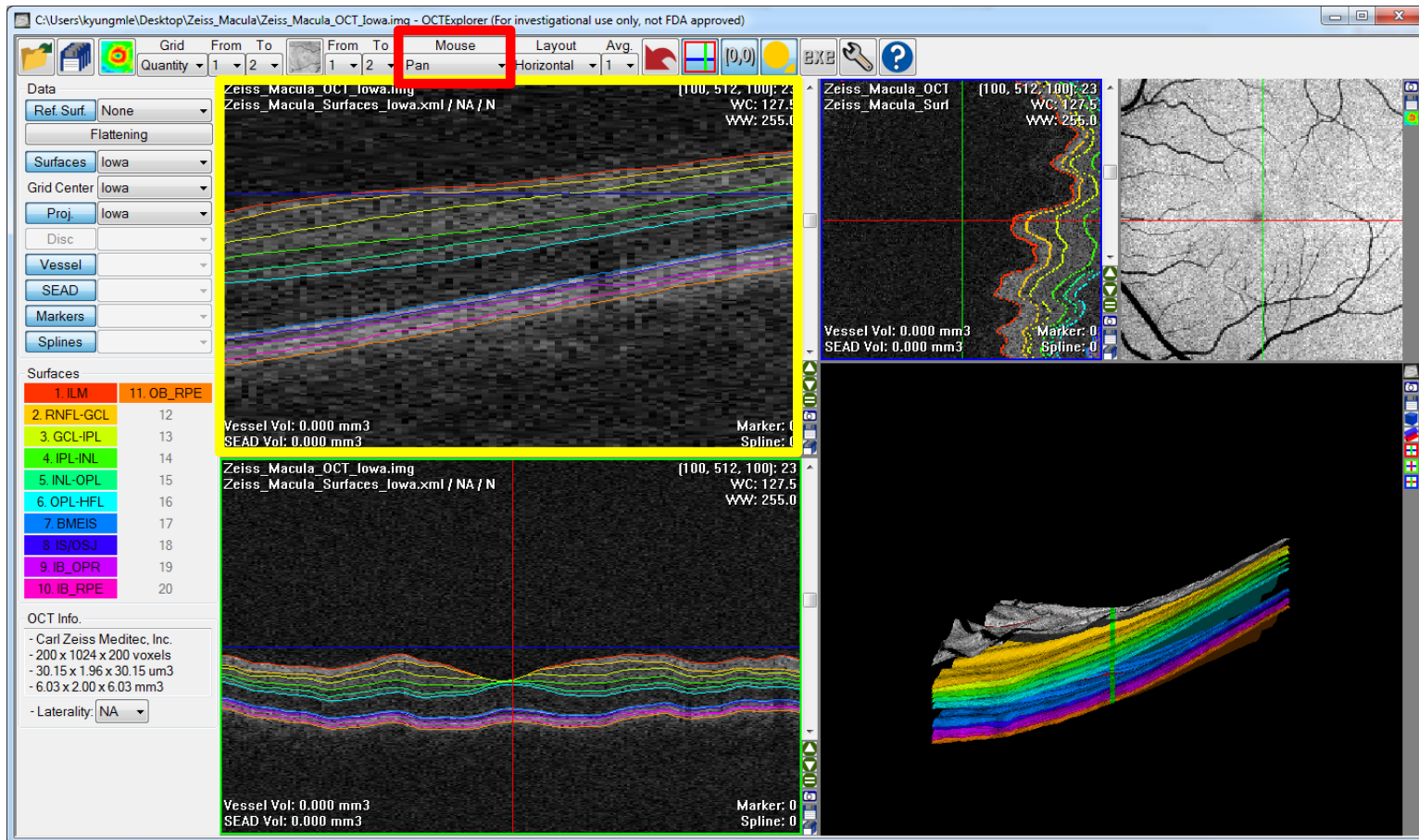
Mouse – Zoom

- Left mouse button drag
 - Up/down: Zoom out/in



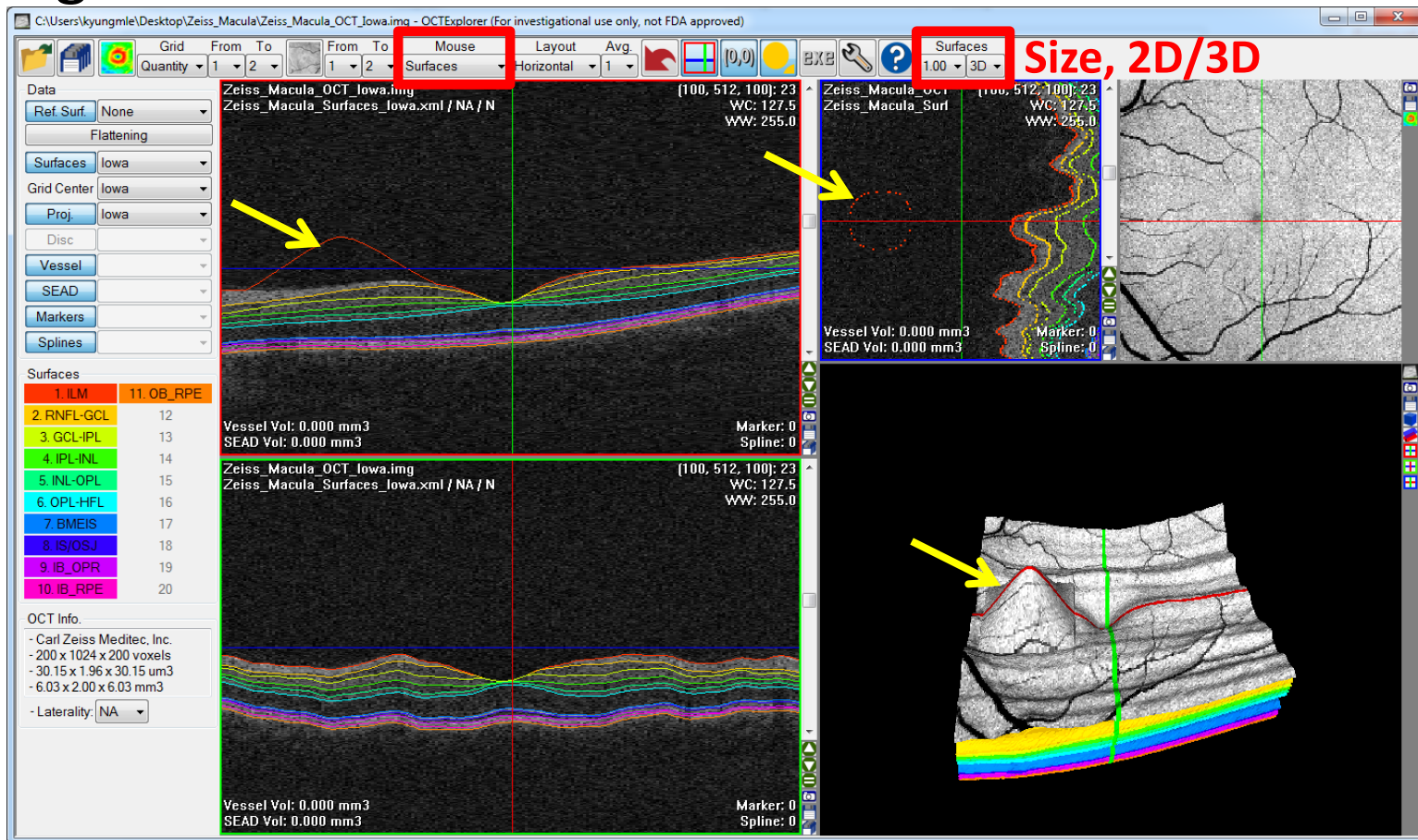
Mouse – Pan

- Left mouse button drag



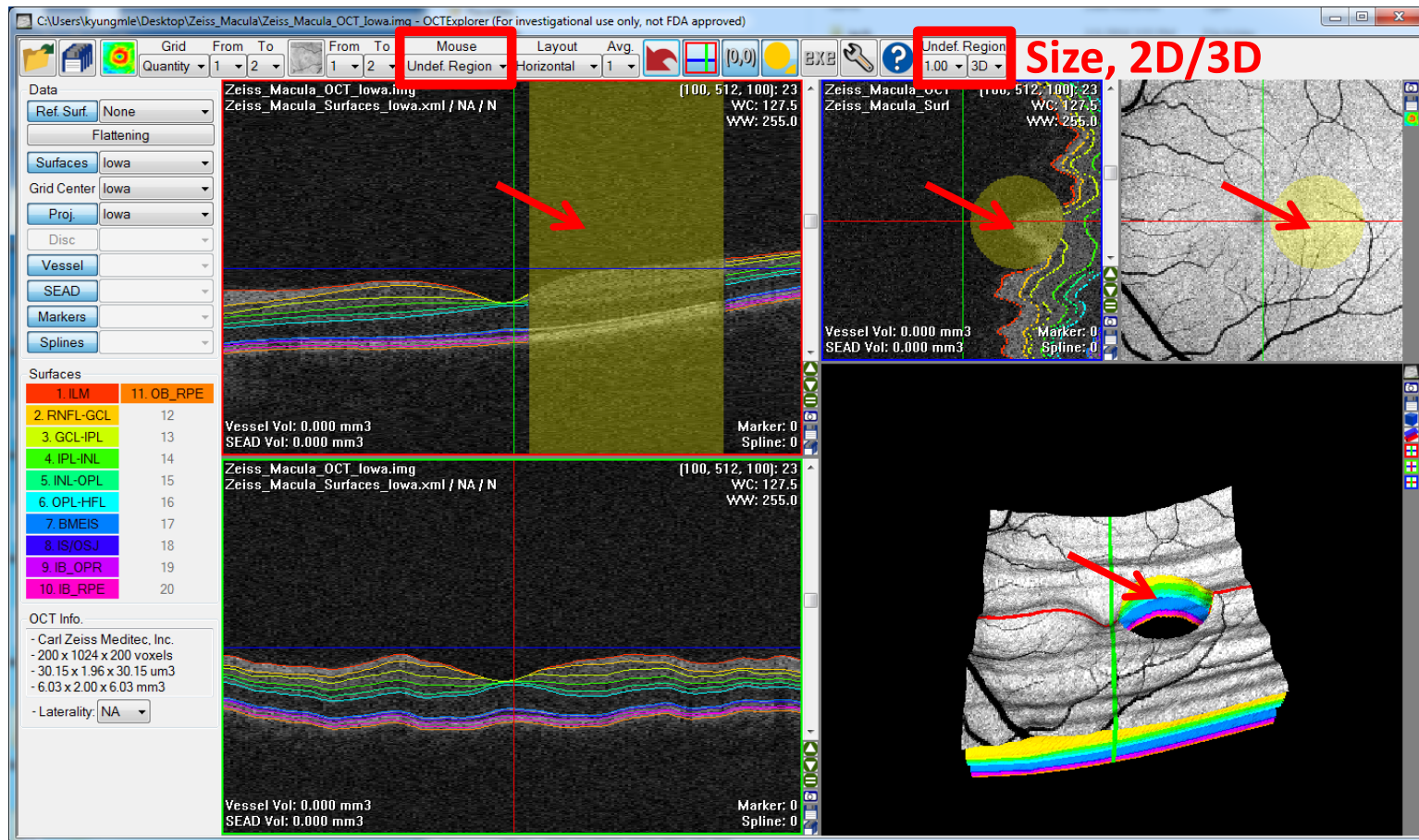
Mouse – Surfaces

- Left mouse button drag
 - Up/down: Move
- Right mouse button click: Undo



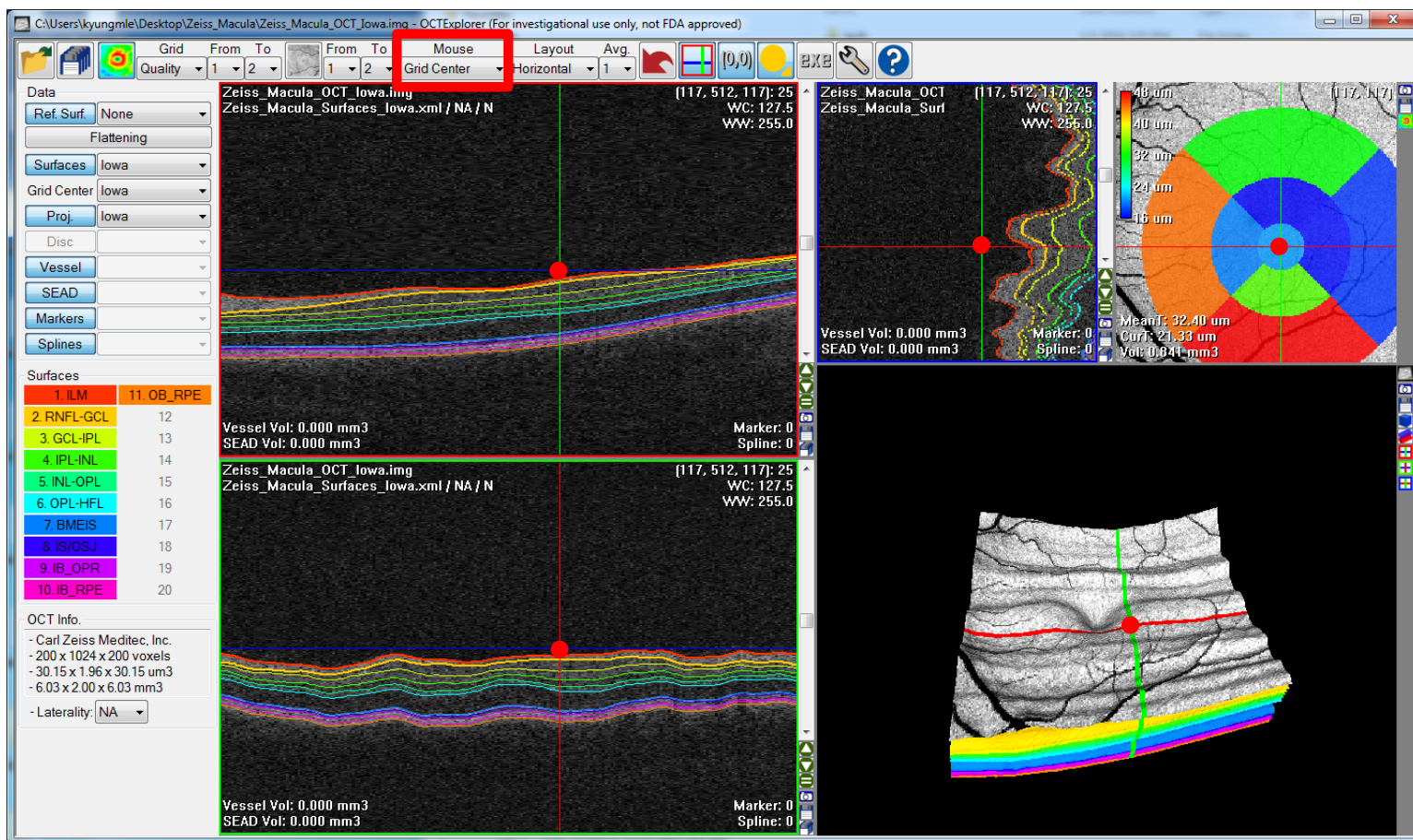
Mouse – Undefined Region

- Left mouse button click/drag : Select
- Right mouse button click/drag: Deselect



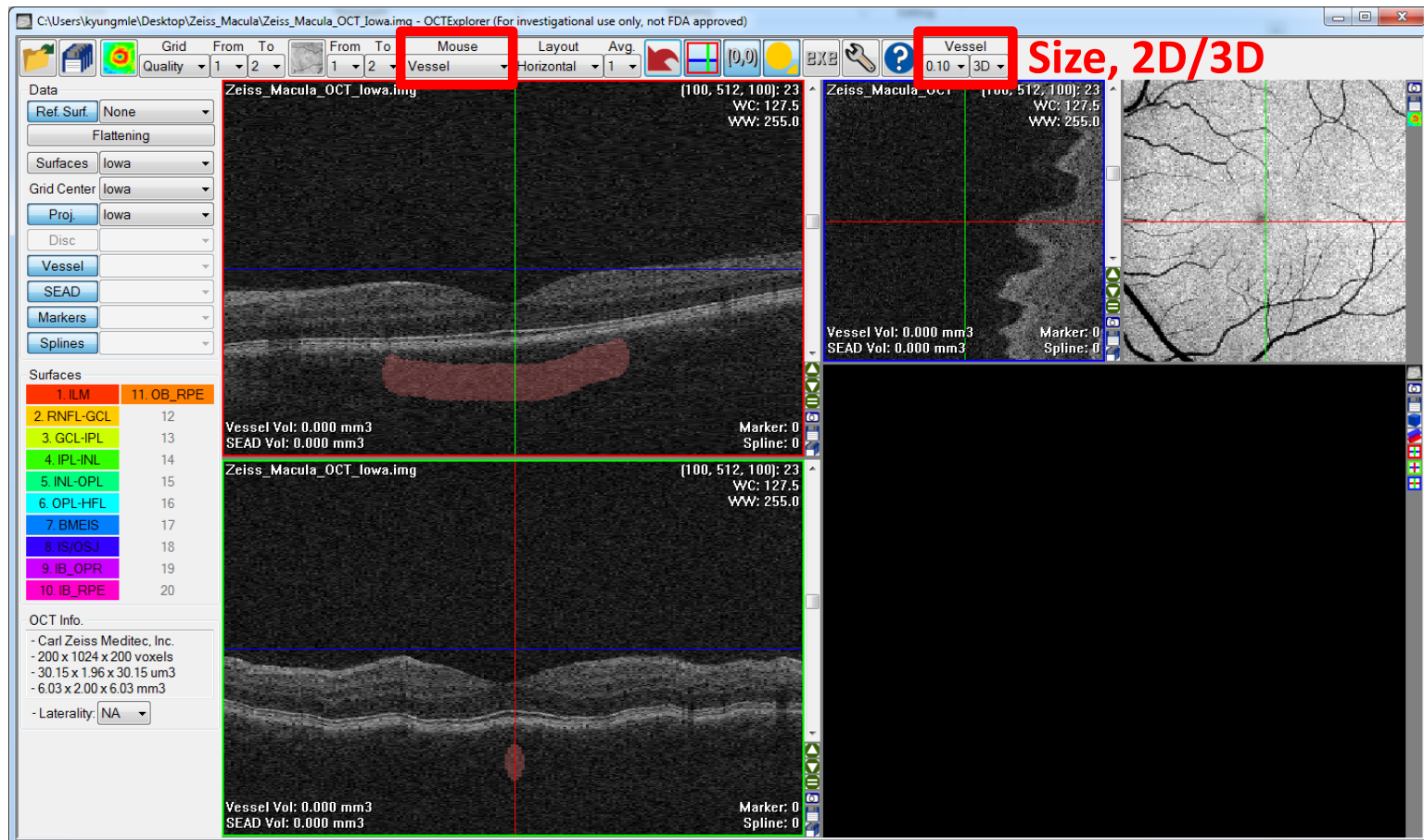
Mouse – Grid Center

- Left mouse button click



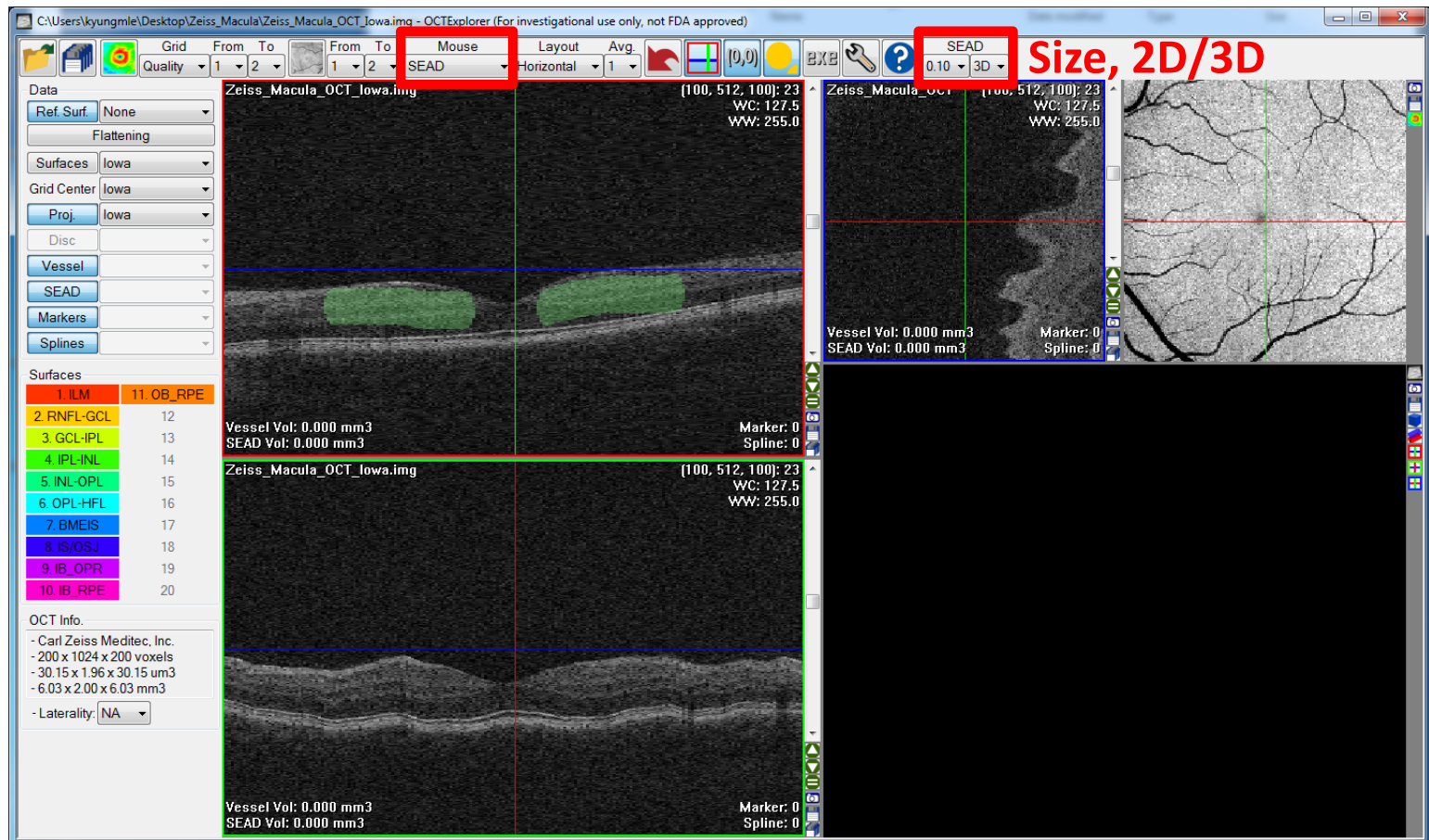
Mouse – Vessel

- Left mouse button click/drag : Select
- Right mouse button click/drag: Deselect



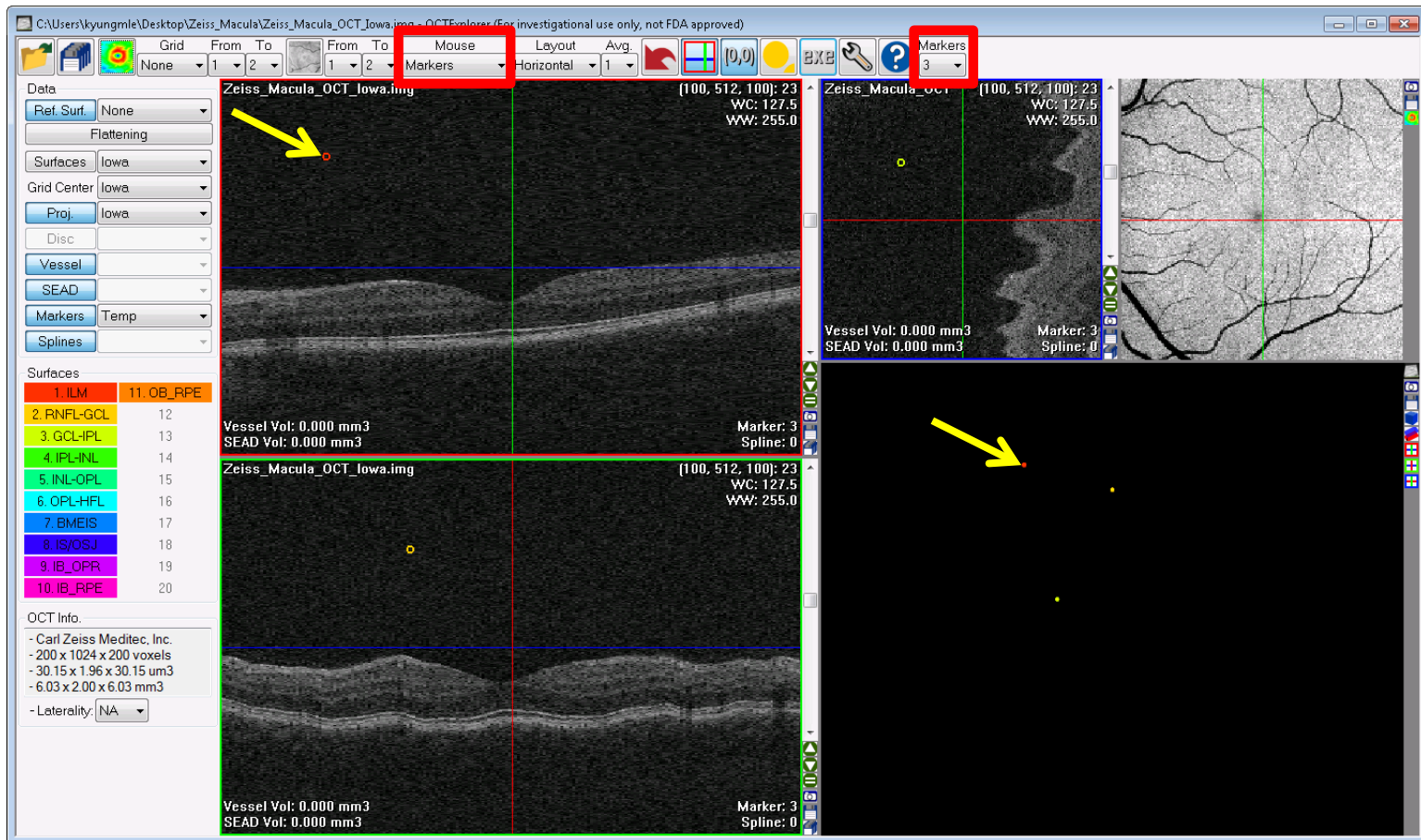
Mouse – SEAD

- Left mouse button click/drag : Select
- Right mouse button click/drag: Deselect



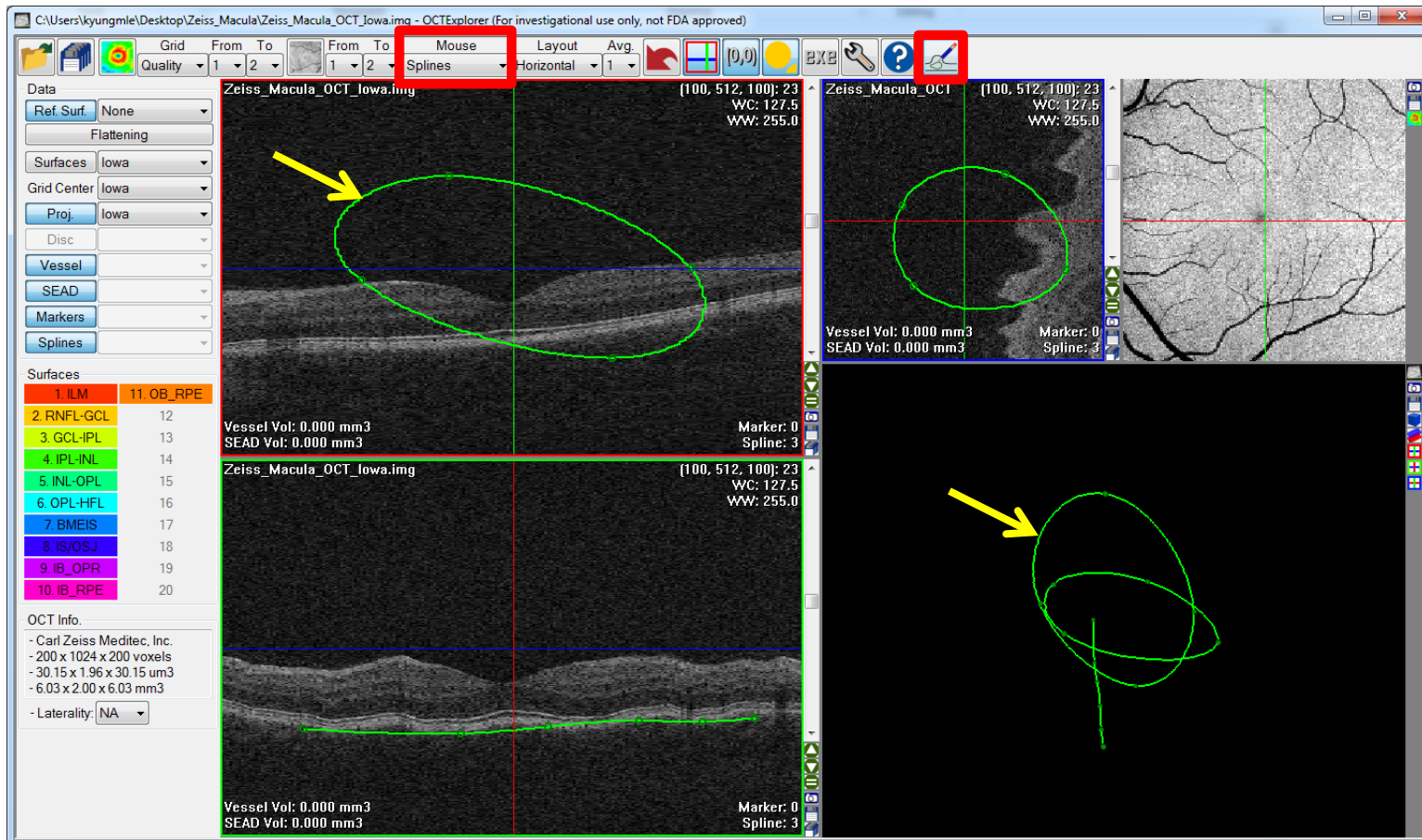
Mouse – Markers

- Left mouse button click: Add
- Left mouse button double click: Delete
- Left mouse button drag: Move

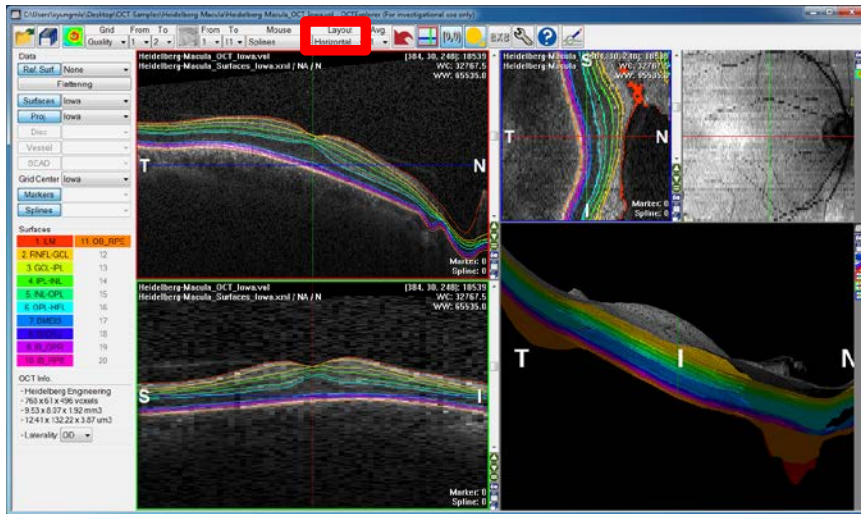


Mouse – Splines

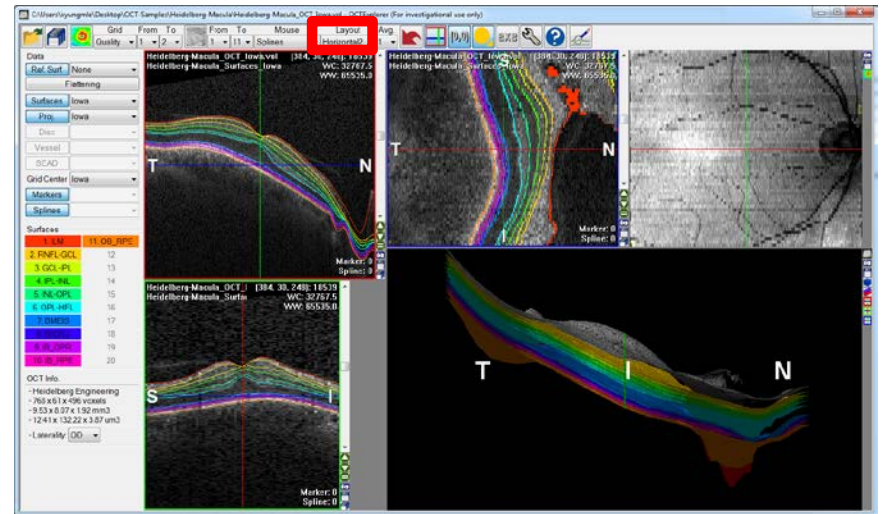
- 'Add Spline' button click + left mouse button click: Add
- Left mouse button double click: Delete
- Left mouse button drag: Move



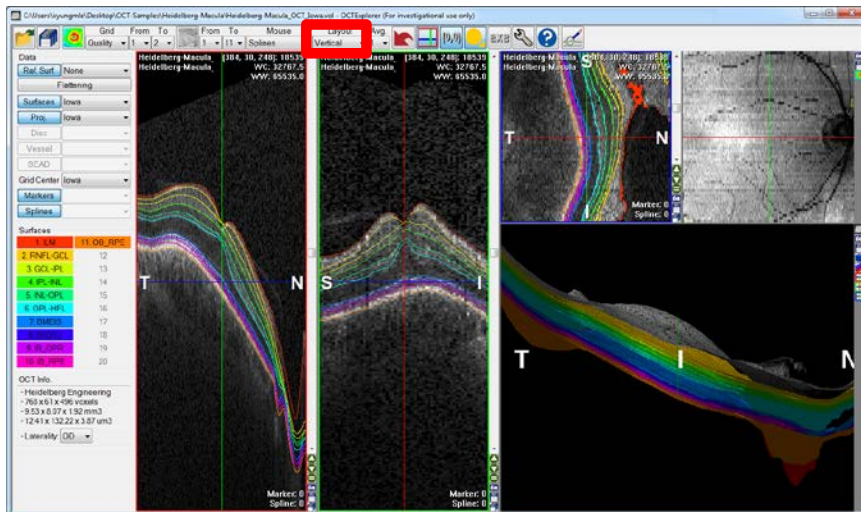
Layout



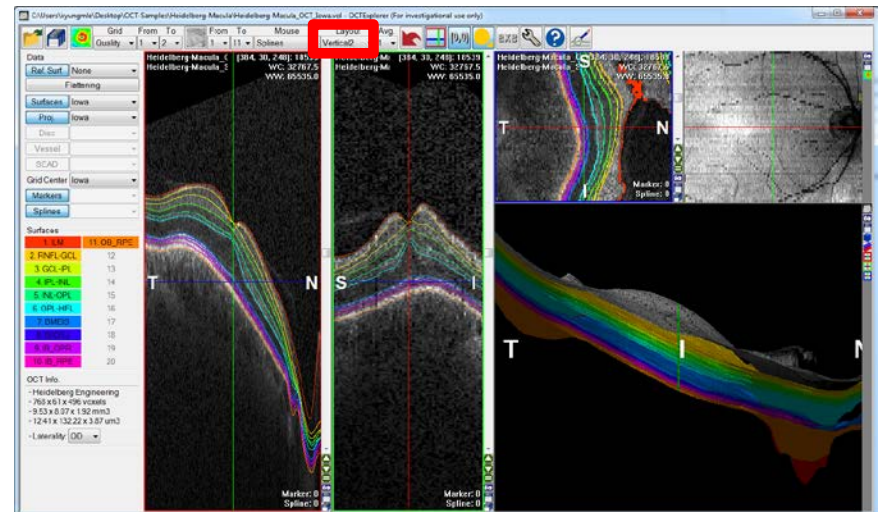
Horizontal



Horizontal2



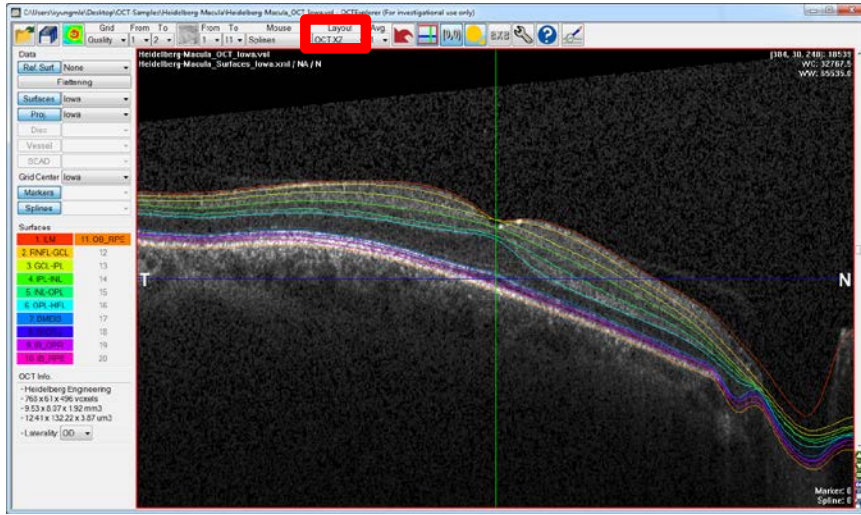
Vertical



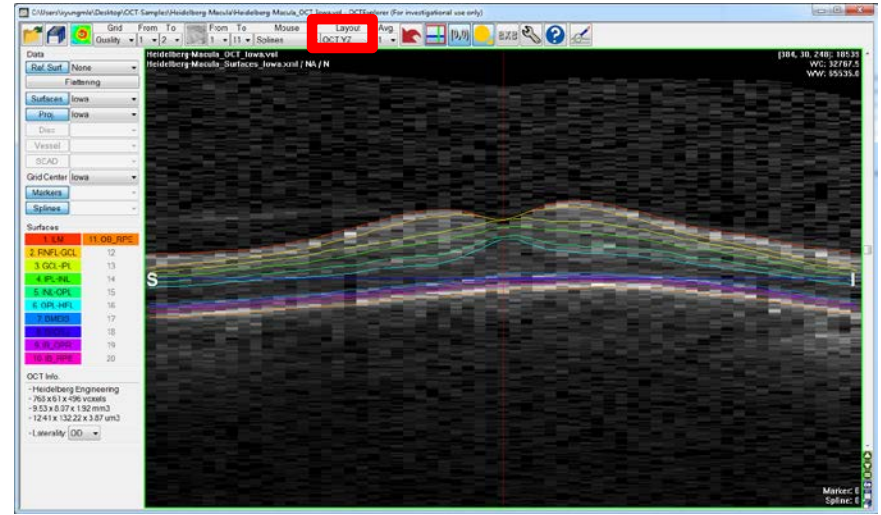
Vertical2

The layout ending with '2' considers the OCT physical size.

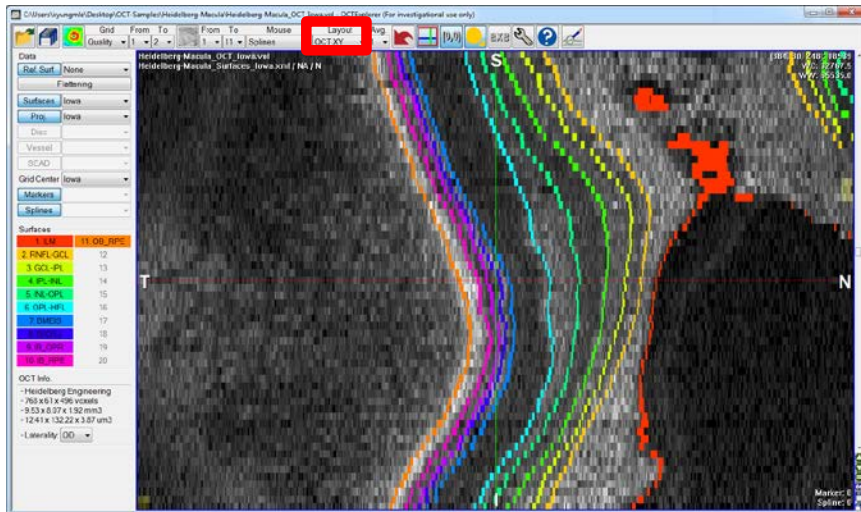
Layout



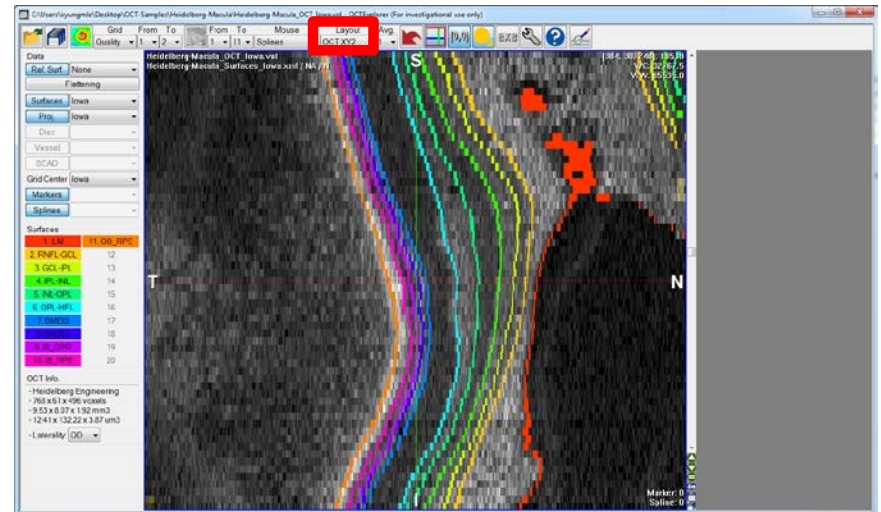
OCT XZ



OCT YZ



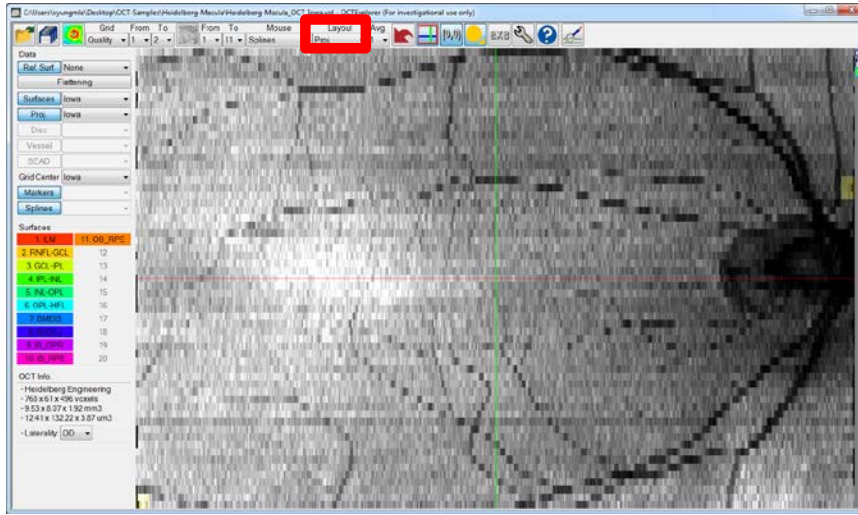
OCT XY



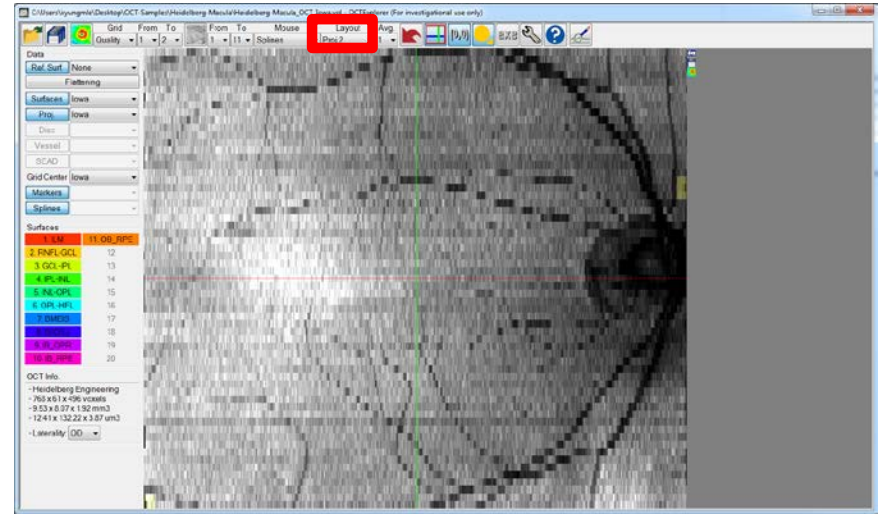
OCT XY2

The layout ending with '2' considers the OCT physical size.

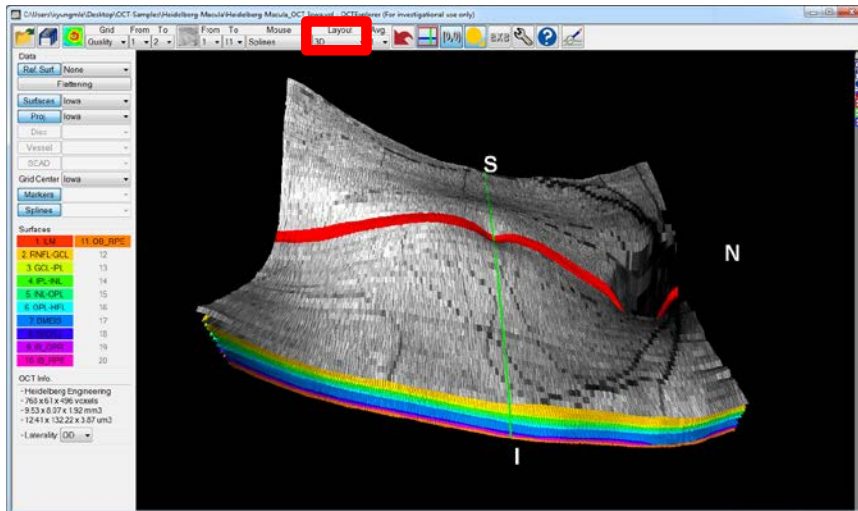
Layout



Proj.



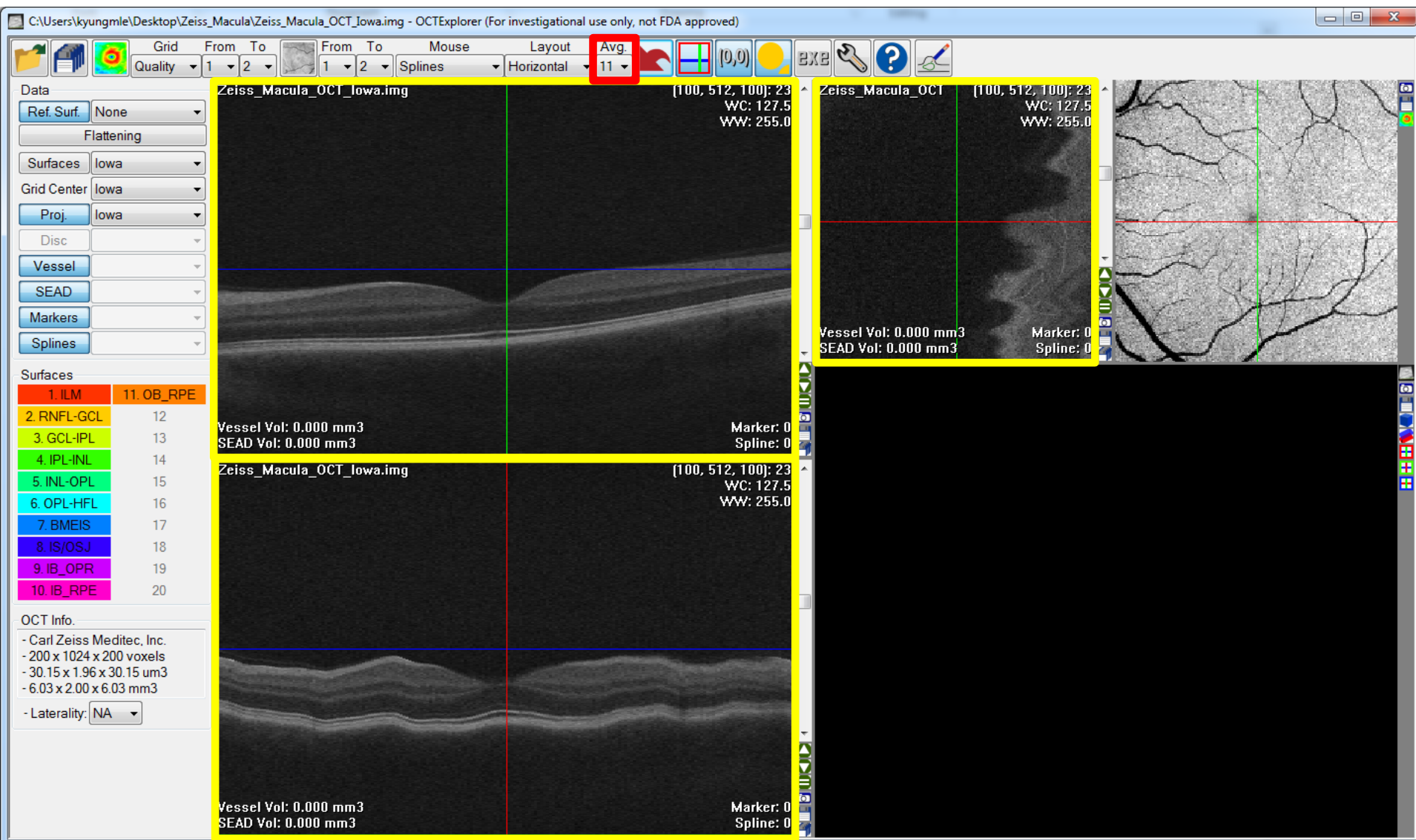
Proj.2



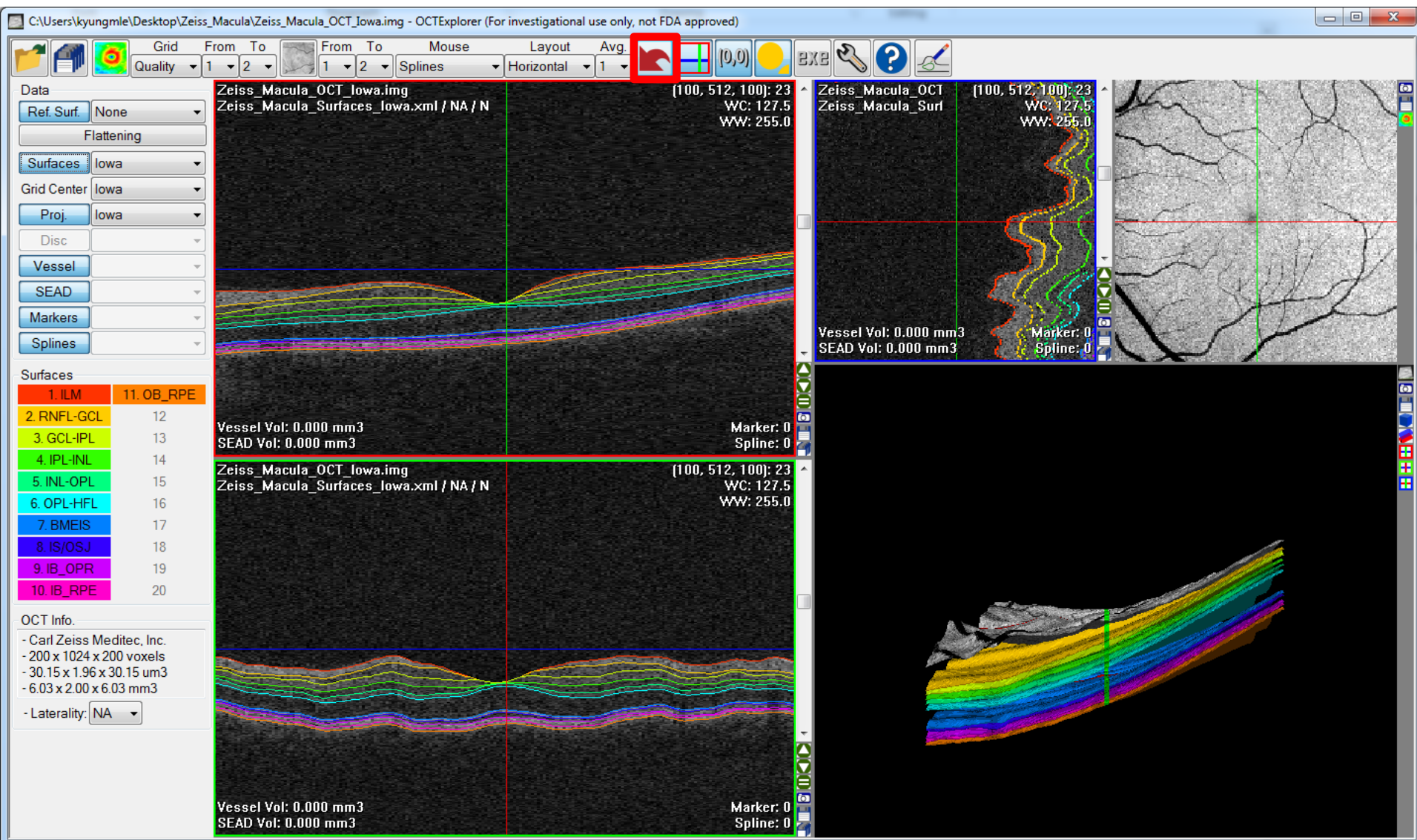
3D

The layout ending with '2' considers the OCT physical size.

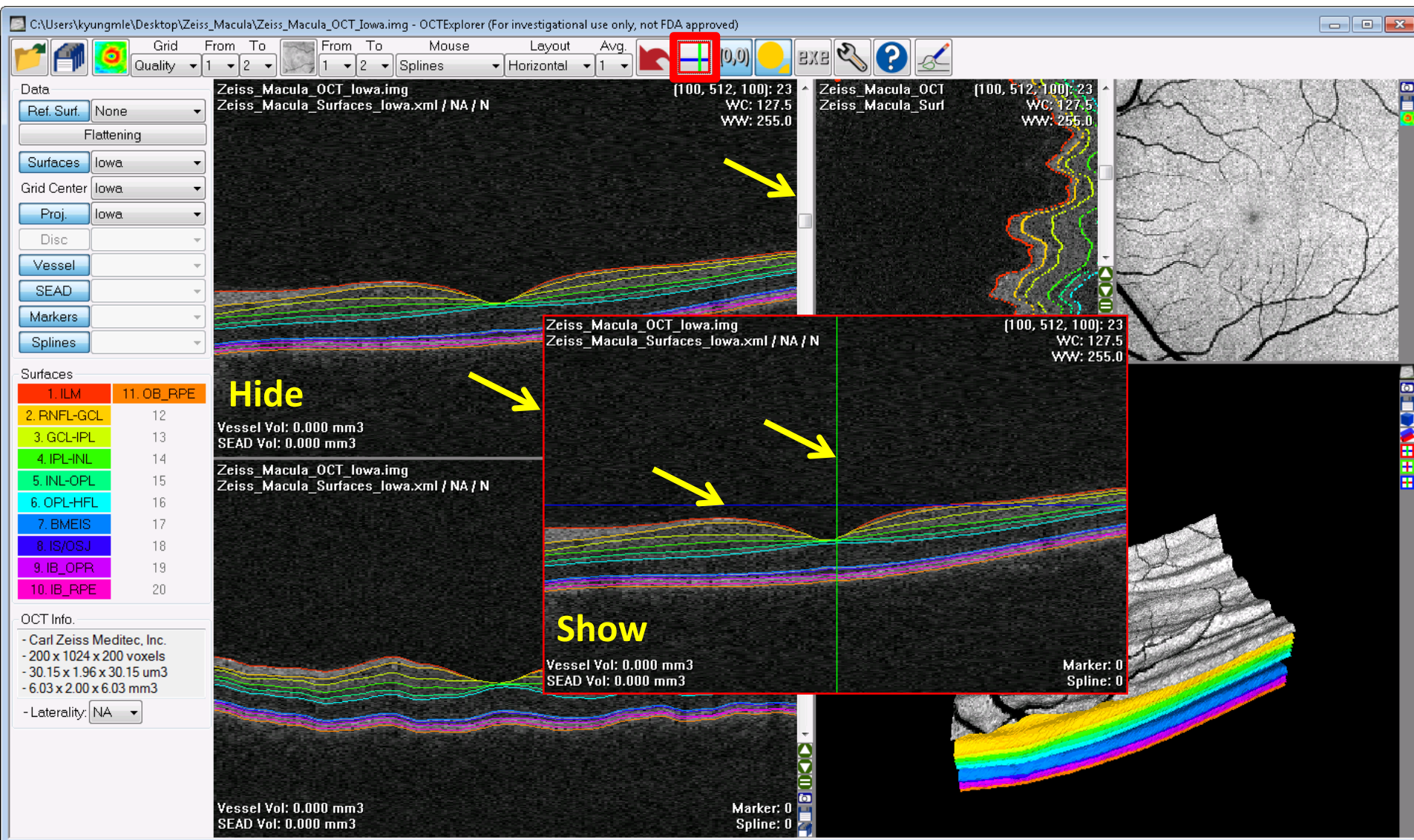
Moving Average Filtering



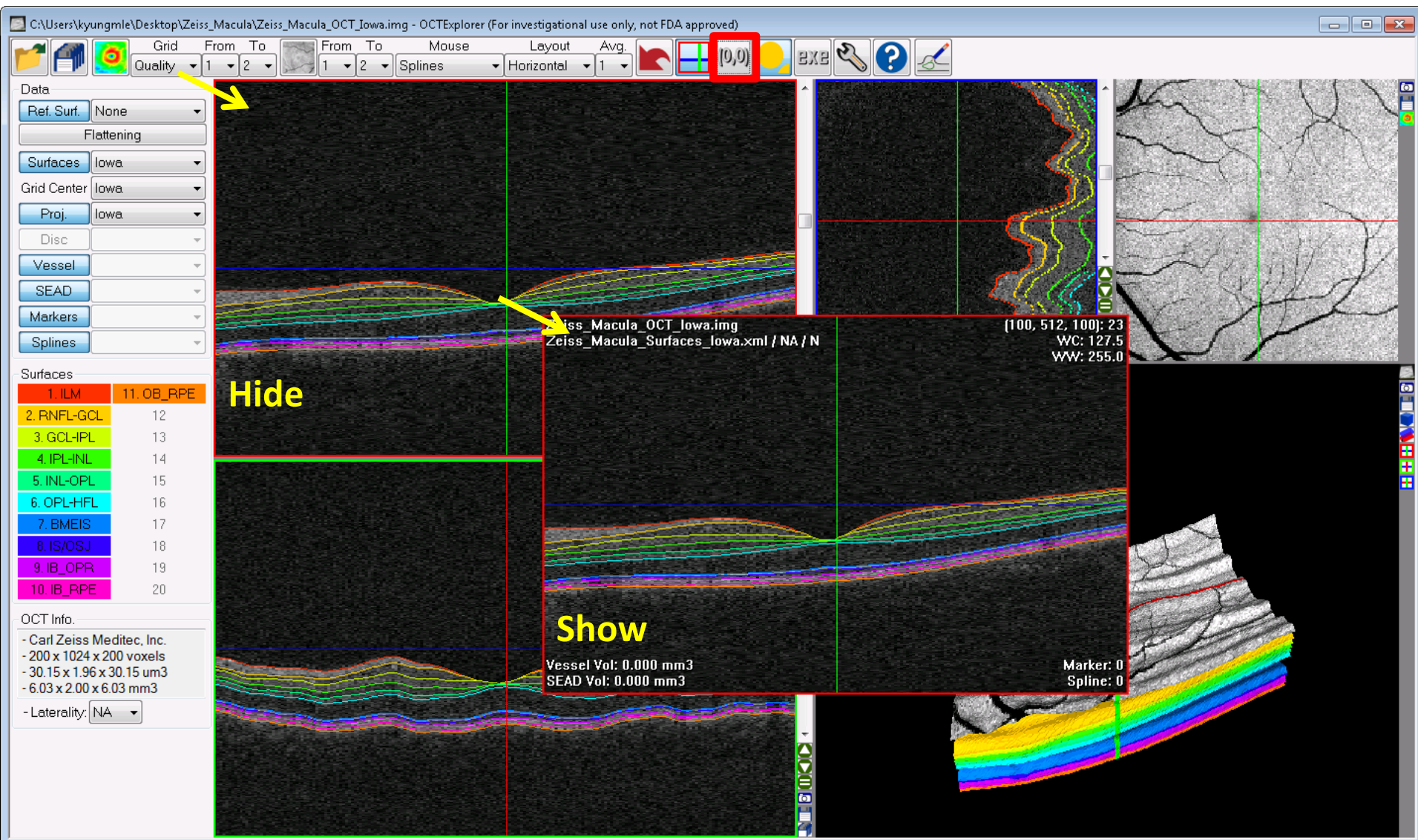
Reset



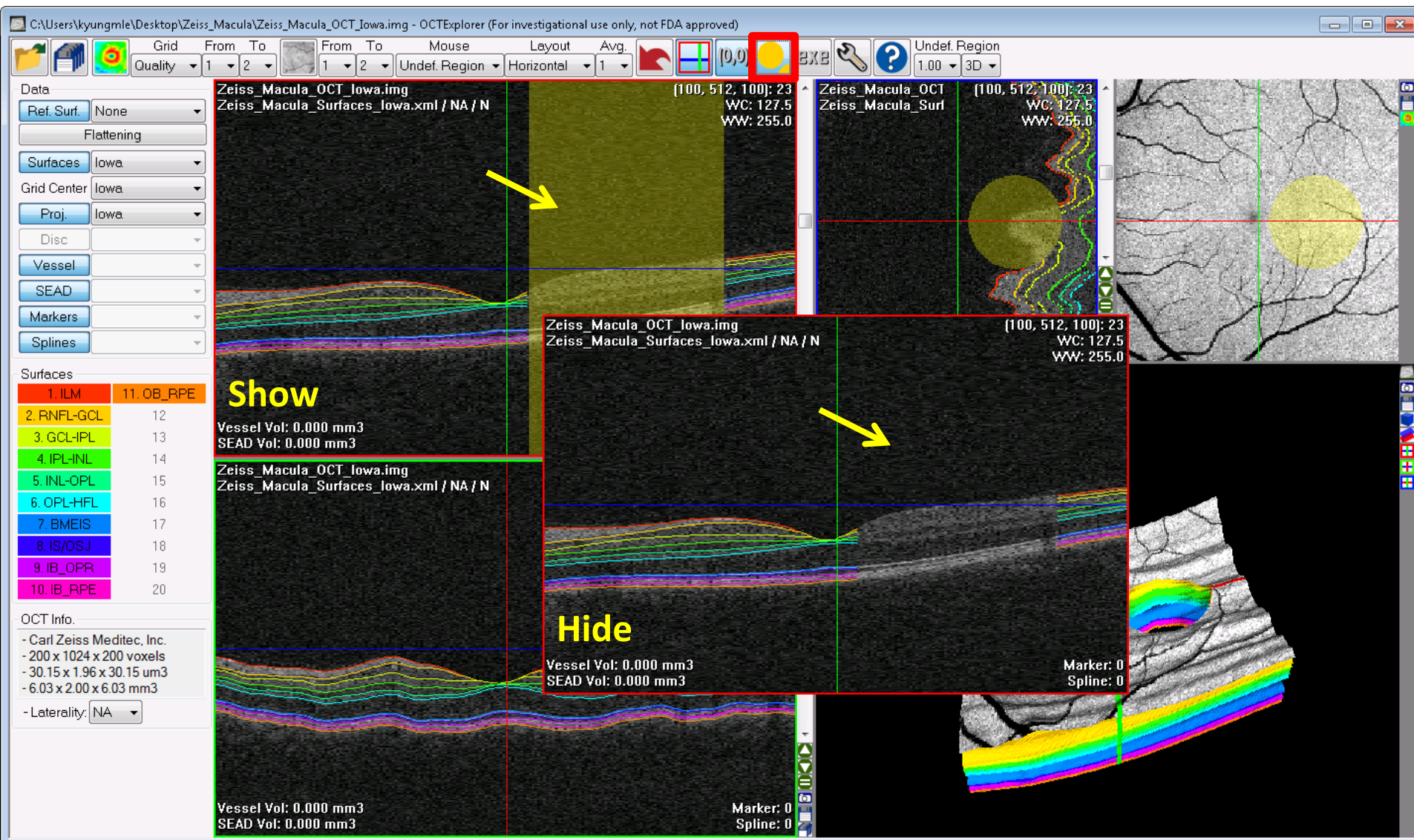
Show/Hide Guide Lines



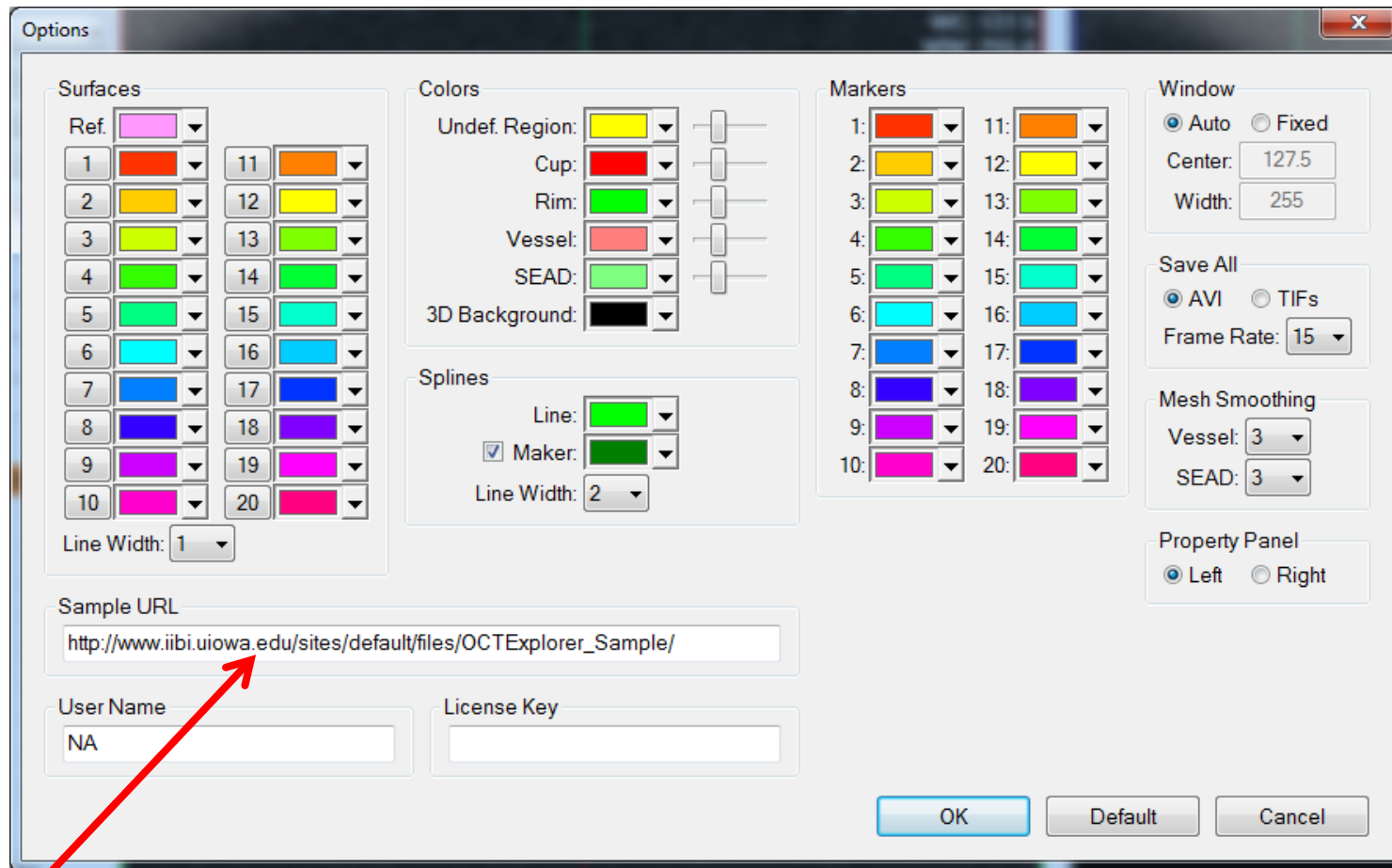
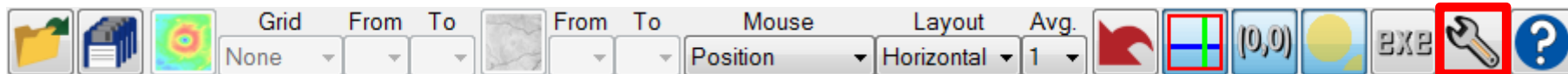
Show/Hide Overlay



Show/Hide Undefined Region

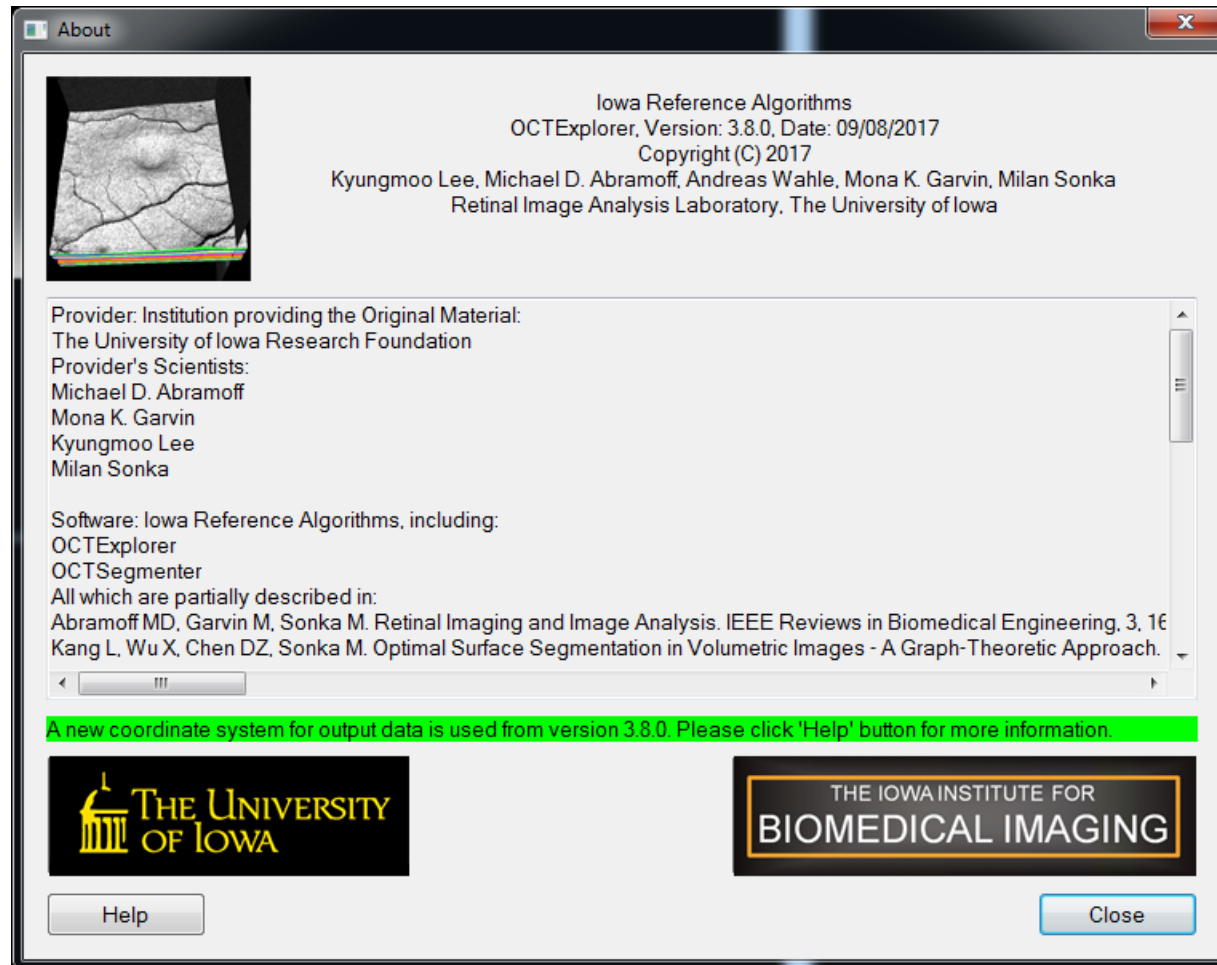
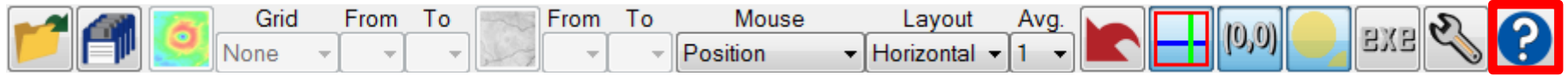


Options

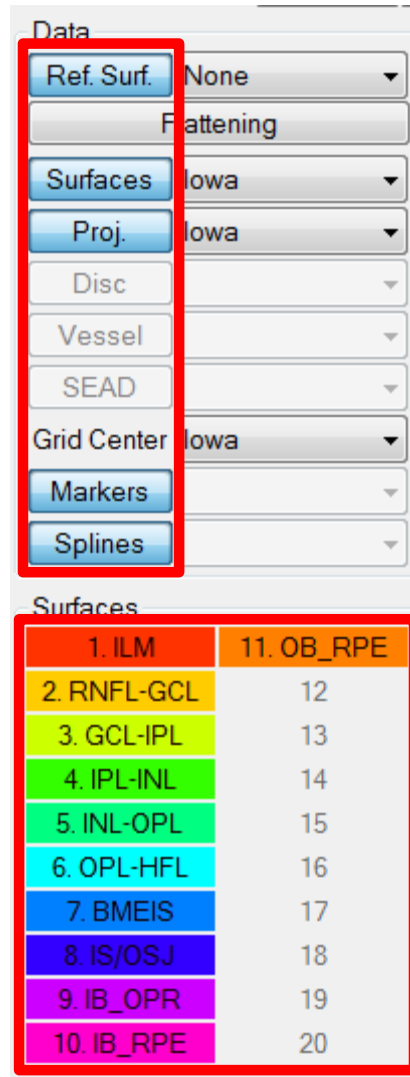


Sample URL: http://www.iibi.uiowa.edu/sites/default/files/OCTExplorer_Sample/

About

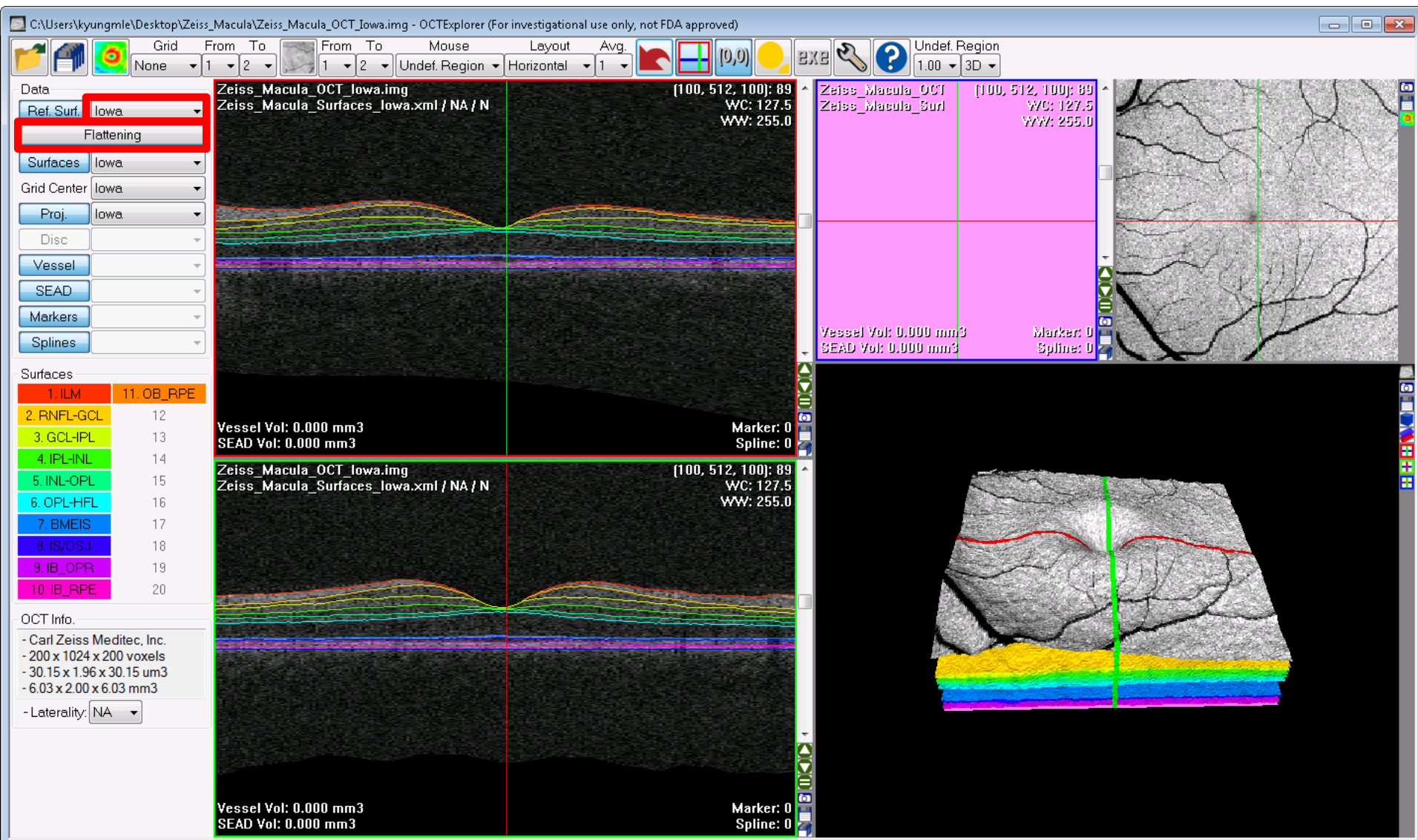


Show/Hide Buttons

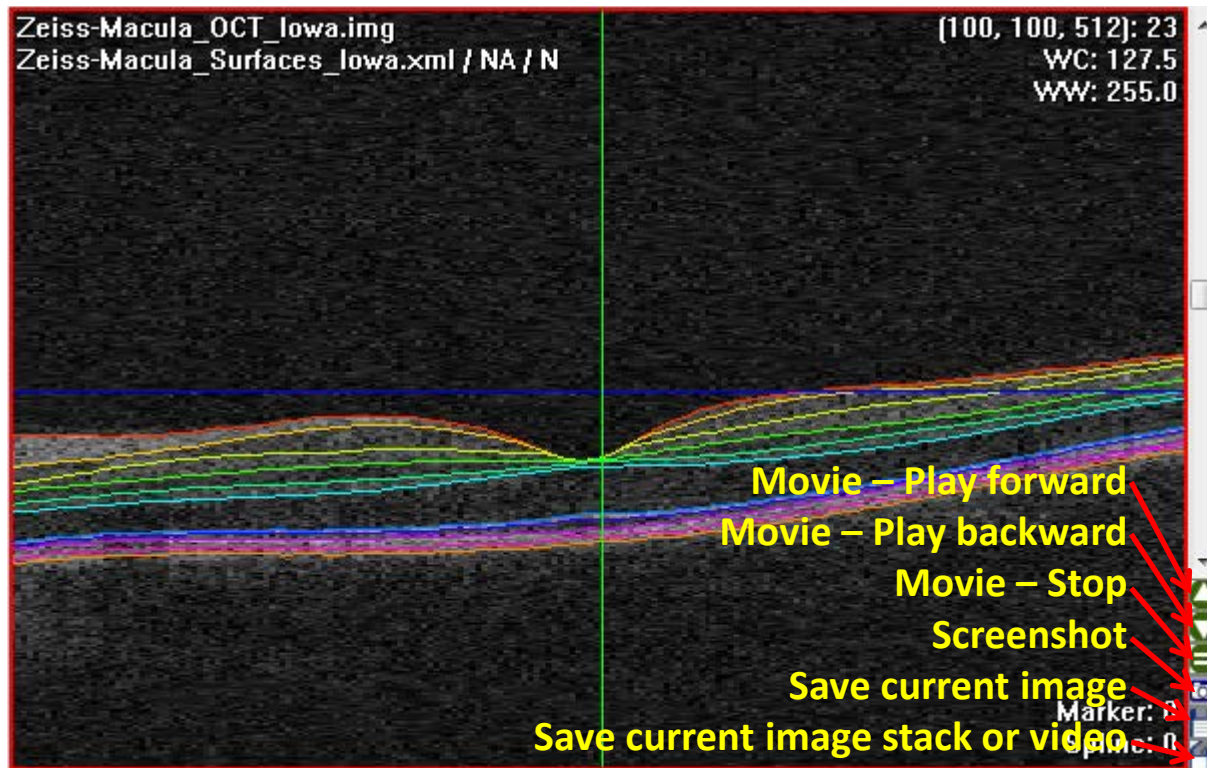


- Space bar: Show/hide surfaces

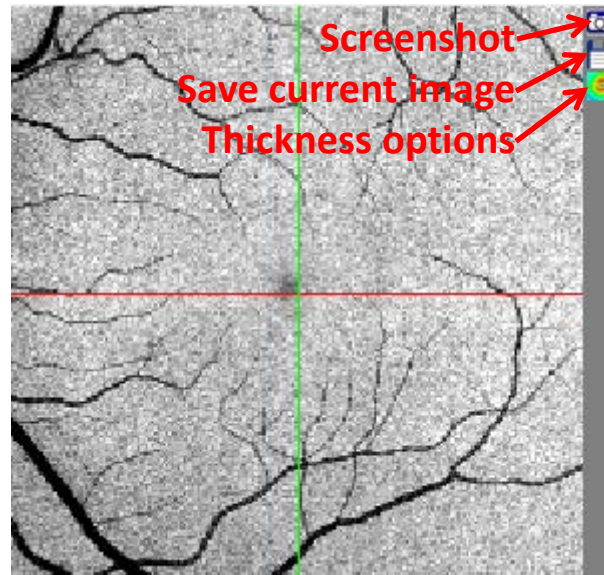
OCT Flattening



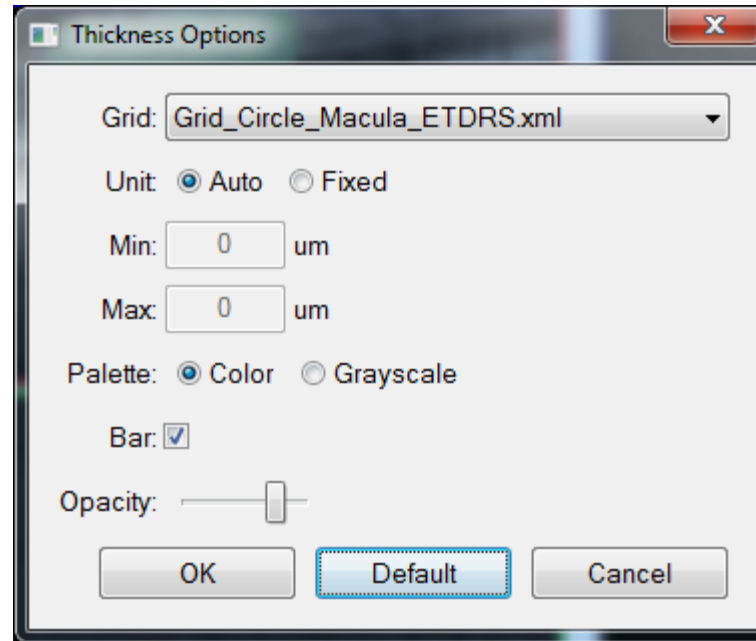
OCT Images



Projection Image

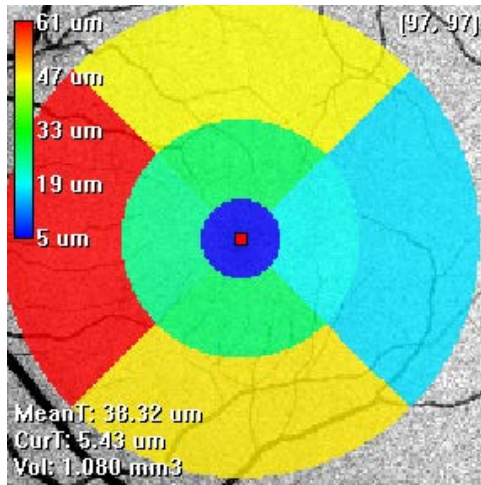


Projection Image – Thickness Options

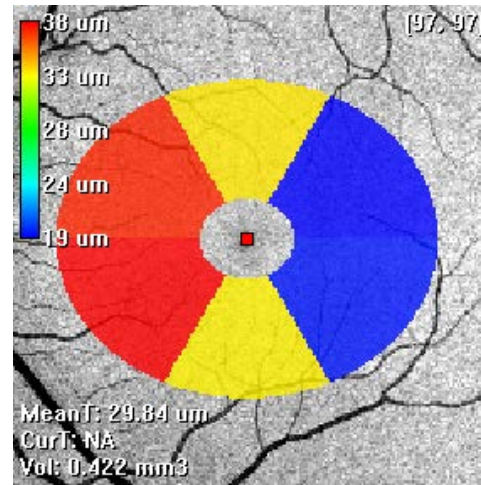


- **Grid**
 - **ETDRS grid** : 'Grid_Circle_Macula_ETDRS.xml'
 - **GCIPL grid** : 'Grid_Ellipse_Macula_GCIPL.xml'
 - **10-2 HVF grid** : 'Grid_Square_Macula_10-2HVF.xml'
 - **R-1.73mm grid**: 'Grid_Circle_ONH_R-1.73mm.xml'
 - **NFB grid** : 'Grid_MultiSquares_Macula_NFB.xml'

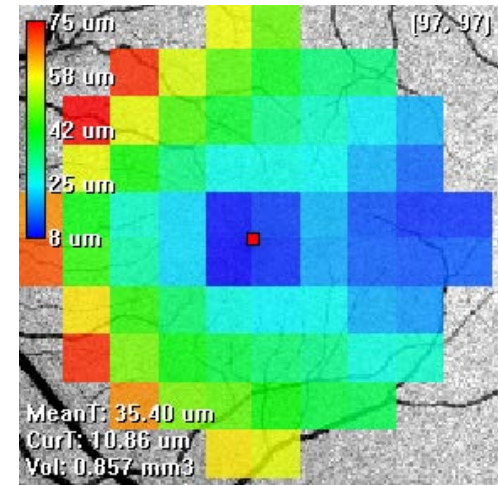
Projection Image – Grids



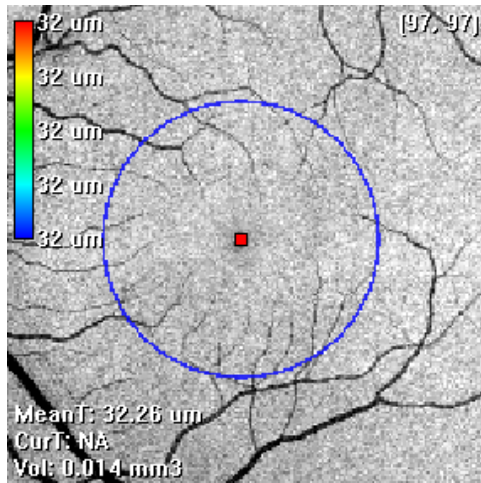
ETDRS



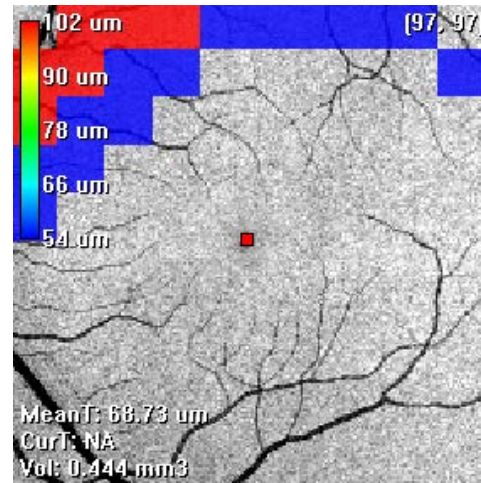
GCIPL



10-2 HVF



R-1.73mm

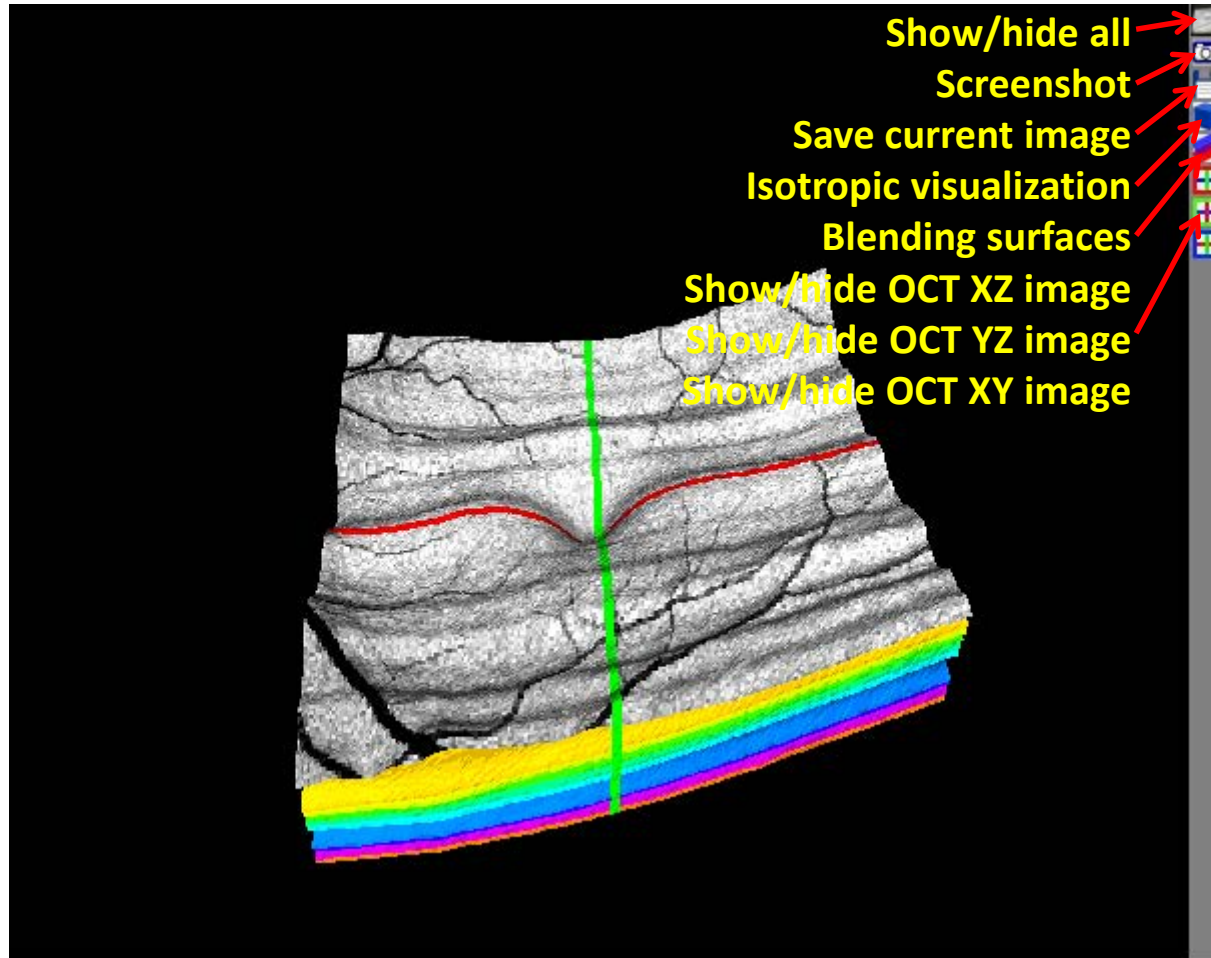


NFB

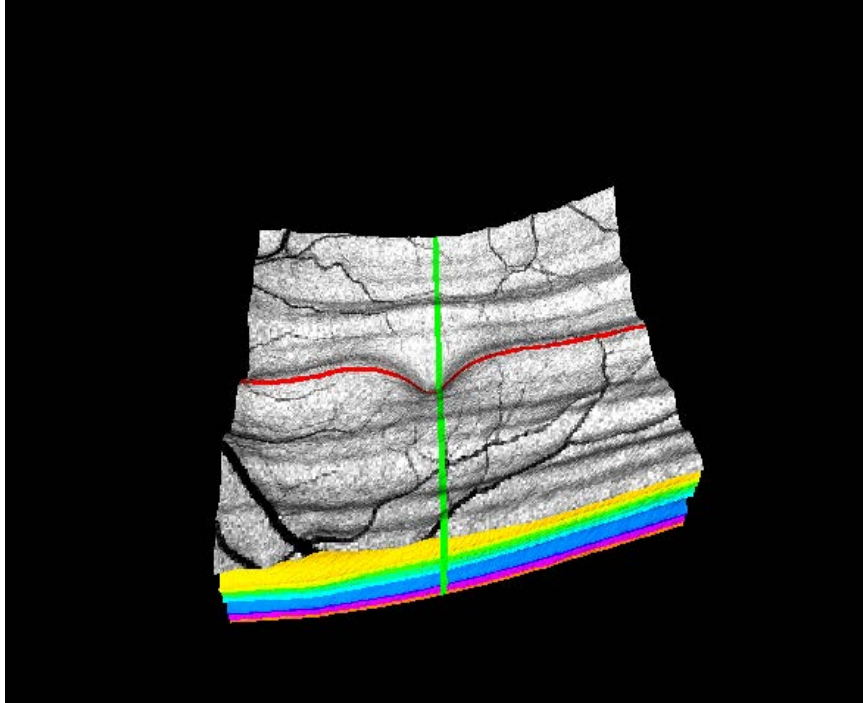
3D

- Left mouse button: Position
- Left mouse button drag: Rotation
- Left mouse button double click: Delete markers or splines
- Middle mouse button drag or (shift + right mouse button drag): Pan
- Right mouse button drag (up/down): Zoom out/in

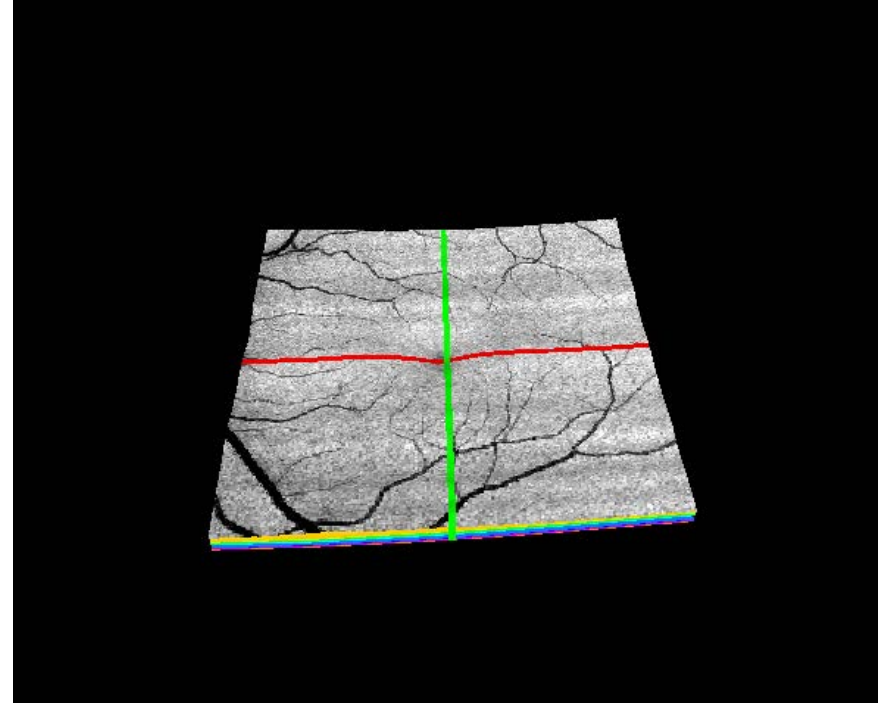
3D



3D – Isotropic Visualization

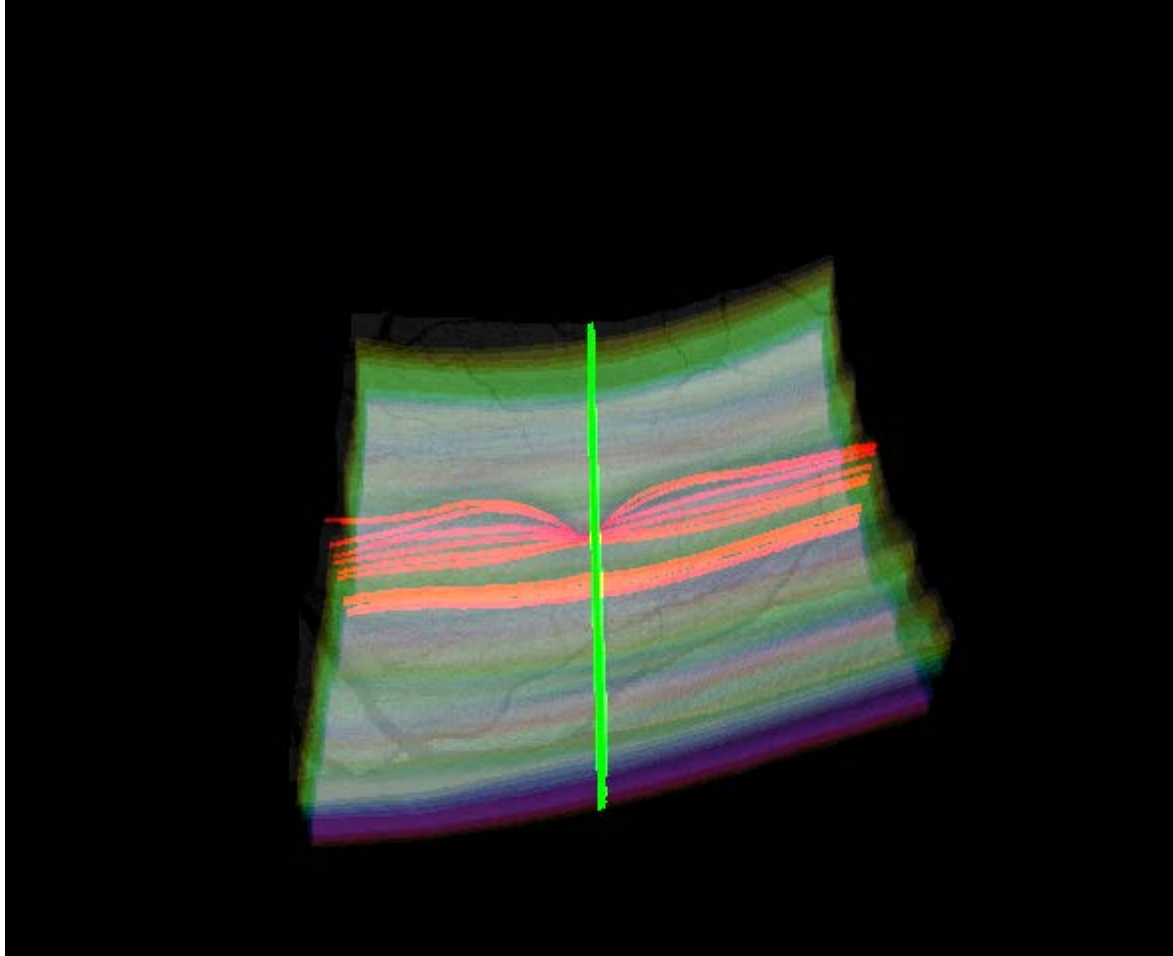


Non-isotropic
(5 times scaled up in Z-axis)

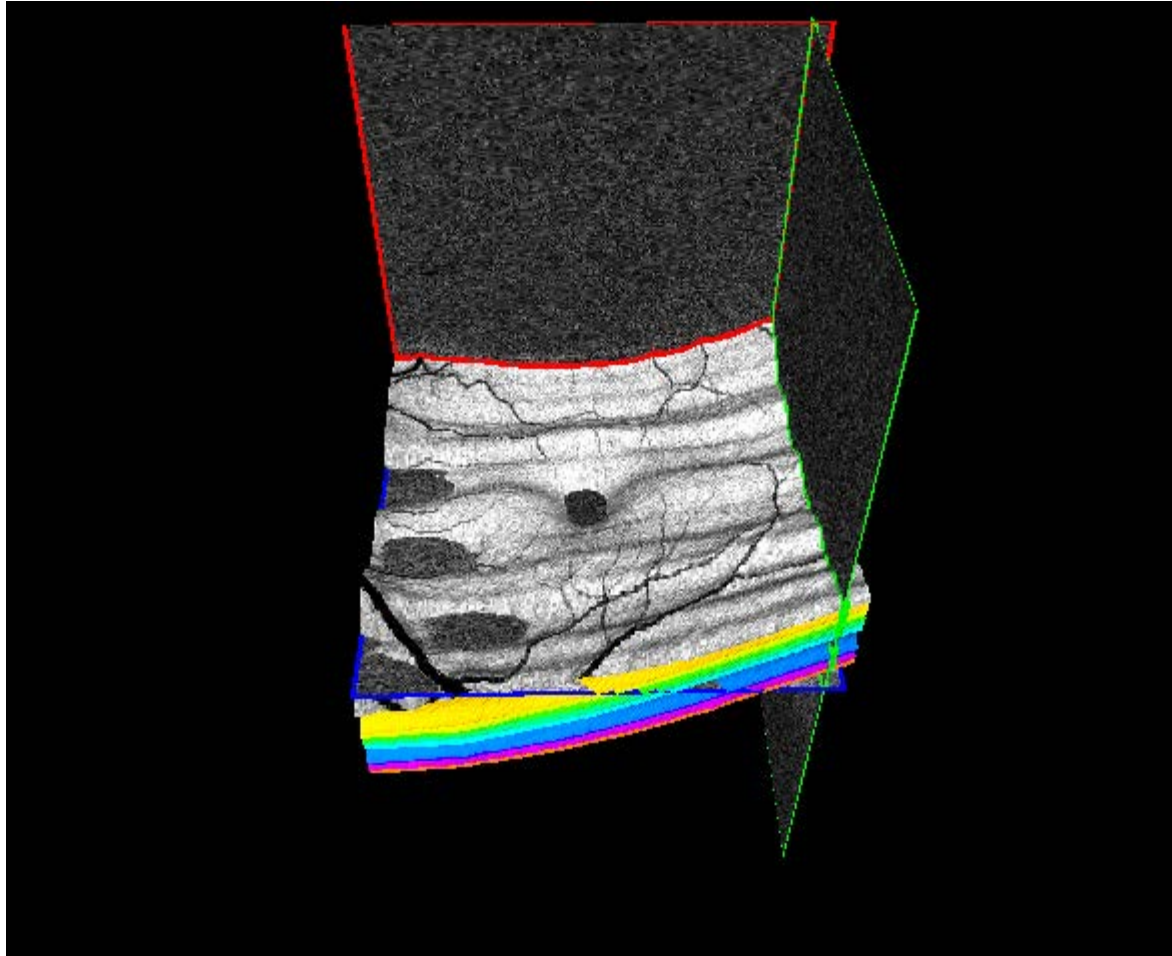


Isotropic

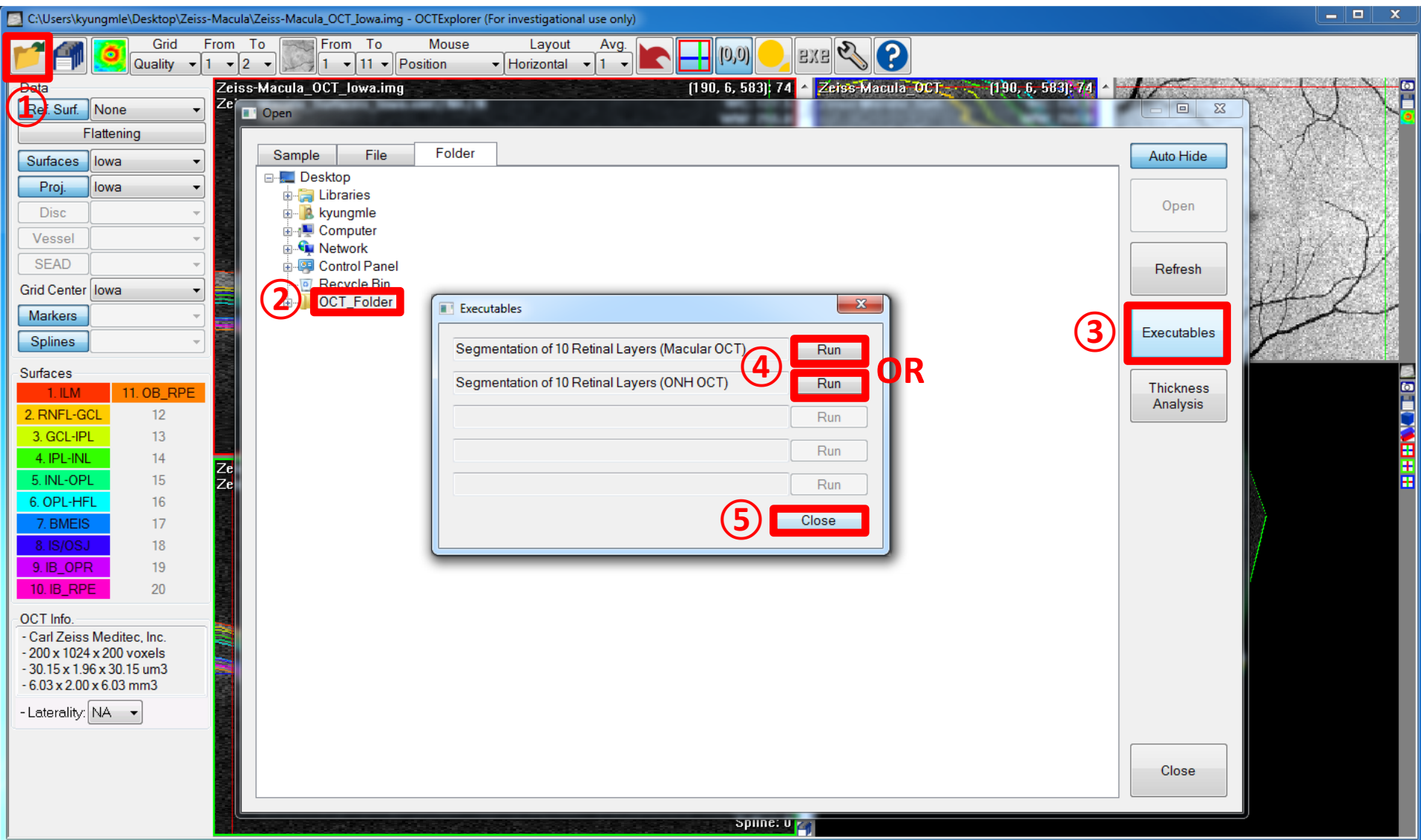
3D – Blending Surfaces



3D – Show/Hide OCT Images



Batch Processing – Layer Segmentation



Batch Processing – Layer Analysis

Thickness Analysis Dialog Box Annotations:

1. File Explorer icon in the top toolbar.
2. 'OCT_Folder' in the 'Open' file browser.
3. 'Thickness Analysis' button on the right sidebar.
4. 'Grid_Circle_Macula_ETDRS.xml' in the 'Grid' dropdown.
5. 'XML' radio button in the 'Grid Center' section.
6. 'Surfaces: _Surfaces_lowa.xml' and 'Grid Center: _GridCenter_lowa.xml' in the 'Filters' section.
7. 'Browse' button (three dots) next to the 'Output Path Name'.
8. 'OK' button at the bottom of the dialog.

OCT Info Panel:

- Carl Zeiss Meditec, Inc.
- 200 x 1024 x 200 voxels
- 30.15 x 1.96 x 30.15 μm^3
- 6.03 x 2.00 x 6.03 mm3
- Laterality: NA

Thickness.csv - Excel Output Table:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Surfaces	Laterality	OCTCenter	OCTSizeX	OCTSizeY	OCTSizeZ	PhysicalSi	PhysicalSi	PhysicalSi	VoxelSize	VoxelSize	VoxelSize	Undefined	Grid	GridCenter	GridCenter	GridCenter	MeanThic
2	C:\Users\NA	Macula	200	1024	200	6.03	2.002	6.03	30.151	1.955	30.151	0	Grid_Circl	C:\Users\NA	97	97	5.26	
3	C:\Users\NA	Macula	200	1024	200	6.03	2.002	6.03	30.151	1.955	30.151	0	Grid_Circl	C:\Users\NA	102	99	4.99	
4	C:\Users\NA	Macula	200	1024	200	6.03	2.002	6.03	30.151	1.955	30.151	0	Grid_Circl	C:\Users\NA	98	100	5.34	
5	C:\Users\NA	Macula	200	1024	200	6.03	2.002	6.03	30.151	1.955	30.151	0	Grid_Circl	C:\Users\NA	96	103	5.43	

Thank you!