How to adapt a mask file in BrainVoyager

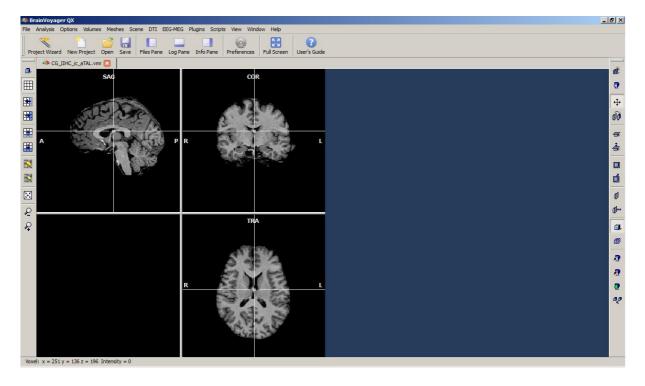
This is no official Brain Innovation support document. For any questions or remarks, please contact the author via heinecke(at)brainvoyager(dot)com

BrainVoyager version used: BV QX 2.6 (64bit ,Windows 7) Dataset used: CG objects sample data

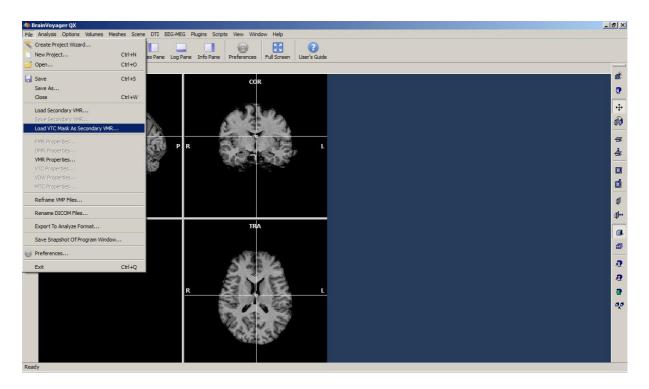
Using masks (either based on anatomical or functional definition) is a reasonable approach to limit the multiple comparisons problem within your statistical analysis.

The following parapraphs describe an approach to adapt previously created mask files within BrainVoyager QX. Although there is to direct way to load an .msk file, we can use the following simple workaround to adapt a mask file.

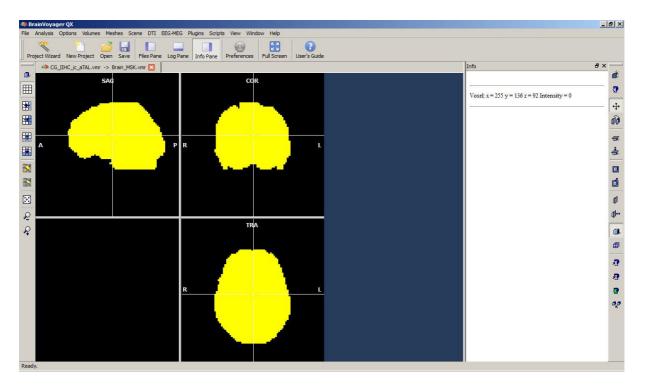
First we open a Talairach VMR file. It has been previously brainpeeled (during the automatic inhomogeneity correction).



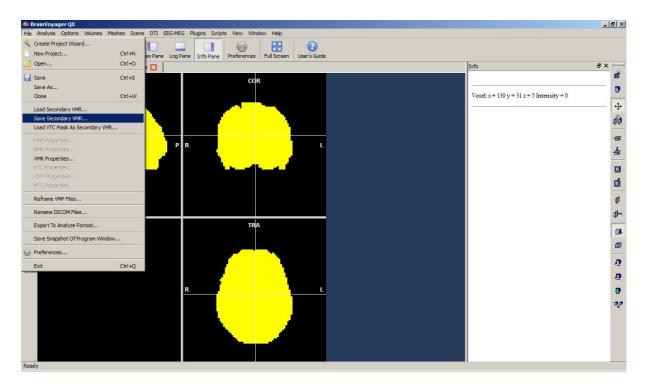
We load a previously created mask file as a secondary VMR ("File" menu).



The mask is displayed in yellow.



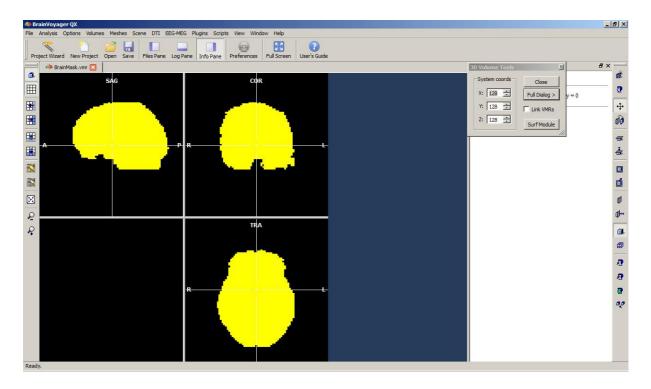
We save the secondary VMR as a "real" VMR (File menu). Currently the mask file is only represented as a temporary VMR and we cannot interact with it (except showing it).



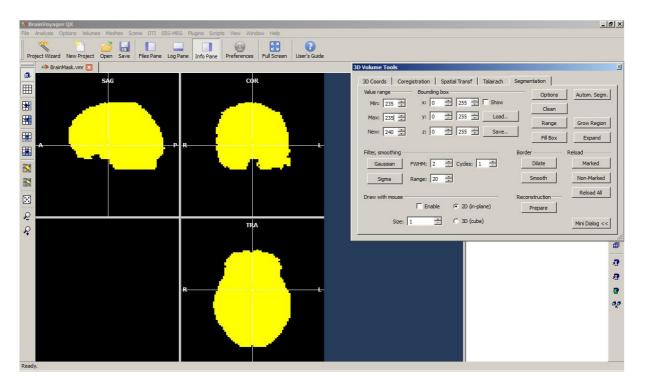
We save the file as "BrainMask.vmr"

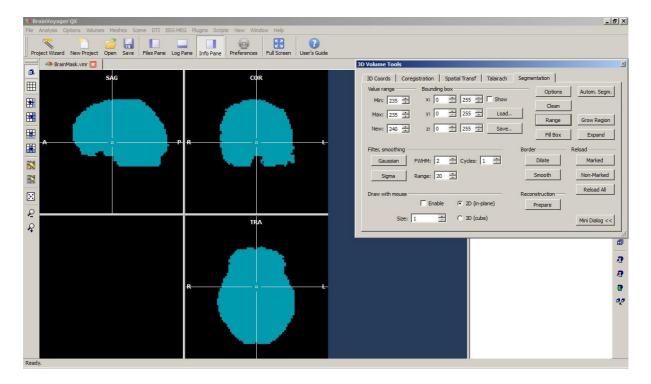
anize 🔻 New folder					- (
7 Favorites	Name *	Date modified	Type	Size	
Martines Desktop	PreparedFiles	26.11.2012 09:28	File folder		
Downloads	BrainMask	18.12.2012 09:45	VMR File	16.385 KB	
	CG	05.12.2011 12:54	VMR File	12.289 KB	
Libraries	CG_BrainMask	05.12.2011 16:06	VMR File	12.289 KB	
Libraries	CG_IIH-BiasField-1	05.12.2011 16:06	VMR File	12.289 KB	
B Homegroup	CG_IIH-BiasField-2	05.12.2011 16:06	VMR File	12.289 KB	
ECAL MARKED	CG_IIHC	05.12.2011 16:06	VMR File	12.289 KB	
Computer		05.12.2011 16:11	VMR File	12.289 KB	
SOOTCAMP (C:)	CG_IIHC_ic_aACPC	10.01.2012 16:17	VMR File	16.385 KB	
Macintosh HD (E:)	CG_IIHC_ic_ACPC	19.11.2012 11:35	VMR File	16.385 KB	
Hy web sites on Hait	CG_IIHC_ic_aTAL	10.01.2012 16:18	VMR File	16.385 KB	
Network	CG_IIHC_ic_aTAL_0.5mmISO	17.08.2012 22:29	VMR File	37.249 KB	
	CG_IIHC_ic_aTAL_cereb	16.02.2012 12:42	VMR File	16.385 KB	
	CG_IIHC_ic_aTAL_cereb2	16.02.2012 12:44	VMR File	16.385 KB	
	CG_IIHC_ic_aTAL_grey	04.07.2012 11:32	VMR File	16.385 KB	
	CG_IIHC_ic_aTAL_LH_BH	17.08.2012 21:27	VMR File	16.385 KB	
	CG_IIHC_ic_aTAL_LH_BH2	17.08.2012 21:27	VMR File	16.385 KB	
	CG_IIHC_ic_aTAL_LH_BH2_0.5mmISO	17.08.2012 21:43	VMR File	21.507 KB	
	CG_IIHC_ic_aTAL_LH_GM	16.02.2012 12:32	VMR File	16.385 KB	
	CG_IIHC_ic_aTAL_LH_WM	16.02.2012 12:32	VMR File	16.385 KB	
	CG_IIHC_ic_aTAL_LH_WM_UnTAL2ACPC	17.08.2012 20:20	VMR File	16.385 KB	
	CG_IIHC_ic_aTAL_LH_WM_UnTAL2ACPC_0	17.08.2012 20:38	VMR File	11.810 KB	
	CG IIHC ic aTAL RH GM	16.02.2012 12:32	VMR File	16.385 KB	
File name: Brain	lask				
Save as type: Anator	mical 3D MRI Files (*.vmr)				

We open the new "BrainMask.vmr".

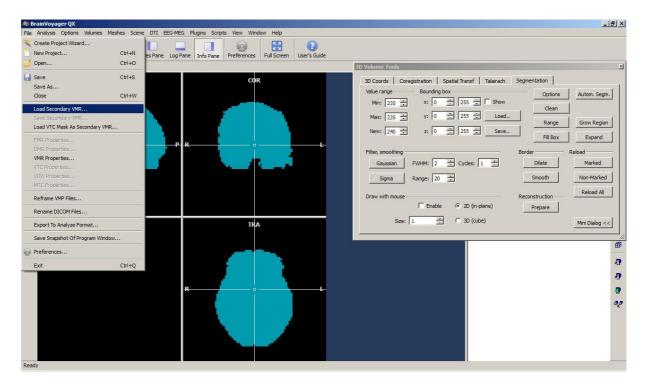


Now we are able to interact with the voxels included in the mask-based VMR. We have to turn the yellow color (numerical value 235) into blue (numerical value 240) to be able to adapt the voxels and the save the result as a new VOI (and finally mask file). We open the Segmentation tab of the 3D Volume tools and enter 235 into the "Min" and "Max" fields. We use the "Range" button to fill all the yellow voxels with blue in one step.





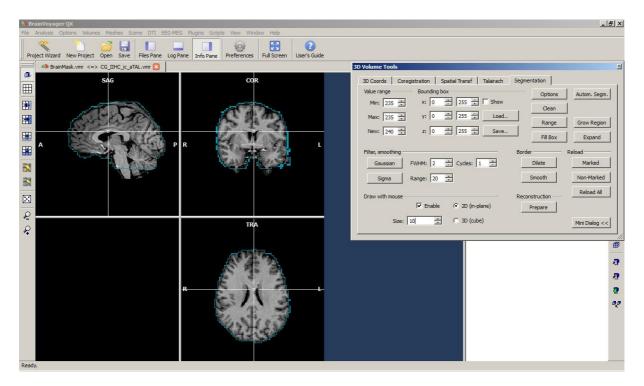
Now we are ready to adapt the voxels. To allow an optimal / guided adaptation, we load the original Talairach VMR as a secondary VMR.



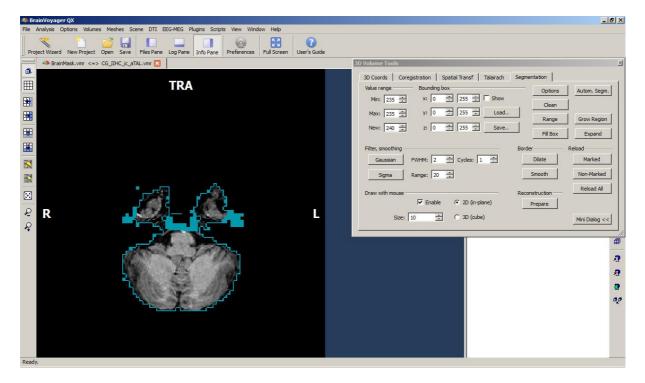
By using the "F9" button we blend in the mask-based VMR and the original Talairach VMR – this way, we just see the outline of the mask-based VMR.

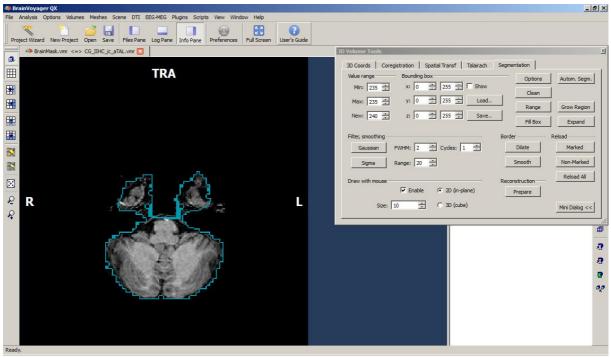
📣 BrainVoyager QX	X
File Analysis Options Volumes Meshes Scene DTI EEG-MEG Plugins Scripts View Window Help	
Project Wizard New Project Open Save Files Pane Log Pane Info Pane Preferences Full Screen User's Guide	
A BrainMask.vmr <=> CG_IIHC_ic_aTAL.vmr 🔀	3D Volume Tools
Image: Short Short Constraints Short Short Constraints Image: Short S	BD Volume Tools 21 30 Coords Coregistration Spatial Transf Talairach Segmentation Value range Bounding box Options Autom. Segm. Min: 225 225 Show Options Max: 225 1 Show Options New: 240 21 0 225 Save Filter, smoothing Border Reload Border Reload Gaussian FWHM: 2 2 Smooth Non-Marked Draw with mouse 20 2 2 Reconstruction Reload All Finder 20 0 20 0 20 Reload All Draw with mouse Enable 20 0 20 Reconstruction Reload All Size: 1 2 0 20 0 20 Reconstruction Reload All 7 30 0 20 0 20 Reconstruction Reload All Reconstruction Reload All Reconstruction Reload Reconstruction Reload

We enable to drawing tool on the Segmentation tab. We can adapt the size of the drawing tool as well as the drawing style (2D vs 3D).

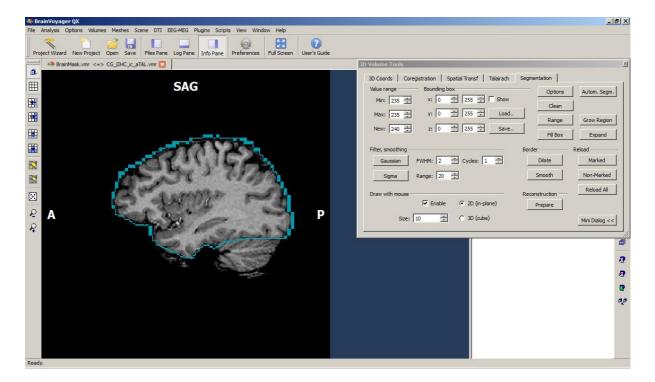


It is usually helpful to zoom into one of the slice views (e.g. axial) to adapt the mask-based VMR in a slice-by-slice fashion.





In this case, we also remove the cerebellum part of the mask-based VMR.



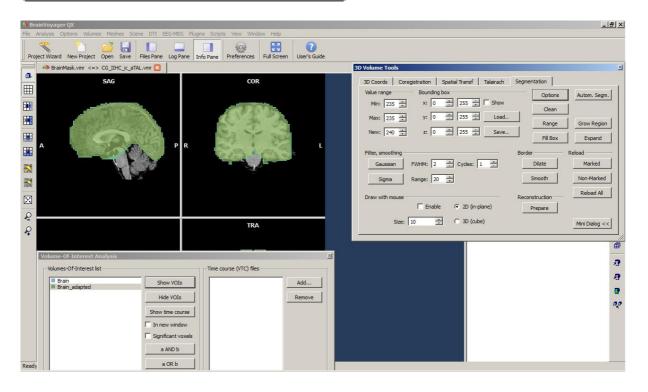
In a couple of minutes, we can e.g. clean the "edges" a bit an also remove the cerebellum from the mask-based VMR.

🦚 BrainVoyager QX		
File Analysis Options Volumes Meshes Scene DTI EEG-Mi	EG Plugins Scripts View Window Help	
Project Wizard New Project Open Save Files Pane Log	Pane Info Pane Preferences Full Screen User's Guide	
A BrainMask.vmr <=> CG_IIHC_ic_aTAL.vmr 🔯		3D Volume Tools
SAG SAG	COR R	30 Coords Coregistration Spatial Transf Talarach Segmentation Value range Bounding box Options Autom. Segm. Min: 235 X: 0 255 Show Options Max: 235 Y: 0 255 Lead Range Grow Region New: 240 2: 0 255 Save Fill Box Expand Filter, smoothing Border Reload Barded Smooth Non-Marked Sigma Range: 20 - Smooth Non-Marked Draw with mouse Enable C 20 (m-plane) Prepare Prepare
\$ 	TRA	Size: 10 ± C 30 (cube) Mini Dialog <<
	R	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Ready.		

Now we are ready to turn the adapted VMR into a VOI. We open the Options of the Segmentation tab. We click the "Define VOI" button.

A Volume Tools Options
Main Masking Operations Settings Mark-Based Region-Of-Interest Definition Bridge Removal Mark color: 240 + Define VOI
Brain peeling ✓ Get high-pass filtered result Change size of resulting brain mask: ✓ Get result with labeled (blue) mask Segment Brain
Volumetry Mark color: 240 Count
OK Cancel

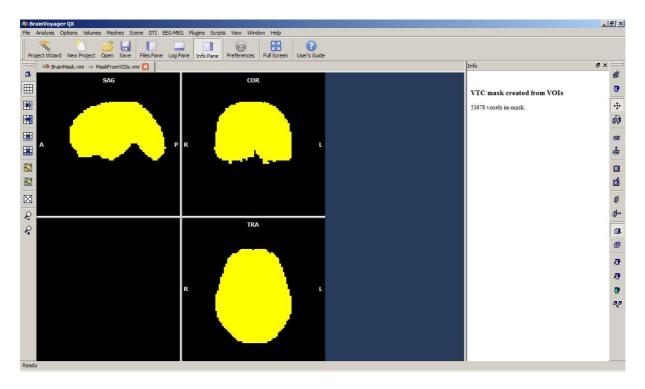
4 Define Volu	me-Of-Inte	erest (VOI)		? X
Properties of	new VOI			
Name: Brain	n_adapted			_
Color:				
		Cancel	0	



Now we turn the VOI into a new mask file by opening the options of the VOI tool and switching to the "VOI Functions" tab. We use the "Create MSK..." button. Make sure the Use "Use selected VOIs" radio button is checked when more than one VOI is saved in the VOI file.

🧆 VOI Analysis Options		?×
Access Options VOI GLM	ANCOVA VTC Data Transformations VOI Functions	
VOI -> Draw in VMR	Flip left / right VOI consistency Voxels with map values	VOI transparency
Convert	Flip X Axis Verify VOI VOI Details	Value: 0,6 🛨
VOI -> Surface clusters	Overview table with VOIs center of gravity	VOI map peak voxels
Create	Individual VOIs C Across subjects Table	Table
Expand selected VOIs	Create MSK file from VOIs	
Dilate	● Use selected VOIs C Use all VOIs Resolution: 3 👘	Create MSK
Probability maps	Multi-VOI event-related averaging plot	VOIs with map values
Create	AVG file: Browse Generate Plot	Table
		Close

The new mask file is again visualized in yellow and the number of voxels included is displayed in the "Info" tab.



As a test, we use the original as well as the adapted mask within the same single run GLM analysis. In the next screenshot, both result maps are displayed side by side (original mask used on the left). In this case, approximately 8000 voxels have been removed based on the mask adaptation.

