Different Options to check the quality of the FMR - VMR alignment in BrainVoyager

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BrainVoyager QX Version used: 1.7.1

This is a preliminary version and no official BrainVoyager help document.

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FMR-VMR alignment is a crucial step in the processing of fMRI data. Because the visual inspection is a very important part of the procedure, one should use all available options to check the quality of the alignment. Generally, it is advised to check every single VTC is a dataset to be sure before running the statistics.

In this document, two different methods to check the quality of the alignment will be provided.

1. First, one has to load a VMR file and to link the corresponding VTC file.

2. In the 3D volume tools, you can use the "Show VTC Vol" button to visualize on volume of the VTC (the specific volume can be changed freely).
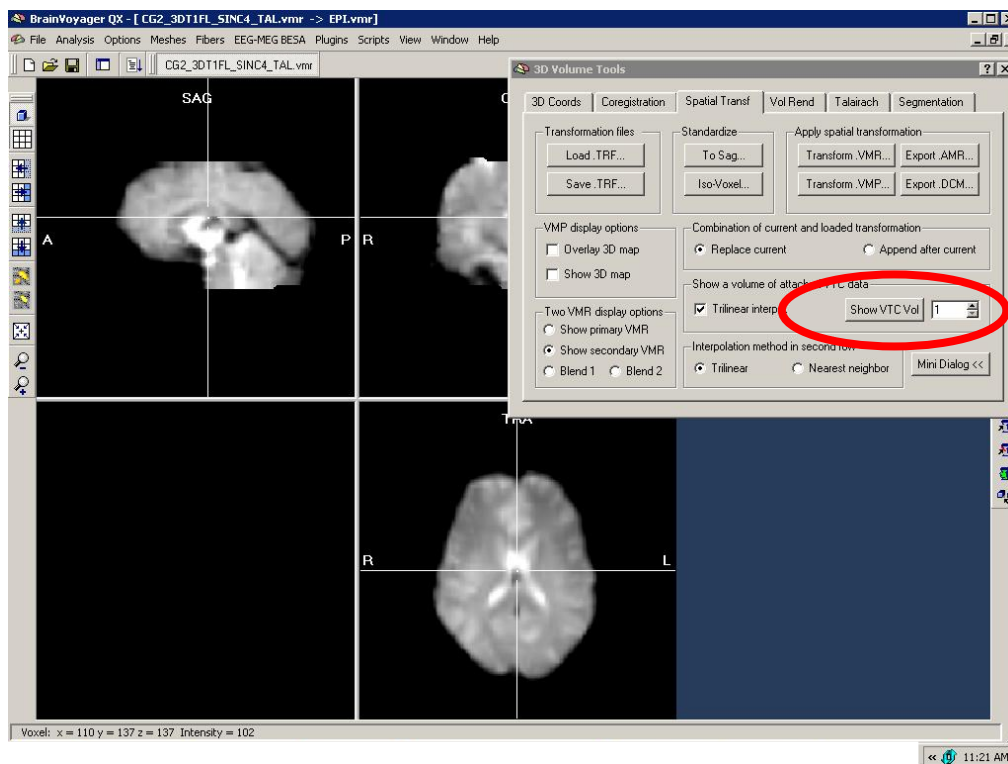
Now, the functional data (called "EPI.vmr") as well as the anatomical data is loaded. Only the EPI is visualized at the moment. This can also be seen in the header bar of BrainVoyager QX.

3. The standard method to check the coregistration would be to switch between the projects. This can be done using "**F8**"and "**F9**" buttons. F8 will switch between the currently loaded projects while F9 will present different modes of overlay. Pressing F9 repeatedly will cycle throught the modes. One of the modes is displayed in the next image
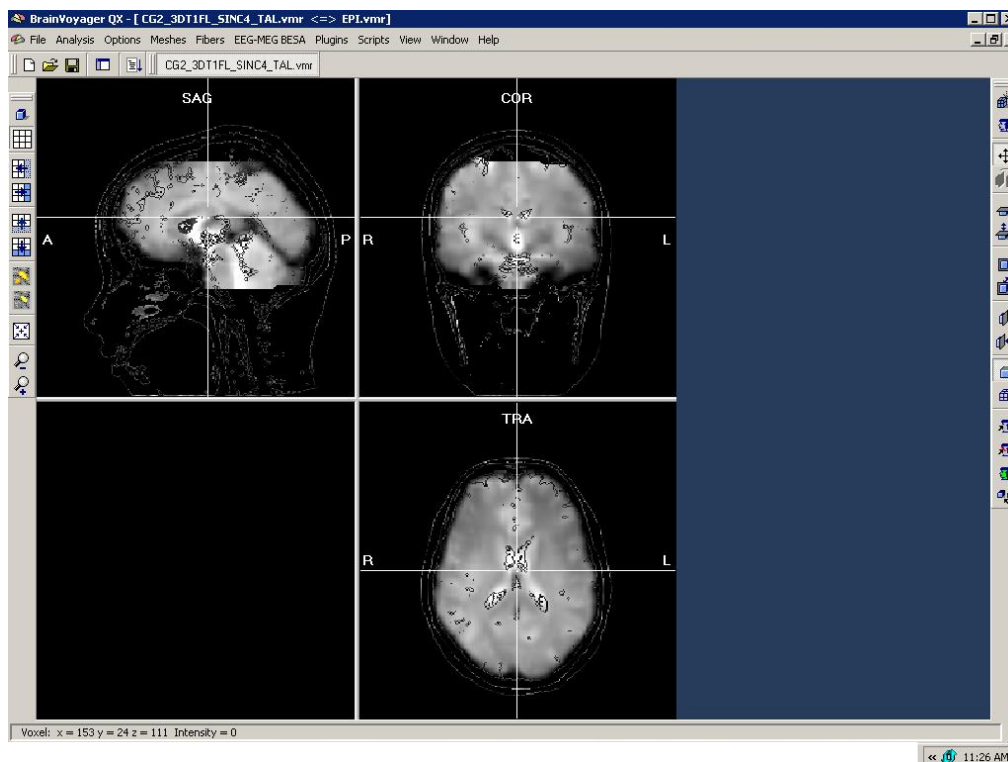

Sometimes it helps to switch very fast between the EPI and the VMR by just holding down the F8 button. Another helpful option is to position the crosshair on a specific anatomical landmark before switching. This will help in detecting detailed differences between the datasets due to alignment errors. Please keep in mind that due to the inherent differences between the datasets, there will always be some unavoidable differences (e.g. due to EPI distortions).

4. One of the drawbacks of the method described above is that the intensities in the EPI data are inverted.

There is a workaround that allows to visualize the VTC data with inverted intensities to possibly improve the visualisation.

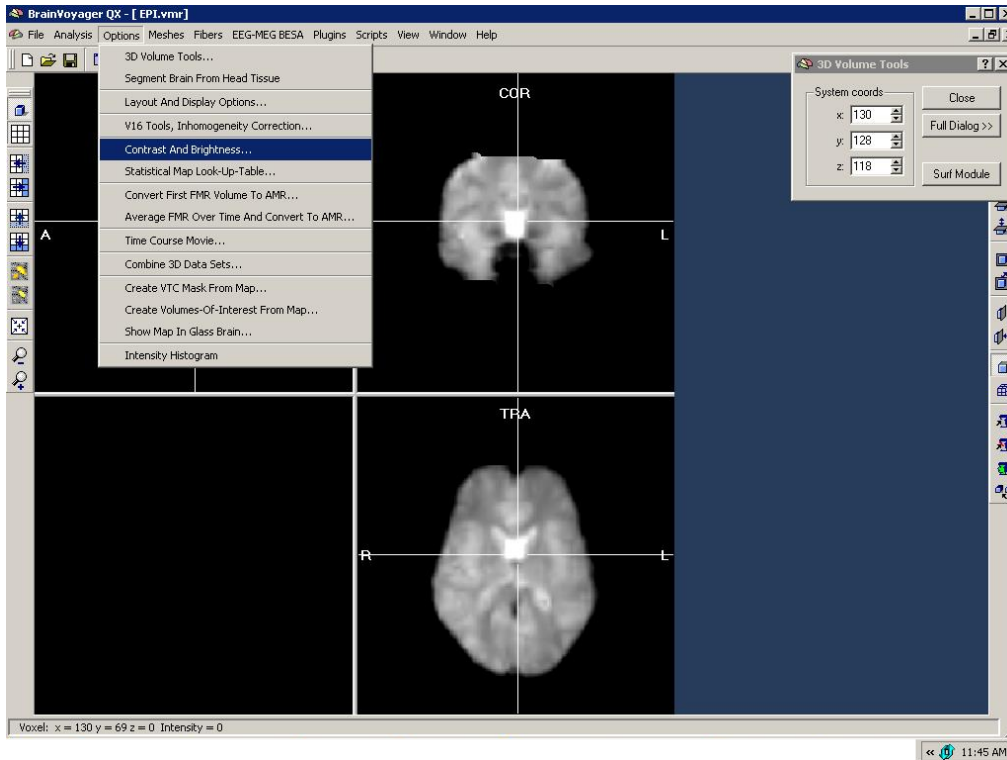To do this, you have to follow a number of steps:

a) you have to save the VTC representation in the overlay as a secondary VMR:
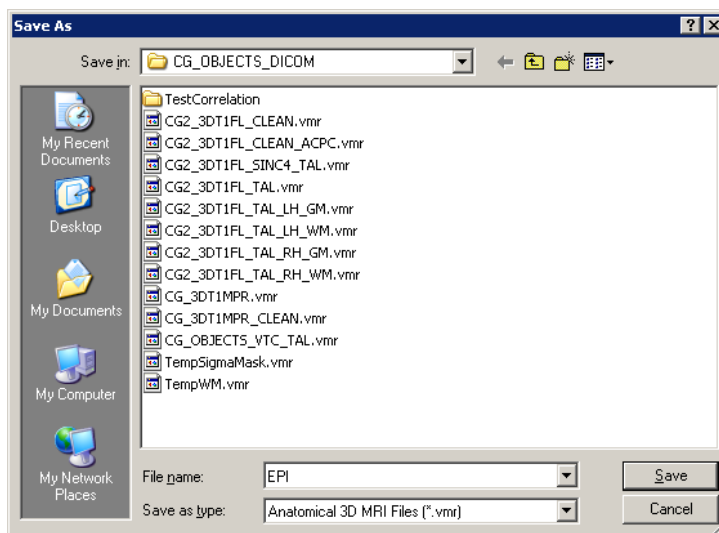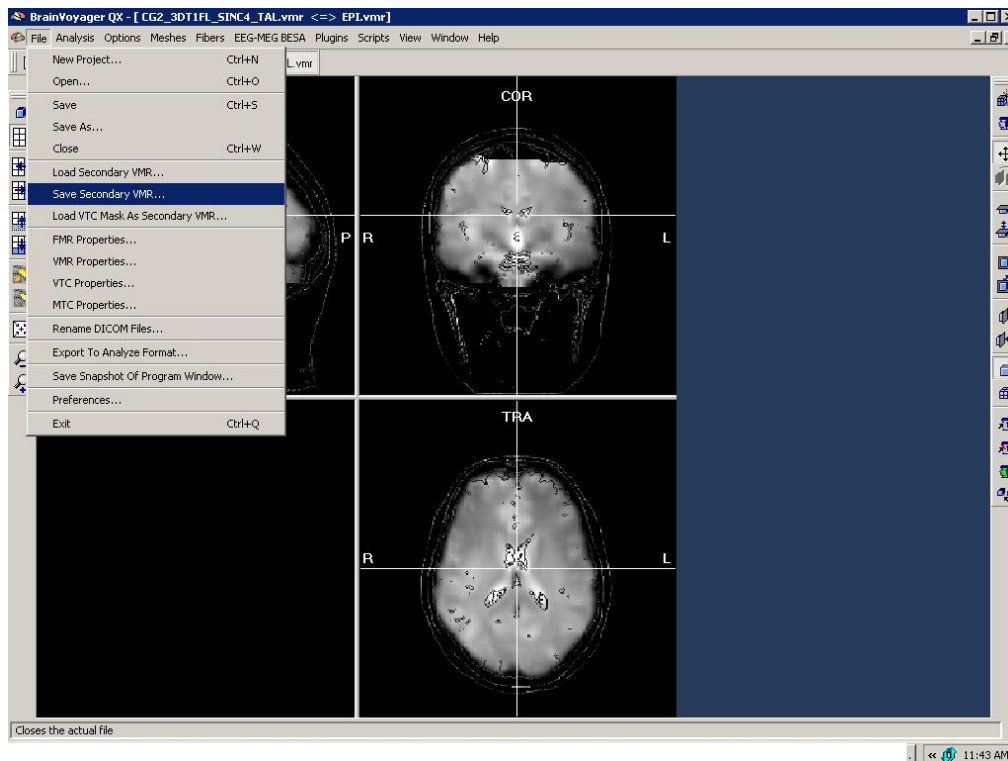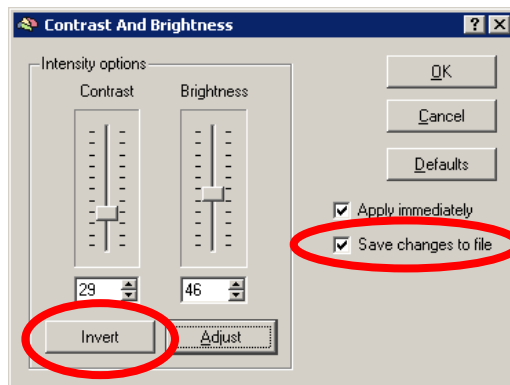

b) you open the new **EPI.vmr** like an ordinary VMR.

The project looks exactly the same as before (the intensities are still inverted with respect to the anatomy).

c) You open the "Contrast and Brightness" dialog (via "Options" of the BrainVoyager main menu).
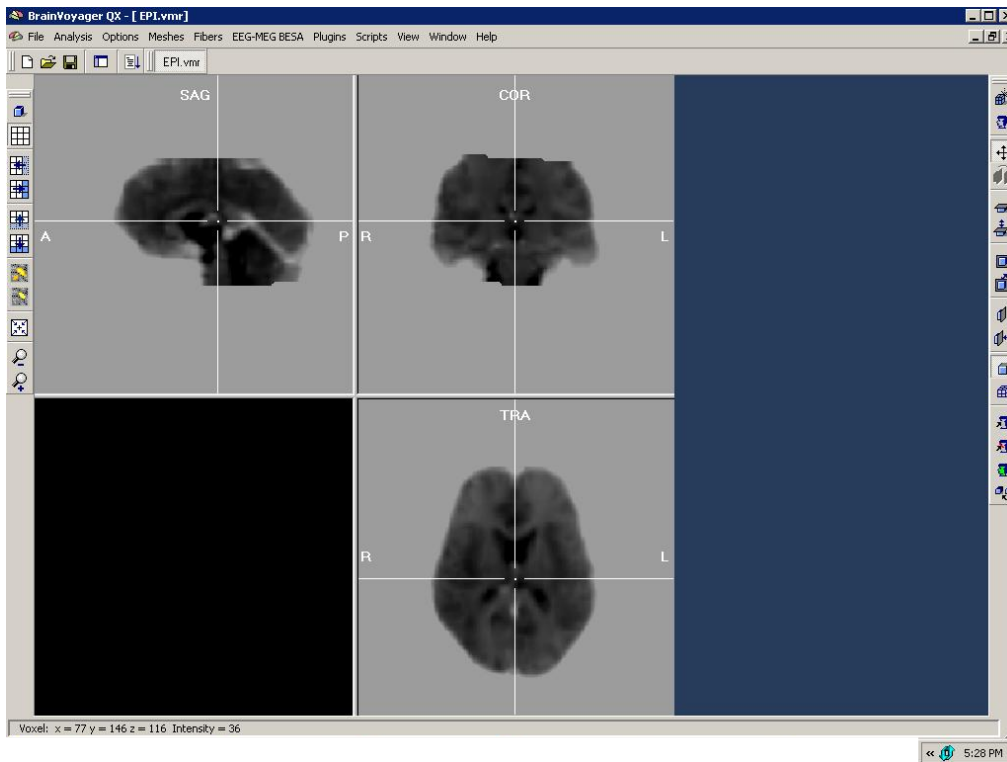

d) you invert the intensities of the project:

To be able to directly save the change in the file, it's advised to use "save the change to file" option. Otherwise, the adaptation will only be temporarily but vanish as soon as the VMR file is closed.

The new inverted VMR project looks like this:

Now, the bright background intensity has to be removed. It's quite easy to use the "Grow region" and "Expand" buttons (on the Segmentation tab) to do this. Because the background intensity is homogeneous, a very small value range can be used (in this case a **Min:** of 141 and a **Max:** of 143 was used).
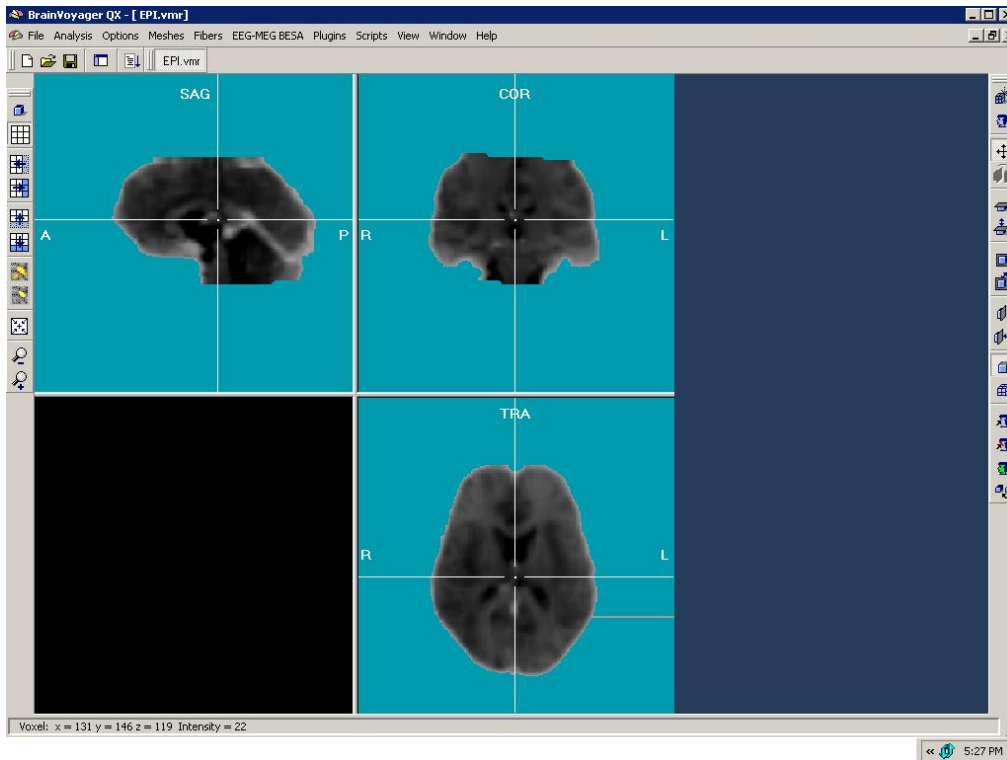
The Reload "Non-Marked" button has to be used to reload only the functional dataset and to cut out the exterior / background.
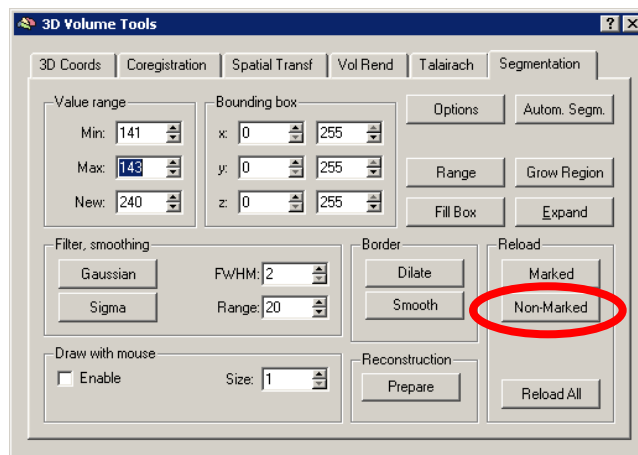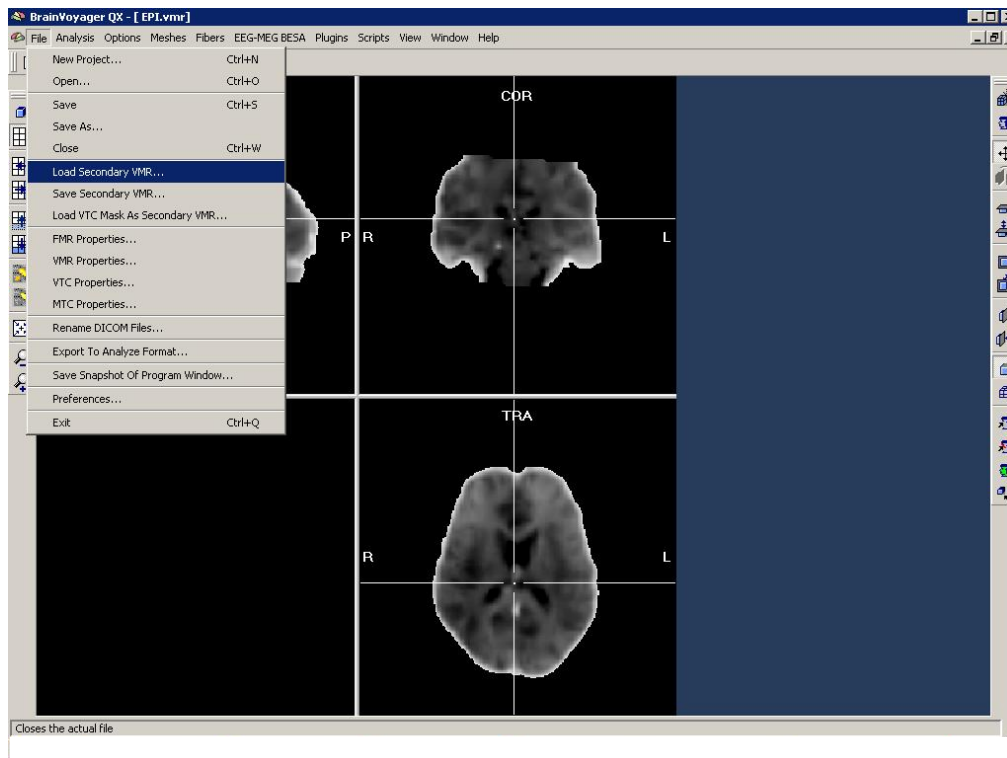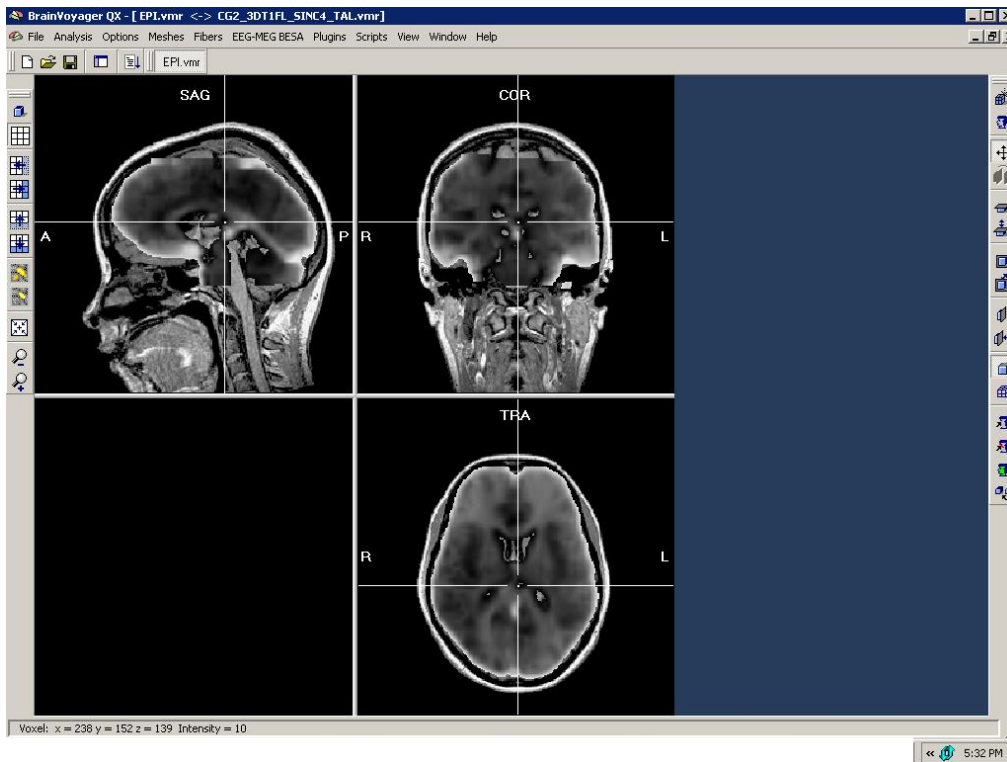
This will result in the following representation:
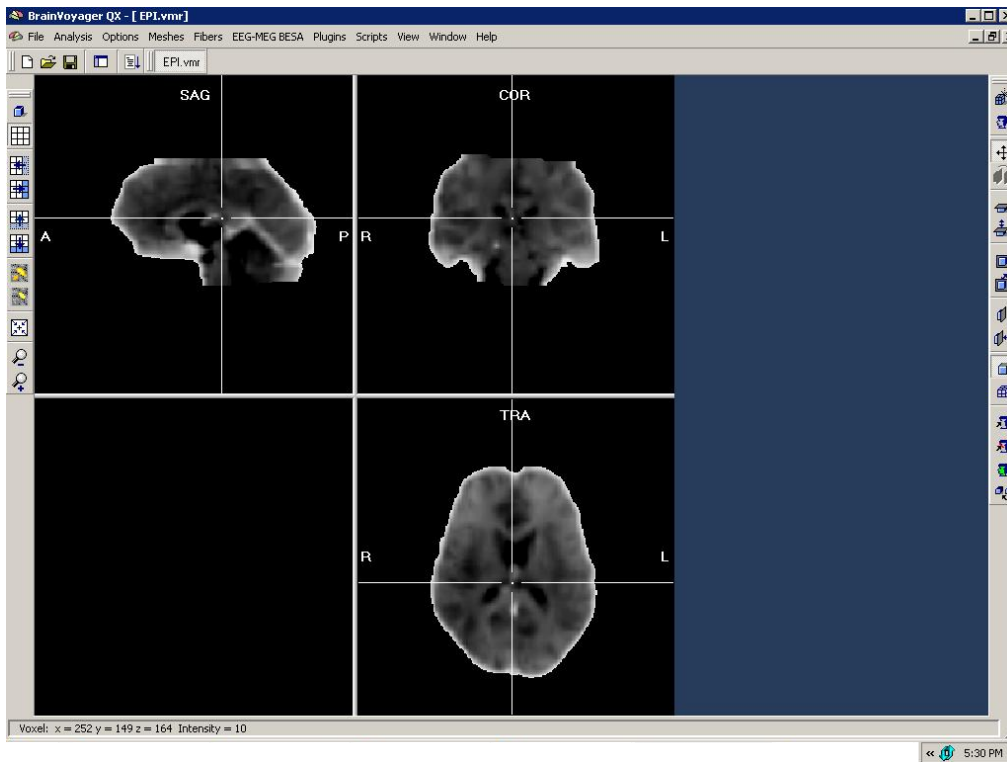
It is advised to save the new project, e.g. as 'EPI_inv.vmr'.

Using the Load Secondary VMR, one can overlay the 3D anatomical VMR to check

the quality of the alignment with the new representation (via the BrainVoyager "File" >

"Load secondary VMR" option).

As usual, the F8 and F9 buttons can be used to either toggle between the different representations or to choose a different overlay.