Quality Assessment

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Good news!

TORTOISE DIFFPREP is now configured to generate a QC folder with snapshots of important pre and post processed outputs.

Requirement

A current version of AFNI should be present on your computer.

Advantages of QC folder

- Quick check of the pre and post processed results.
- Snapshots saved for future reference.
- Easy identification of potential data or processing issues.

QC folder outputs explained

QC folder contents

```
AP_bUP_DMC_DWI_onescl.axi.gif      AP_bUP_DWI_onescl.axi.png
AP_bUP_DMC_DWI_onescl.axi.png      AP_bUP_DWI_onescl.cor.gif
AP_bUP_DMC_DWI_onescl.cor.gif      AP_bUP_DWI_onescl.cor.png
AP_bUP_DMC_DWI_onescl.cor.png      AP_bUP_DWI_onescl.sag.gif
AP_bUP_DMC_DWI_onescl.sag.gif      AP_bUP_DWI_onescl.sag.png
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AP_bUP_DMC_DWI_sepscl.sag.gif      AP_bUP_DWI_sepscl.sag.png
AP_bUP_DMC_DWI_sepscl.sag.png      AP_bUP_structural.axi.png
AP_bUP_DMC_EPI_structural.axi.png  AP_bUP_structural.cor.png
AP_bUP_DMC_EPI_structural.cor.png  AP_bUP_structural.sag.png
AP_bUP_DMC_EPI_structural.sag.png  __WORK_imgr_CXcOcVdfMxi
AP_bUP_DWI_onescl.axi.gif
```
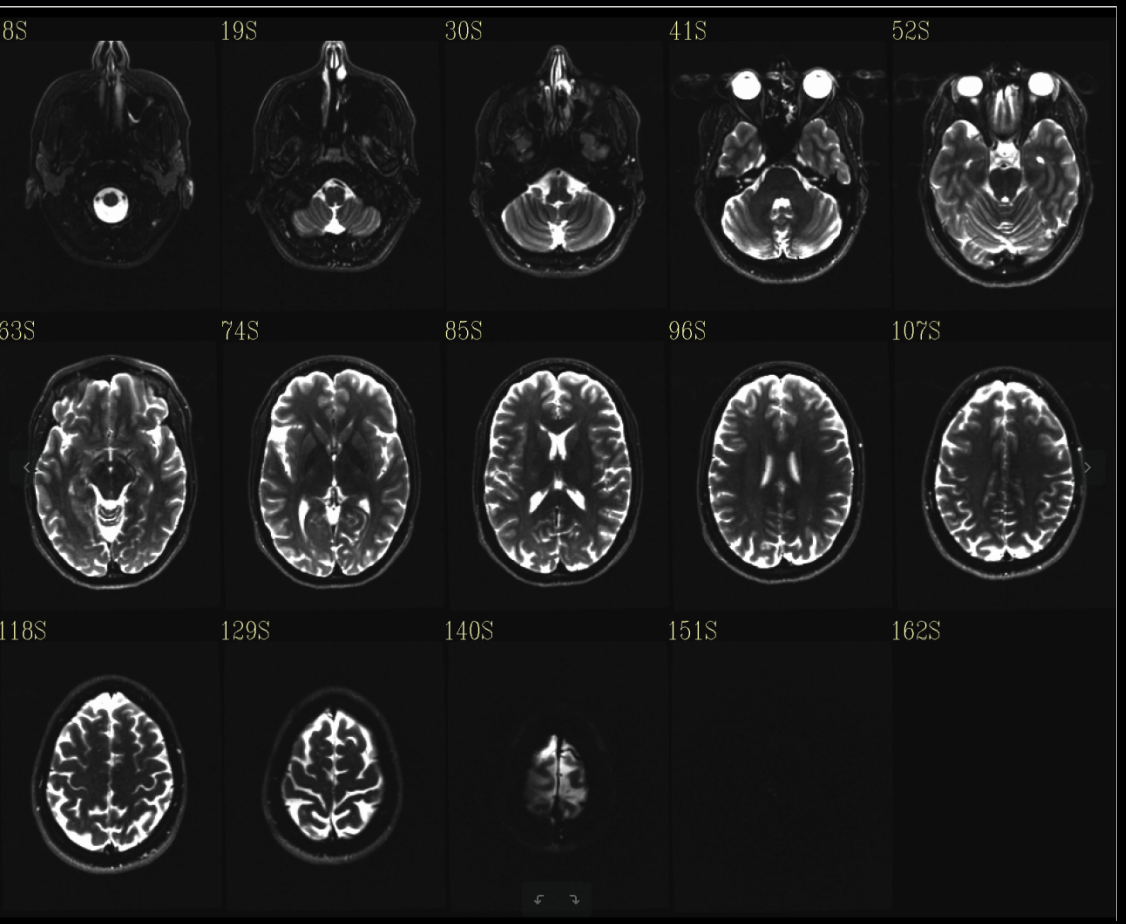
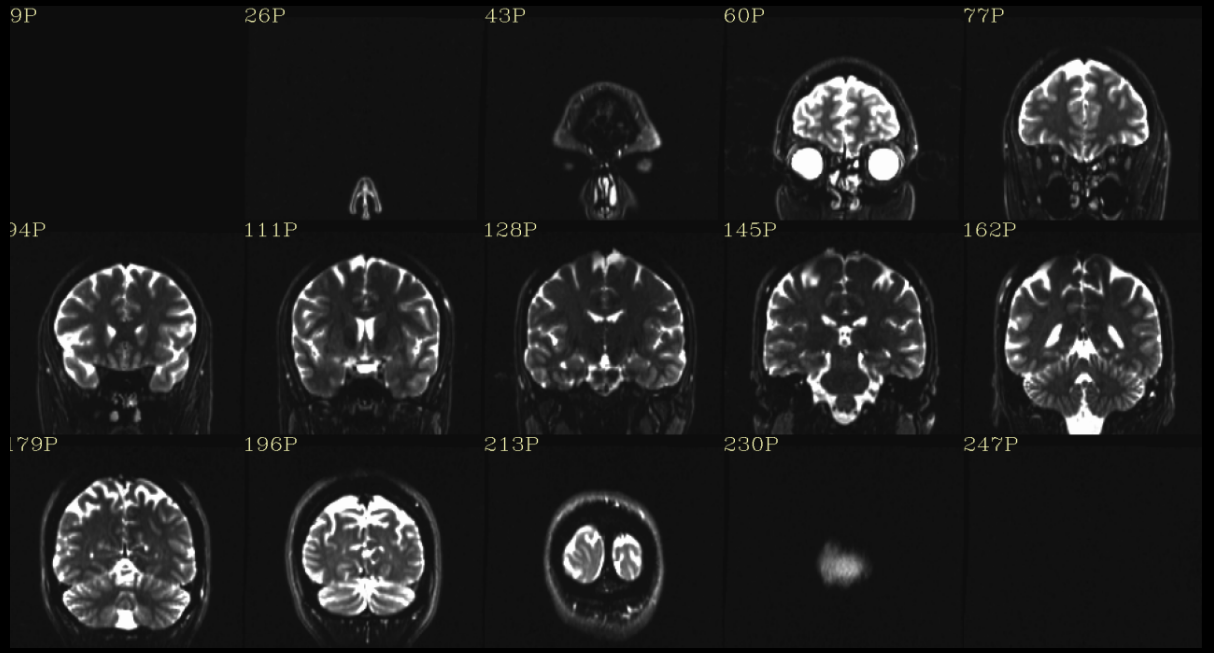

Important files to evaluate

- Structural data
- Raw diffusion data : DWI
- Processed diffusion data: DMC_DWI
- EPI corrected output: DMC_EPI_structural
- EDDY and motion pre correction: DWI.gif
- EDDY and motion post correction: DMC.gif

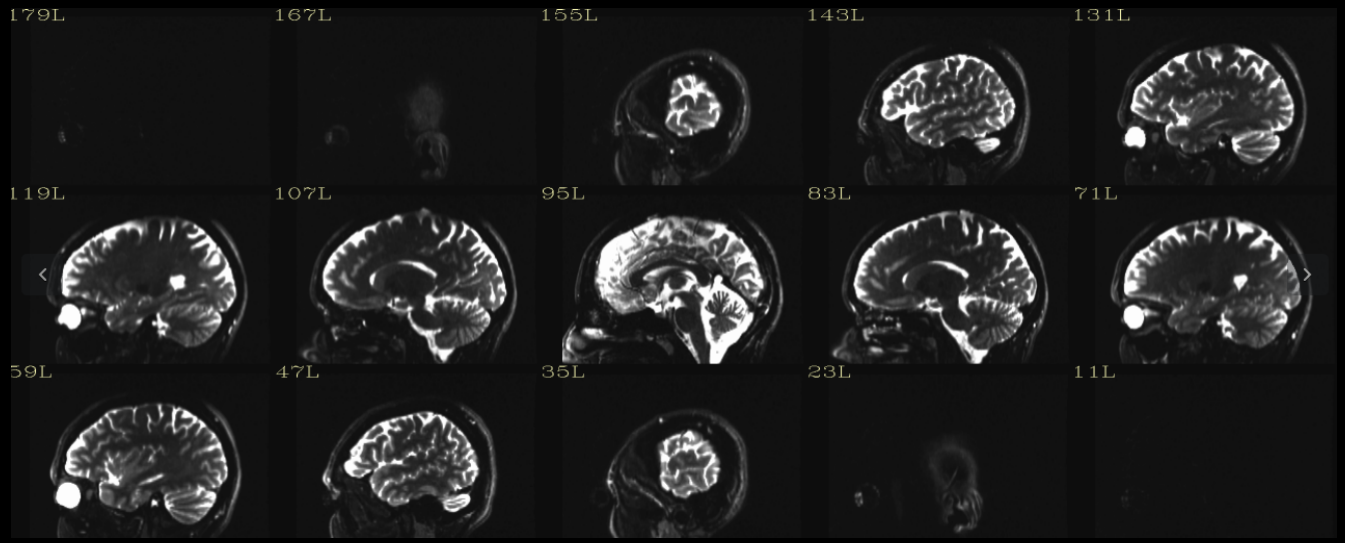
Input structural data



*structural_axi.png

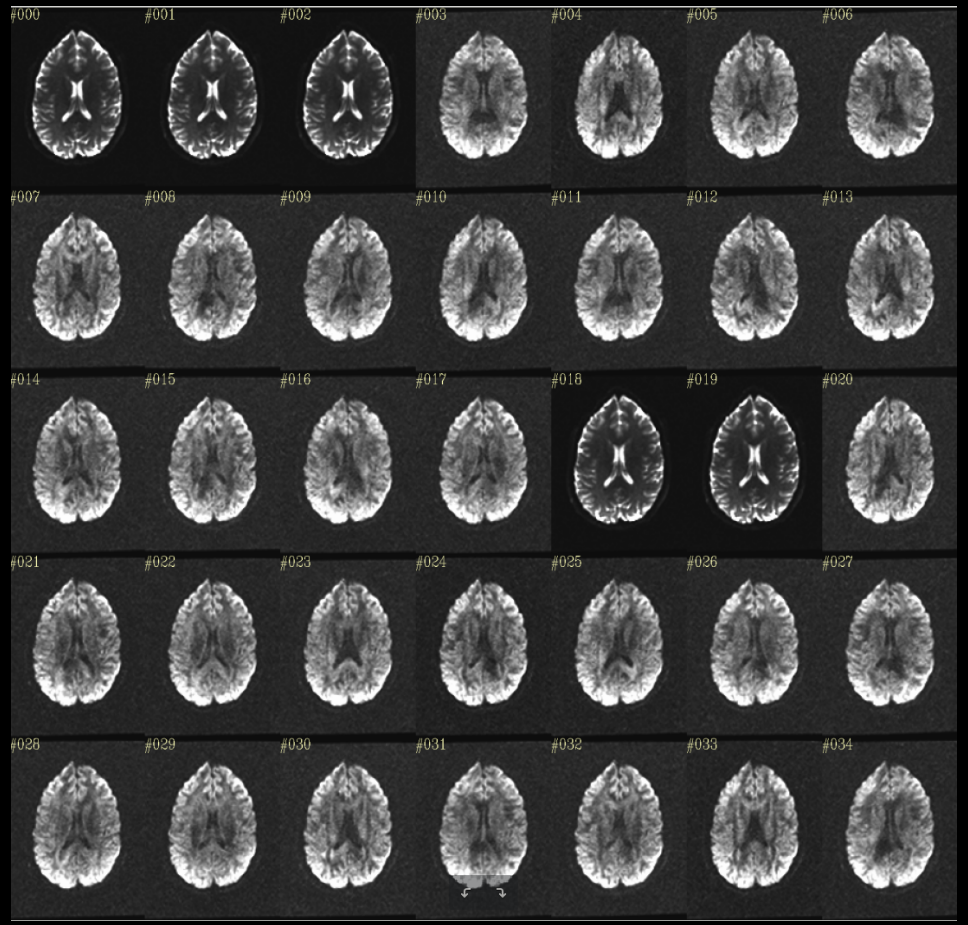


*structural_cor.png

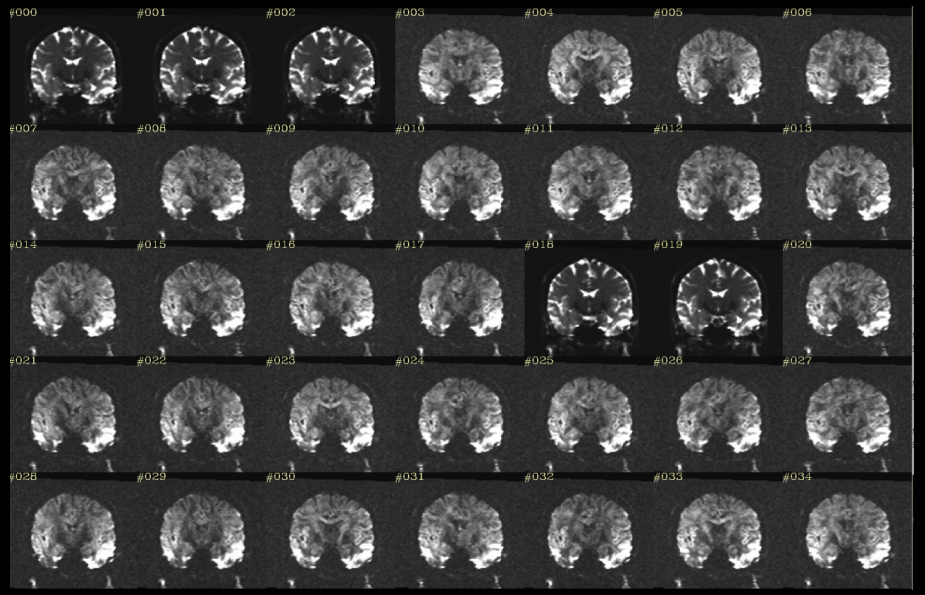


*structural_sag.png

Raw DWI



*DWI_sepscl_axi.png



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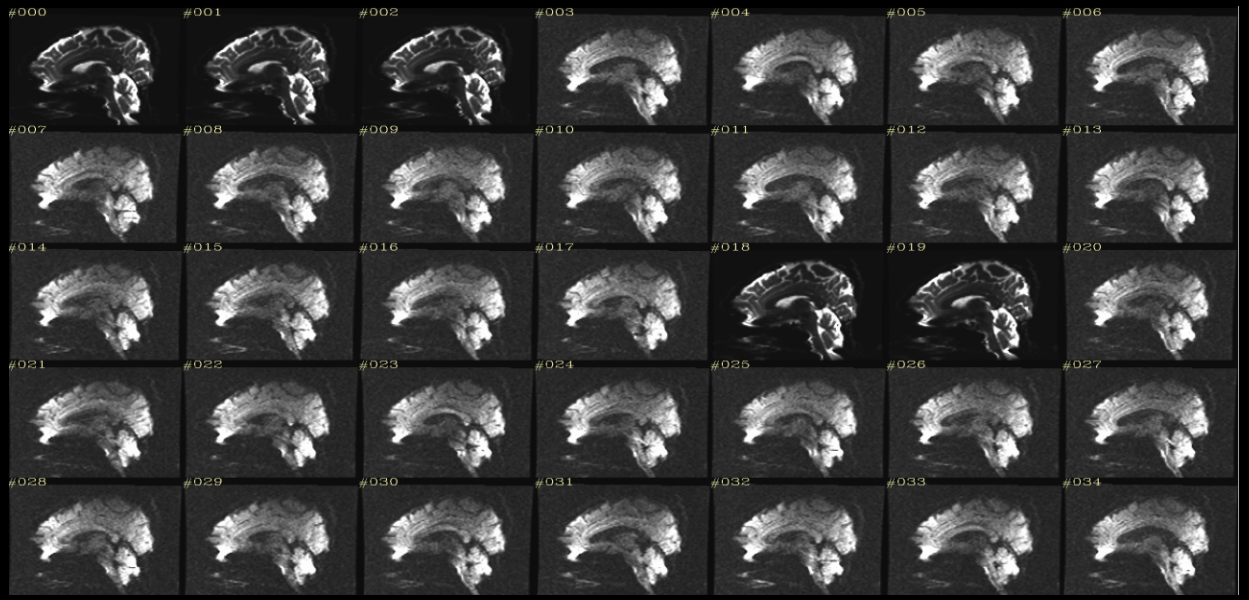
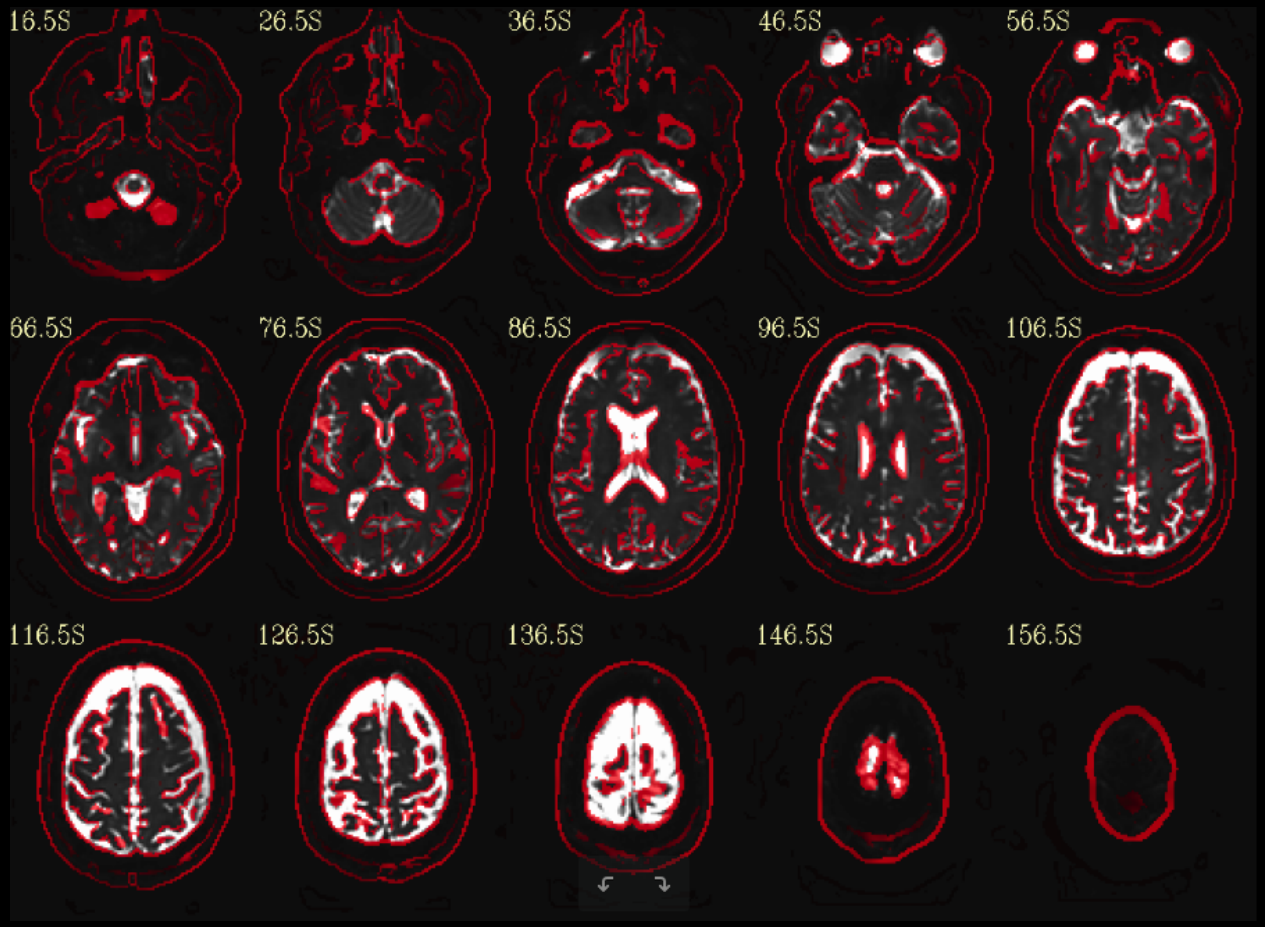
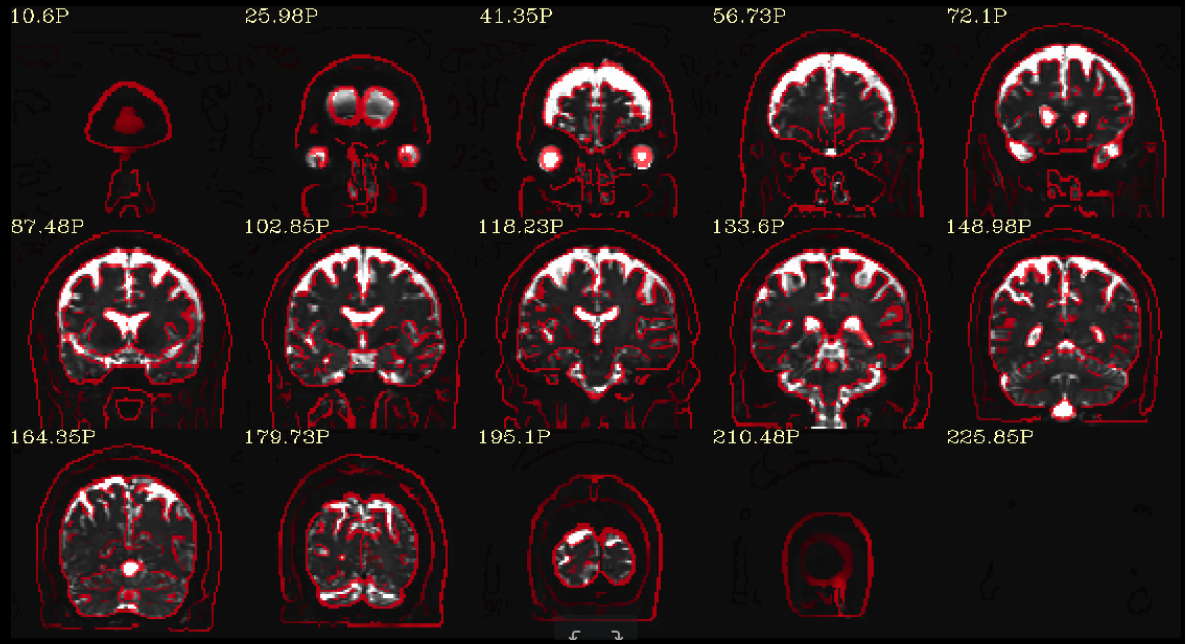


*DWI_sepscl_sag.png

EPI correction



*DMC_EPI_structural_axi.png



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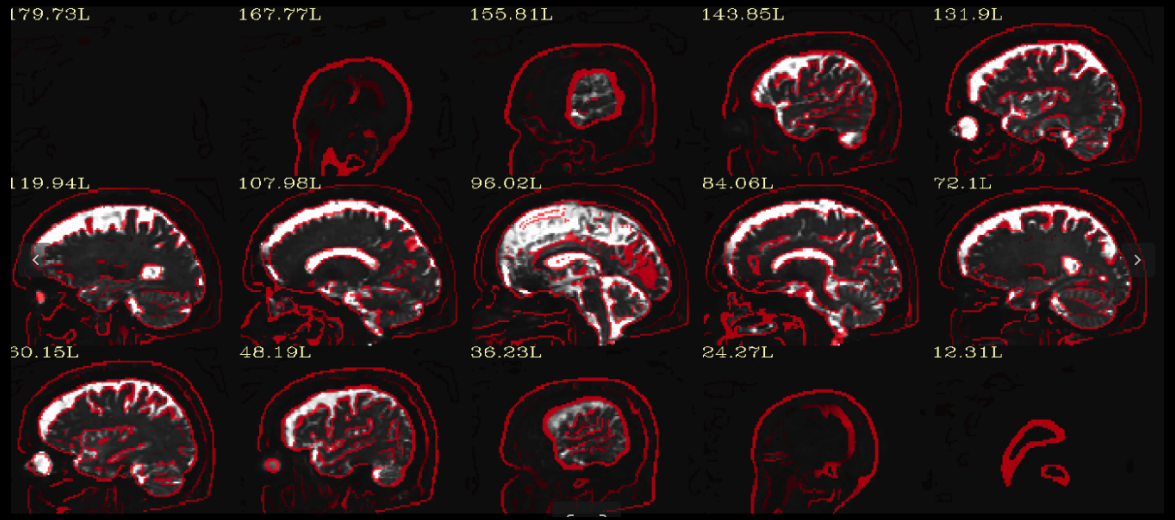


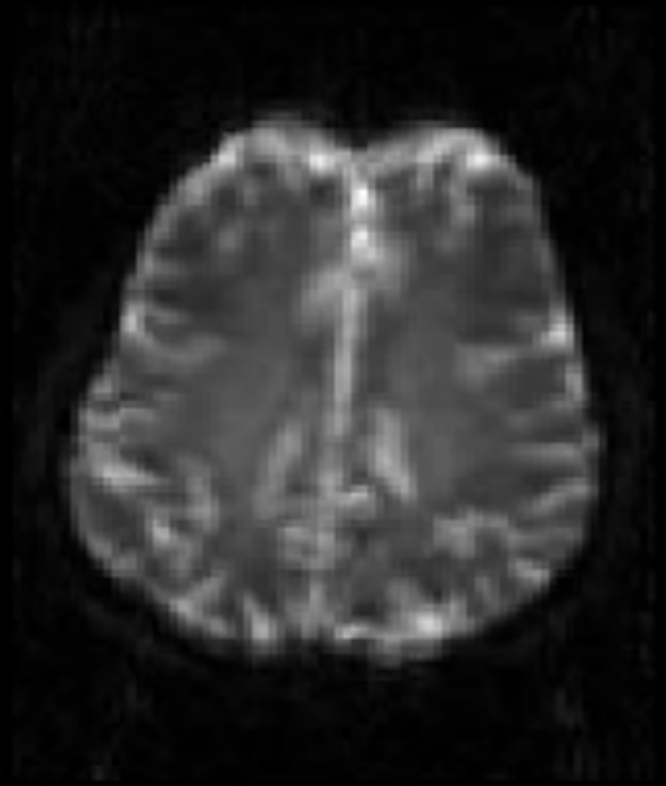
*DMC_EPI_structural_sag.png

Artifacts corrected in DIFFPREP

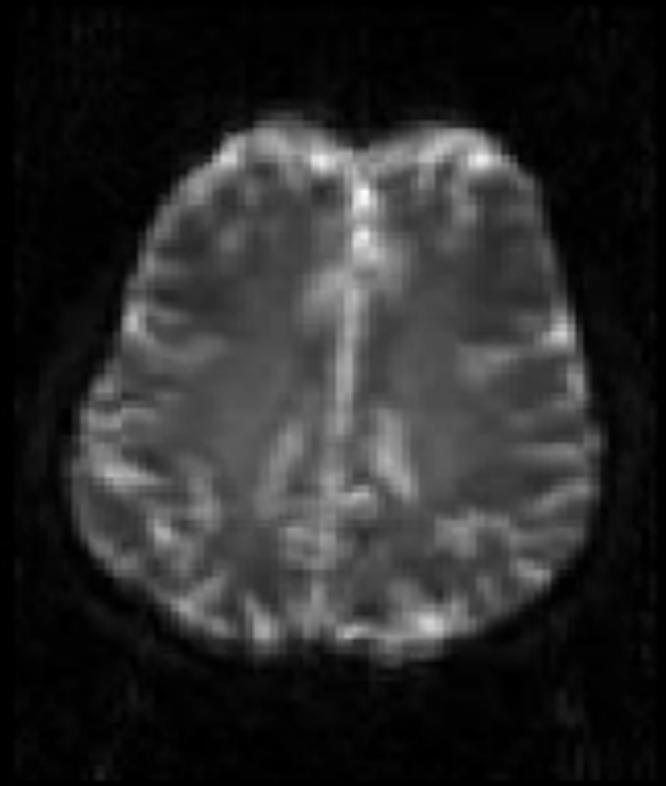
- Motion and eddy distortions
- EPI distortions

Eddy-currents Distortions

- *<u>Eddy currents distortions:</u>*



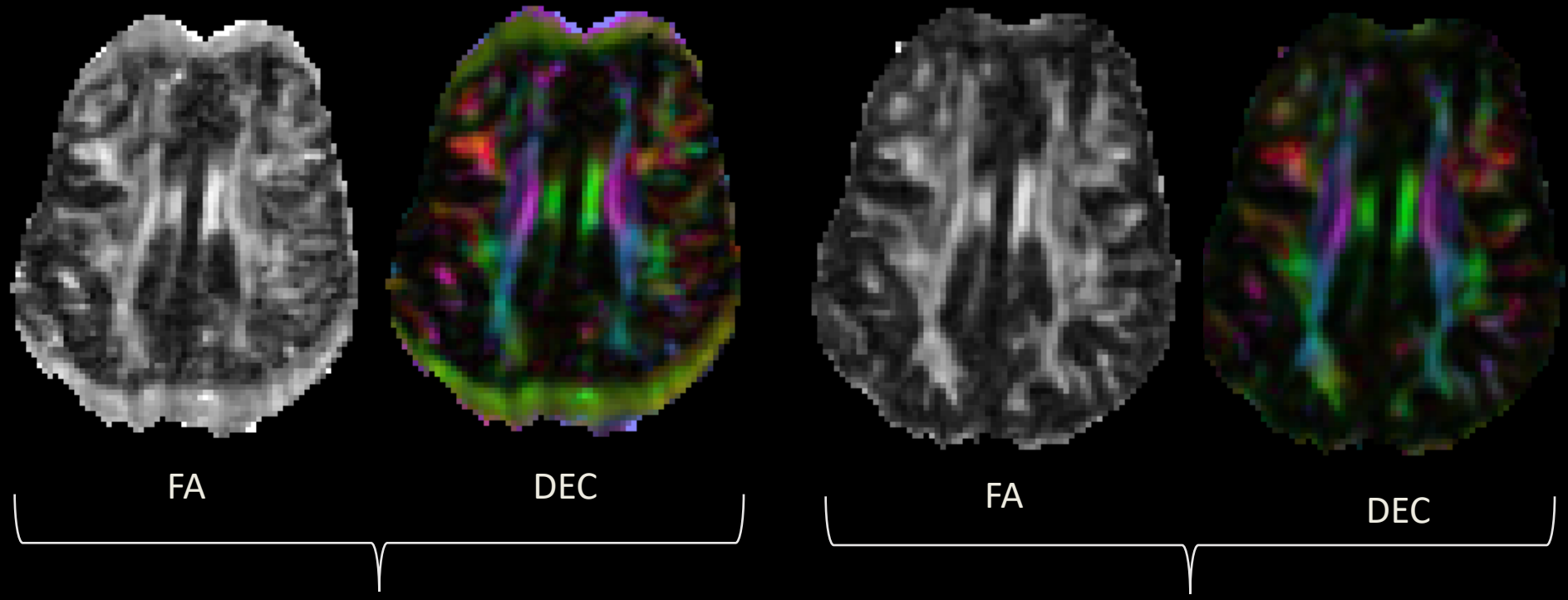
Raw distorted DWIs



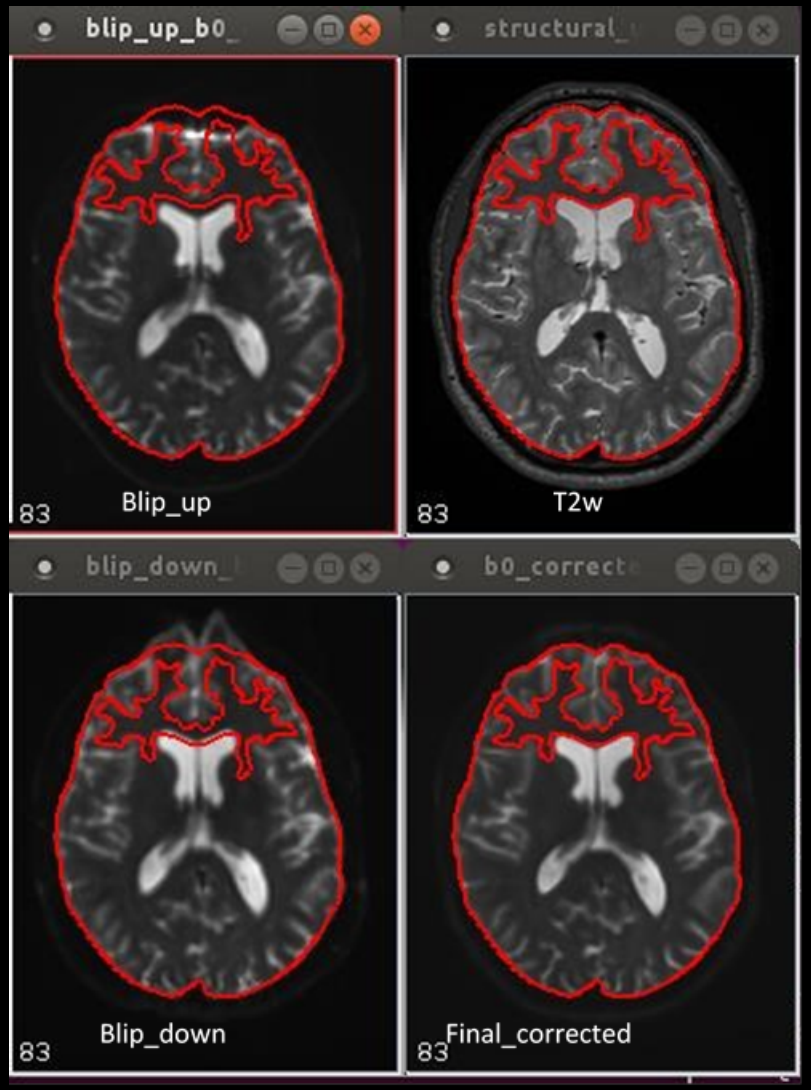
DWIs corrected for eddy currents distortions with TORTOISE

Effects of Eddy Currents Distortions

- Uncorrected eddy-currents distortions can cause artifactually high anisotropy:



EPI distortions

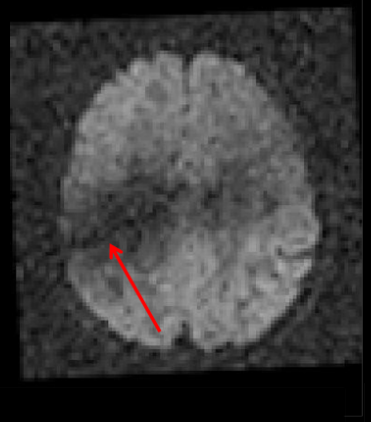


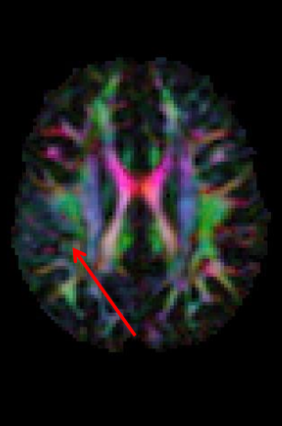
NEW! All features of DIFFCALC 2.5.2 have now been incorporated into DIFFCALC3.2

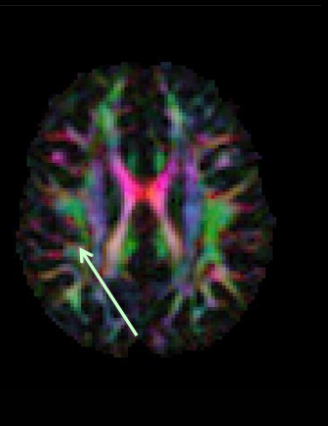
Command line RESTORE tensor computation exists in the new version.

Requirements: Robust data acquired with additional volumes that can compensate for the loss of information due to artifacts.

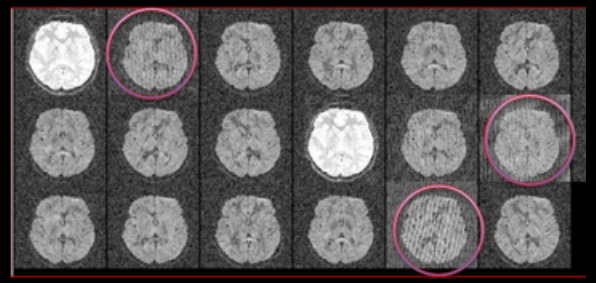
Signal
Dropouts

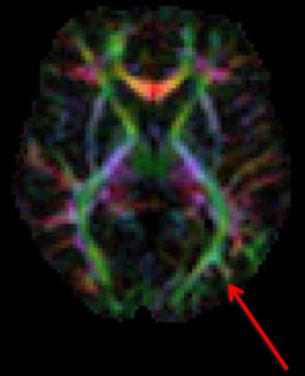


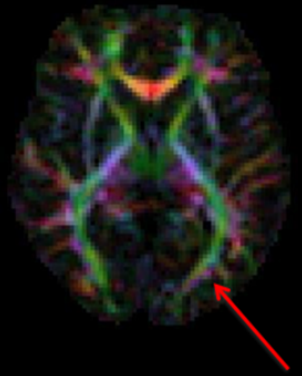




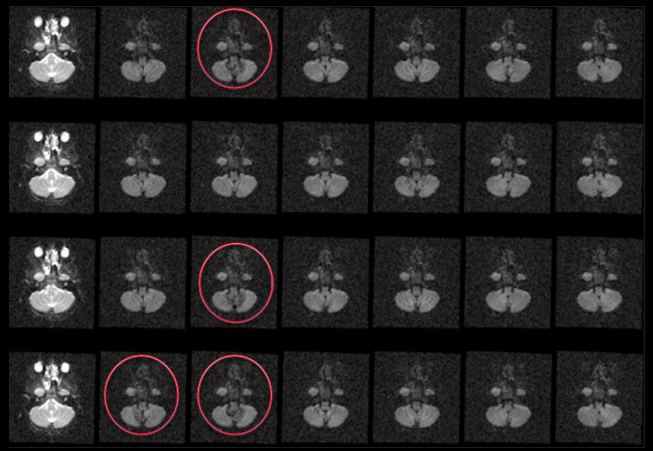
Spike
artifacts

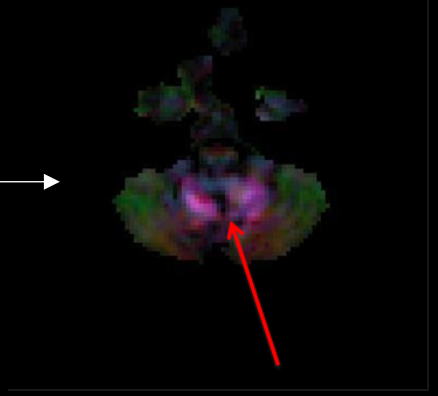


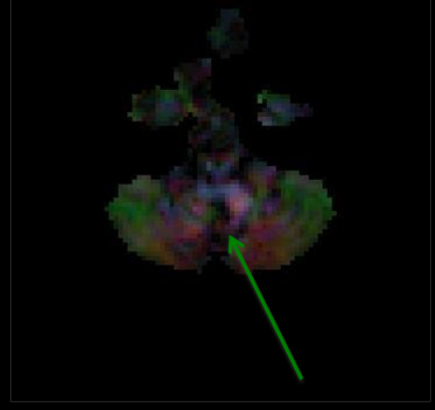


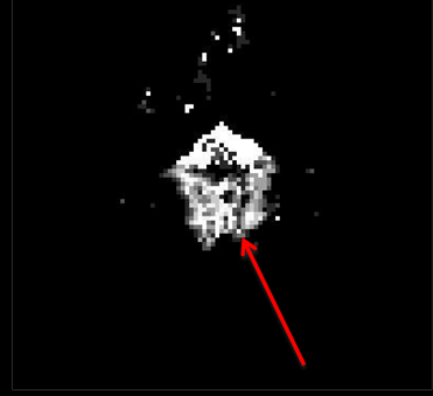


Cardiac pulsation artifacts









Conclusion

- Post process quality check is essential to ensure that the processing has completed smoothly.
- Please make sure to check the outputs.
- Certain occasions, the correction pipeline may require additional information to perform adequate correction and this needs to be understood by checking the processing result of few of the datasets from a study.
- These quality checks can ensure you are using adequately corrected data in your data analysis.