



Single subject QC report generated using eddy quad v1.0.2

When using eddy and its QC tools, we ask you to please reference the papers describing the different aspects of the modelling and corrections. The following suggestion for a methods section and list of references has been tailored for you based on your eddy command line.

METHODS

The susceptibility induced off-resonance field was estimated from spin-echo EPI images acquired with different phase-encode directions (Andersson et al., 2003). This field was passed to "eddy", a tool that combined it with estimating gross subject movement and eddy current-induced distortions (Andersson & Sotiropoulos, 2016). The quality of the dataset was assessed using the eddy QC tools (Bastiani et al., 2019). Slices with signal loss caused by subject movement coinciding with the diffusion encoding were detected and replaced by predictions made by a Gaussian Process (Andersson et al., 2016). Intra-volume subject movement, leading to disjoint slices that when stacked does not amount to a valid volumetric representation of the object, was corrected using slice-to-volume alignment (Andersson et al., 2017). Changes to the susceptibility-induced distortions caused by subject movement was estimated directly from the data using a Taylor expansion, with respect to pitch and roll, around the first volume of the data set (Andersson et al., 2018).

REFERENCES

- Jesper L.R. Andersson, Stefan Skare and John Ashburner. 2003. How to correct susceptibility distortions in spin-echo echo-planar images: application to diffusion tensor imaging. *NeuroImage* 20:870-888
- Jesper L.R. Andersson and Stamatios N. Sotiropoulos. 2016. An integrated approach to correction for off-resonance effects and subject movement in diffusion MR imaging. *NeuroImage* 125:1063-1078
- Matteo Bastiani, Michiel Cottaar, Sean P. Fitzgibbon, Sana Suri, Fidel Alfaro-Almagro, Stamatios N. Sotiropoulos, Saad Jbabdi and Jesper L.R. Andersson. 2019. Automated quality control for within and between studies diffusion MRI data using a non-parametric framework for movement and distortion correction. *NeuroImage* 184:801-812
- Jesper L.R. Andersson, Mark S. Graham, Eniko Zsoldos and Stamatios N. Sotiropoulos. 2016. Incorporating outlier detection and replacement into a non-parametric framework for movement and distortion correction of diffusion MR images. *NeuroImage* 141:556-572
- Jesper L.R. Andersson, Mark S. Graham, Ivana Drobnjak, Hui Zhang, Nicola Filippini and Matteo Bastiani. 2017. Towards a comprehensive framework for movement and distortion correction of diffusion MR images: Within volume movement. *NeuroImage* 152:450-466
- Jesper L.R. Andersson, Mark S. Graham, Ivana Drobnjak, Hui Zhang and Jon Campbell. 2018. Susceptibility-induced distortion that varies due to motion: Correction in diffusion MR without acquiring additional data. *NeuroImage* 171:277-295

Volume-to-volume motion

.	Average abs. motion (mm)	1.36
.	Average rel. motion (mm)	1.20
.	Average x translation (mm)	-0.37
.	Average y translation (mm)	0.01
.	Average z translation (mm)	-0.63
.	Average x rotation (deg)	-0.55
.	Average y rotation (deg)	0.52
.	Average z rotation (deg)	-0.47

Within-volume motion

.	Avg std x translation (mm)	0.05
.	Avg std y translation (mm)	0.06
.	Avg std z translation (mm)	0.18
.	Avg std x rotation (deg)	0.28
.	Avg std y rotation (deg)	0.20
.	Avg std z rotation (deg)	0.15

Outliers

.	Total outliers (%)	2.72
.	Outliers (b=400 s/mm ²)	8.54
.	Outliers (b=1000 s/mm ²)	1.79
.	Outliers (b=2600 s/mm ²)	0.44
.	Outliers (PE dir=[0. 1. 0.])	2.17
.	Outliers (PE dir=[0. -1. 0.])	0.67
.	Outliers (PE dir=[1. 0. 0.])	3.83
.	Outliers (PE dir=[-1. 0. 0.])	3.48

SNR/CNR

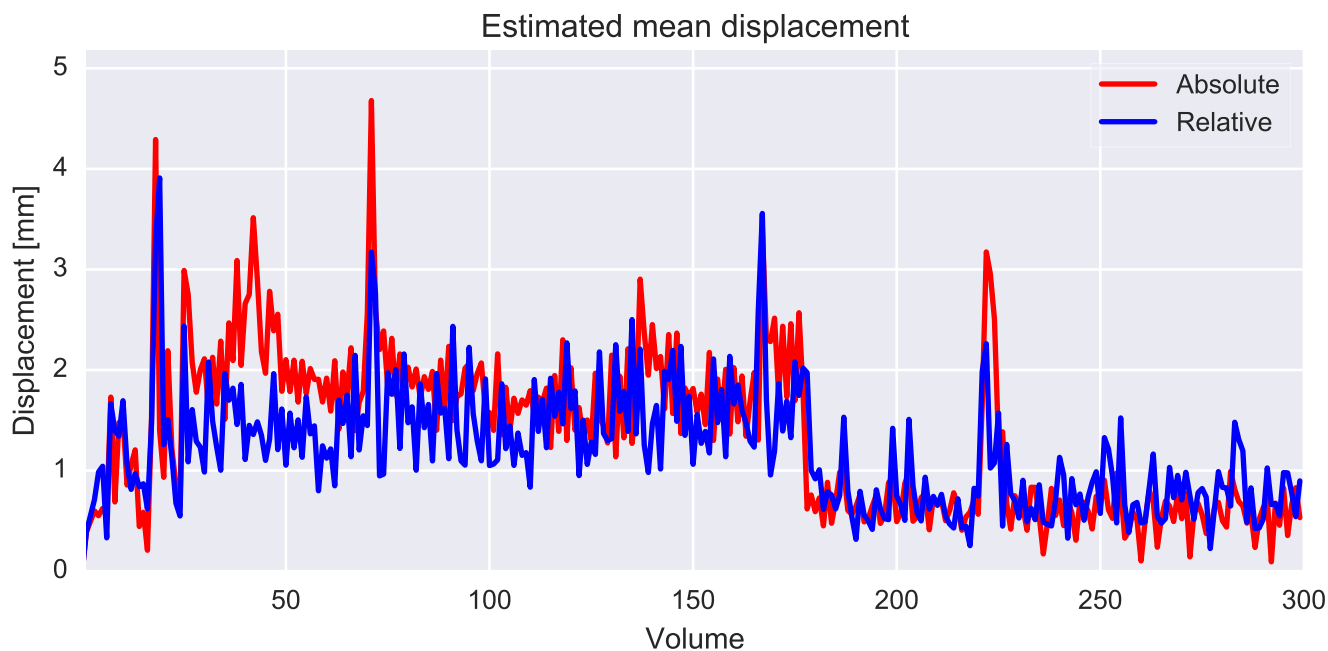
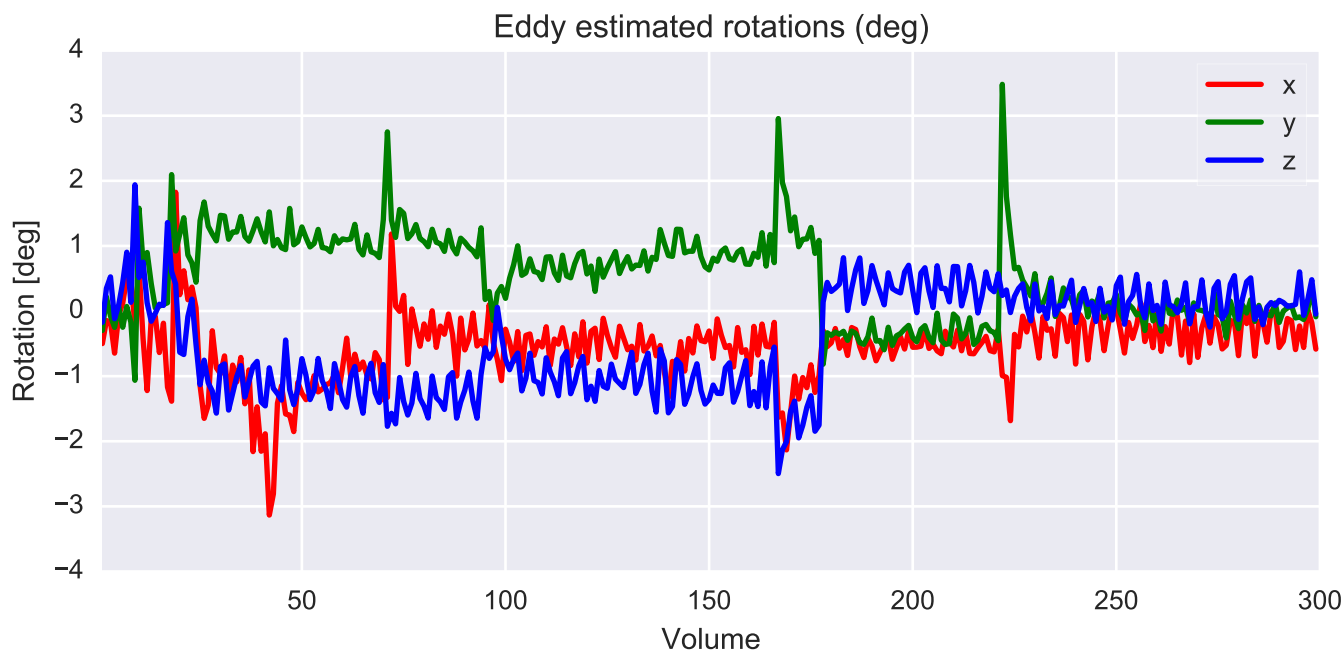
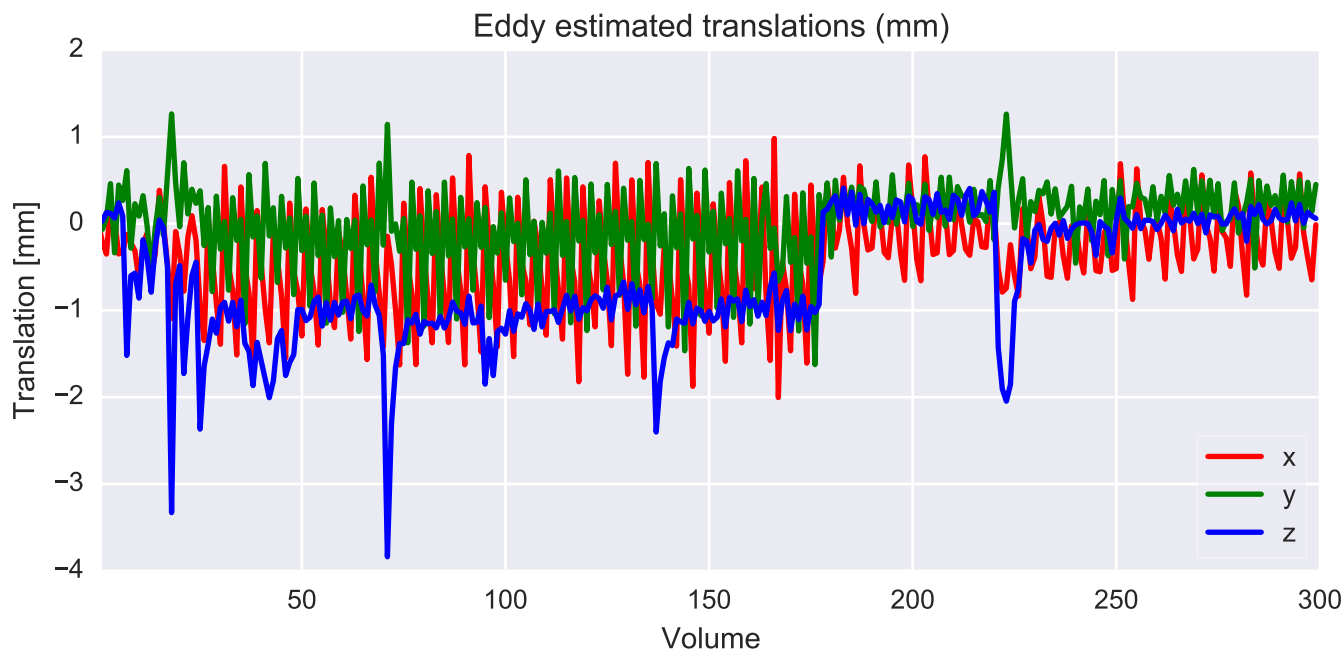
.	Average SNR (b=0 s/mm ²)	15.56
.	Average CNR (b=400 s/mm ²)	0.54
.	Average CNR (b=1000 s/mm ²)	0.89
.	Average CNR (b=2600 s/mm ²)	0.73

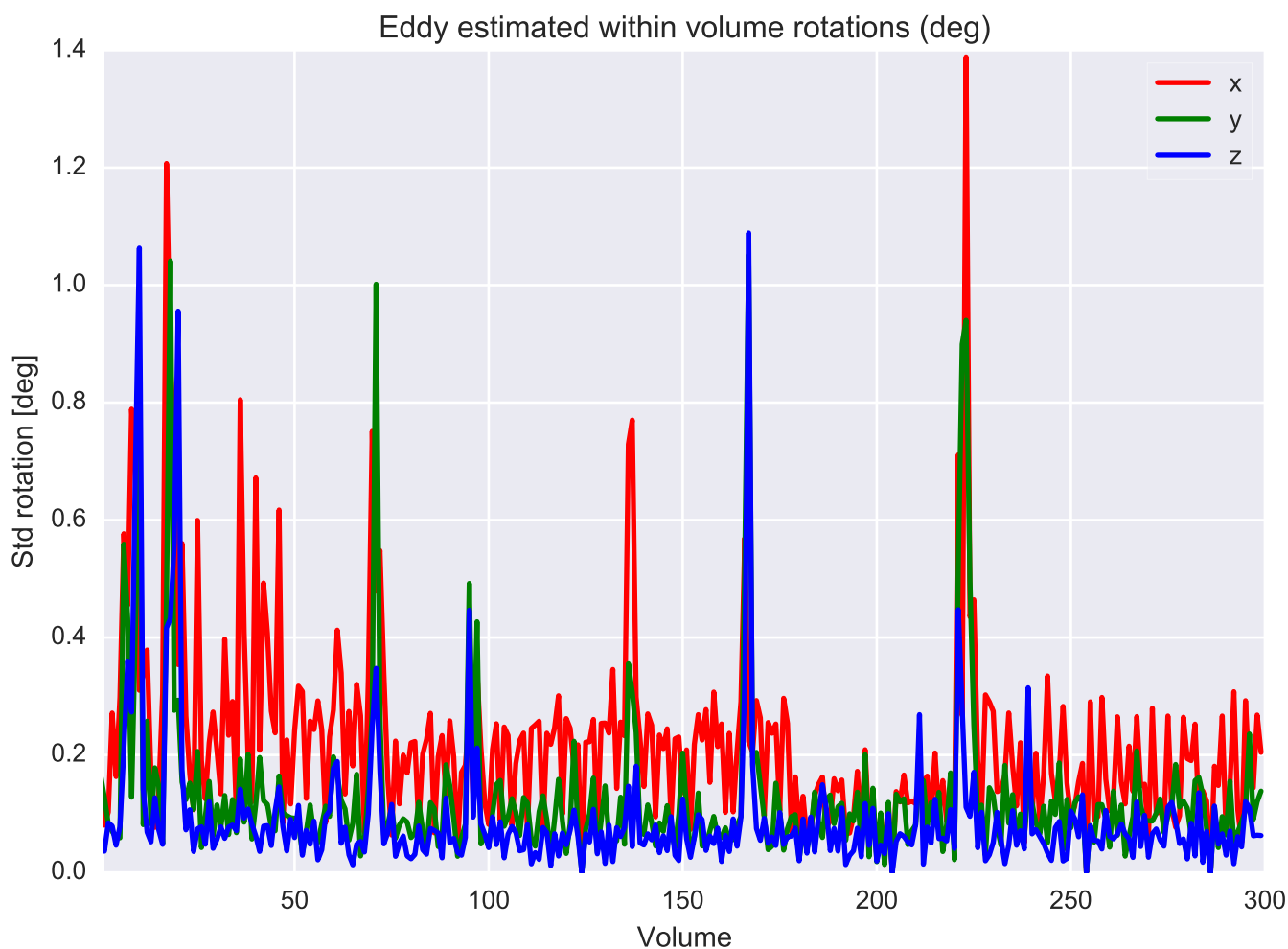
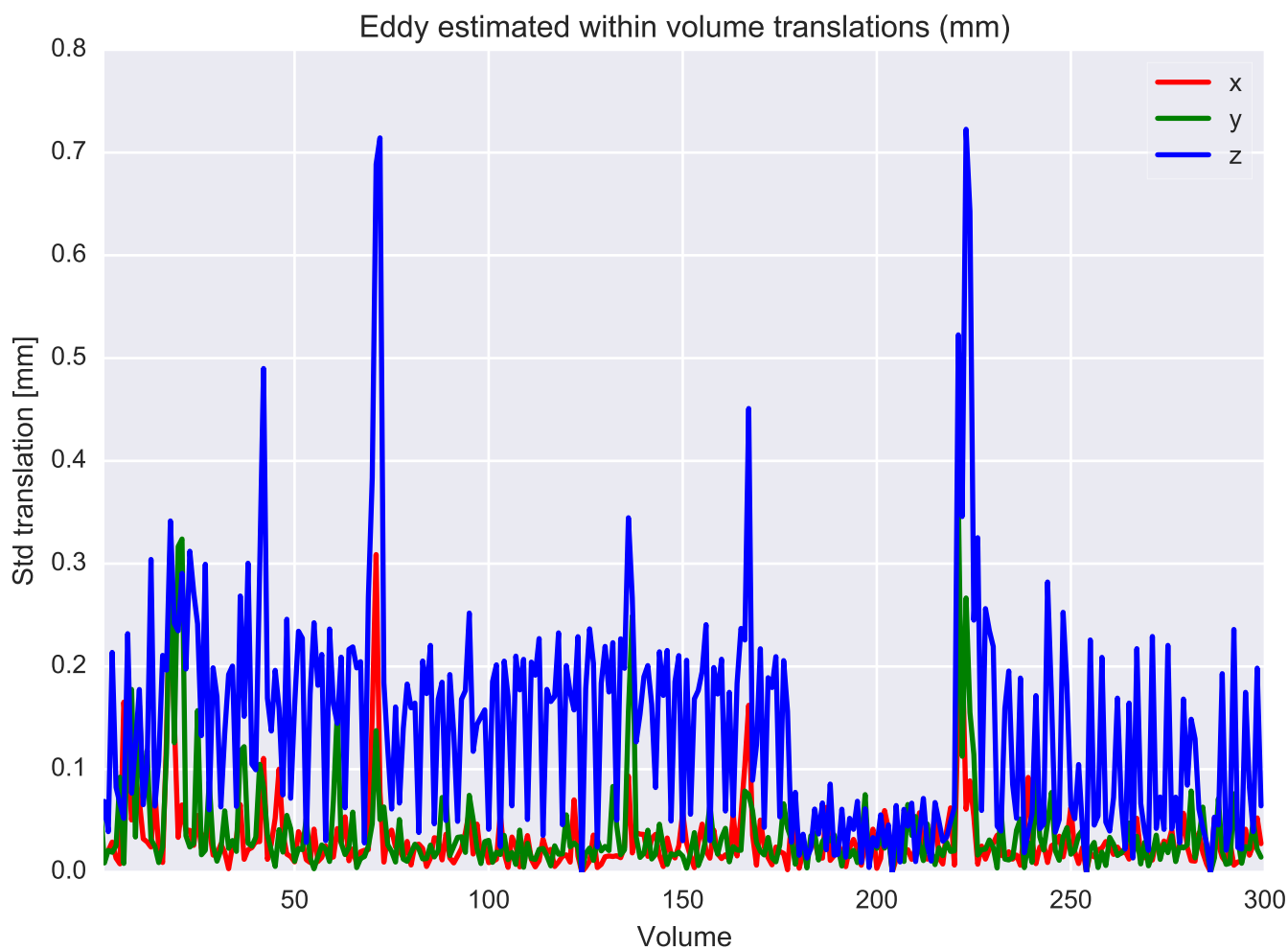
Eddy currents

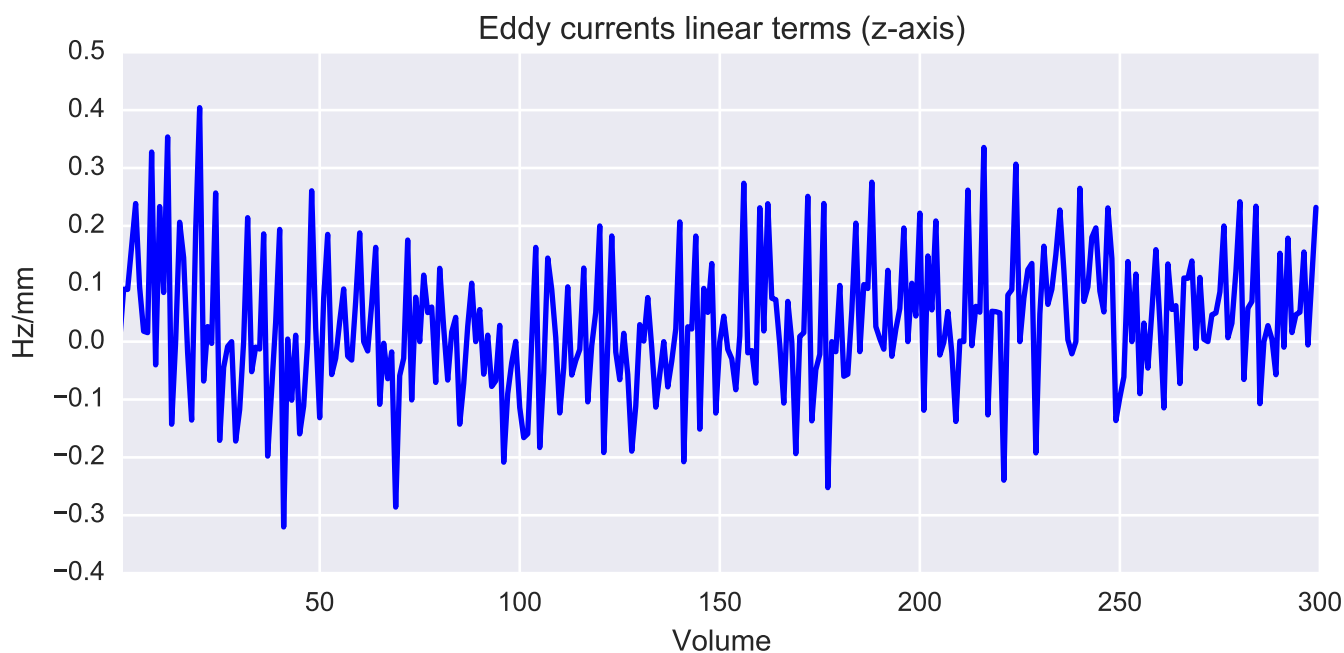
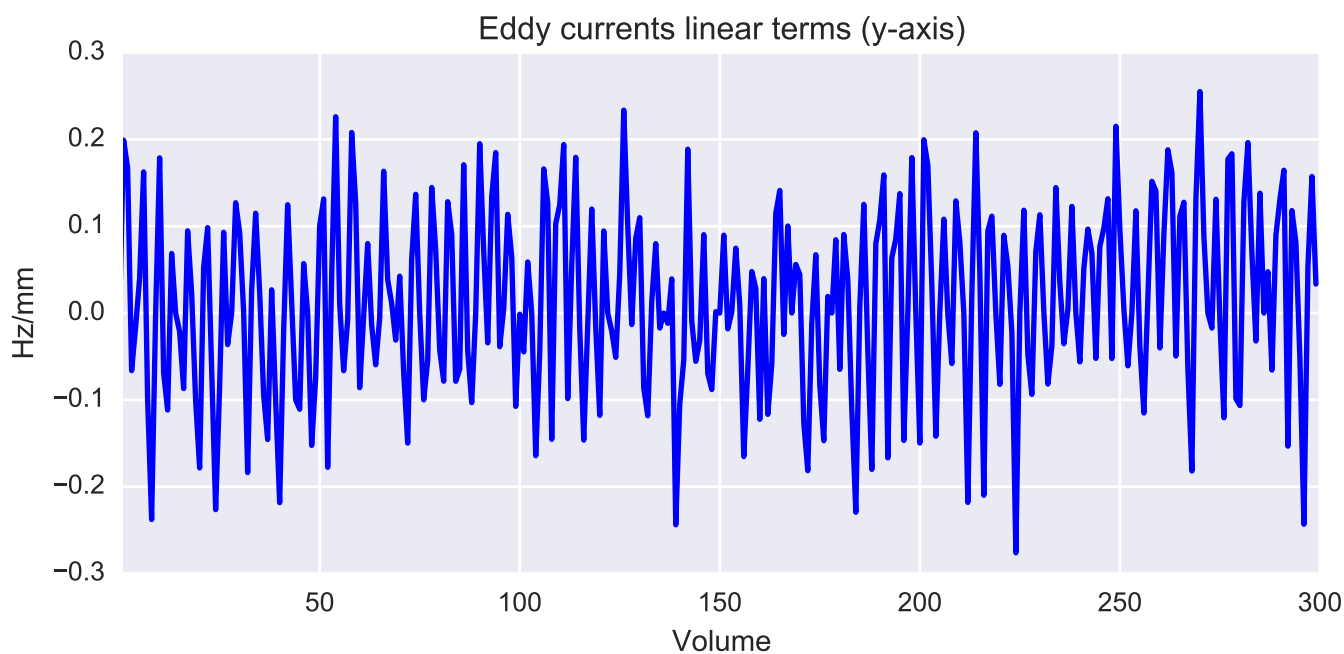
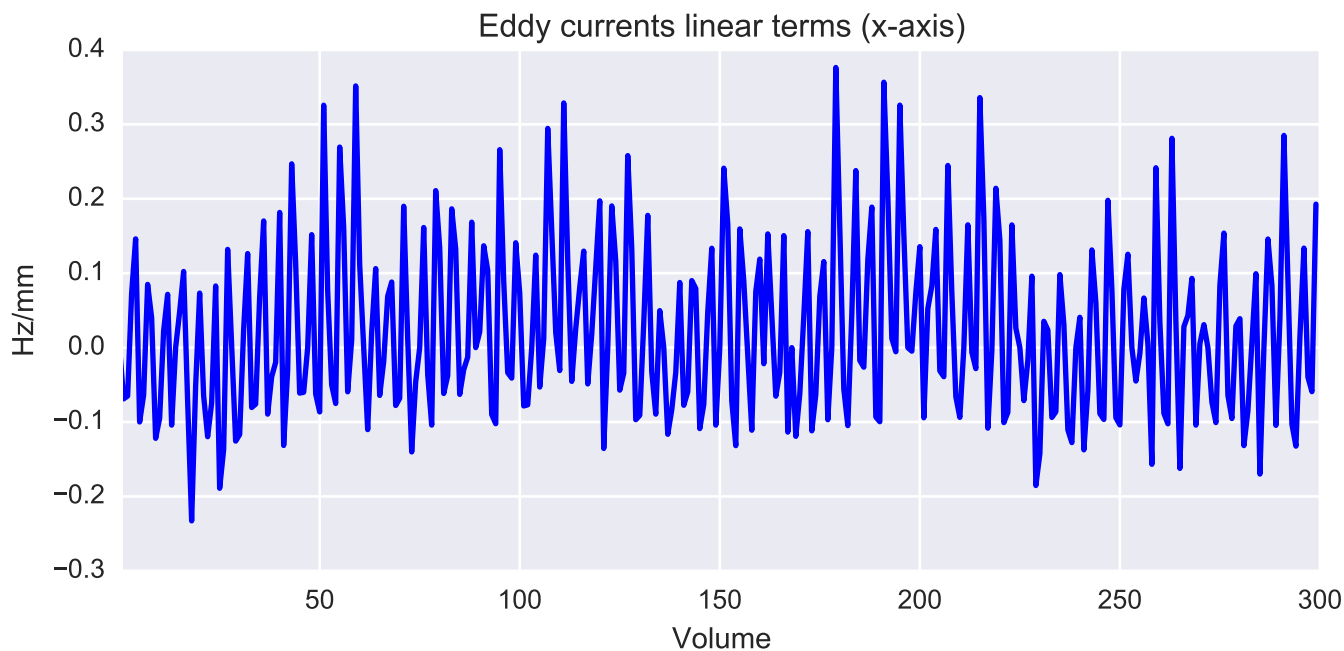
.	Std Dev EC linear term (x)	0.12
.	Std Dev EC linear term (y)	0.11
.	Std Dev EC linear term (z)	0.12

Susceptibility distortions

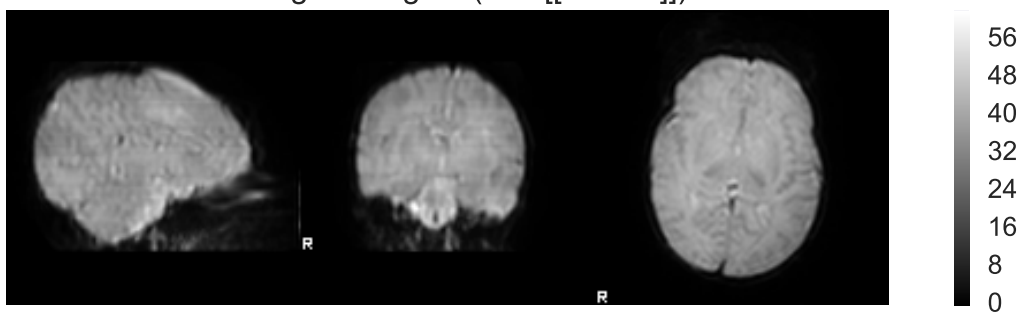
.	Std Dev voxel displacement	1.28
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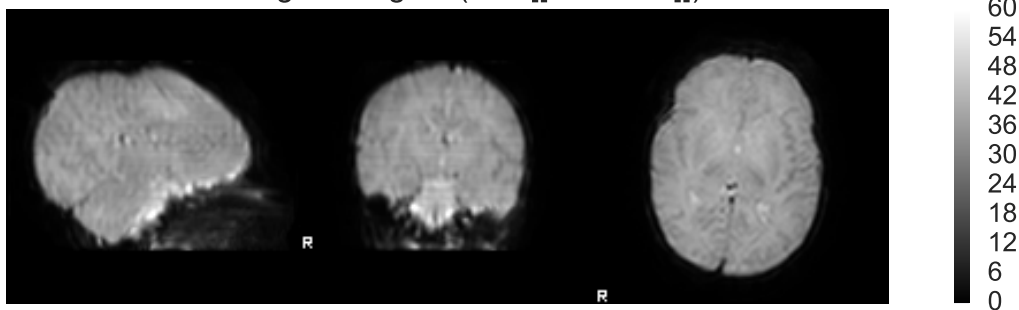




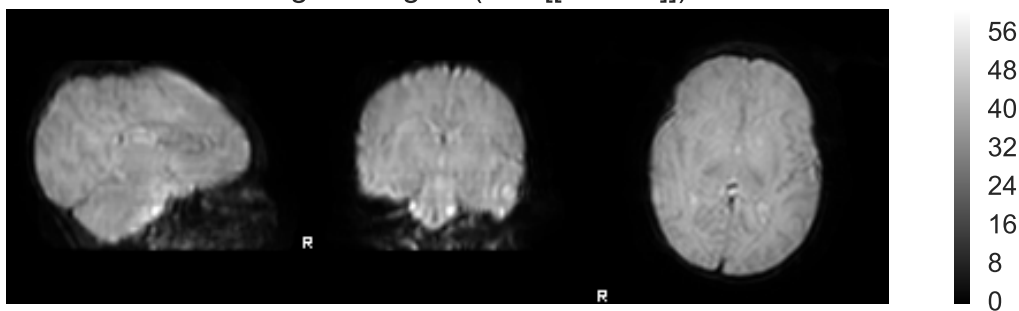
Average b0 signal (PE=[[0. 1. 0.]])



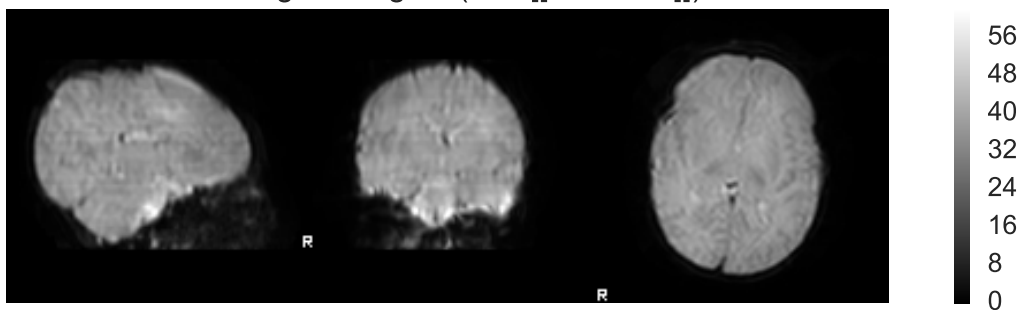
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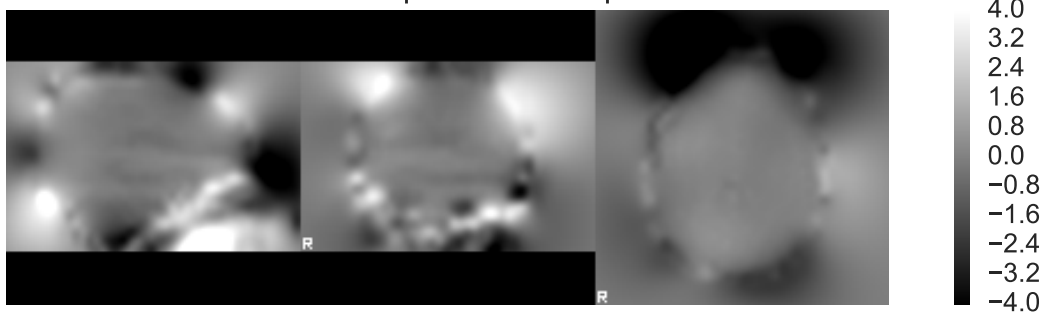
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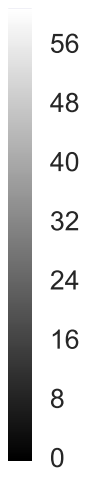
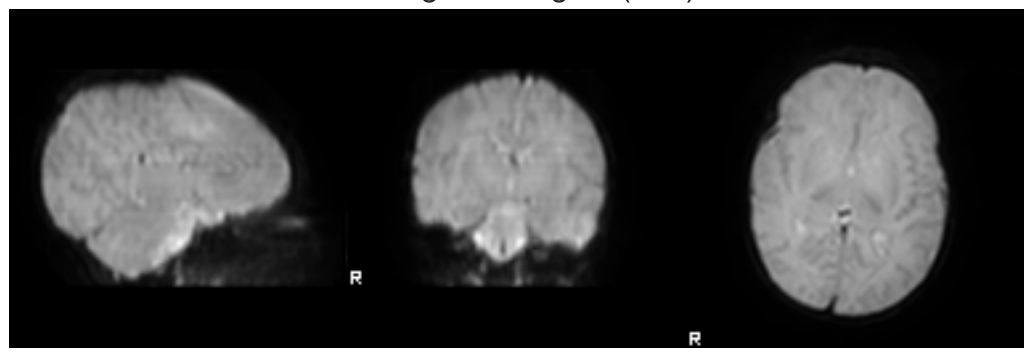
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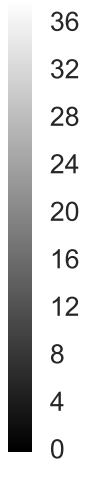
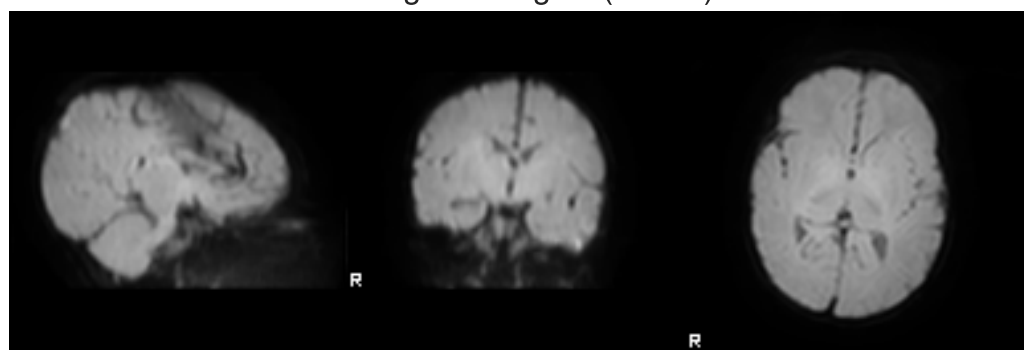
Voxel displacement map



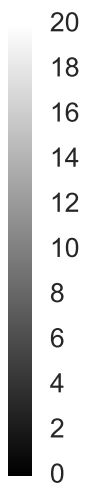
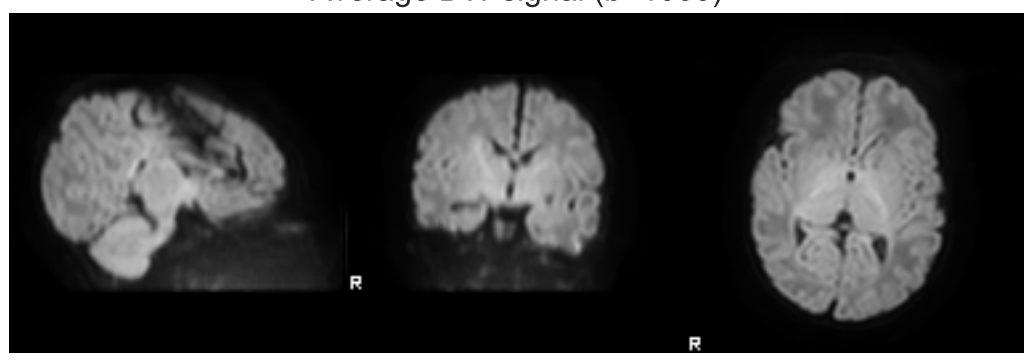
Average DW signal (b=0)



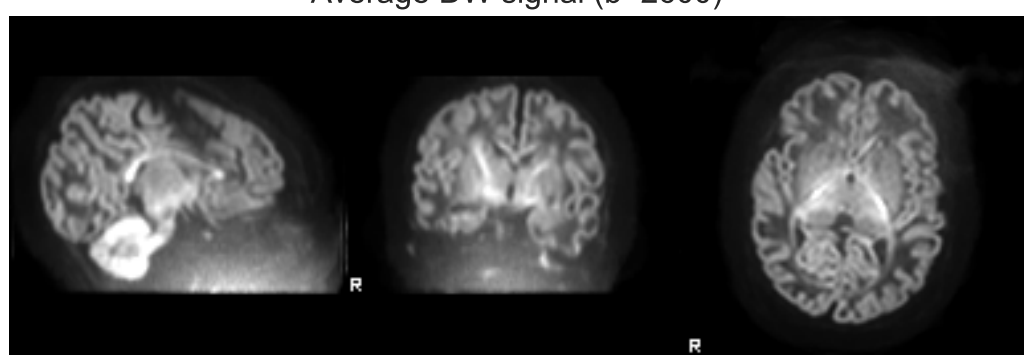
Average DW signal (b=400)

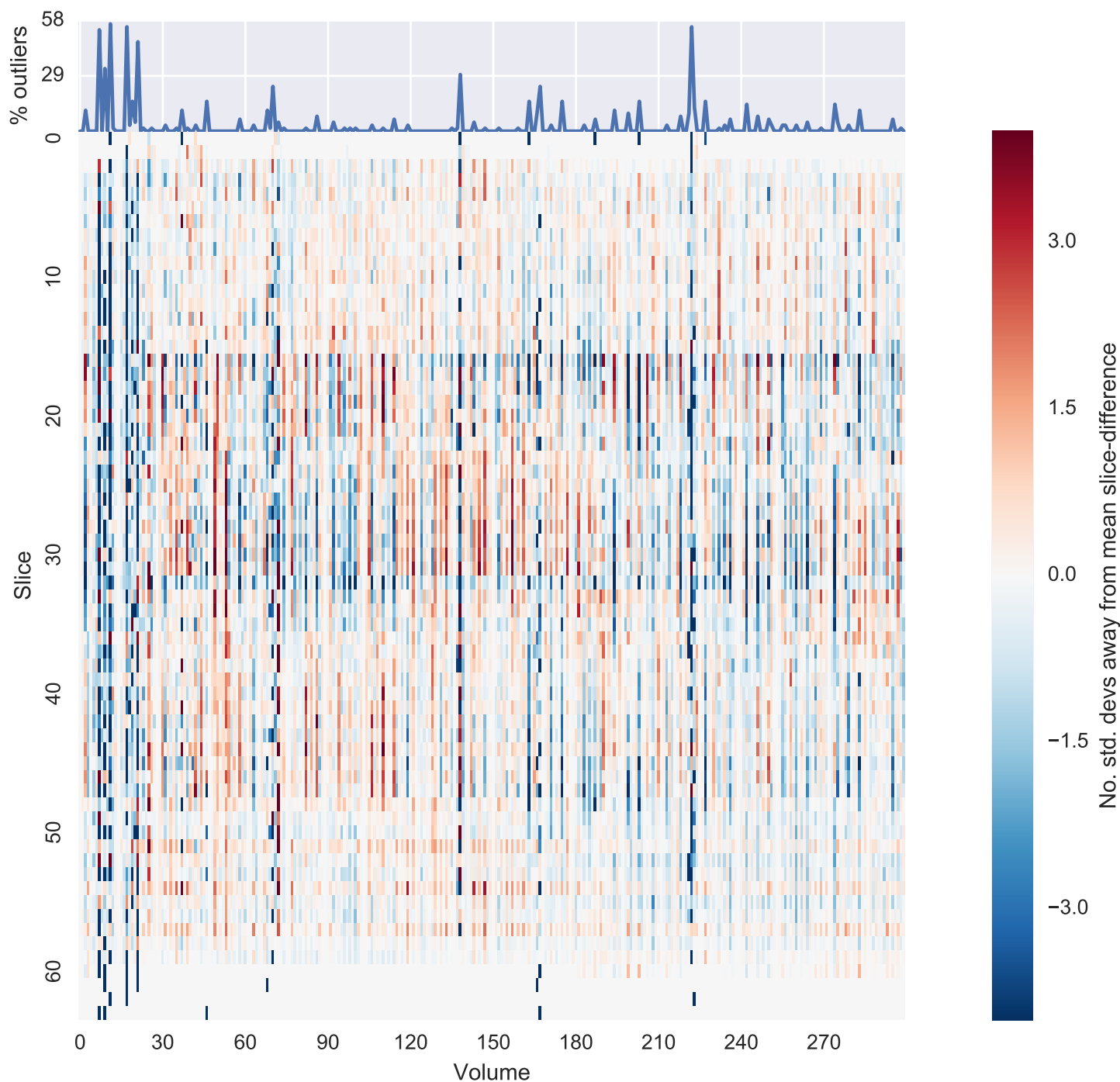
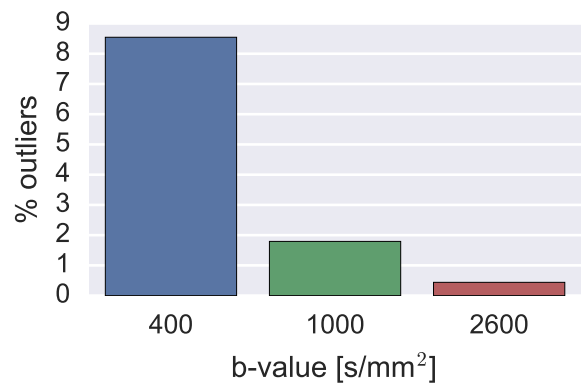
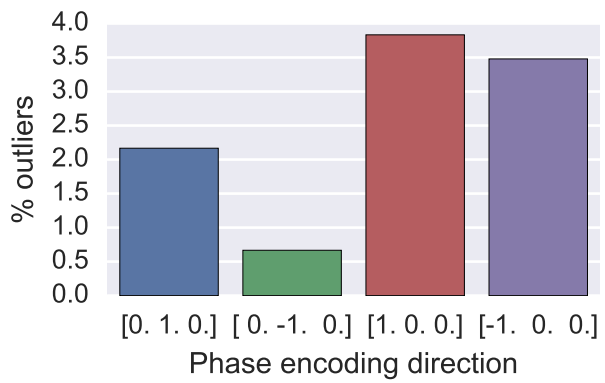


Average DW signal (b=1000)

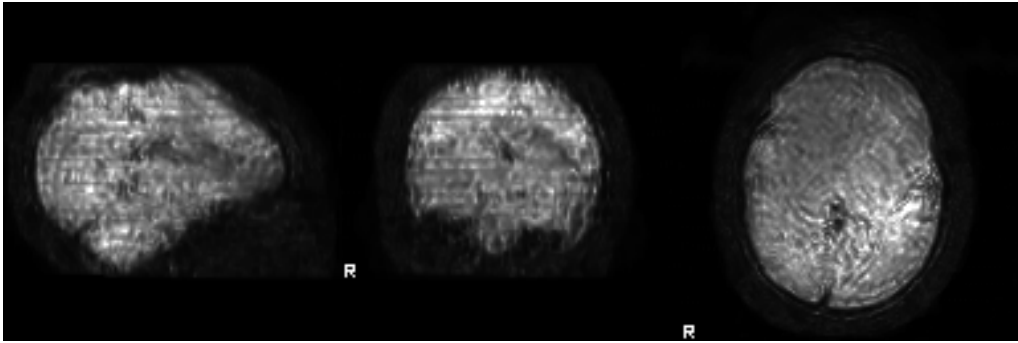


Average DW signal (b=2600)

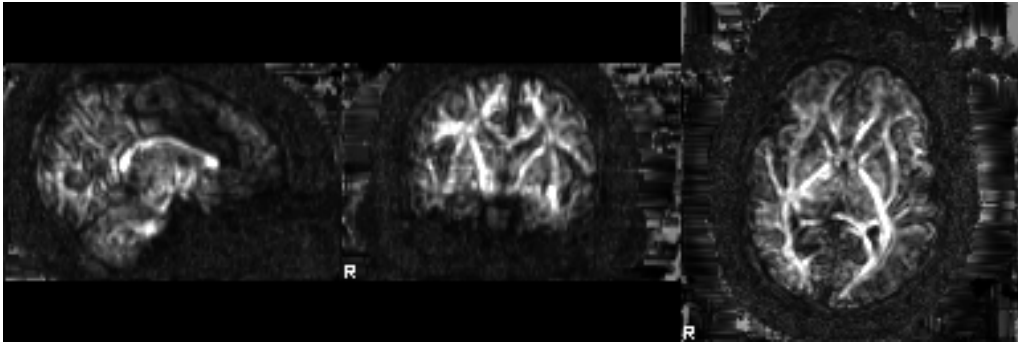




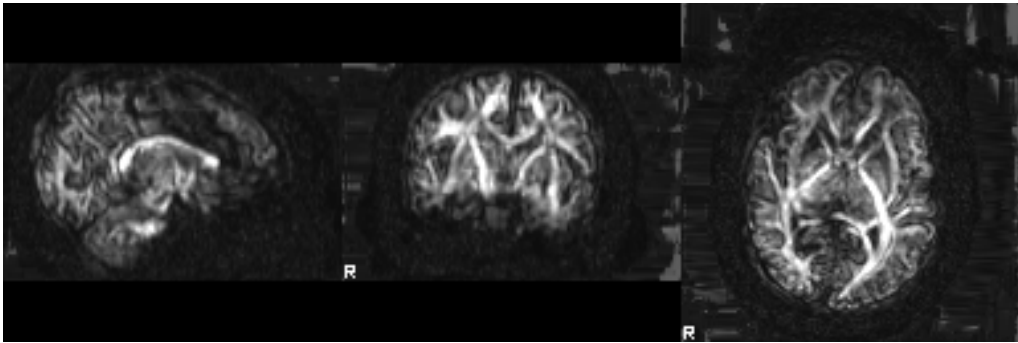
tSNR map (b=0)



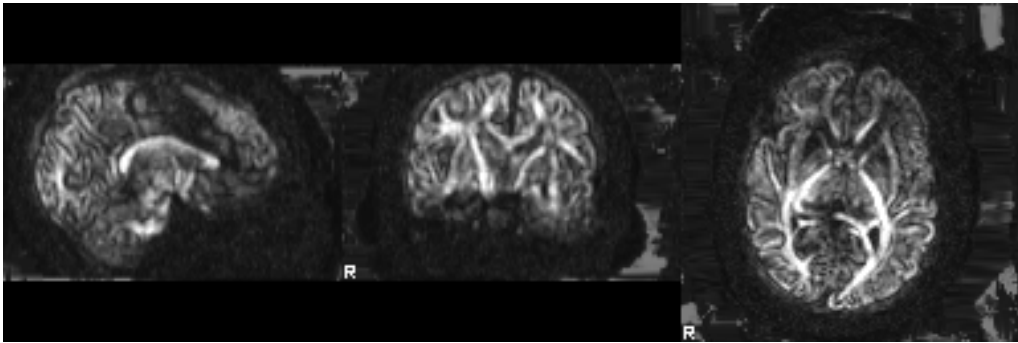
CNR map (b=400)



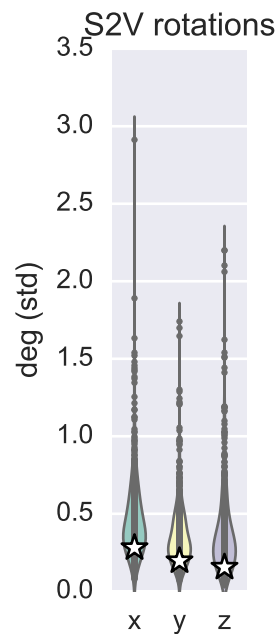
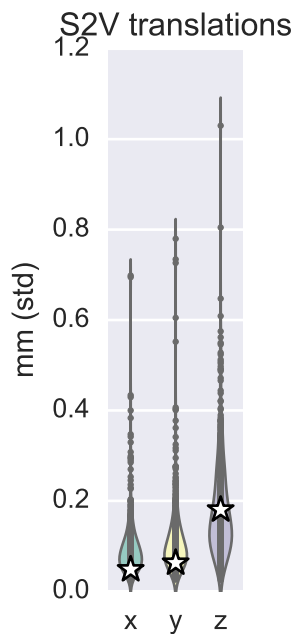
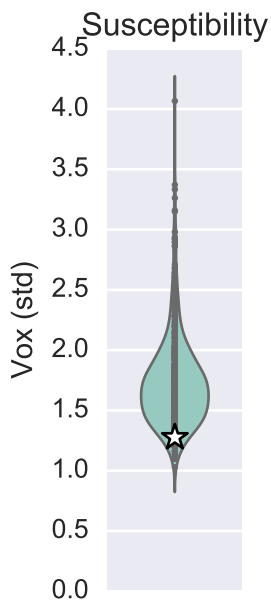
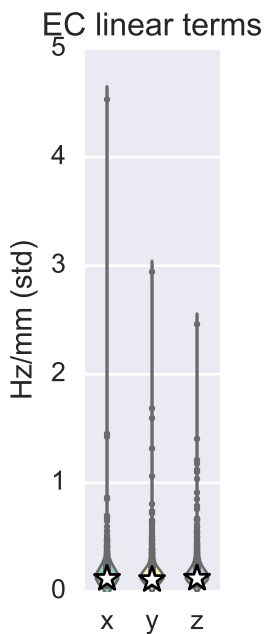
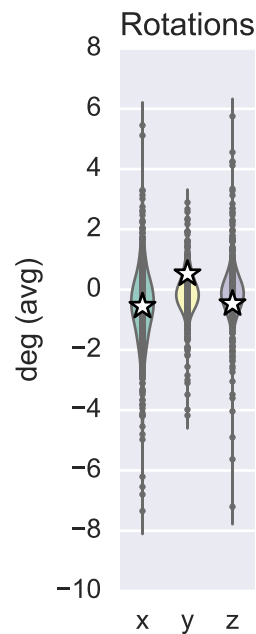
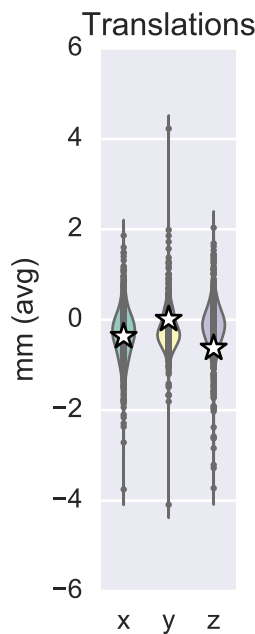
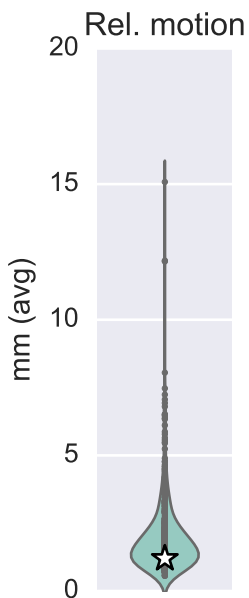
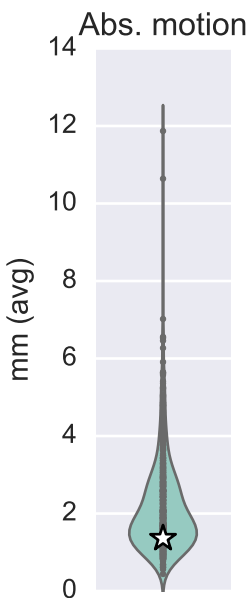
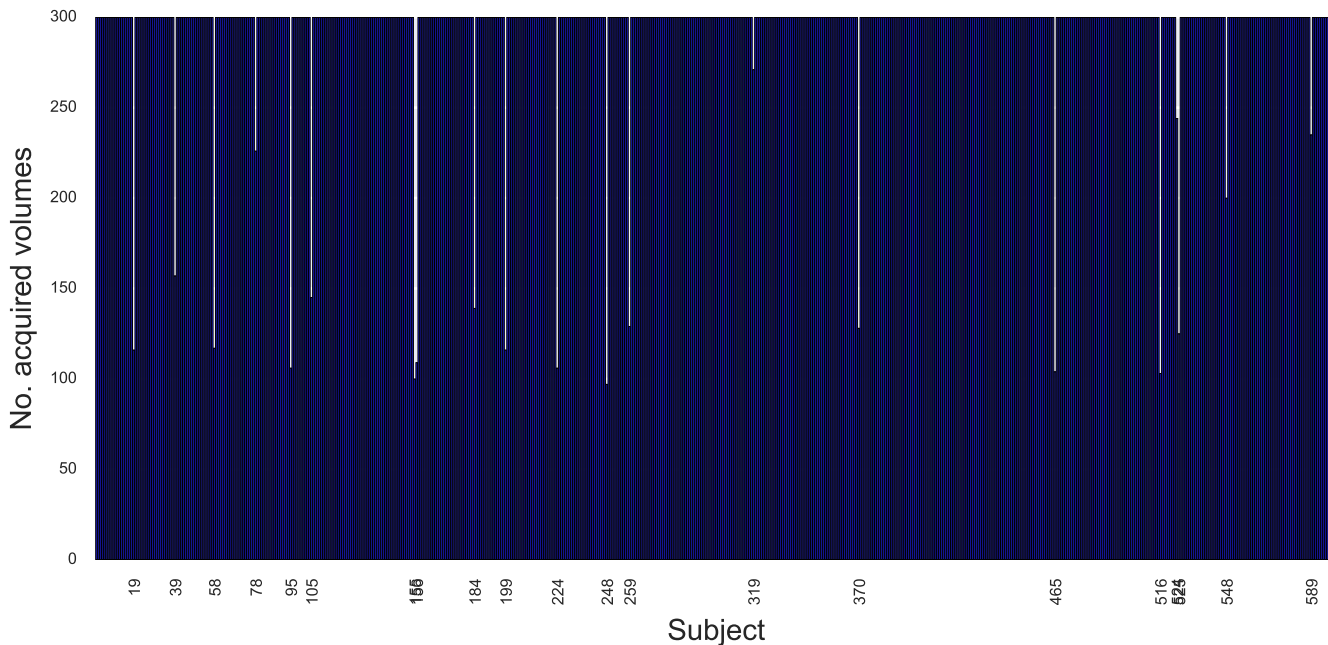
CNR map (b=1000)



CNR map (b=2600)



SQUAD: Group report



SQUAD: Group report

