Why it is NOT a good idea to censor after bandpass filtering, but you should do it prior.

This is specifically for resting state analysis

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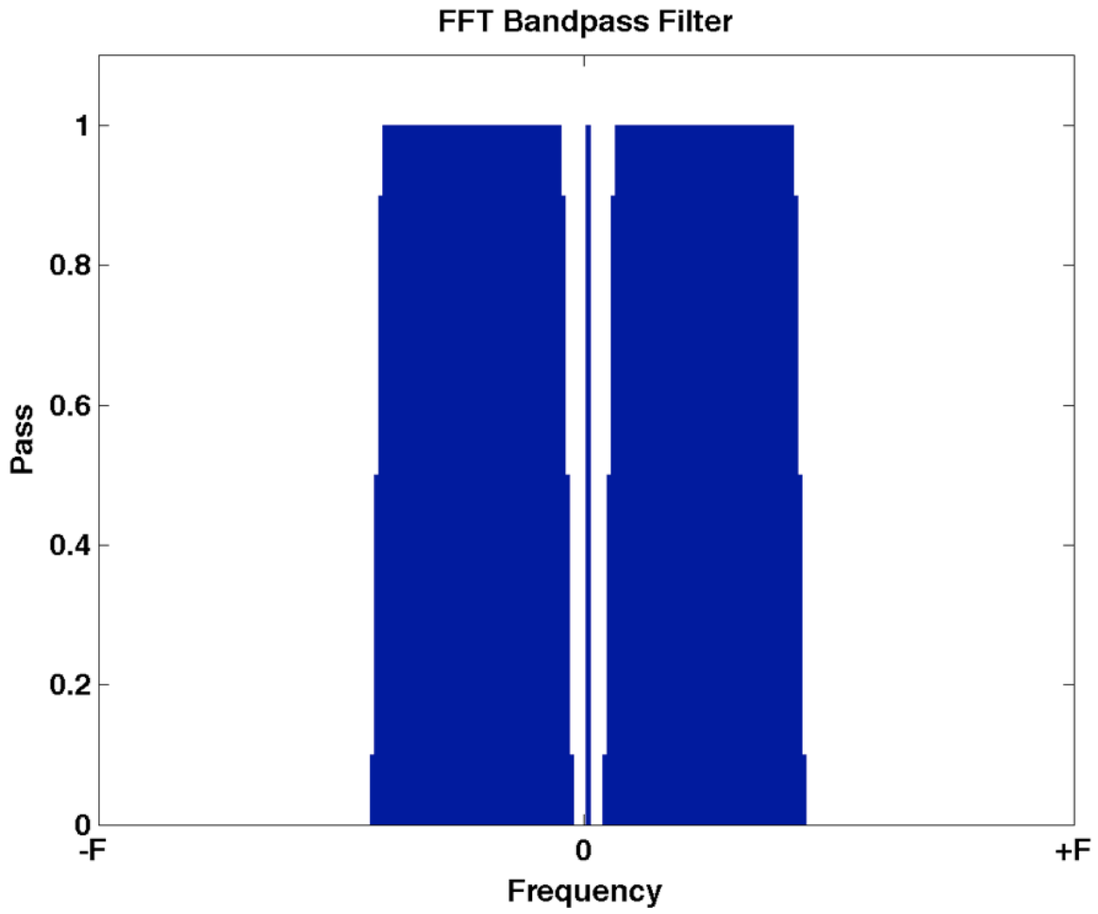
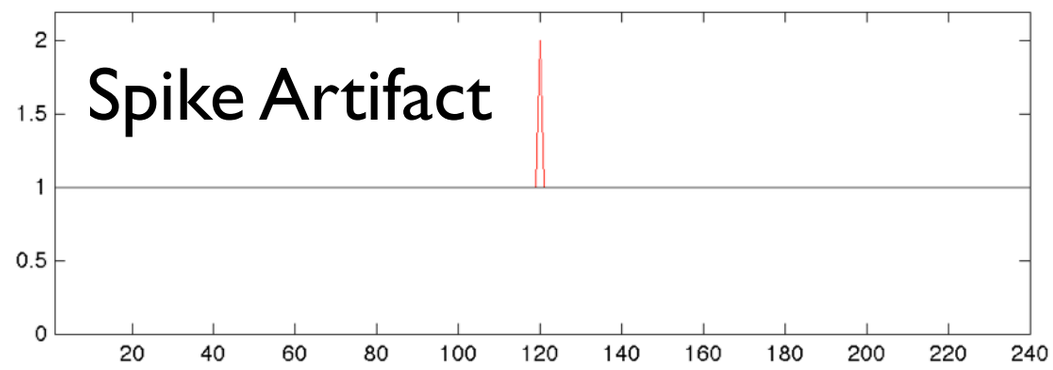
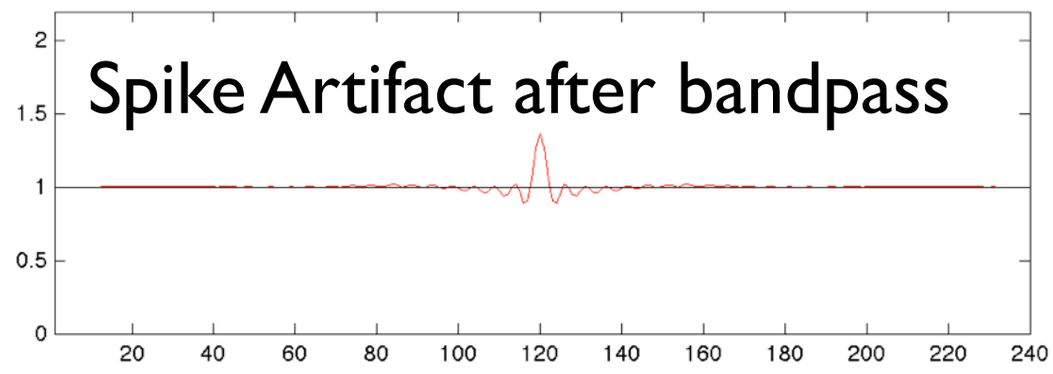
Filtering inherently will spread a single time point to many time points.

The ConnTool ToolBox utilized a FFT BandPass Filter.







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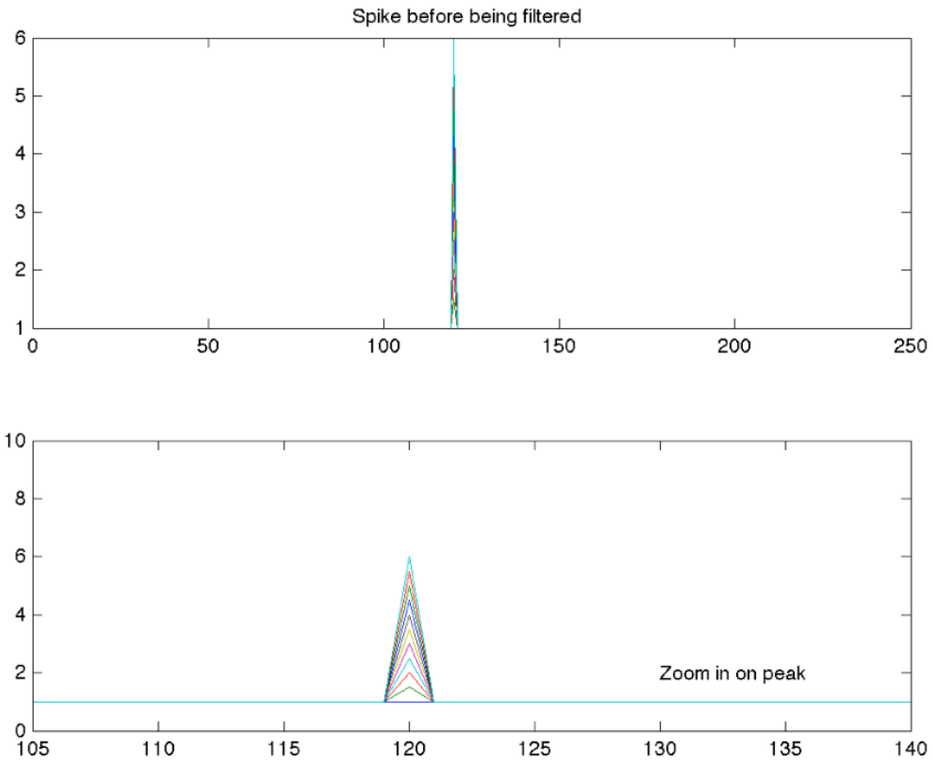
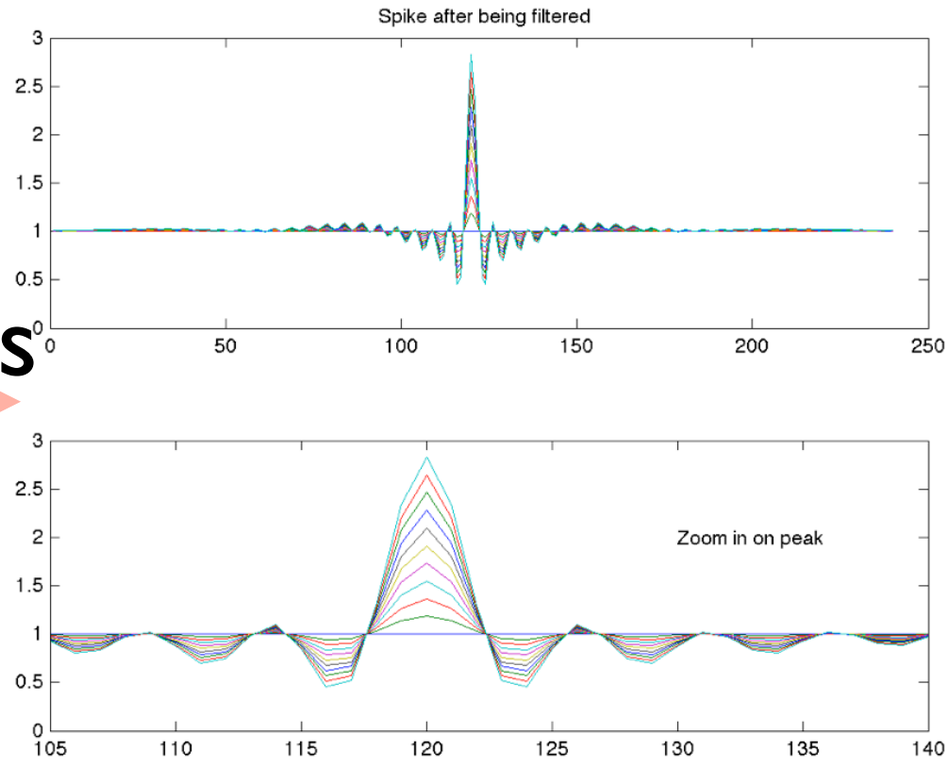
The result is that as the magnitude of the spike gets larger the ripple become large. This ripple will be through out all voxels and will increase the artifactual positive correlations.



BandPass Filter



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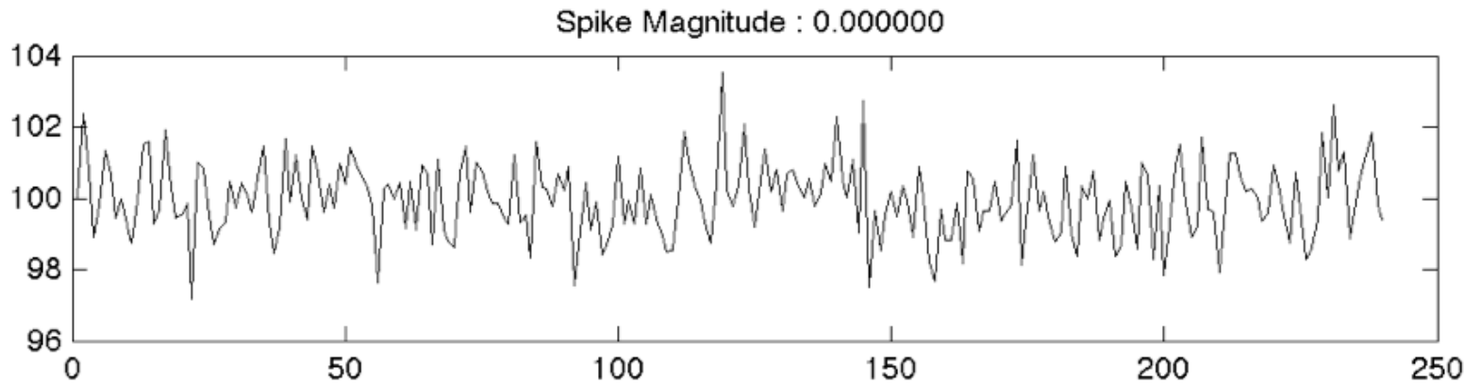
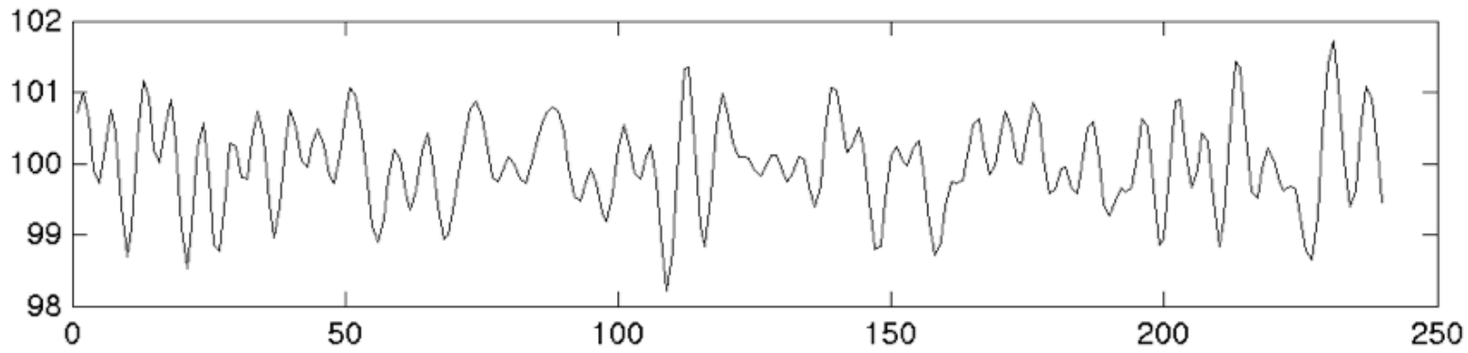
Randomly created time-series data (normal distribution), added a baseline of 100. Then introduce a spike at time-point 120 with varying amplitude and affecting whole brain.

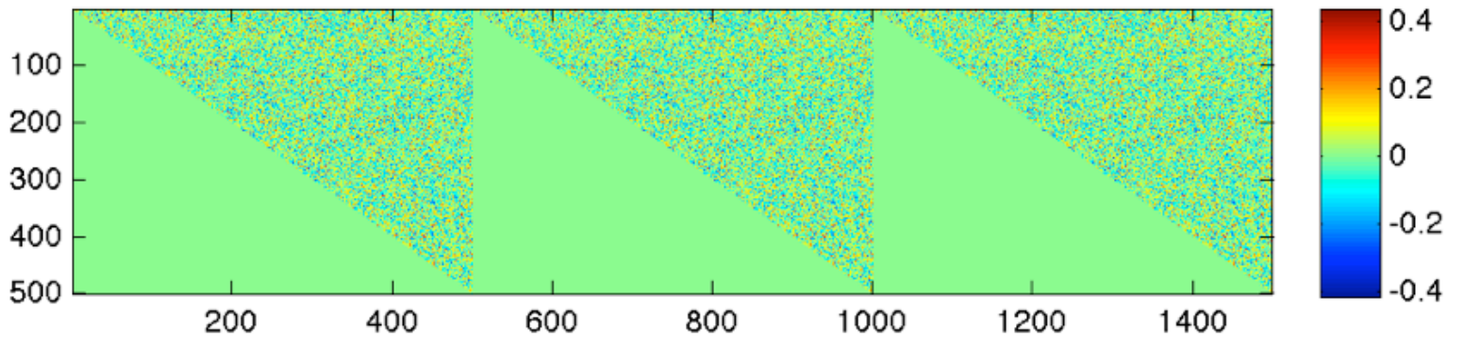
Random time-course



Filtered time-course



Correlation Maps



Pre-Filter

Post-Filter Good

Post-Filer Bad

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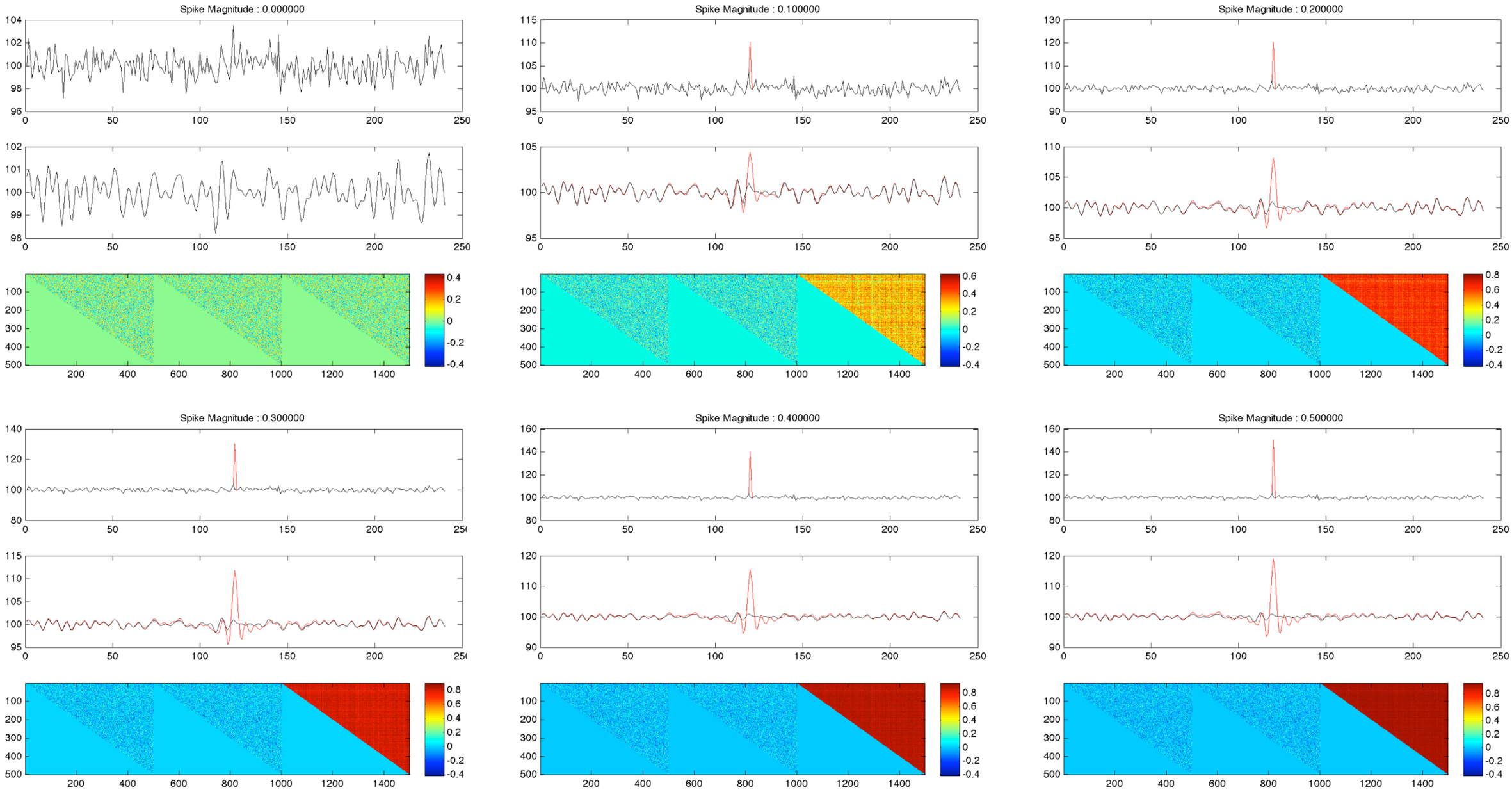

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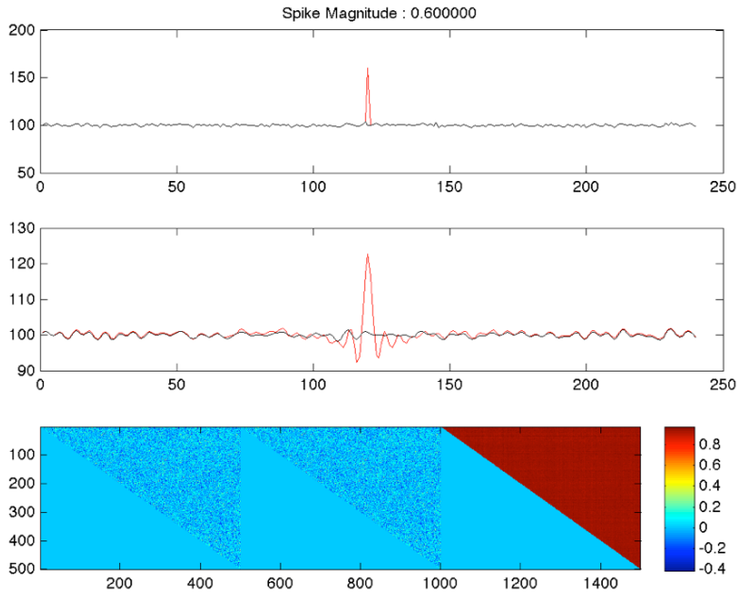

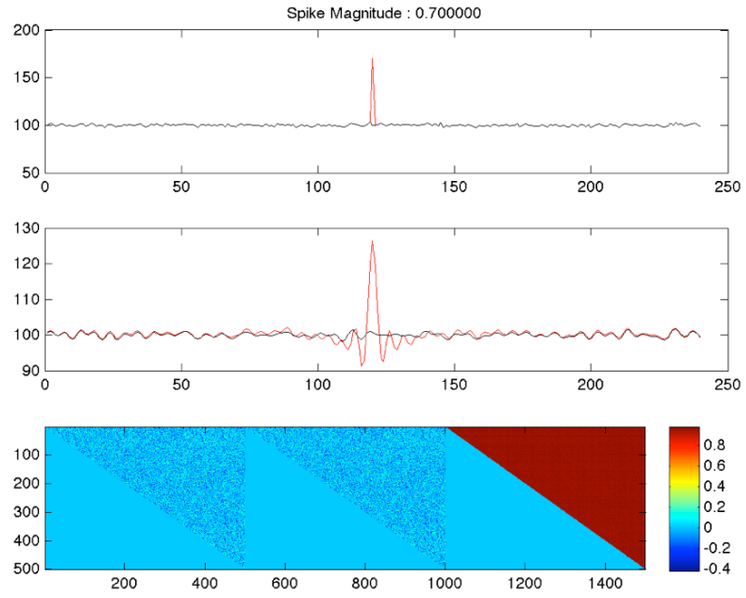

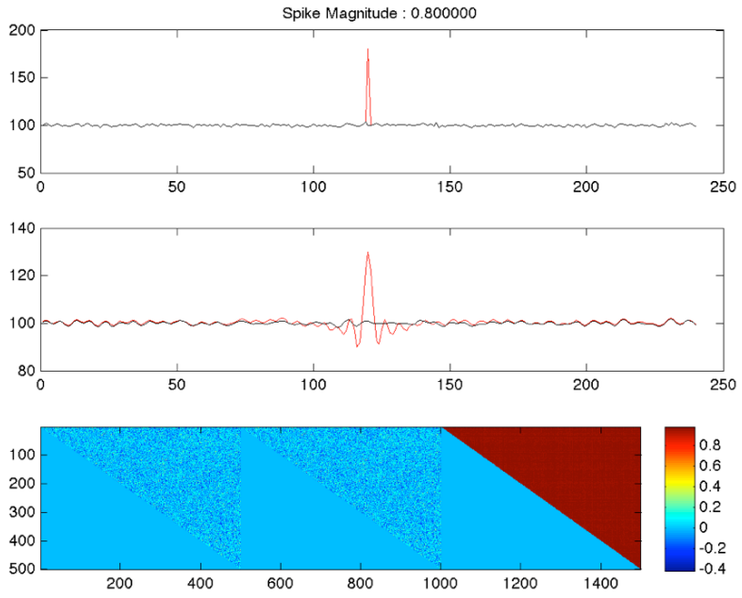

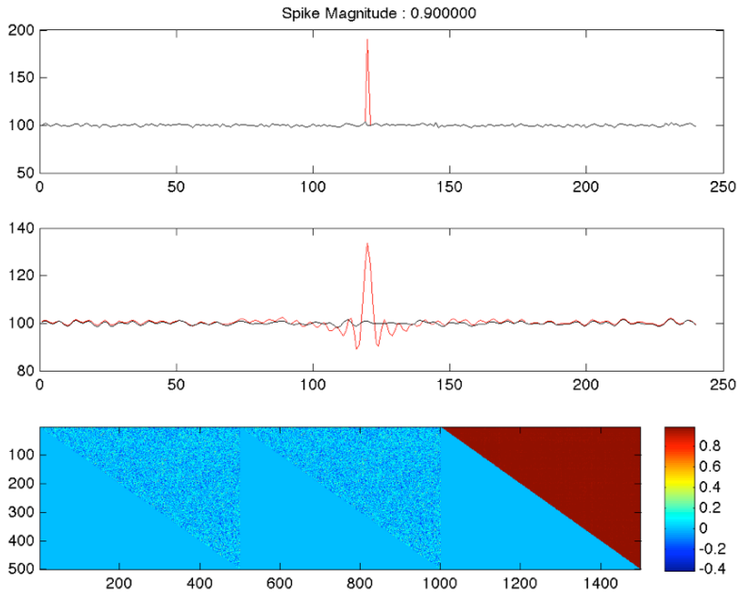

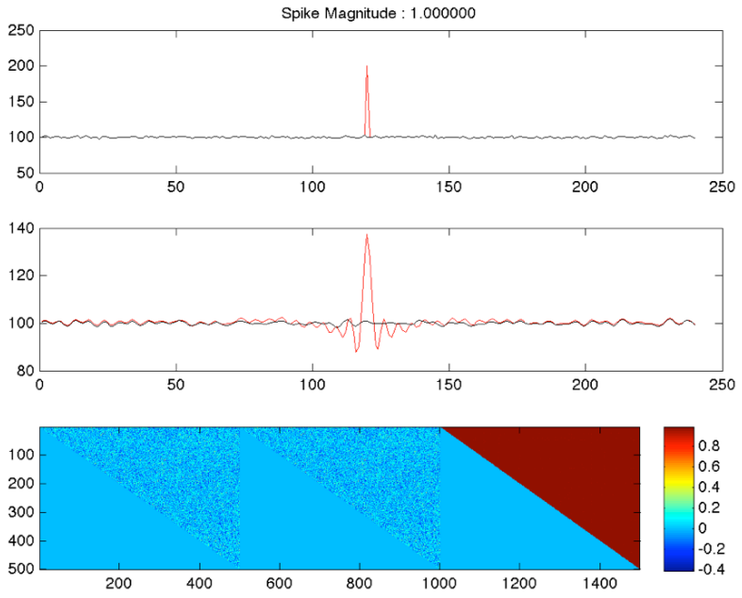

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In general time-series data are effectively random. A spike in the signal intensity due to motion or a something wrong with the scanner will manifest itself across time if the data are not cleaned PRIOR to filtering. This will introduce positive correlation throughout the brain.

Bottom-Line : **I recommend cleaning the data prior to filtering. So as to not introduce a discontinuity in the data it would probably be best to interpolate -- however this should still be investigated, but since we slice-time correct there is already interpolation taking place.**

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