
Visualize the EEG output from the PREP processing pipeline.

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Calling directly: prepReport

This helper reporting script expects that EEGReporting will be in the base workspace with an EEGReporting.etc.noiseDetection structure containing the report. It also expects the following variables in the base workspace:

- summaryFile - variable containing the open file descriptor for summary
- consoleID - variable with open file descriptor for console (usually 1 unless the output is redirected).
- relativeReportLocation report location relative to summary

The reporting function appends a summary to the summary report.

Usually the prepReport script is called through the function:

```
publishPrepReport
```

It is not a function itself, to allow the MATLAB publish to dump a nice output.

Write data status and report header

```
EEGeeGLab_data.set[32 channels, 30504 frames]
Error status:
good
Boundary errors: [ ]
Detrend errors: [ ]
Line noise errors: [ ]
Reference errors: [ ]
Versions:
  Detrend:v0.54 GlobalTrend:v0.54 LineNoise:v0.54 Resampling:v0.54
  Reference:v0.54 Interpolation:v0.54
Sampling rate:
128
Hz
Events: 154, Original events: 154
Unique event types: 2
Bad channels interpolated for reference: [ ]
```

Line noise removal step

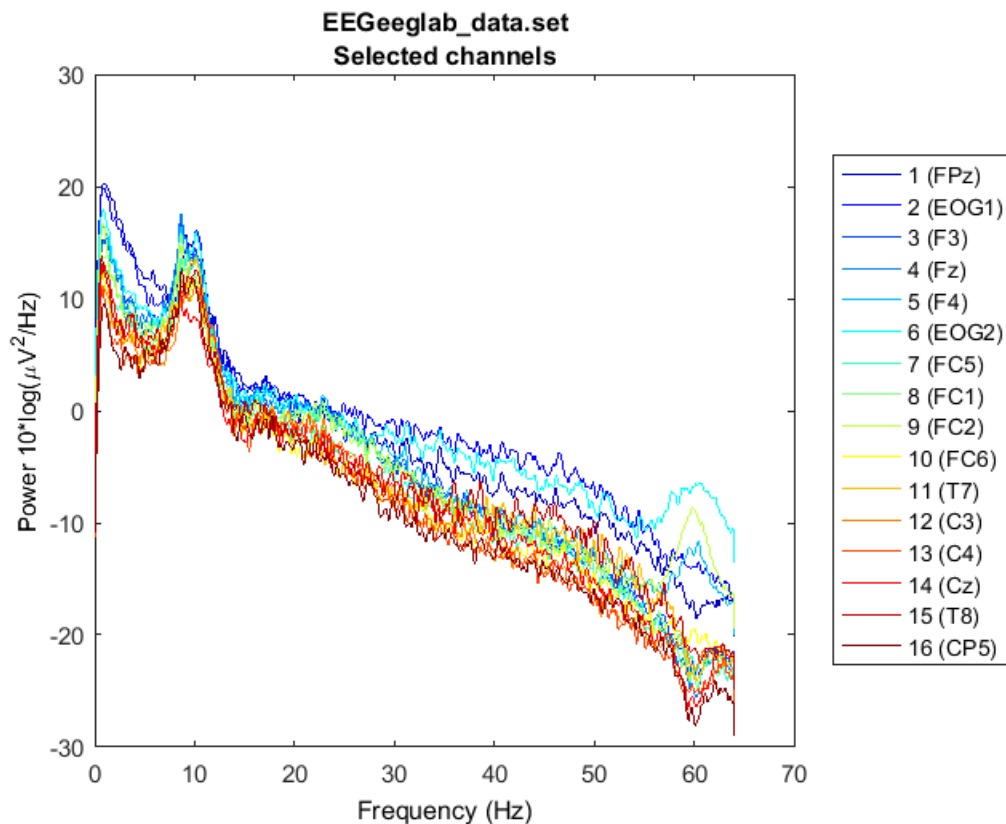
```
Line noise method: blasst
Version v0.54
Sampling frequency Fs: 128 Hz
Line noise frequencies:
[ 60 ]
Maximum iterations: 10
Significant frequency p-value: 0.01
+/- frequency BW for significant peaks (fScanBandWidth): 2
Taper bandwidth: 2 Hz
Taper window size (seconds): 4
Taper step size (seconds): 1
Sigmoidal smoothing factor (tau): 100
Spectral pad factor: 0
Analysis frequency interval(fPassBand): [ 0, 64 ] Hz
Line noise channels (32 channels):
[ 1 2 3 4 5 6 7 8 9 10
  11 12 13 14 15 16 17 18 19 20
  21 22 23 24 25 26 27 28 29 30
  31 32 ]
```

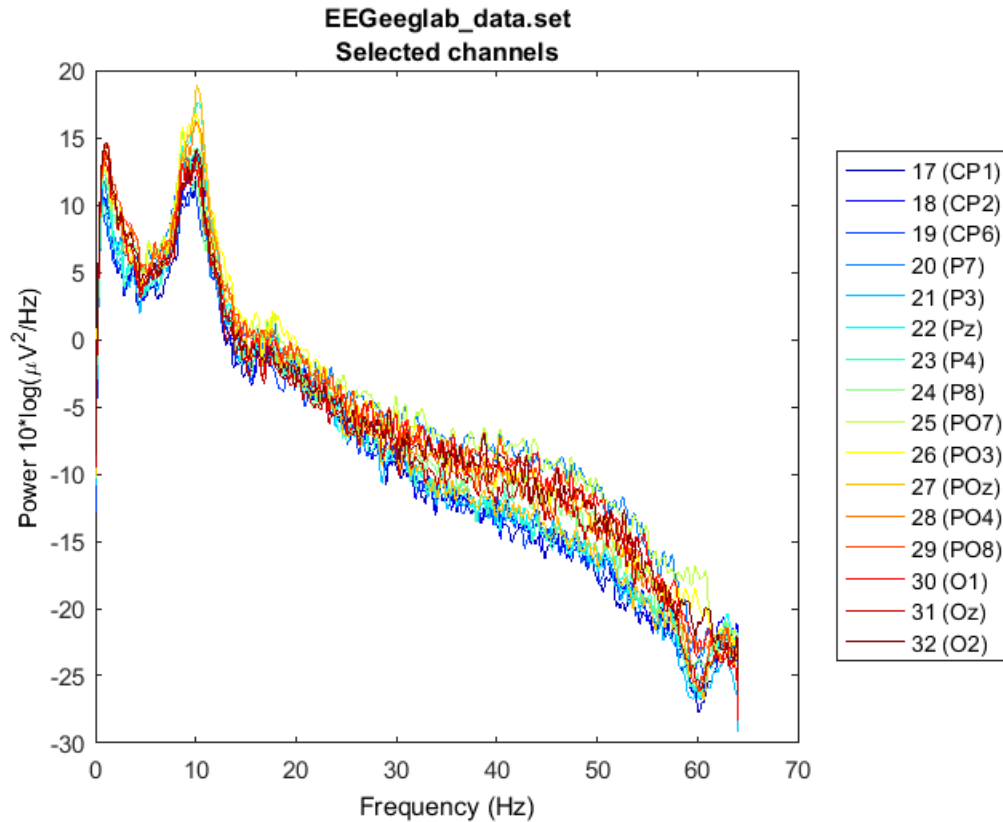
Initial detrend for reference calculation

```
Detrend version v0.54
Detrend cutoff: 1 Hz
Detrend type: high pass
Detrend step size: 2.000000e-02
Detrend command:
EEG1 = pop_eegfiltnew(EEG1, [], 1, 424, true, [], 0);
Detrended channels (32 channels):
[ 1 2 3 4 5 6 7 8 9 10
 11 12 13 14 15 16 17 18 19 20
 21 22 23 24 25 26 27 28 29 30
 31 32 ]
```

Spectrum after line noise and detrend

```
pop_eegfiltnew() - performing 425 point highpass filtering.
pop_eegfiltnew() - transition band width: 1 Hz
pop_eegfiltnew() - passband edge(s): 1 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.5 Hz
pop_eegfiltnew() - filtering the data (zero-phase)
firfilt(): |=====| 100%, ETE 00:00
```





Report referencing step

Referencing version v0.54
Reference type robust
Interpolation order post-reference

Reference channels (32 channels):
[1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
31 32]

Evaluation channels (32 channels):
[1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
31 32]

RereferencedChannels (32 channels):
[1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
31 32]

Noisy channel detection parameters:

Robust deviation threshold (z score): 5
High frequency noise threshold (ratio): 5
Correlation window size (in seconds): 1
Correlation threshold (with any channel): 0.4
Bad correlation threshold: 0.01
(fraction of time with low correlation or dropout)
Ransac off (if 1 Ransac turned off) : 0
Ransac sample size : 50
(number channels to use for interpolated estimate)
Ransac channel fraction (for ransac sample size): 0.25
RansacCorrelationThreshold: 0.75
RansacUnbrokenTime (input parameter): 0.4
RansacWindowSeconds (in seconds): 5
RansacPerformed (if 1, Ransac on and enough channels): 1
Maximum reference iterations: 4
Actual reference iterations: 2

Bad channels interpolated:

[]

Bad because of NaN:

[]

Bad because data is constant:

[]

Bad because of low SNR:

[]

Bad because of drop outs:

[]

Bad because of poor max correlation:

[]

Bad because of large deviation:

[]

Bad because of HF noise:

[]

Bad because of poor Ransac predictability :

[]

Bad channels after interpolation+referencing:

[]

Bad because of NaN:

[]

Bad because data is constant:

[]

Bad because of low SNR:

[]

Bad because of drop outs:

[]

Bad because of poor max correlation:

[]

Bad because of large deviation:

[]

Bad because of HF noise:

[]

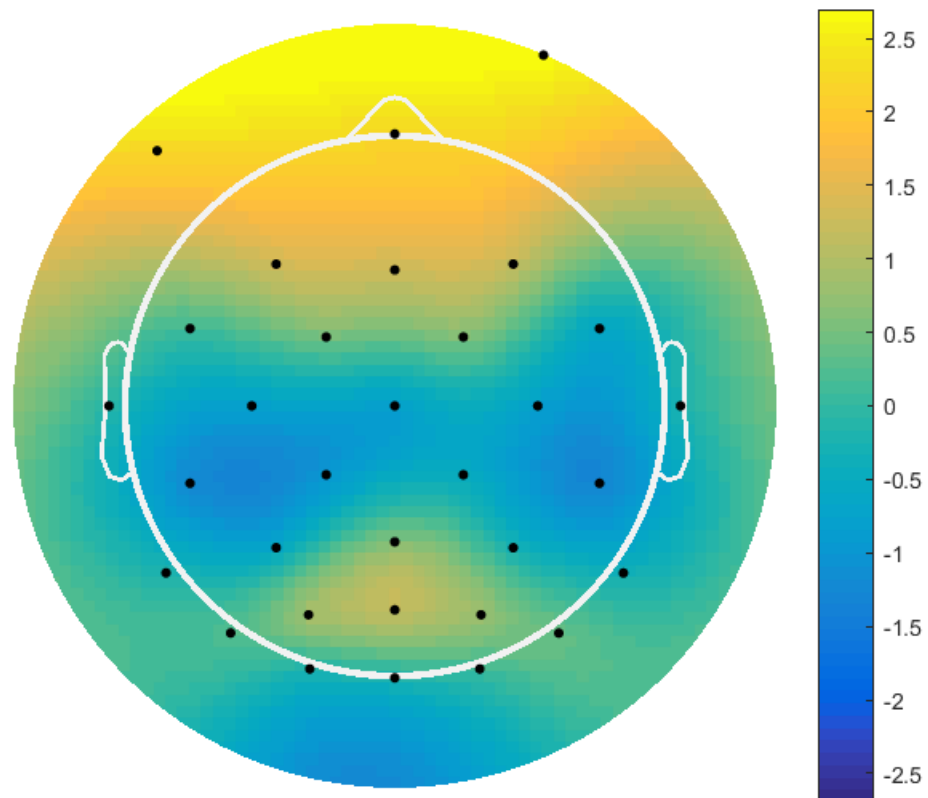
Bad because of poor Ransac predictability :

[]

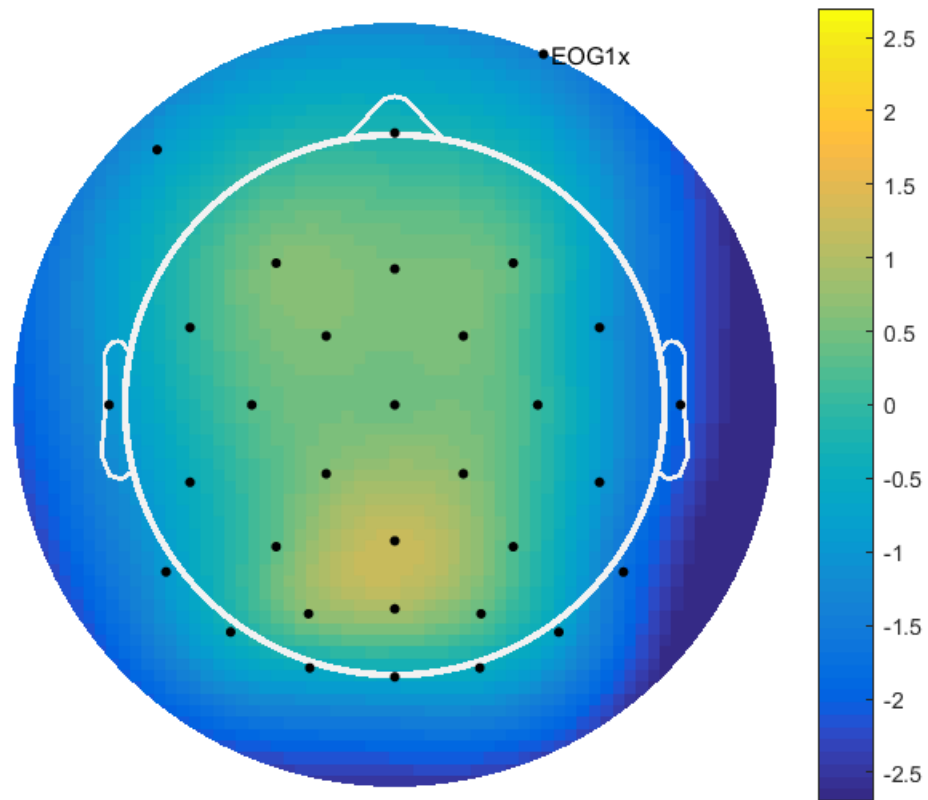
Actual interpolation iterations: 2

Robust channel deviation (referenced)

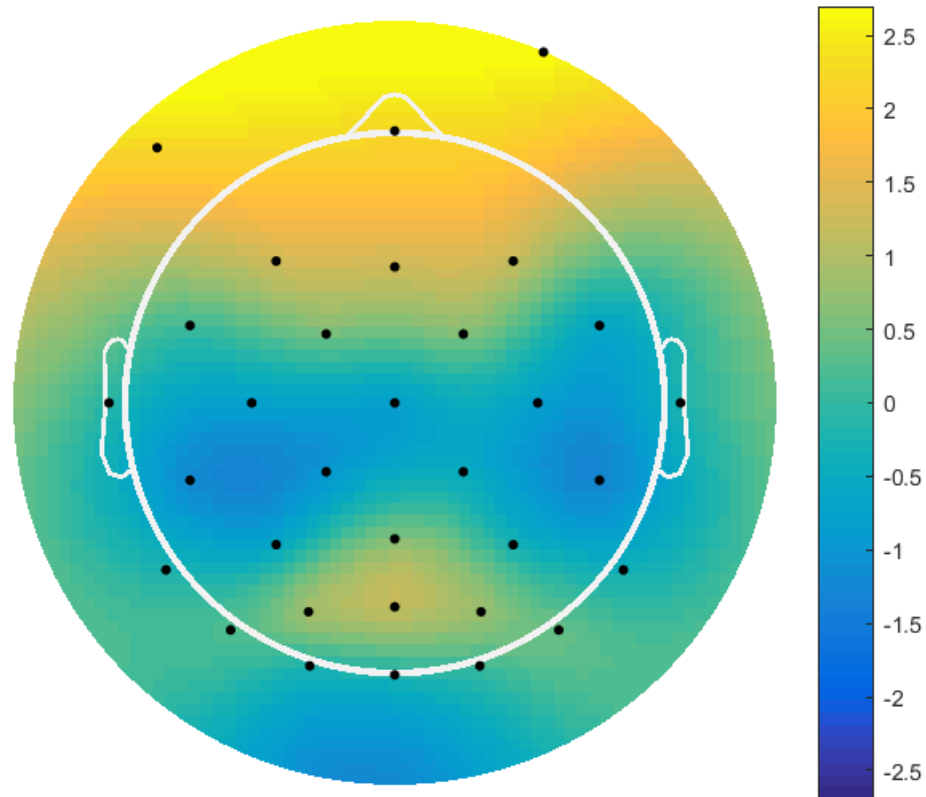
Noisy channel legend: NaN: n
NoData: z
LowSNR: s
Corr: c
Amp: +
Noise: x
Ran: ?



Robust channel deviation (original)

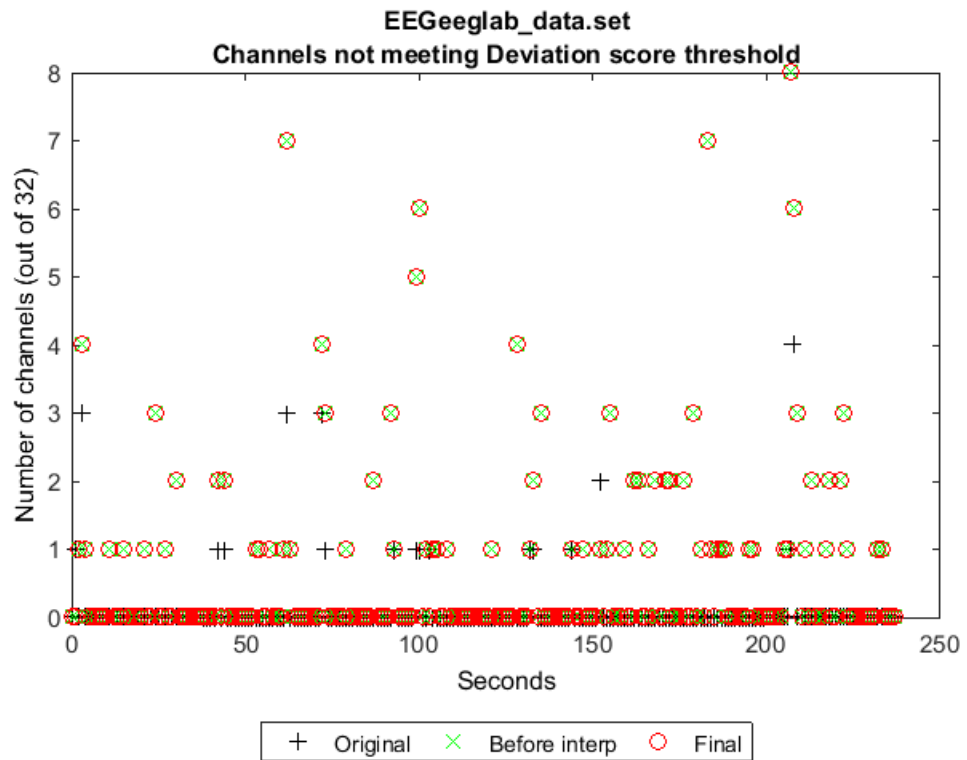
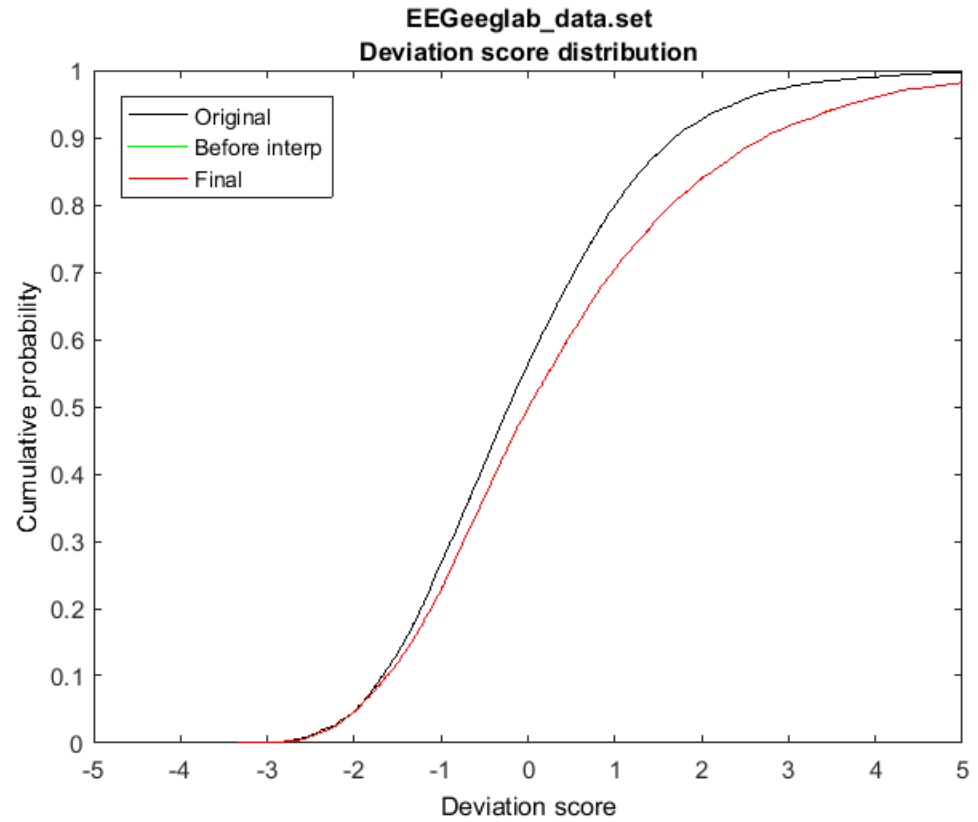


Robust channel deviation (marking interpolated)

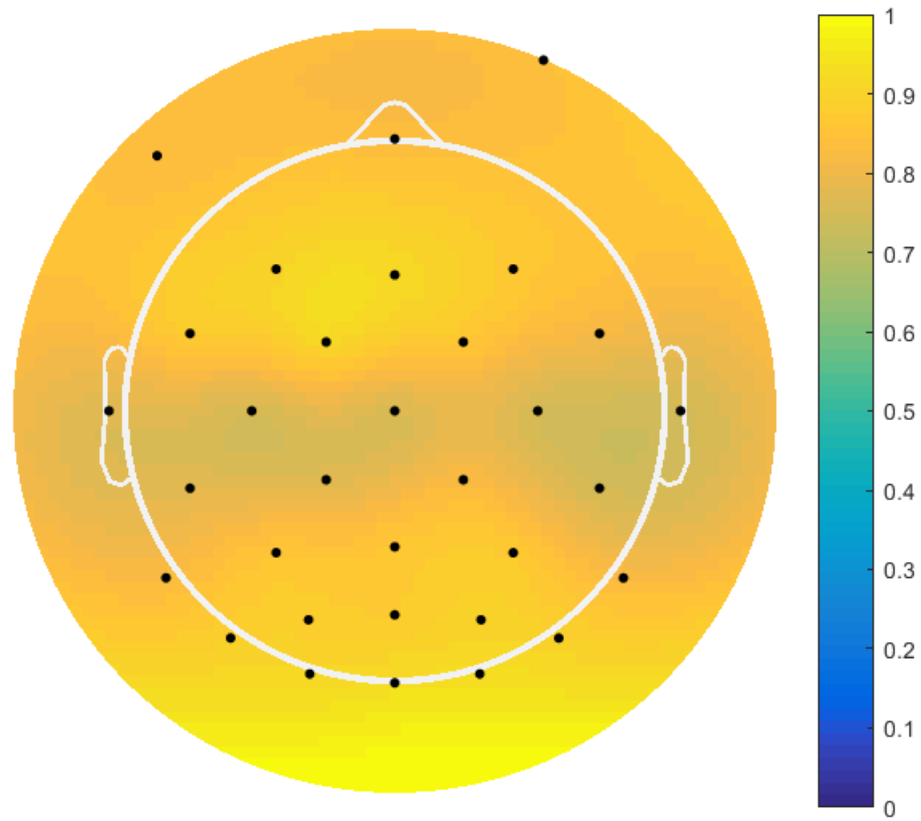


Robust deviation window statistics

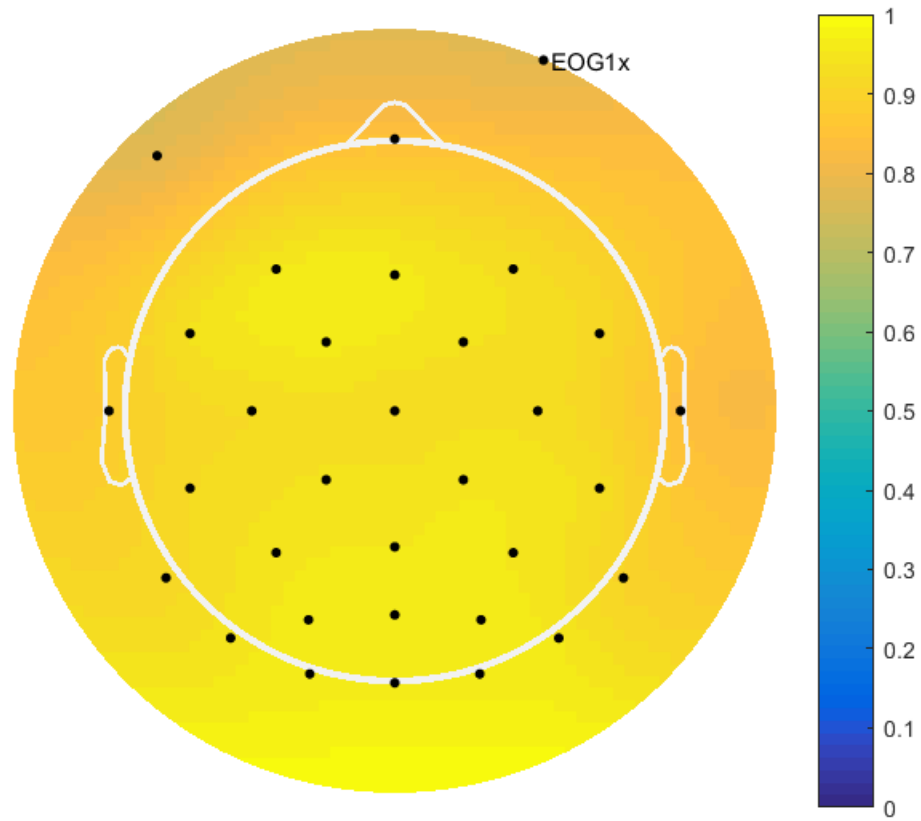
```
Deviation window statistics (over 238 windows):  
Large deviation channel fraction:  
    [before=0.0035452, after=0.018645]  
Median channel deviation: [before=16.591, after=10.6979]  
SD channel deviation: [before=3.8139, after=2.0924]  
Max raw deviation level [before=103.6396, after=87.662]  
Average fraction 0.0035452 (0.11345 channels)  
    not meeting threshold before in each window  
Average fraction 0.018645 (0.59664 channels)  
    not meeting threshold after in each window  
Windows with > 1/4 deviation channels:  
    [before=0, after=0]  
Windows with > 1/2 deviation channels:  
    [before=0, after=0]  
Median window deviations: [before=15.7555, after=10.7205]  
SD window deviations: [before=5.0675, after=3.276]  
Channels with dropouts: None
```

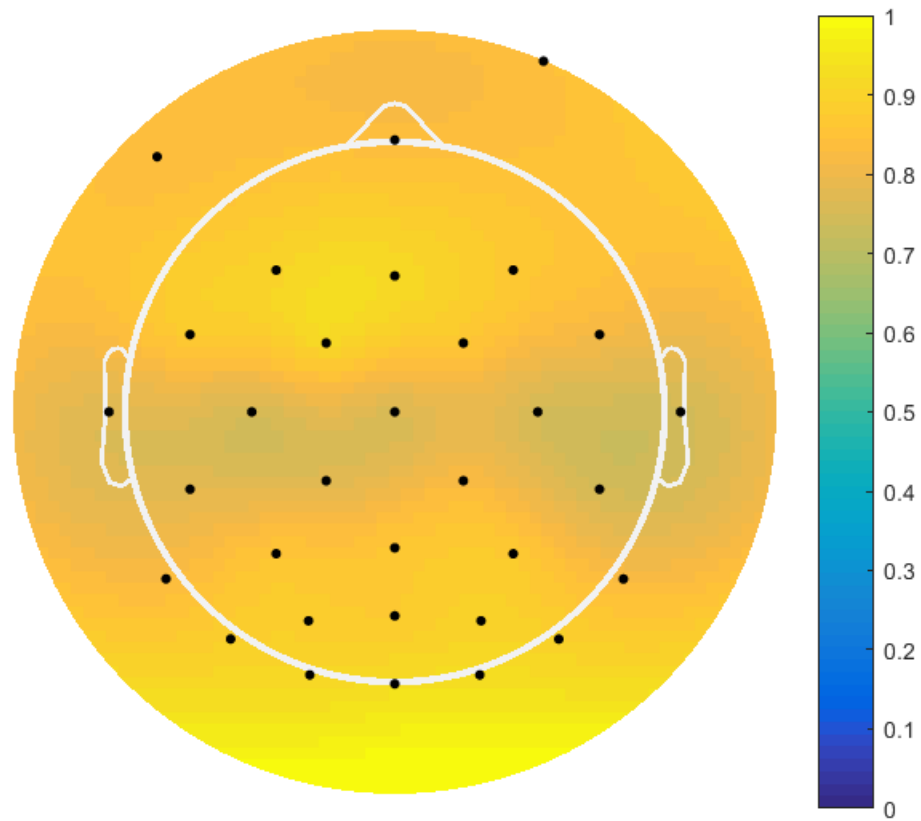
Median max abs correlation (referenced)



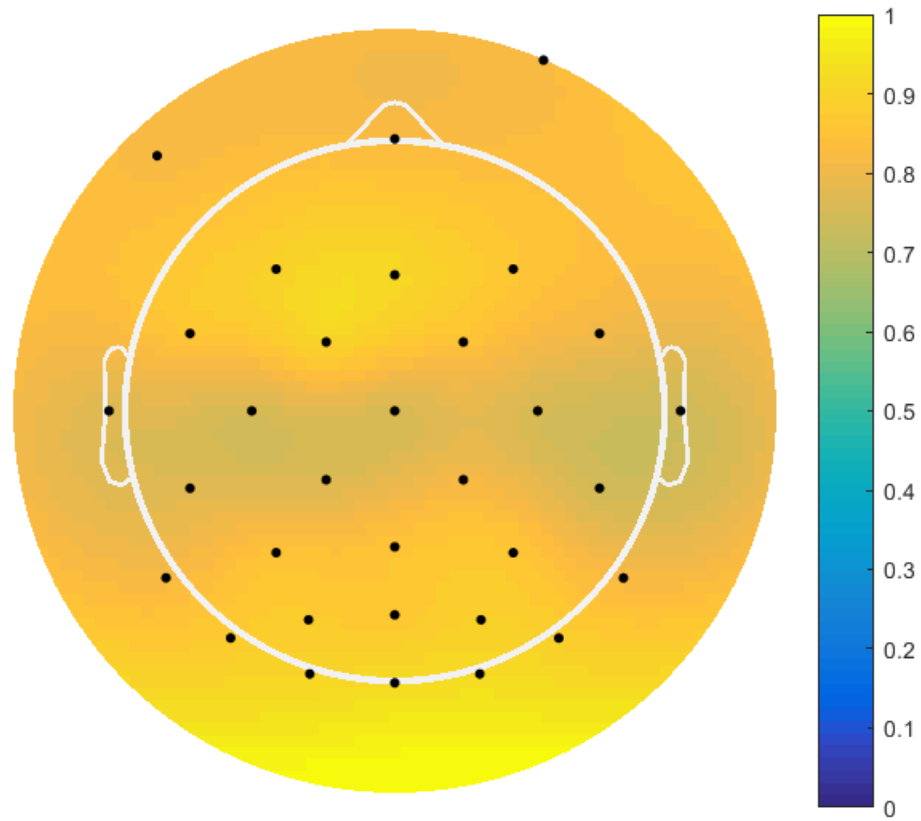
Median max abs correlation (original)



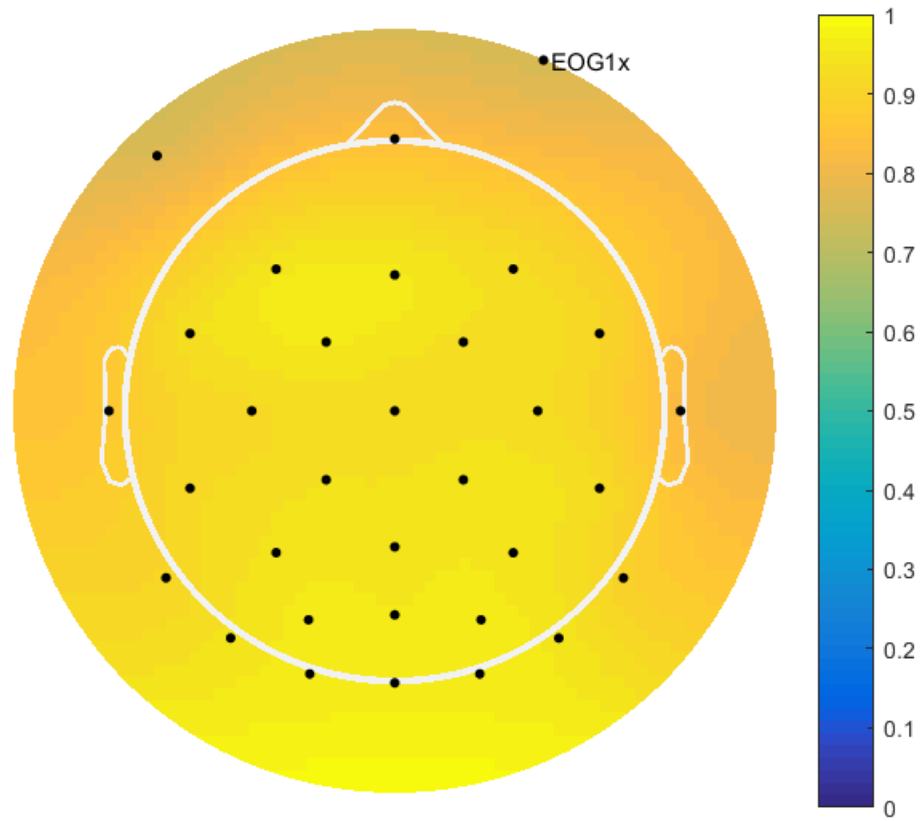
Median max abs correlation (marking interpolated)



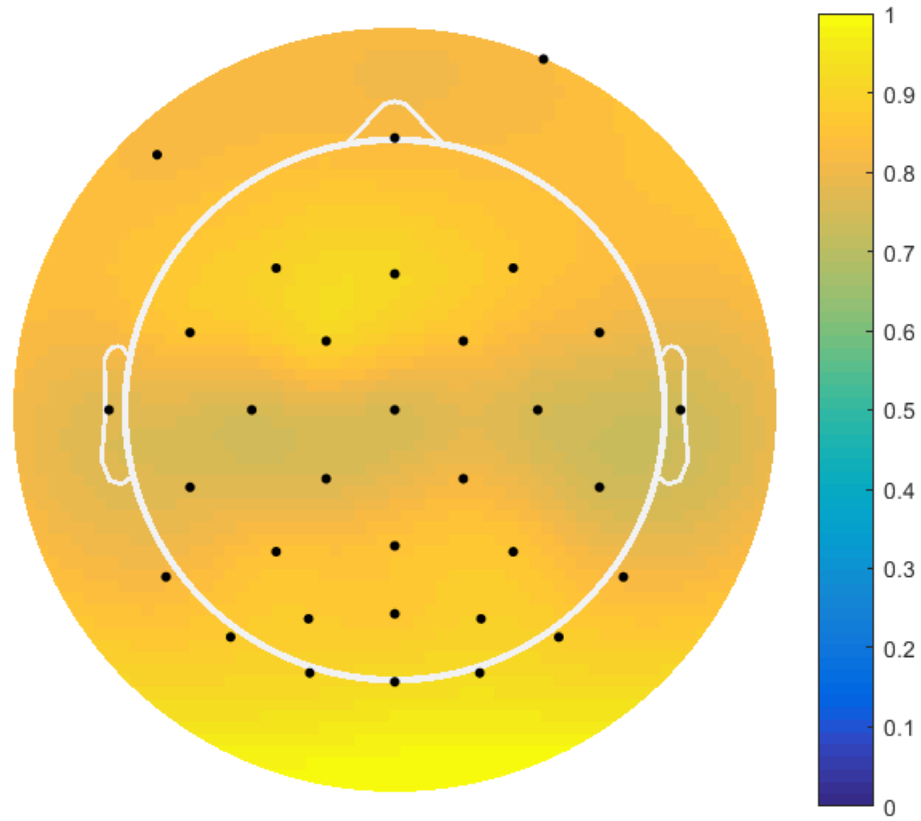
Mean max abs correlation (referenced)



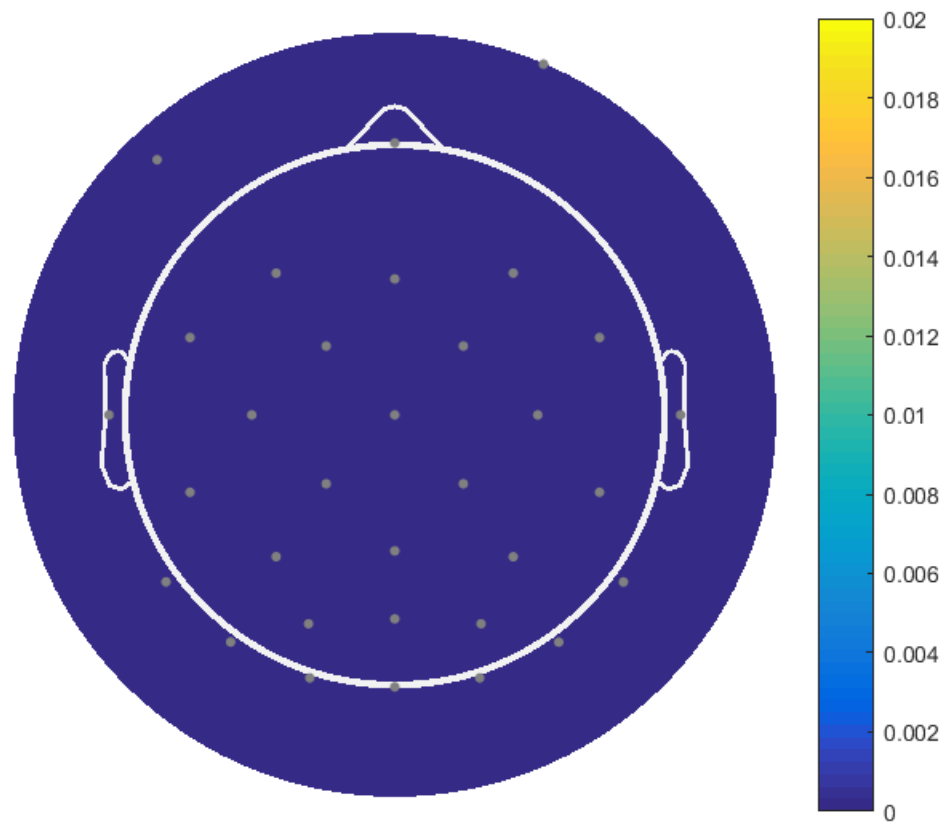
Mean max abs correlation (original)



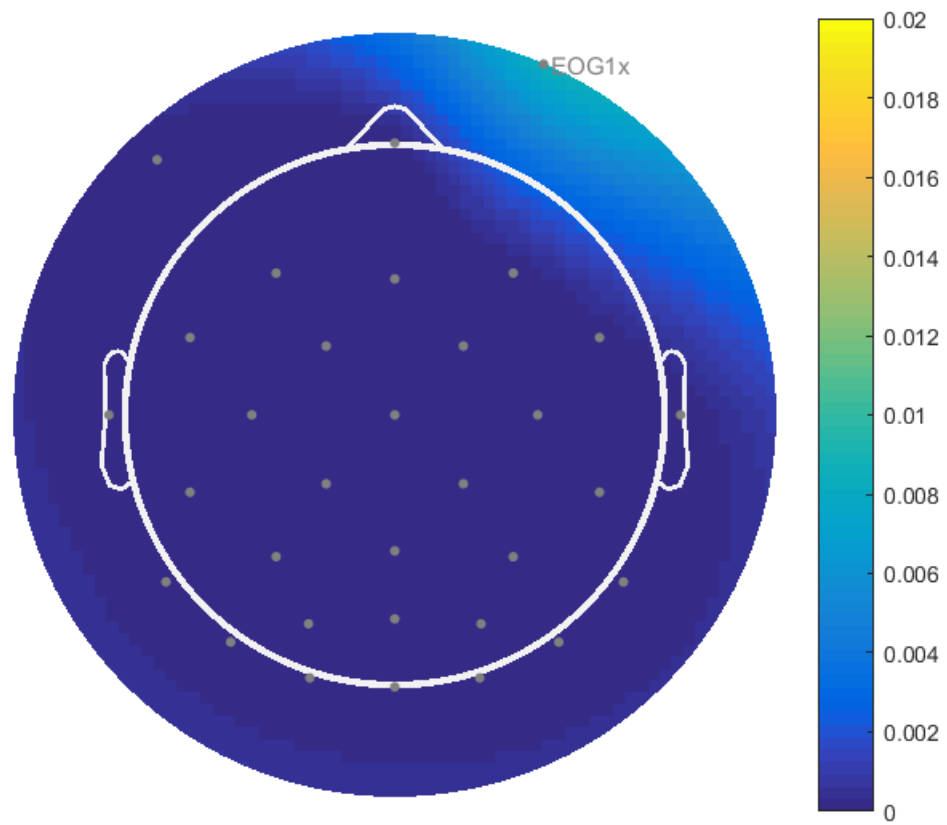
Mean max abs correlation (marking interpolated)



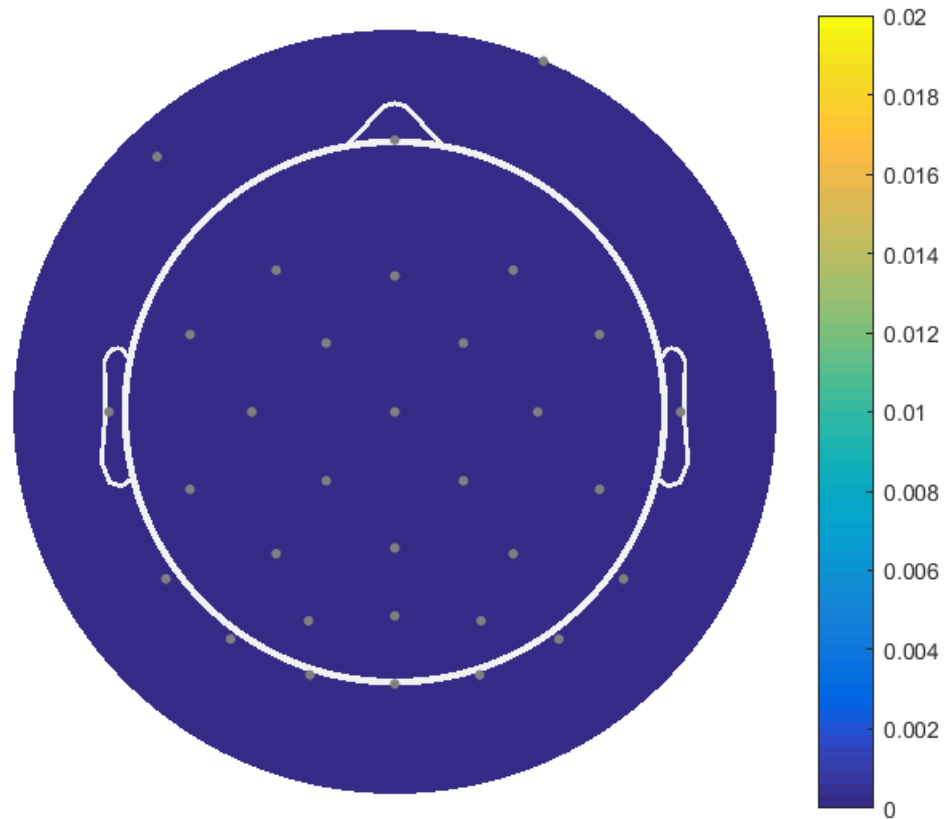
Bad min max correlation fraction (referenced)



Bad min max correlation fraction(original)

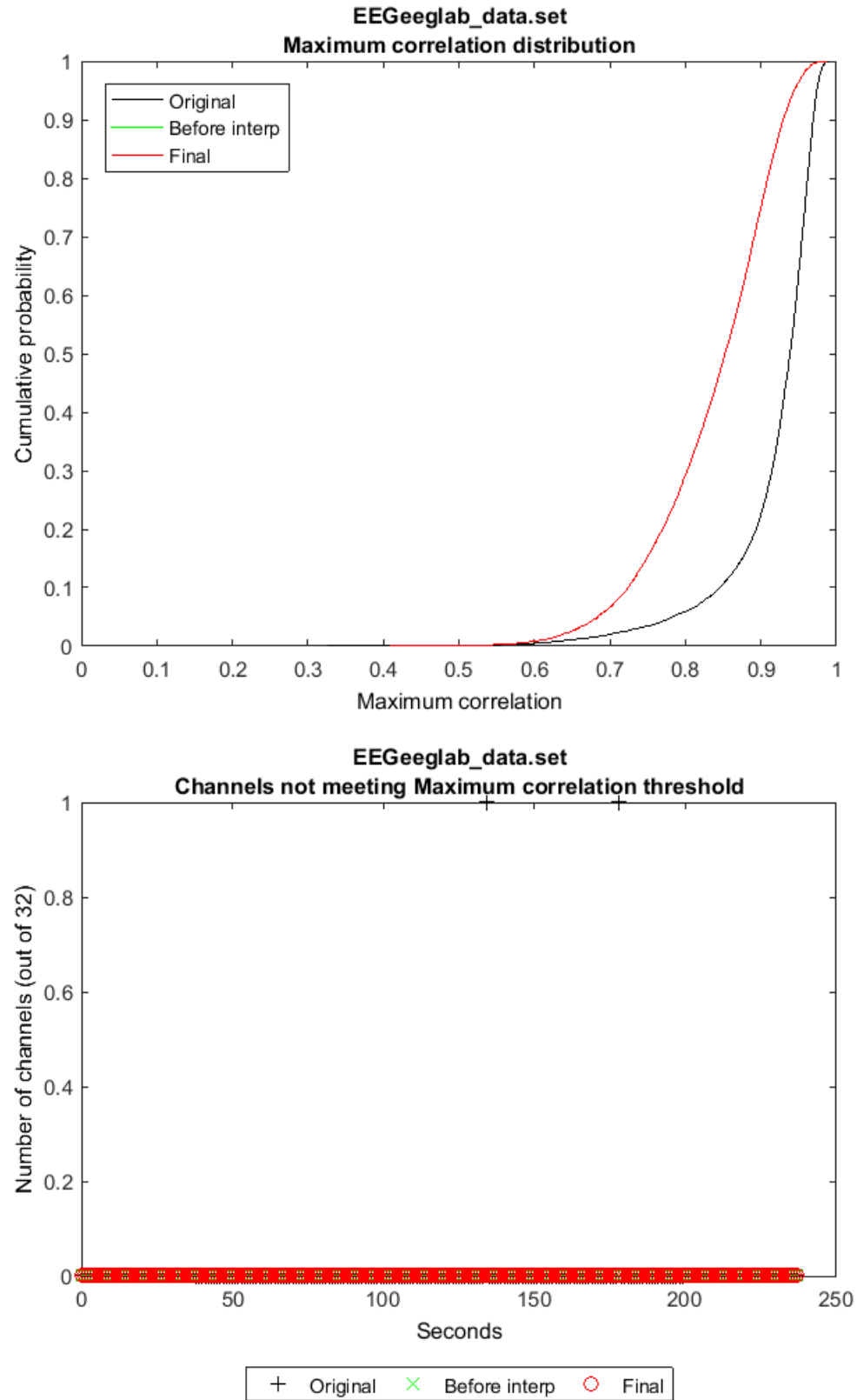


Bad min max correlation fraction (marking interpolated)

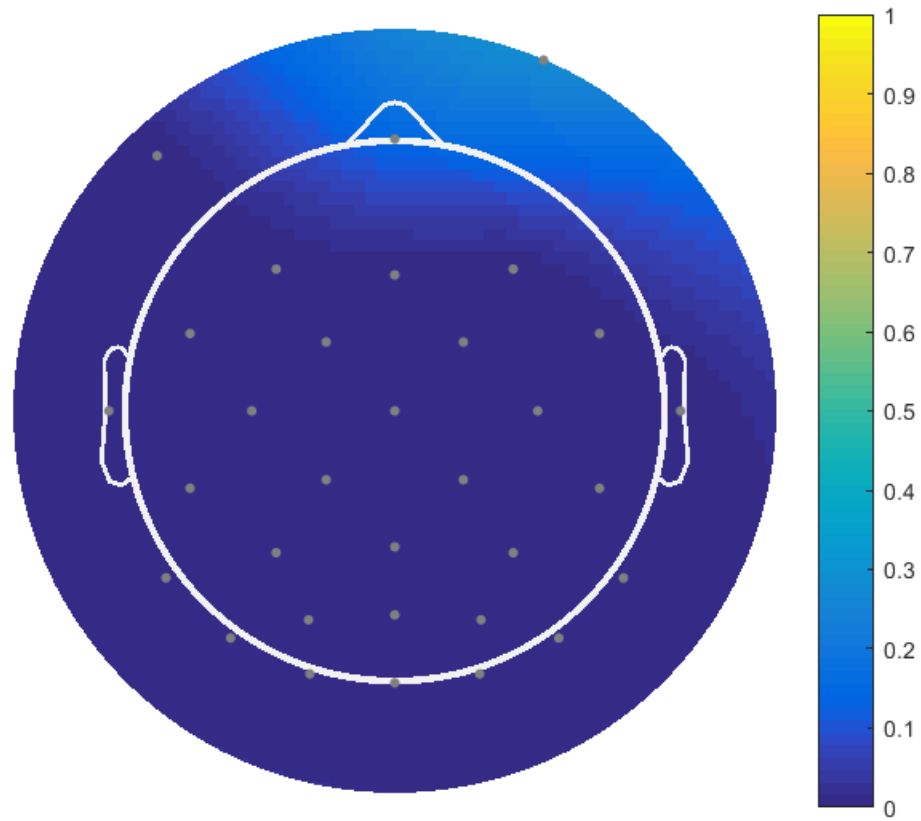


Correlation window statistics

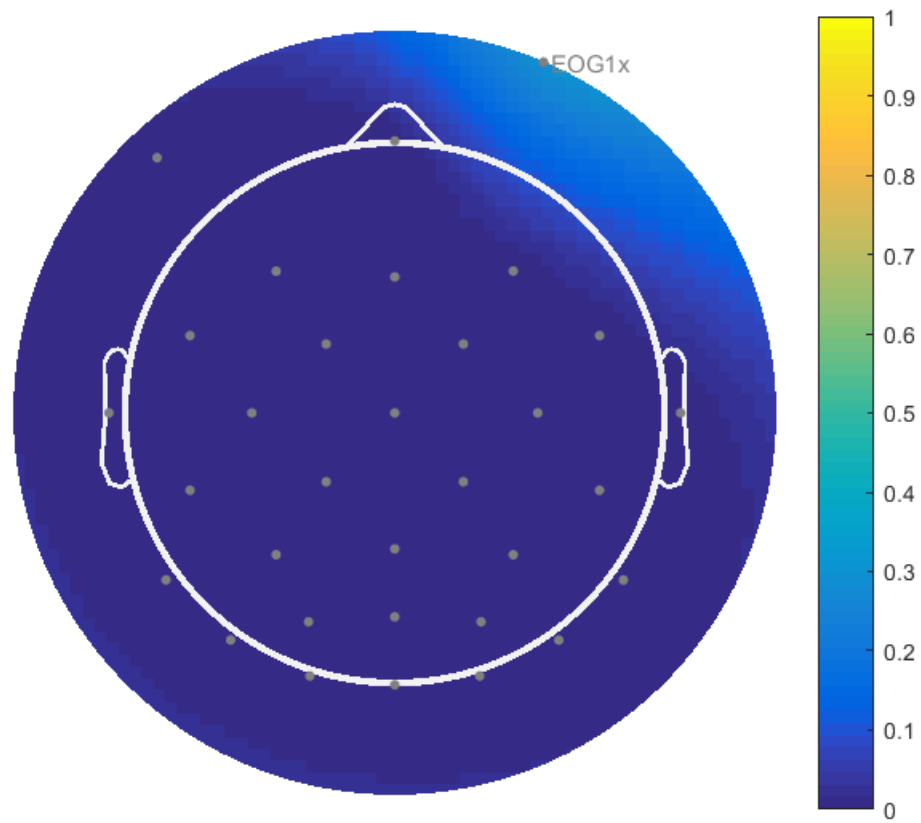
```
Max correlation window statistics (over 238 windows):  
Overall median maximum correlation [before=0.93942, after=0.8595]  
Low max correlation fraction [before=0.00026261, after=0]  
Minimum max correlation level [before=0.32573, after=0.40968]  
Average fraction 0.00026261 (0.0084034 channels):  
    not meeting threshold before in each window  
Average fraction 0 (0 channels):  
    not meeting threshold after in each window  
Windows with > 1/4 bad channels: [before=0, after=0]  
Windows with > 1/2 bad channels: [before=0, after=0]
```



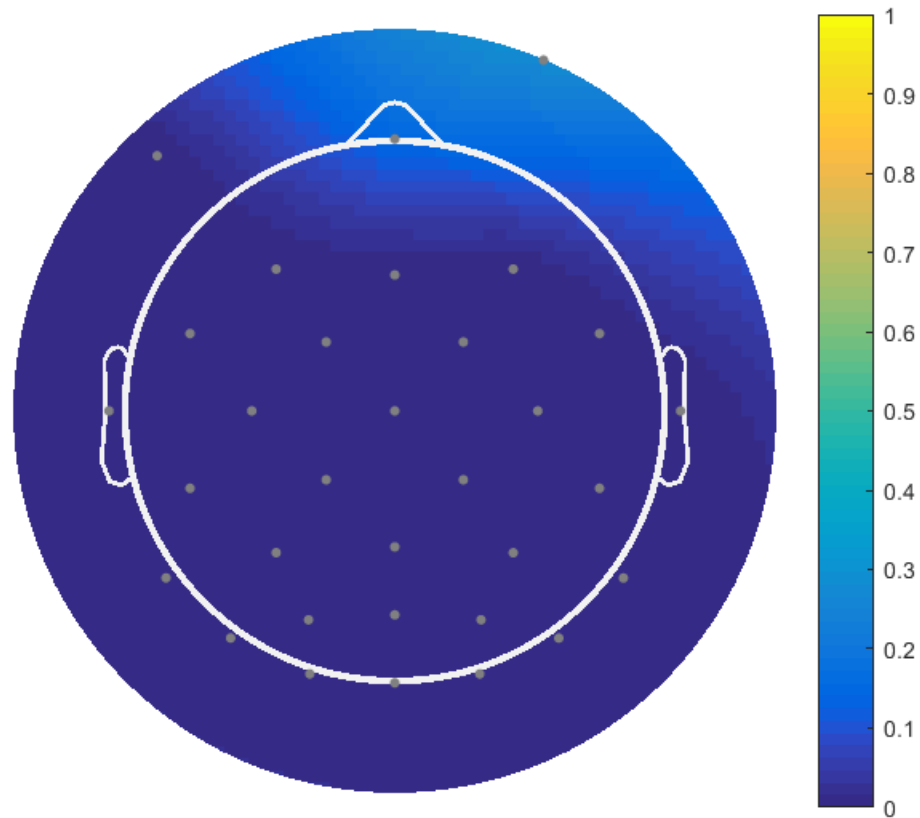
Bad ransac fraction (referenced)



Bad ransac fraction (original)

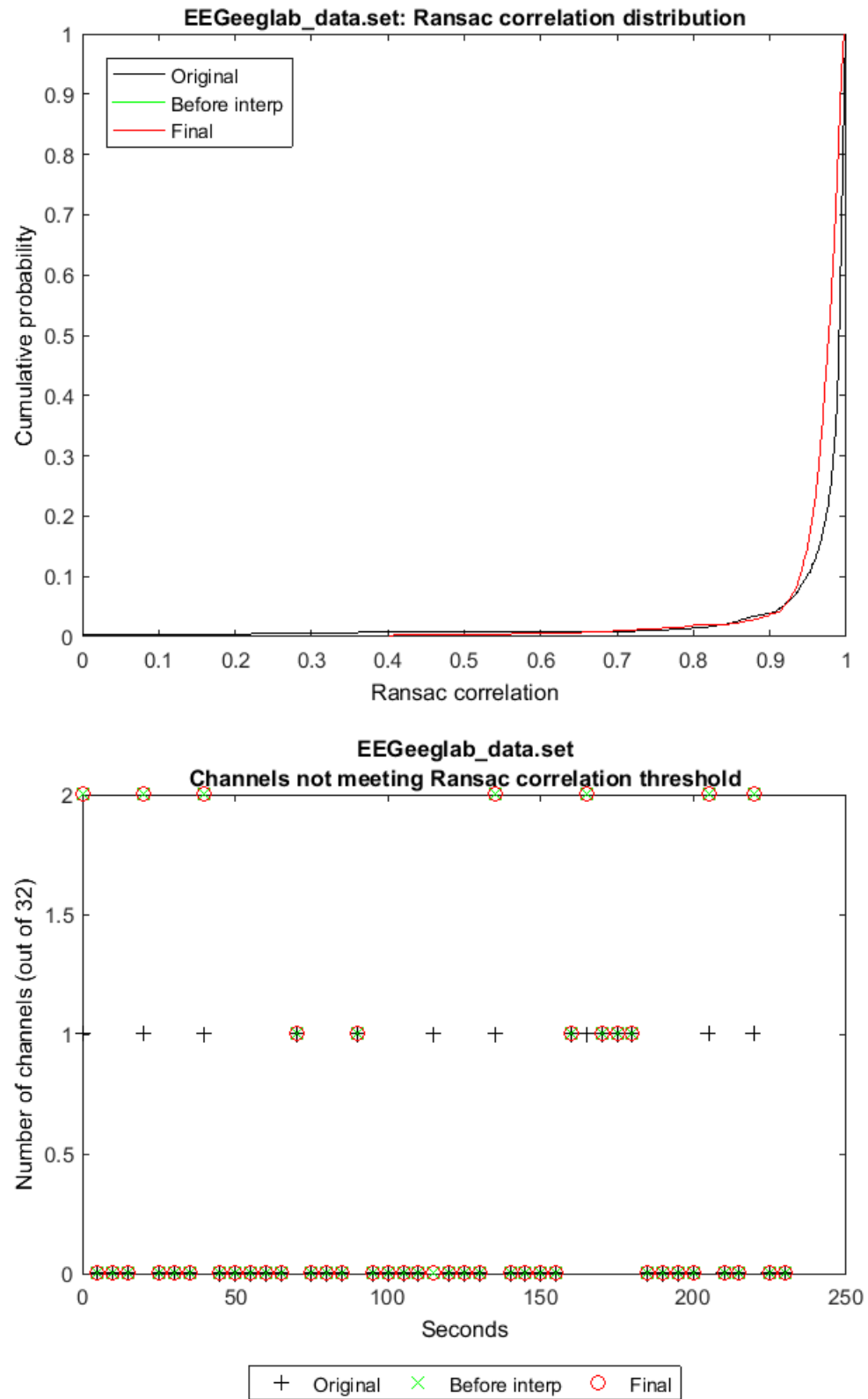


Bad ransac fraction (marking interpolated)

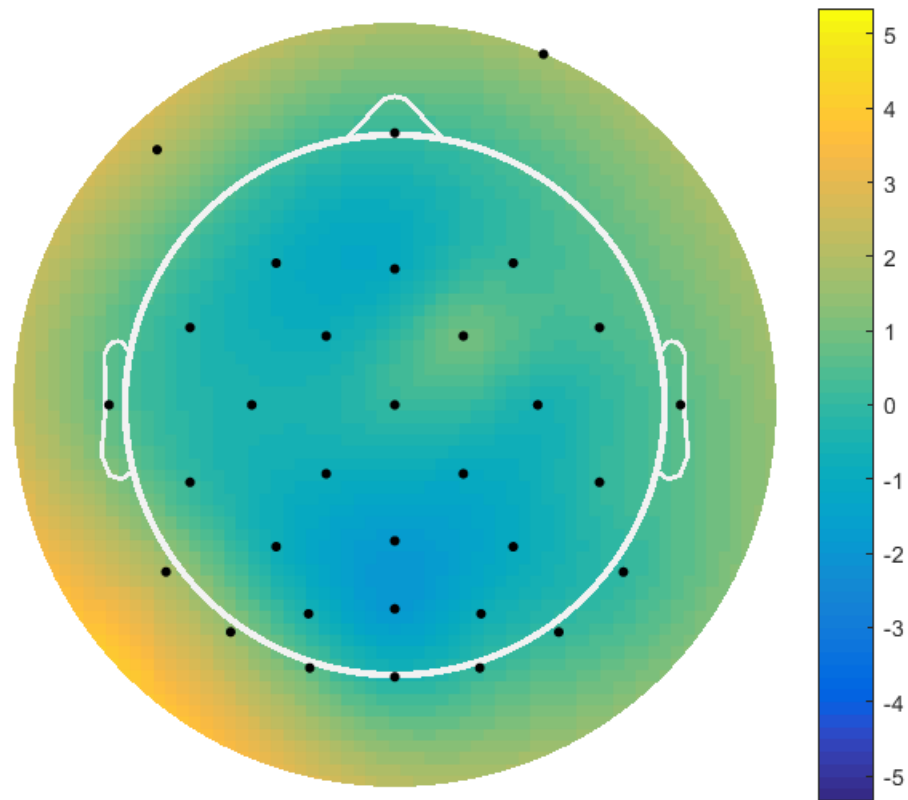


Channels with poor ransac correlations

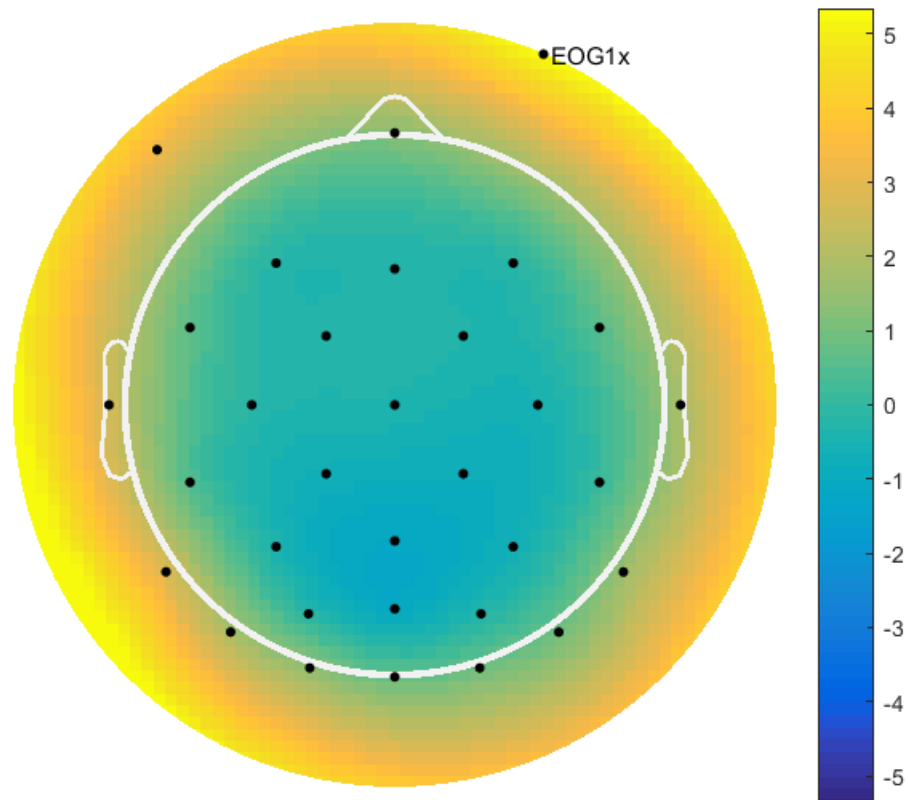
```
Ransac window statistics (over 47 windows):  
Low ransac channel fraction [before=0.0093085, after=0.013298]  
Minimum ransac correlation [before=-0.29752, after=0.40284]  
Average fraction 0.0093085 (0.29787 channels):  
    not meeting threshold before in each window  
Average fraction 0.013298 (0.42553 channels):  
    not meeting threshold after in each window  
Windows with > 1/4 bad ransac channels: [before=0, after=0]  
Windows with > 1/2 bad ransac channels: [before=0, after=0]
```



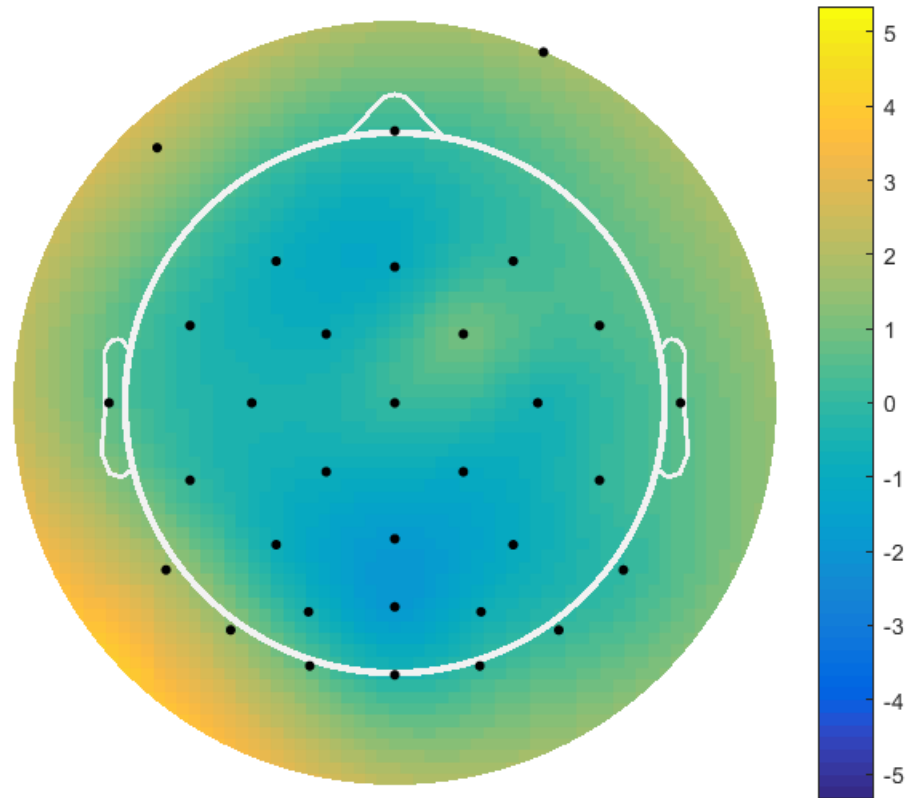
HF noise Z-score (referenced)



HF noise Z-score (original)

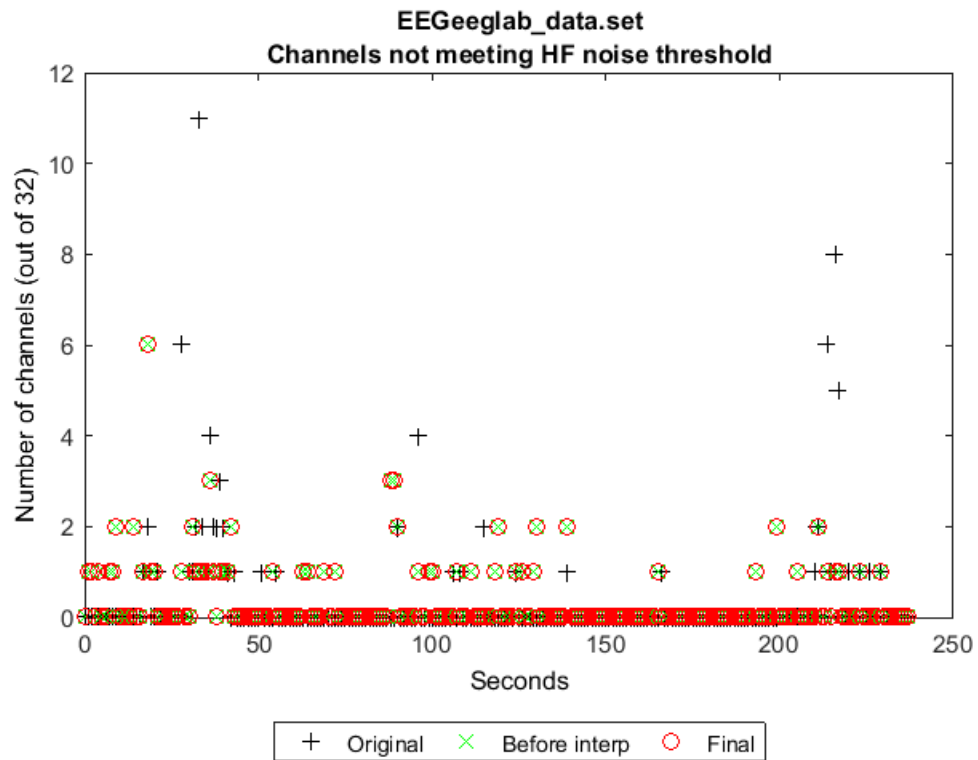
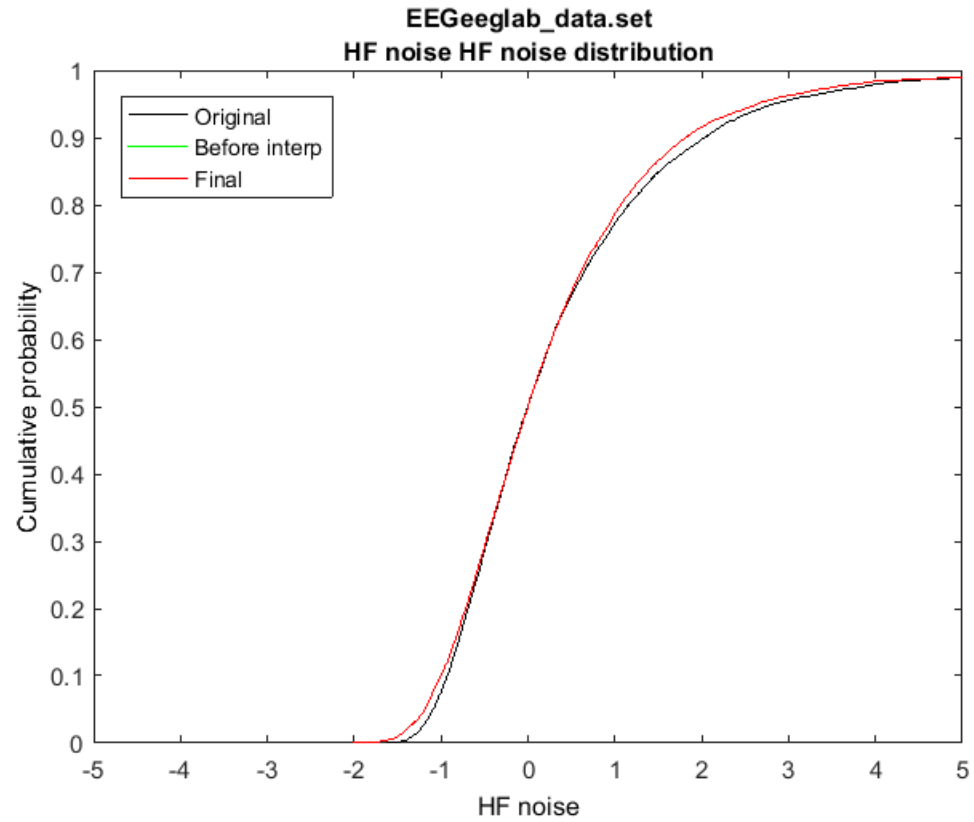


HF noise Z-score (marking interpolated)

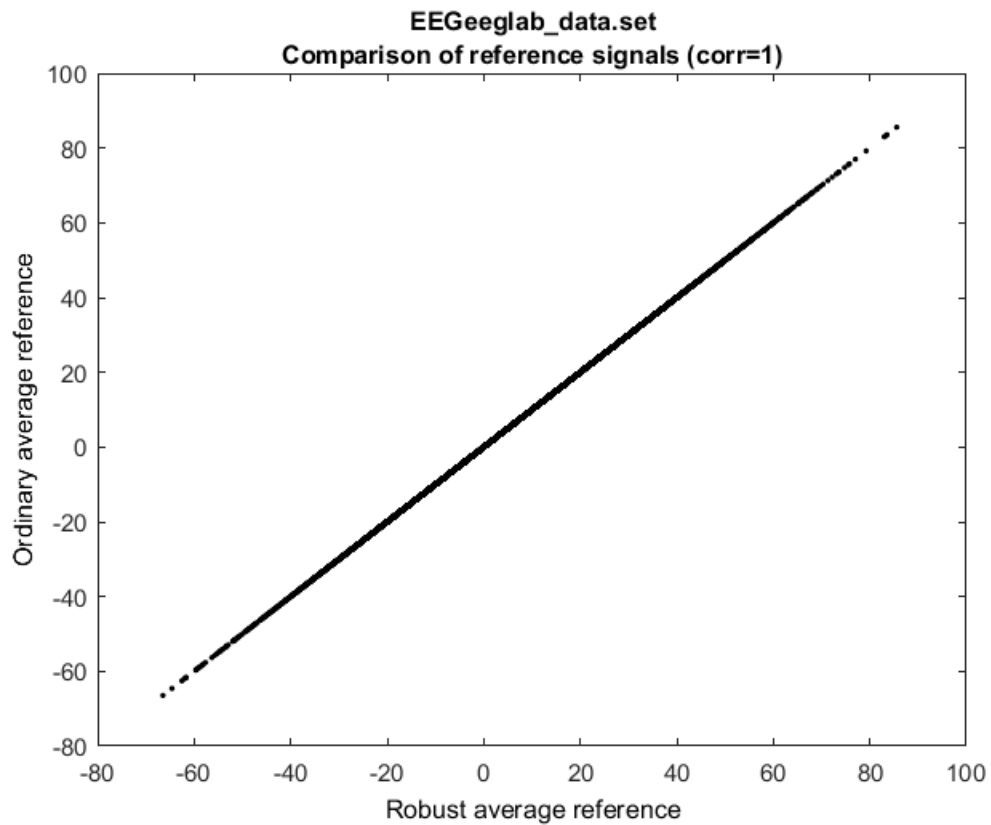


HF noise window stats

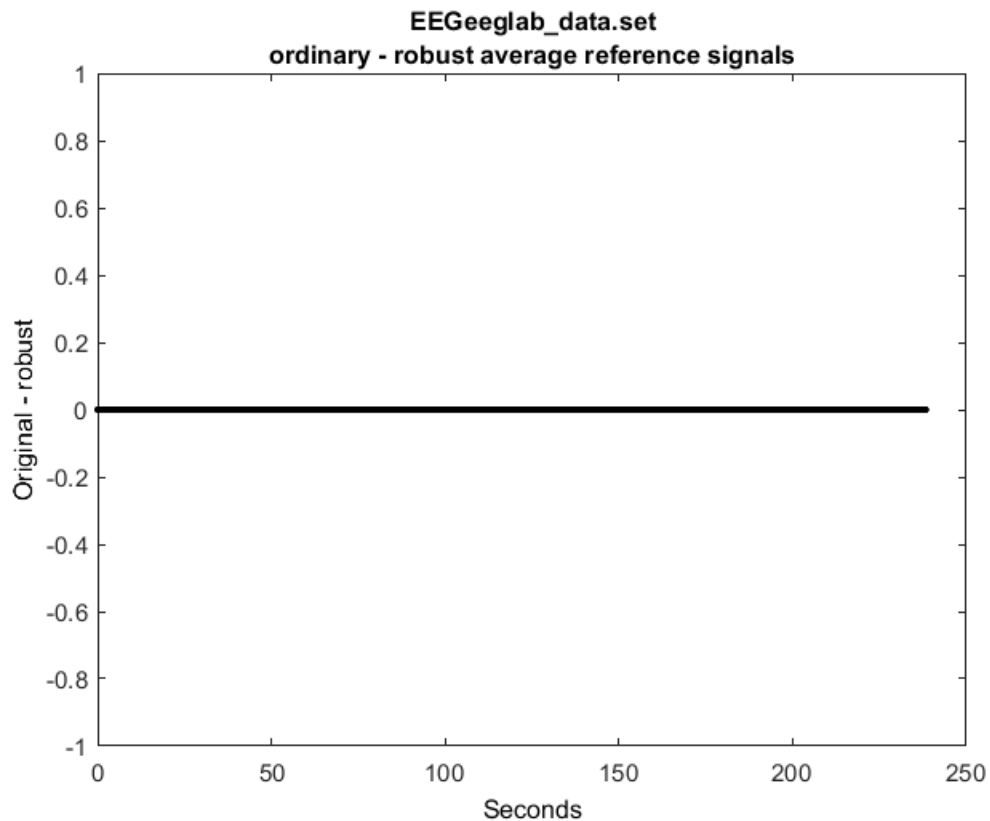
```
Noise window statistics (over 238 windows):  
Channel fraction with HF noise:  
  [before=0.011161, after=0.0097164]  
Median noisiness: [before=0.05724, after=0.050681]  
SD noisiness: [before=0.011556, after=0.0095862]  
Max HF noise levels [before=0.44561, after=0.31207]  
Average fraction 0.011161 (0.35714 channels):  
  not meeting threshold before in each window  
Average fraction 0.0097164 (0.31092 channels):  
  not meeting threshold after in each window  
  not meeting threshold after relative to before in each window  
Windows with > 1/4 HF channels:  
  [before=1, after=0]  
Windows with > 1/2 HF channels:  
  [before=0, after=0]  
Median window HF: [before=0.064316, after=0.050365]  
SD window HF: [before=0.030872, after=0.019622]
```



Noisy average reference vs robust average reference



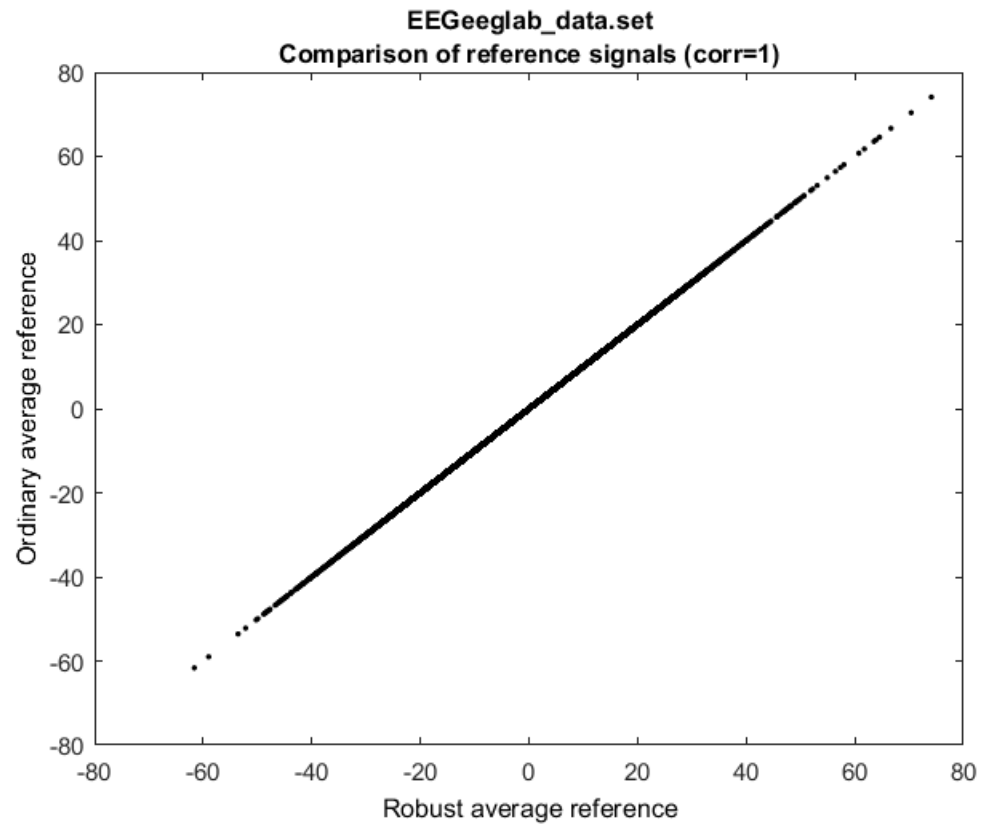
Noisy average reference - robust average reference by time



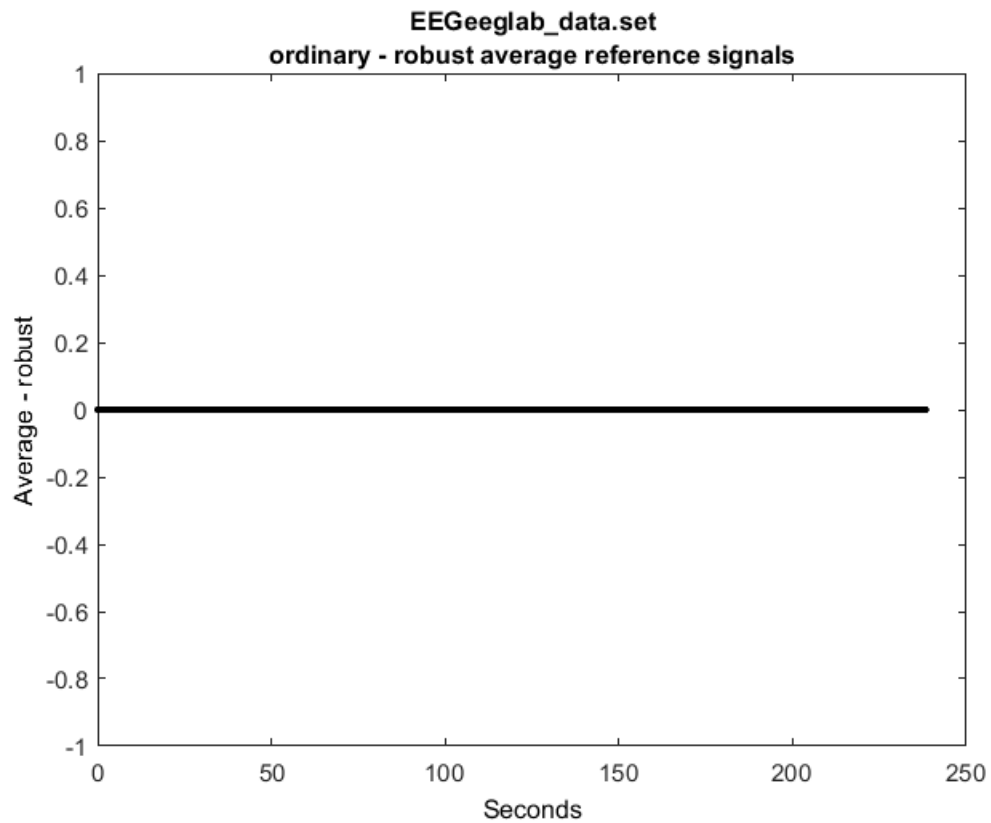
Noisy average reference vs robust average reference (filtered)

```
pop_eegfiltnew() - performing 425 point highpass filtering.  
pop_eegfiltnew() - transition band width: 1 Hz  
pop_eegfiltnew() - passband edge(s): 1 Hz  
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.5 Hz  
pop_eegfiltnew() - filtering the data (zero-phase)  
firfilt(): |=====| 100%, ETE 00:00
```

Visualize the EEG output from
the PREP processing pipeline.



Noisy average reference - robust average reference by time



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