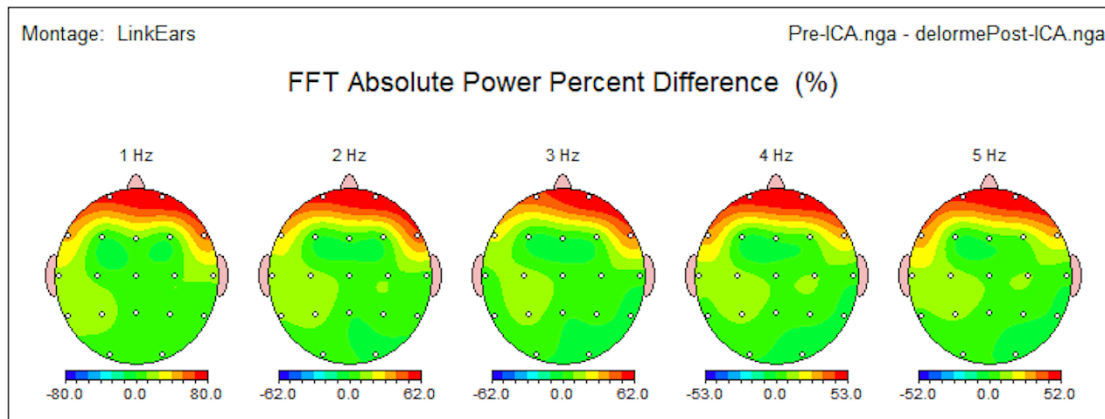
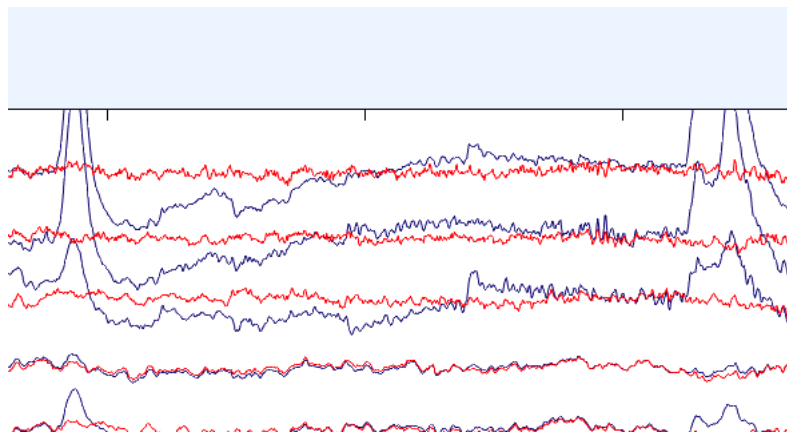


1- I find it hard to believe all of the plots in your compressed document compared artifact free regions of data. For example, you observed 71% change over frontal channels in the delta band (see attached screen capture from PCT DIFF PRE VS POST-DELORME/PRE VS POST-DELORME_4.bmp). This is consistent with selecting portions of data which contains eye-related artifacts as I show below.

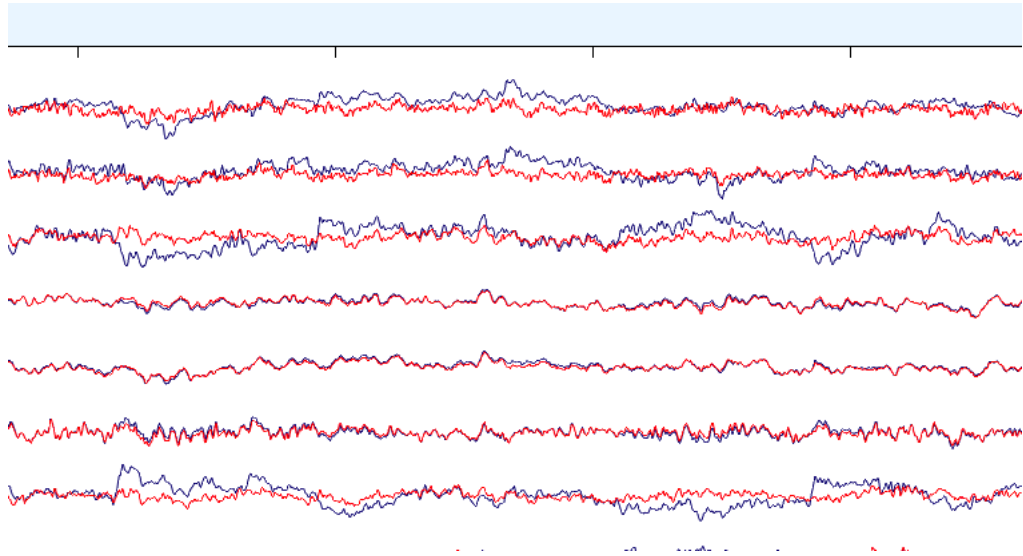


2- The data you shared has a high density of blinks, there is only a handful segments of data where the subject stops blinking for more than 5 seconds. Even in these clean segments, in the frontal channels, we can see some slow some activity that likely reflect eye movement (or contamination from previous eye movements by the filter you might have used). ICA is able to remove these as well. I am attaching two examples below.

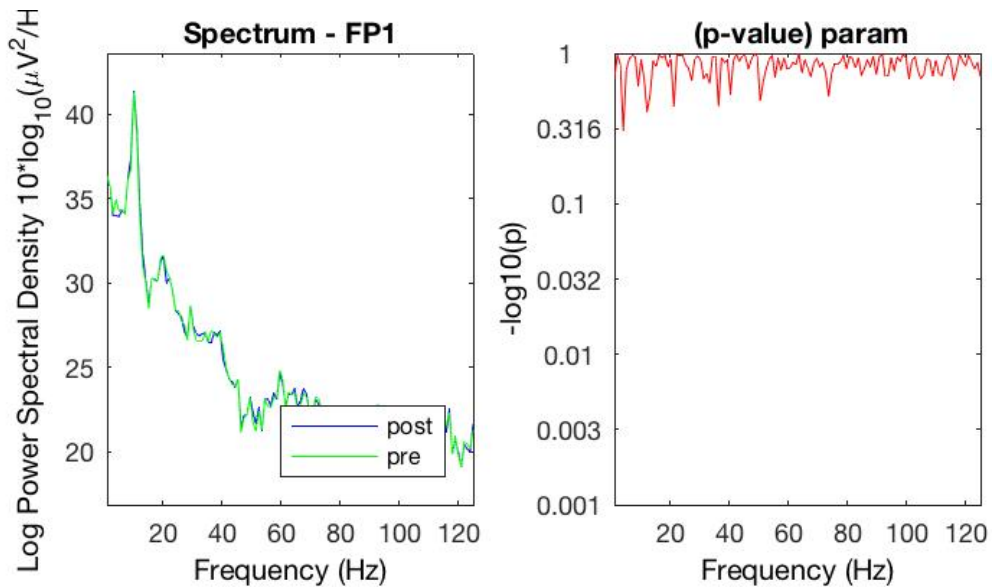
In between the two blinks below (blue trace original data, red trace after ICA cleaning), you can see that the “clean” segment is not that clean. It is still contaminated by eye artifacts at least on the first 3 channels (in order from top to bottom FP1,FP2, F7, F3, Fz, F4, F8). I do not think that anybody would argue that removing this activity amounts to removing brain. So it is important to be careful when selecting “clean” data segment.

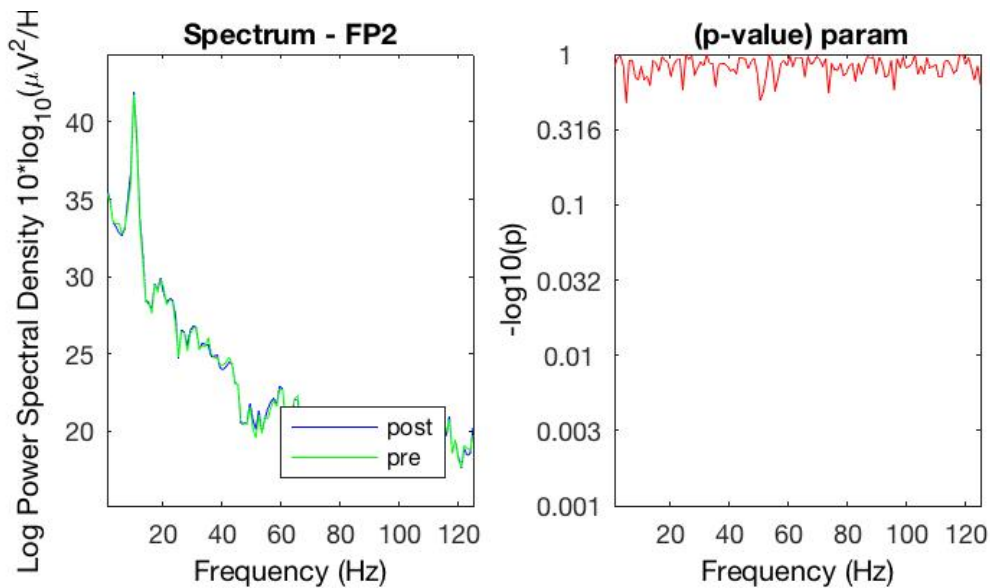


Below is another clean data segment, and you can see a subtle eye related artifact on FP1,FP2, F7 and F8 that is probably hard for the uninformed user to see in raw data. Again, the segment looks clean, but it really is not.

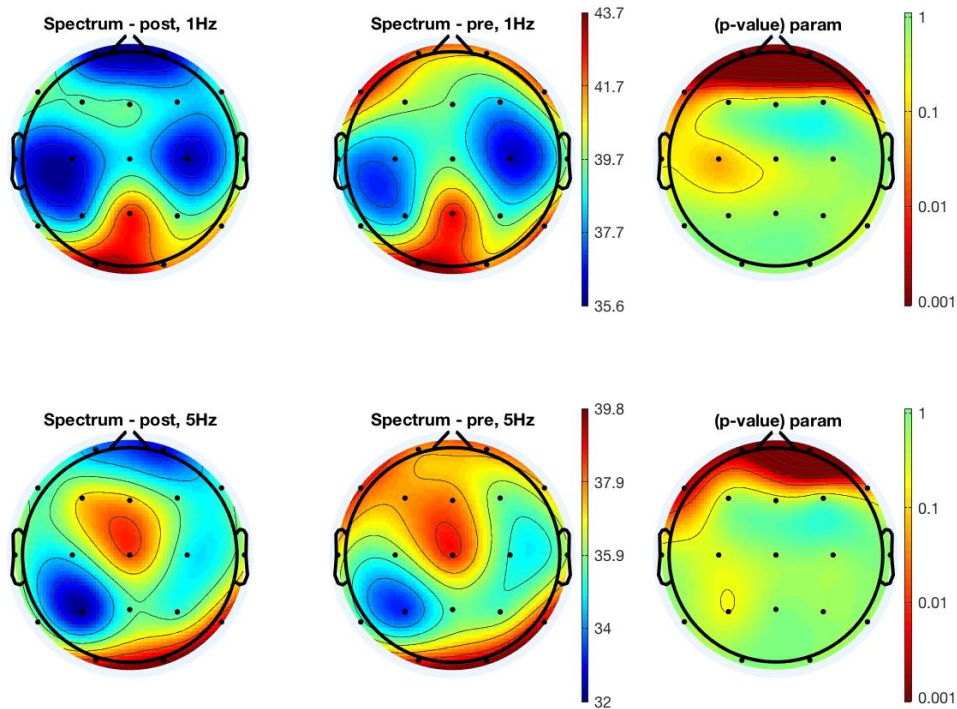


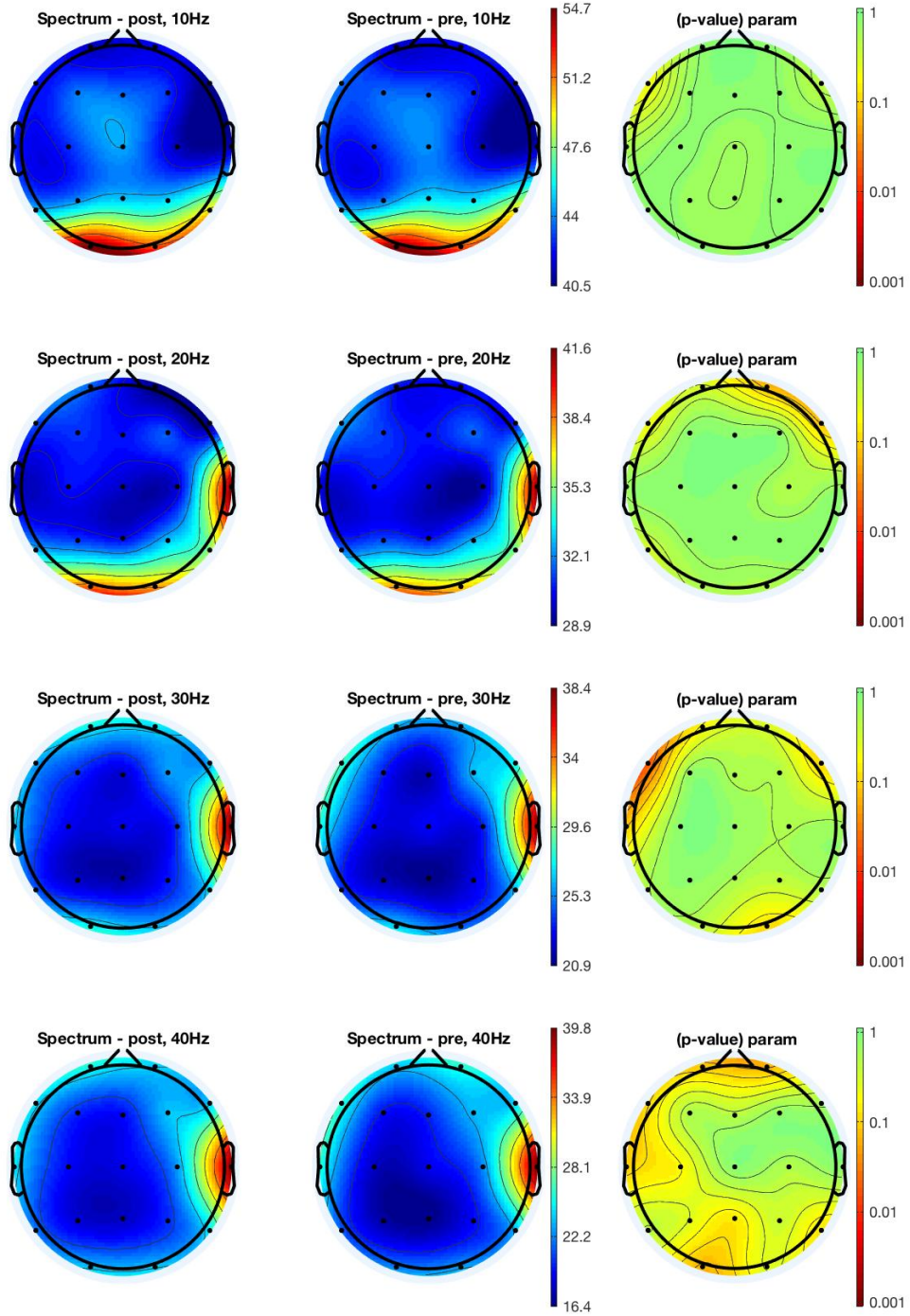
3. I have removed all portion of data where eye activity was visible preserving only 40 seconds out of 410 in the original file and I am assessing below the data distortion. Spectrum was calculated on non-overlapping 1 minute data segments (I am attaching the script).





Below is the scalp topography pre vs post in different frequency bands. Note the difference in frontal channels at 1Hz and 5Hz. This is due to what is mentioned in 2, that even clean segments are not totally free of artifacts and I believe that these represent true eye artifacts removed by ICA. We can also see that the power at other channels is not affected. Beyond 5 Hz, the power spectrum does not seem to be affected even in frontal channels with very similar scalp topographies. There is no 71% difference in absolute power (in my case, it seems to be about 25% at 1Hz over frontal channel and again, this correspond to removed residual eye blinks).





Script to reproduce these results in EEGLAB

```
fileNamePre = 'Australia-Pre-ICA.edf';
fileNamePost = 'Australia-Post-ICA.edf';

% import data
eeglab
EEG = pop_biosig(fileNamePre);

% channel locations
EEG=pop_chanedit(EEG,
'lookup','/data/matlab/eeglab/plugins/dipfit2.3/standard_BESA/standard-10-5-
cap385.elp','rplurchanloc',1,'changeField',{1 'labels' 'FP1'},'changeField',{2 'labels'
'FP2'},'changeField',{3 'labels' 'F7'},'changeField',{4 'labels' 'F3'},'changeField',{5
'labels' 'Fz'},'changeField',{6 'labels' 'F4'},'changeField',{7 'labels'
'F8'},'changeField',{8 'labels' 'T3'},'changeField',{9 'labels' 'C3'},'changeField',{10
'labels' 'Cz'},'changeField',{11 'labels' 'C4'},'changeField',{12 'labels'
'T4'},'changeField',{13 'labels' 'T5'},'changeField',{14 'labels'
'P3'},'changeField',{15 'labels' 'Pz'},'changeField',{16 'labels'
'P4'},'changeField',{17 'labels' 'T6'},'changeField',{18 'labels'
'O1'},'changeField',{19 'labels'
'O2'},'lookup','/data/matlab/eeglab/plugins/dipfit2.3/standard_BESA/standard-10-5-
cap385.elp','rplurchanloc',1);

% run ICA (default)
EEG = pop_runica(EEG, 'extended',1,'interrupt','on');

% save dataset (will change extension to .set)
EEG = pop_saveset( EEG, 'filename', fileNamePre);
[ALLEEG EEG CURRENTSET] = eeg_store(ALLEEG, EEG);

% plot properties of the first two components
pop_prop( EEG, 0, [1 2], NaN, {'frequentrange' [2 50] });

% reject data with artifacts
EEG = eeg_egrej( EEG, [3 9391;10885 25431;26955 31983;33682 34417;35320 38134;38930
50358;50951 83720;85593 92319;93495 102738]);

% save dataset pruned
EEG = pop_saveset( EEG, 'filename', [fileNamePre(1:end-4) '_pruned.set' ]);
[ALLEEG EEG] = eeg_store(ALLEEG, EEG, CURRENTSET);

% remove ICA (in general, ICA components indices are not fixed
% but these artifacts are so large that they always seem to end
% up as component 1 and 2).
EEG = pop_subcomp( EEG, [1:2]);

% save dataset pruned with ICA removed
EEG = pop_saveset( EEG, 'filename', [fileNamePost(1:end-4) '_pruned.set' ]);
[ALLEEG EEG] = eeg_store(ALLEEG, EEG);

% create STUDY
[STUDY ALLEEG] = std_editset( STUDY, ALLEEG, 'commands',{{'index' 1 'condition' 'pre'}
{'index' 2 'condition' 'post'} {'index' 1 'subject' 'S1'} {'index' 2 'subject'
'S1'}},'updatedat','on','savedat','on','rmclust','on' );
EEG = ALLEEG; CURRENTSET = [1:length(ALLEEG)]; CURRENTSTUDY = 1;
[STUDY ALLEEG] = std_precomp(STUDY, ALLEEG,
{'savetrials','on','recompute','on','spec','on','specparams',{'specmode' 'fft'
'logtrials' 'off'}});

% plot spectrum at 10Hz
STUDY = pop_statparams(STUDY, 'condstats','on', 'singletrials','on');
STUDY = std_specplot(STUDY,ALLEEG,'channels',{'FP1'}, 'plotconditions','together');
```

```
STUDY = std_specplot(STUDY,ALLEEG,'channels',{ 'FP2'}, 'plotconditions','together');
allchans = { 'FP1' 'FP2' 'F7' 'F3' 'Fz' 'F4' 'F8' 'T3' 'C3' 'Cz' 'C4' 'T4' 'T5' 'P3'
'Pz' 'P4' 'T6' 'O1' 'O2' };
STUDY = std_specplot(STUDY,ALLEEG,'channels', allchans, 'topofreq',1);
STUDY = std_specplot(STUDY,ALLEEG,'channels', allchans, 'topofreq',1);
STUDY = std_specplot(STUDY,ALLEEG,'channels', allchans, 'topofreq',5);
STUDY = std_specplot(STUDY,ALLEEG,'channels', allchans, 'topofreq',10);
STUDY = std_specplot(STUDY,ALLEEG,'channels', allchans, 'topofreq',20);
STUDY = std_specplot(STUDY,ALLEEG,'channels', allchans, 'topofreq',30);
STUDY = std_specplot(STUDY,ALLEEG,'channels', allchans, 'topofreq',40);
eeglab redraw
```