

# ASSR: Letswave steps

Varghese Peter

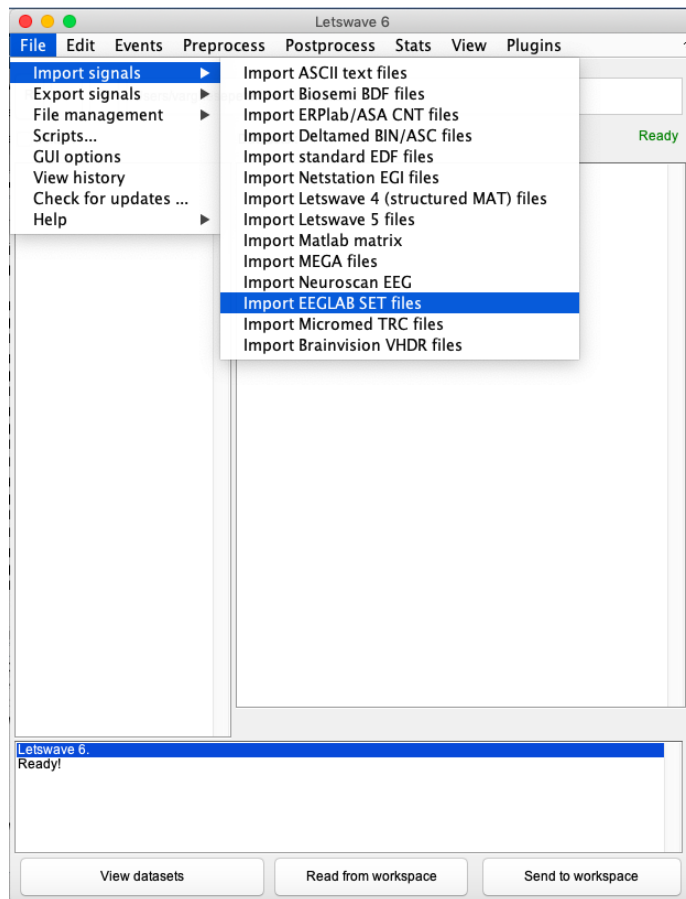
May 2019

Letswave has multiple features that are ideal for ASSR analysis. First step is to open Letswave by typing "**letswave**" in the command window.

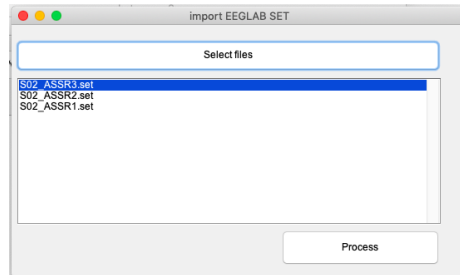
```
>> letswave
```

In the Letswave GUI load the EEGLAB set files by

**File** → **Import Signals**→**Import EEGLAB set files**

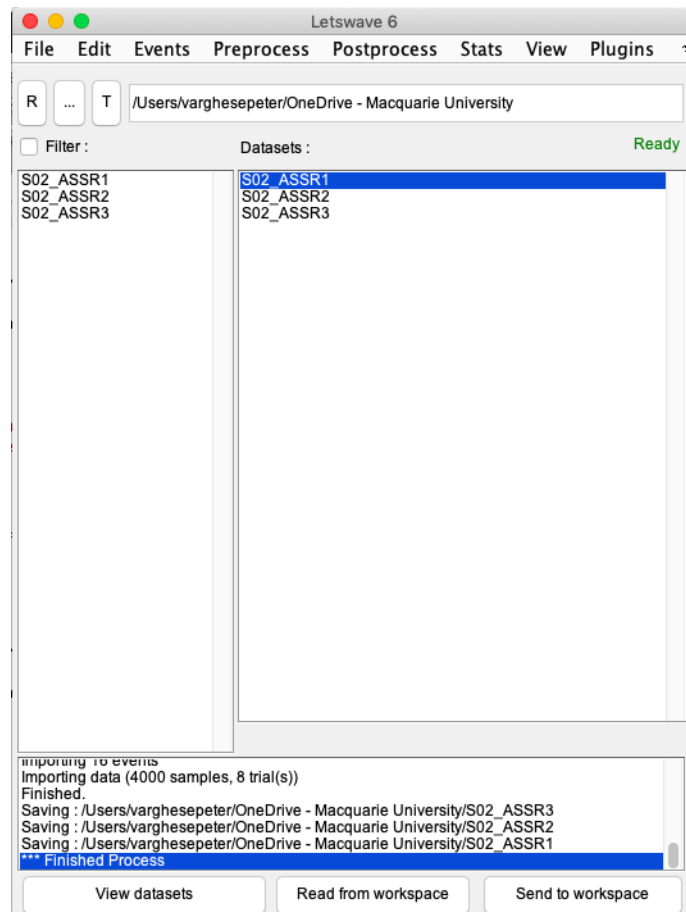


In the pop up window click on **Select files** and select the .set files that needs to be imported (Note: You can import multiple .set files at a time).



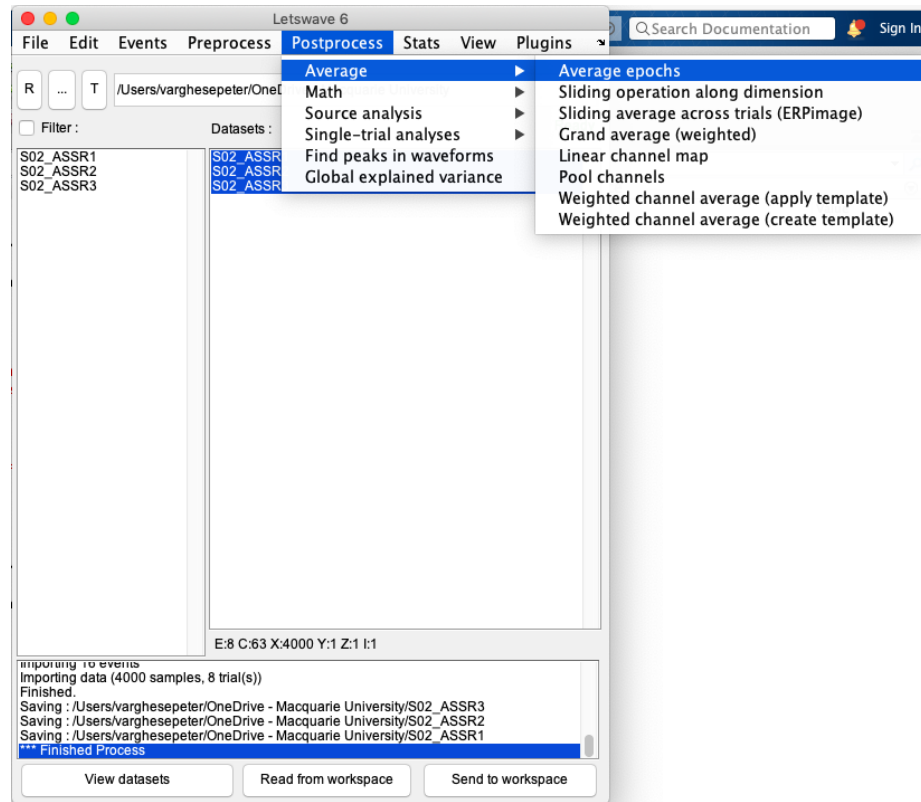
Once you press "**Process**" the EEGLAB files will be imported into Letswave.

**Note:** In Letswave all the output files will be saved to the current folder automatically. No need to save them again.

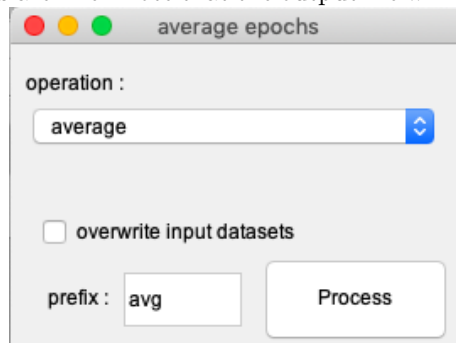


The next step is to average the epochs for each condition. Within each imported file, there are multiple trials/epochs. This step averages the trials together, similar to the MMN/ACC analysis. This steps can be applied to multilple files by selecting them under datasets

**Postprocess → Average→Average epochs**

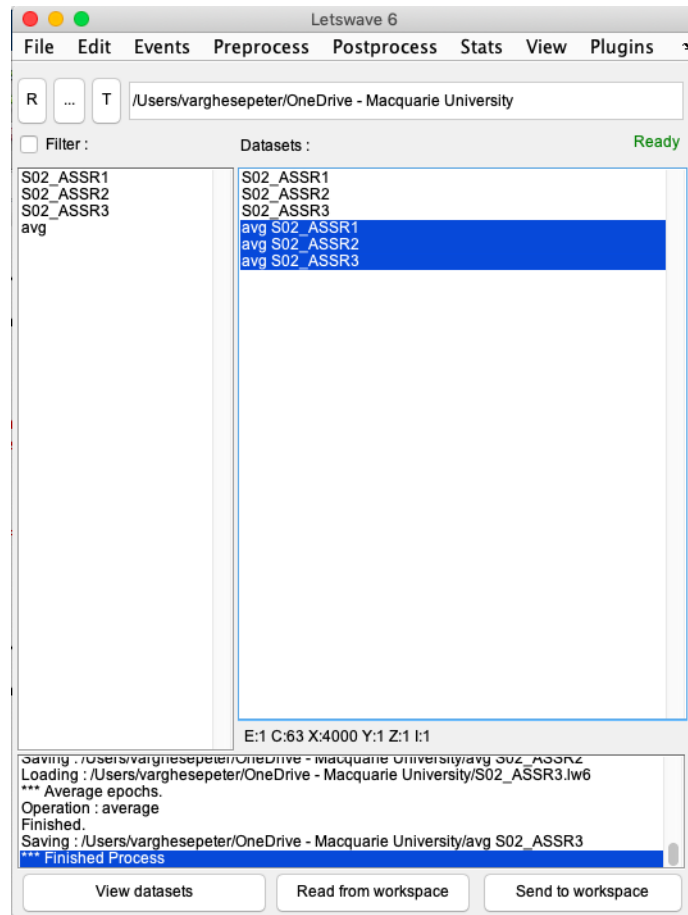


The default parameters are fine. Note that the output file will have avg as prefix

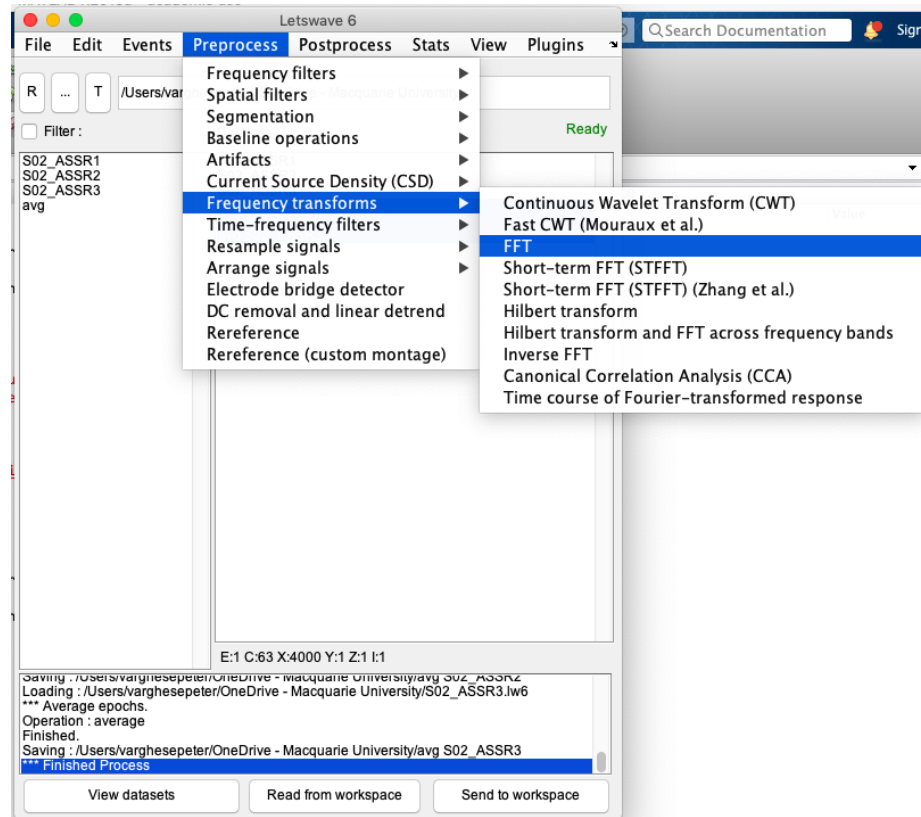


The next step is frequency transformation (FFT). As before, this step can be

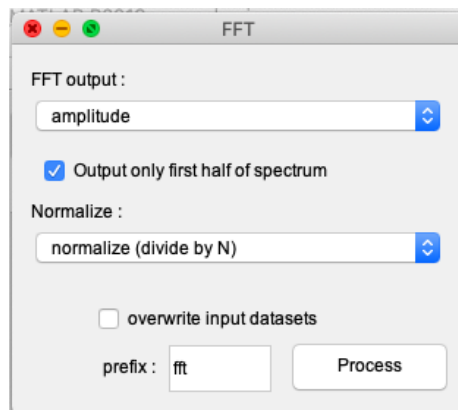
done for multiple files at the same time. Select the files that you want to frequency transform (with "avg" as prefix)



Preprocess → Frequency transforms→FFT

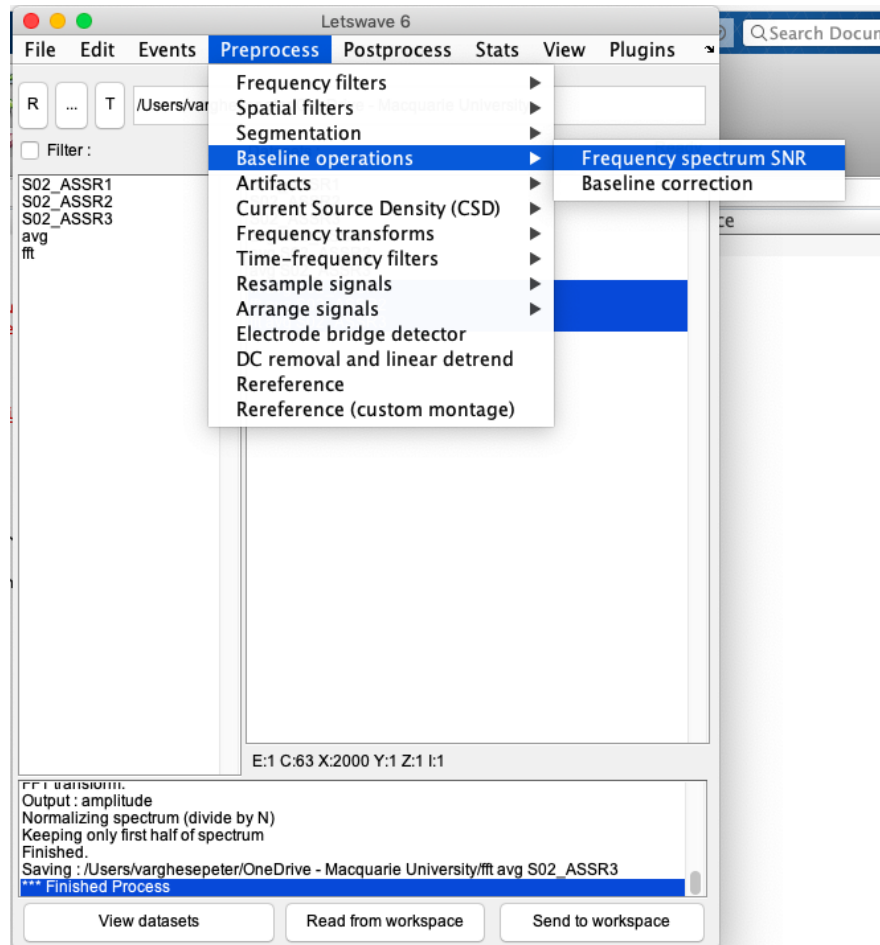


The default parameters are fine. Note that the output file will have "fft" as prefix



The next step is baselining the frequency. As for other steps you can select multiple files with fft prefix for this step.

Preprocess → Baseline operations → Frequency spectrum SNR



One of the default parameter needs to be changed here. Change "Range of surrounding bins defining baseline" to "2 to 12"

frequency spectrum SNR

Range of surrounding bins defining baseline :

2 - 12

Number of extreme bins (min and max) to remove :

0

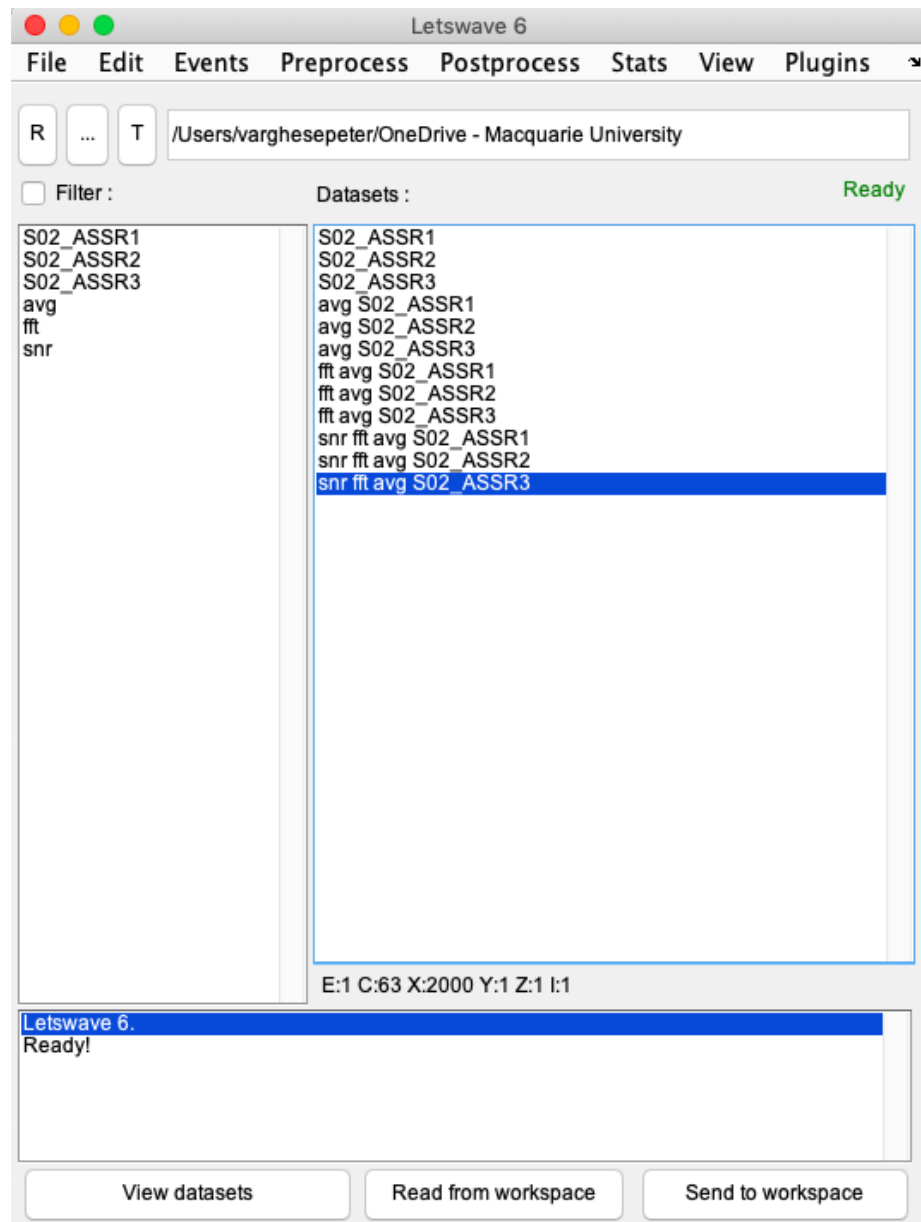
Operation :

subtract

☐ overwrite input datasets

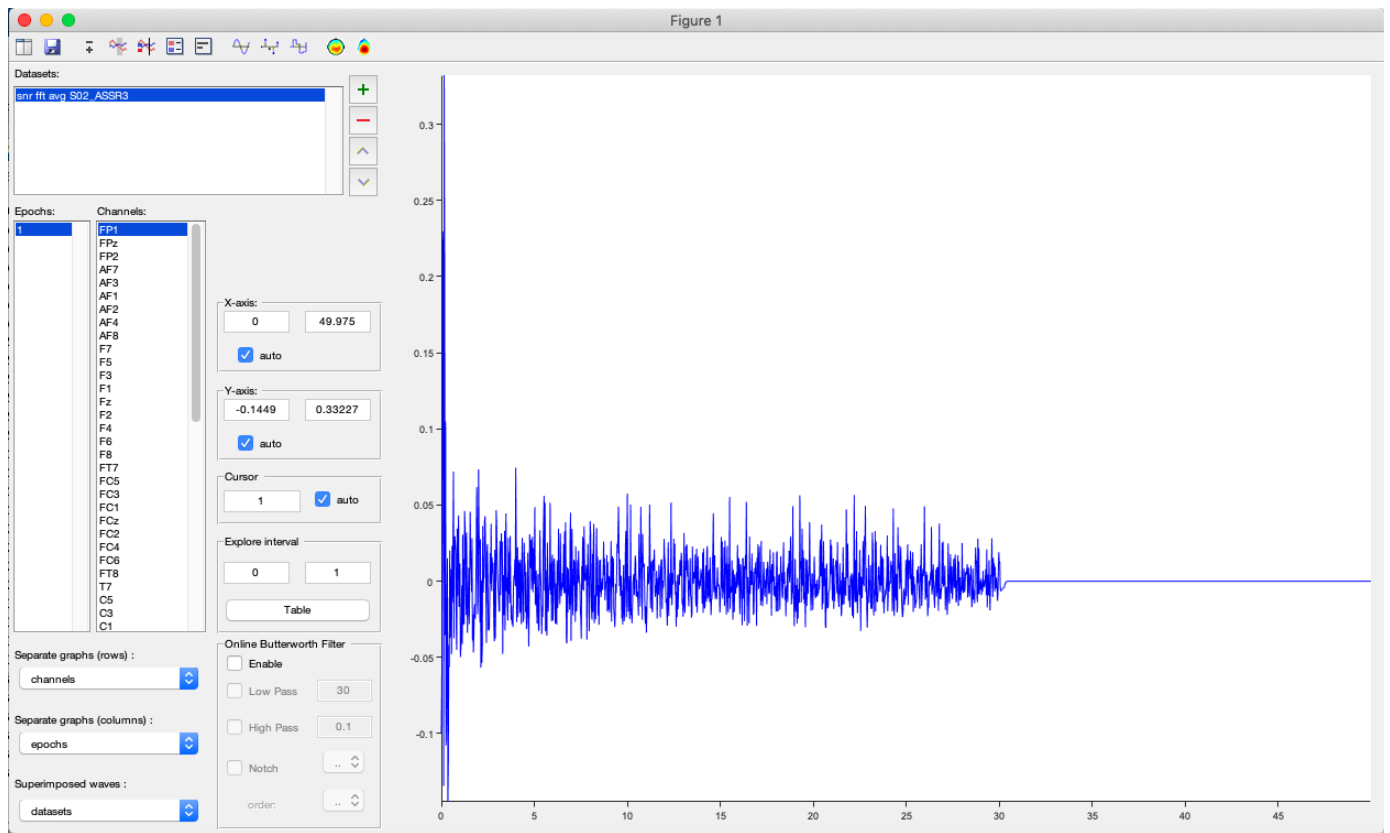
prefix : snr Process

The output file will have "snr" as prefix. This is the final output file for the analysis.

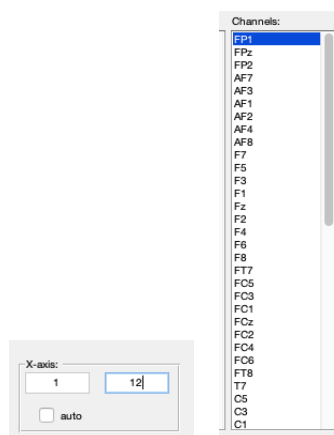


You can double click on the "snr fft avg Sxx\_ASSRx" file to view and the output. It will open

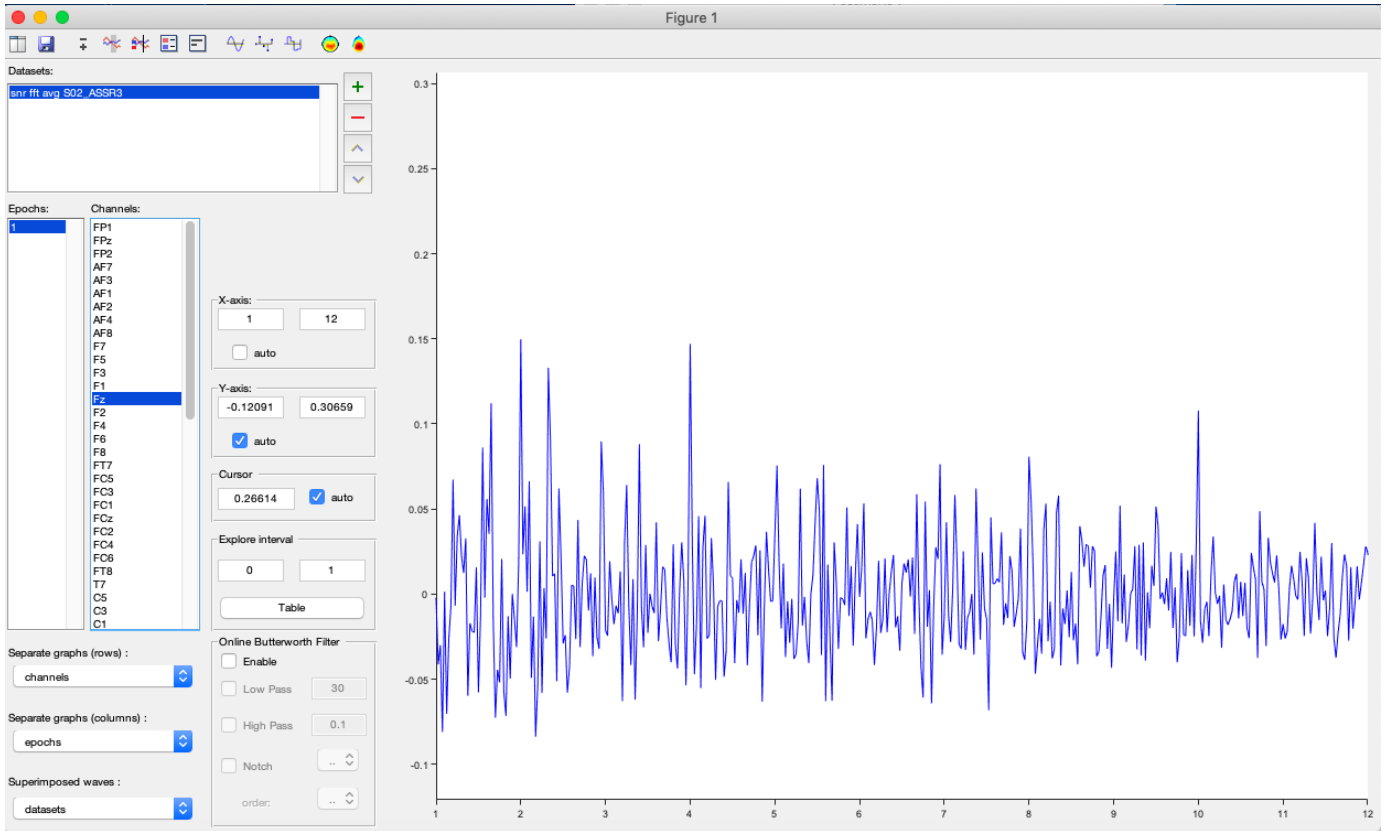




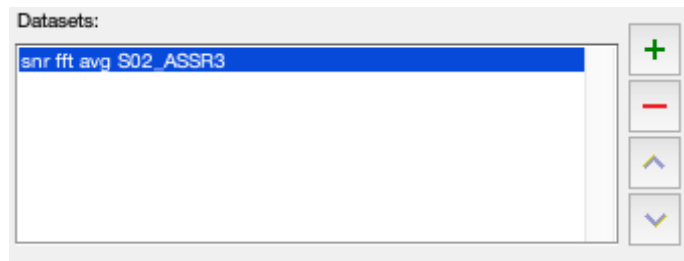
The main plot has frequency on the x axis and amplitude on the y axis. Since in the experiment, we are interested in the frequencies of 2 Hz and 10 Hz, you can limit the x axis to 1 to 12 Hz, so that the data can be visualised better. You can also select the channel you want to see and do a whole lot of other things.



The below figure shows the spectrum with 1 to 12 Hz on the x axis and at the Fz channel. You can see ASSR responses at 2 Hz, 4Hz and 10 Hz



Additionally you can load multiple output files in the "Datasets" box into so that they appear in the same figure for comparison.



Another feature that can be visualised here is the topography (ie, the distribution of the ASSR response across the scalp). For this you can click on the topography icon in the top ribbon and enter the frequency you want to plot in the "Cursor" box



The figures below shows the topography at 10 Hz and 2 Hz

