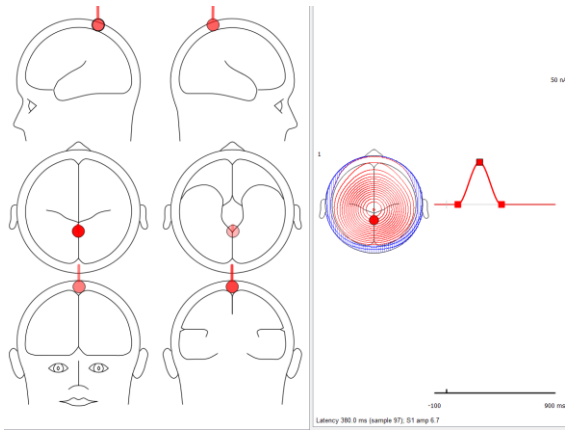
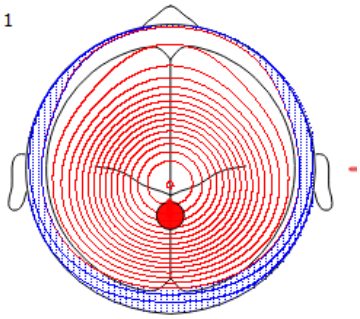
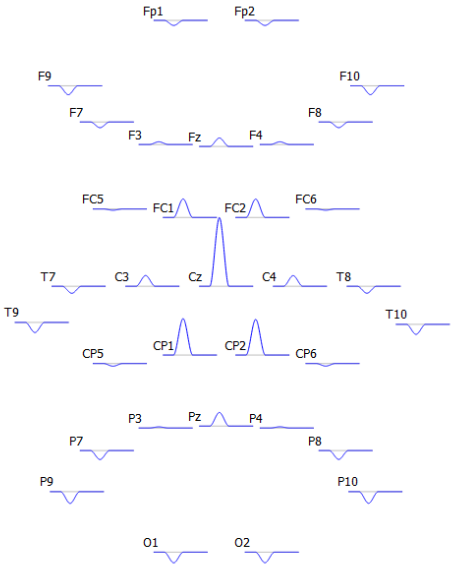
1. Simulate a source in S1 – post-central gyrus



a. How does the topographical plot look like? Where is the maximal activation and why?



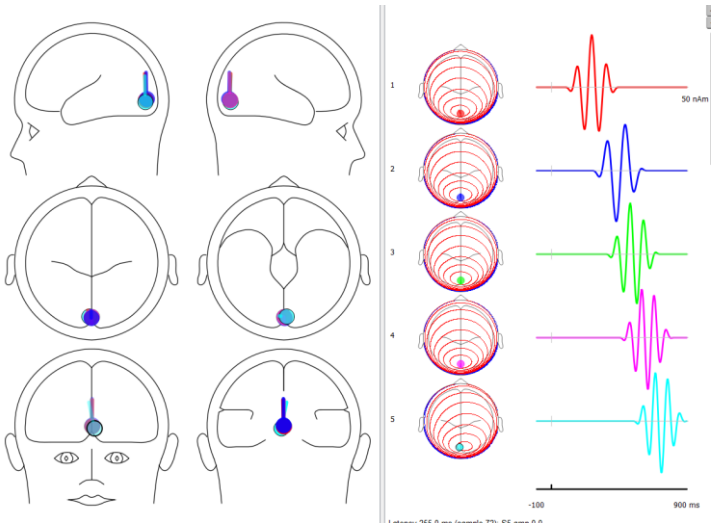
The topographical plot is shown above.
The maximum activation is located on the post central gyrus, as it is the origin of the dipole. This can also be seen from the waveform simulation as shown below



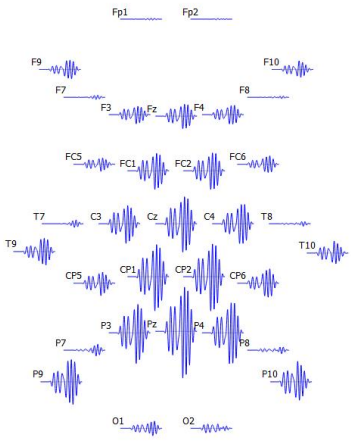
b. Move the dipole around to understand how topoplot changes with the dipole
The topoplot always orients itself along the direction of the dipole, with the strongest activation on the origin of the dipole.

c. Can you reduce the topo-plot to a simple electric vector in each case?

2. Simulate an oscillating sinusoidal source (8-12 Hz) in the visual cortex



a. How does the topographical plot look like? Where is the maximal activation and why?
The topological plot is shown above. The maximal activation is in the centro-parietal region as the set of dipoles representing the frequencies of 8-12Hz have originated there.

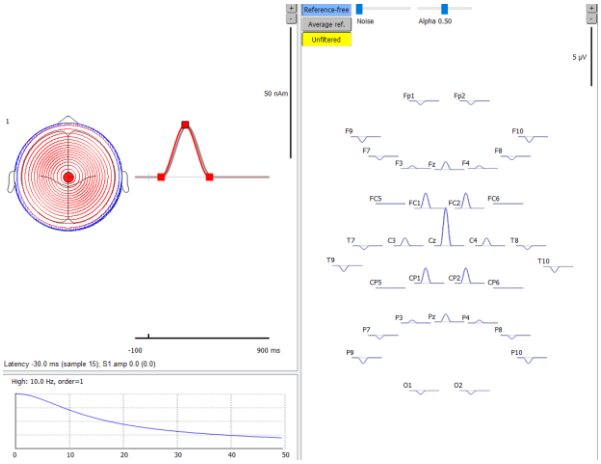


3. Effect of filtering on evoked potential

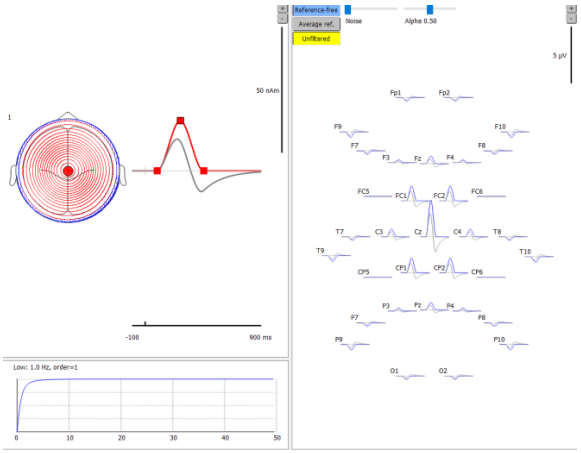
a. Low-pass, high-pass

b. Forward, reverse, zero-phase filtering

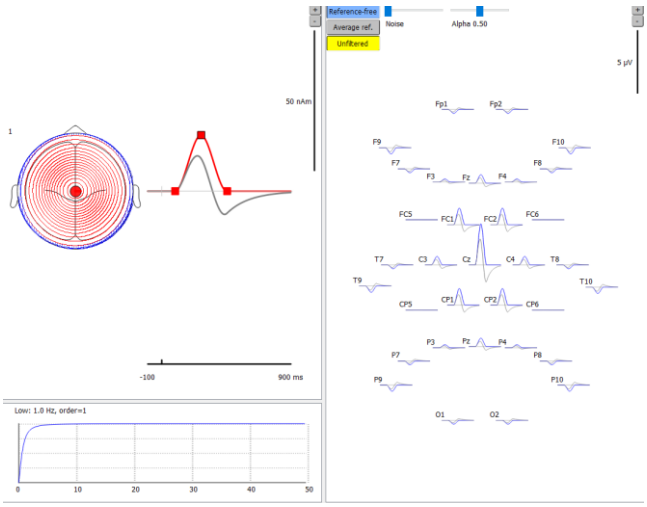
LPF



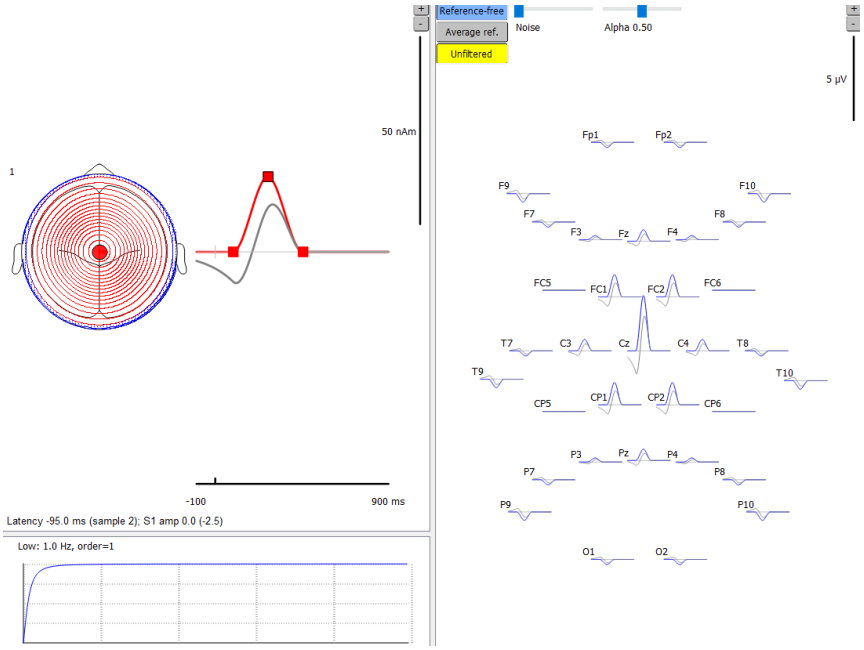
HPF



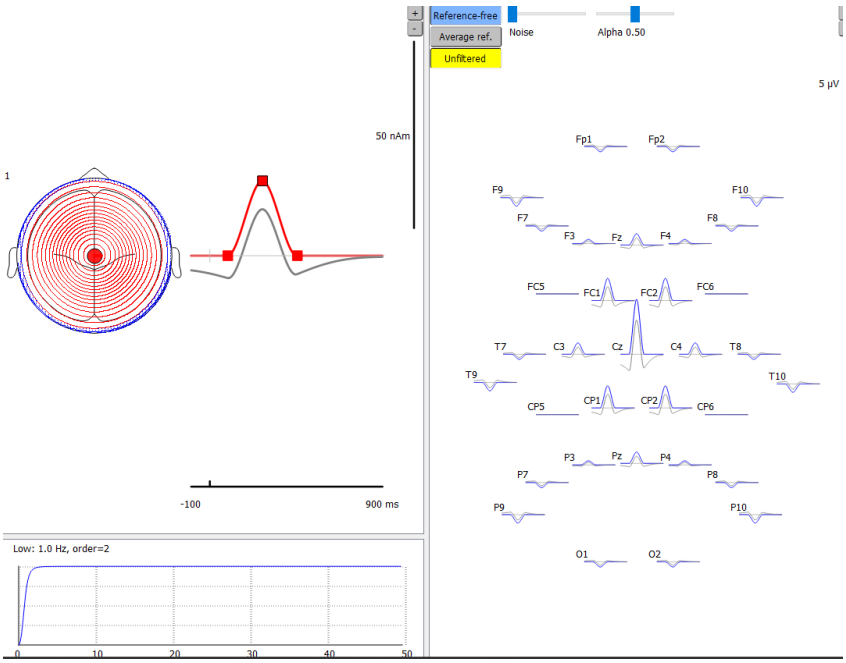
Forward



Reverse

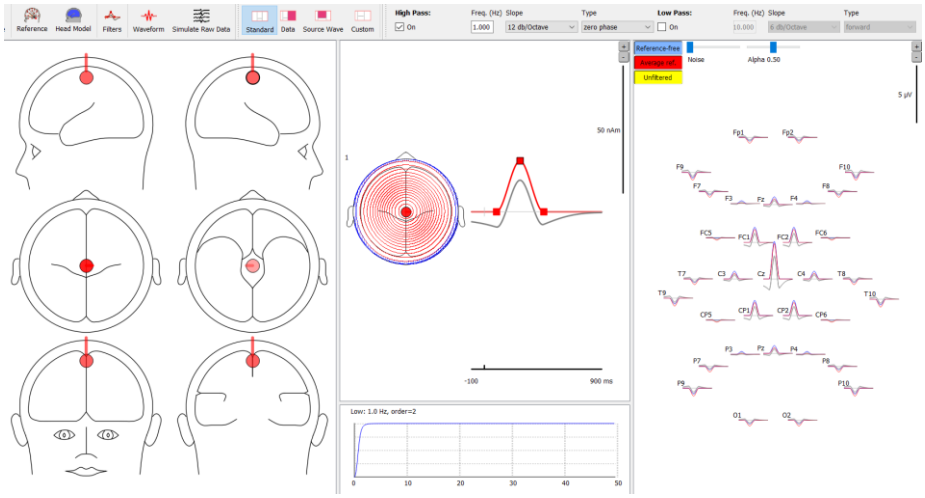


Zero-phase filtering

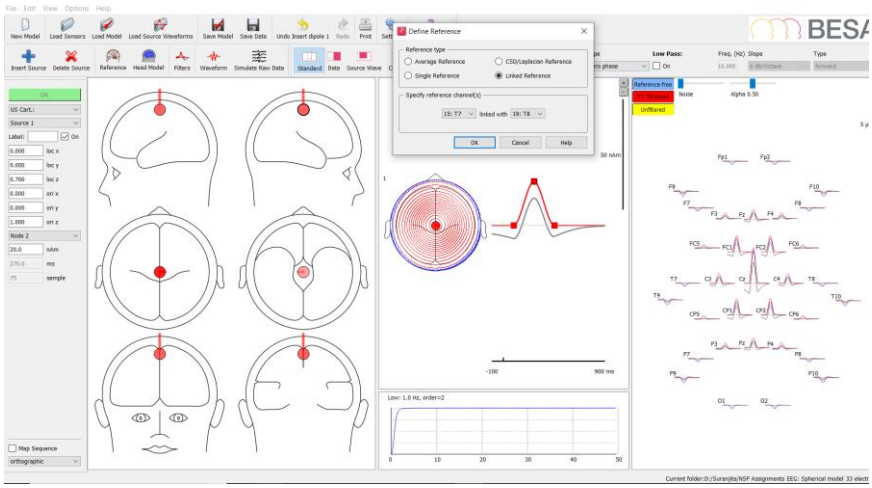


4. Effect of re-referencing – topoplot changes with different references

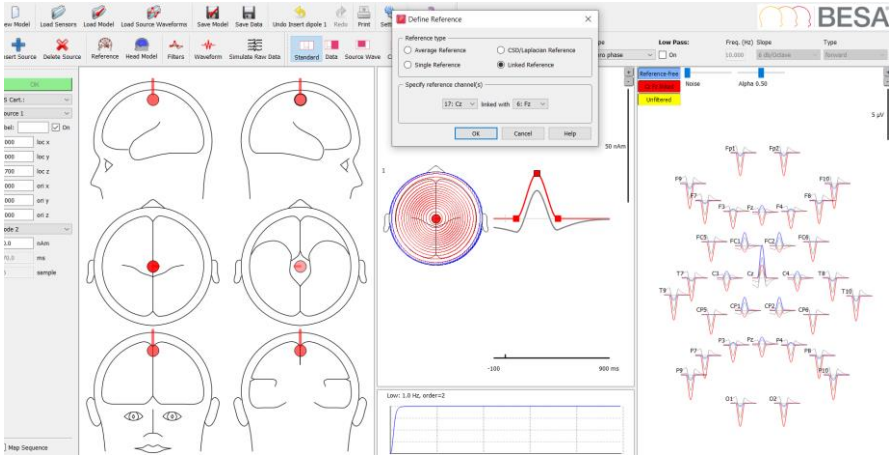
a. Common average



b. Linked mastoid reference

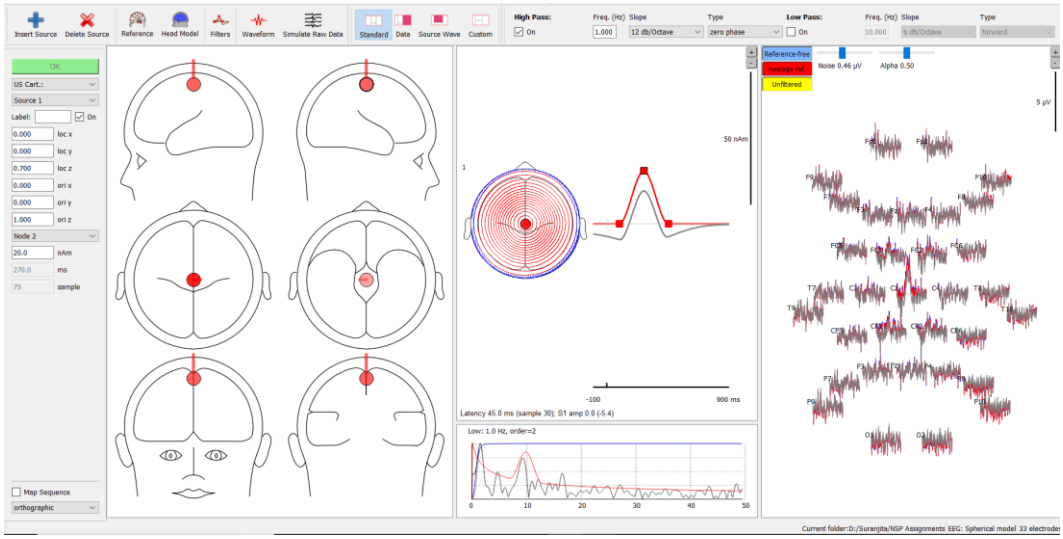


c. Cz, Fz



5. Effect of noise on re-reference techniques

a. Add noise



b. Which of the re-referencing technique handles noise best?

Common average reference technique handles noise best.