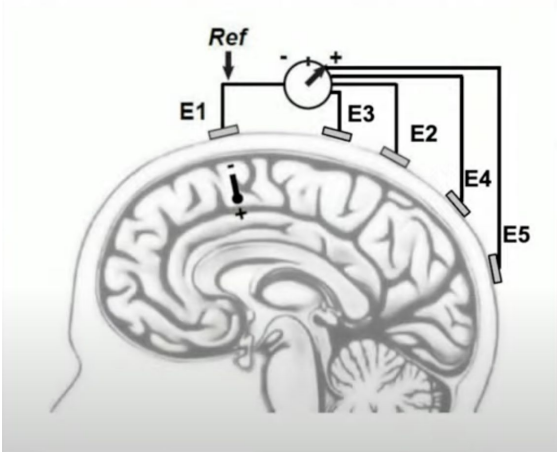
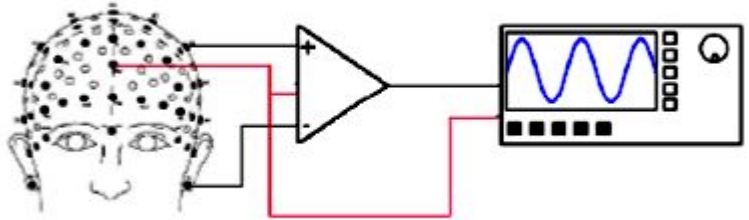
Rereferencing

What does EEG measure?

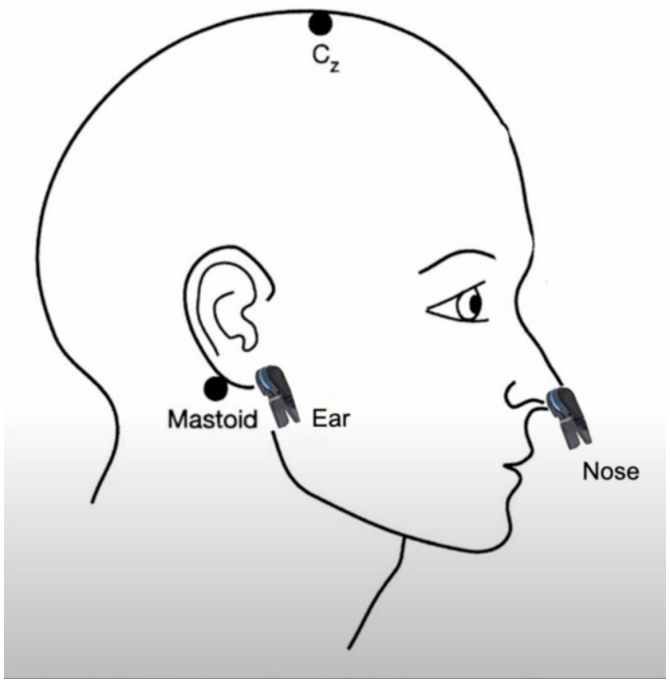
- EEG measures the voltage between each electrode and a reference electrode
- This means that whatever signal is present at the reference electrode is subtracted from all the measurement electrodes





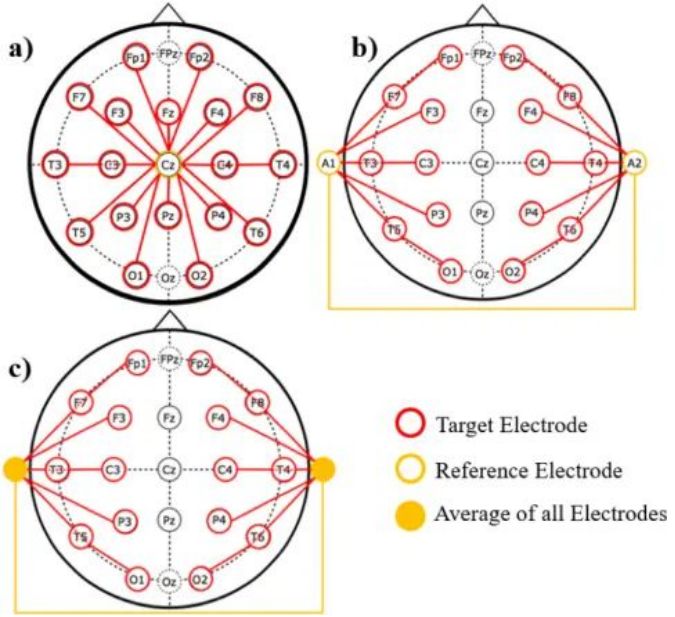
Where is the perfect reference?

- Picks up no brain-related electric fluctuations
- Picks up all environmental noise/interference
- Close to the head but as far away from the neural sources as possible



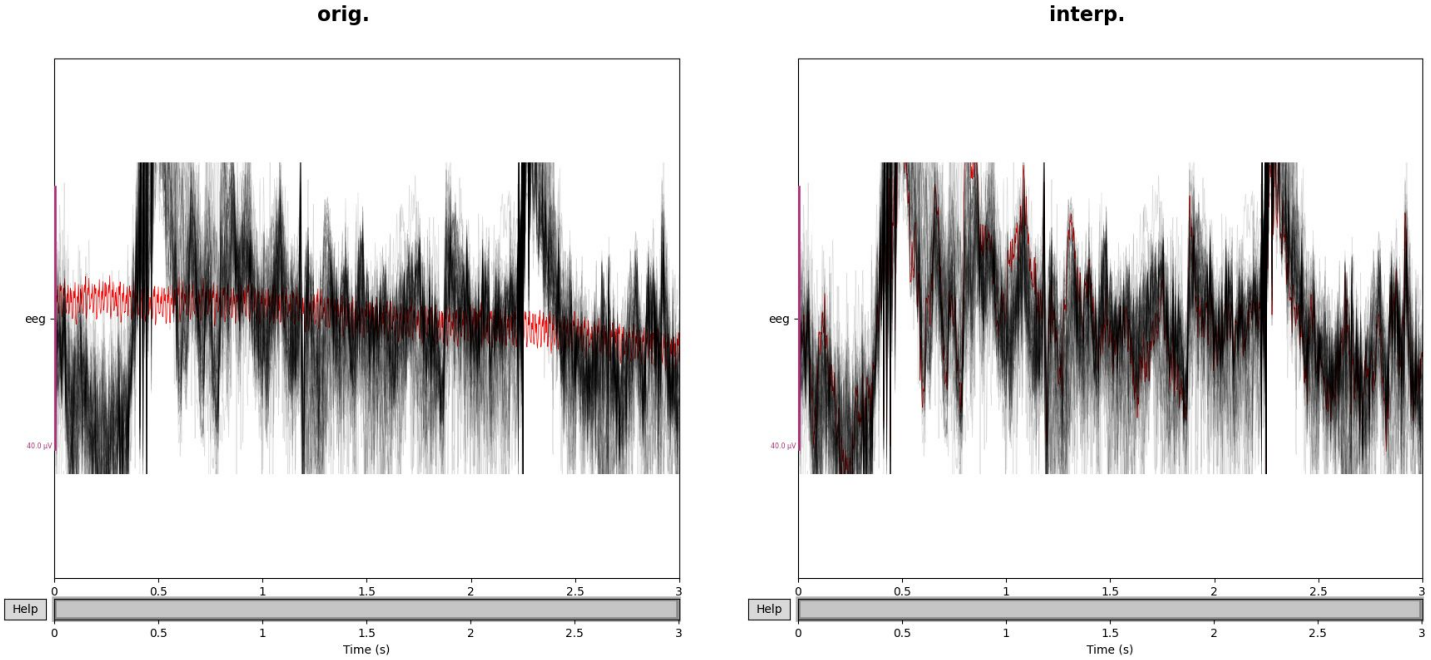
Rereferencing

- Recompute all channel data based on a new reference electrode after the recording
- The reference point can be a combination/average of multiple electrode sites
- The scalp average is a commonly used reference point



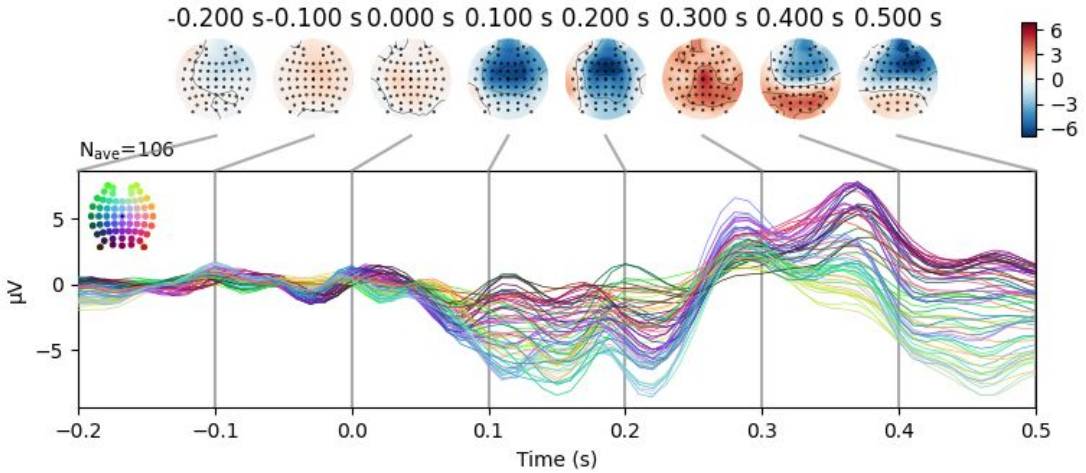
Why is sensor location important?

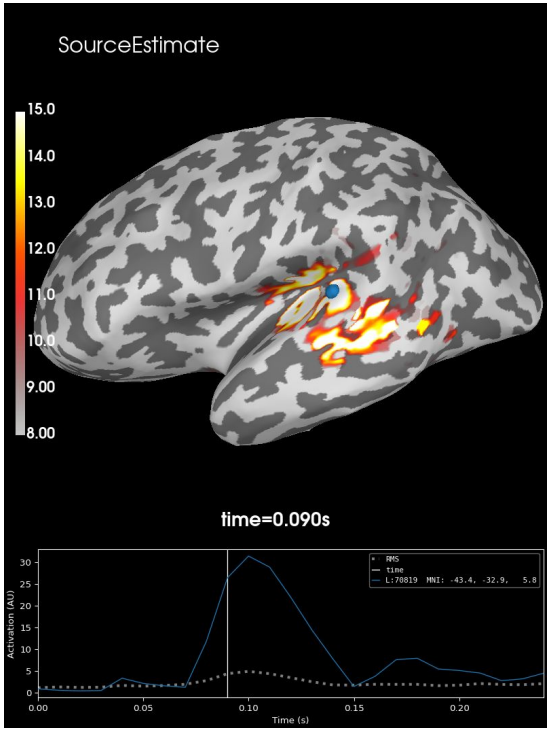
Interpolating bad channels



Why is sensor location important?

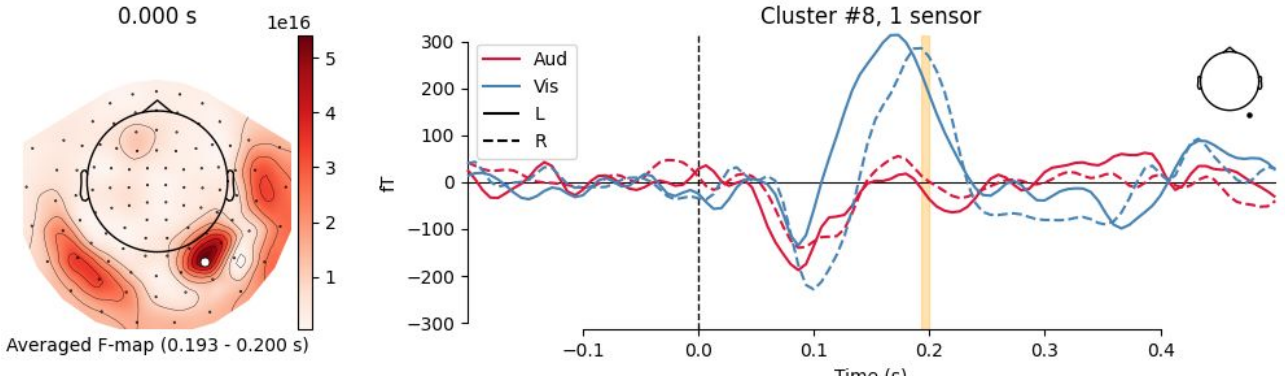
Source modeling and localisation





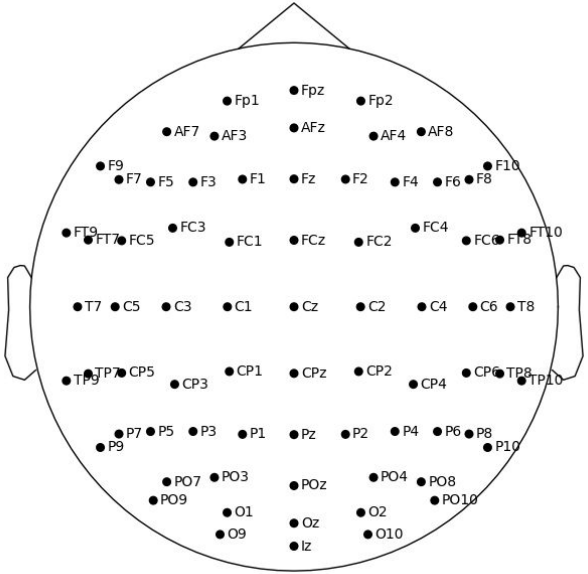
Why is sensor location important?

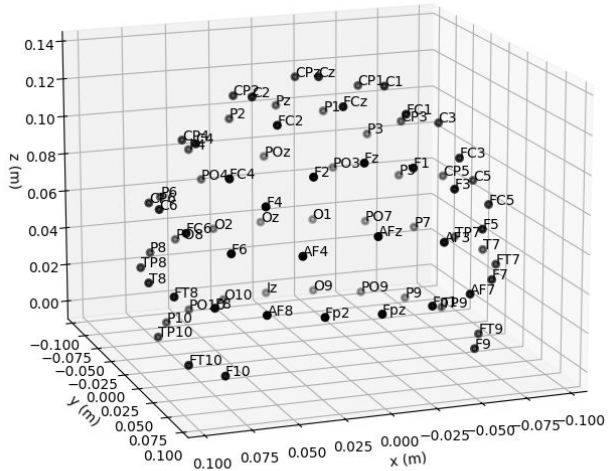
Statistics: spatio-temporal clustering



How to map channels to locations?

MNE python: montages





Recommendations

- Use whatever reference is common in your field for comparability
- Look at your data with multiple different references
- There is no perfect reference site