

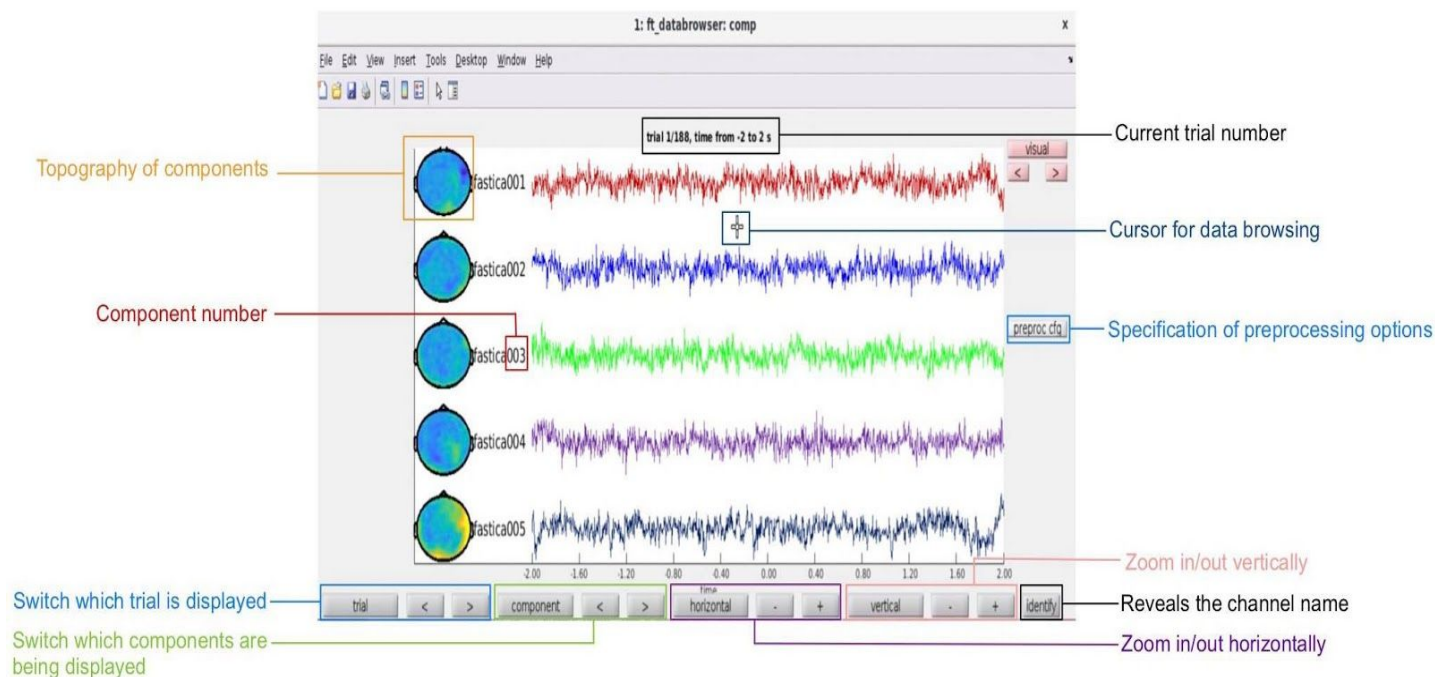
Fcp_2_5 ICA Checkpoint Databrowser Guide

A guide on how to identify components associated with artifacts

The fcp_2_5_checkpoint.m step of the MEG pipeline is an interactive session that uses a data browser to guide the user through inspection of ICA components and identify components associated with artifacts (unwanted features in data such as heartbeats, blinks, etc.). After inspection, the pipeline backprojects ICA components to remove the signal corresponding with the bad ICA components. This guide is intended to give users an idea of how to use the data browser feature to identify the bad components.

Step 1: Getting familiar with the data browser

- When the fcp_2_5_checkpoint step is run, a data browser will pop up for the first participant, require the user to browse through it to identify artifacts, and the user will then have to enter those components or skip the step if no artifacts exist. This will repeat for each participant.
- The data browser and its components are explained in the figure below.



Step 2: Identifying artifacts

- To identify artifacts, users should use the data browser to scroll through the components from each trial. When identifying artifacts, it is important that users pay attention to markers given by both the component topography (displayed in the heads to the left of the component numbers) and the component signals (displayed to the right of the component numbers).

- The most common artifacts that users will run into and their respective topography/signal component markers are outlined below:

- ❖ *Heartbeats*: Topography components will have a ring around the edges of the head boundaries. Component signals will display repeated ECG peaks.



- ❖ *Blinks*: Topography components will show coloration in the frontal area, near the eyes. Component signals will be uniform for the majority but have sudden dips.



- ❖ *Head/neck movement*: Topography components will be localized to the ears or the back of the neck. Component signal effects will depend on the type of head movement, but will often display a sudden spike..



- ❖ *Saccades*: Topography components will have the frontal area completely covered. Component signals will appear uniform followed by a sudden change.

- ❖ *Shunt/metal artifacts*: Topography components will be very localized and intense in coloration. Component signals will display a sudden spike, often towards the end of the signal.



- ❖ *Squid jumps*: Component signals will display very large and sudden spikes (straight, vertical lines).

Rule of thumb: If you are unsure whether a component should be removed, do not remove it.