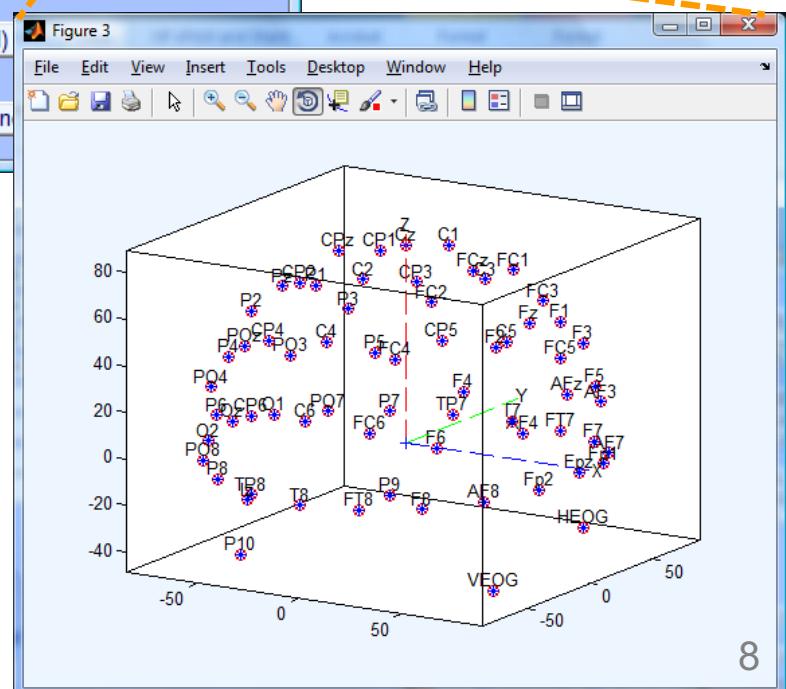
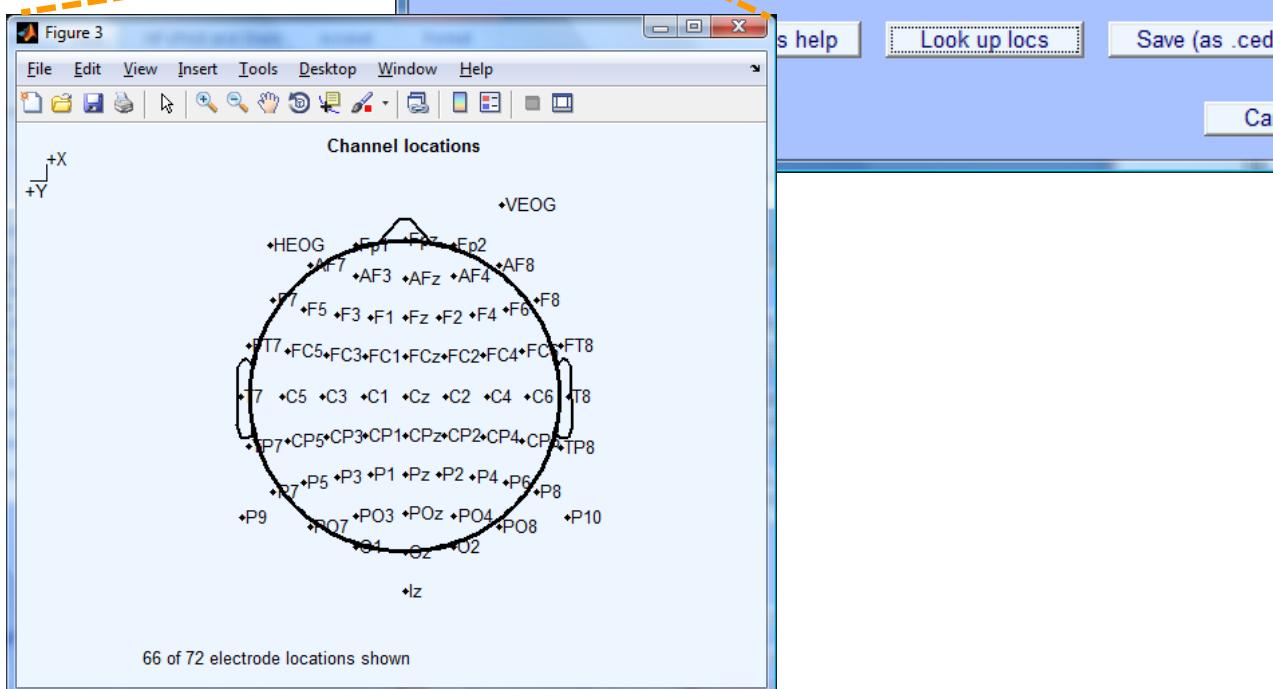
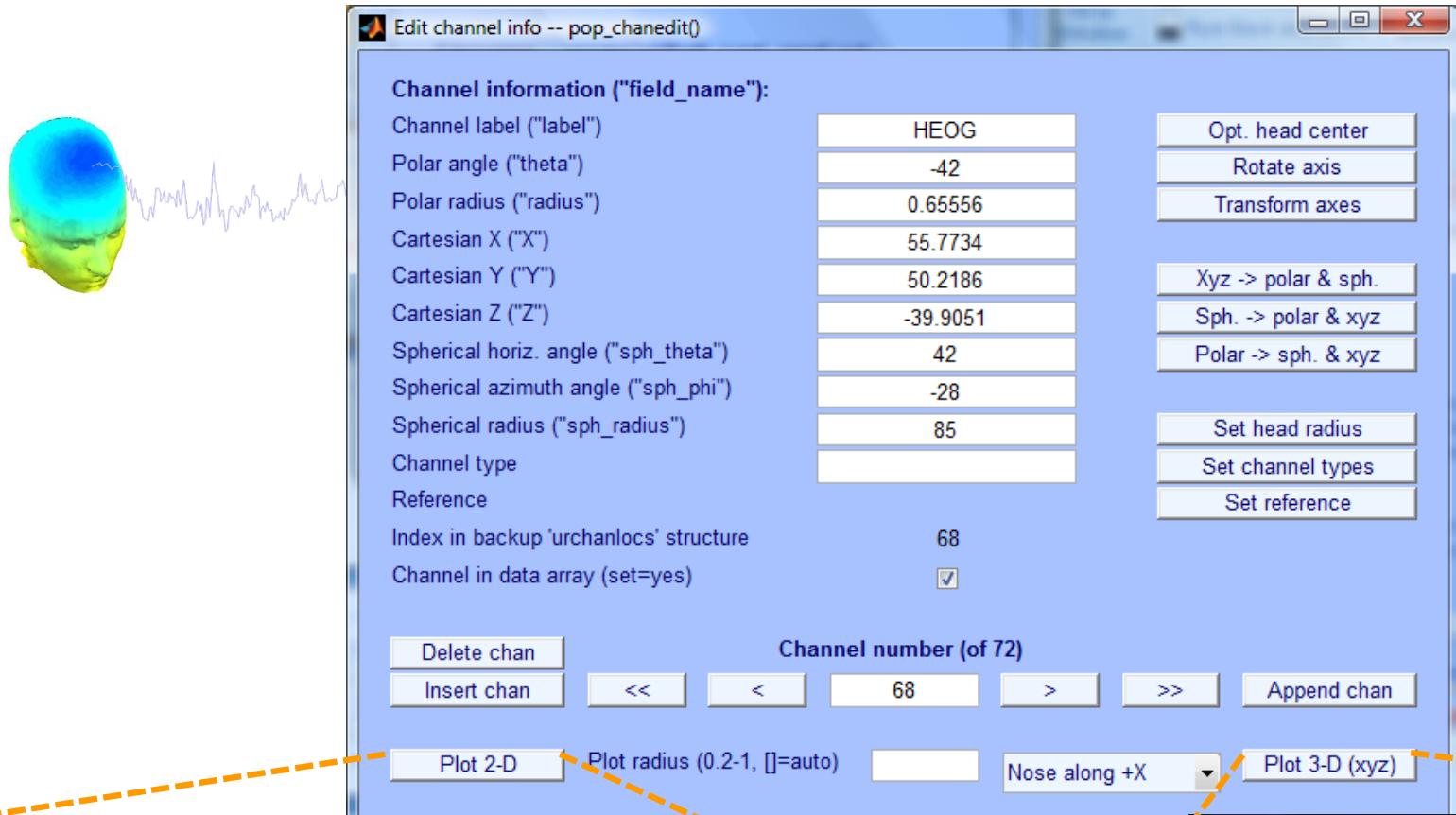
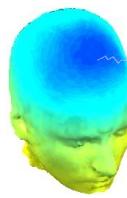
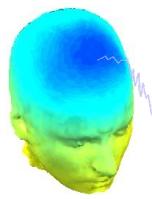


DIPFIT and model co-registration

1. Co-register electrodes with model
2. Fit components







EEGLAB development head

File Edit Tools Plot Study Datasets Help

#1: EE

- Filename
- Channels
- Frames p
- Epochs
- Events
- Sampling
- Epoch st
- Epoch en
- Reference
- Channel
- ICA weig
- Dataset

Change sampling rate
Filter the data
Re-reference
Interpolate electrodes
Reject continuous data by eye

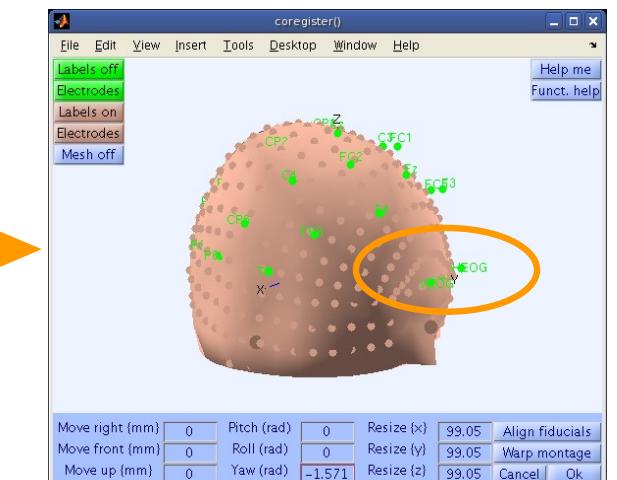
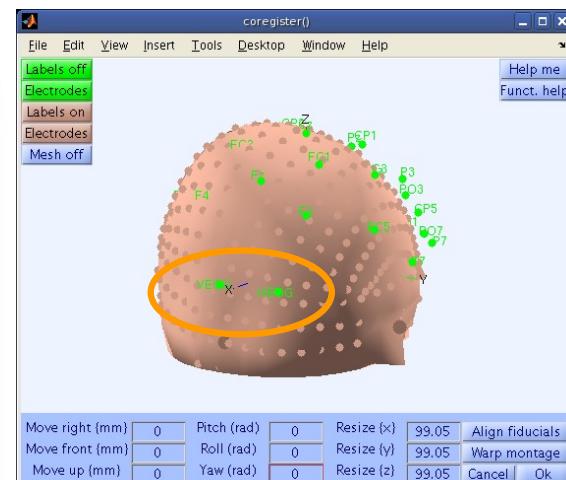
Extract epochs
Remove baseline

Run ICA
Remove components

Automatic channel rejection
Automatic continuous rejection
Automatic epoch rejection
Reject data epochs
Reject data using ICA
ICLabel

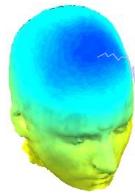
Clean continuous data using ASR

Locate dipoles using DIPFIT



- Head model and settings
- Component dipole coarse fit
 - Component dipole fine fit
 - Component dipole plot
 - Component dipole autofit
- Distributed source Leadfield matrix
- Distributed source component modelling
- Source reconstruction of ERP

EEG.dipfit structure



```
>> EEG.dipfit
```

```
ans =
```

```
    hdmfile: [1x76 char]  
    mrifile: [1x71 char]  
    chanfile: [1x83 char]  
    chansel: [1x33 double]  
    coordformat: 'spherical'
```

```
    model: [1x33 struct]
```

```
    current: 32
```

```
    vol: [1x1 struct]
```

```
    leadfield: []
```

```
    coord_transform: [0 0 -1.570796 100 76 90.87264 1 1 1]
```

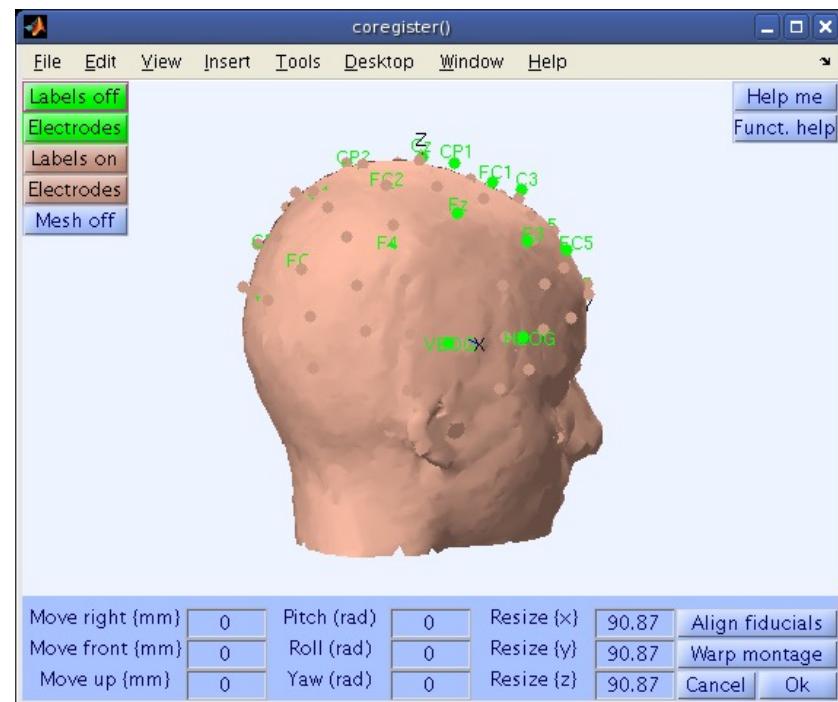
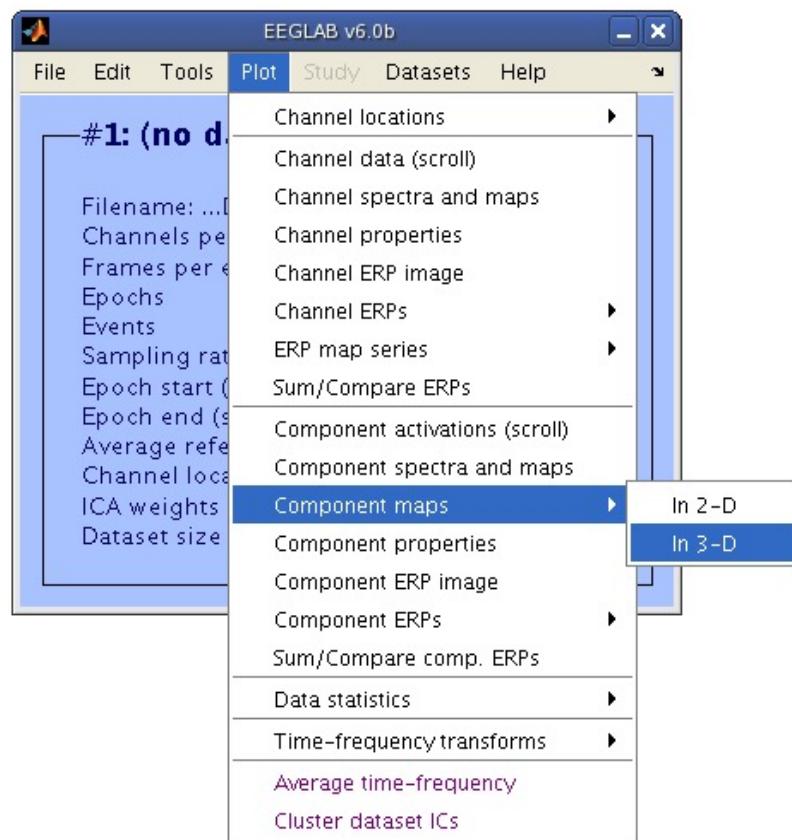
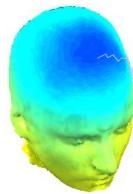
Rotation

Translation

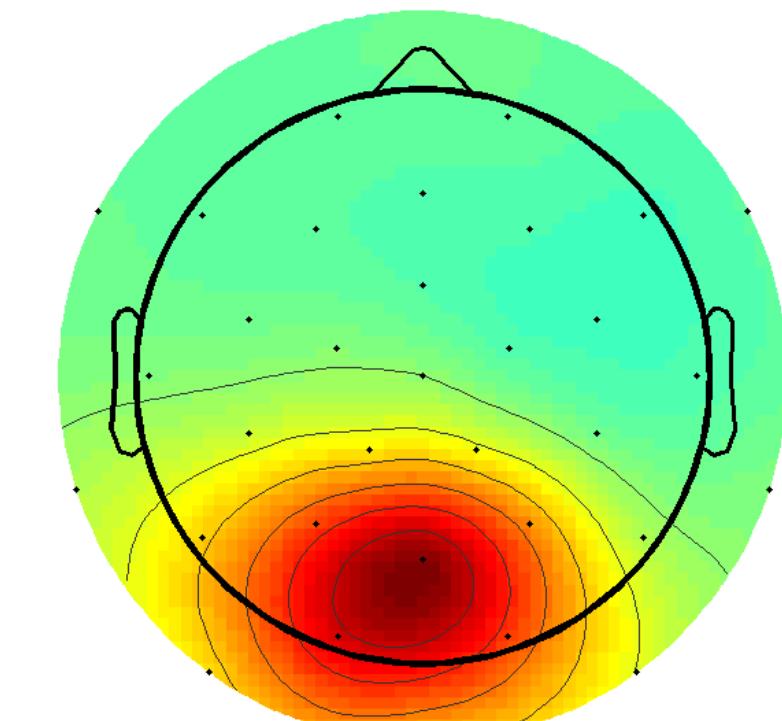
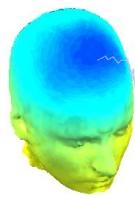
Scaling



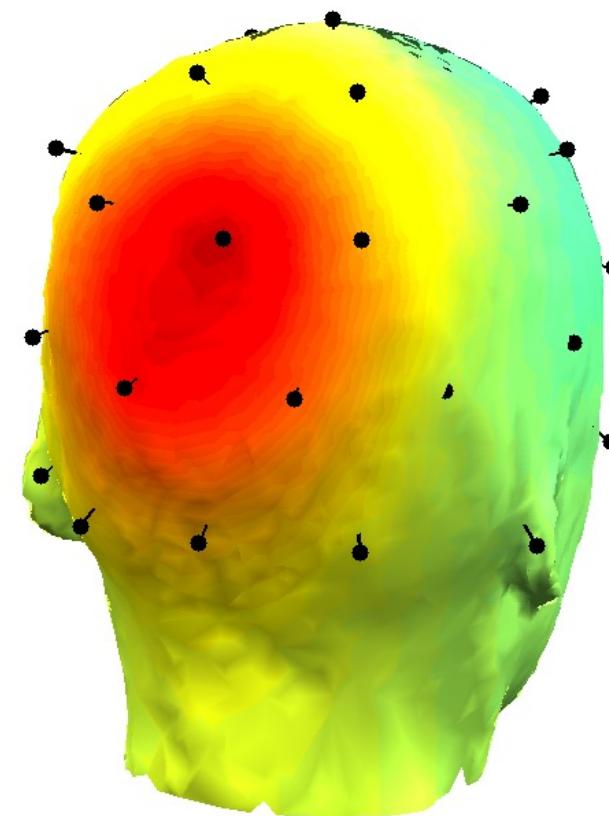
Plot scalp maps in 3D



Go through co-registration
in the same way as
with dipfit co-registration

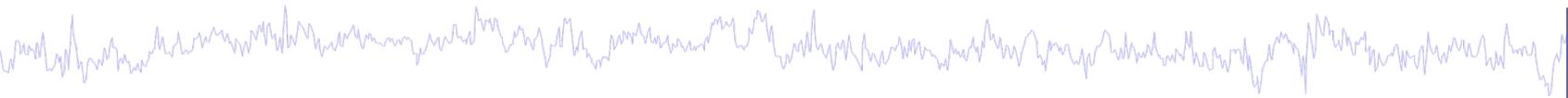
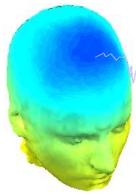


2D scalp map for IC 12



3D scalp map for IC 12

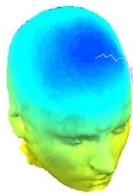




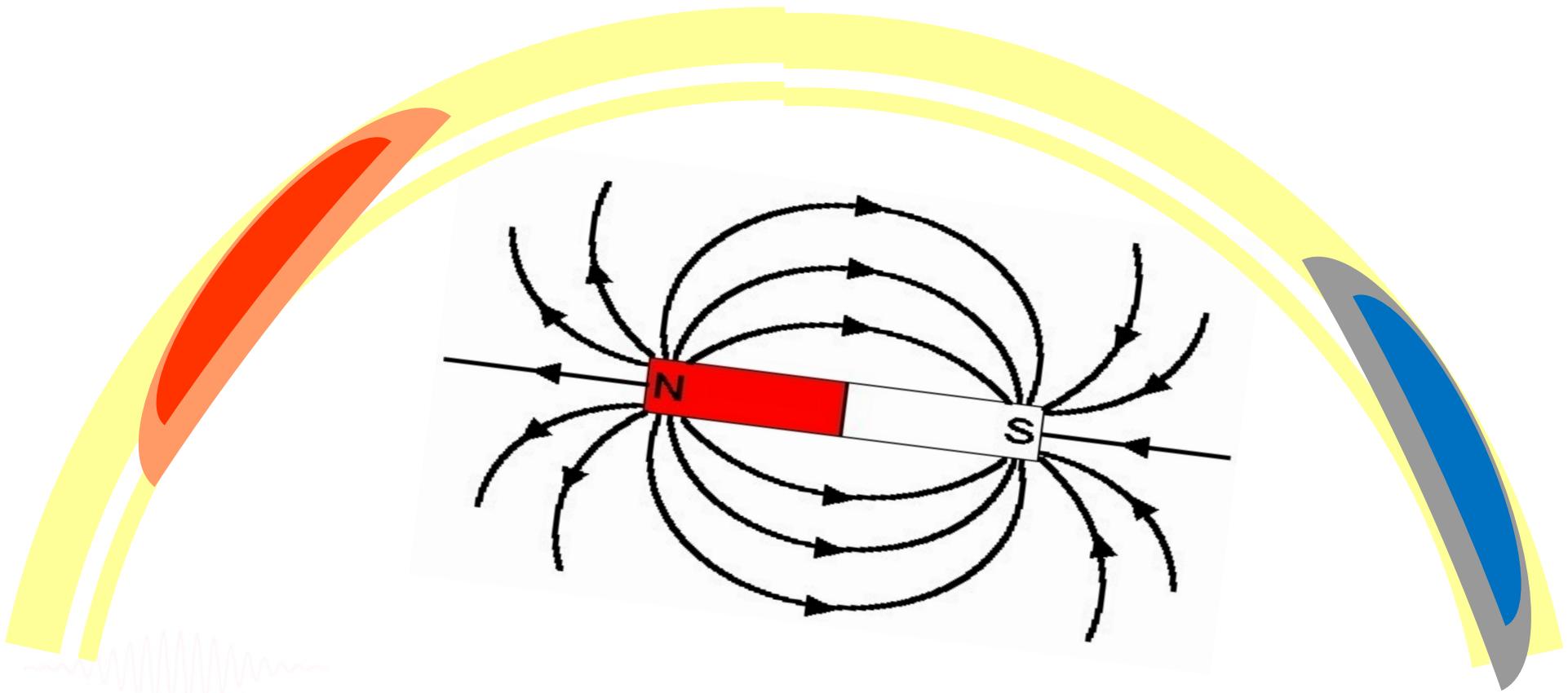
DIPFIT and model co-registration

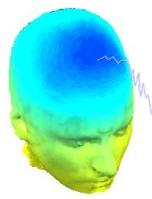
1. Co-register electrodes with model
2. Fit components





Patch of Cortex Acting as a Dipole





Fit equivalent dipoles

EEGLAB development head

File Edit Tools Plot Study Datasets Help

#1: EE

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Automatic channel rejection
Automatic continuous rejection
Automatic epoch rejection
Reject data epochs
Reject data using ICA
ICLabel

Clean continuous data using ASR

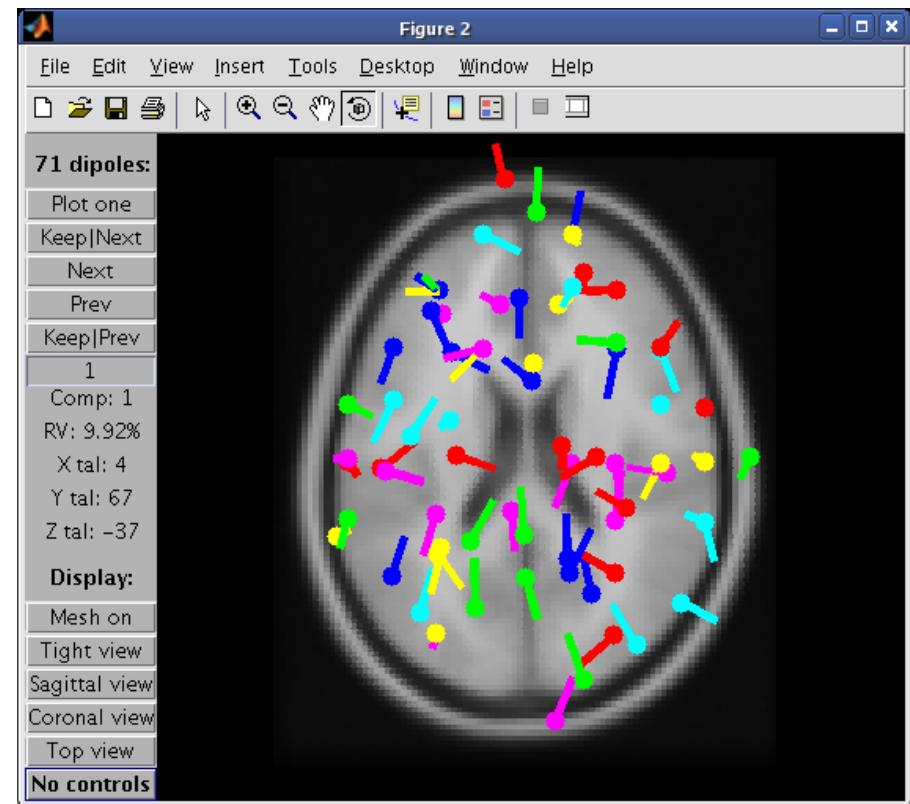
Locate dipoles using DIPFIT

Head model and settings

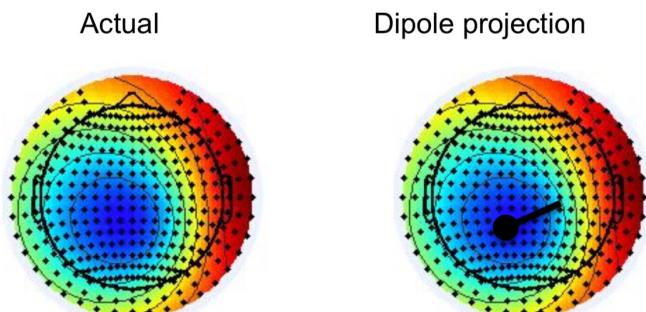
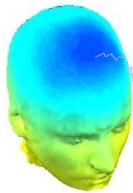
- Component dipole coarse fit
- Component dipole fine fit
- Component dipole plot
- Component dipole autofit**

Distributed source Leadfield matrix
Distributed source component modelling

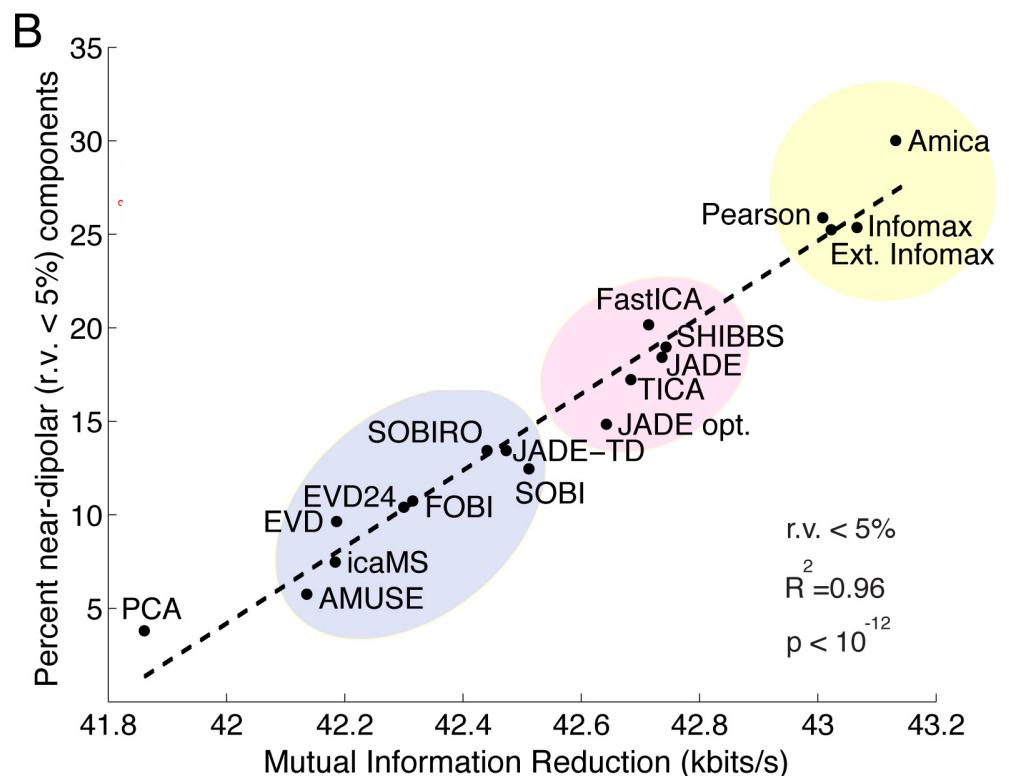
Source reconstruction of ERP



Computing residual variance

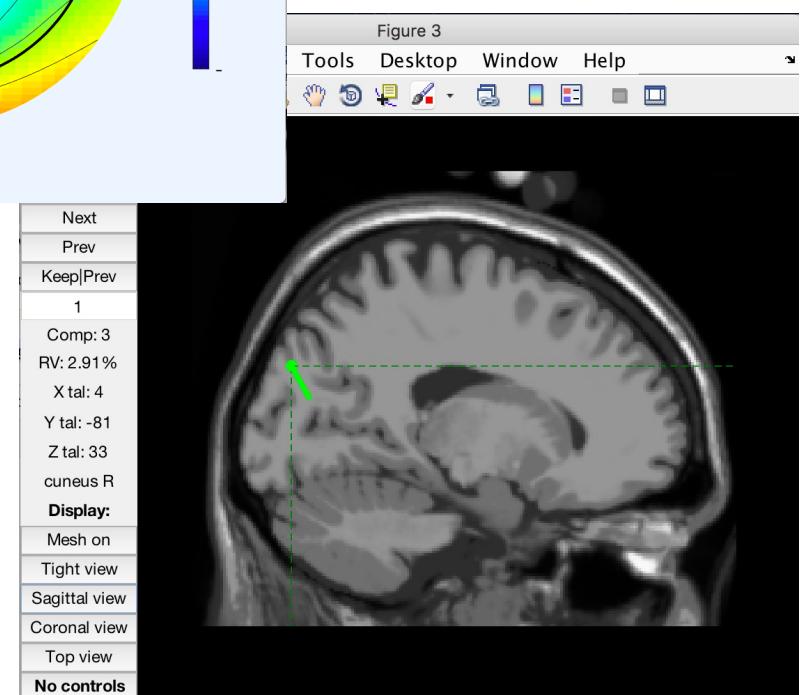
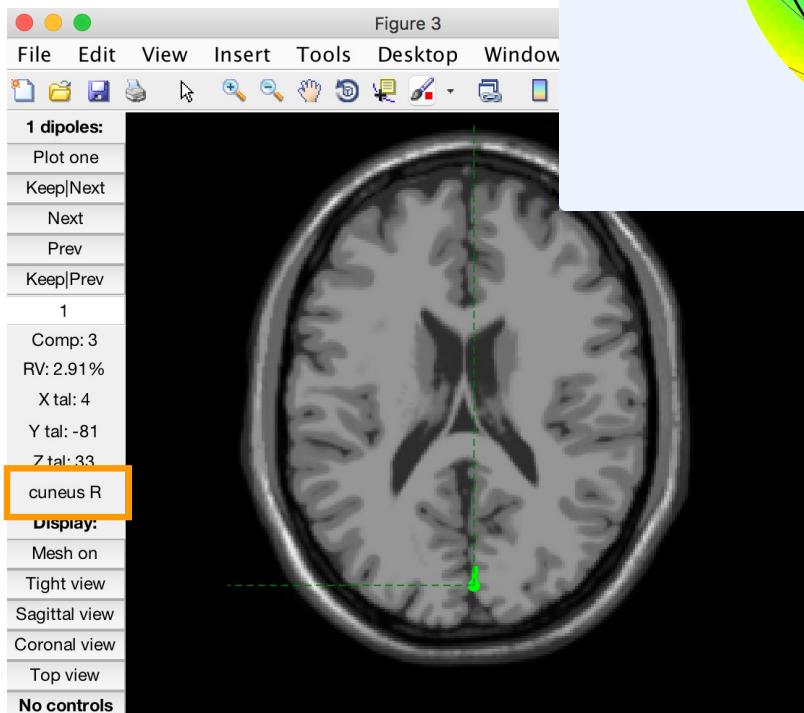
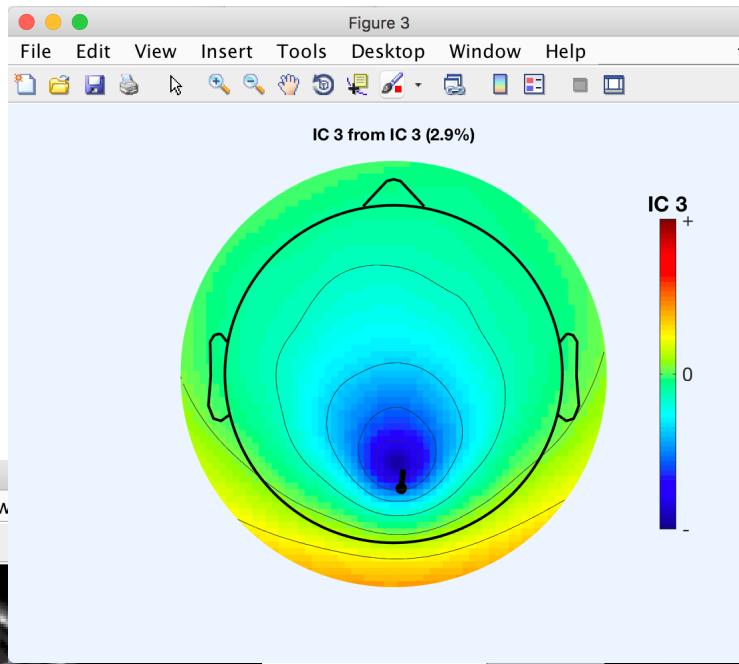
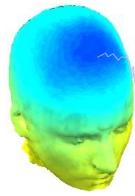


$$r = \sum(x_i - \tilde{x}_i)^2 / \sum x_i^2$$

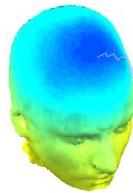


Delorme A, Palmer J, Onton J, Oostenveld R, Makeig S. Independent EEG sources are dipolar. PLoS One. 2012;7(2):e30135. doi: 10.1371/journal.pone.0030135. Epub 2012 Feb 15. PMID: 22355308; PMCID: PMC3280242.

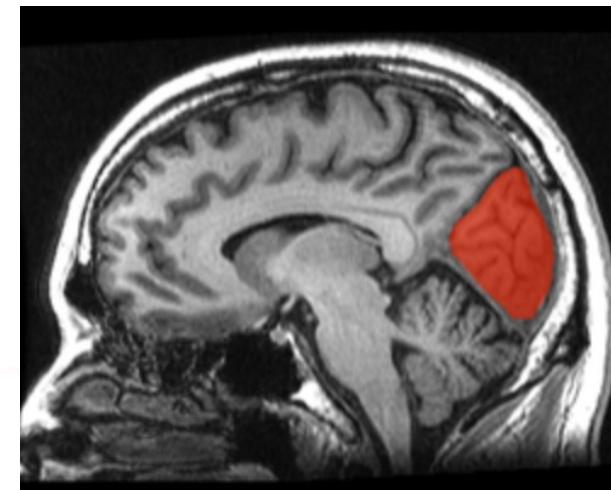
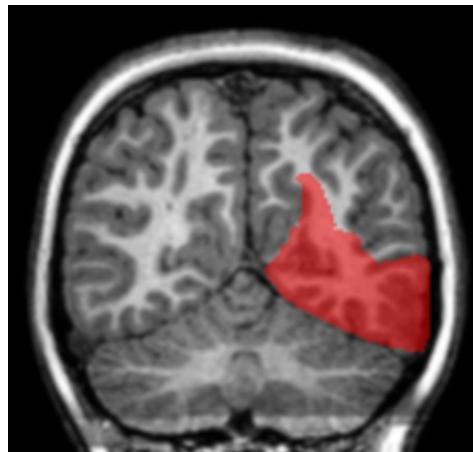
Scroll through dipoles



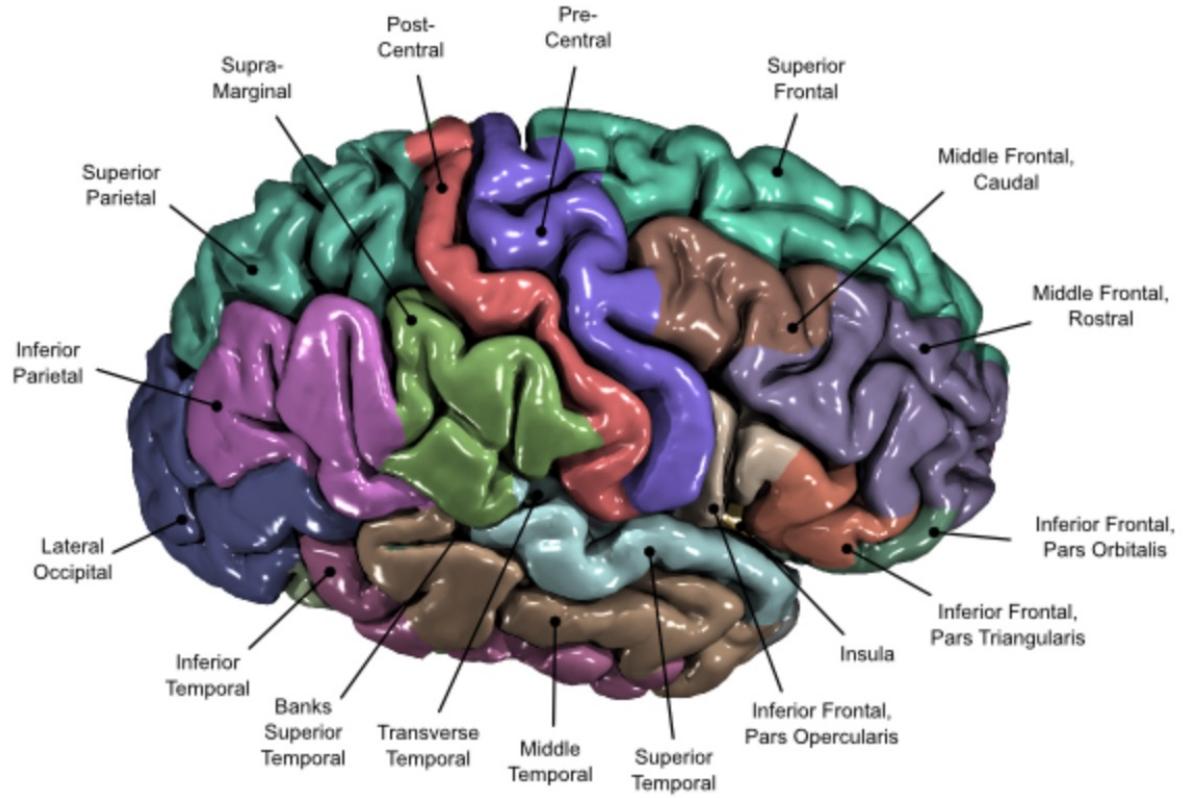
Desikan-Killiany Atlas

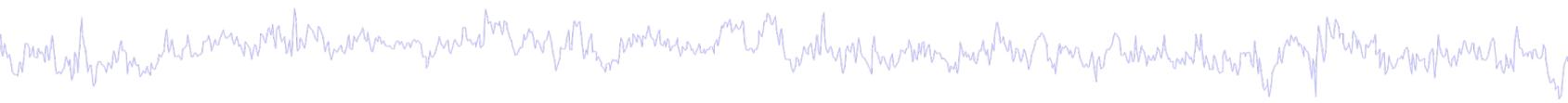
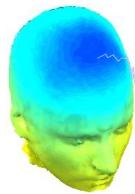


Right Cuneus

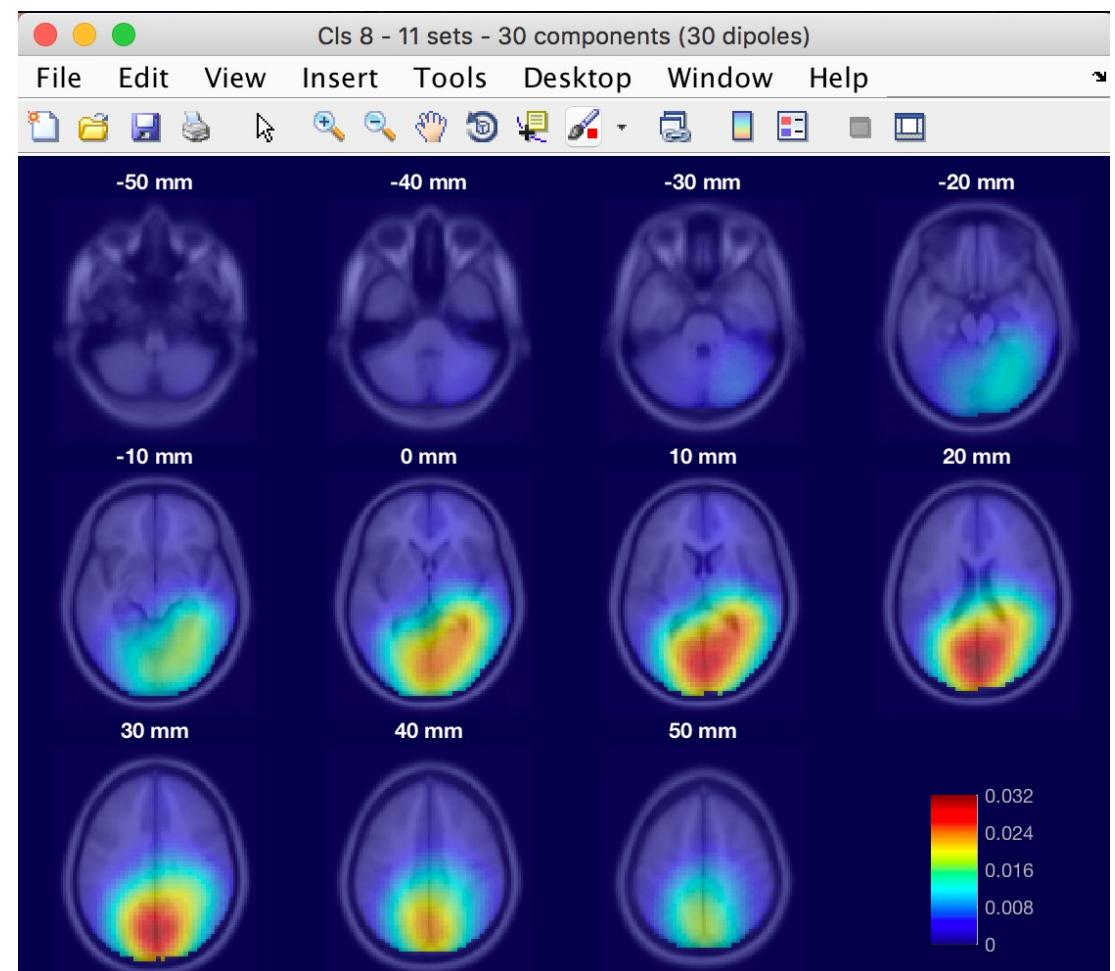
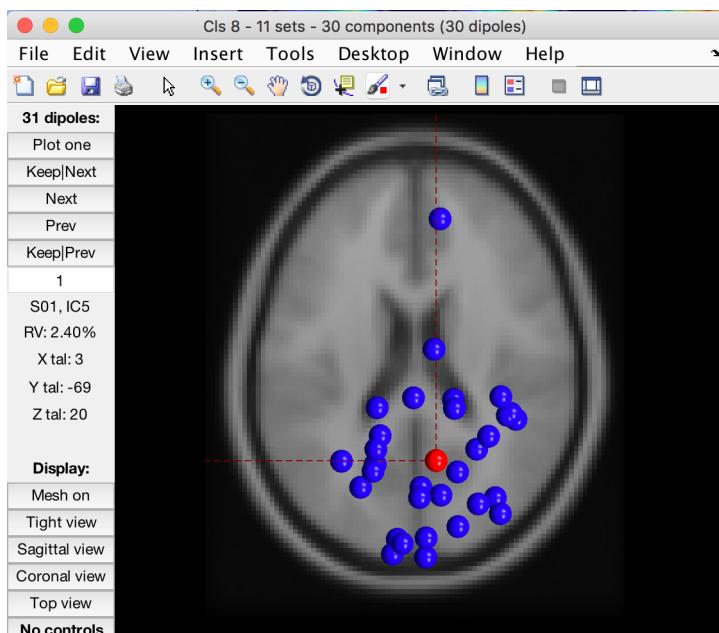


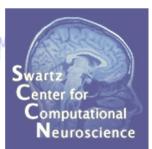
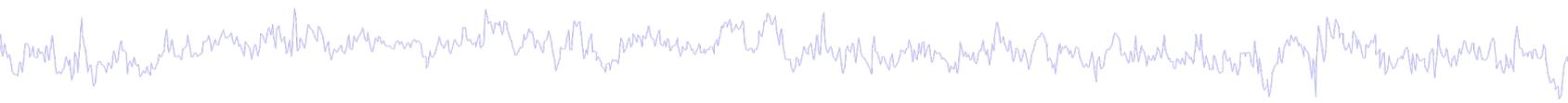
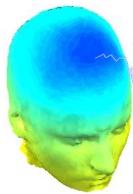
68 brain areas





Visualizing ICA component clusters





Distributed source localization in DIPFIT

The screenshot shows the EEGLAB development head interface. The main window has a toolbar at the top with File, Edit, Tools, Plot, Study, Datasets, and Help menus. The Tools menu is currently active, displaying a list of various processing steps. The 'Locate dipoles using DIPFIT' option is highlighted with a blue rectangle. A sub-menu for DIPFIT options is displayed below it, with the 'Distributed source Leadfield matrix' option highlighted with an orange rectangle.

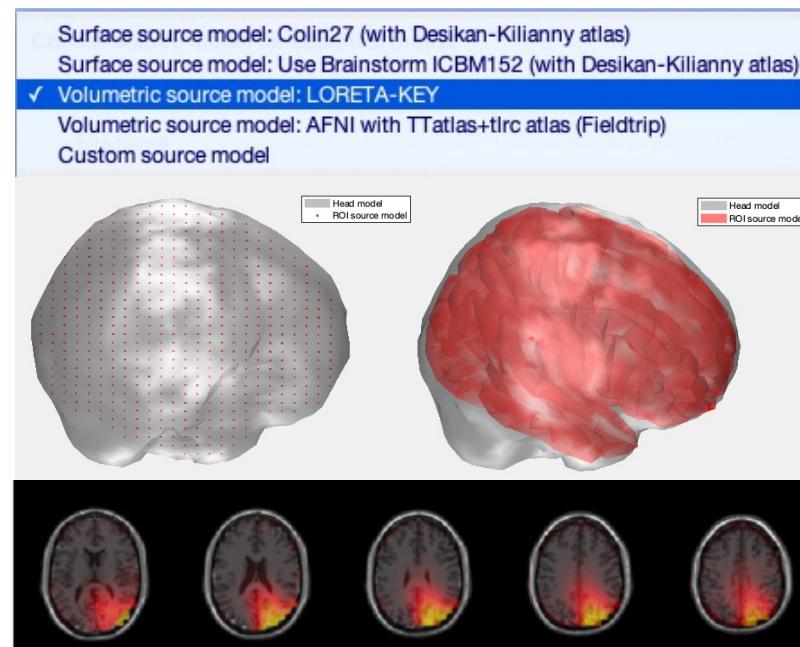
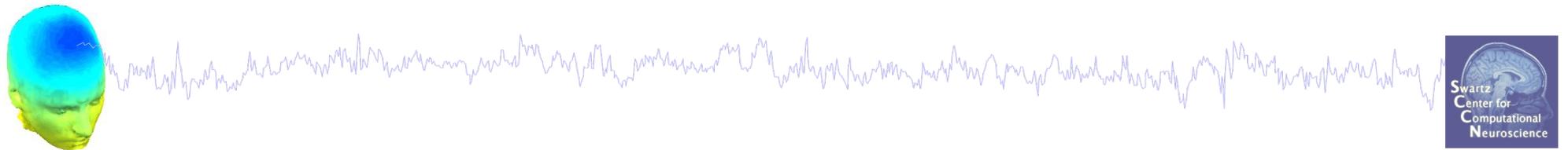
Surface source model: Colin27 (with Desikan-Kilianny atlas)
Surface source model: Use Brainstorm ICBM152 (with Desikan-Kilianny atlas)
✓ Volumetric source model: LORETA-KEY
Volumetric source model: AFNI with TTatlas+tlrc atlas (Fieldtrip)
Custom source model

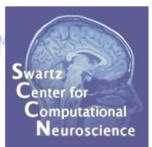
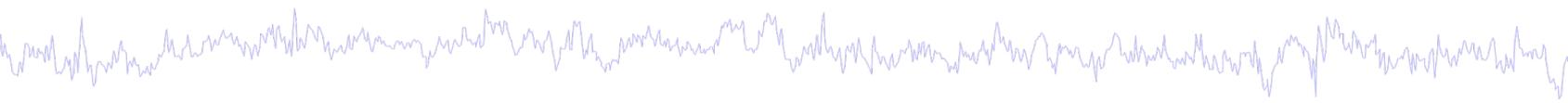
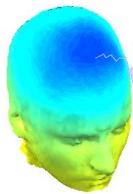
Volume

Surface

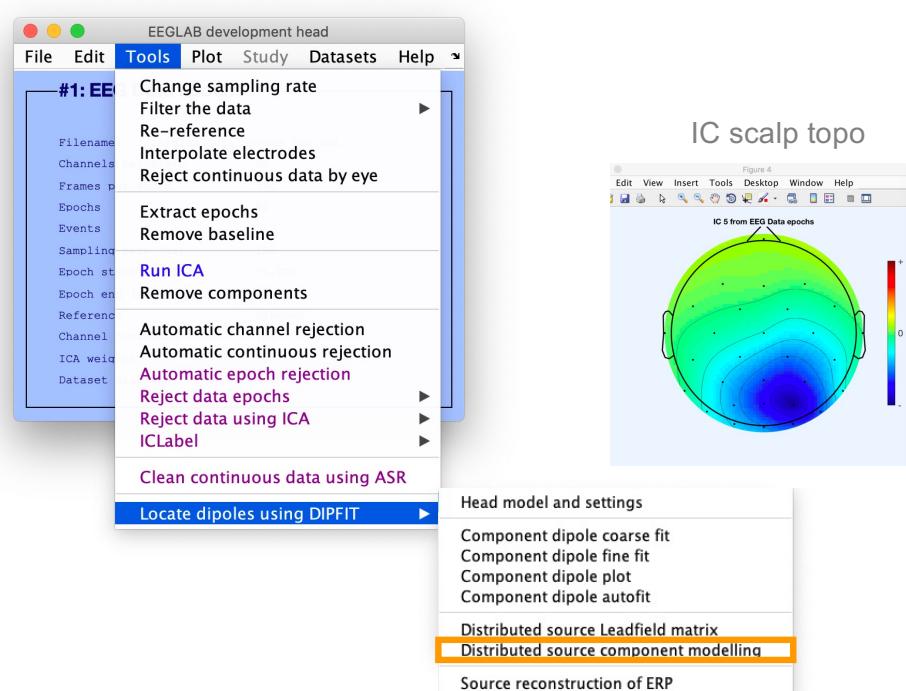
Head model and settings

Component dipole coarse fit
Component dipole fine fit
Component dipole plot
Component dipole autofit
Distributed source Leadfield matrix
Distributed source component modelling
Source reconstruction of ERP

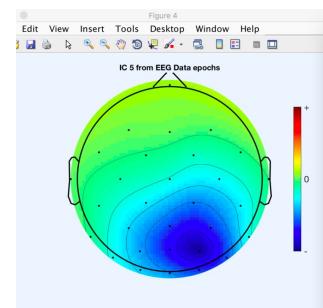




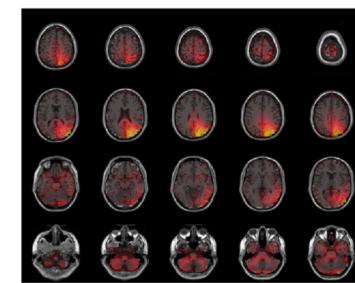
Distributed source localization (eloreta or LCMV beamforming)



IC scalp topo



Volume



Surface

