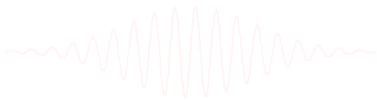
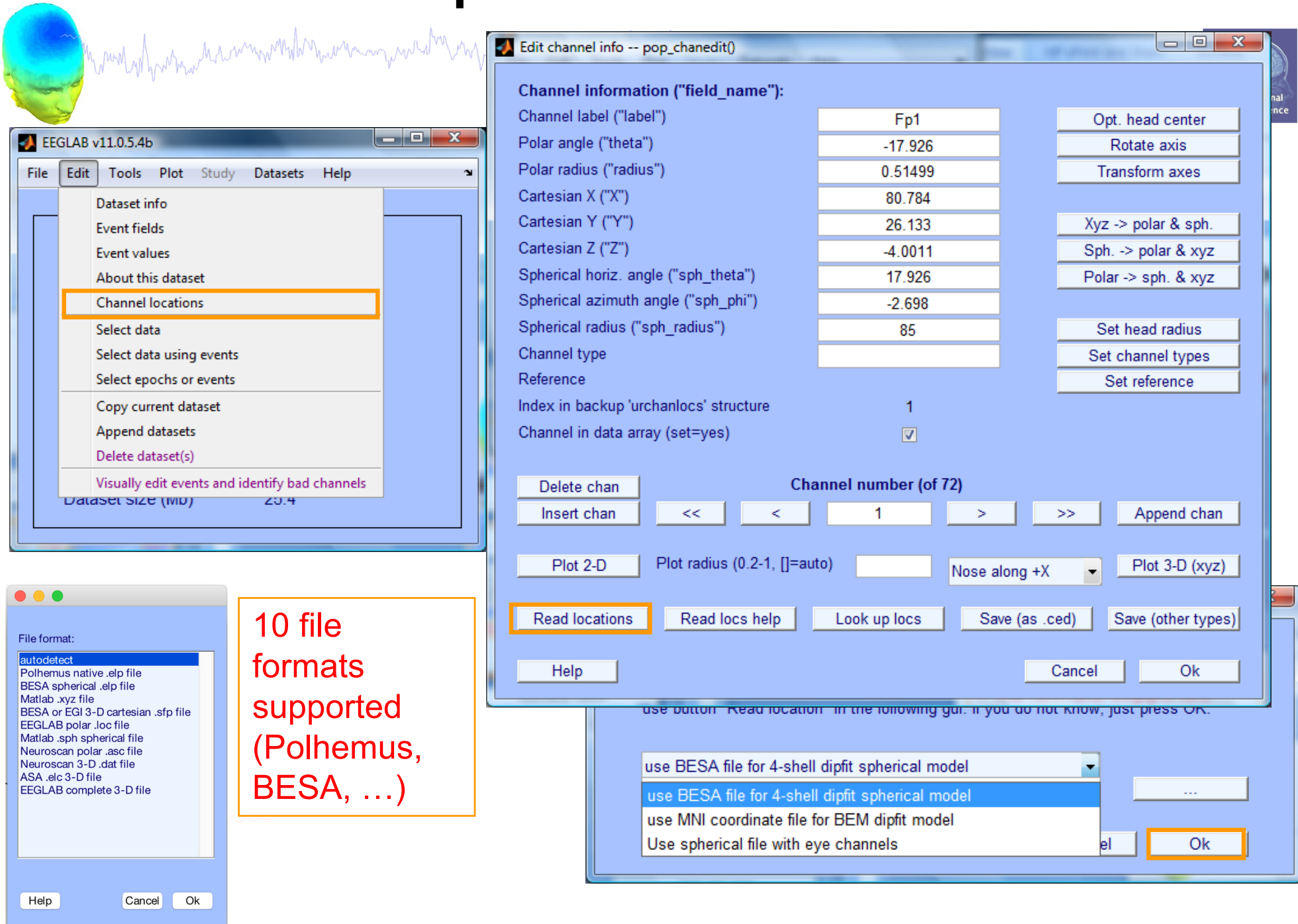


# Channel coordinates and source localization





# Import channel locations



**EEGLAB v11.0.5.4b**

File Edit Tools Plot Study Datasets Help

Dataset info  
Event fields  
Event values  
About this dataset  
**Channel locations**  
Select data  
Select data using events  
Select epochs or events  
Copy current dataset  
Append datasets  
Delete dataset(s)  
Visually edit events and identify bad channels

Dataset Size (MB) 25.4

**Edit channel info -- pop\_chanedit()**

Channel information ("field\_name"):

Channel label ("label")	Fp1	Opt. head center
Polar angle ("theta")	-17.926	Rotate axis
Polar radius ("radius")	0.51499	Transform axes
Cartesian X ("X")	80.784	XYZ -> polar & sph.
Cartesian Y ("Y")	26.133	Sph. -> polar & xyz
Cartesian Z ("Z")	-4.0011	Polar -> sph. & xyz
Spherical horiz. angle ("sph_theta")	17.926	Set head radius
Spherical azimuth angle ("sph_phi")	-2.698	Set channel types
Spherical radius ("sph_radius")	85	Set reference
Channel type		
Reference		
Index in backup 'urchanlocs' structure	1	
Channel in data array (set=yes)	<input checked="" type="checkbox"/>	

Delete chan Channel number (of 72) Append chan

Insert chan << < 1 > >>

Plot 2-D Plot radius (0.2-1, []=auto) Nose along +X Plot 3-D (xyz)

**Read locations** Read locs help Look up locs Save (as .ced) Save (other types)

Help Cancel Ok

10 file formats supported (Polhemus, BESA, ...)

File format:

- autodetect
- Polhemus native .elp file
- BESA spherical .elp file
- Matlab .xyz file
- BESA or EGI 3-D cartesian .sfp file
- EEGLAB polar .loc file
- Matlab .sph spherical file
- Neuroscan polar .asc file
- Neuroscan 3-D .dat file
- ASA .elc 3-D file
- EEGLAB complete 3-D file

Help Cancel Ok

use button "Read location" in the following gui. If you do not know, just press OK.

use BESA file for 4-shell dipfit spherical model

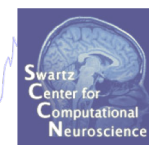
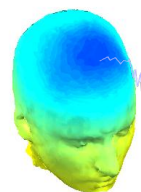
use BESA file for 4-shell dipfit spherical model

use MNI coordinate file for BEM dipfit model

Use spherical file with eye channels

Ok

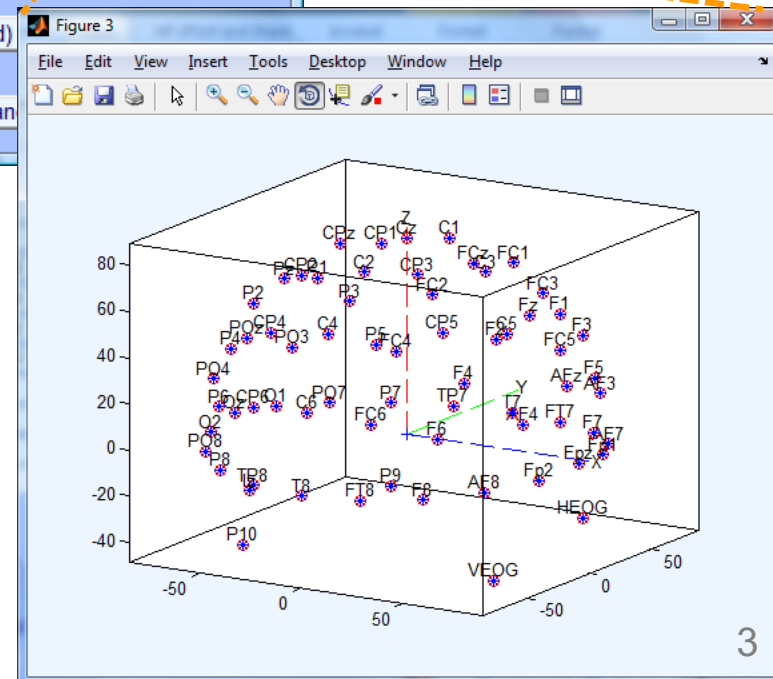
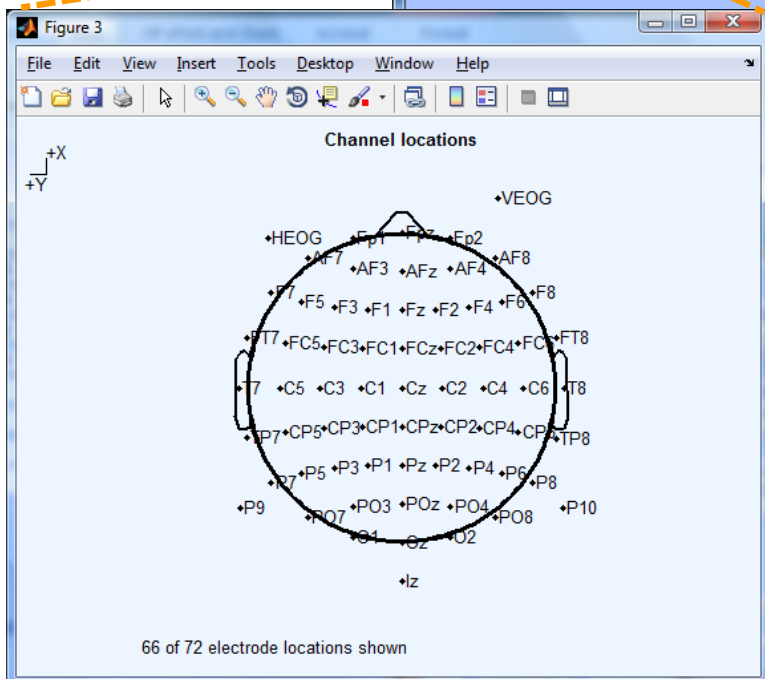




Edit channel info -- pop\_chanedit()

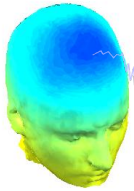
**Channel information ("field\_name"):**

Channel label ("label")	HEOG	Opt. head center
Polar angle ("theta")	-42	Rotate axis
Polar radius ("radius")	0.65556	Transform axes
Cartesian X ("X")	55.7734	
Cartesian Y ("Y")	50.2186	Xyz -> polar & sph.
Cartesian Z ("Z")	-39.9051	Sph. -> polar & xyz
Spherical horiz. angle ("sph_theta")	42	Polar -> sph. & xyz
Spherical azimuth angle ("sph_phi")	-28	
Spherical radius ("sph_radius")	85	
Channel type		Set head radius
Reference		Set channel types
Index in backup 'urchanlocs' structure	68	Set reference
Channel in data array (set=yes)	<input checked="" type="checkbox"/>	





# Import channel locations



**Edit channel info -- pop\_chanedit()**

**Channel information ("field\_name"):**

Channel label ("label")	LEYE
Polar angle ("theta")	-45.1543
Polar radius ("radius")	0.54374
Cartesian X ("X")	0.79487
Cartesian Y ("Y")	0.79917
Cartesian Z ("Z")	-0.15585
Spherical horiz. angle ("sph_theta")	45.1543
Spherical azimuth angle ("sph_phi")	-7.8725
Spherical radius ("sph_radius")	1.1379
Channel type	EEG
Reference	
Index in backup 'urchanlocs' structure	
Channel in data array (set=yes)	<input checked="" type="checkbox"/>

**Channel number (of 71)**

Channel indices: 1:71  
Type (e.g. EEG): EEG

**Buttons:** Delete chan, Insert chan, Plot 2-D, Read locations, Help, Plot radius (0.2-1, []=auto), Nose along +X, Plot 3-D (xyz), Save (as .ced), Save (other types), Cancel, Ok.

**Opt. head center**  
**Rotate axis**  
Transform axes

XYZ -> polar & sph.  
Sph. -> polar & xyz  
Polar -> sph. & xyz

Set head radius  
Set channel types  
Set reference

**Convert channel locations -- pop\_chancenter()**

Optimize center location ☒ or specify center 0 0 0

Channel indices to ignore for best-sphere matching

Help Cancel Ok

**Force electrode location -- forclocs()**

X/Y value Coordinate Electrode list

0 X (rotate X-Z plane) Cz Pick

Help Cancel Ok

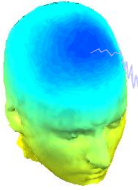
**Set channel ...**

Channel indices 1:71  
Type (e.g. EEG) EEG

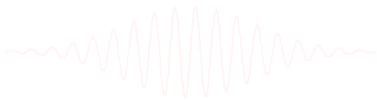
Help Cancel Ok



# DIPFIT and model co-registration

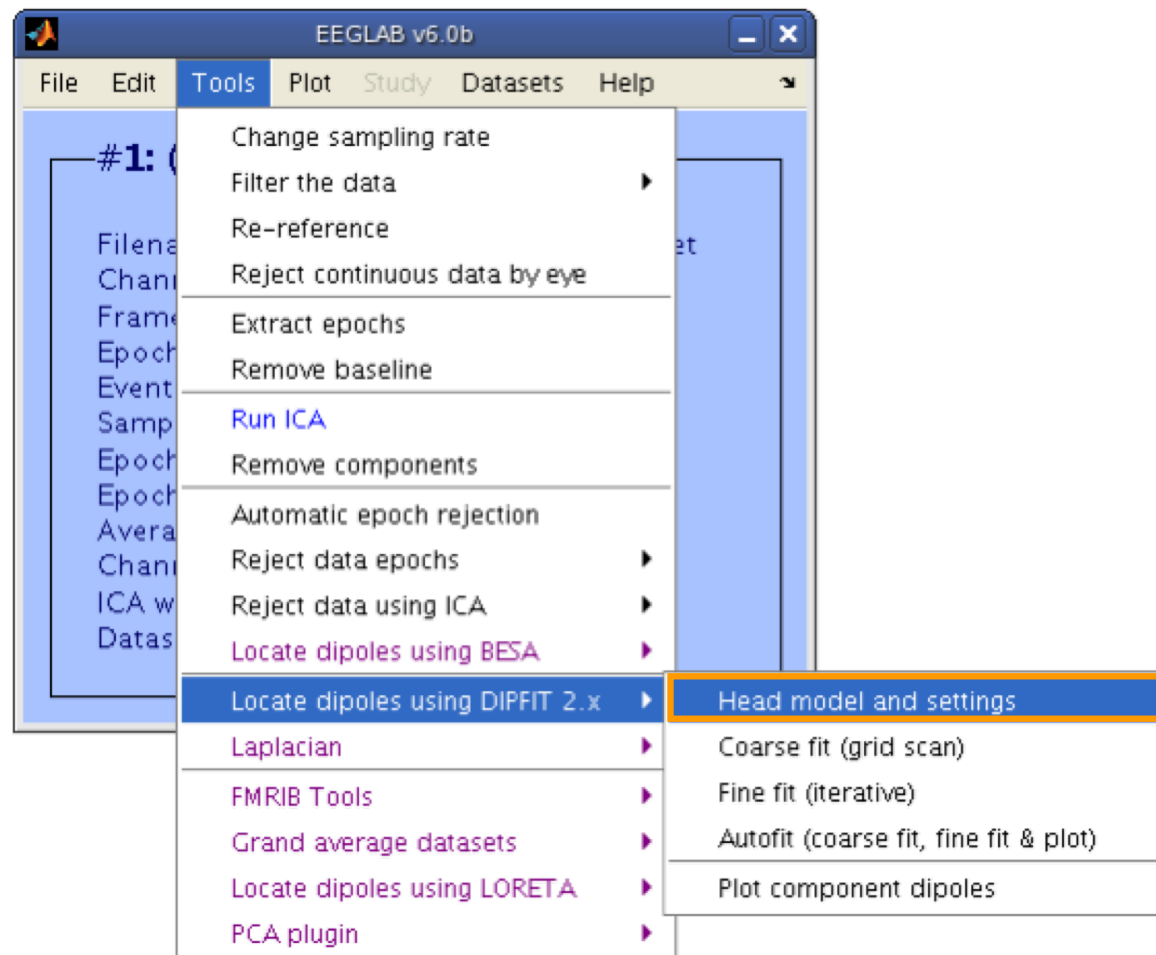
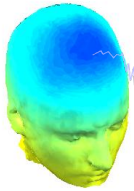


1. Co-register electrodes with model
2. Autofit, plot dipoles, fine fit
3. 3D headplot co-registration



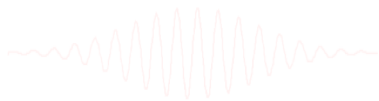
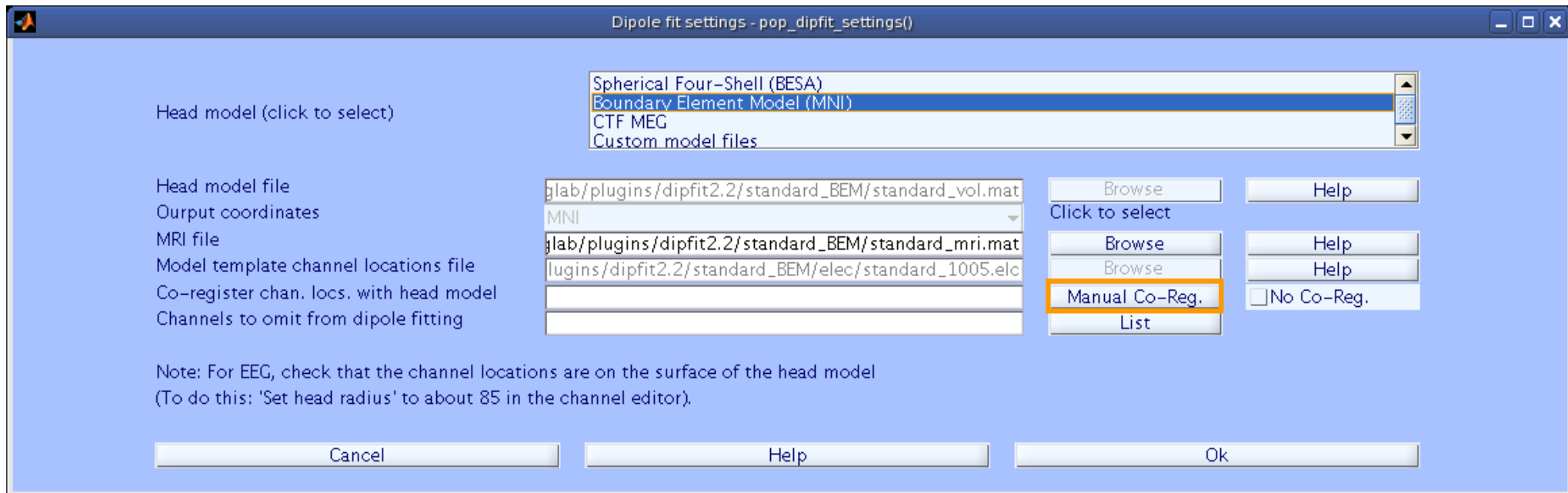
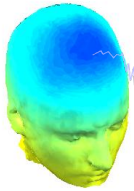


# Finding dipole locations using DIPFIT in EEGLAB



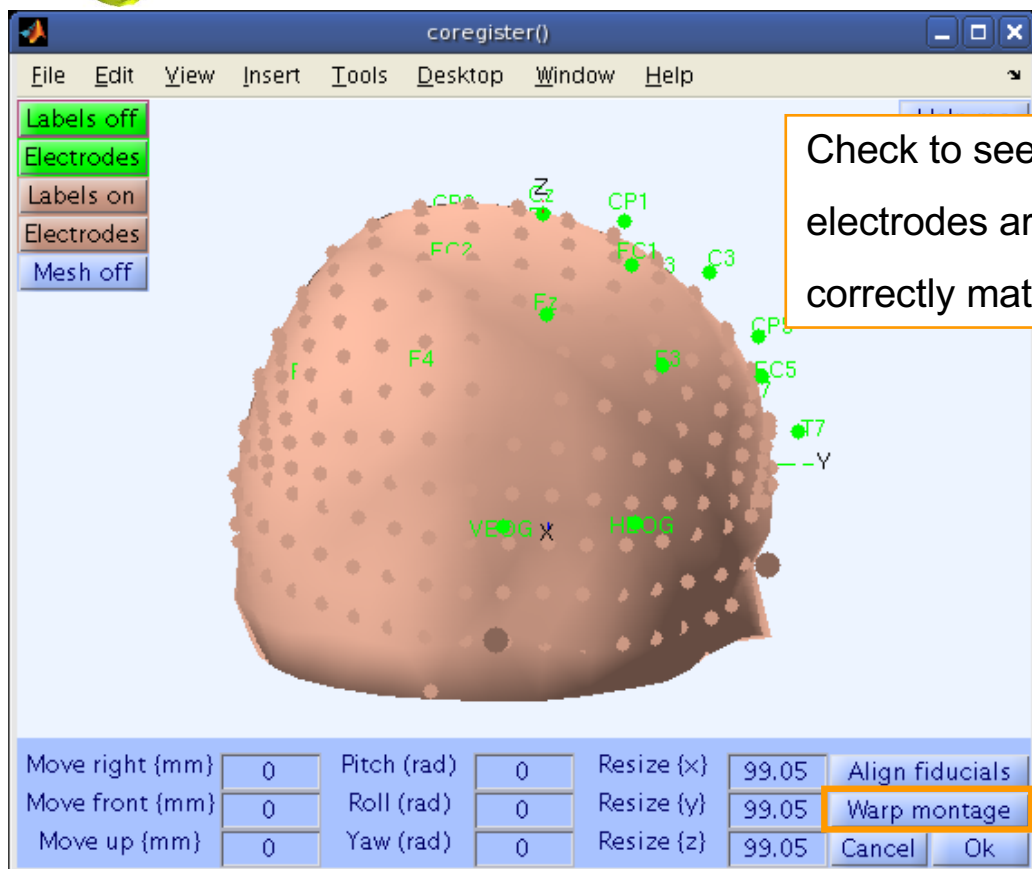
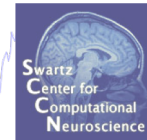
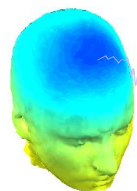


# Co-register to model

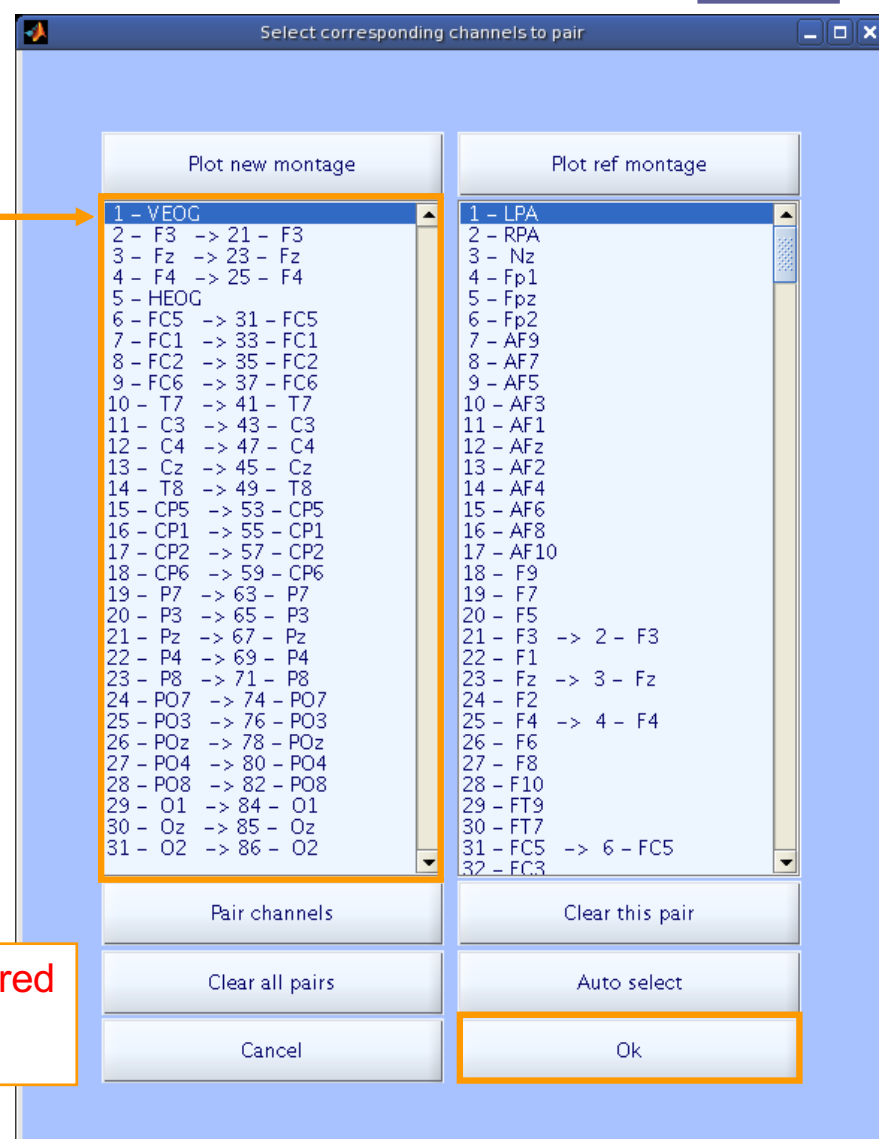




# Alternatively, warp to standard montage



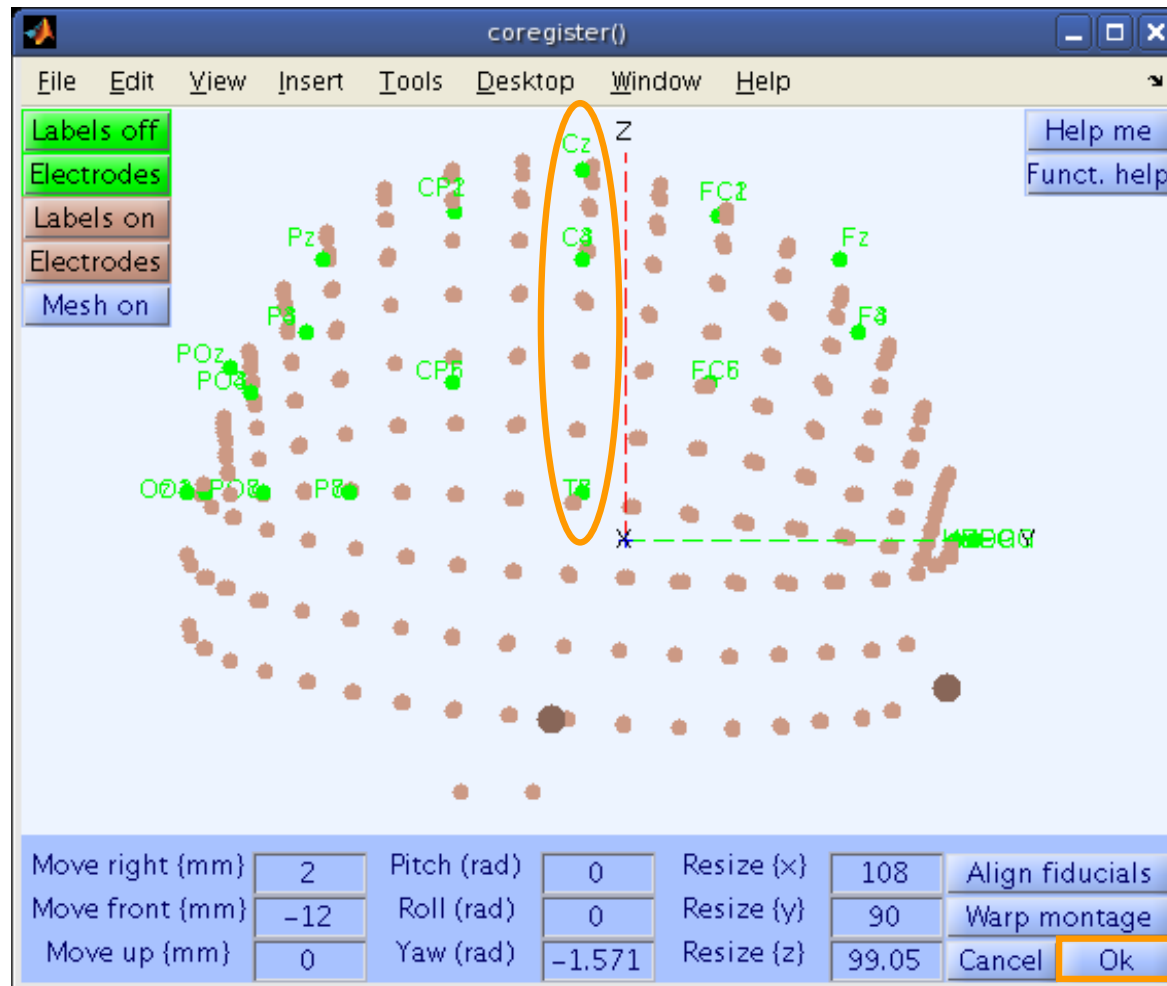
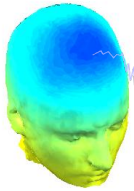
Check to see that  
electrodes are  
correctly matched



stats toolbox required  
for warping

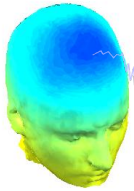


# Check coregistration with model





# Confirm electrode transformation



Dipole fit settings - pop\_dipfit\_settings()

Head model (click to select)

Spherical Four-Shell (BESA)  
Boundary Element Model (MNI)  
CTF MEG  
Custom model files

Head model file: g:\lab\plugins\dipfit2.2\standard\_BEM\standard\_vol.mat

Output coordinates: MNI

MRI file: g:\lab\plugins\dipfit2.2\standard\_BEM\standard\_mri.mat

Model template channel locations file: g:\lab\plugins\dipfit2.2\standard\_BEM\elec\standard\_1005.elc

Co-register chan. locs. with head model: 0 -1.570796 108 90 99.05485

Channels to omit from dipole fitting

Note: For EEG, check that the channel locations are on the surface of the head model  
(To do this: 'Set head radius' to about 85 in the channel editor).

Cancel Help Ok

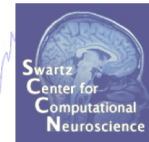
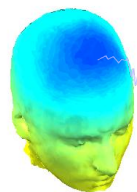
Manual Co-Reg. ☐ No Co-Reg.

Browser buttons: Browse, Click to select, Browse, Browse, Manual Co-Reg., List

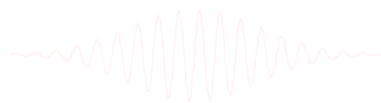
Help buttons: Help, Help, Help



# DIPFIT and model co-registration

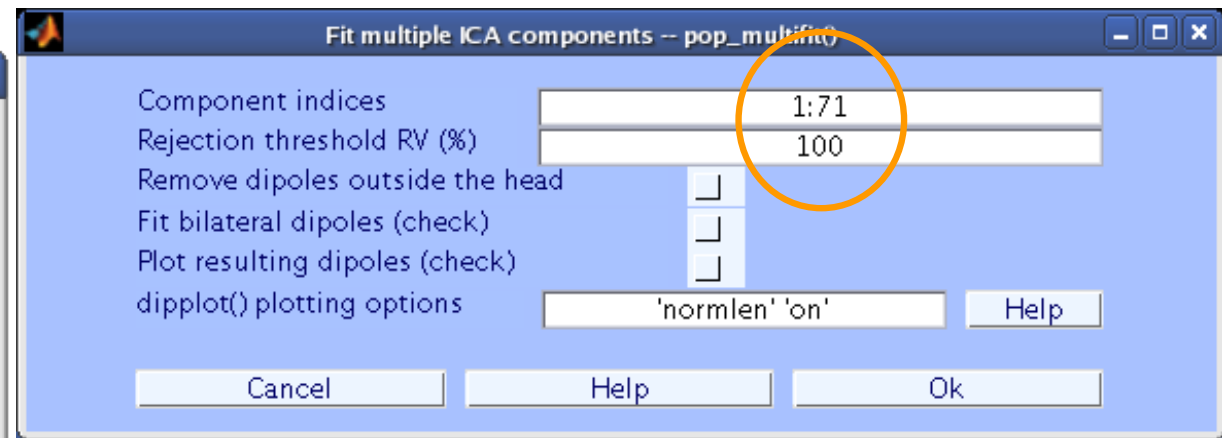
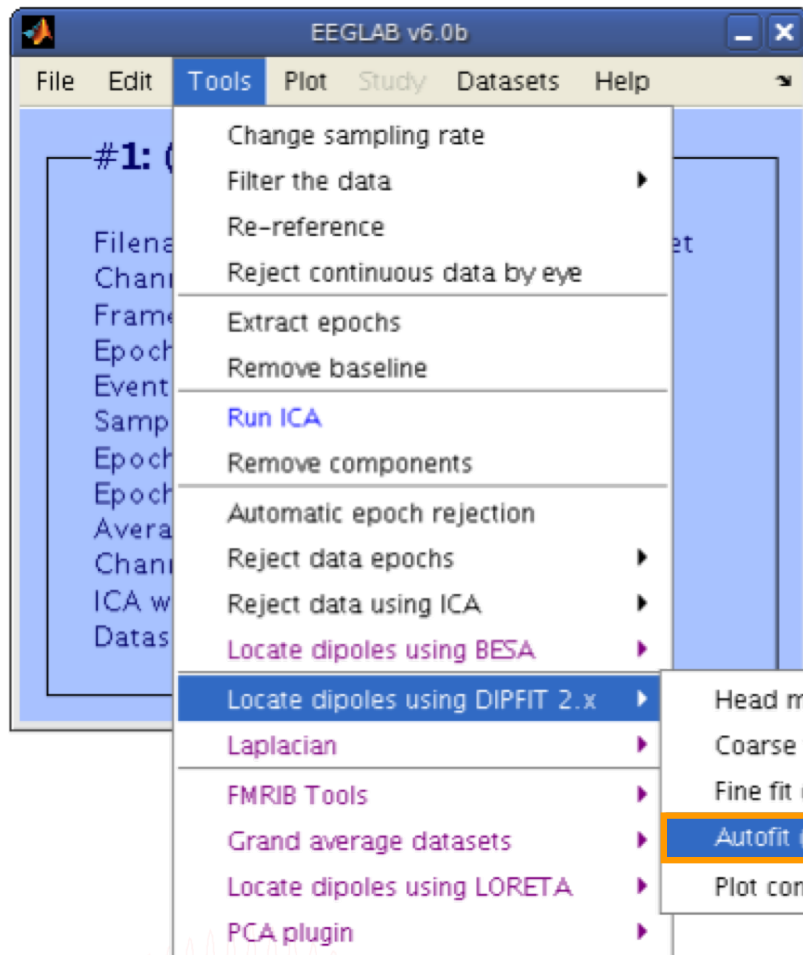
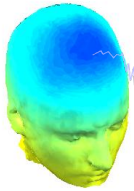


1. Co-register electrodes with model
2. Autofit, plot dipoles, fine fit
3. 3D headplot co-registration



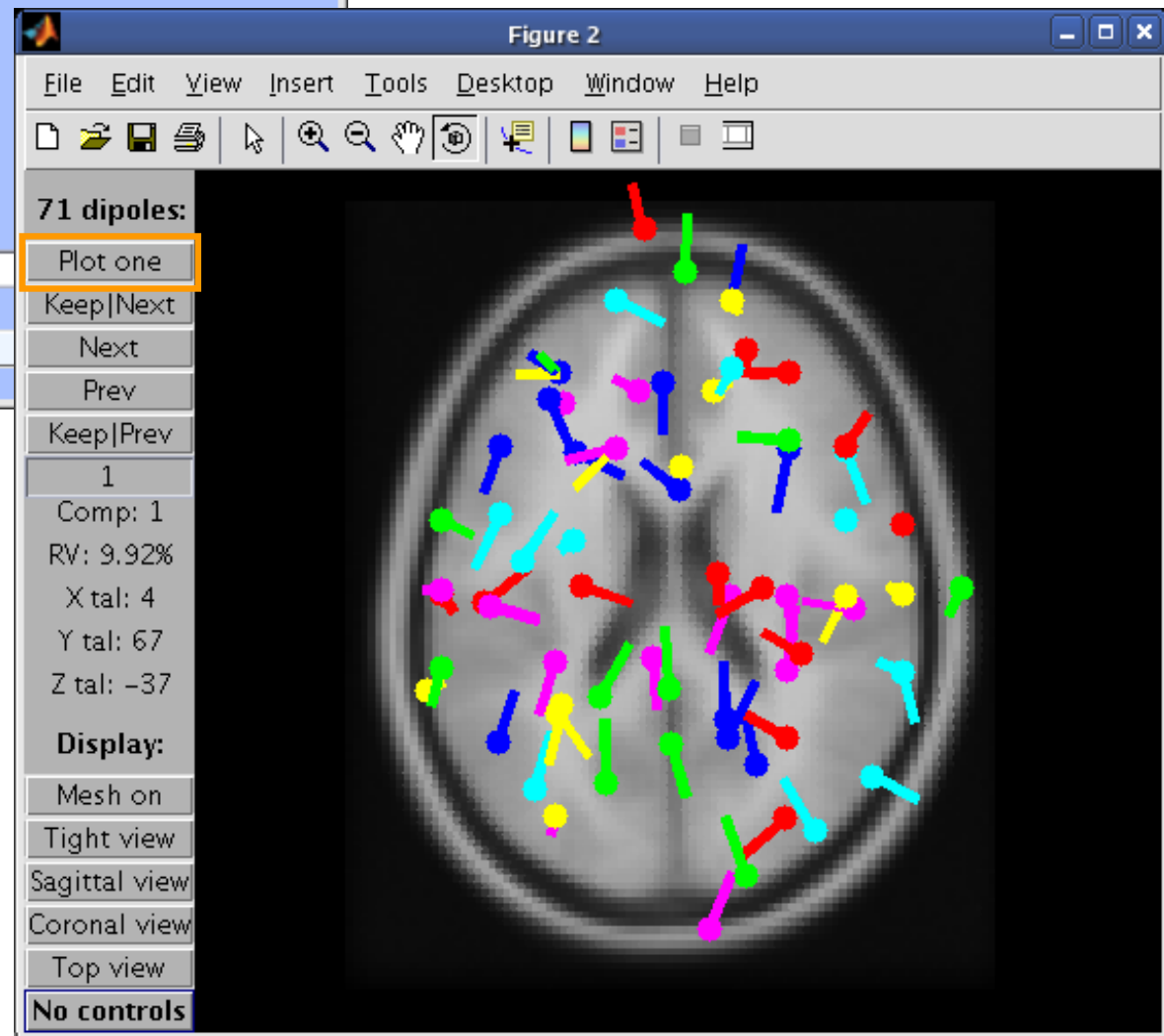
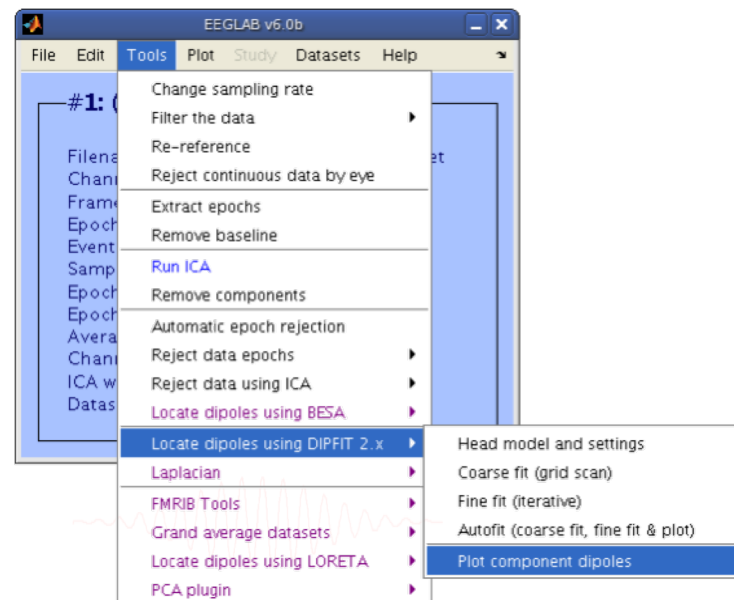
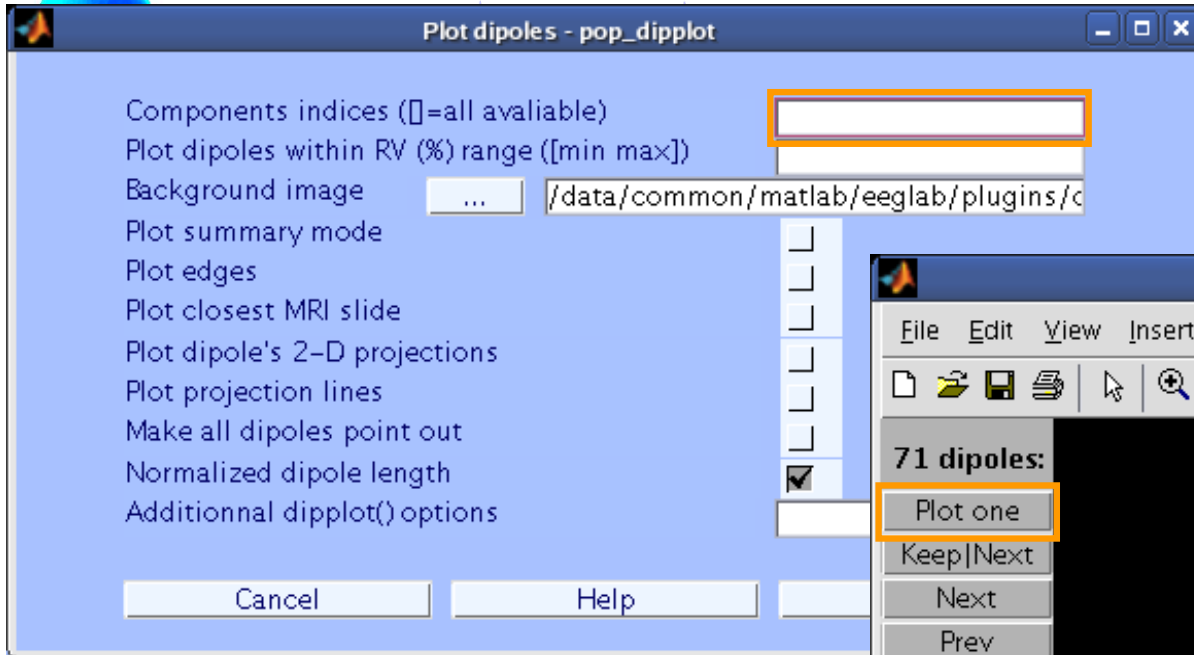


# Autofit equivalent dipoles



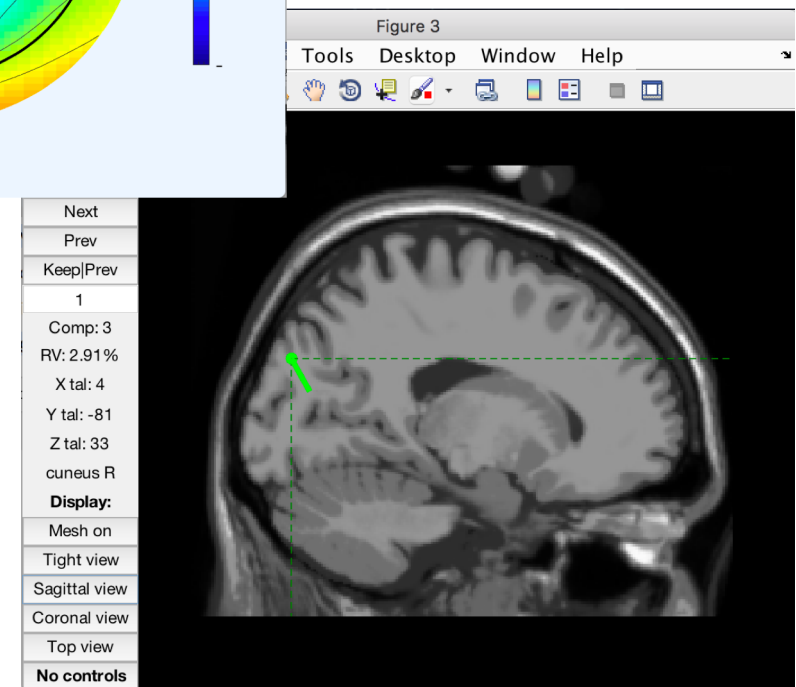
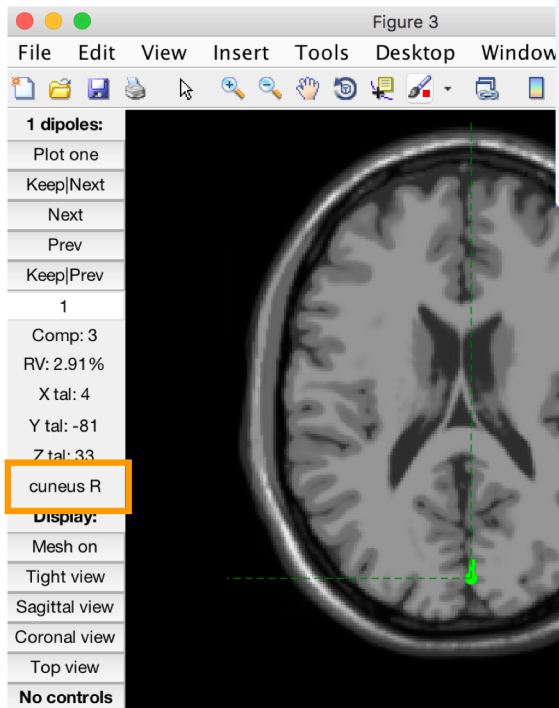
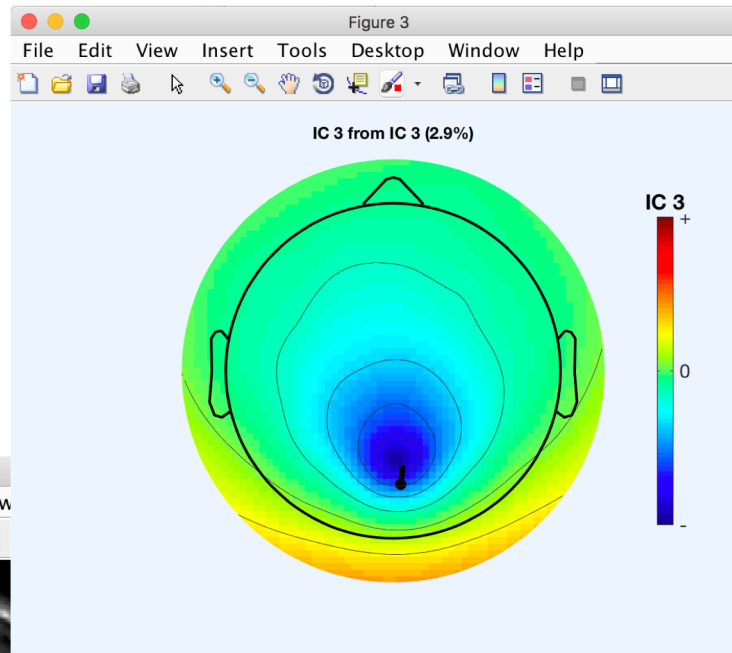
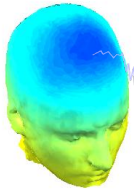


# Plot dipoles



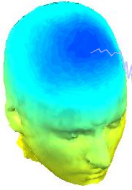


# Scroll through dipoles

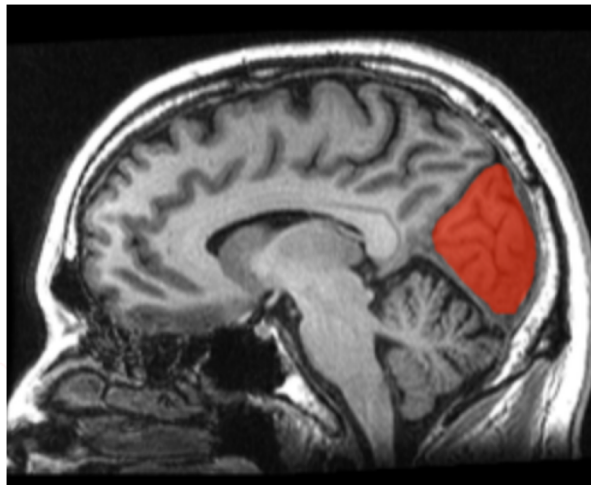
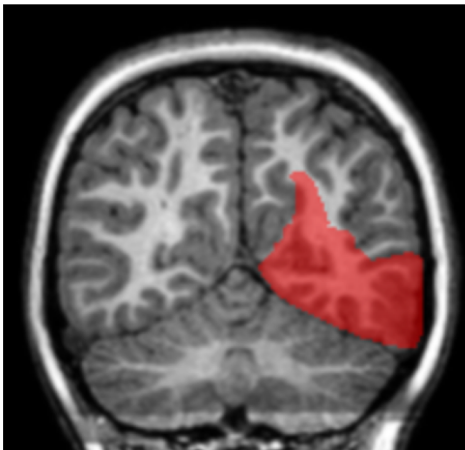




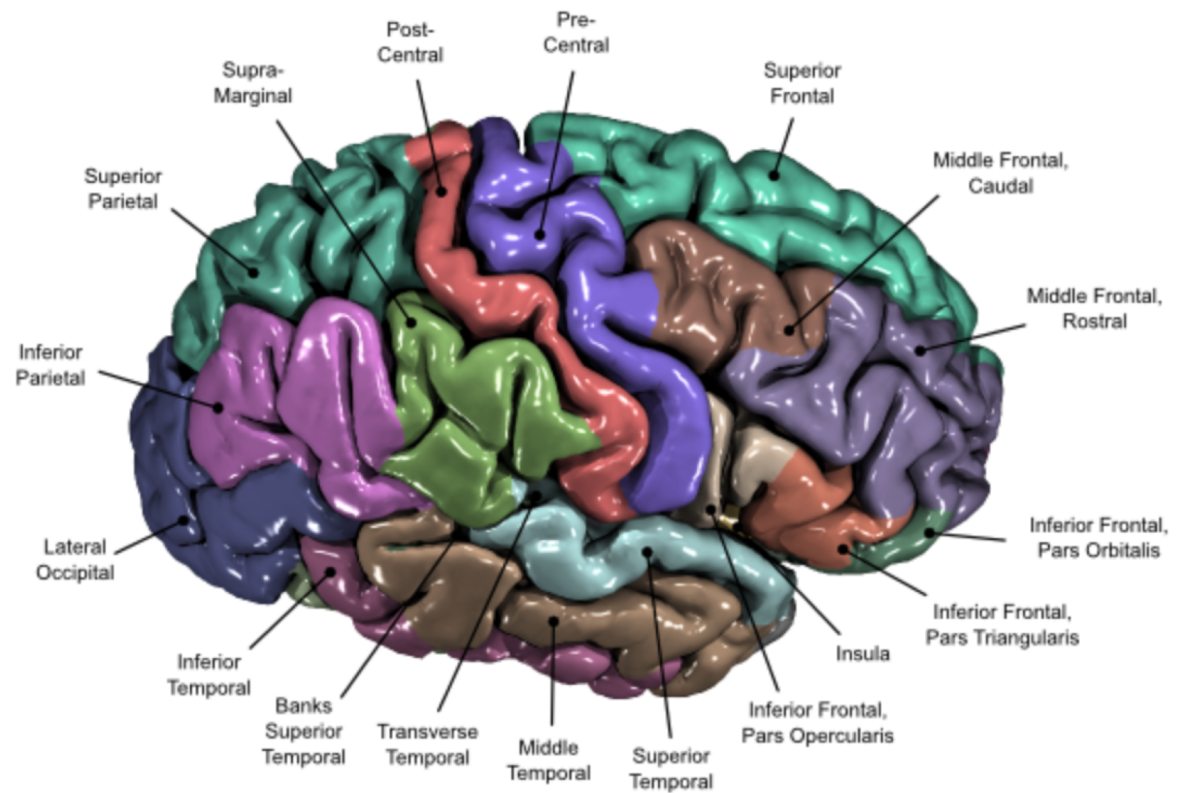
# Desikan-Killiany Atlas



## Right Cuneus

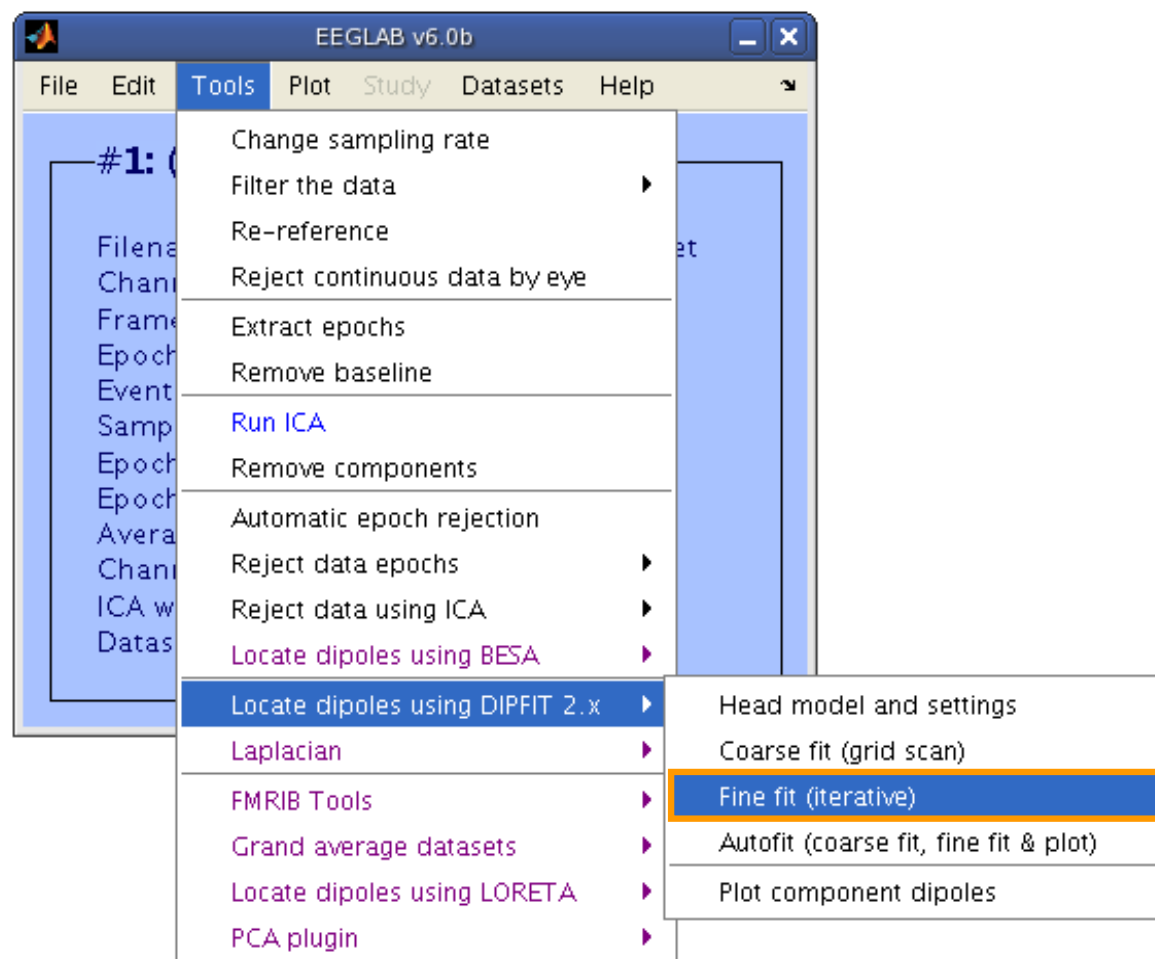
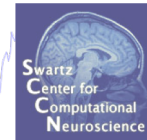
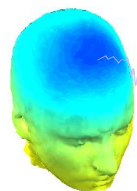


## 68 brain areas



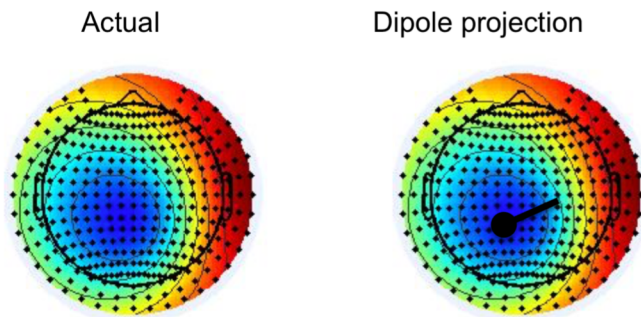
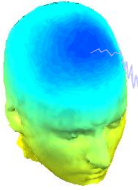


# Fine fit options in DIPFIT

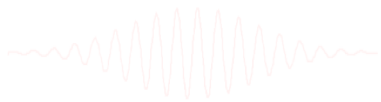
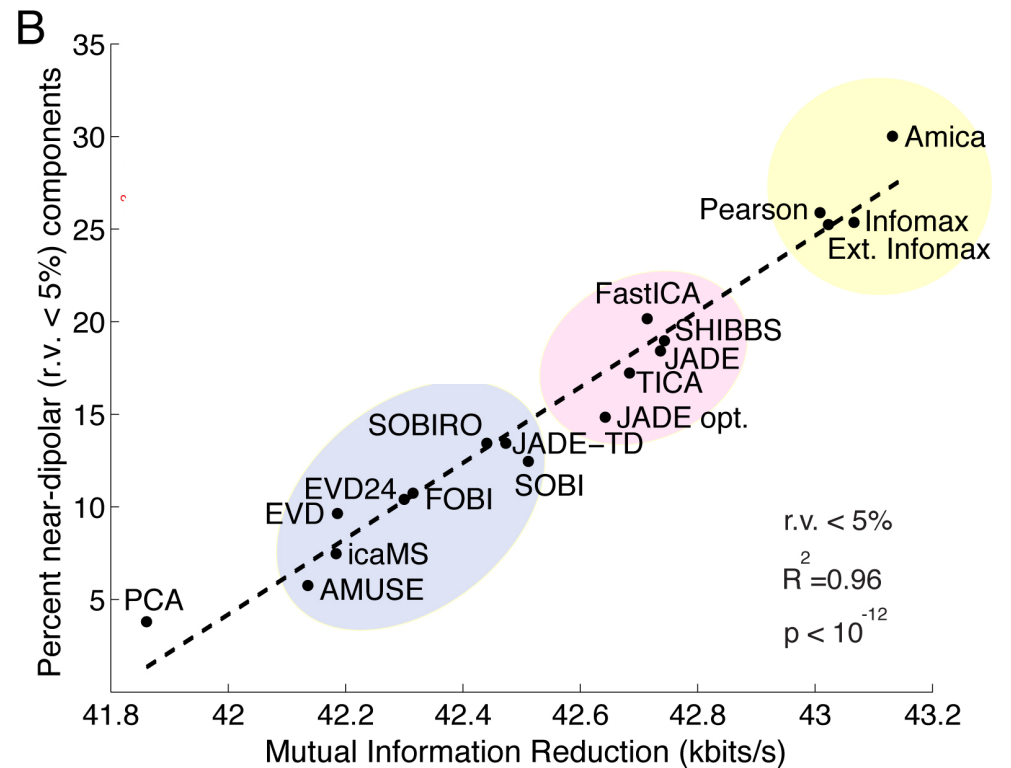




# Computing residual variance

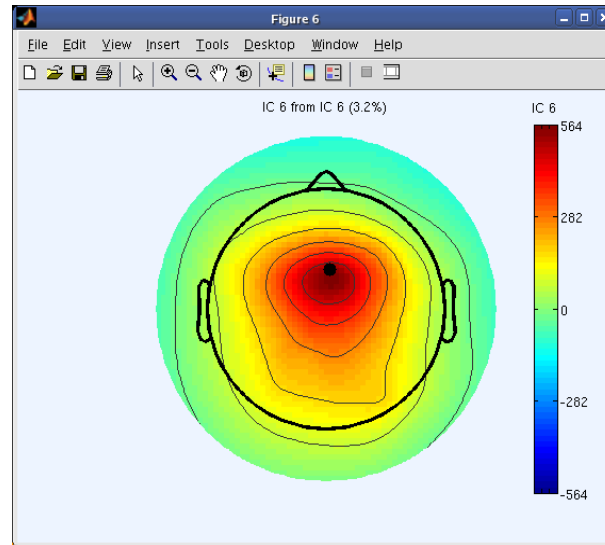
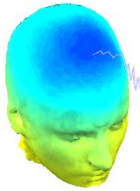


$$r = \sum (x_i - \tilde{x}_i)^2 / \sum x_i^2$$





# Fine fit menu



Manual dipole fit -- pop\_dipfit\_nonlinear()

Component to fit: 6 Plot map Residual variance = 3.21%

dipole	fit	position	moment	
#1	<input checked="" type="checkbox"/>	28.222 -2.401 37.331	2.380 475942.653 3819304.288	Flip (in out)
#2	<input type="checkbox"/>	0.000 0.000 0.000	0.000 0.000 0.000	Flip (in out)

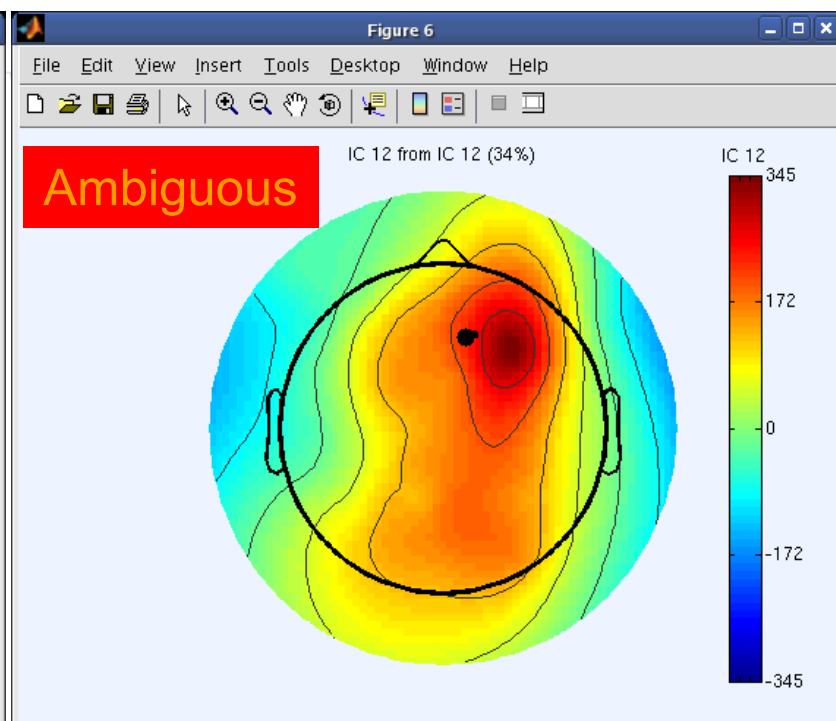
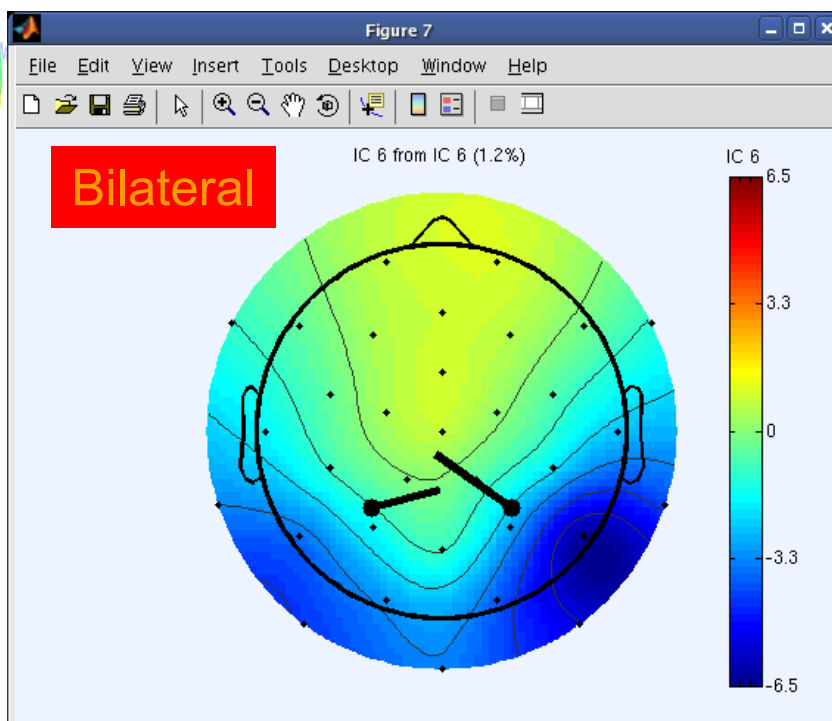
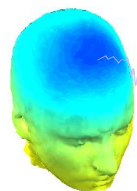
☒ Symmetry constrain for dipole ...

Fit dipole(s)' position & moment Or fit only dipole(s)' moment Plot dipole(s)

Cancel Help Ok



# Bilateral dipoles



Manual dipole fit -- pop\_dipfit\_nonlinear()

Component to fit: 6 Plot map Residual variance = 1.23%

dipole	fit	position	moment	
#1	<input checked="" type="checkbox"/>	-35.066 -32.492 -4.684	32271.382 46141.284 5880.224	Flip (in out)
#2	<input checked="" type="checkbox"/>	-35.066 32.492 -4.684	005.419 -38050.427 14094.824	Flip (in out)

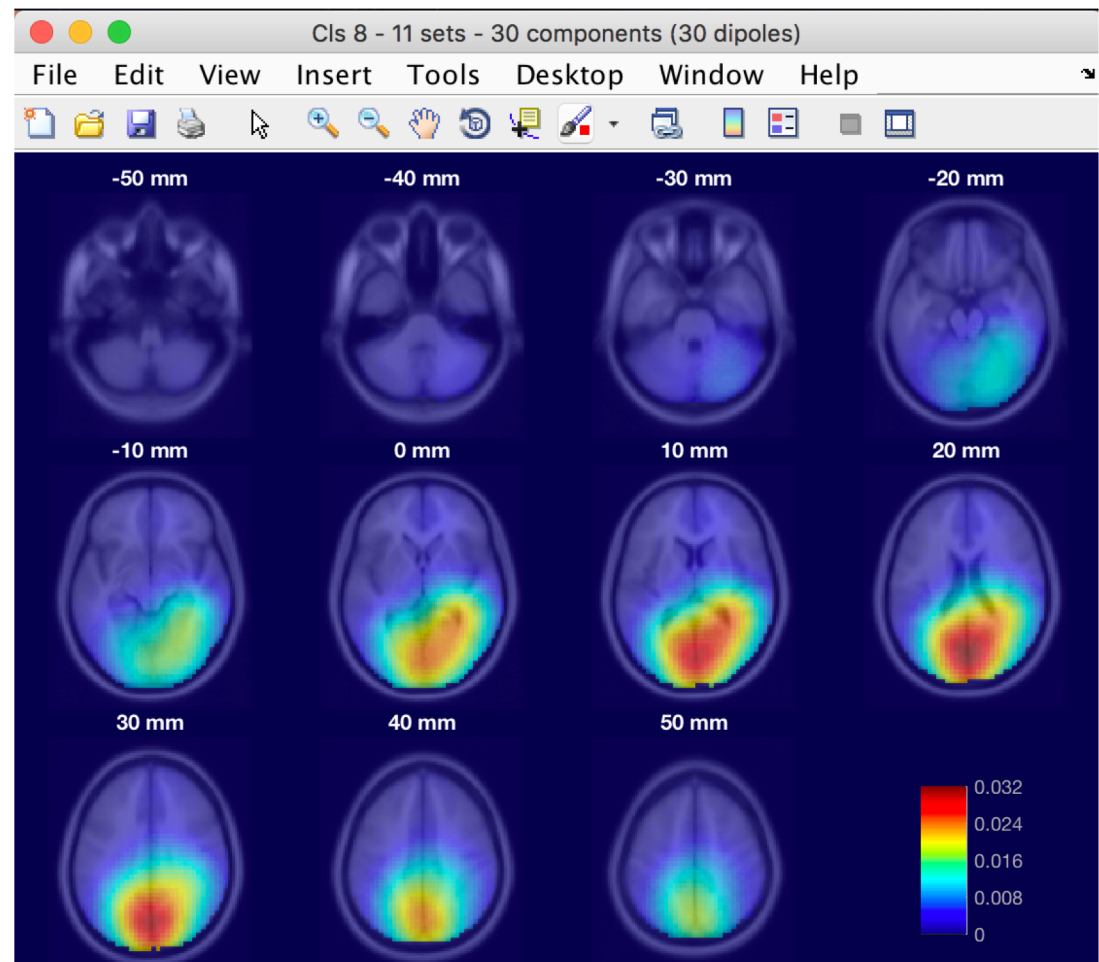
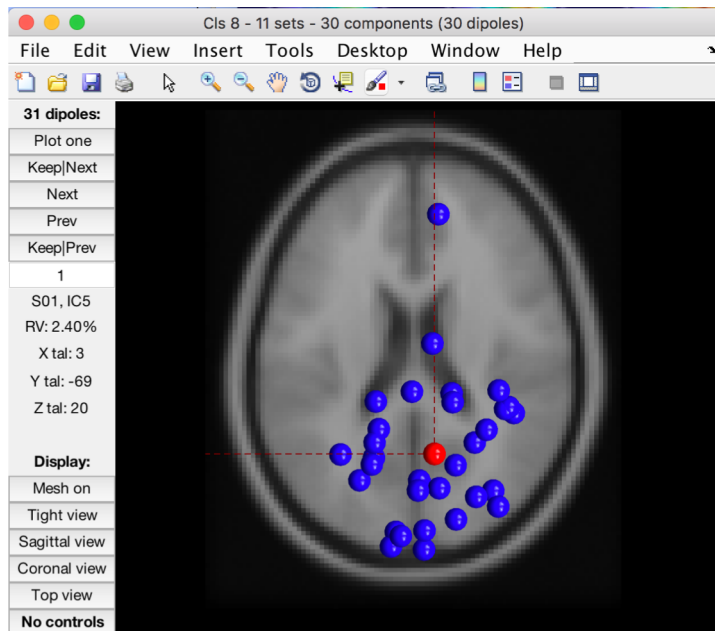
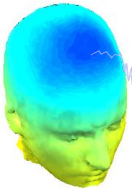
☒ Symmetry constrain for dipole ...

Fit dipole(s)' position & moment Or fit only dipole(s)' moment Plot dipole(s)

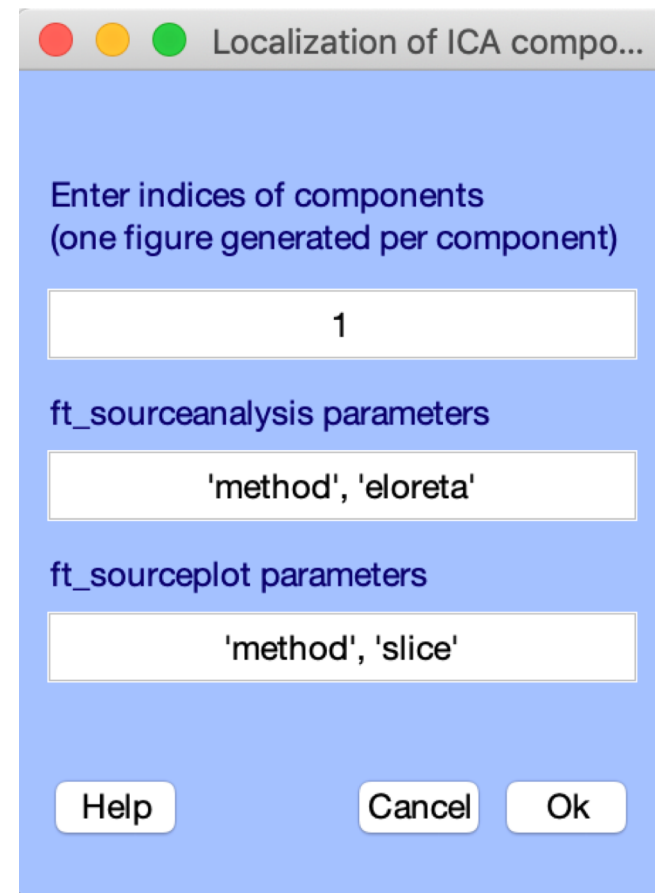
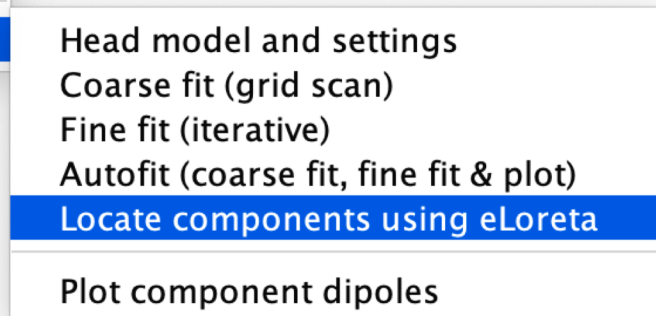
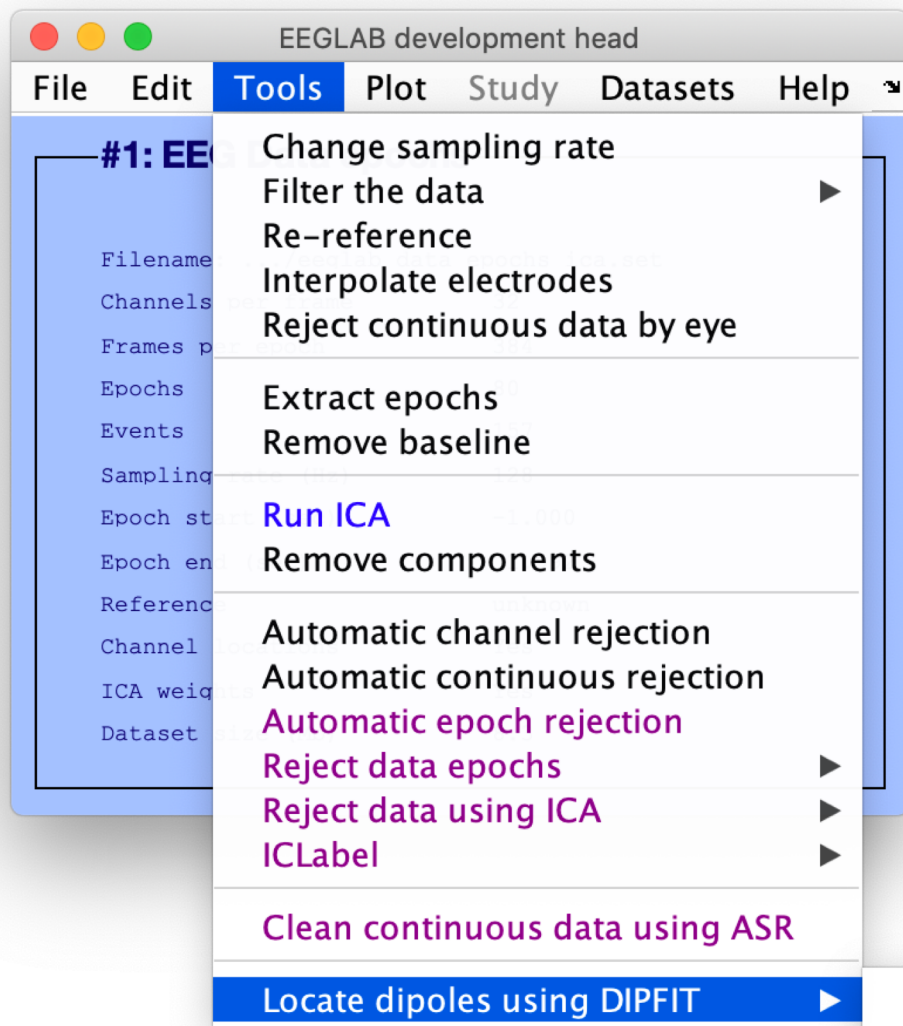
Cancel Help Ok



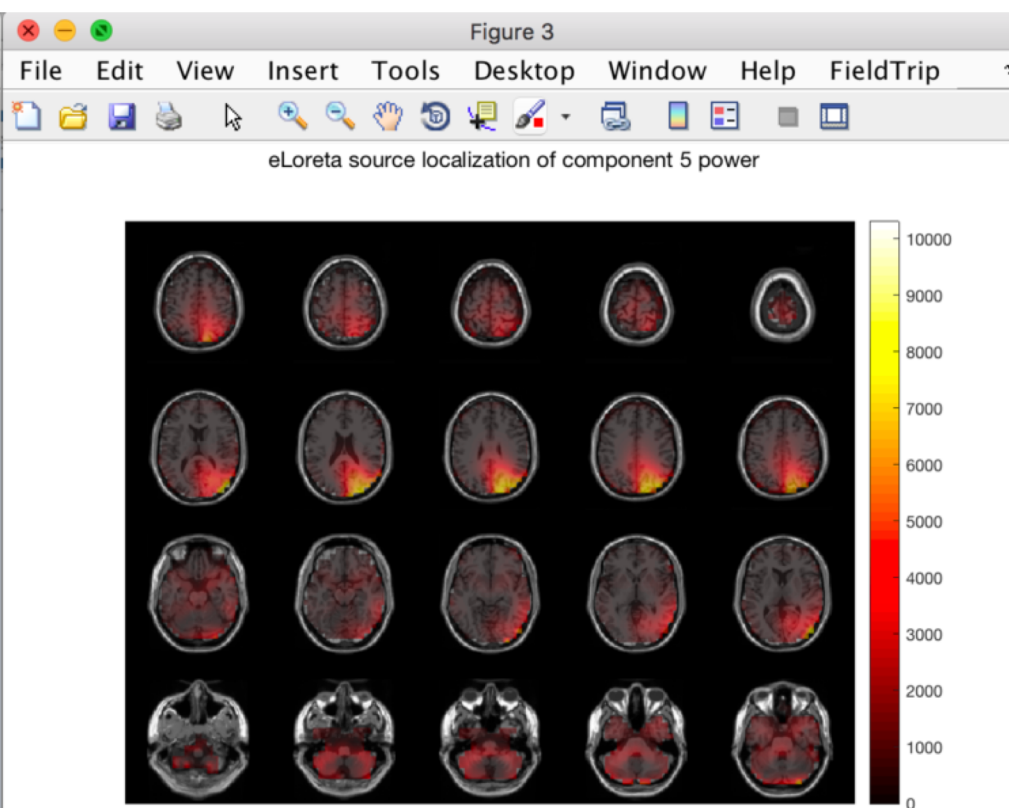
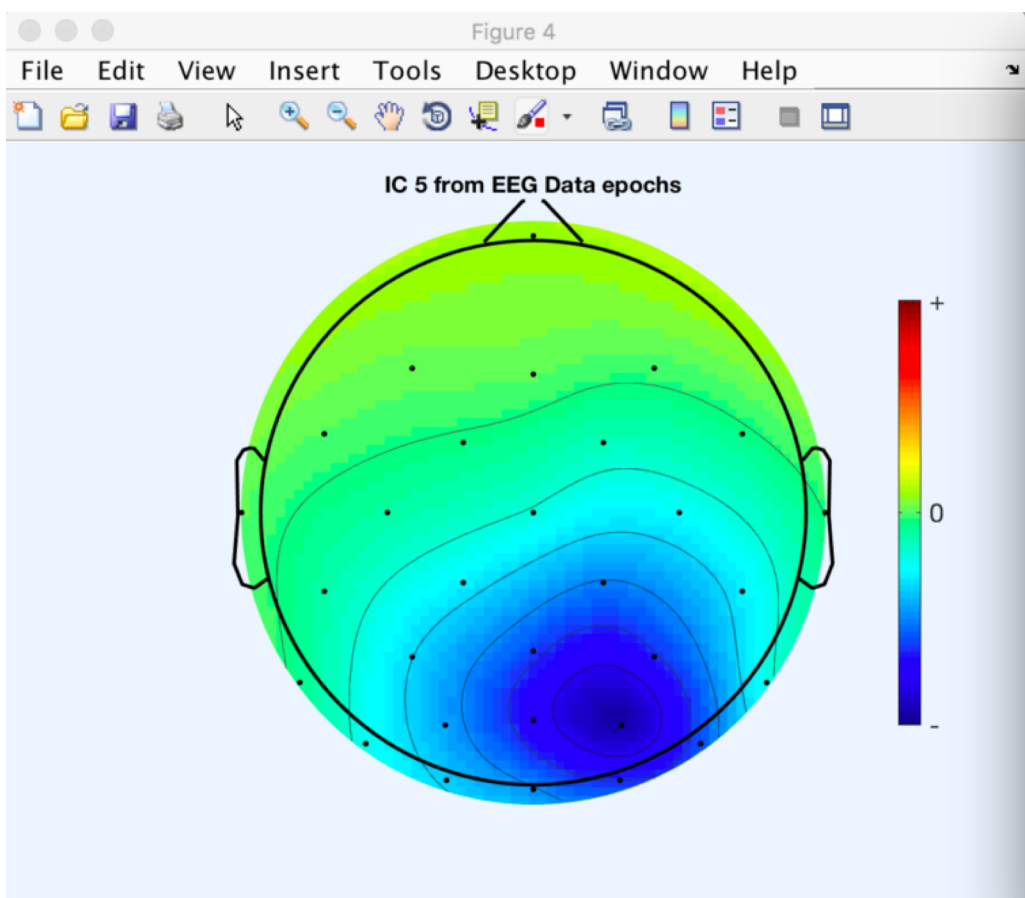
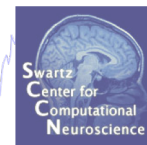
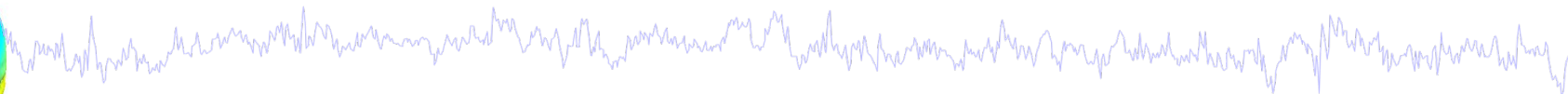
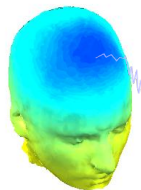
# Visualizing ICA component clusters





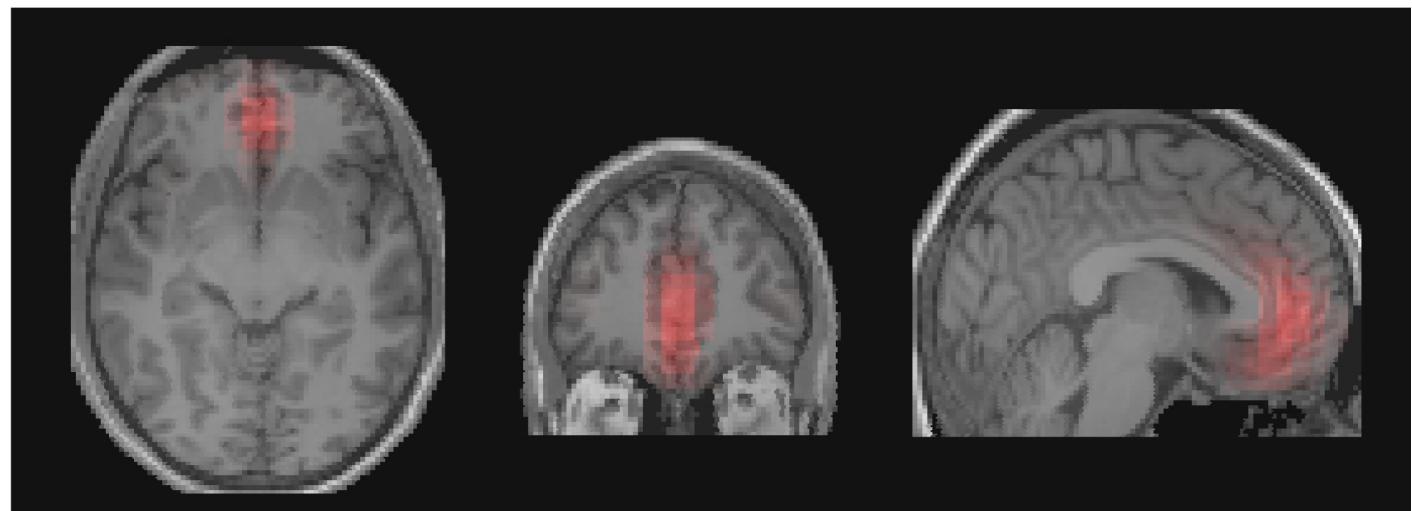
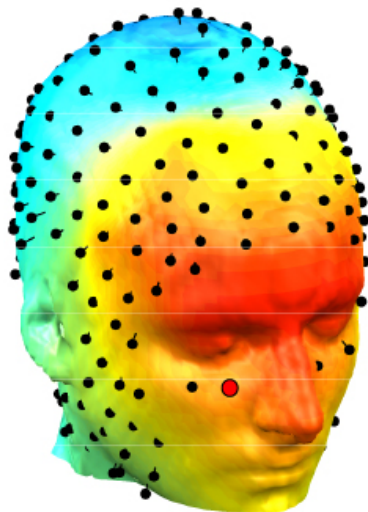
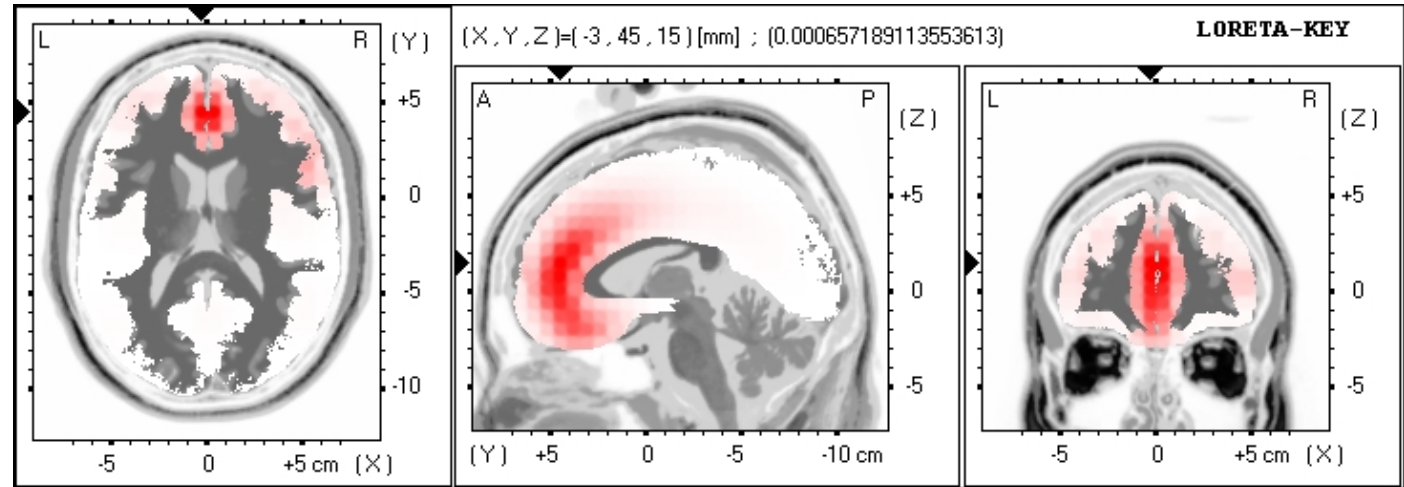
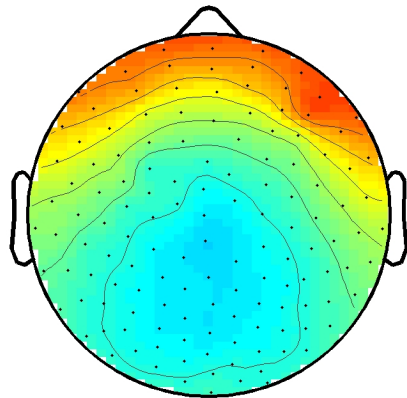
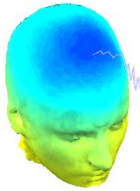




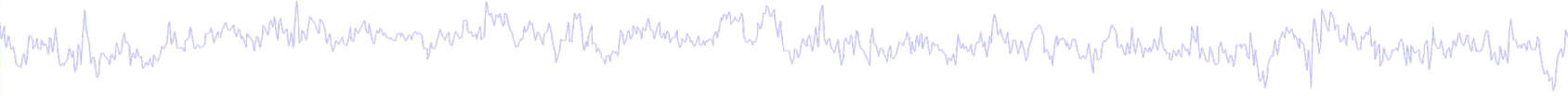
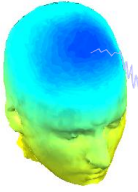




# Localization of activity using Loreta







[https://sccn.ucsd.edu/wiki/LORETA\\_for\\_EEGLAB](https://sccn.ucsd.edu/wiki/LORETA_for_EEGLAB)

(8) LORETA plugin for EEGLAB x

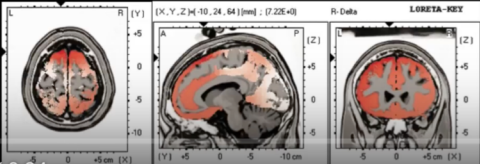
Secure | [https://www.youtube.com/watch?v=amttvN\\_Sb6A](https://www.youtube.com/watch?v=amttvN_Sb6A)

Apps Qwant Google Google maps Sofia email MyYoutb Math Leili JAST Japan Israel Activit Jira PJ mask Other Bookmarks

YouTube JP Rechercher

# Using the LORETA 2.0 plugin for EEGLAB

Arnaud Delorme, PhD



0:01 / 8:24

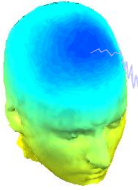
LORETA plugin for EEGLAB

293 vues

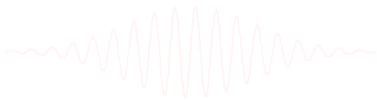
5 0 PARTAGER



# DIPFIT and model co-registration

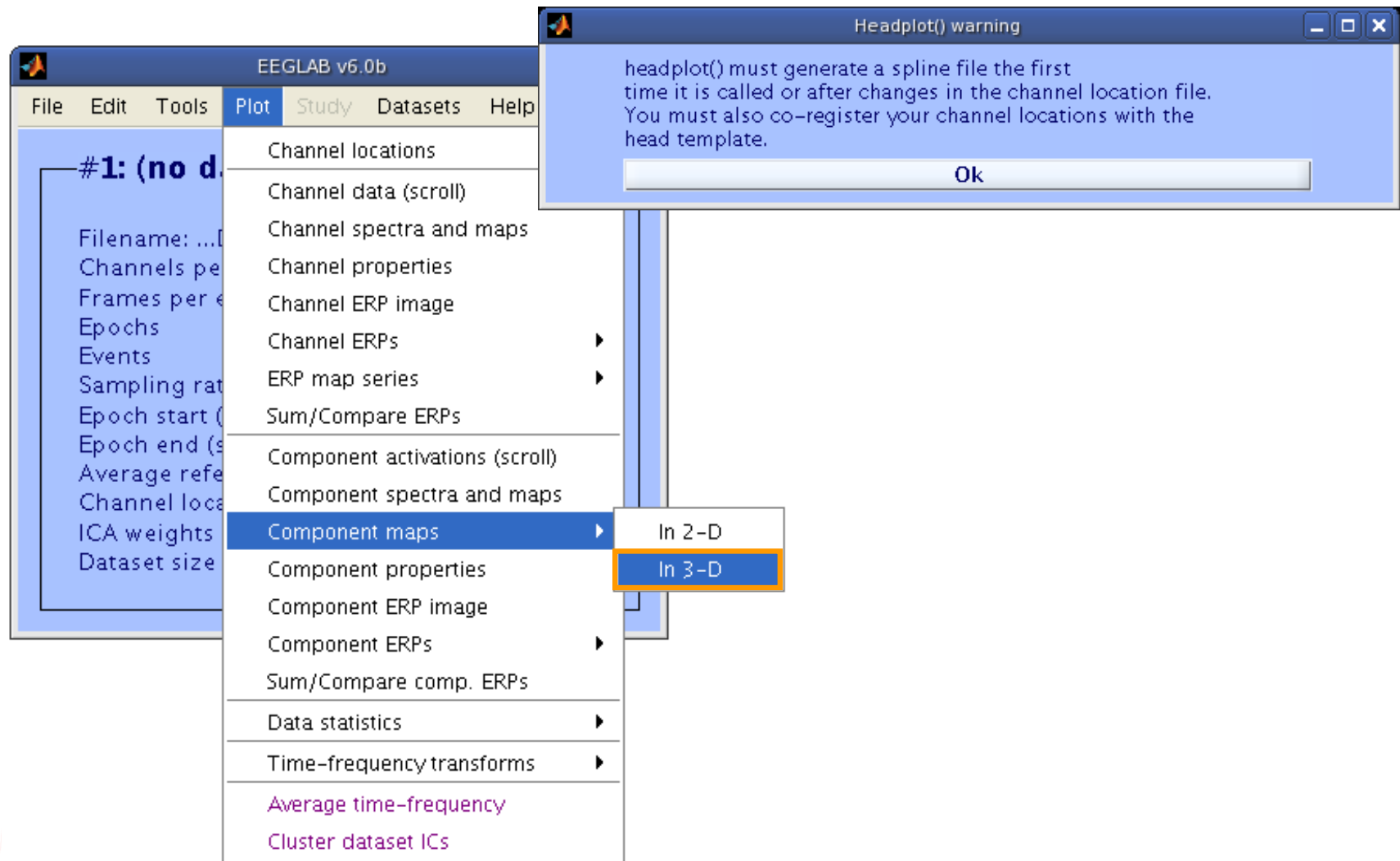
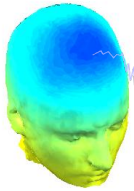


1. Co-register electrodes with model
2. Autofit, plot dipoles, fine fit
3. 3D headplot co-registration



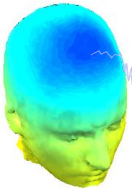


# Plot scalp maps in 3D





# Headplot co-registration



Component head plot(s) -- pop\_headplot()

**Co-register channel locations with head mesh and compute a mesh spline file (done only once)**

☐ Use the following spline file or structure

☒ Or (re)compute a new spline file named:

3-D head mesh file

Mesh associated channel file

Talairach-model transformation matrix

/home/julie/S01\_attend1\_pos1.spl

mheadnew.mat

mheadnew.xyz

Browse

Help

Browse

Help

Browse

Browse

Manual coreg.

1:31

Components of dataset:

Ok

coregister()

File Edit View Insert Tools Desktop Window Help

Labels off

Electrodes

Labels on

Electrodes

Mesh off

Help me

Funct. help

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

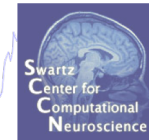
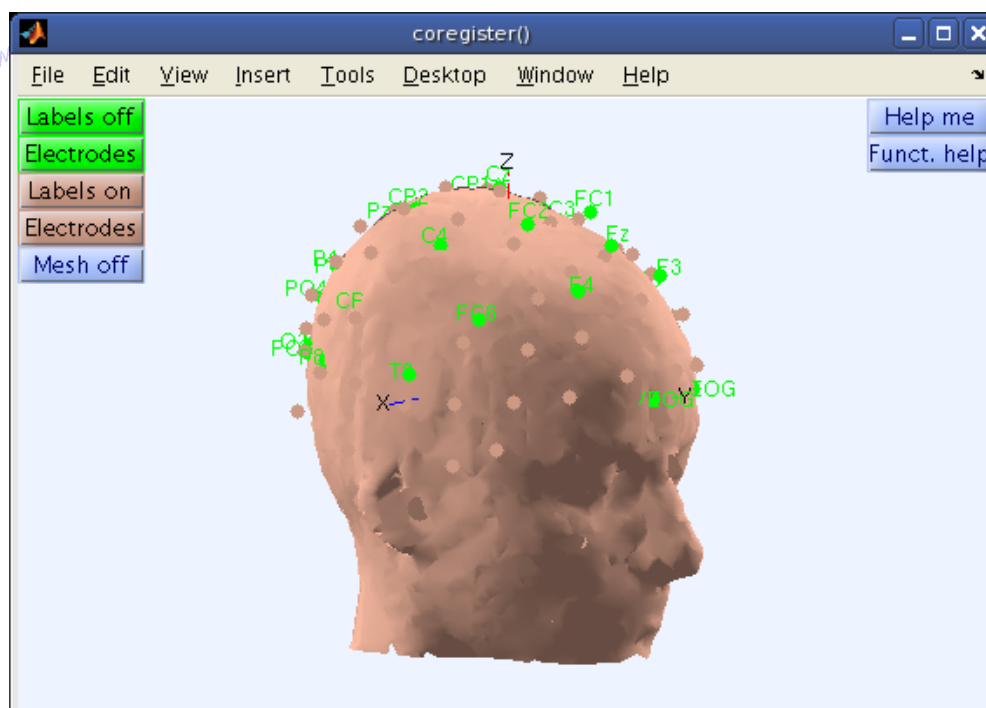
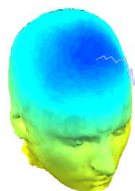
Move right {mm} 0 Pitch (rad) 0 Resize {x} 90.87 Align fiducials

Move front {mm} 0 Roll (rad) 0 Resize {y} 90.87 Warp montage

Move up {mm} 0 Yaw (rad) 0 Resize {z} 90.87 Cancel Ok



# Confirm headplot co-registration



Component head plot(s) -- pop\_headplot()

**Co-register channel locations with head mesh and compute a mesh spline file (done only once)**

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/home/julie/S01_attend1_pos1.spl					
mheadnew.mat					
mheadnew.xyz					
0	0	-1.570796	100	76	90.87264

Browse Help

Browse Help

Browse

Browse

Manual coreg.

**Plot interpolated activity onto 3-D head**

Component numbers to plot (negative numbers invert comp. polarities):

Plot title:

Plot geometry (rows,columns): (Default [] = near square)

-> headplot() options (See >> help headplot):

1:31

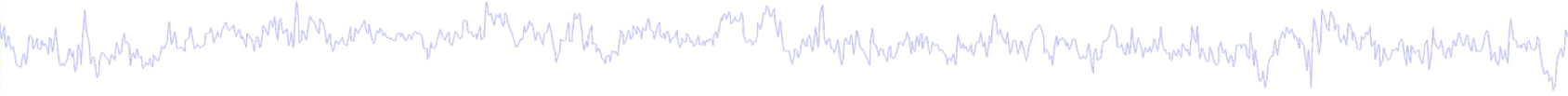
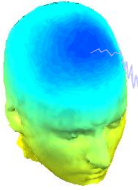
Components of dataset:

Cancel

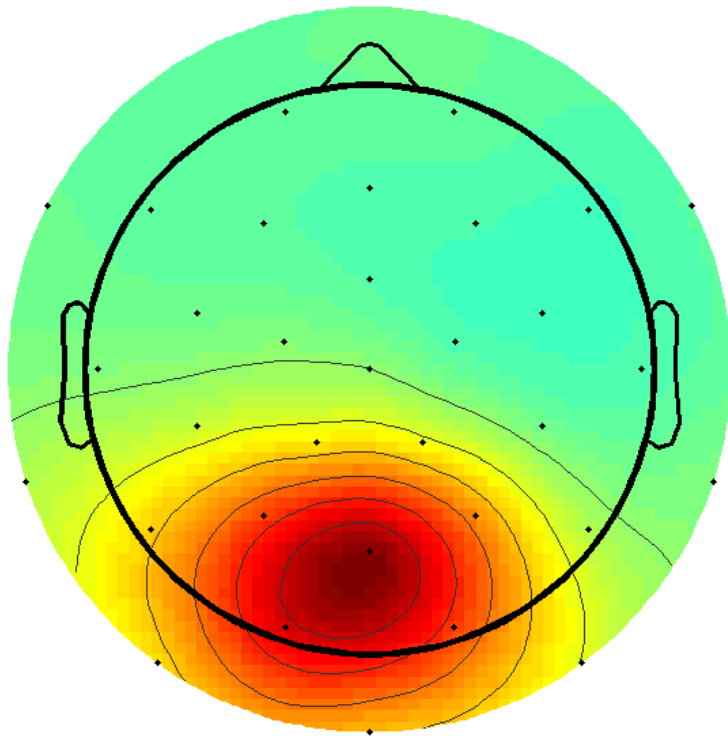
Ok



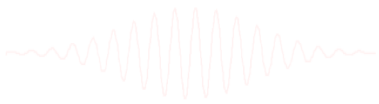
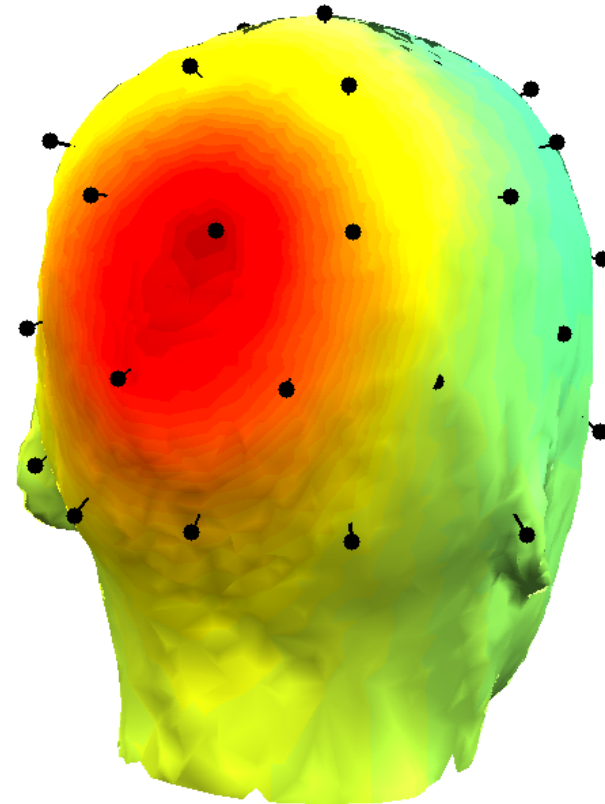
# Spline file in EEG structure



2D scalp map for IC 12

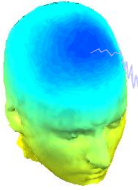


3D scalp map for IC 12





# Exercise



- **Novice / Intermediate**
  - Load 'stern\_125Hz.set' dataset
  - Practice co-registering electrodes with **BEM** model (choose 'Erase' because this dataset has co-registration done already)
  - Autofit IC dipoles
  - Fine fit dipoles
  - Plot dipoles from the GUI; scroll through components individually
  - Co-register the head model for 3D scalp map plotting. Then plot some ICs in 3D
- **Advanced**
  - In the Finefit menu, try fitting a bilateral dipole, what happens to the residual variance?
  - Try plotting a subset of dipoles in 'summary mode'

