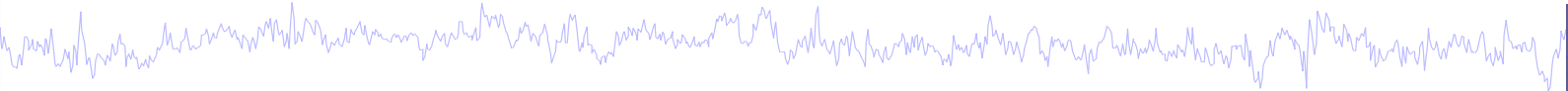


# The STUDY gui



## **Task 1**

Build a STUDY

## **Task 2**

Precluster the data

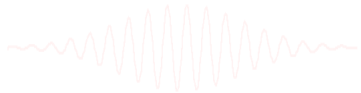
## **Task 3**

Cluster the data

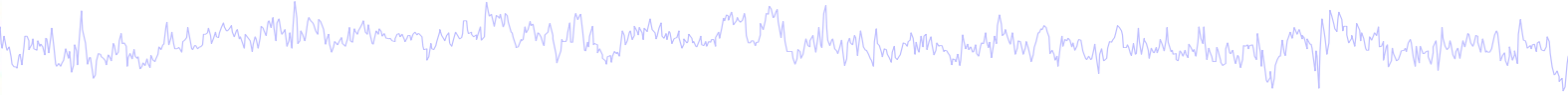
## **Task 4**

Edit/view the clusters

## **Exercise...**



# The STUDY gui



## **Task 1**

Build a STUDY

## **Task 2**

Precluster the data

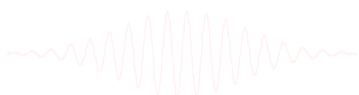
## **Task 3**

Cluster the data

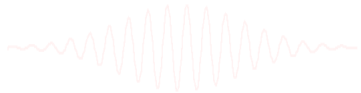
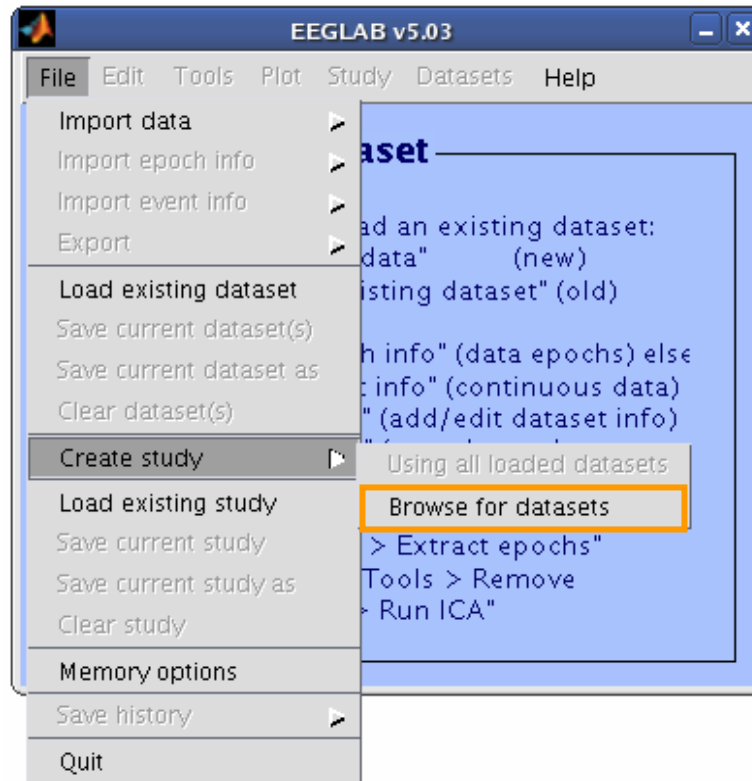
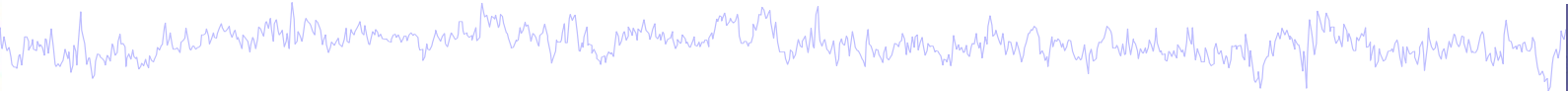
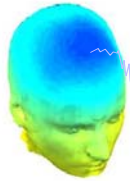
## **Task 4**

Edit/view the clusters

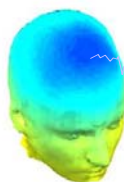
## **Exercise...**



# Build a STUDY



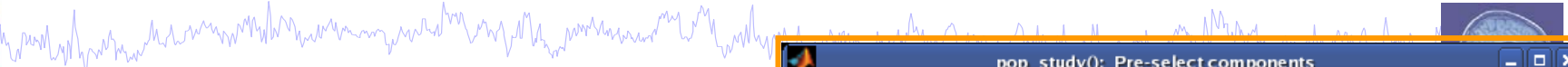
# Build a STUDY, cont'd



The main dialog box is titled "Create a new STUDY set: pop\_study()". It contains fields for "STUDY set name:", "STUDY set task name:", and "STUDY set notes:". Below these is a table with columns: "dataset filename", "browse", "subject", "session", and "condition". The table has 10 rows, with the "browse" column containing ellipsis buttons. At the bottom of the dialog are checkboxes for "Update dataset info" (checked) and "Delete cluster information", and a field for "Save this study to a disk file named:". Buttons for "Cancel", "Help", and "Ok" are at the bottom.

The file selection window is titled "Choose dataset to add to STUDY -- pop\_study()". It has a "Filter" field with the text "/home/julie/workshop06/5subjects/S02/\*.set\*,\*.SET\*". It shows two panes: "Directories" with "/home/julie/workshop06/5subjects/S02/" selected, and "Files" with "syn02-S253-clean.set" and "syn02-S254-clean.set" listed. The "Files of type" is set to "\*.set\*,\*.SET\*". The "Selection" field shows "/home/julie/workshop06/5subjects/S02/". Buttons for "Open", "Filter", and "Cancel" are at the bottom.

# Edit dataset info



pop\_study(): Pre-select components

Enter maximum residual (topo map - dipole proj.) var. (in %)  
NOTE: This will delete any existing component clusters!

15

Cancel Help Ok

Create a new STUDY set -- pop\_study()

Create a new STUDY set

STUDY set name: Synonyms

STUDY set task name: Word Recognition

STUDY set notes:

	dataset filename	browse	subject	session	condition	group	Select by r.v.	
1	objects/S02/syn02-S253-clean.set	...	S02		synonyms		All comp.	Clear
2	objects/S02/syn02-S254-clean.set	...	S02		non-synonyms		All comp.	Clear
3	objects/S05/syn05-S253-clean.set	...	S05		synonyms		All comp.	Clear
4	objects/S05/syn05-S254-clean.set	...	S05		non-synonyms		All comp.	Clear
5	objects/S07/syn07-S253-clean.set	...	S07		synonyms		All comp.	Clear
6	objects/S07/syn07-S254-clean.set	...	S07		non-synonyms		All comp.	Clear
7	objects/S08/syn08-S253-clean.set	...	S08		synonyms		All comp.	Clear
8	objects/S08/syn08-S254-clean.set	...	S08		non-synonyms		All comp.	Clear
9	objects/S10/syn10-S253-clean.set	...	S10		synonyms		All comp.	Clear
10	objects/S10/syn10-S254-clean.set	...	S10		non-synonyms		All comp.	Clear

Important note: Removed datasets will not be saved before being deleted from EEGLAB memory

< Page 1 >

Update dataset info - datasets stored on disk will be overwritten (unset = Keep study info separate).

Delete cluster information (to allow loading new datasets, set new components for clustering, etc.)

Save this study to a disk file named: \_\_\_\_\_

Cancel Help Ok

# Choosing ICs to cluster



Create a new STUDY set -- pop\_study()

**Create a new STUDY set**  
STUDY set name:  
STUDY set task name:  
STUDY set notes:

dataset filename

1	objects/S02/syn02-S253-clean.
2	objects/S02/syn02-S254-clean.
3	objects/S05/syn05-S253-clean.
4	objects/S05/syn05-S254-clean.
5	objects/S07/syn07-S253-clean.
6	objects/S07/syn07-S254-clean.
7	objects/S08/syn08-S253-clean.
8	objects/S08/syn08-S254-clean.
9	objects/S10/syn10-S253-clean.
10	objects/S10/syn10-S254-clean.

Important note: Removed datasets will

Update dataset info – datasets  
 Delete cluster information (to allow loading new datasets, set new components for clustering, etc.)  
Save this study to a disk file named: \_\_\_\_\_

Cancel Help Ok

select components

ic 19
ic 20
ic 21
ic 22
ic 23
ic 24
ic 25
ic 26
ic 27
ic 28
ic 29
ic 30
ic 31
ic 32

Cancel Ok

Synonyms  
Word Recognition

condition	group	Select by r.v.	
synonyms		Comp.: 1 2 ...	Clear
on-synonyms		Comp.: 1 2 ...	Clear
synonyms		Comp.: 1 2 ...	Clear
on-synonyms		Comp.: 1 2 ...	Clear
synonyms		Comp.: 1 2 ...	Clear
on-synonyms		Comp.: 1 2 ...	Clear
synonyms		Comp.: 1 2 ...	Clear
on-synonyms		Comp.: 1 2 ...	Clear
synonyms		Comp.: 1 2 ...	Clear
on-synonyms		Comp.: 1 2 ...	Clear
GLAB memory		Comp.: 1 2 ...	Clear

>

Keep study info separate).

# STUDY structure

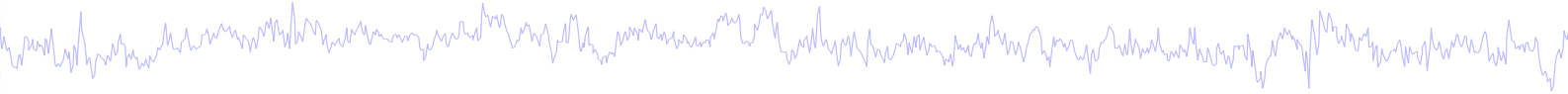


STUDY =

```
    name: 'Synonyms'  
    task: 'Word Recognition'  
    notes: ''  
    filename: 'workshop.study'  
    cluster: [1x1 struct]  
    history: [1x6654 char]  
datasetinfo: [1x10 struct]  
    filepath: '/data/STUDY'  
    subject: {'S02' 'S05' 'S07' 'S08' 'S10'}  
    group: {}  
    session: []  
condition: {'non-synonyms' 'synonyms'}  
    setind: [2x5 double]  
    etc: [1x1 struct]  
preclust: [1x1 struct]  
    saved: 'no'  
changgrp: []
```

>>

# More useful STUDY info...



```
>> STUDY.datasetinfo
```

```
ans =
```

```
1x10 struct array with fields:
```

```
    filepath
```

```
    filename
```

```
    subject
```

```
    session
```

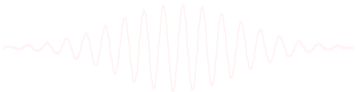
```
    condition
```

```
    group
```

```
    comps
```

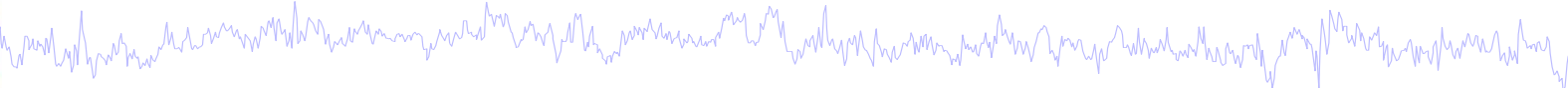
```
    index
```

```
>>
```





# Cluster info in 'STUDY'



```
>> STUDY.cluster
```

```
ans =
```

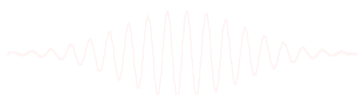
```
1x13 struct array with fields:
```

```
    name  
    parent  
    child  
    comps  
    sets  
    algorithm  
    centroid  
    preclust
```

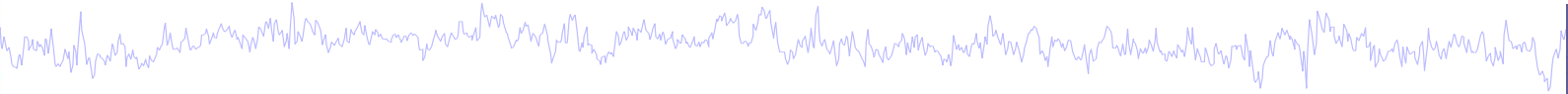
```
>> STUDY.cluster(2)
```

```
ans =
```

```
    name: 'Cls 2'  
    parent: {'ParentCluster 1'}  
    child: []  
    comps: [9 10 21 18 26 20 27]  
    sets: [2x7 double]  
    algorithm: {'Kmeans' [12]}  
    centroid: []  
    preclust: [1x1 struct]
```



# The STUDY gui



## **Task 1**

Build a STUDY

## **Task 2**

Precluster the data

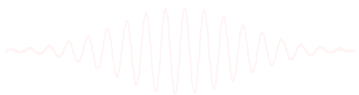
## **Task 3**

Cluster the data

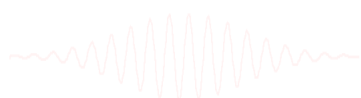
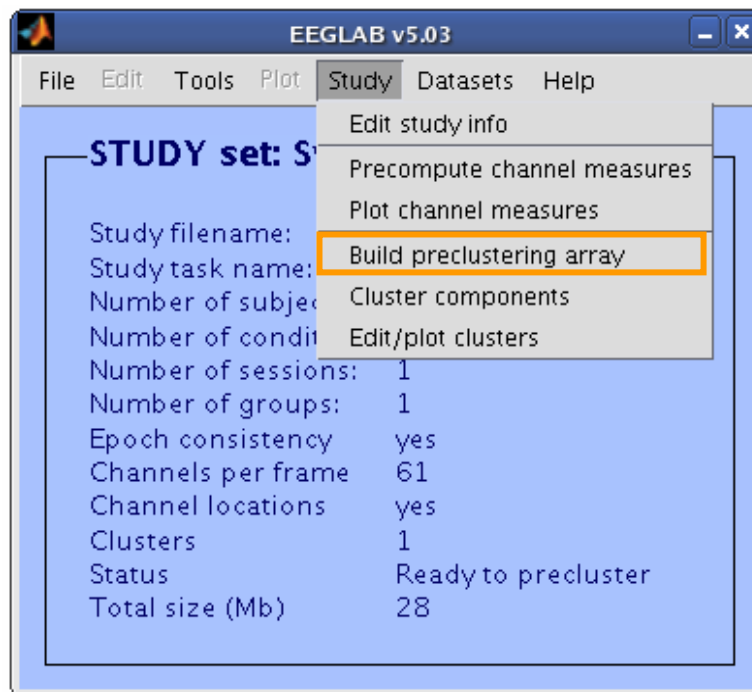
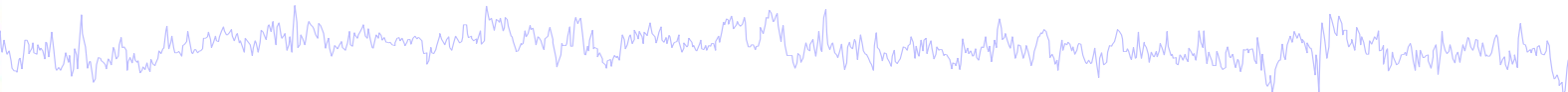
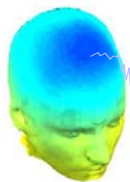
## **Task 4**

Edit/view the clusters

## **Exercise...**



# Precluster the data



# Precluster the data



Select and compute component measures for later clustering -- pop\_preclust()

**Pre-compute clustering measures for STUDY 'Synonyms'**  
Select the cluster to refine during sub-clustering (any existing sub-hierarchy will be overwritten)

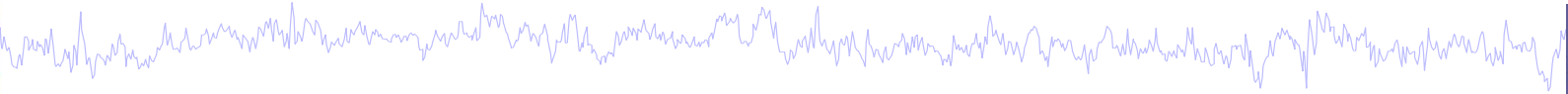
ParentCluster 1 (151 ICs)

Pre-compute or Load	Dims.	Norm.	Rel. Wt.	
<input checked="" type="checkbox"/> spectra	10	<input checked="" type="checkbox"/> 1	Frequency range [Hz]	3 25
<input type="checkbox"/> ERPs	10	<input checked="" type="checkbox"/> 1	Latency range in ms [lo hi]	-2100 1995
<input checked="" type="checkbox"/> dipoles	3	<input checked="" type="checkbox"/> 10		
<input type="checkbox"/> scalp maps	10	<input checked="" type="checkbox"/> 1	Use channel values	<input checked="" type="checkbox"/> Absolute values
<input checked="" type="checkbox"/> ERSPs	10	<input checked="" type="checkbox"/> 1	Time/freq. parameters	'freqrange', [3 50], 'timewind'
<input checked="" type="checkbox"/> ITCs	10	<input checked="" type="checkbox"/> 1	Time/freq. parameters	'freqrange', [3 50], 'timewind'
<input type="checkbox"/> Final dimensions	10			

Save STUDY to file

Cancel Help Ok

# The STUDY gui



## **Task 1**

Build a STUDY

## **Task 2**

Precluster the data

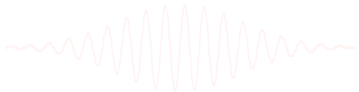
## **Task 3**

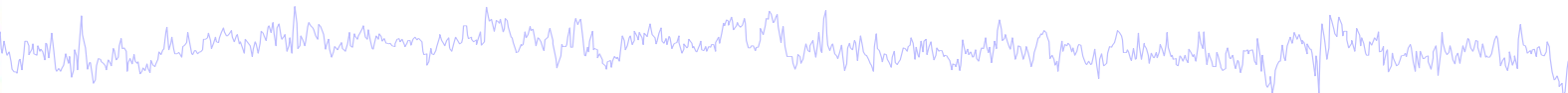
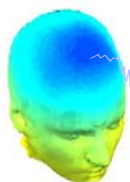
Cluster the data

## **Task 4**

Edit/view the clusters

## **Exercise...**





EEGLAB v5.03

File Edit Tools Plot **Study** Datasets Help

**STUDY set: S**

Study filename:  
Study task name:  
Number of subjects:  
Number of conditions:  
Number of sessions: 1  
Number of groups: 1  
Epoch consistency: yes  
Channels per frame: 61  
Channel locations: yes  
Clusters: 1  
Status: Ready  
Total size (Mb): 28

- Edit study info
- Precompute channel measures
- Plot channel measures
- Build preclustering array
- Cluster components**
- Edit/plot clusters

Set clustering algorithm -- pop\_clust()

**Performing clustering on cluster 'ParentCluster 1'**

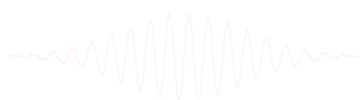
Clustering algorithm: **Kmeans** ✓

Number of clusters to compute:  
12  
3

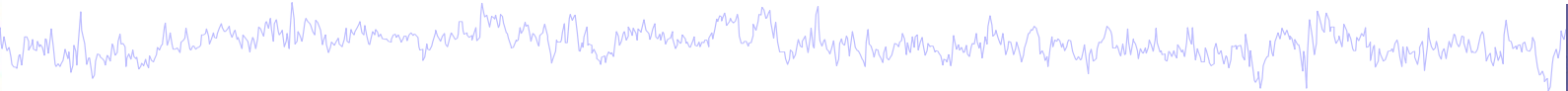
Separate outliers %gt; [N] std.dev. from any cluster center

Save STUDY set to disk

Cancel Help Ok



# The STUDY gui



## Task 1

Build a STUDY

## Task 2

Precluster the data

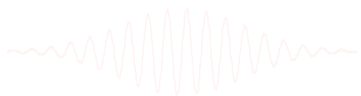
## Task 3

Cluster the data

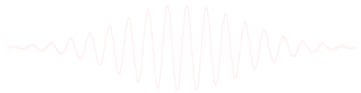
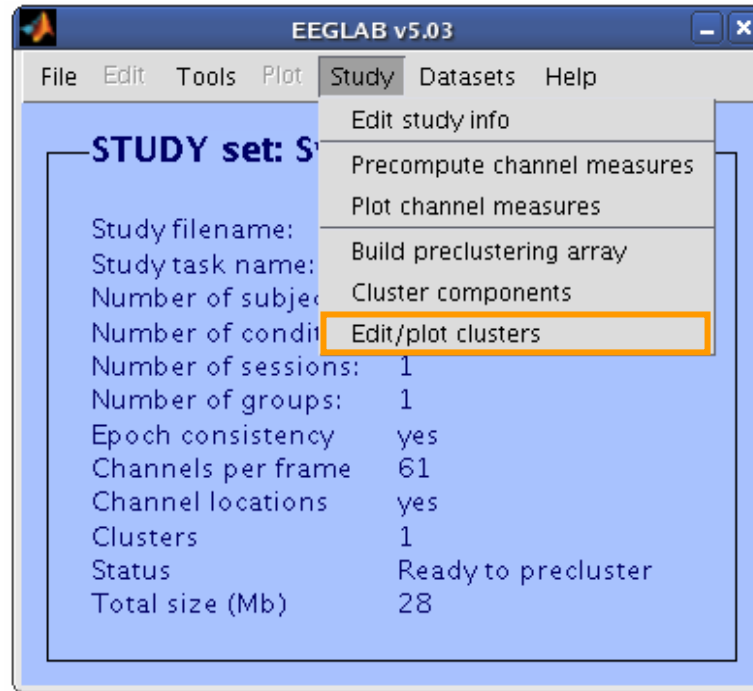
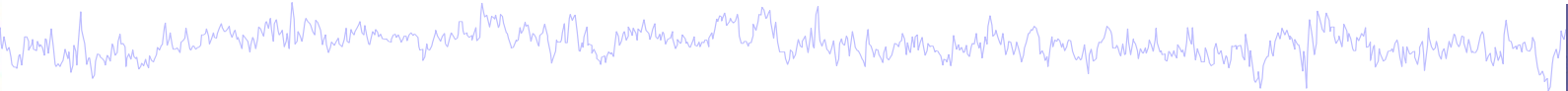
## Task 4

Edit/view the clusters

## Exercise...



# View and edit clusters





# Plot cluster data



View and edit current component

Study: 151 of 151 components clustered

Select cluster to plot

- All cluster centroids
- ParentCluster 1 (151 ICs)
- Cls 2 (11 ICs)
- Cls 3 (12 ICs)
- Cls 4 (11 ICs)
- Cls 5 (9 ICs)
- Cls 6 (7 ICs)
- Cls 7 (10 ICs)

Plot scalp maps

Plot dipoles

Plot ERPs

Plot spectra

Plot ERSPs

Plot ITCs

Plot cluster properties

Create new cluster

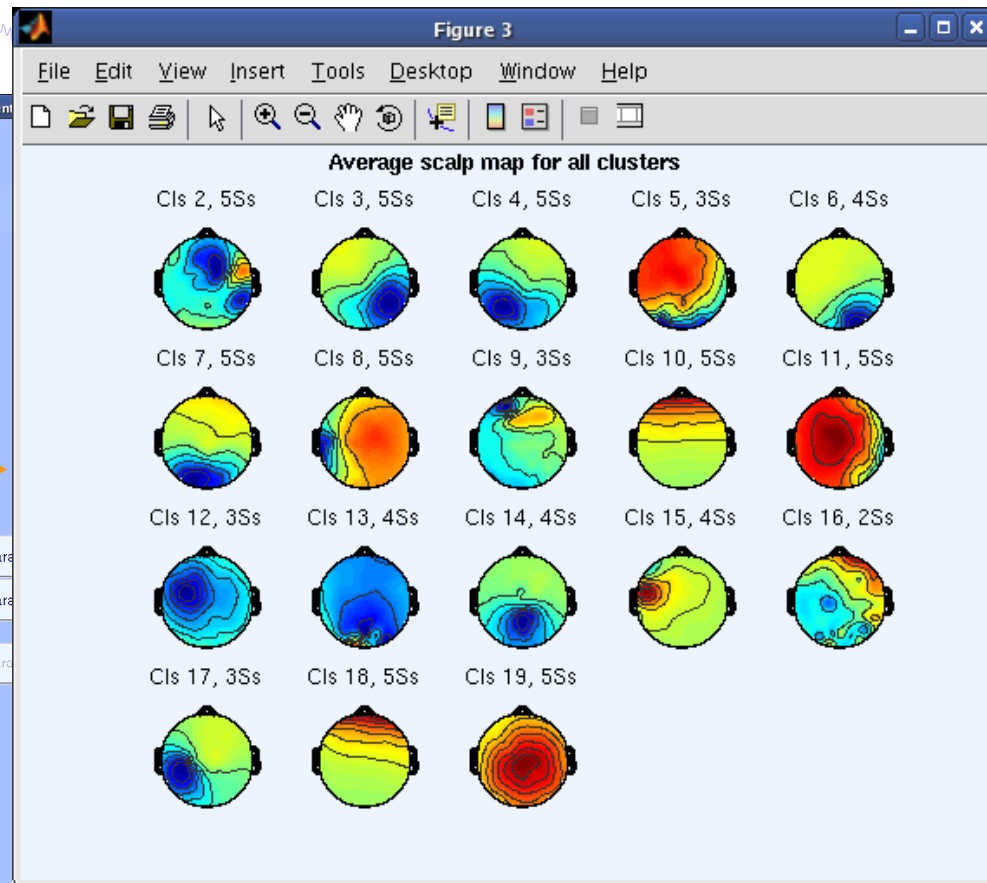
Rename selected cluster

Merge clusters

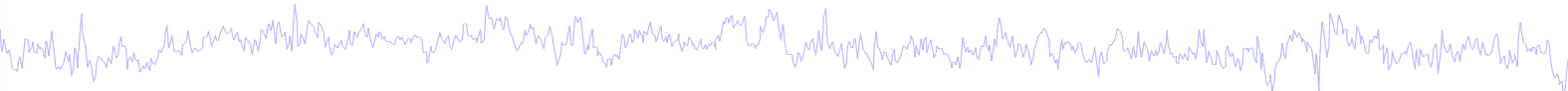
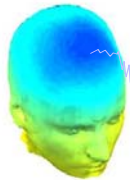
Save STUDY set to disk

/home/julie/workshop06/5subjects/WSstudy.study

Cancel Help Ok



# Plot cluster data



View and edit current component clusters -- pop\_clustedit()

Study #: 151 of 151 components clustered

Select cluster to plot

- Cls 15 (8 ICs)
- Cls 16 (6 ICs)
- Cls 17 (4 ICs)
- Cls 18 (14 ICs)
- Cls 19 (14 ICs)**

Select component(s) to plot

- All components**
- S02 IC3
- S02 IC11
- S02 IC12
- S02 IC17

Plot scalp map(s)

Plot dipole(s)

Plot ERP(s)

Plot spectra

Plot ERSF(s)

Plot ITC(s)

Plot component properties

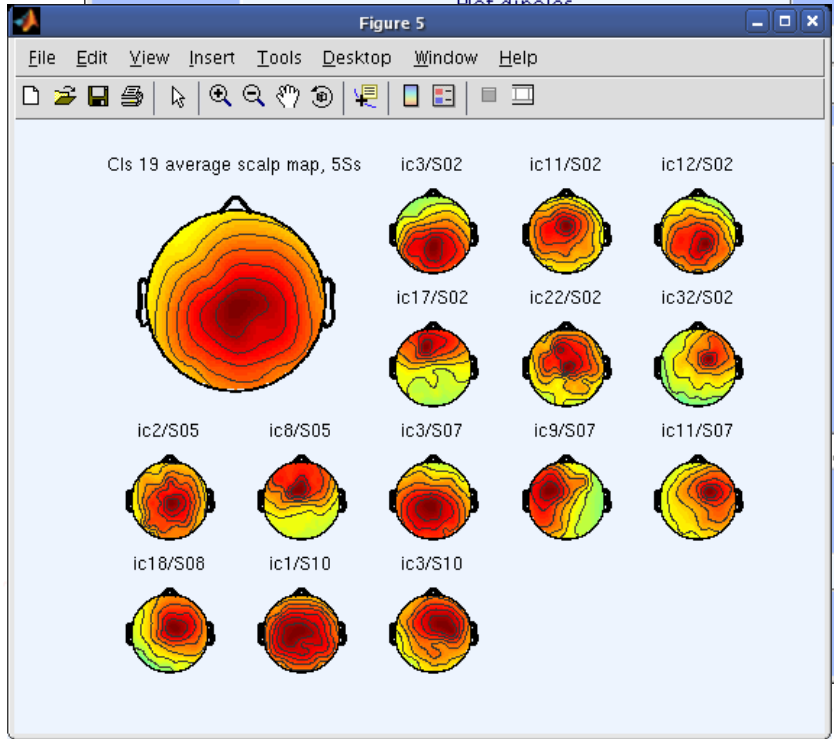
Reassign selected component(s)

Remove selected outlier comps.

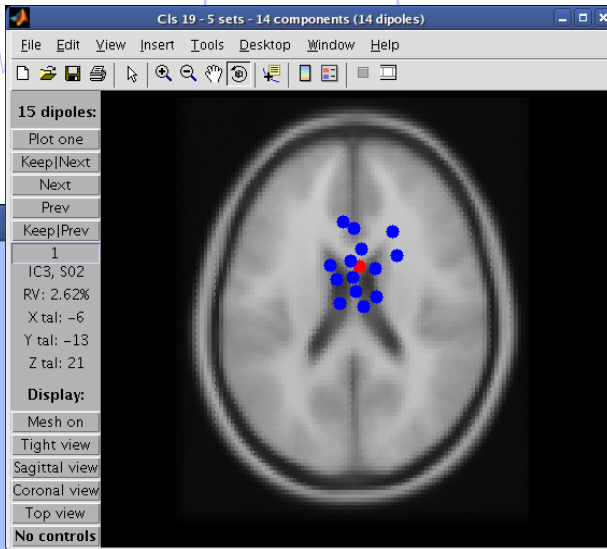
Auto-reject outlier components

/home/julie/workshop06/5subjects/WSstudy.study

Help Ok



# Plot cluster data



component clusters -- pop\_clustedit()

Select component(s) to plot

- All components
- S02 IC3
- S02 IC11
- S02 IC12
- S02 IC17

Plot scalp map(s)

**Plot dipole(s)**

Plot ERP(s)

Plot spectra

Plot ERSP(s)

Plot ITC(s)

Plot component properties

Params

Params

Params

Create new cluster

Rename selected cluster

Merge clusters

Reassign selected component(s)

Remove selected outlier comps.

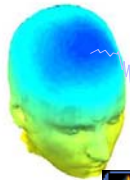
Auto-reject outlier components

Save STUDY set to disk

/home/julie/workshop06/5subjects/WSstudy.study

Cancel Help Ok

# Plot cluster data



View and edit current component clusters -- pop\_clustedit()

Study #: 151 of 151 components clustered

Select cluster to plot

- Cls 15 (8 ICs)
- Cls 16 (6 ICs)
- Cls 17 (4 ICs)
- Cls 18 (14 ICs)
- Cls 19 (14 ICs)

Plot scalp maps

Plot dipoles

Plot ERPs

Plot spectra

Plot ERSPs

Plot ITCs

Params

Params

Params

Select component(s) to plot

- All components
- S02 IC3
- S02 IC11
- S02 IC12
- S02 IC17

Plot scalp map(s)

Plot dipole(s)

Plot ERP(s)

Plot spectra

Plot ERSP(s)

Plot ITC(s)

Set parameters for plotting ERPs -- pop\_erpparams()

Time range in ms [low high]  Plot limits in uV [low high]

Plot conditions on the same panel

Plot groups on the same panel

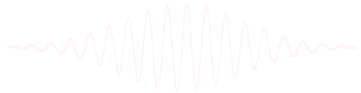
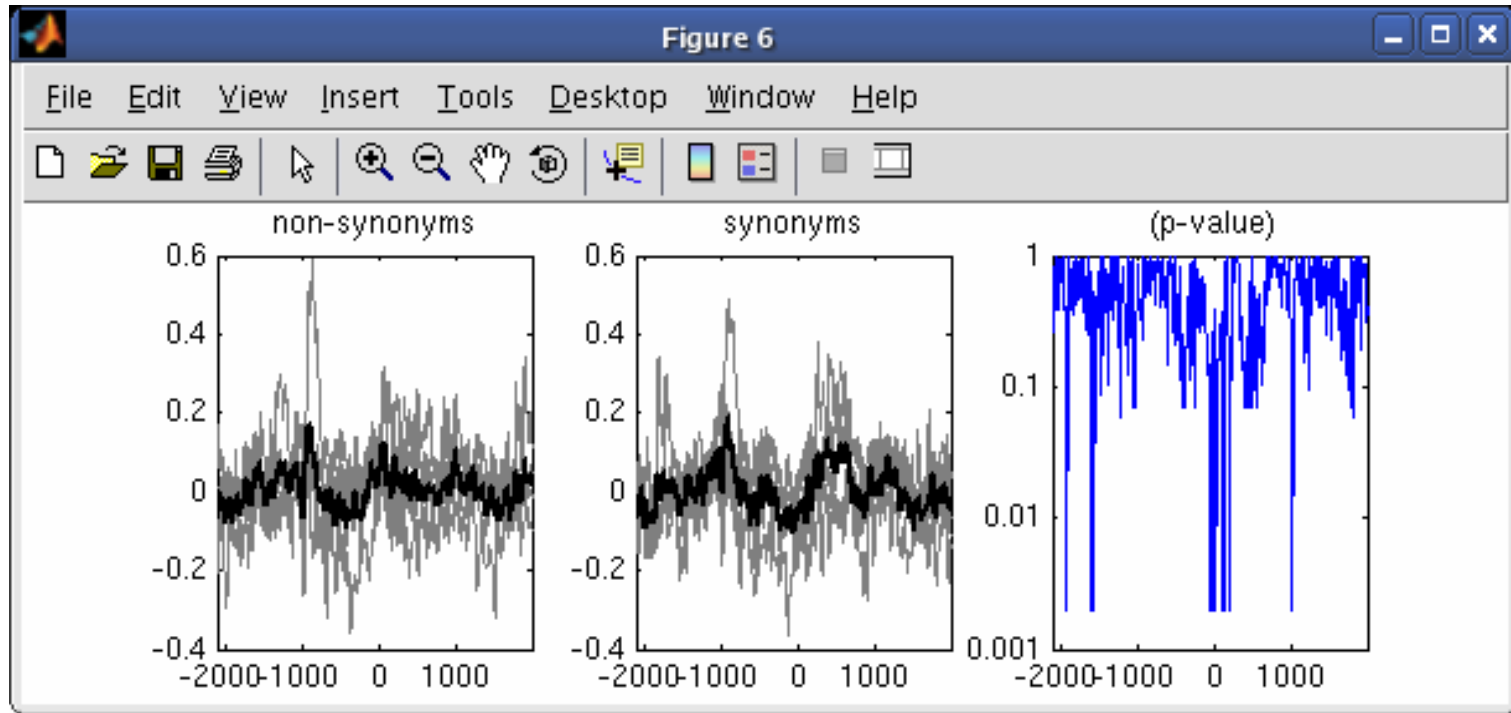
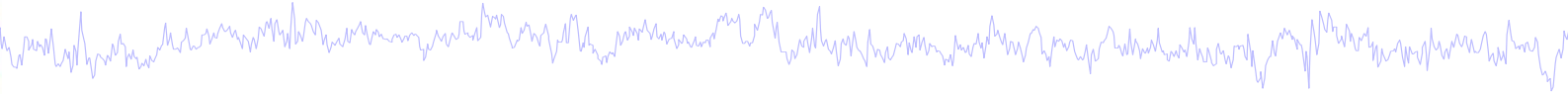
Statistics  Permutations  Threshold

Compute condition statistics

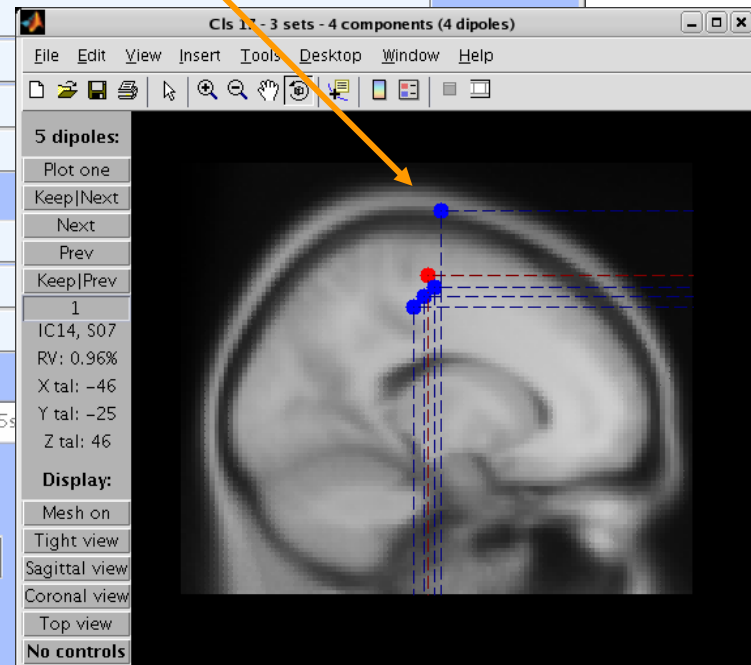
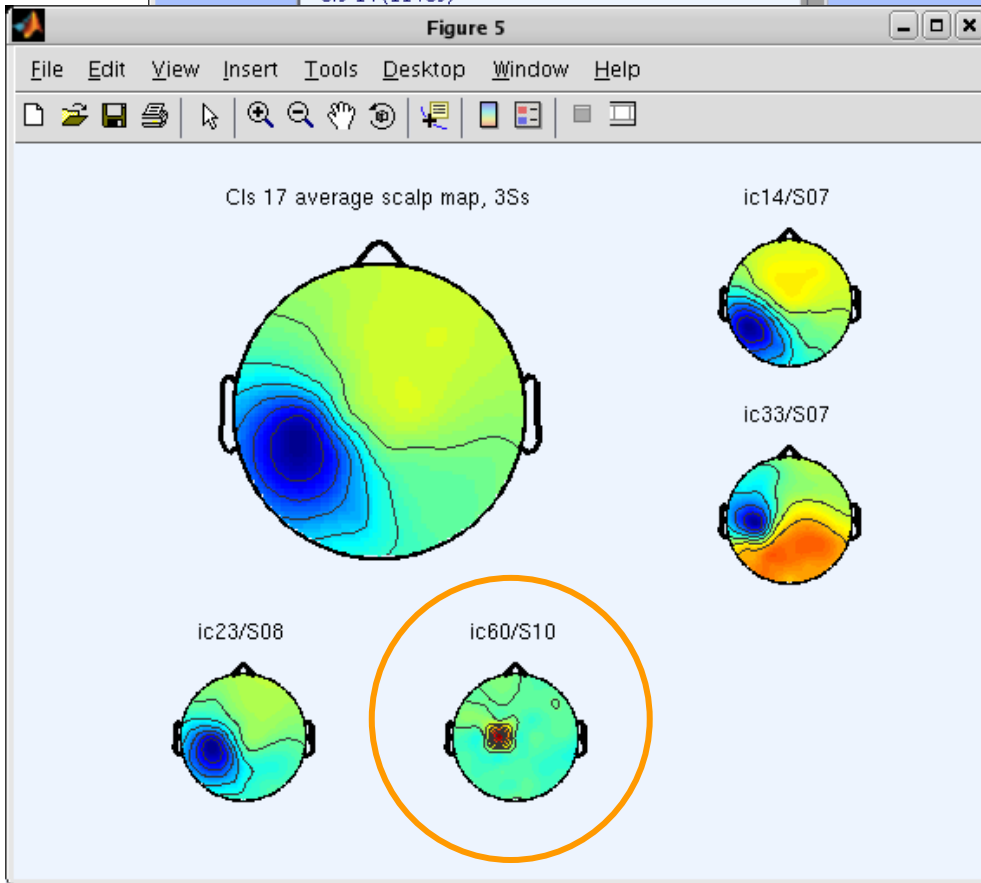
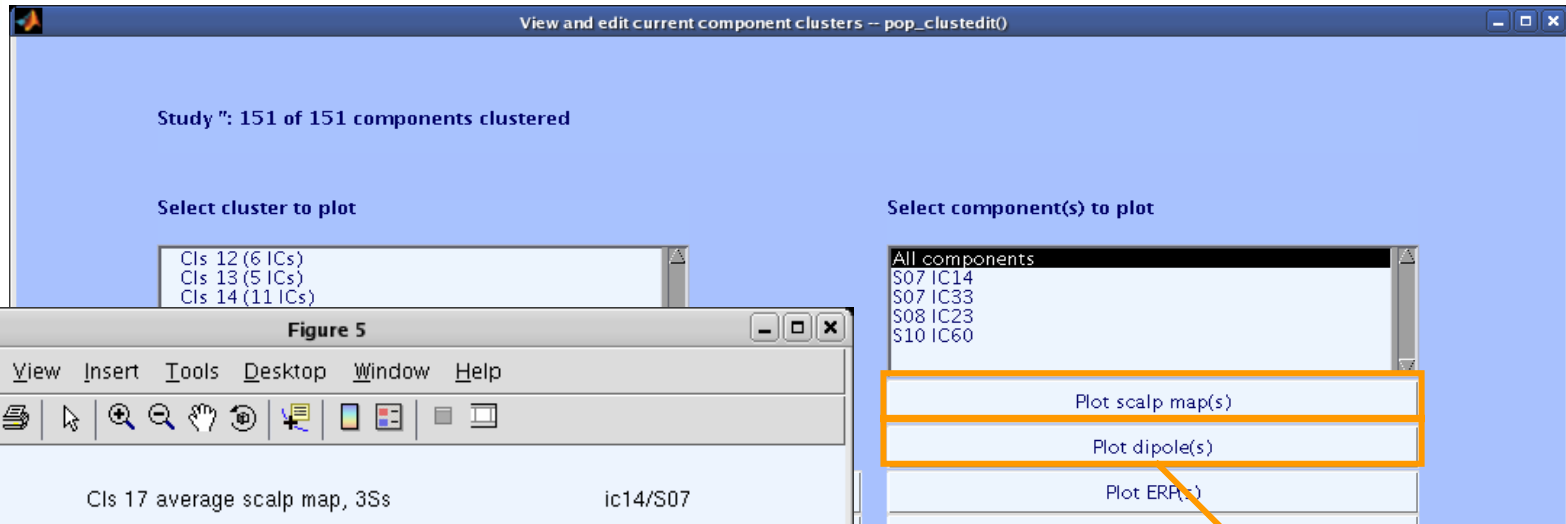
Compute group statistics

Cancel Help Ok

# Plot cluster ERP



# Reassigning components



# Reassigning components



View and edit current component clusters -- pop\_clustedit()

Study #: 151 of 151 components clustered

Select cluster to plot

- Cls 13 (5 ICs)
- Cls 14 (11 ICs)
- Cls 15 (8 ICs)
- Cls 16 (6 ICs)
- Cls 17 (4 ICs)

Select component(s) to plot

- All components
- S07 IC14
- S07 IC33
- S08 IC23
- S10 IC60

Plot scalp maps

Plot dipoles

Plot ERPs

Plot spectra

Plot ERSPs

Plot ITCs

Plot cluster properties

Create new cluster

Rename selected cluster

Merge clusters

Save STUDY set to disk  /home/julie/workshop06/5subjects/WSstudy.study ...

Cancel Help Ok

Remove outliers - from pop\_clustedit()

Remove currently selected component below from Cls 17 to its outlier cluster?

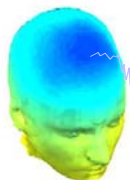
- S10 IC60

Cancel Ok

Remove selected outlier comps.

Auto-reject outlier components

# Outlier cluster reassignment



View and edit current component clusters -- pop\_clustedit()

Study #: 151 of 151 components clustered

**Select cluster to plot**

- Cls 16 (6 ICs)
- Cls 17 (3 ICs)
- Cls 18 (14 ICs)
- Cls 19 (14 ICs)
- Outliers Cls 17 20 (1 ICs)

**Select component(s) to plot**

- All components
- S10 IC60

Plot scalp maps

Plot dipoles

Plot ERPs

Plot spectra

Plot ERSPs

Plot ITCs

Plot cluster properties

Params

Params

Params

Plot scalp map(s)

Plot dipole(s)

Plot ERP(s)

Plot spectra

Plot ERSP(s)

Plot ITC(s)

Plot component properties

Create new cluster

Rename selected cluster

Merge clusters

Reassign selected component(s)

Remove selected outlier comps.

Auto-reject outlier components

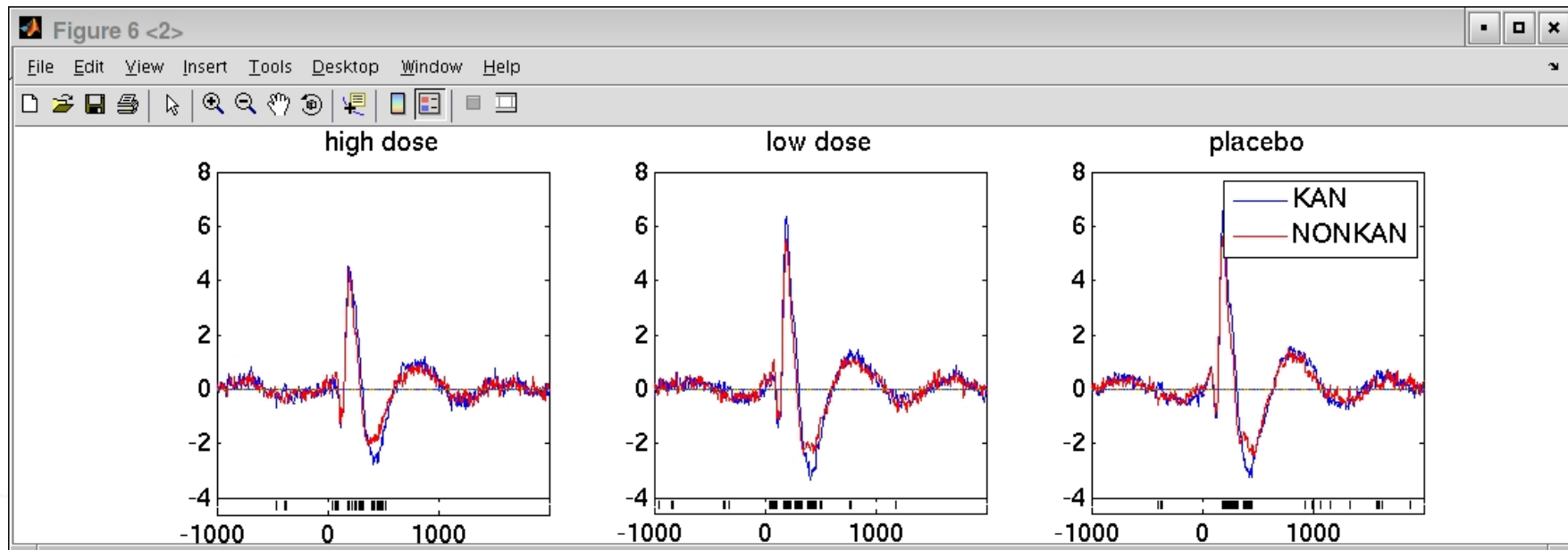
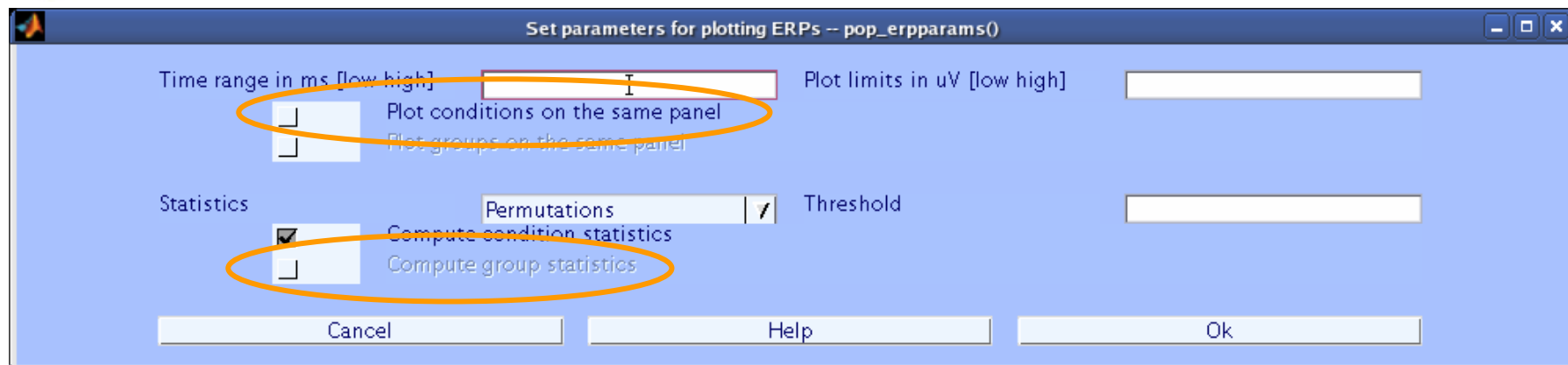
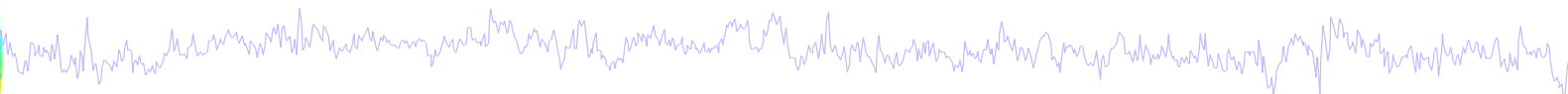
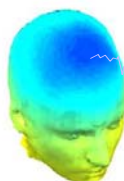
Save STUDY set to disk

/home/julie/workshop06/5subjects/WSstudy.study

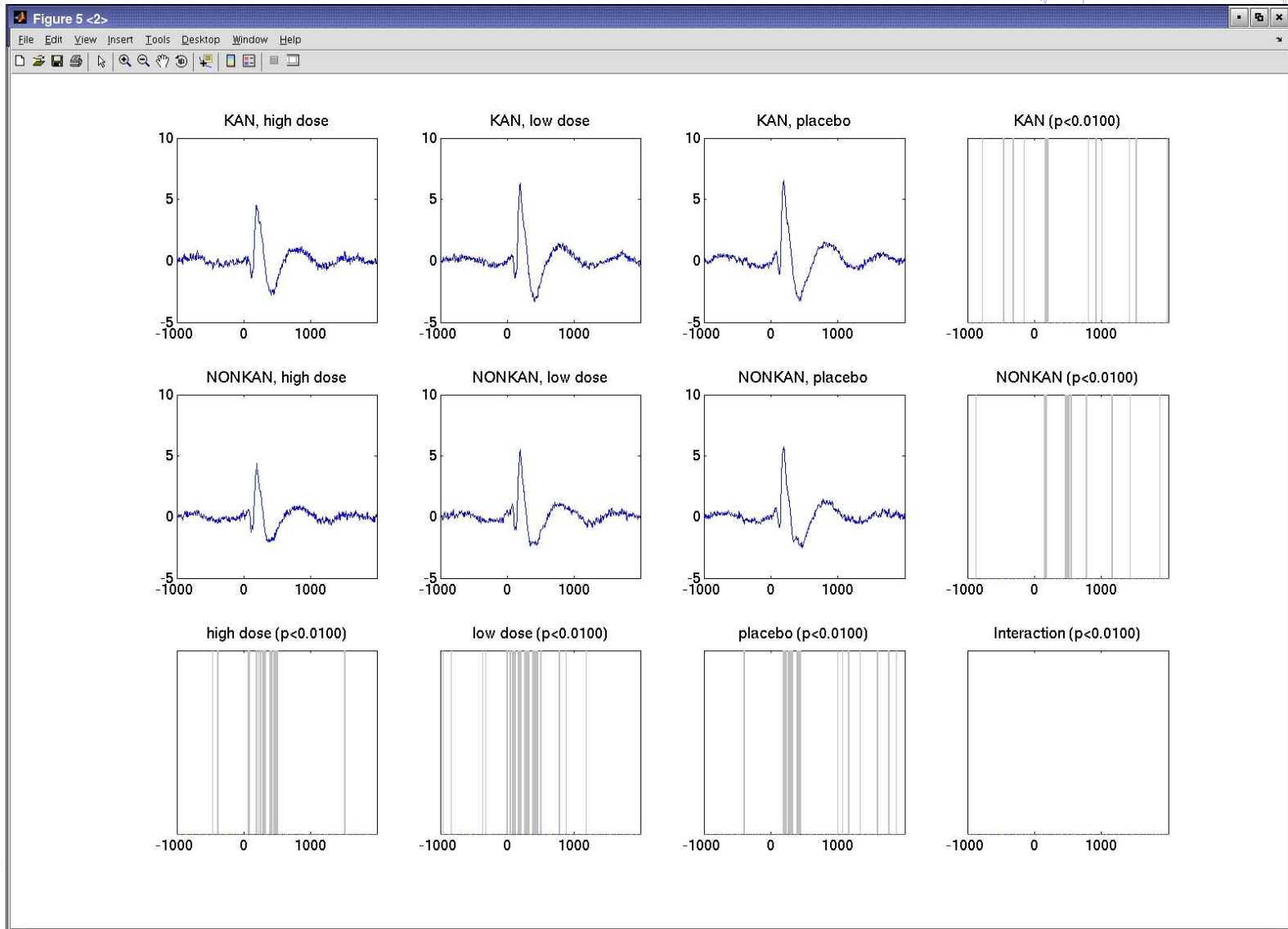
Cancel Help Ok



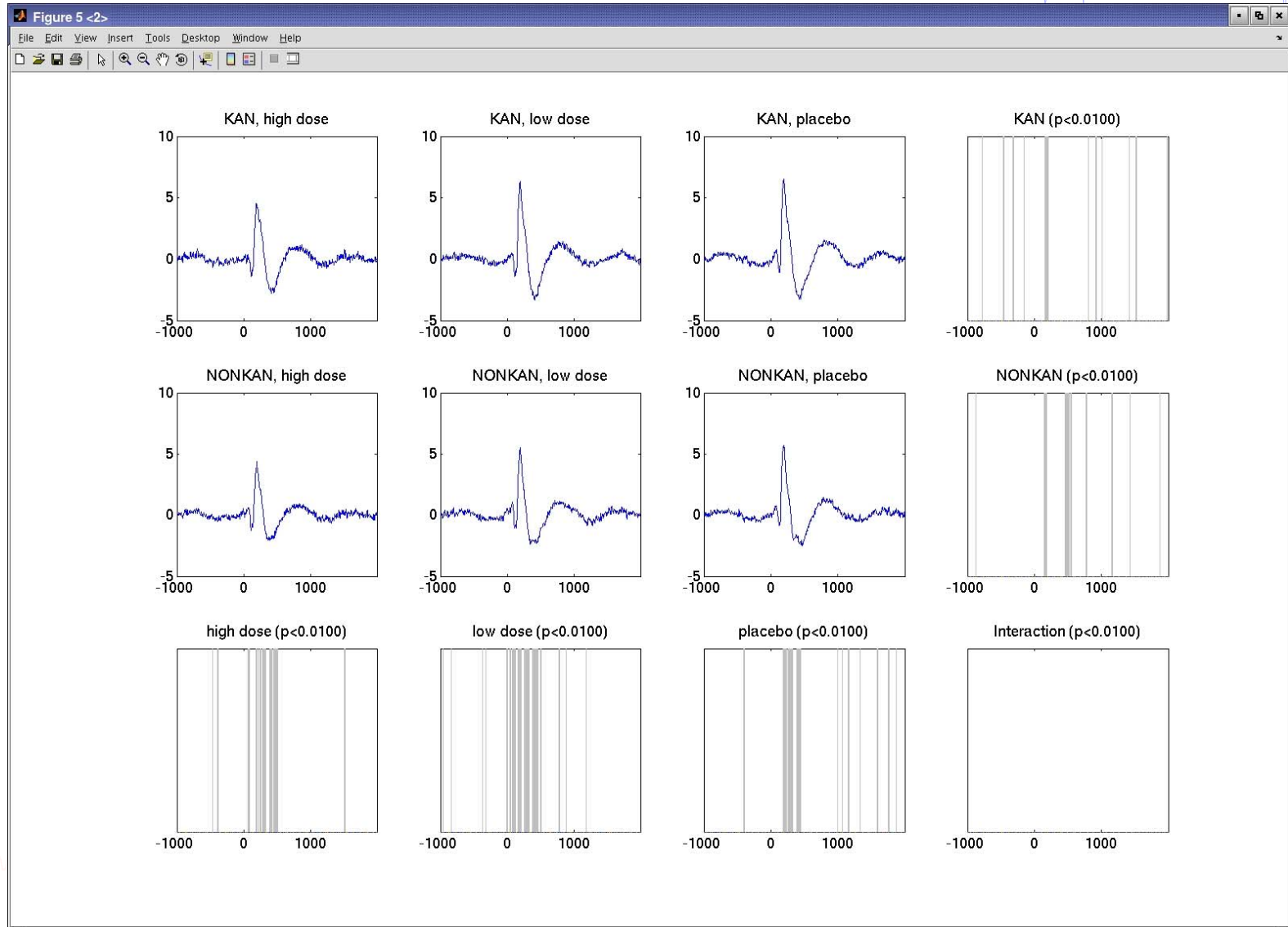
# Other plotting options...



# STUDY ERPs with p-value

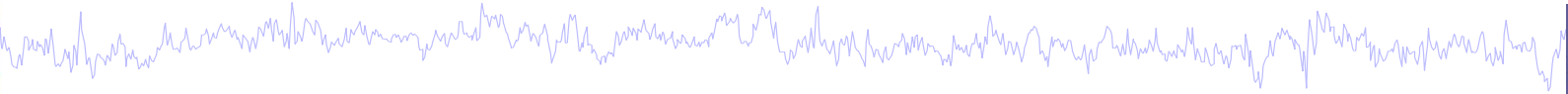


# STUDY ERPs with threshold





# Exercise



- Load '*.../data/STUDY/workshop.study*'
- Create a precluster array of choice
- Cluster the data using kmeans, any # of clusters
- View the clusters and try the plotting options
- Try re-clustering with a different # of clusters

