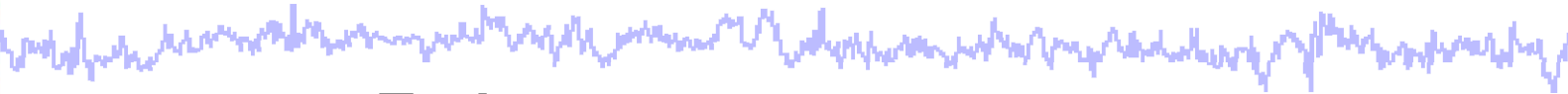


# Data importing and channel analysis



## Task 1

- Import raw data
- Re-reference data
- Scroll channel data

## Task 2

- Import channel location file

## Task 3

- Import data events

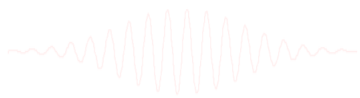
## Task 4

- Extract data epochs
- Select epochs/events

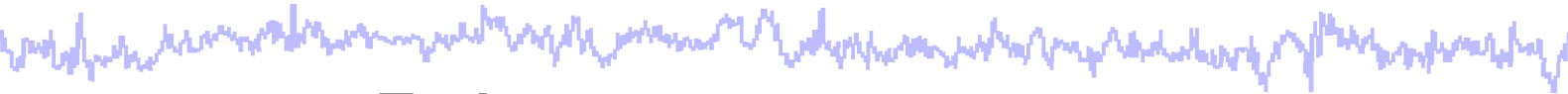
## Task 5

- Channel analysis

[Exercise...](#)



# Data importing and channel analysis



## Task 1

- Import raw data
- Re-reference data
- Scroll channel data

## Task 2

- Import channel location file

## Task 3

- Import data events

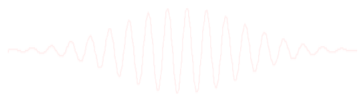
## Task 4

- Extract data epochs
- Select epochs/events

## Task 4

- Channel analysis

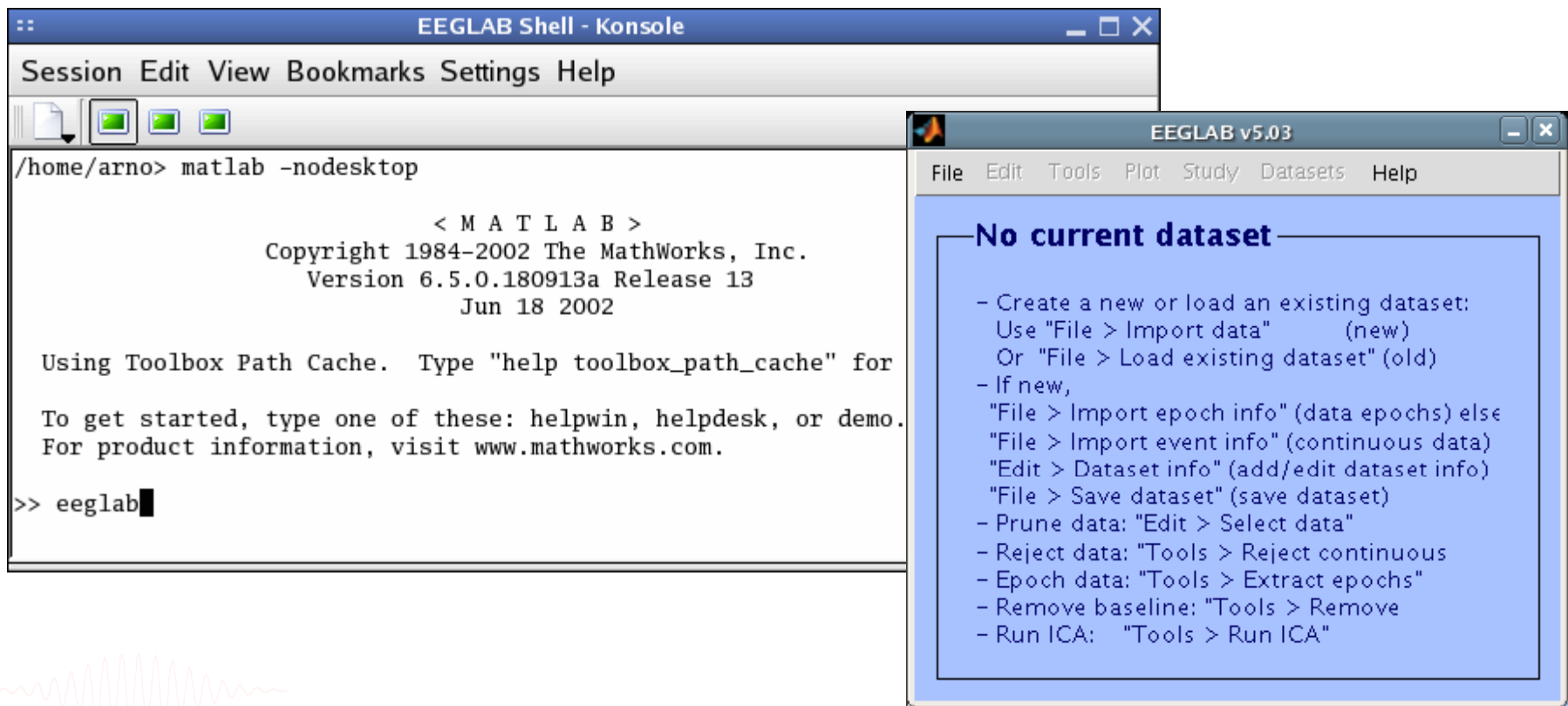
## Exercise...



# The EEGLAB Matlab software

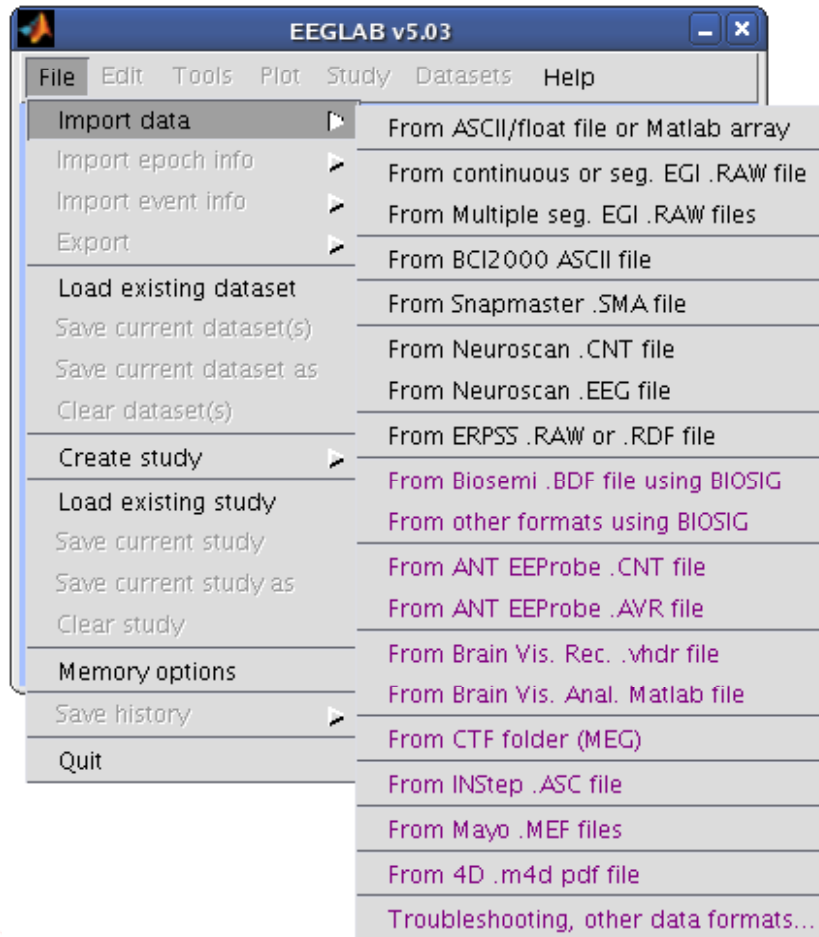


## main graphic interface

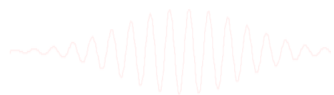


60 menus, more than 300 Matlab functions and more than 50,000 lines of code

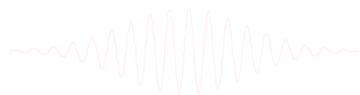
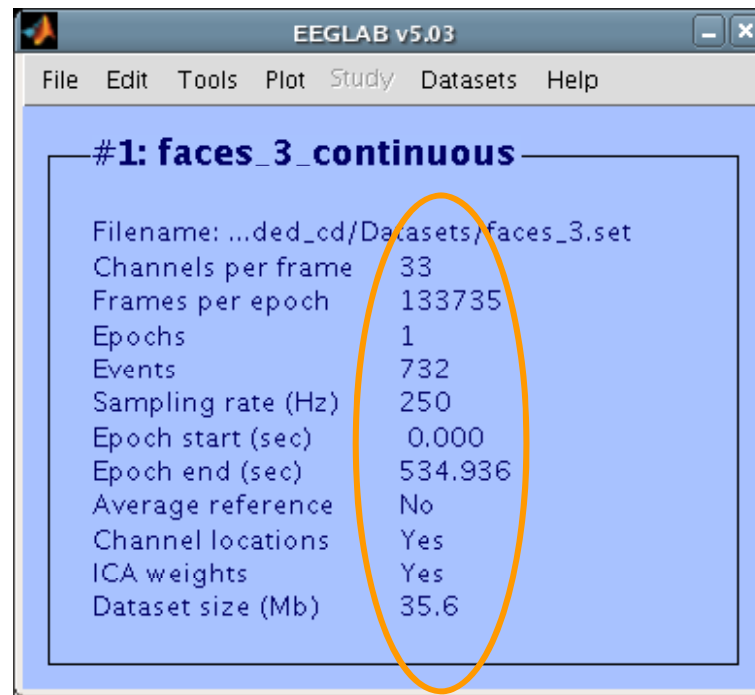
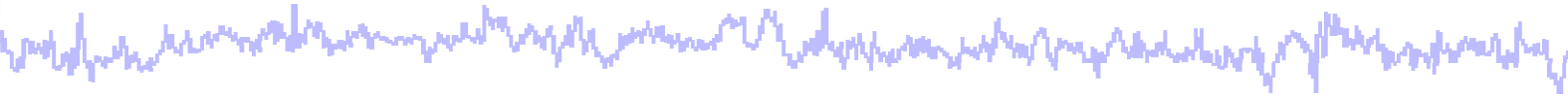
# Importing a dataset



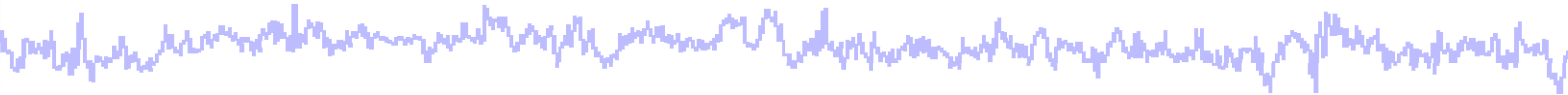
**EEGLAB supports many different raw data formats**



# Imported EEG data



# The example data: faces vs. objects



## File

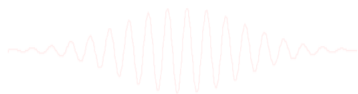
../data/faces\_3.set

## Data

33 channel EEG, nose-tip reference, 250 Hz sampling rate, 0.5-100 Hz, 16 bit, BrainAmps

## Task

speeded discrimination between objects and faces, 500 ms presentation duration, ISI 500-1900 ms, 362 trials



# Comments



Read/Enter comments -- pop\_comments()

**About this dataset**

Data acquired by: Stefan Debener  
Data acquired on: Oct 15, 1974

Data:  
33 channel EEG  
nose-tip reference  
sampling rate: 250 Hz  
filtered: .5 - 100 Hz  
16 bit, BrainAmps

Task:  
speeded discrimination between objects and faces  
500 ms presentation duration  
ISI 500-1900 ms  
362 trials

CANCEL SAVE

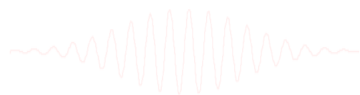
EEGLAB v5.03

File Edit Tools Plot Study Datasets Help

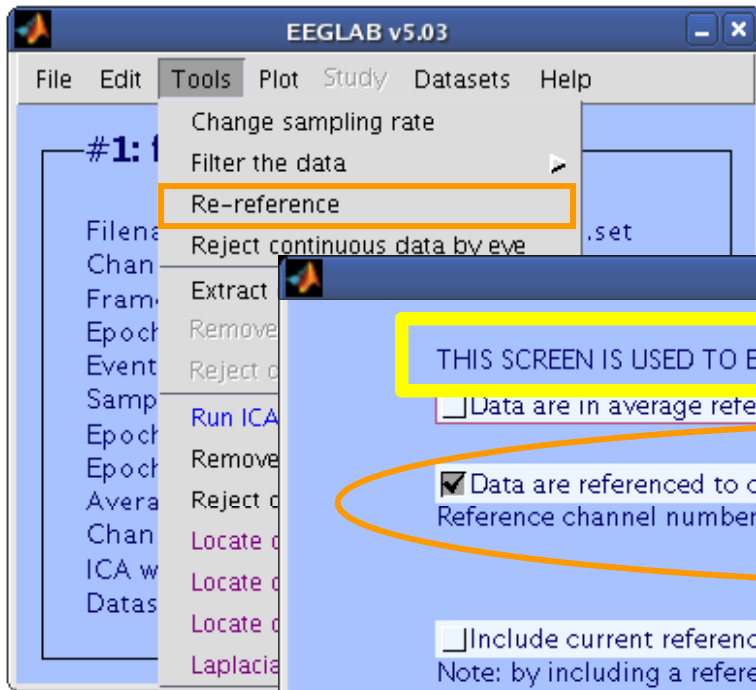
Dataset info  
Event fields  
Event values  
**About this dataset**  
Channel locations  
Select data  
Select epochs/events  
Copy current dataset  
Append datasets  
Delete dataset(s)

Continuous

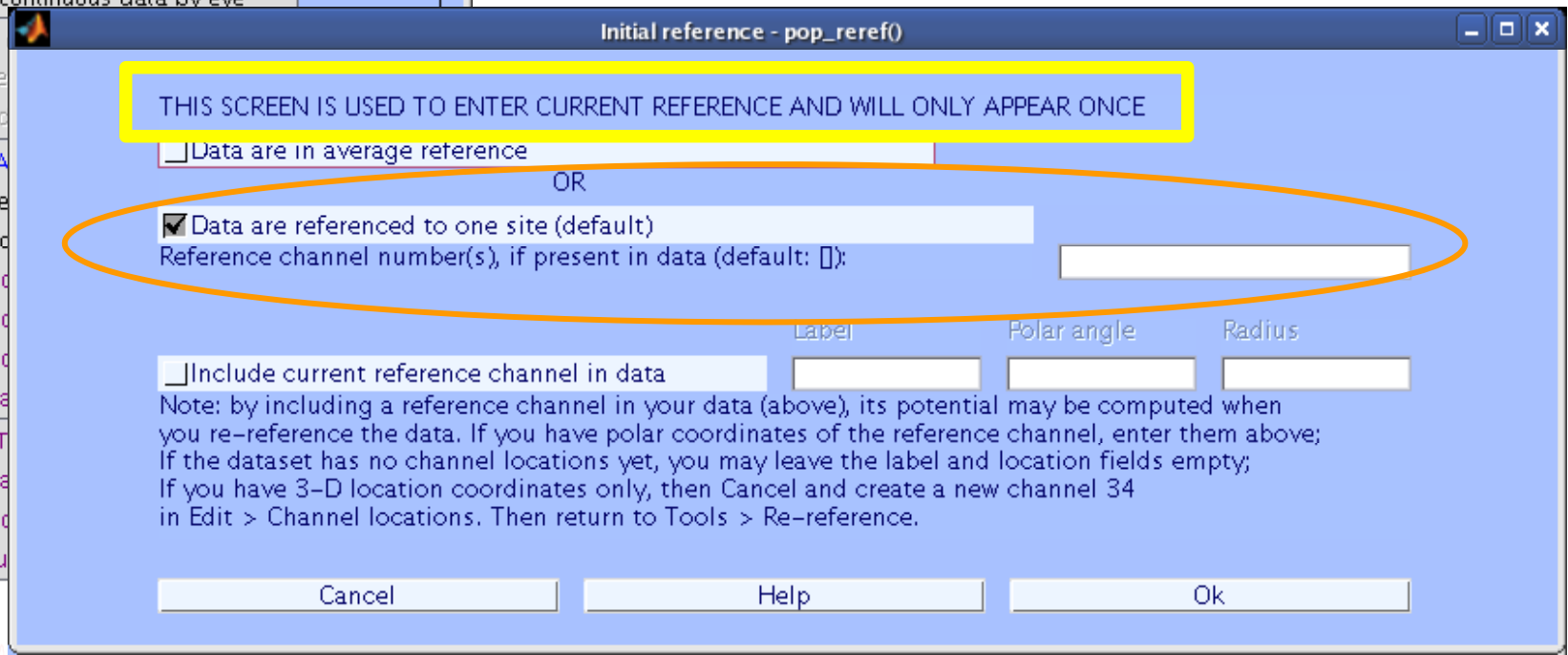
shop06/faces\_3.set  
33  
133735  
1  
732  
250  
0.000  
534.936  
No  
Yes  
Yes  
35.6



# Re-reference data

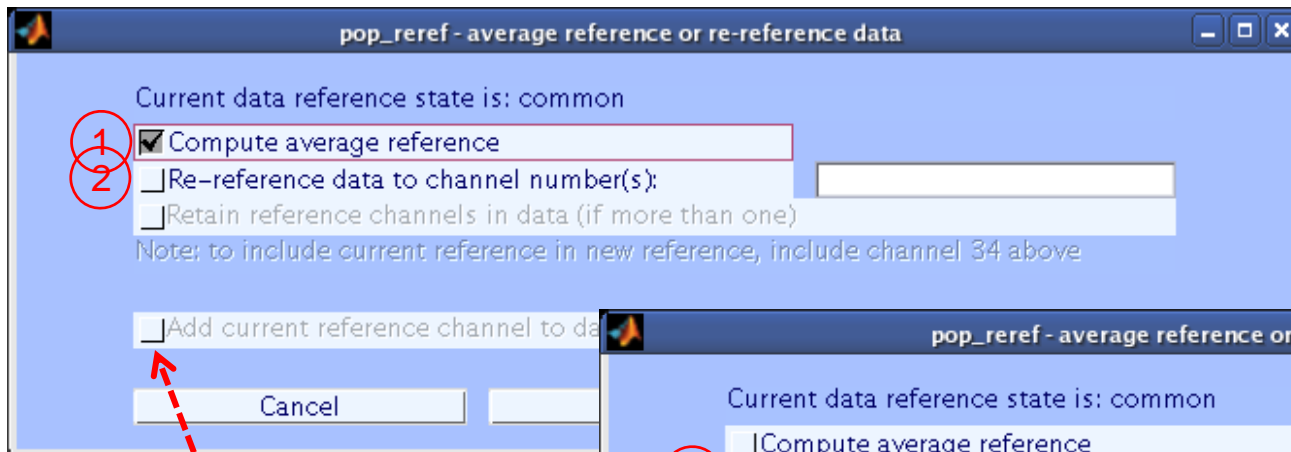


Specify the reference scheme of imported data



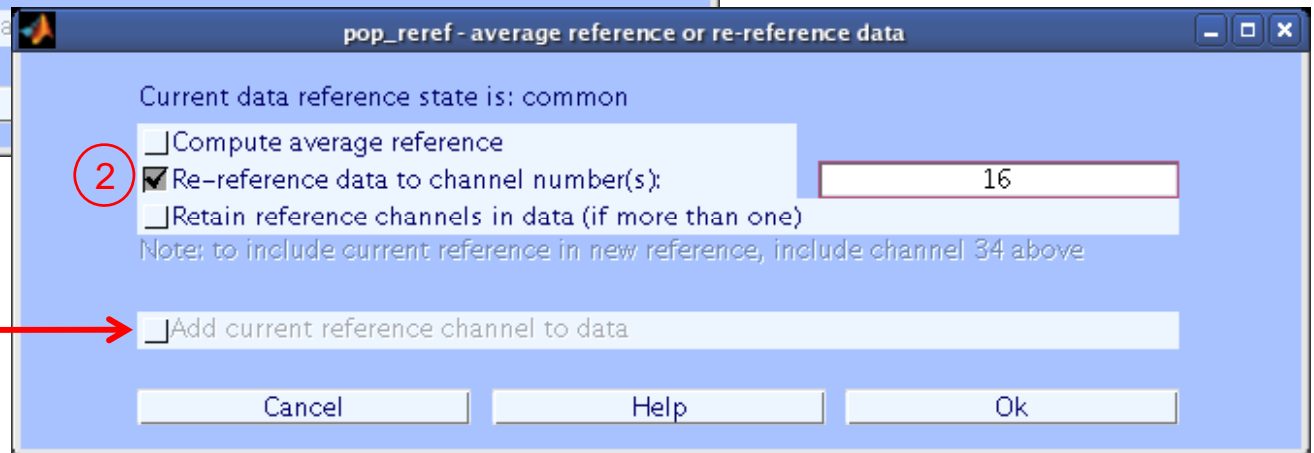


# Rereferencing, cont'd

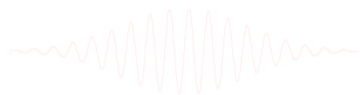


**Two re-reference choices:**  
1) Average reference  
2) New channel (s)

Must specify in first re-ref GUI



```
EEG = pop_reref( EEG, 16, 'refstate', 0);
```



# Save new dataset, keep old one



**Dataset info -- pop\_newset()**

What do you want to do with the new dataset?

Name it:

Save it as file:

Some changes have not been saved. What do you want to do with the old dataset?

Overwrite it in memory (set=yes; unset=create a new dataset)

Save it as file:

**Save dataset with .set extension -- pop\_saveset()**

Filter: /home/julie/workshop06/\*.set

Directories: /home/julie/workshop06/, /home/julie/workshop06/., /home/julie/workshop06/tmpfigs

Files: faces\_3.set, faces\_4.set

Save as type: \*.set

Selection: /home/julie/workshop06/faces\_2\_rereferenced.set

**EEGLAB v5.03**

File Edit Tools Plot Study Datasets Help

#2: faces\_3\_continuous rereferen...

Filename:	none
Channels per frame	32
Frames per epoch	133735
Epochs	1
Events	732
Sampling rate (Hz)	250
Epoch start (sec)	0.000
Epoch end (sec)	534.936
Average reference	No
Channel locations	Yes
ICA weights	Yes
Dataset size (Mb)	35

```
[ALLEEG EEG CURRENTSET] = pop_newset(ALLEEG,...  
EEG, 1, 'setname', 'rereferenced data');
```

# Multiple active datasets (ALLEEG)



EEGLAB v5.03

File Edit Tools Plot Study Datasets Help

**#1: faces\_3\_continuous**

Filename: ...ulie/workshop06/faces\_3.set  
Channels per frame 33  
Frames per epoch 133735  
Epochs 1  
Events 732  
Sampling rate (Hz) 250  
Epoch start (sec) 0.000  
Epoch end (sec) 534.936  
Average reference No  
Channel locations Yes  
ICA weights Yes  
Dataset size (Mb) 35.6

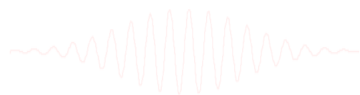
EEGLAB v5.03

File Edit Tools Plot Study Help

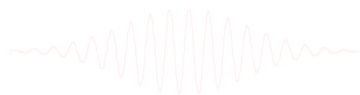
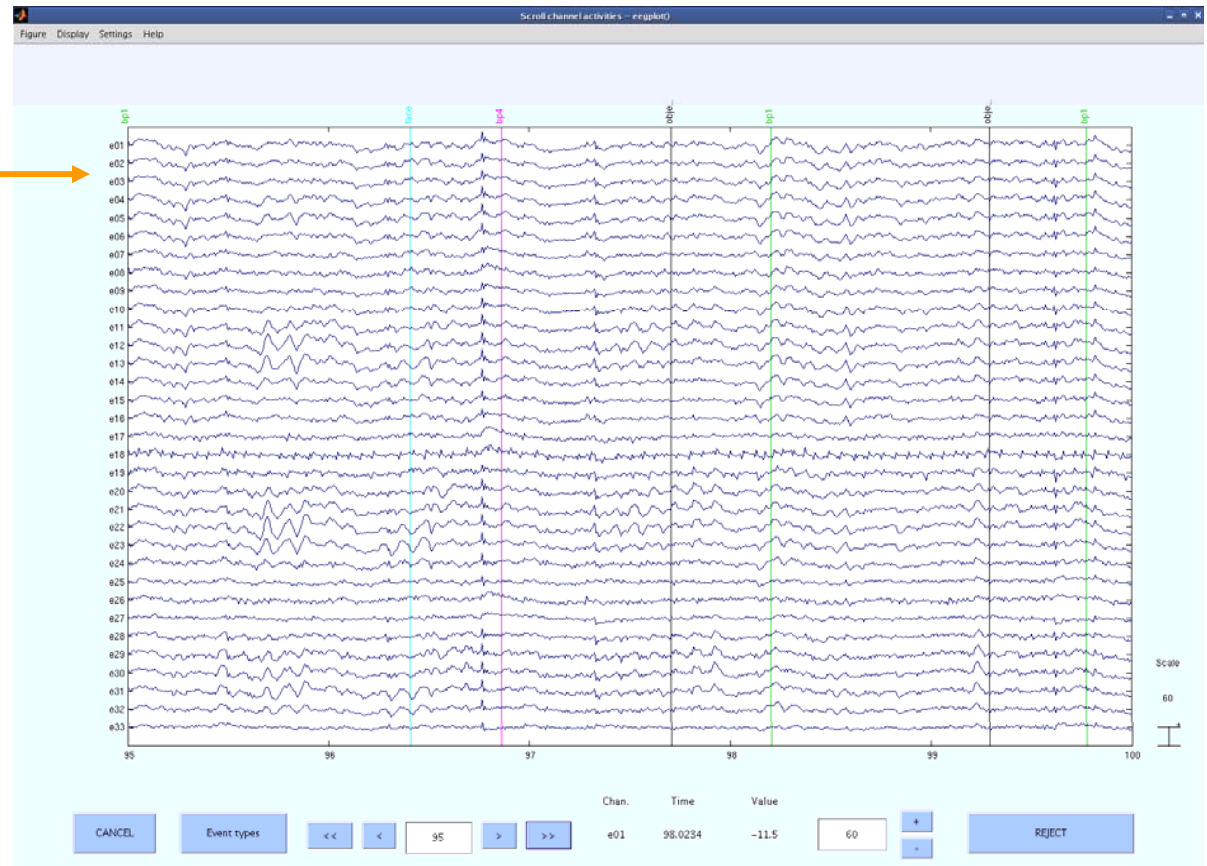
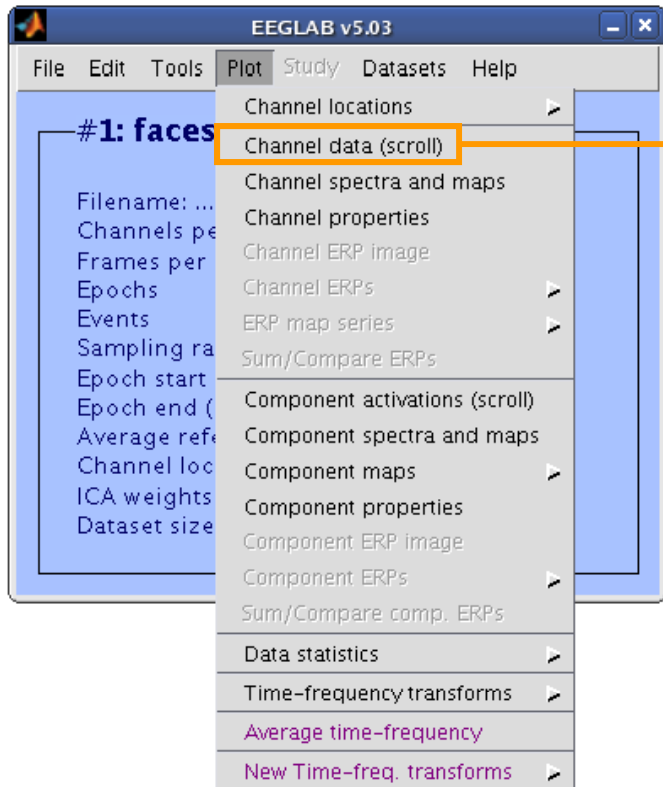
**#2: faces\_3\_continuous**

Filename: none  
Channels per frame 33  
Frames per epoch 133735  
Epochs 1  
Events 732  
Sampling rate (Hz) 250  
Epoch start (sec) 0.000  
Epoch end (sec) 534.936  
Average reference No  
Channel locations Yes  
ICA weights Yes  
Dataset size (Mb) 35

Dataset 1: faces\_3\_continuous  
Dataset 2: faces\_3\_continuous rereferenced  
-----  
Select multiple datasets

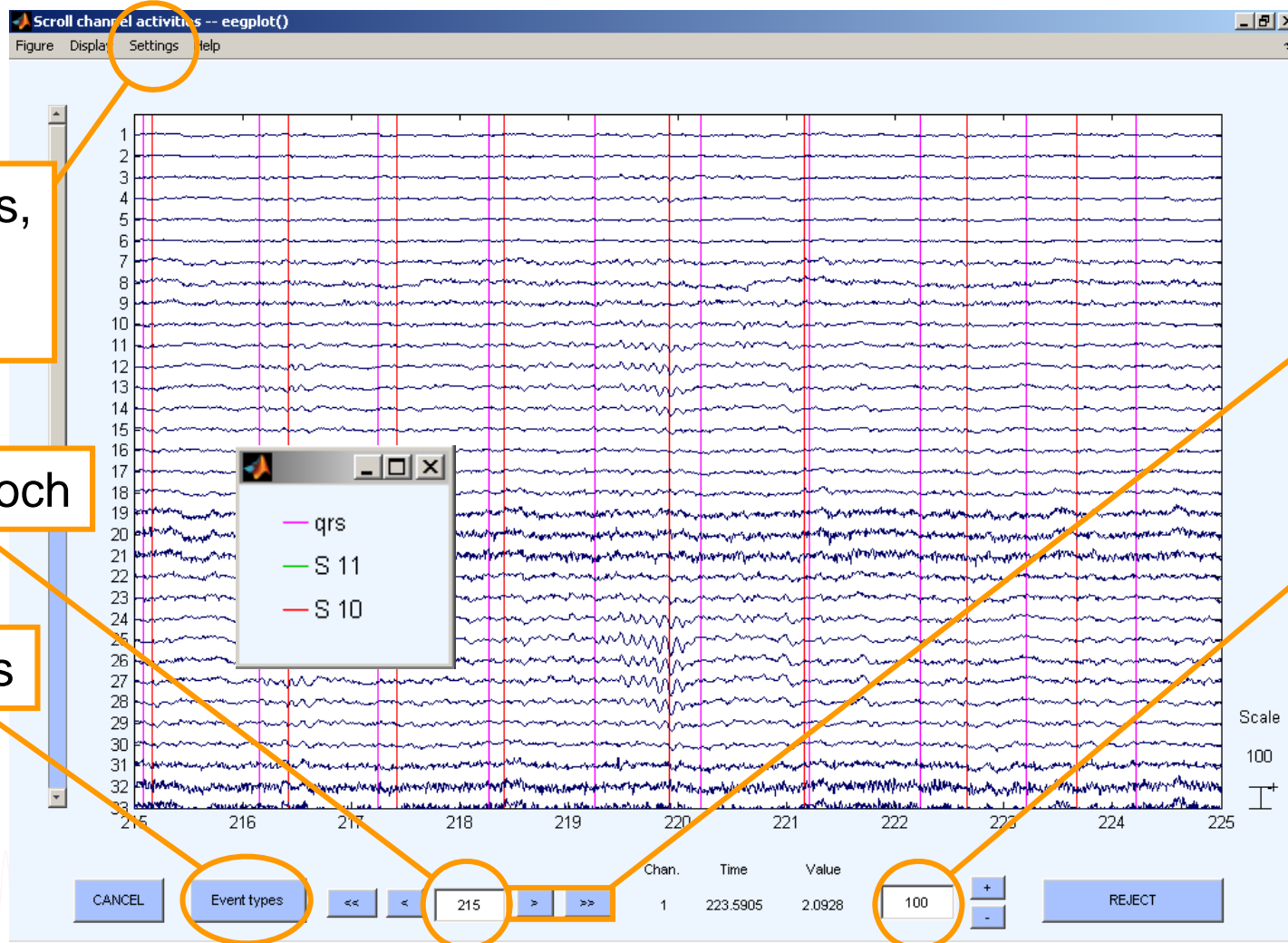


# Scroll data



```
>> pop_eegplot(EEG,1,1,1);
```

# Scroll channel data



channels,  
time,  
events

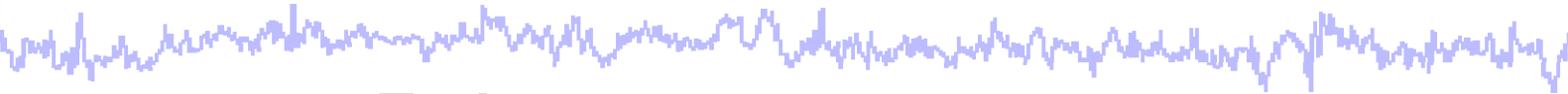
sec/epoch

events

Scroll  
buttons

scaling

# Data importing and channel analysis



## Task 1

- Import raw data
- Re-reference data
- Scroll channel data

## Task 2

- Import channel location file

## Task 3

- Import data events

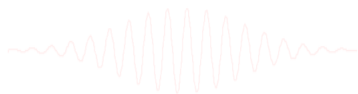
## Task 4

- Extract data epochs
- Select epochs/events

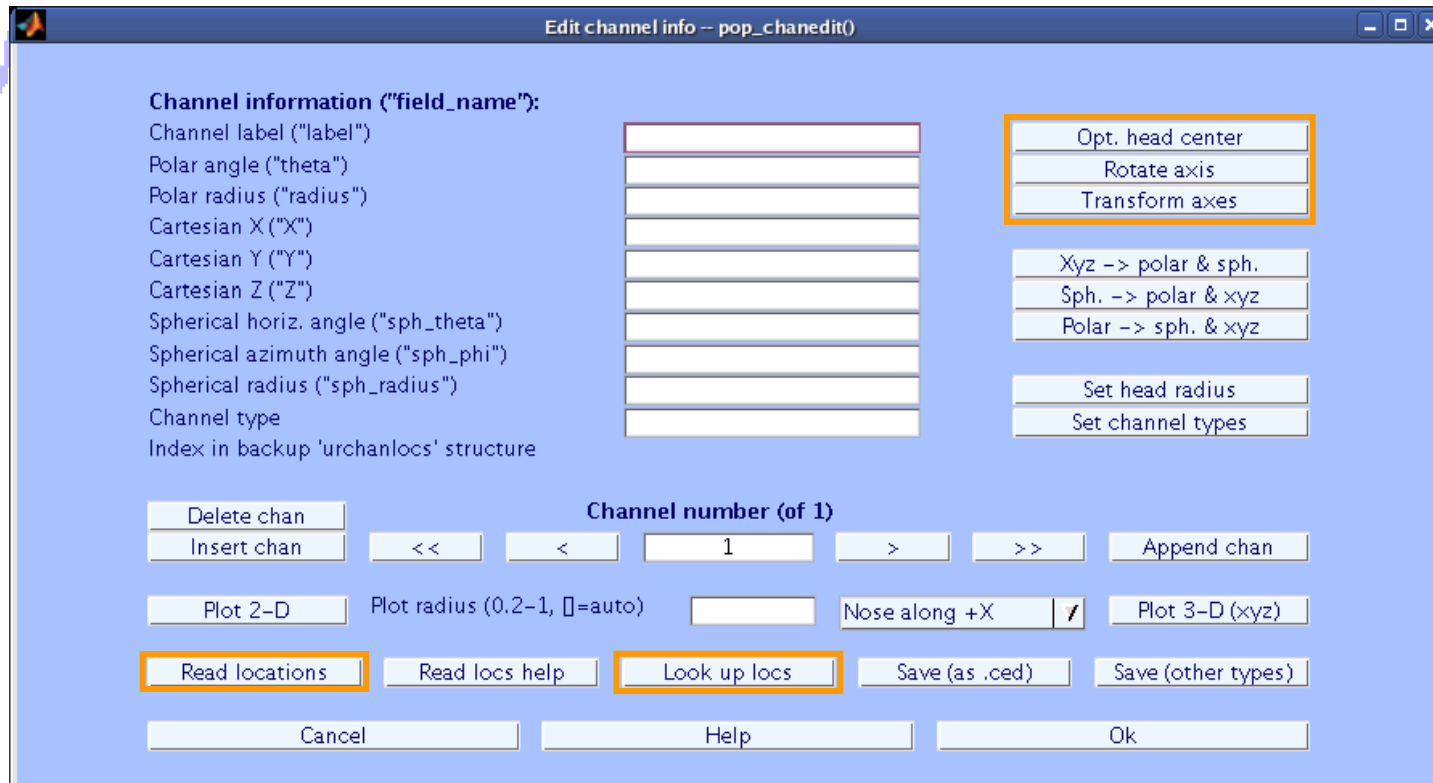
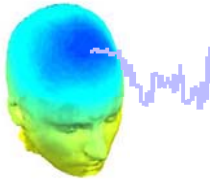
## Task 4

- Channel analysis

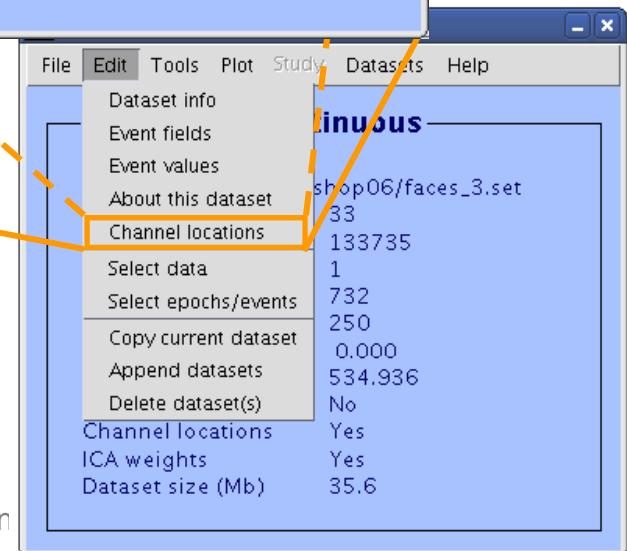
Exercise...

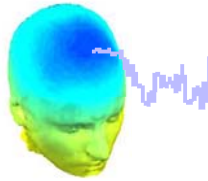


# Import channel locations



- Use channel names and automatically assign channel location
- Import channel location file
- Modify/stretch/rotate channel locations





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

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

- Channel label ("label")
- Polar angle ("theta")
- Polar radius ("radius")
- Cartesian X ("X")
- Cartesian Y ("Y")
- Cartesian Z ("Z")
- Spherical horiz. angle ("sph\_theta")
- Spherical azimuth angle ("sph\_phi")
- Spherical radius ("sph\_radius")
- Channel type
- Index in backup 'urchanlocs' structure

Buttons: Opt. head center, Rotate axis, Transform axes, Xyz -> polar & sph., Sph. -> polar & xyz, Polar -> sph. & xyz, Set head radius, Set channel types

Channel number (of 1): 1

Buttons: Delete chan, Insert chan, <<, <, >, >>, Append chan

Buttons: 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)

Buttons: Cancel, Help, Ok

**Load a channel location file**

Filter: /home/julie/workshop06/

Directories: tmpfigs

Files: faces\_3.eeg, faces\_3.locs, faces\_3.set, faces\_3.vhdr, faces\_3.vmrk, faces\_4.set, practicum\_4.m, practicum\_5.m

Files of type: \*

Selection: /home/julie/workshop06/

Buttons: Open, Filter, Cancel

**Read electrode file**

File format: Autodetect file format from file extension

autodetect  
Polhemus native .elp file  
BESA spherical .elp file  
Matlab .xyz file  
BESA or EGI 3-D cartesian .  
EECLAB polar .loc file

Buttons: Cancel, Help, Ok

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



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

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

Channel label ("label")  
Polar angle ("theta")  
Polar radius ("radius")  
Cartesian X ("X")  
Cartesian Y ("Y")  
Cartesian Z ("Z")  
Spherical horiz. angle ("sph\_theta")  
Spherical azimuth angle ("sph\_phi")  
Spherical radius ("sph\_radius")  
Channel type  
Index in backup 'urchanlocs' structure

e01
90
0
3.7494e-33
-6.1232e-17
1
-90
90
1
EEG

Opt. head center  
Rotate axis  
Transform axes

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

Set head radius  
Set channel types

Channel number (of 33)  
Delete chan  
Insert chan  
<< < 1 > >> Append chan

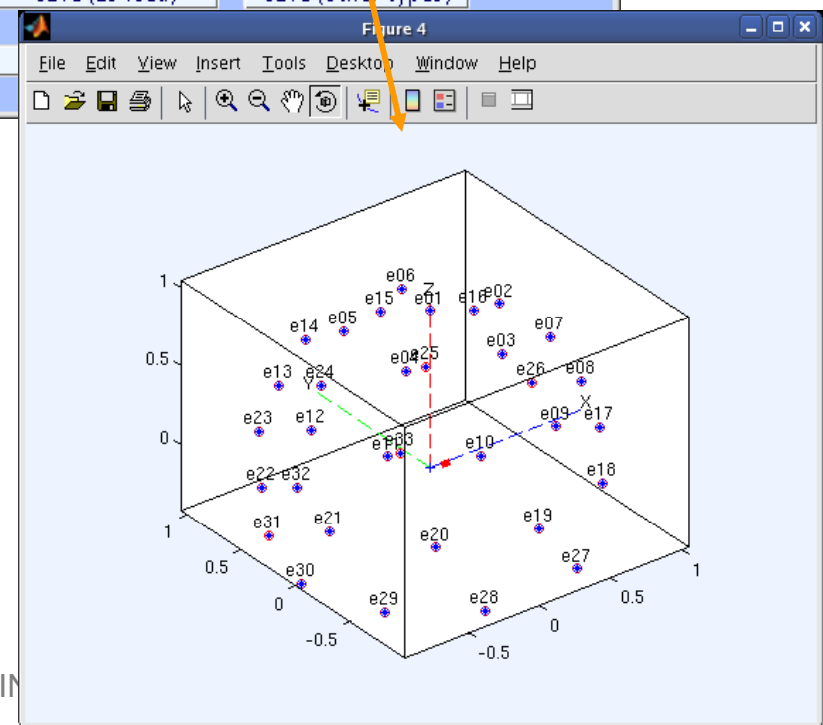
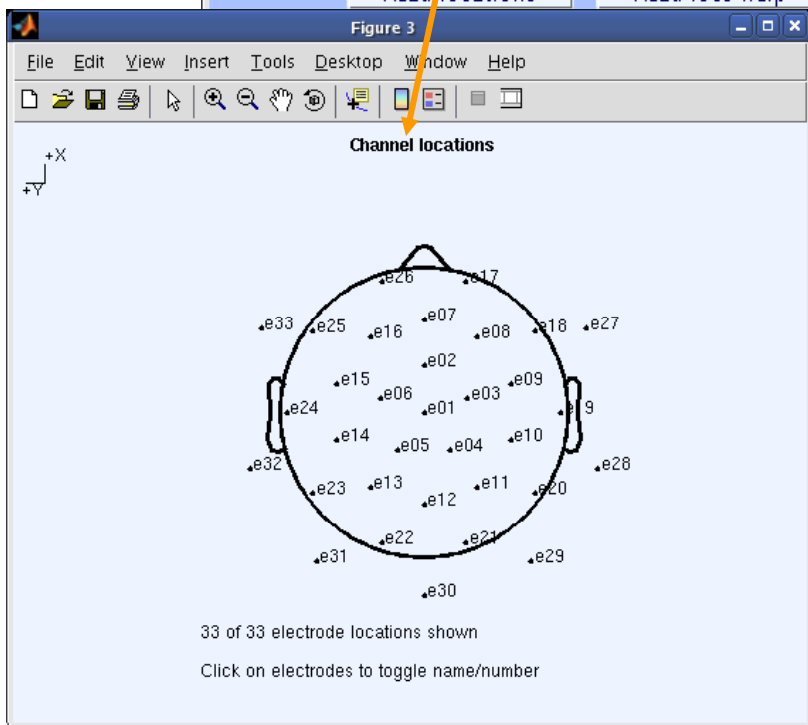
Plot 2-D Plot radius (0.2-1, []=auto) Nose along +X Plot 3-D (xyz)

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

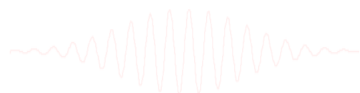
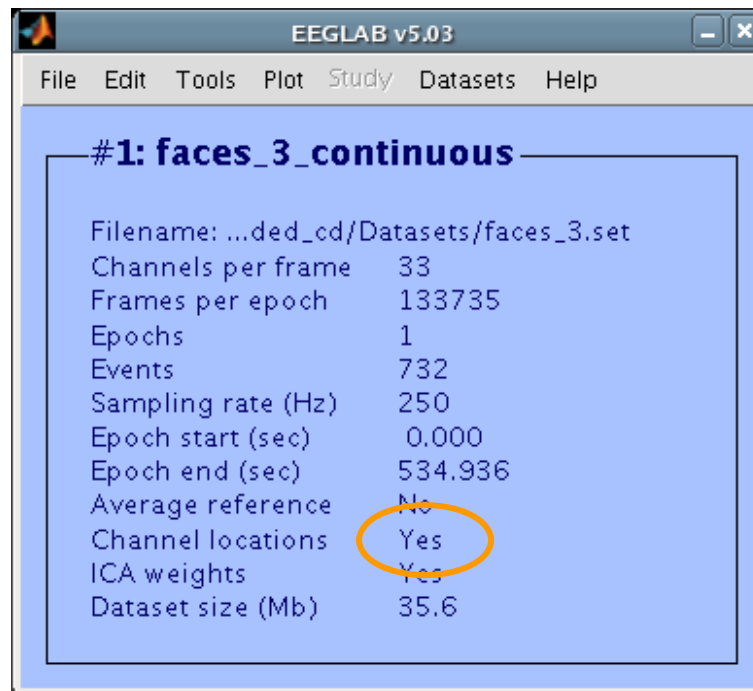
**Set channel type**

Channel indices: 1:33  
Type (e.g. EEG): EEG

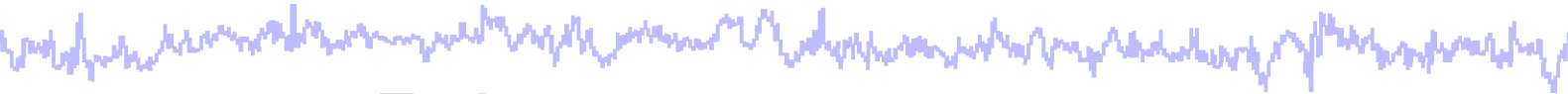
Cancel Help Ok



# Import channel locations



# Data importing and channel analysis



## Task 1

- Import raw data
- Re-reference data
- Scroll channel data

## Task 2

- Import channel location file

## Task 3

- Import data events

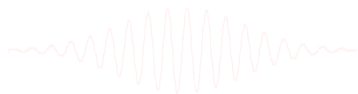
## Task 4

- Extract data epochs
- Select epochs/events

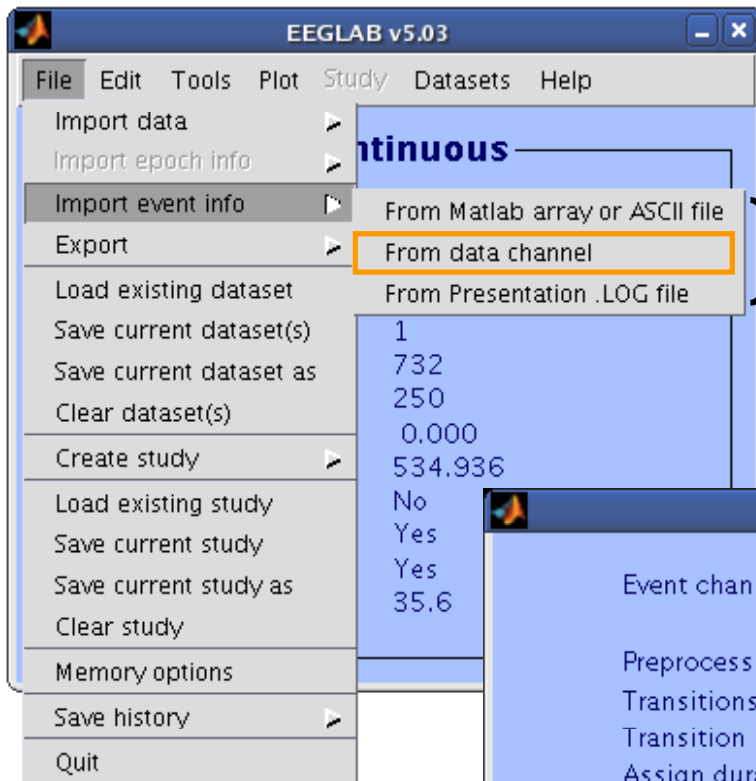
## Task 4

- Channel analysis

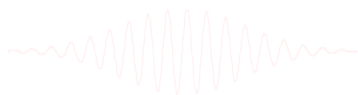
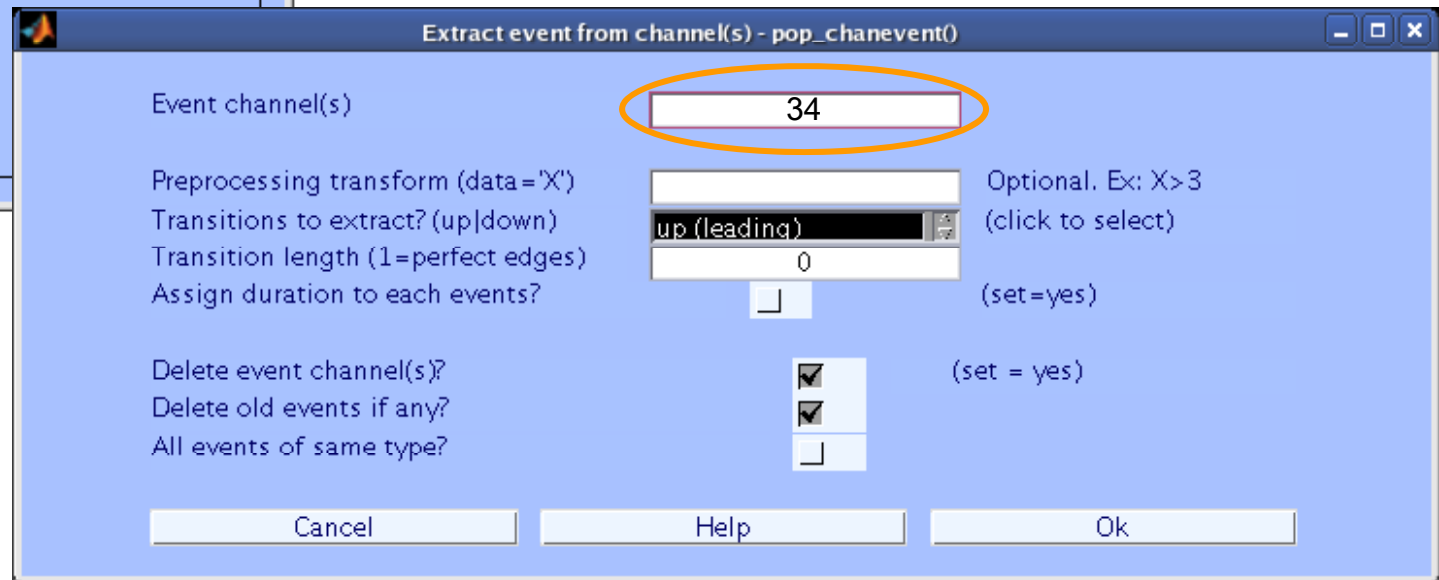
## Exercise...

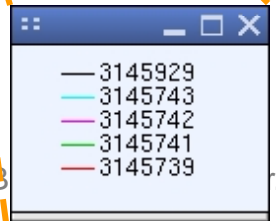
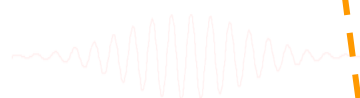
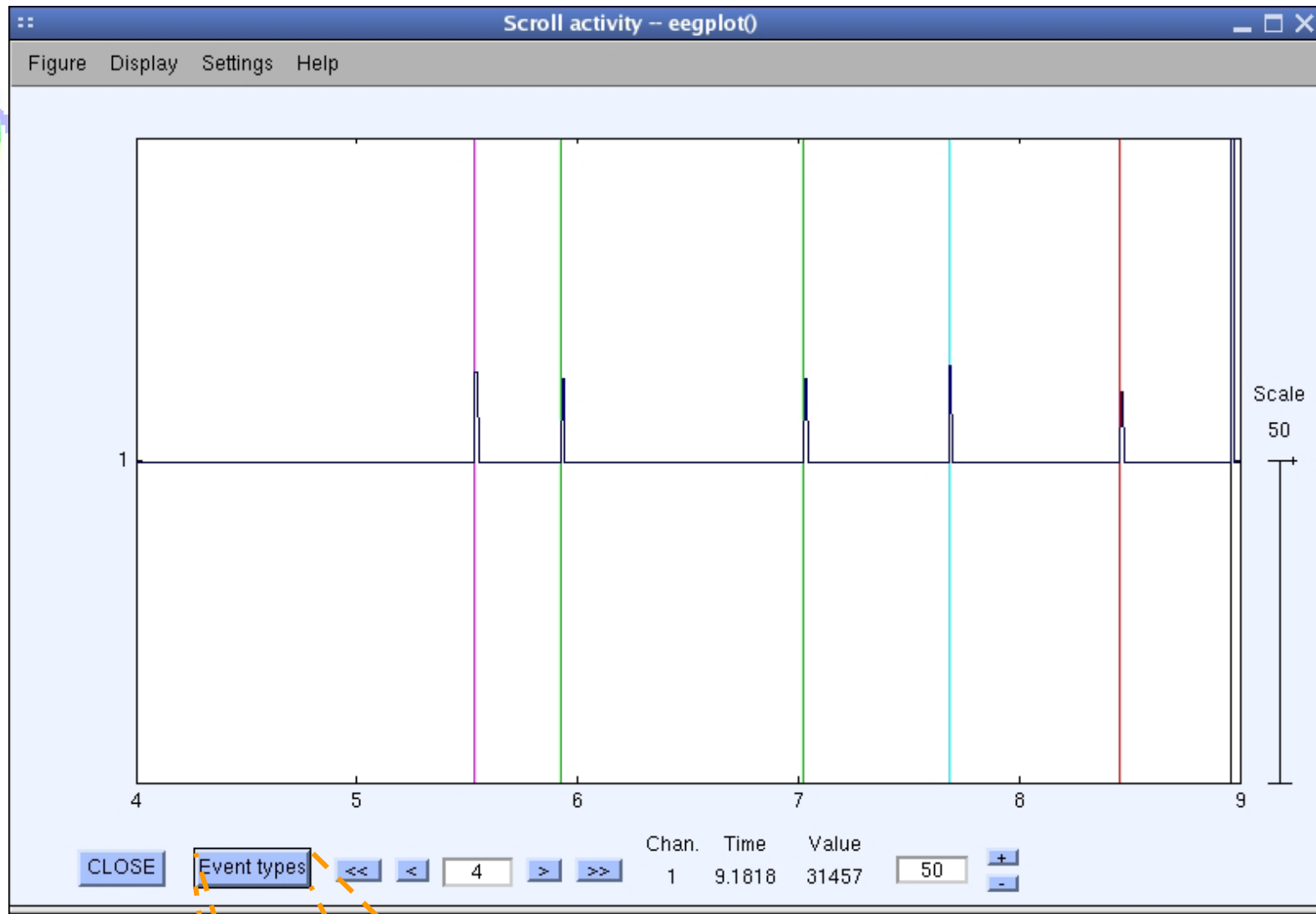


# Import data events

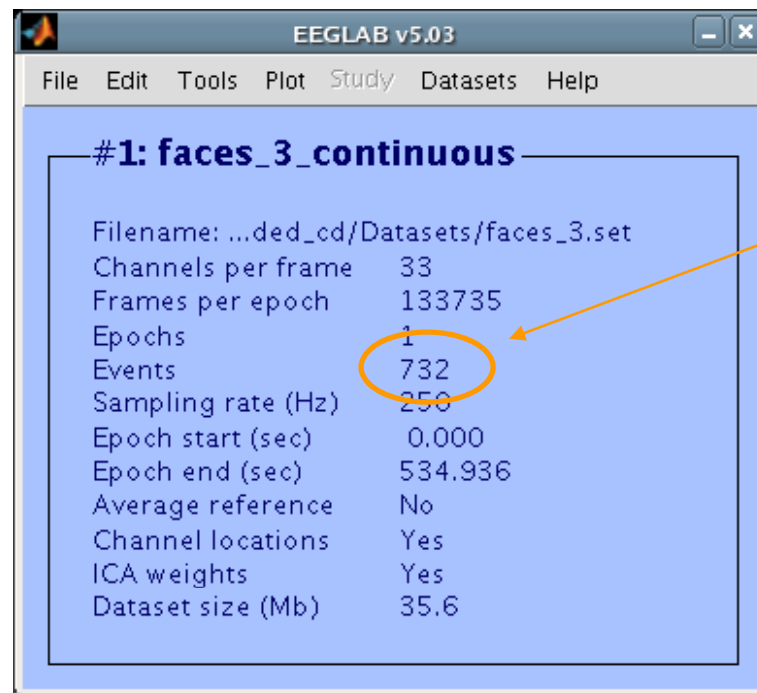


- Import events from Matlab array or ASCII file
- **Import events from data channel**
- Import from Presentation event file

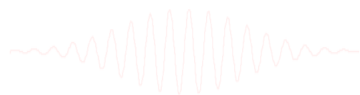




# Import data events



If event import was successful, you will see an appropriate number here



# Review event values



EEGLAB v5.03

File Edit Tools Plot Study Datasets Help

Dataset info  
Event fields  
**Event values**  
About this dataset  
Channel locations  
Select data  
Select epochs/events  
Copy current dataset  
Append datasets  
Delete dataset(s)  
Channel locations  
ICA weights  
Dataset size (Mb)

shop06/faces\_3.set  
33  
133735  
1  
732  
250  
0.000  
534.936  
No  
Yes  
Yes  
35.6

Event 'type' and 'latency' are recognized fields

Append event AFTER current event

Delete CURRENT event

Edit event values -- pop\_editeventvals()

Edit event field values (currently 732 events)

Latency (sec)	4.964
Type	object

Event Num: 2

Buttons: Insert event, <<, <, >, >>, Append event, Delete event

Re-order events (for review only)

Main sorting field: No field selected  Click for decreasing order

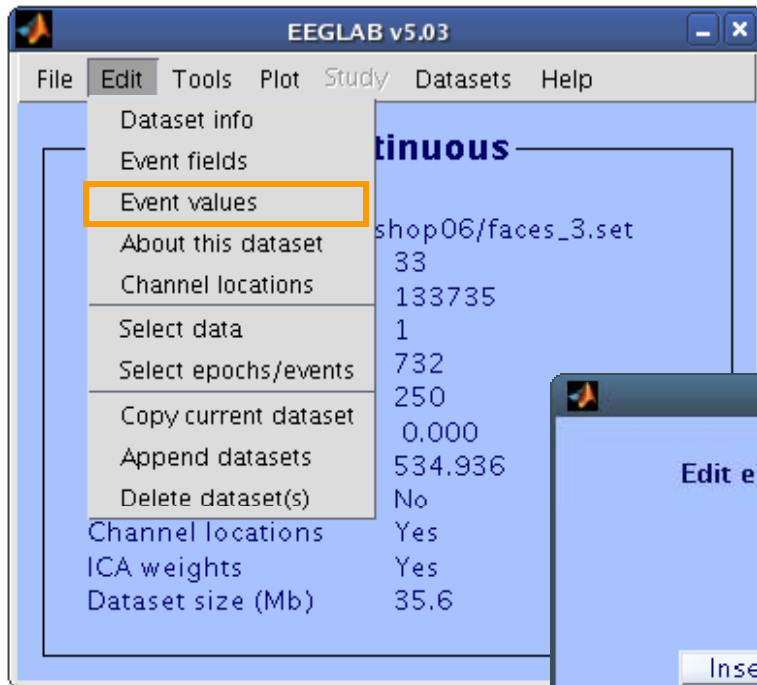
Secondary sorting field: No field selected  Click for decreasing order

Buttons: Re-sort, Cancel, Help, Ok

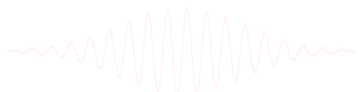
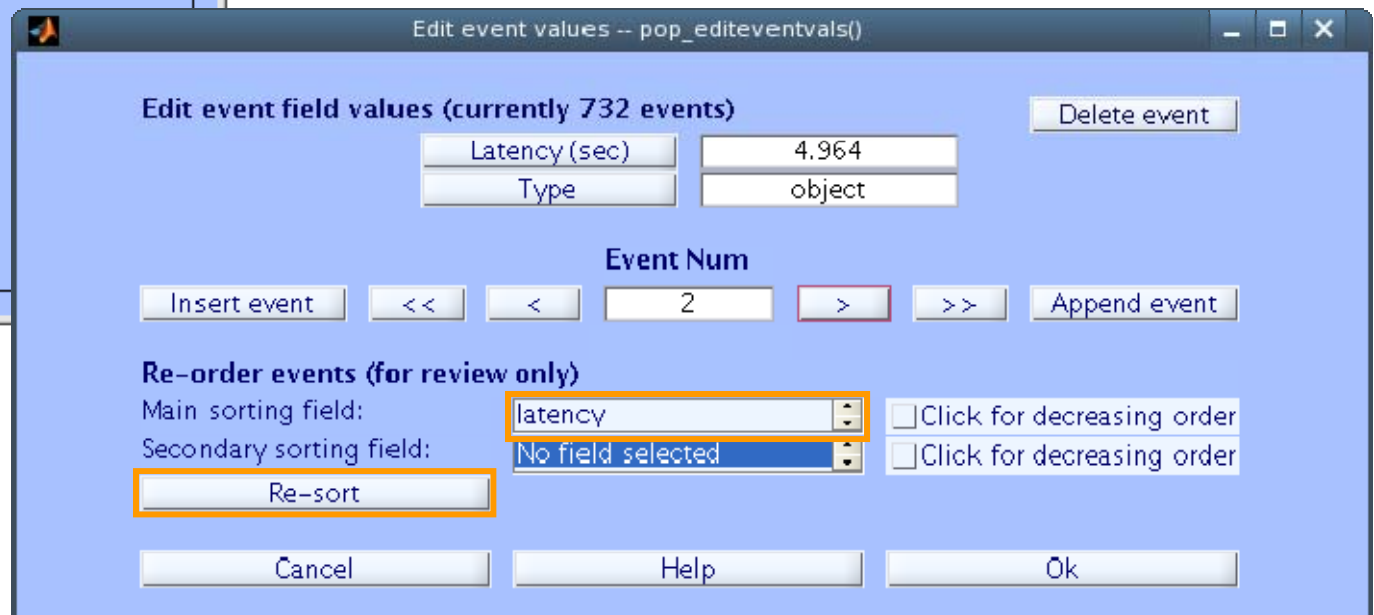
Insert event BEFORE current event

To resort: first select Main sorting field

# Review event values

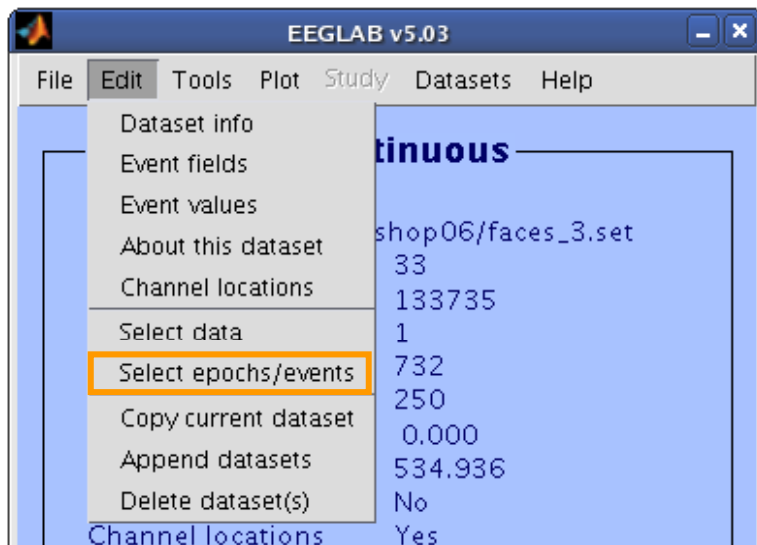


Event 'type' and 'latency'  
are recognized fields

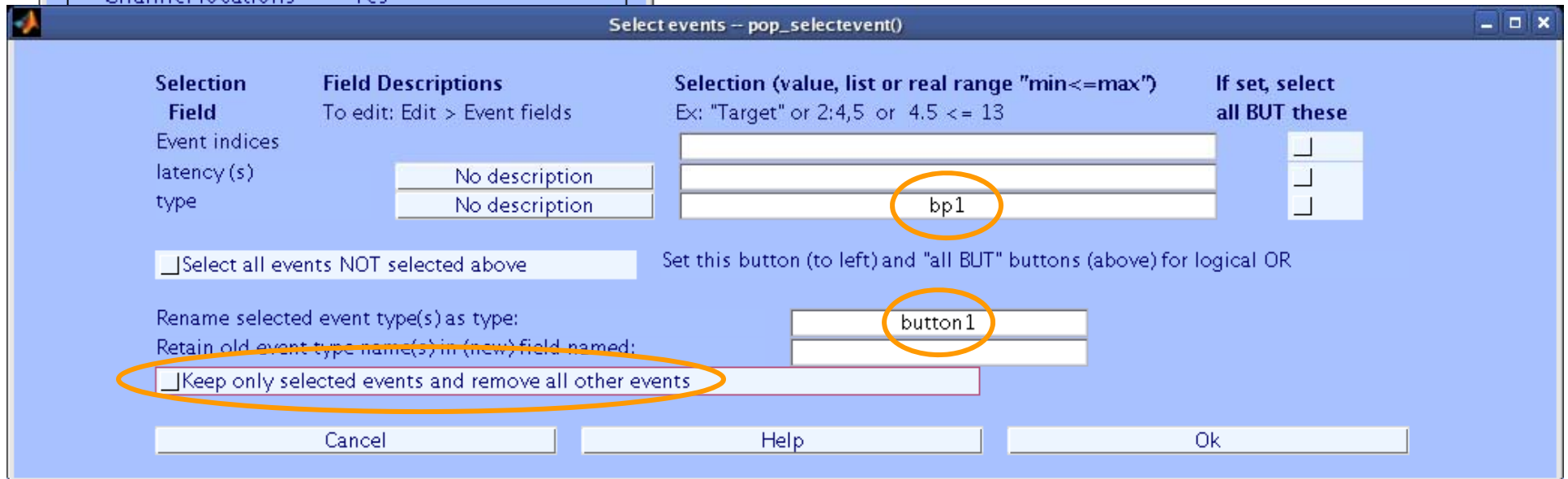




# Renaming events



- 1) input original 'type' code
- 2) input new 'type' code
- 3) Keep/delete all other events



# Renaming events



EEGLAB v5.03

File Edit Tools Plot Study Datasets Help

- Dataset info
- Event fields
- Event values**
- About this dataset
- Channel locations
- Select data
- Select epochs/events
- Copy current dataset
- Append datasets
- Delete dataset(s)
- Channel locations
- ICA weights
- Dataset size (Mb)

shop06/faces\_3.set

33
133735
1
732
250
0.000
534.936
No
Yes
Yes
35.6

Edit event values -- pop\_editeventvals()

Edit event field values (currently 732 events) Delete event

Latency (sec)	5.724
Type	<b>button1</b>

Event Num

Insert event << < 3 > >> Append event

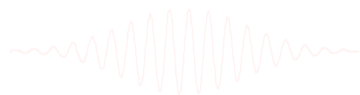
Re-order events (for review only)

Main sorting field: No field selected  Click for decreasing order

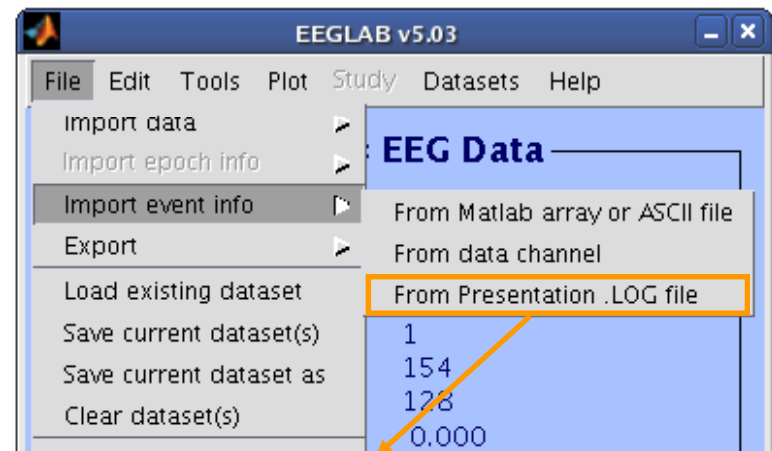
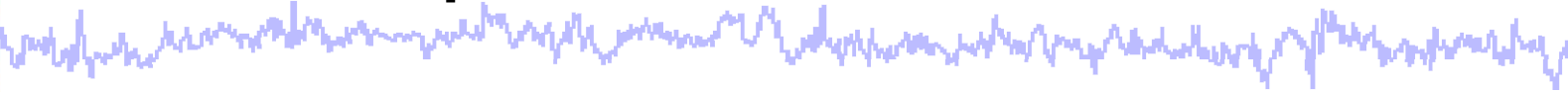
Secondary sorting field: No field selected  Click for decreasing order

Re-sort

Cancel Help Ok



# Alternative method for importing events: Import events from event file



...

**Check alignment between pre-existing (old) and loaded event latencies:**

**Old event latencies (10 first):** 10789 21315 31375 41902 51962 62489 ...

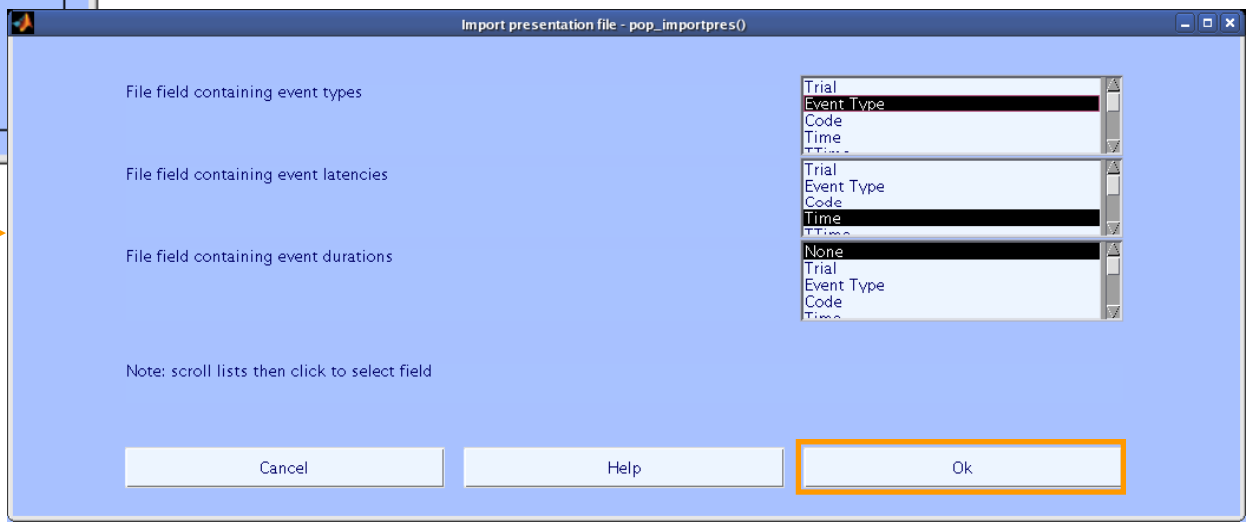
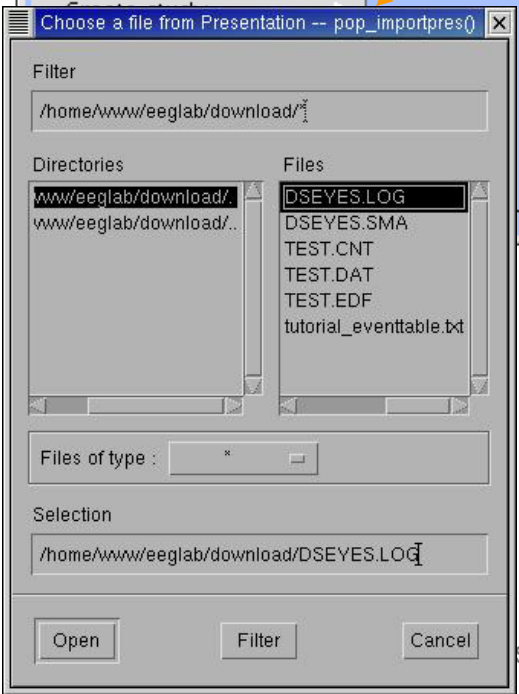
**New event latencies (10 first):** 10789 21315 31376 41902 51963 62489 ...

**Best sampling rate ratio found is** 0.9999895. Below latencies after adjustment

**Old event latencies (10 first):** 10789 21315 31376 41902 51963 62488 ...

**New event latencies (10 first):** 10789 21315 31375 41902 51962 62489 ...

...



# Scroll data with events



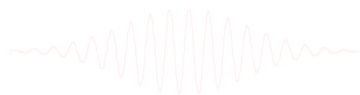
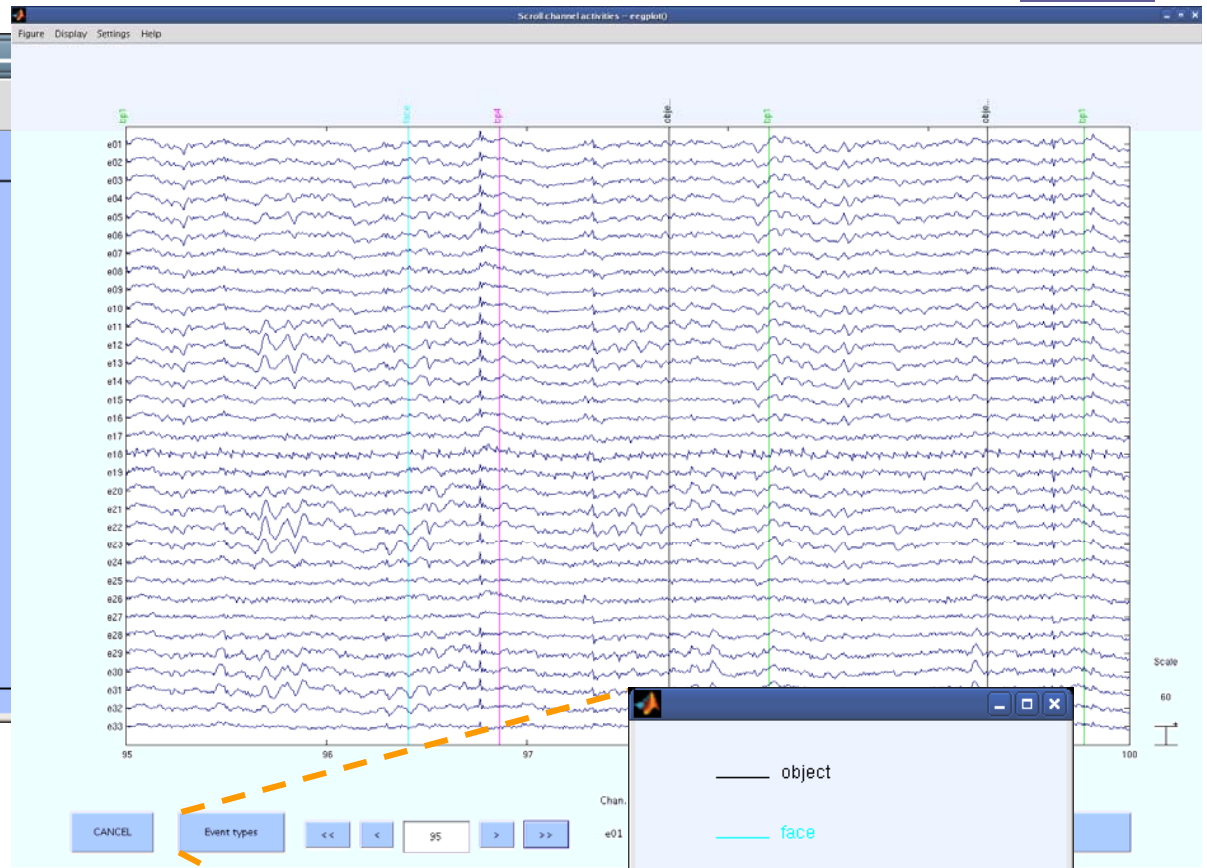
EEGLAB v5.03

File Edit Tools Study Datasets Help

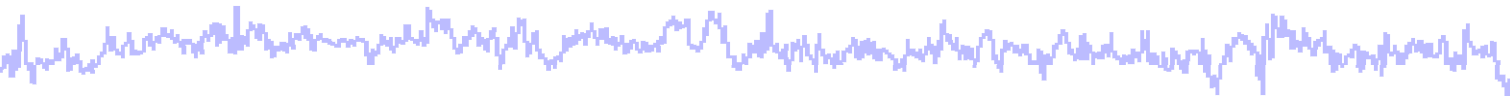
#1: faces

Filename: ...  
Channels per ...  
Frames per e...  
Epochs  
Events  
Sampling rat...  
Epoch start (...)  
Epoch end (s...)  
Average refe...  
Channel loca...  
ICA weights  
Dataset size

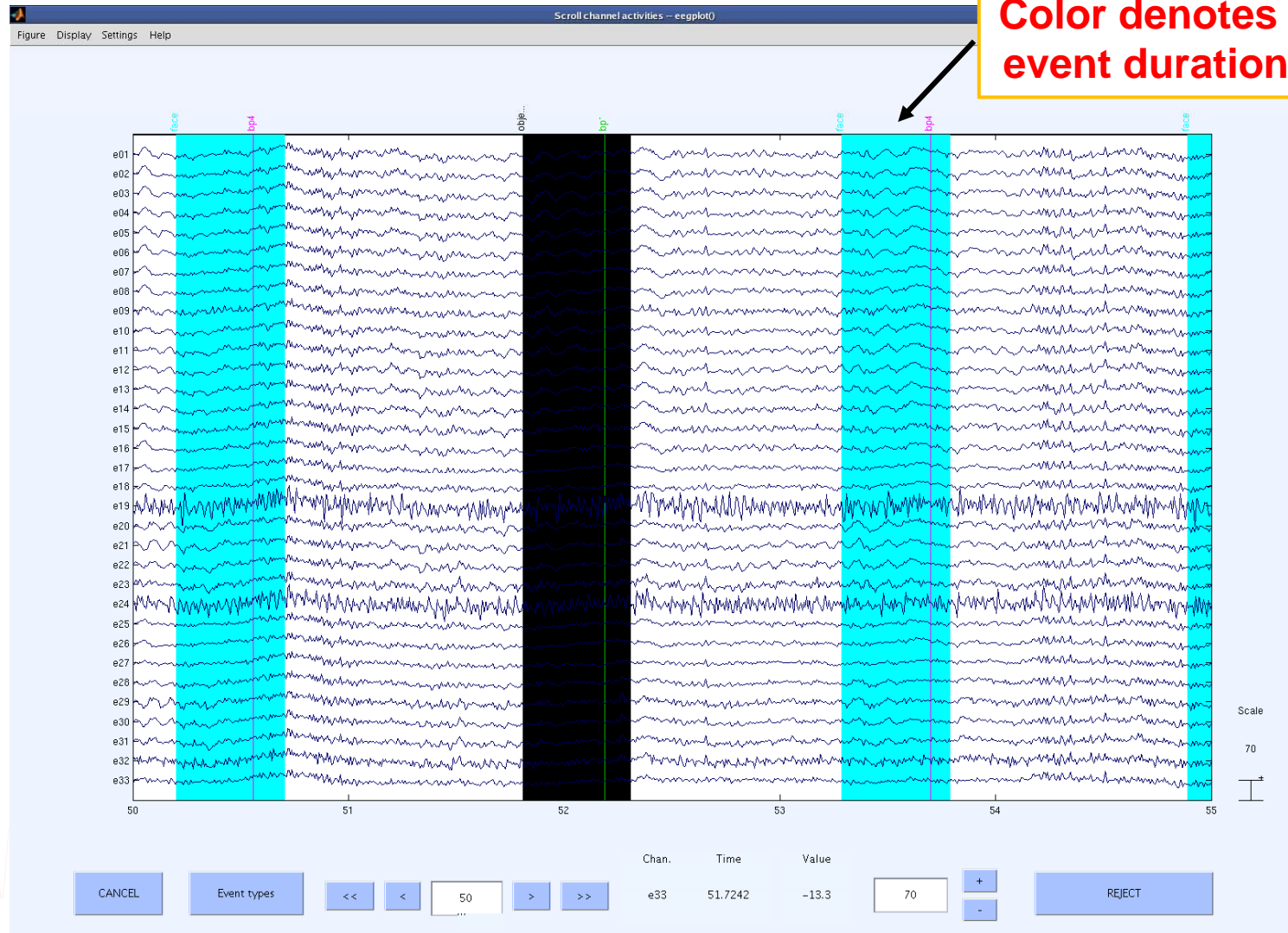
- Channel locations
- Channel data (scroll)**
- Channel spectra and maps
- Channel properties
- Channel ERP image
- Channel ERPs
- ERP map series
- Sum/Compare ERPs
- Component activations (scroll)
- Component spectra and maps
- Component maps
- Component properties
- Component ERP image
- Component ERPs
- Sum/Compare comp. ERPs
- Data statistics
- Time-frequency transforms
- Average time-frequency
- New Time-freq. transforms



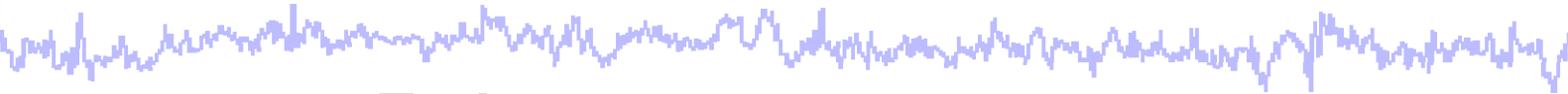
# Event durations



**Color denotes event duration**



# Data importing and channel analysis



## Task 1

- Import raw data
- Re-reference data
- Scroll channel data

## Task 2

- Import channel location file

## Task 3

- Import data events

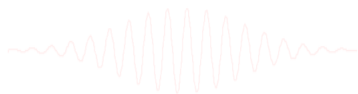
## Task 4

- Extract data epochs
- Select epochs/events

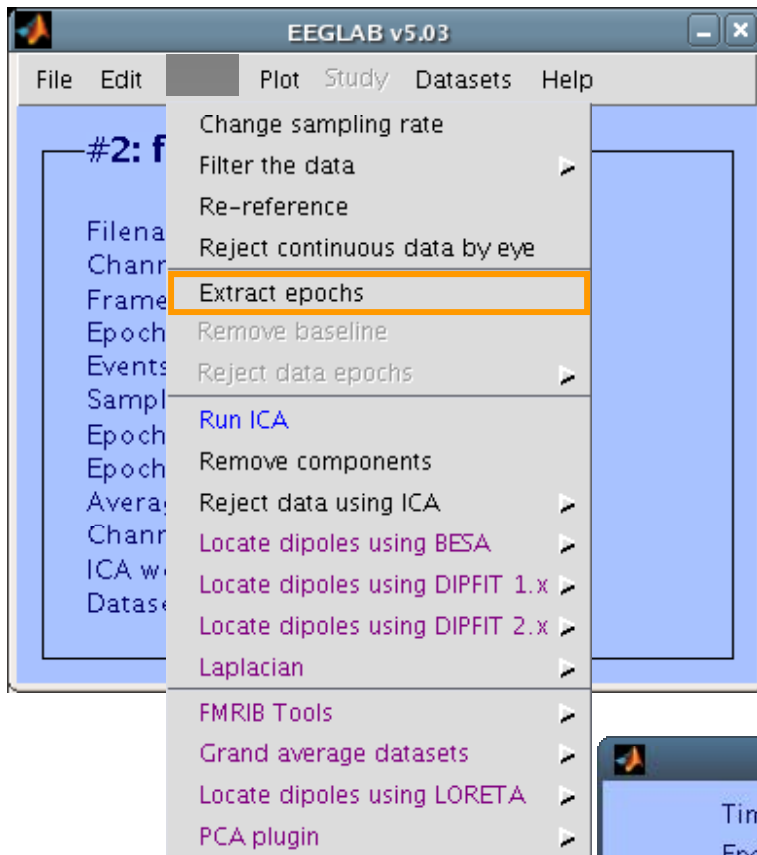
## Task 4

- Channel analysis

Exercise...

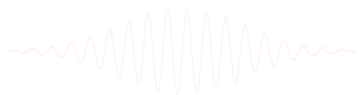
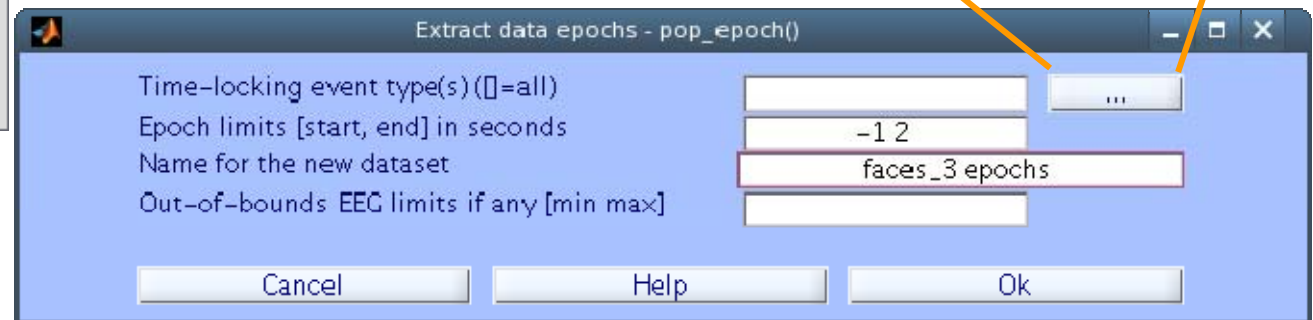
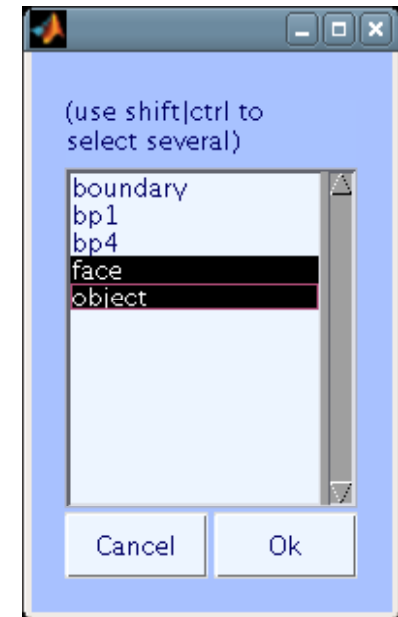


# Extract epochs



```
>> eeg_eventtypes(EEG)
```

<b>boundary</b>	<b>1</b>
<b>bp1</b>	<b>183</b>
<b>bp4</b>	<b>184</b>
<b>face</b>	<b>182</b>
<b>object</b>	<b>182</b>



# Extract epochs

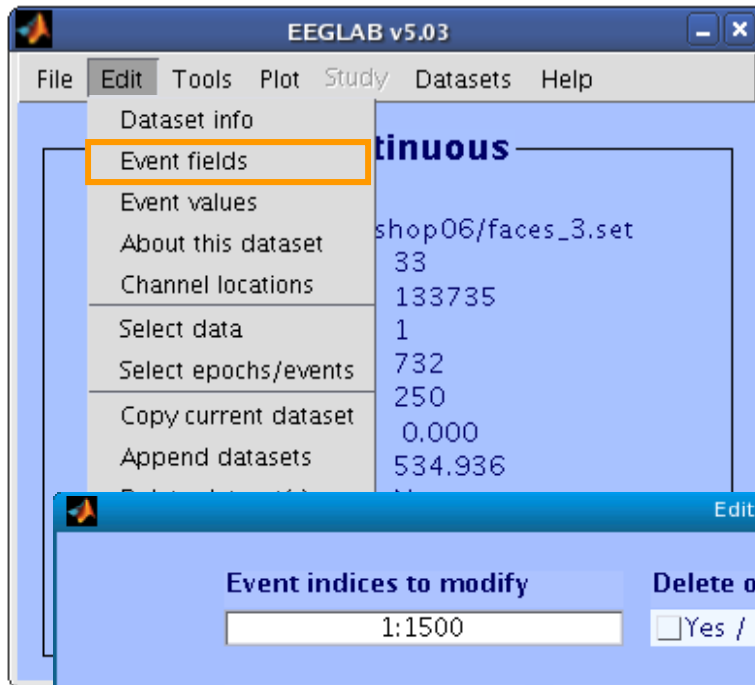


#3: faces_3_chans removed epochs	
Filename:	none
Channels per frame	31
Frames per epoch	750
Epochs	364
Events	1500
Sampling rate (Hz)	250
Epoch start (sec)	-1.000
Epoch end (sec)	1.996
Average reference	No
Channel locations	Yes
ICA weights	Yes
Dataset size (Mb)	70.6

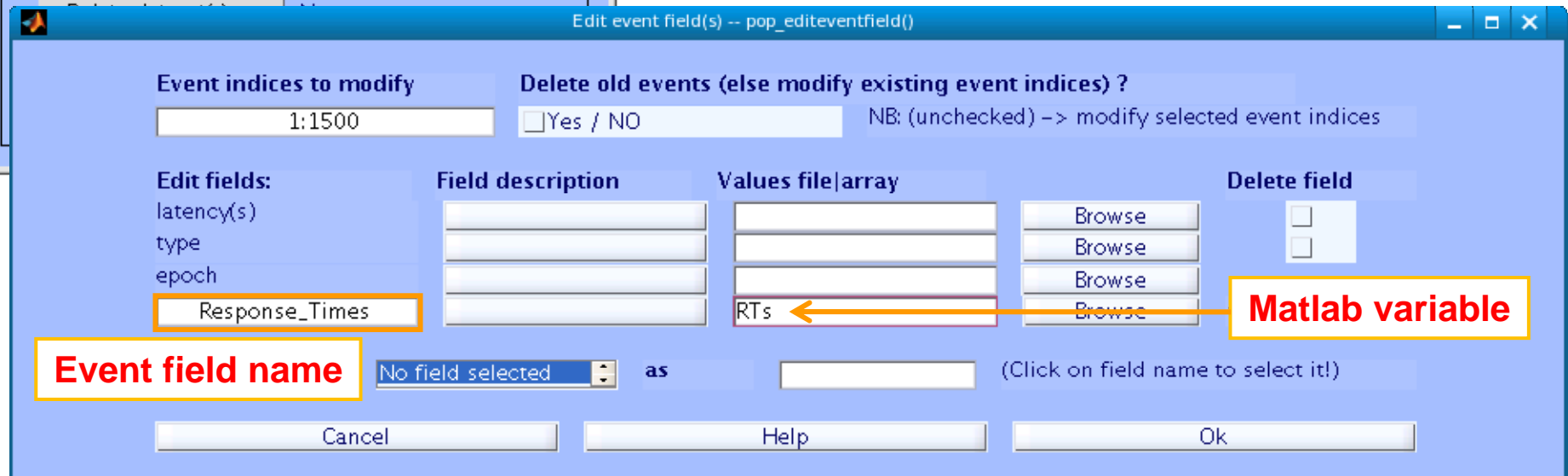
```
>> EEG = pop_epoch(EEG,{'face' 'object'},[-1 2],...
    'newname','faces_3 epochs',...
    'epochinfo','yes');
>> EEG = pop_rmbase(EEG,[-100 0]);
>> [ALLEEG EEG CURRENTSET] = pop_newset(ALLEEG,EEG,...
    CURRENTSET,'setname','faces_3 epochs');
```



# Create new event field



```
EEG = pop_editeventfield( EEG,...  
    'indices','1:732','latencyinfo',...  
    [],'typeinfo',[],'duration','0');  
[ALLEEG EEG] = eeg_store(ALLEEG,...  
    EEG, CURRENTSET);
```



# Select epochs

EEGLAB v5.03

File Edit Tools Plot Study Datasets Help

Dataset info  
Event fields  
Event values  
About this dataset  
Channel locations  
Select data  
**Select epochs/events**  
Copy current dataset  
Append datasets  
Delete

Continuous

shop06/faces\_3.set  
33  
133735  
1  
732  
250  
0.000  
534.936

Confirmation

Warning: delete 97 (out of 364) un-referenced epochs ?

Cancel Ok

Select events - pop\_selectevent()

Selection	Field Descriptions	Selection (value, list or real range "min<=max")	If set, select all BUT these
Field	To edit: Edit > Event fields	Ex: "Target" or 2;4,5 or 4.5 <= 13	
Event indices			<input type="checkbox"/>
latency (ms)	No description		<input type="checkbox"/>
type	No description	face	<input type="checkbox"/>
epoch	No description		<input type="checkbox"/>

Select all events NOT selected above Set this button (to left) and "all BUT" buttons (above) for logical OR

Rename selected event type(s) as type:

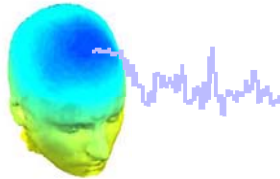
Retain old event type name(s) in (new) field named:

Keep only selected events and remove all other events

Remove epochs not referenced by any selected event

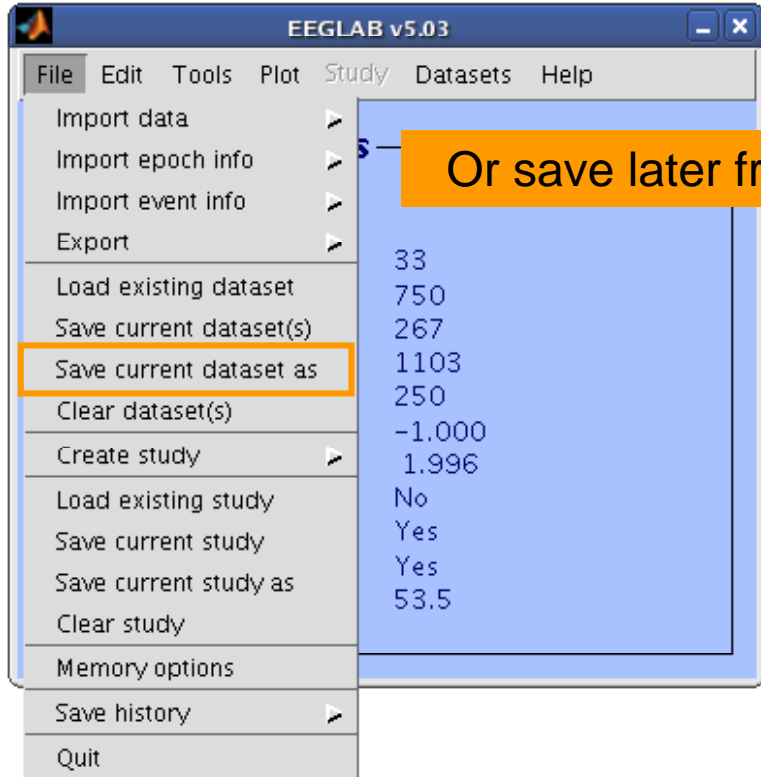
Cancel Help Ok

```
>> EEG = pop_selectevent(EEG,'type',{'face'},...  
    'deleteevents','off','deleteepochs','on');  
>> [ALLEEG EEG CURRENTSET] = pop_newset(ALLEEG,EEG,4,...  
    'setname','faces only epochs');
```

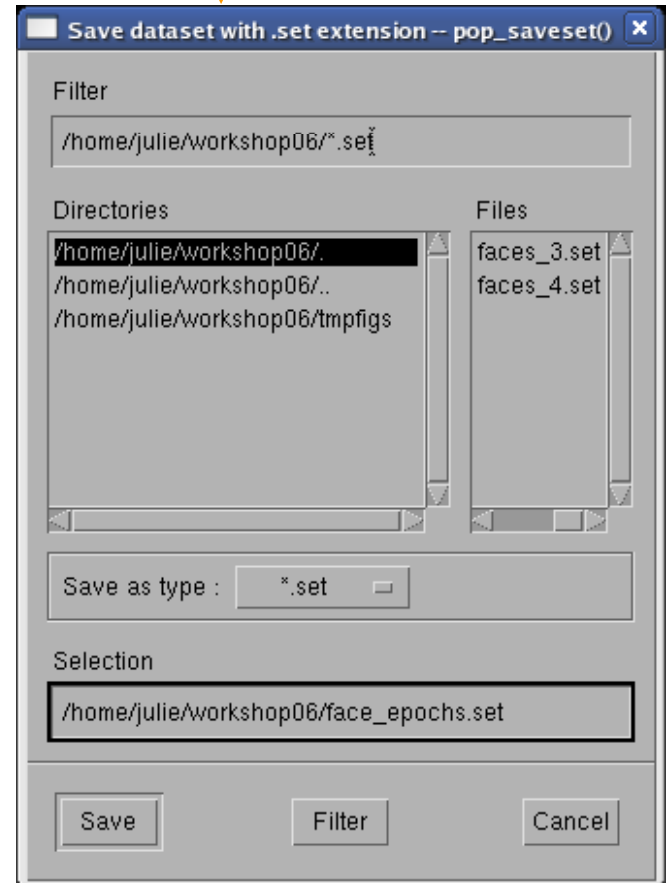


**“Do not overwrite current dataset”**

## Save dataset (optional)



**Or save later from menu**





EEGLAB v5.02

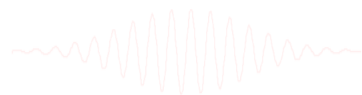
File Edit Tools Plot Study **Datasets** Help

#2: face epochs

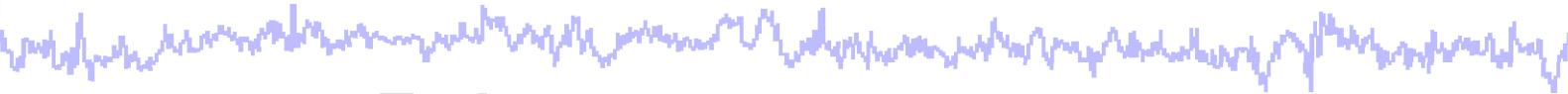
- Dataset 1:faces\_3\_continuous
- Dataset 2:face epochs
- Select multiple datasets

Filename: none  
Channels per frame 33  
Frames per epoch 750  
Epochs 267  
Events 1103  
Sampling rate (Hz) 250  
Epoch start (sec) -1.000  
Epoch end (sec) 1.996  
Average reference No  
Channel locations Yes  
ICA weights Yes  
Dataset size (Mb) 53.5

**New dataset created**



# Data importing and channel analysis



## Task 1

- Import raw data
- Re-reference data
- Scroll channel data

## Task 2

- Import channel location file

## Task 3

- Import data events

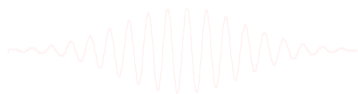
## Task 4

- Extract data epochs
- Select epochs/events

## Task 4

- Channel analysis

**Exercise...**



# Analysis of ERPs



EEGLAB v5.0b

File Edit Tools **Plot** Study Datasets Help

#2: face

Filename: no  
Channels per  
Frames per e  
Epochs  
Events  
Sampling rat  
Epoch start (s  
Epoch end (s  
Average refe  
Channel loca  
ICA weights  
Dataset size

- Channel locations
- Channel data (scroll)
- Channel spectra and maps
- Channel properties
- Channel ERP image
- Channel ERPs**
  - With scalp maps
  - In scalp/rect. array
  - In rect. array
- ERP map series
- Sum/Compare ERPs
- Component activations (scroll)
- Component spectra and maps
- Component maps
- Component properties
- Component ERP image
- Component ERPs
- Sum/Compare comp. ERPs
- Data statistics
- Time-frequency transforms
- Average time-frequency
- Cluster dataset ICs

ERP data and scalp maps -- pop\_timtopo()

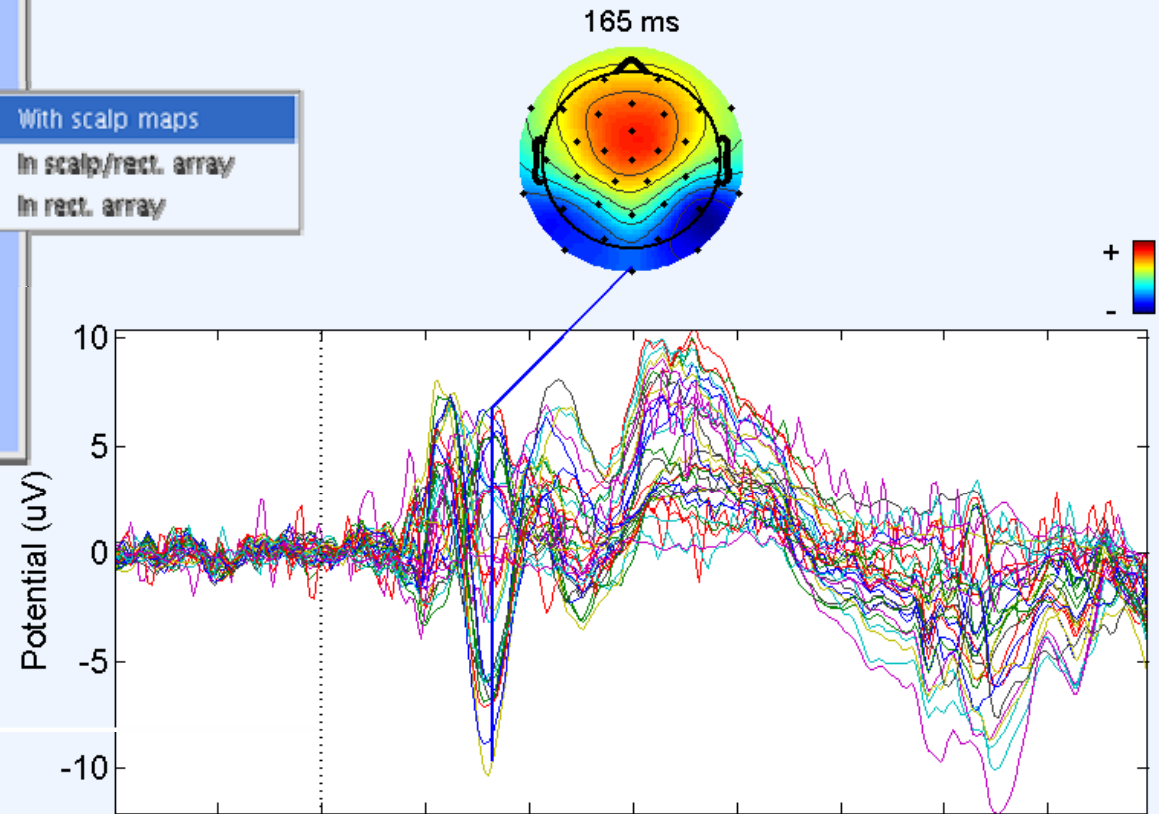
Plotting time range (ms): -200 796

Scalp map latencies (ms, NaN -> max-RMS): 165

Plot title: ERP data and scalp maps of f

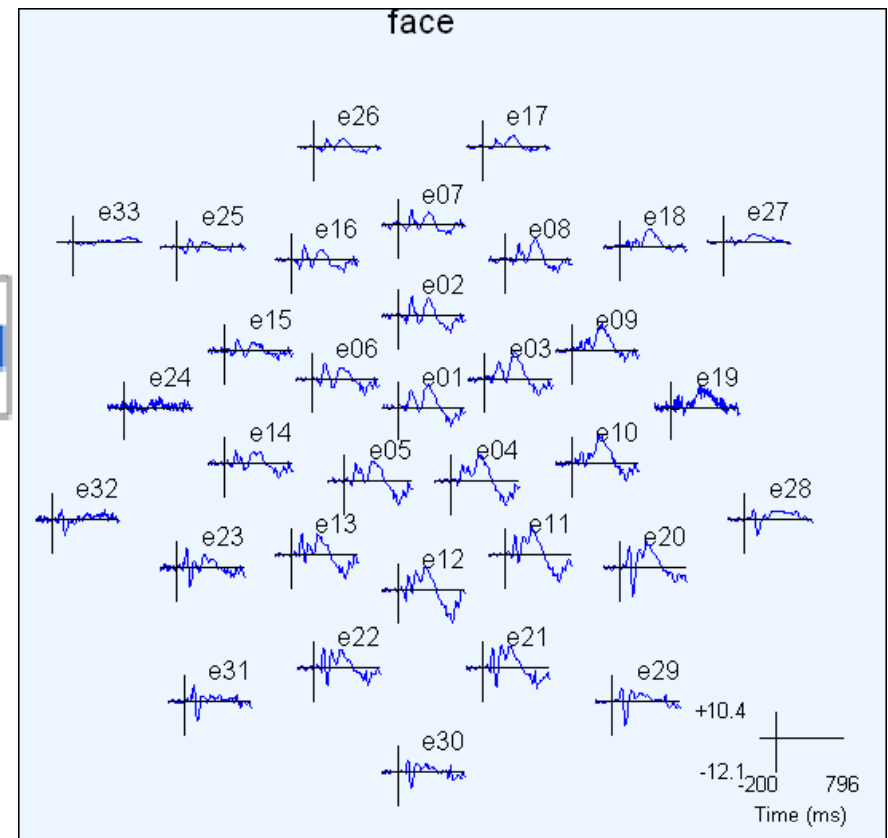
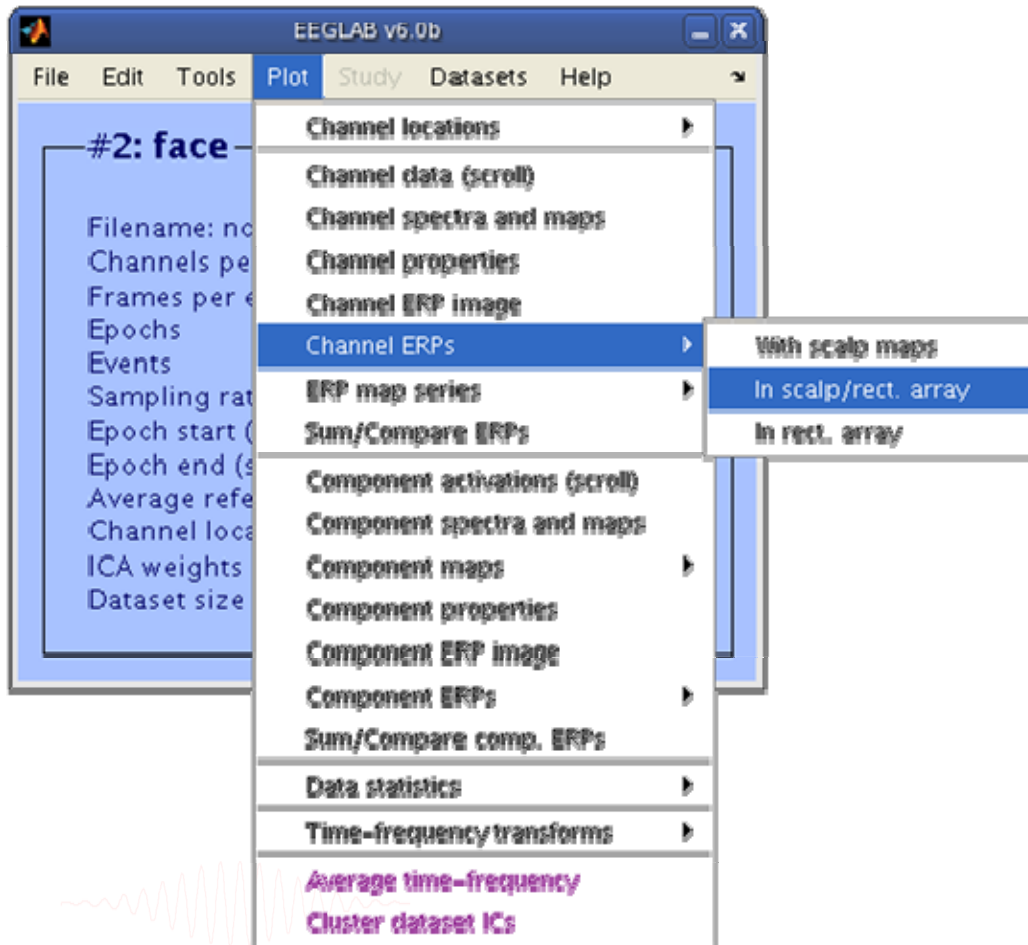
Scalp map options (see >> help topoplot):

Cancel Help Ok

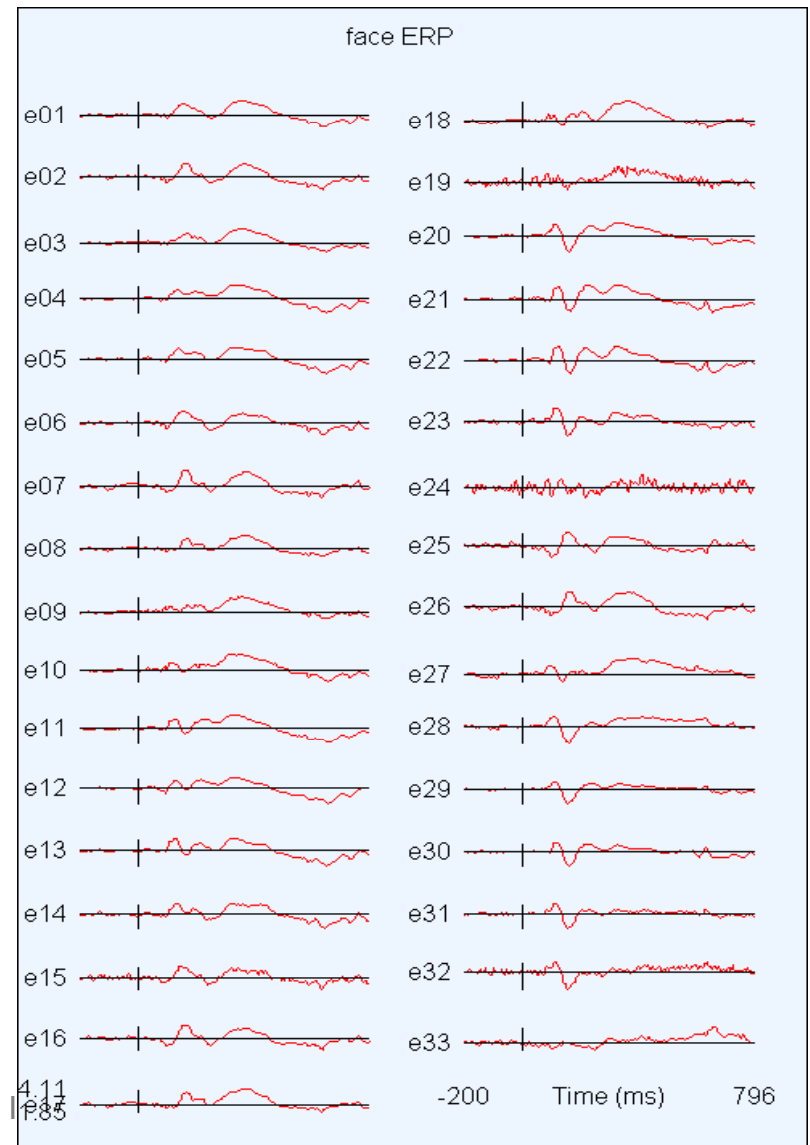
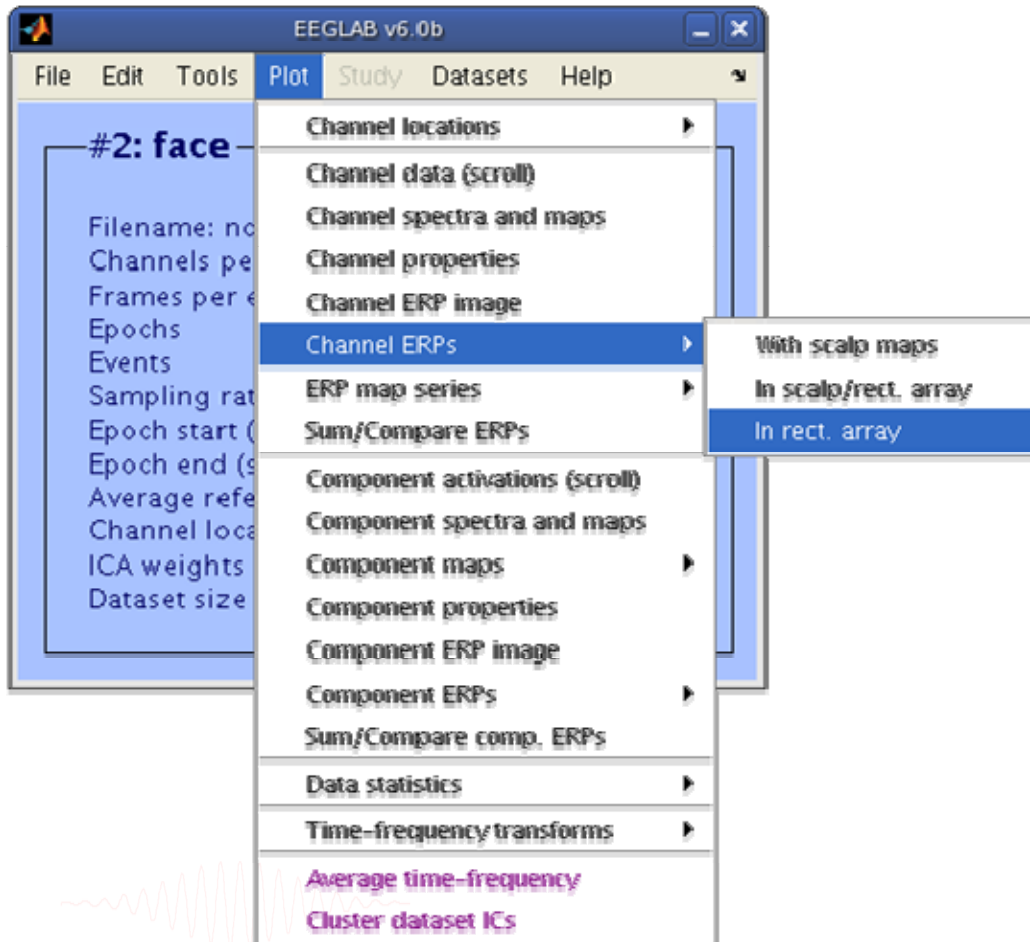


```
>> pop_timtopo(EEG, [-200 796], [165], 'ERP data and scalp maps');
```

# Analysis of ERPs

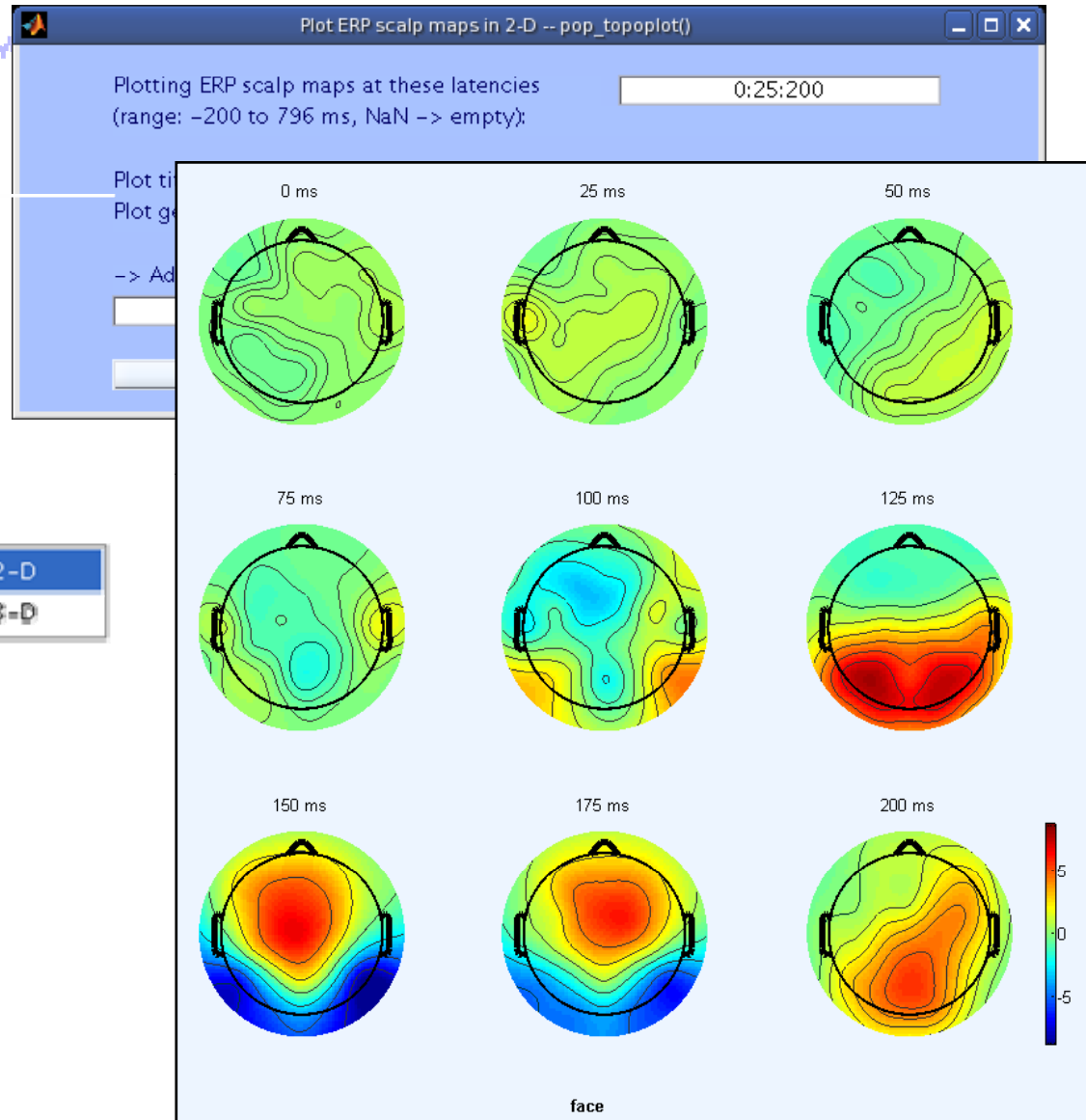
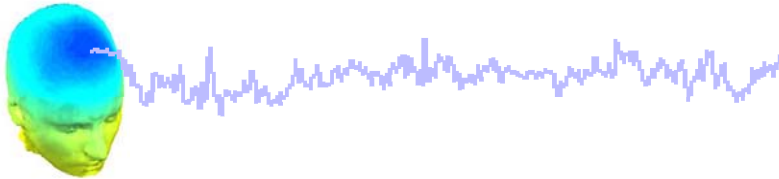


# Analysis of ERPs



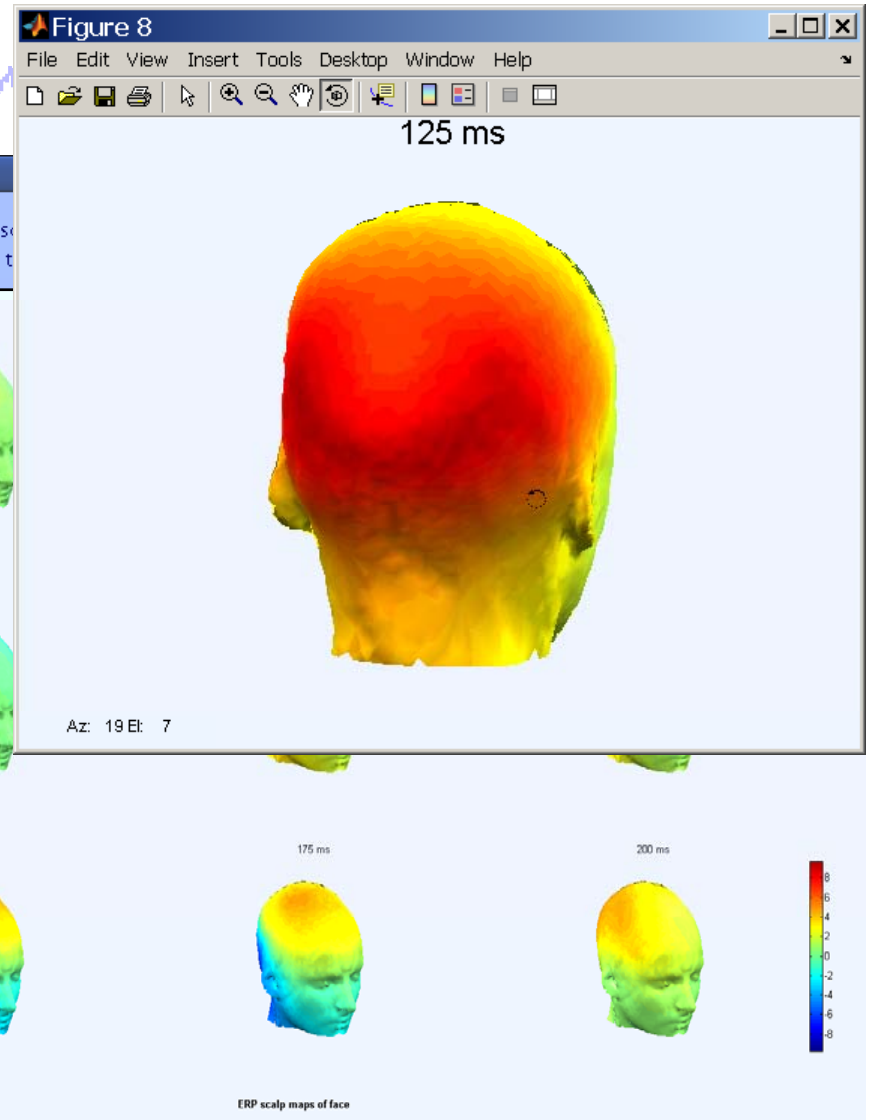
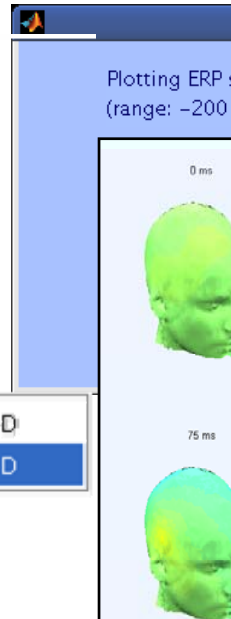
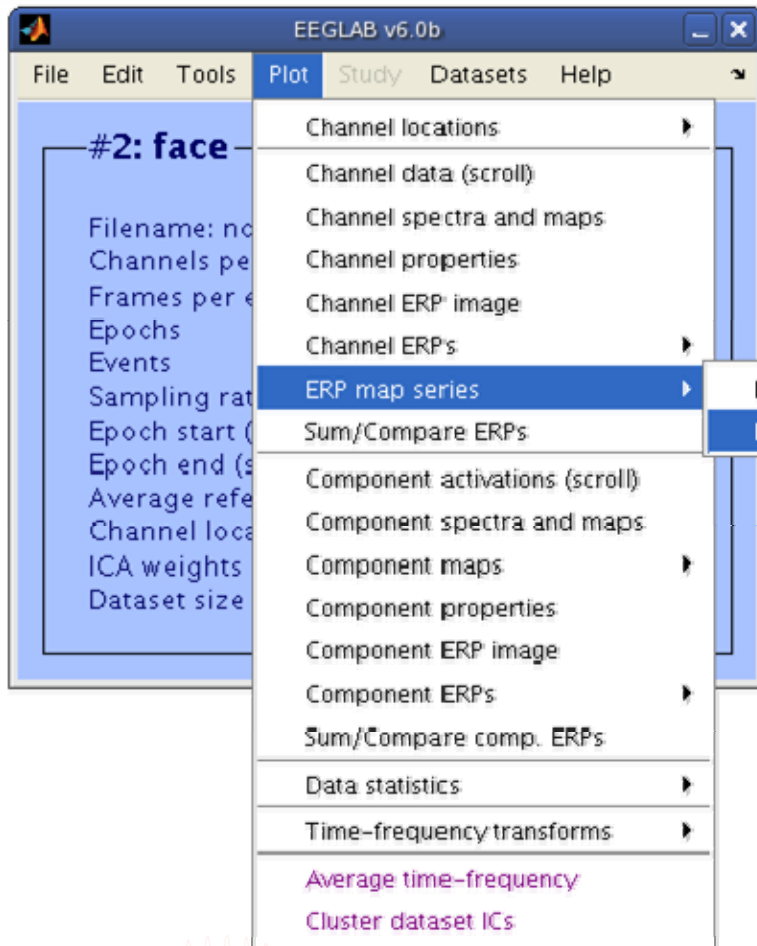


# Analysis of ERPs



```
>>pop_topoplot(EEG,1,[0:25:200],'face',[3 3],0,'electrodes','off');
```

# Analysis of ERPs



```
>> pop_headplot(EEG,1,[0:25:200],'ERP scalp maps',[3 3],...  
'electrodes', 'off');
```

# Compare ERPs across conditions



Select 'object' epochs and create new dataset

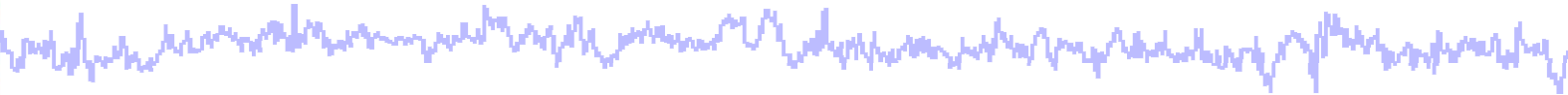
Property	Value
Filename	none
Channels per frame	3
Frames per epoch	7
Epochs	2
Events	1063
Sampling rate (Hz)	250
Epoch start (sec)	-1.000
Epoch end (sec)	1.996
Average reference	No
Channel locations	Yes
ICA weights	Yes
Dataset size (Mb)	49.9

- Dataset 1: faces\_3\_continuous
- Dataset 2: faces\_3\_chans removed
- Dataset 3: faces\_3\_chans removed epochs
- Dataset 4: faces only epochs
- Dataset 5: objects only epochs
- Select multiple datasets

How do 'face' and 'object' ERPs differ?

```
>> [EEG,ALLEEG,CURRENTSET] = pop_newset(ALLEEG,EEG,4, ...  
    'retrieve',3,'study',0);  
>> EEG = pop_selectevent(EEG,'type',{'object'},...  
    'deleteevents','off','deleteepochs','on');  
>> [ALLEEG EEG CURRENTSET] = pop_newset(ALLEEG,EEG,5, ...  
    'setname','object only epochs');
```

# Compare ERPs across conditions



EEGLAB v6.0b

File Edit Tools Plot Study Datasets Help

#1: f ERP grand average

Compare ERPs from two conditions

Datasets to average (ex: 1 3 4): 4,5

Datasets to average and subtract (ex: 5 6 7):

Plot difference

Channels subset ([]=all):

Highlight significant regions (.01 -> p=.01)

Use RMS instead of average (check):

Low pass (Hz) (for display only): 20

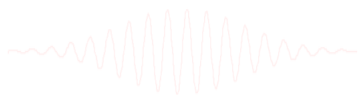
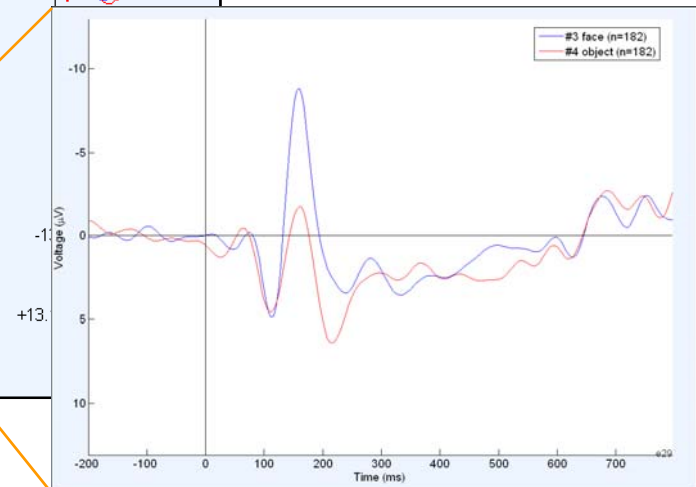
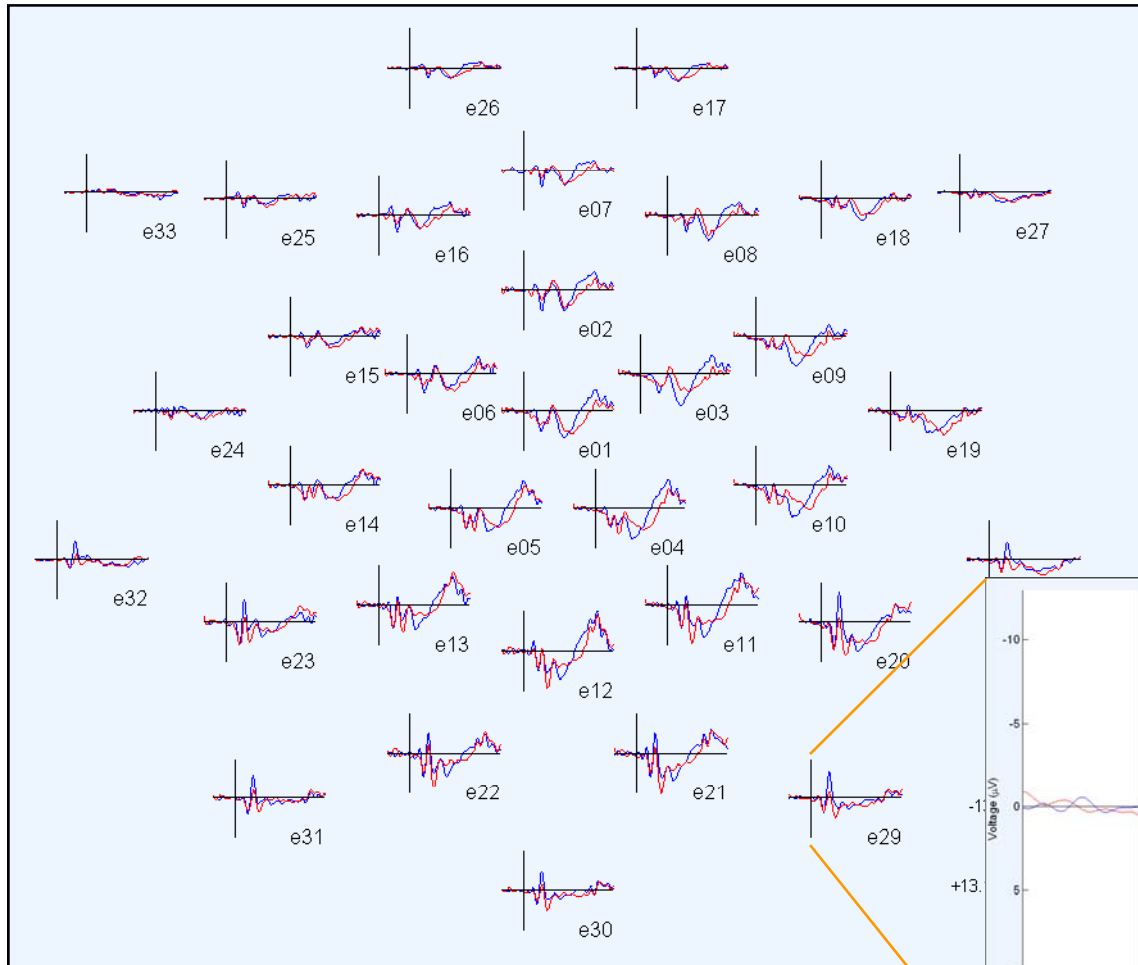
Plottopo options ('key', 'val'): 'ydir', -1

avg.  std.  all ERPs

Cancel Help Ok

```
>>pop_comperp(ALLEEG,1,[4 5],[],'addavg','off','addstd','off', ...  
'addall','on','diffavg','off','diffstd','off','lowpass',20, ...  
'tplotopt',{'ydir',-1});
```

# Compare ERPs across conditions



# Analysis of ERP differences



ERP grand av

**Plot difference between two conditions**

	avg.	std.	all ERPs
Datasets to average (ex: 1 3 4):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Datasets to average and subtract (ex: 5 6 7):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plot difference	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Channels subset ([]=all):

Highlight significant regions (.01 -> p=.01)

Use RMS instead of average (check):

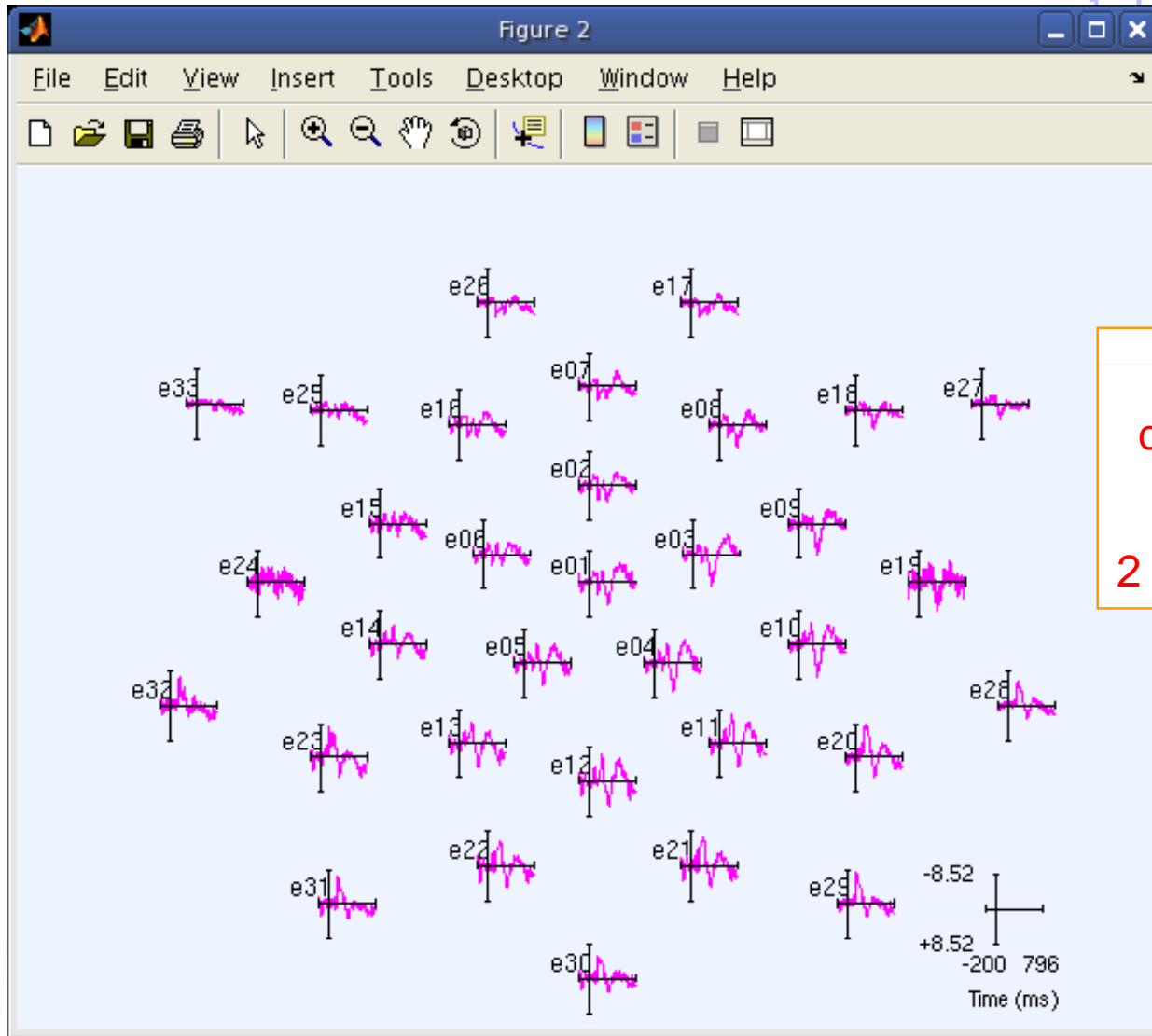
Low pass (Hz) (for display only)

Plottopo options ('key', 'val'): 'ydir', -1

Cancel Help Ok

```
>> pop_comperp(ALLEEG,1, 4, 5,'addavg','off',...  
'addstd','off', 'diffavg','on','diffstd','off', ...  
'lowpass',20, 'tplotopt',{'ydir',-1});
```

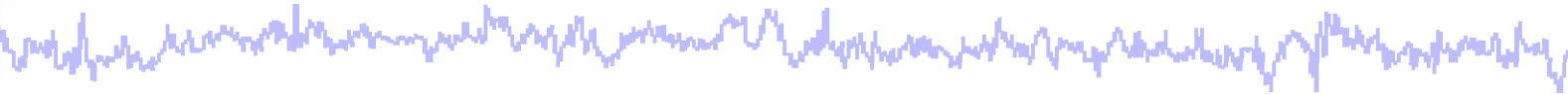
# Analysis of ERP differences



ERP  
difference  
between  
2 conditions



# Export EEG data



	e01	e02	e03	e04	e05	e06	e07	e08	e09	e10	e11	e12	e13
Exp	-0.7021	-0.6395	-0.5491	-0.3844	-0.4730	-0.5075	-0.						
Exp	-0.7116	-0.7245	-0.4236	-0.2221	-0.4850	-0.7165	-0.						
Exp	-0.5483	-0.6298	-0.2757	-0.0396	-0.3252	-0.7949	-0.						
Tr	-0.4038	-0.4629	-0.1161	-0.1454	-0.3393	-0.7880	-0.						
Exp	-0.3721	-0.3333	-0.1556	-0.3324	-0.4109	-0.7188	-0.						
Exp	-0.2317	-0.1290	-0.2646	-0.2754	-0.2334	-0.4372	-0.						
Exp	0.0962	0.2113	-0.0913	-0.1361	0.0039	0.0085	0.1						
Nur	0.5633	0.6851	0.3850	0.0617	0.2508	0.4841	0.5						
App	0.7854	0.9445	0.7090	0.2071	0.3589	0.6747	0.6						
	0.3744	0.5905	0.2864	-0.1259	0.0329	0.3895	0.3						
	-0.0672	0.1176	-0.2224	-0.4370	-0.1789	0.0444	-0.						
	-0.0826	-0.0019	-0.1886	-0.2928	-0.0028	-0.1215	-0.						
	-0.0582	-0.0889	-0.1299	-0.1322	0.1167	-0.2183	-0.						
	-0.1189	-0.2618	-0.2840	-0.1262	0.1378	-0.2262	-0.						
	-0.0765	-0.2820	-0.4683	-0.0749	0.2594	-0.1621	-0.						
	0.1603	-0.0609	-0.3273	0.1355	0.4519	0.0595	-0.						
	0.3770	0.2577	0.0617	0.3868	0.5652	0.3752	-0.						

```
>> pop_export(EEG, 'D:\tmp\faces.dat', 'erp', 'on', ...  
             'transpose', 'on', 'time', 'off');
```



# Exercise



- **ALL**
  - Load faces\_3.set
  - Do not save your changes under the same filename!
- **Novice**
  - Rereference the data to Cz.
  - Scroll data and explore plotting options under 'Settings'.
- **Intermediate**
  - Load channel locations from .locs file in 'data' folder, explore options to transform axes.
  - Review events in Edit->Event values, rename an event in Select epochs/events.
  - Create a new event field in Edit->Event fields.
- **Advanced**
  - Epoch the data on faces and objects separately, then use pop\_comperp to compare ERPs between conditions.
  - Explore other menu options.

