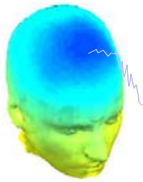
Data preprocessing and epoching



Task 1

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

Task 2

- Import channel location file

Task 3

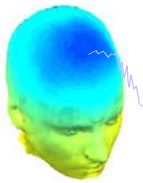
- Import data events

Task 4

- Extract data epochs
- Select epochs/events

Exercise...

Data preprocessing and epoching



Task 1

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

Task 2

- Import channel location file

Task 3

- Import data events

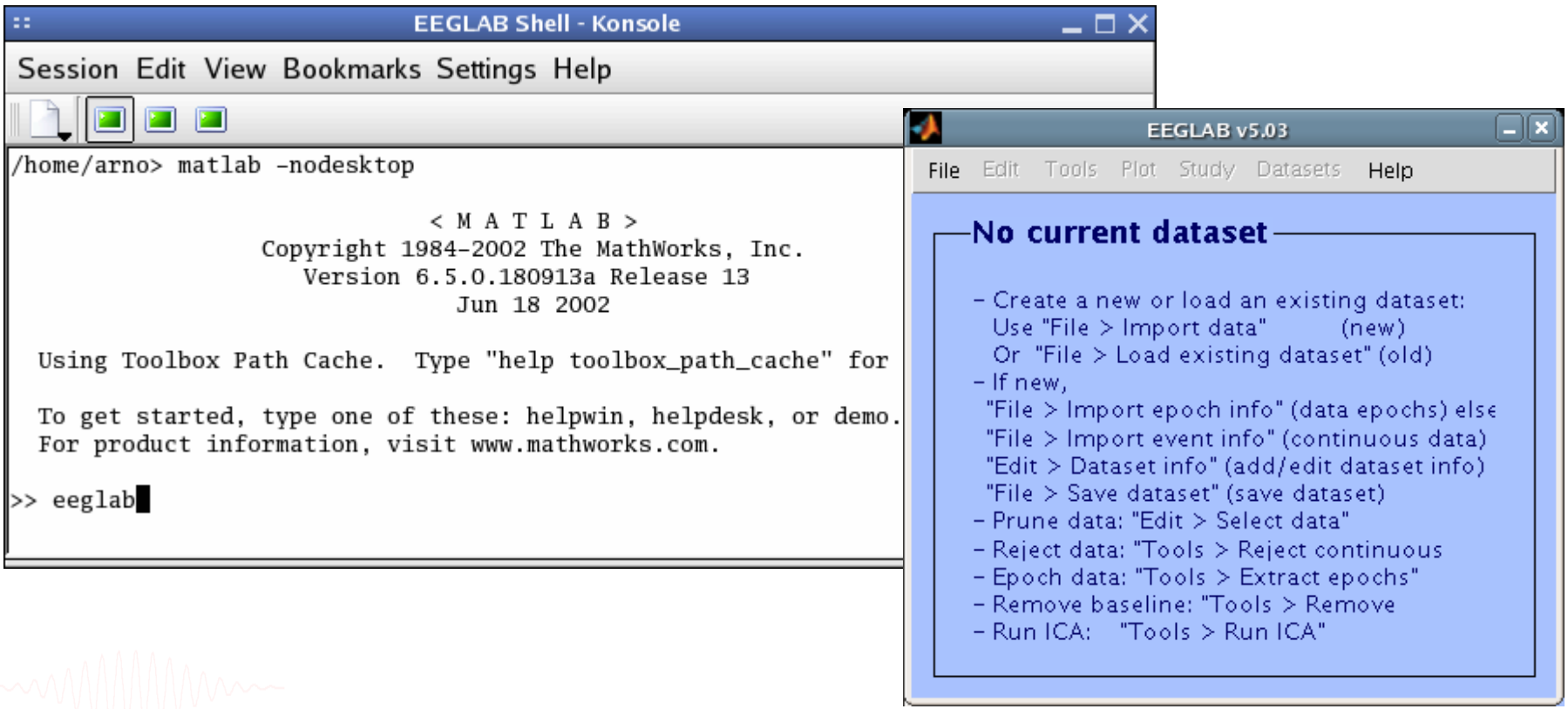
Task 4

- Extract data epochs
- Select epochs/events

Exercise...

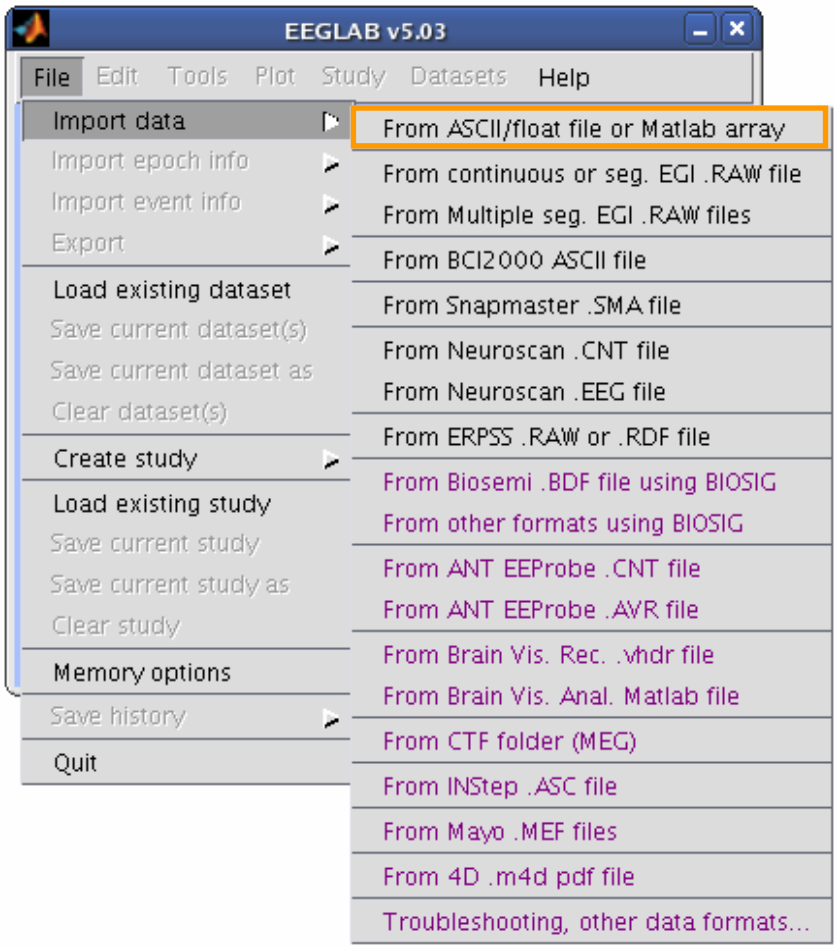
The EEGLAB Matlab software

main graphic interface

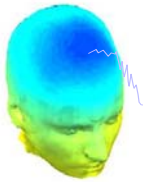


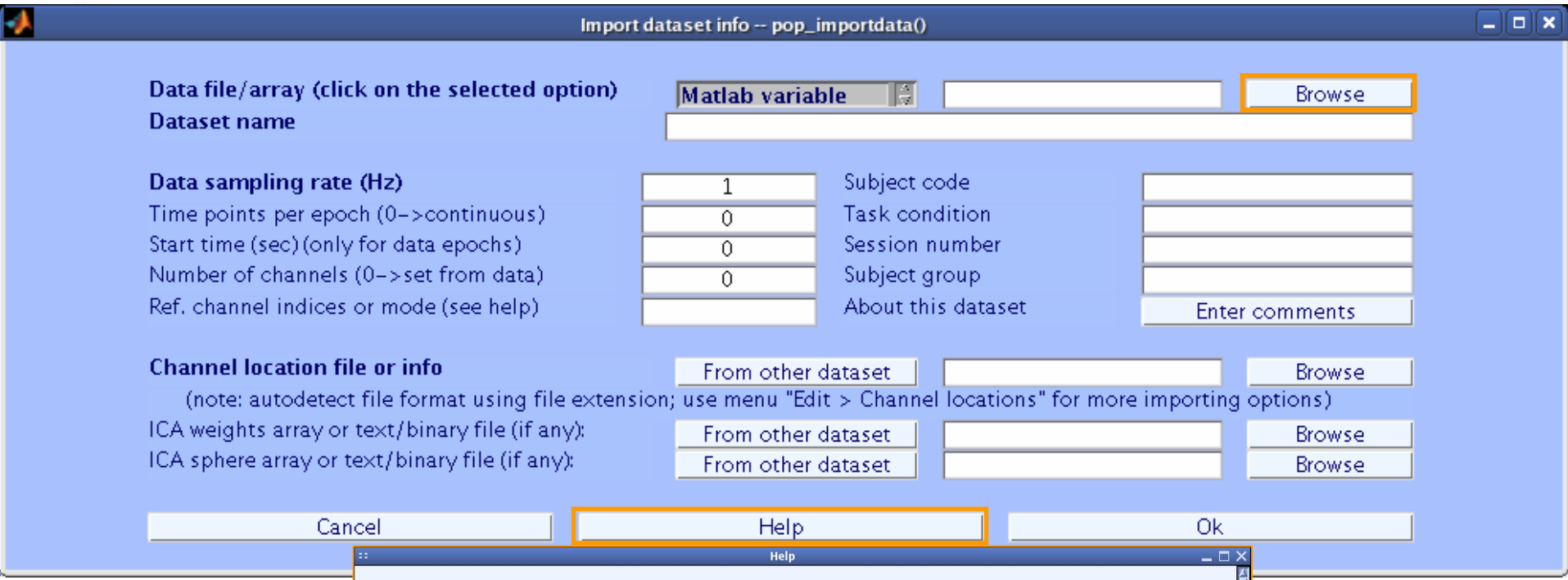
60 menus, more than 300 Matlab functions and more than 50,000 lines of code

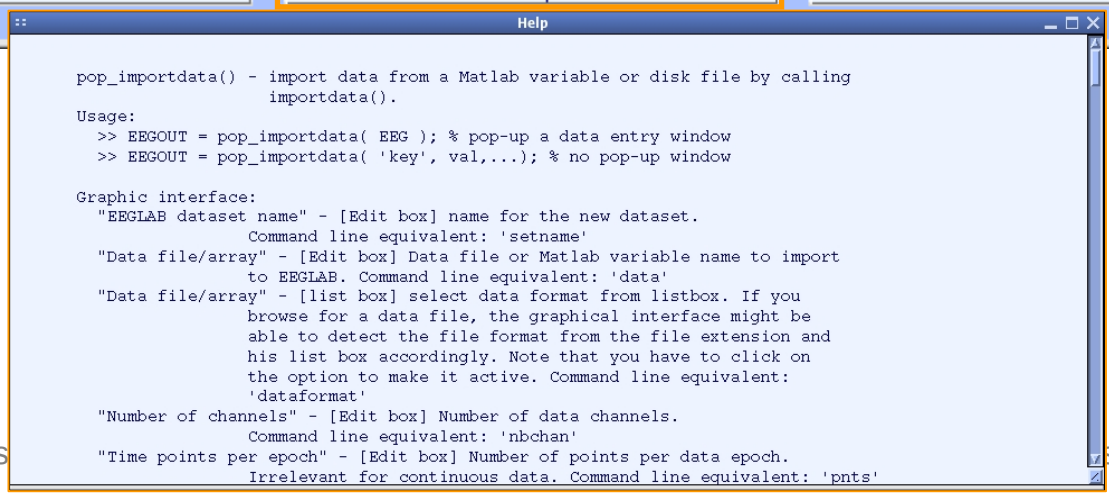
Importing a dataset



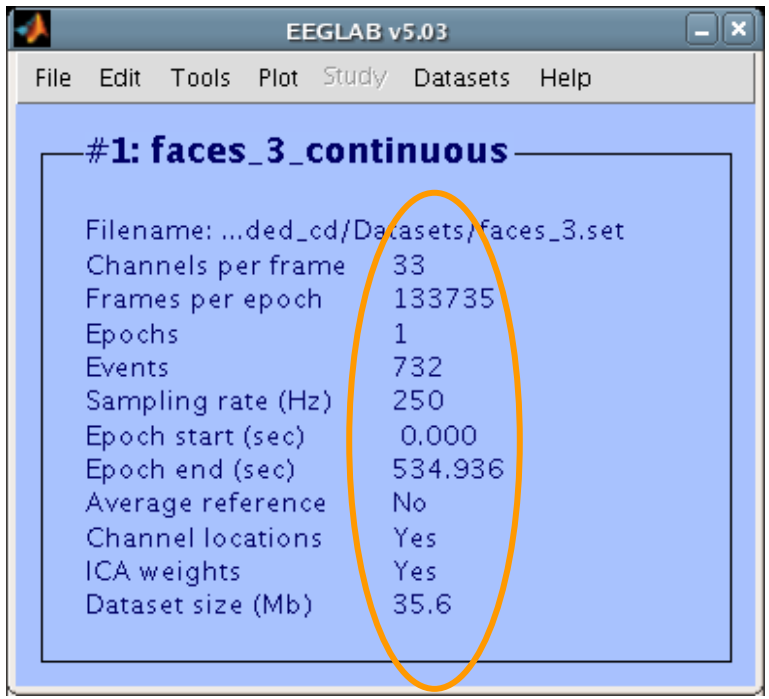
Import raw data



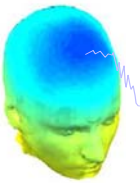


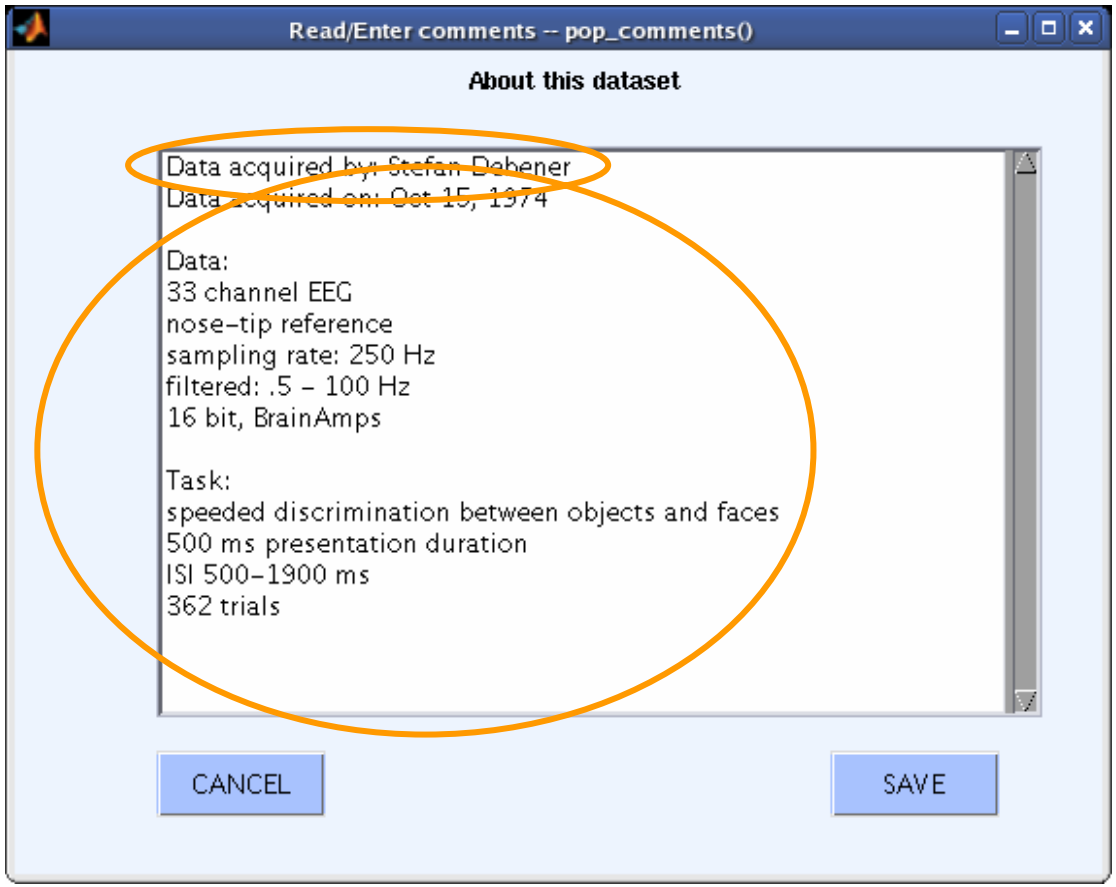


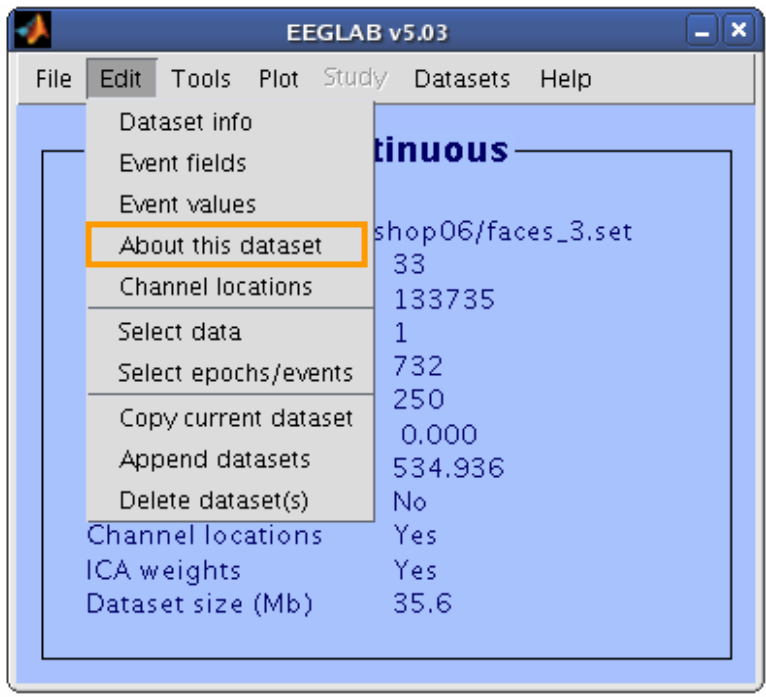
Imported EEG data



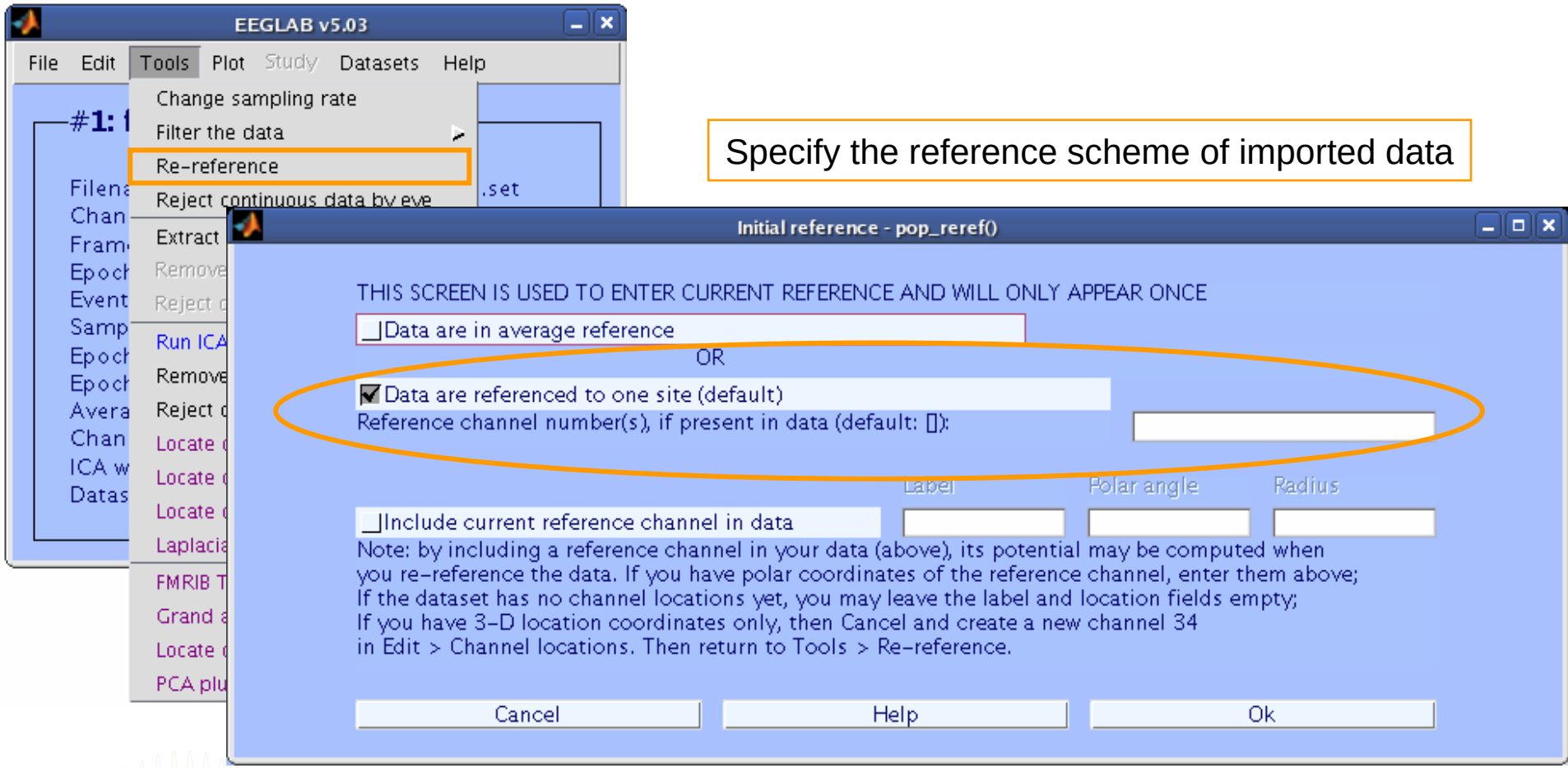
Comments




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

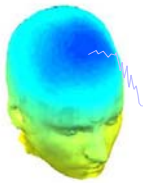

EEGLAB v5.03
File
Edit
Tools
Plot
Study
Datasets
Help
Dataset info
Event fields
Event values
About this dataset
Channel locations
Select data
Select epochs/events
Copy current dataset
Append datasets
Delete dataset(s)
tinuous
shop06/faces_3.set
33
133735
1
732
250
0.000
534.936
No
Channel locations Yes
ICA weights Yes
Dataset size (Mb) 35.6

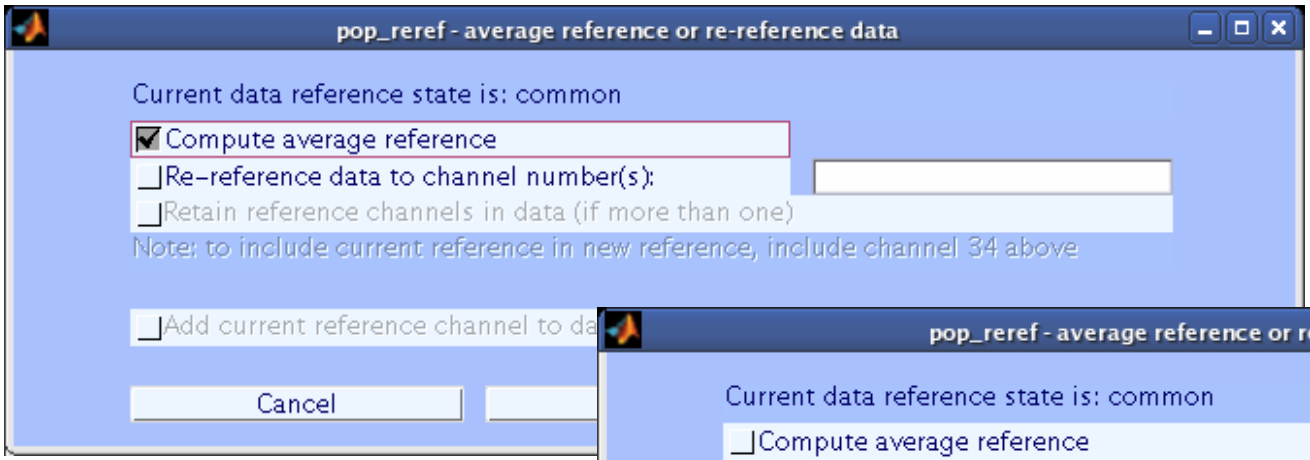
Re-reference data

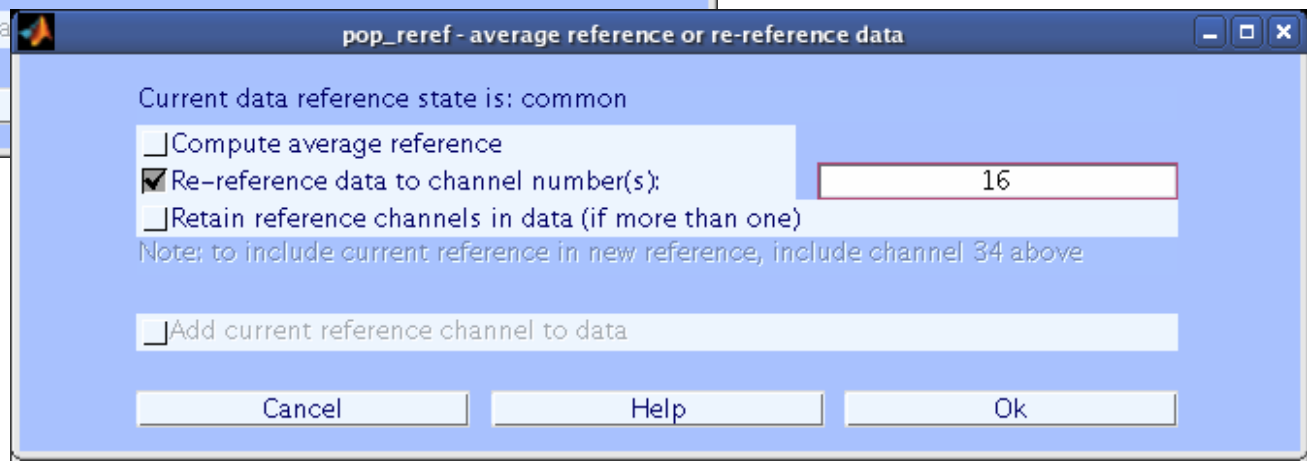


Specify the reference scheme of imported data

Rereferencing, cont'd



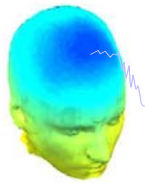


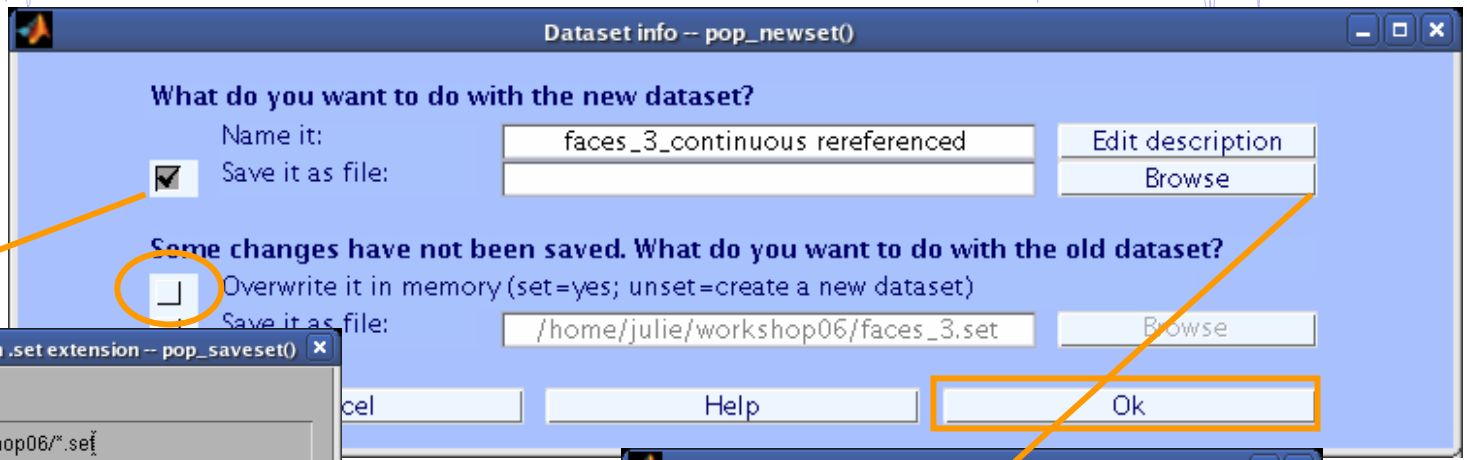


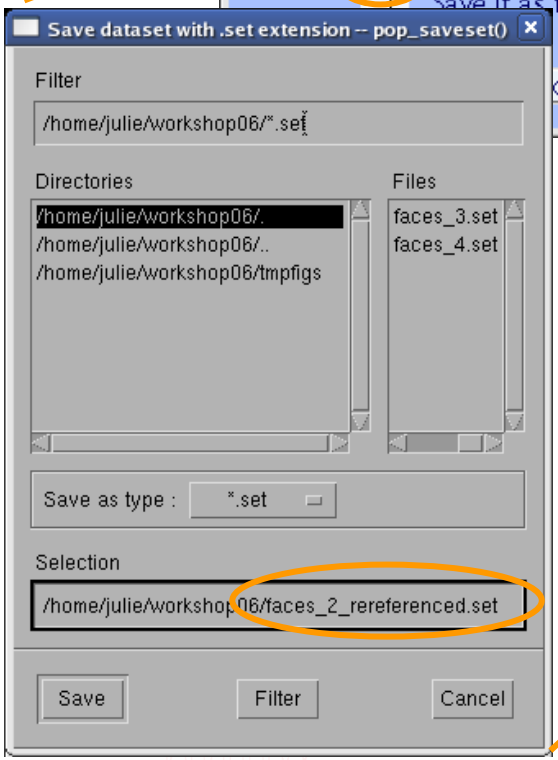
2 re-reference choices

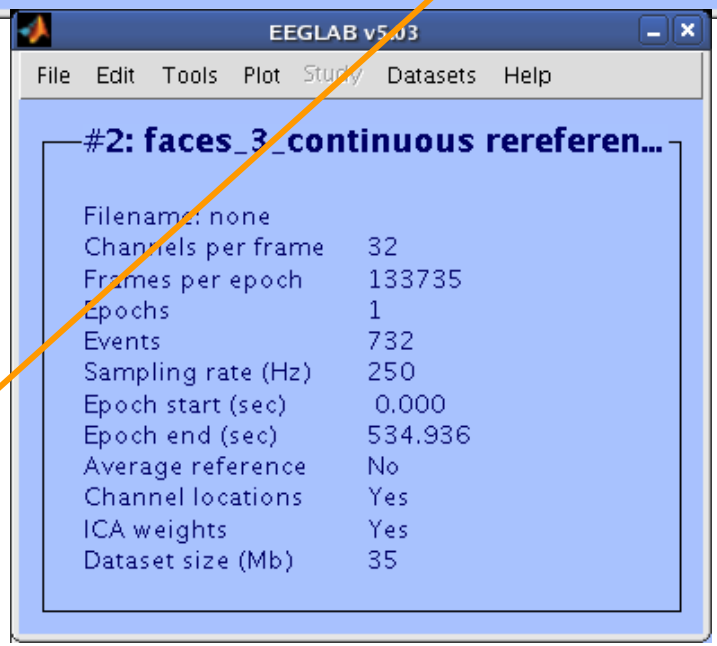
```
EEG = pop_reref( EEG, 16, 'refstate',0);
```

Save new dataset, keep old one



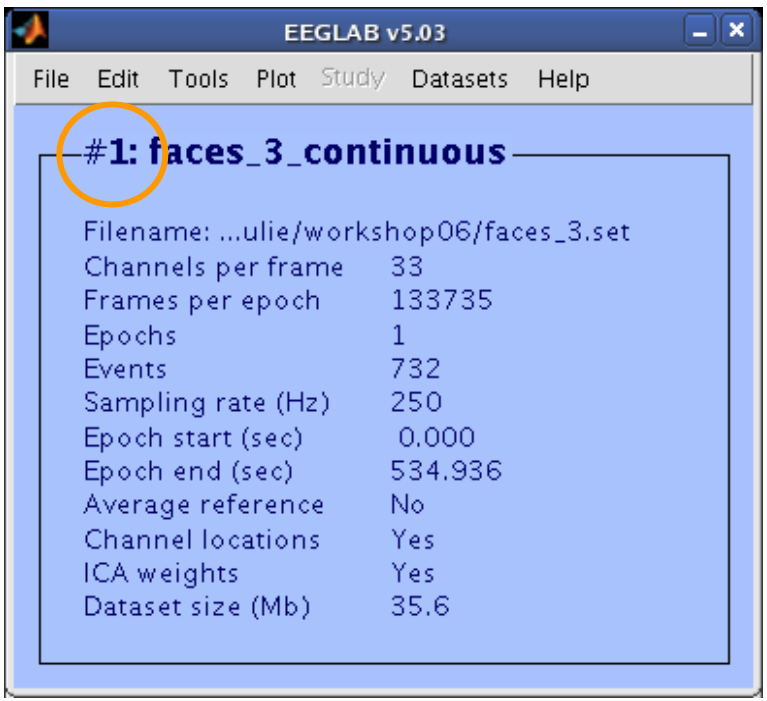


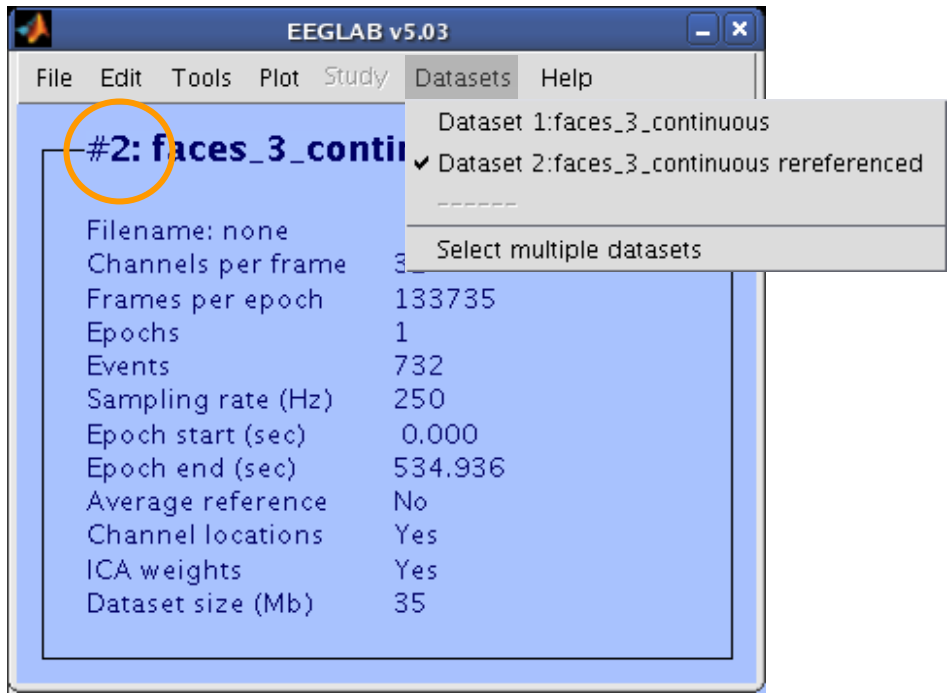




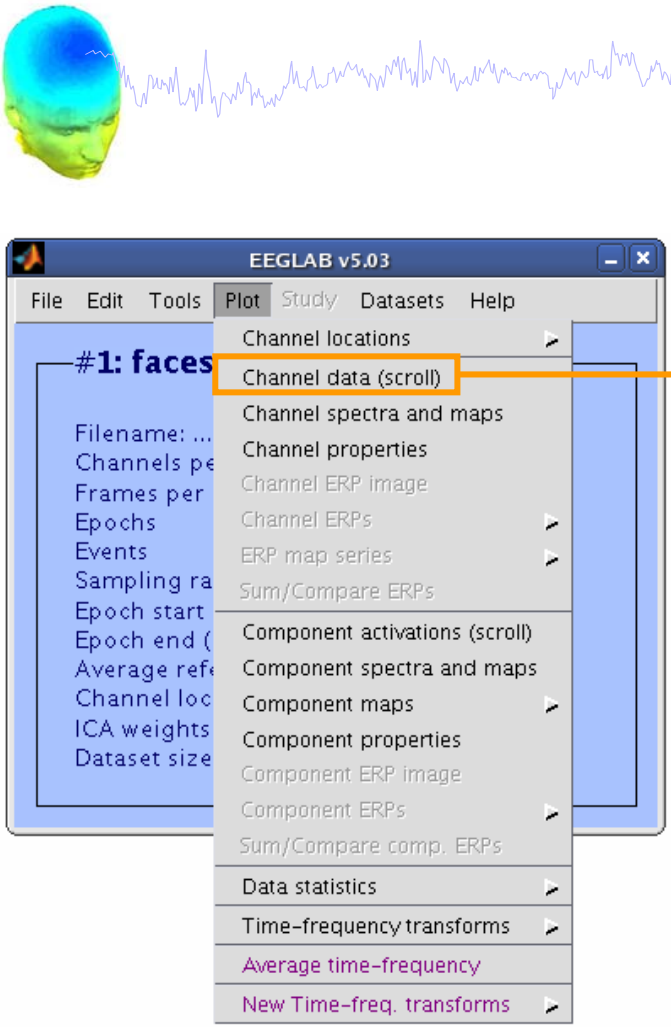

```
[ALLEEG EEG CURRENTSET] = pop_newset(ALLEEG,…
    EEG, 1, 'setname', 'rereferenced data');
```

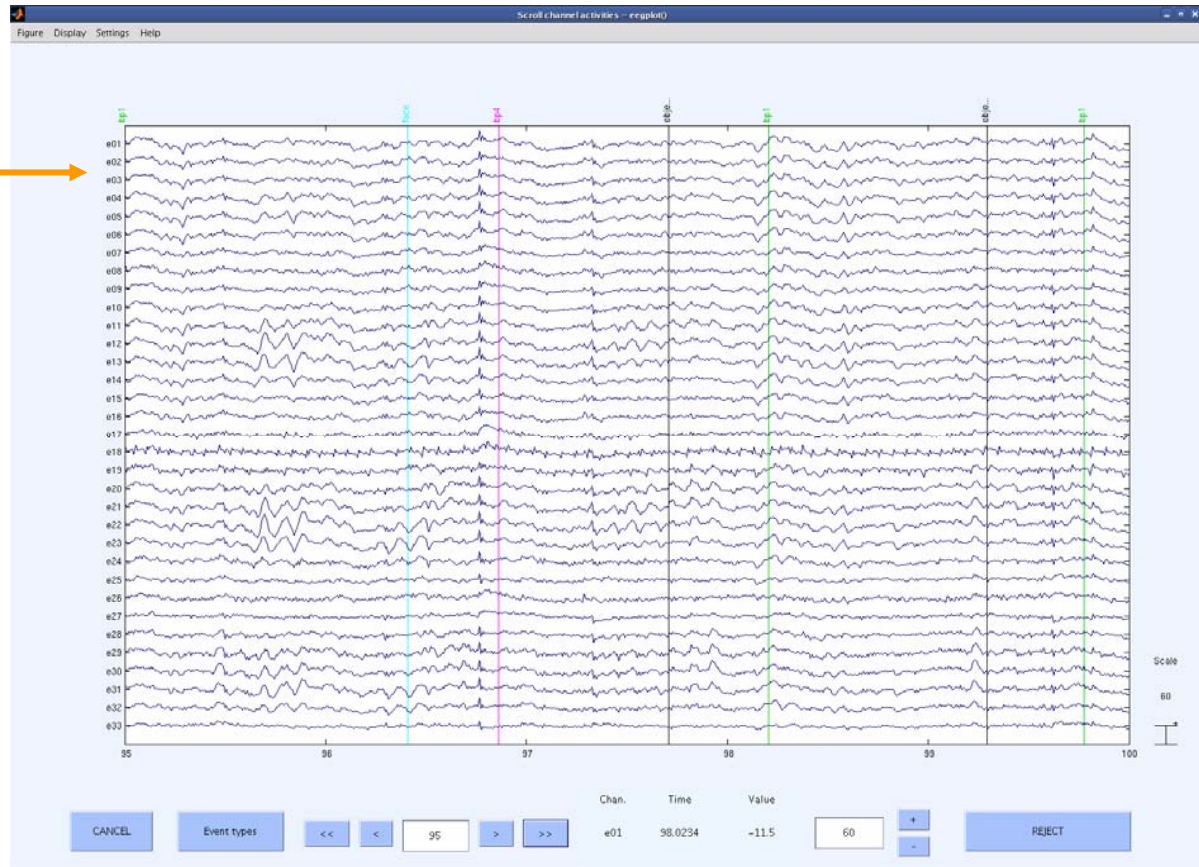
Multiple active datasets (ALLEEG)





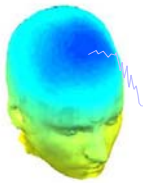
Scroll data

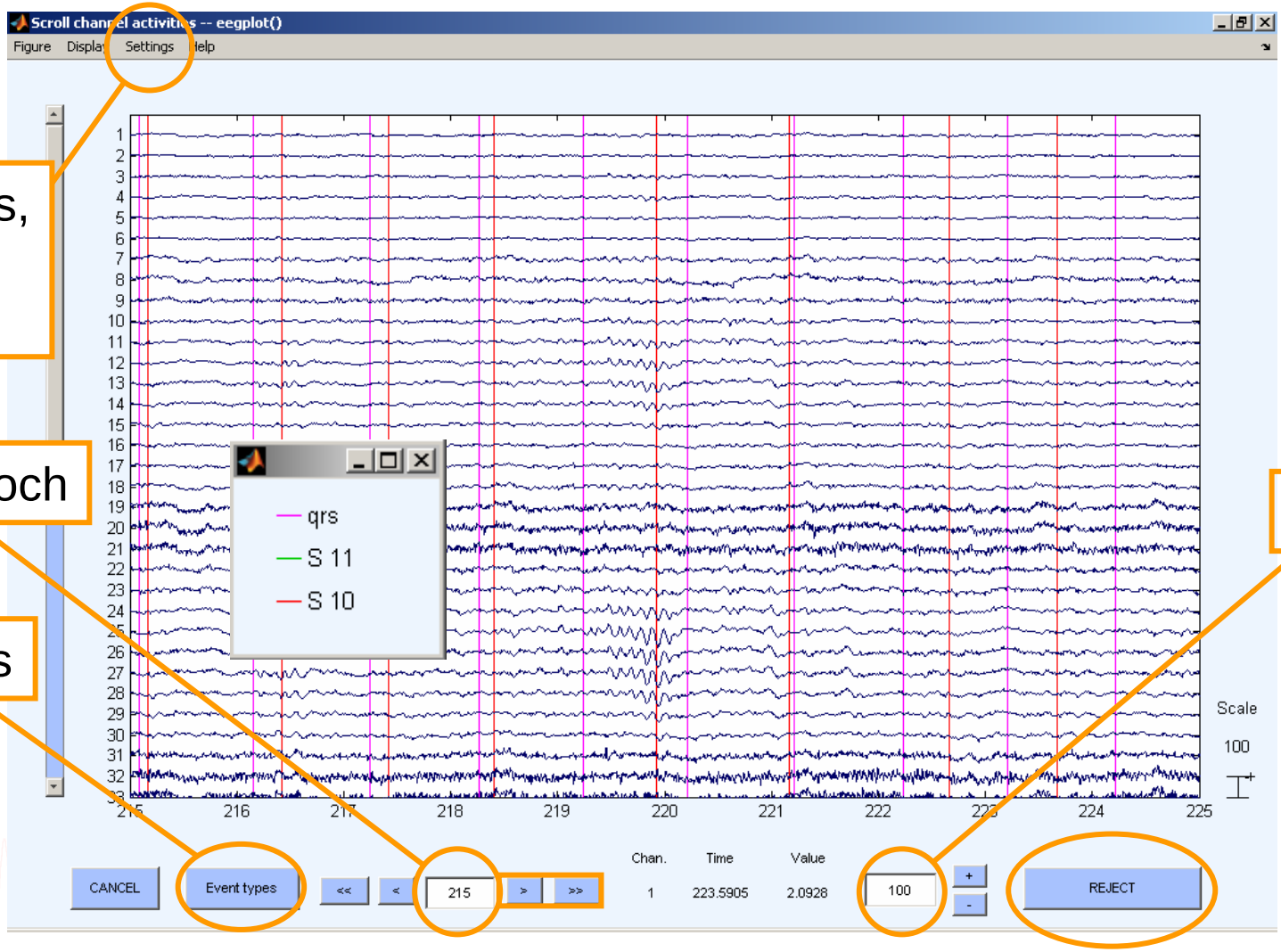




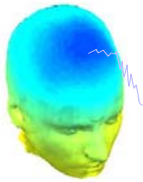

```
>> pop_eegplot(EEG,1,1,1);
```

Scroll channel data





Data preprocessing and epoching



Task 1

Import raw data

Re-reference data

Scroll channel data

Task 2

Import channel location file

Task 3

Import data events

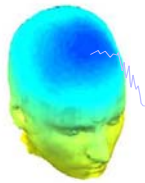
Task 4

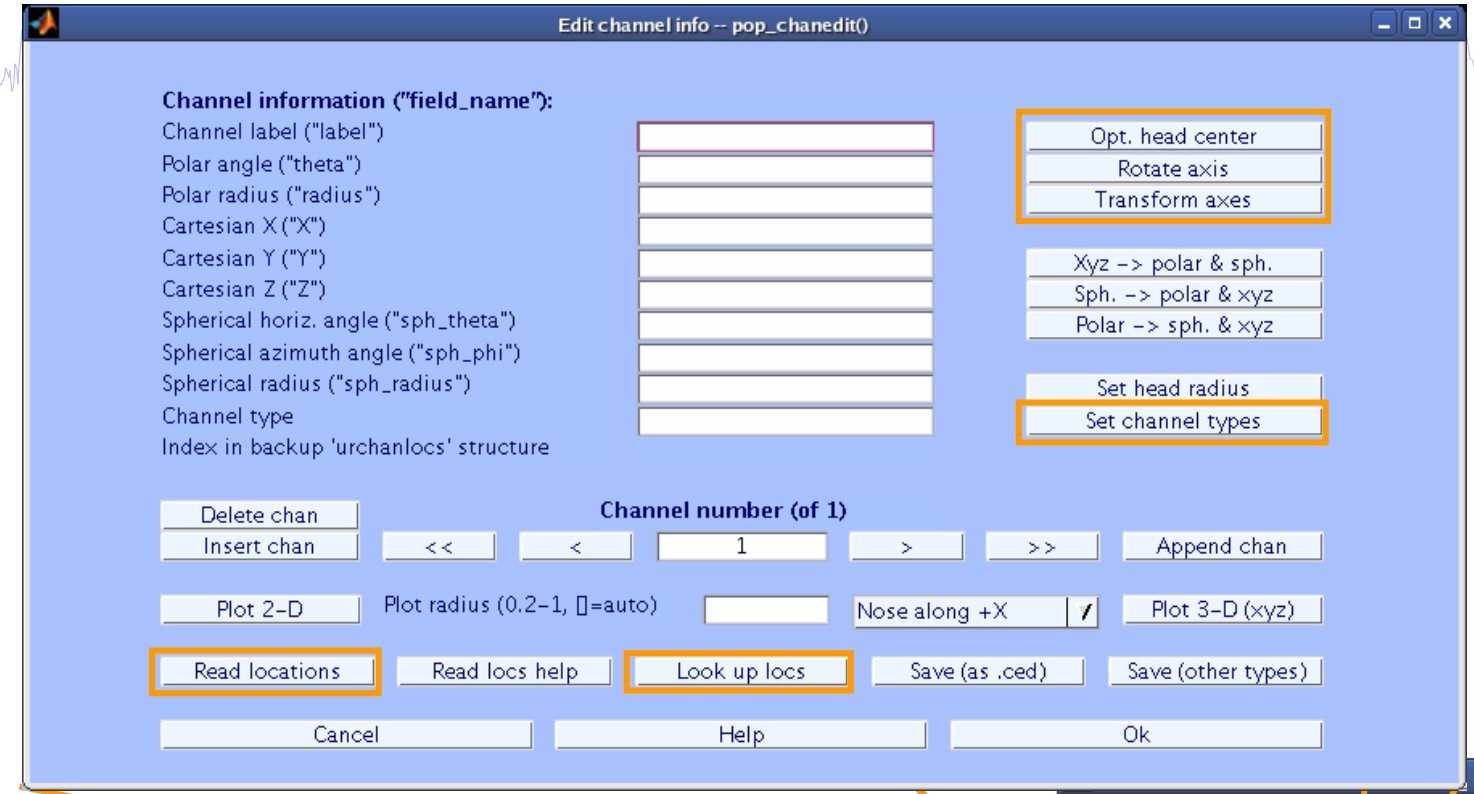
Extract data epochs

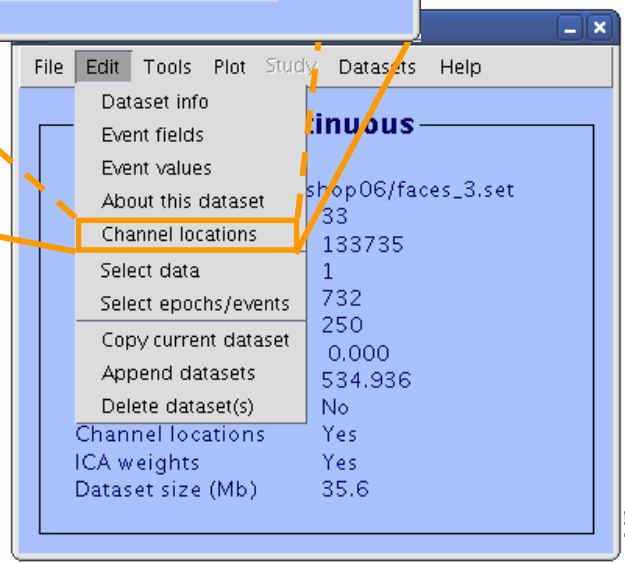
Select epochs/events

Exercise...

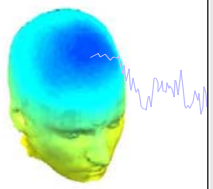
Import channel locations

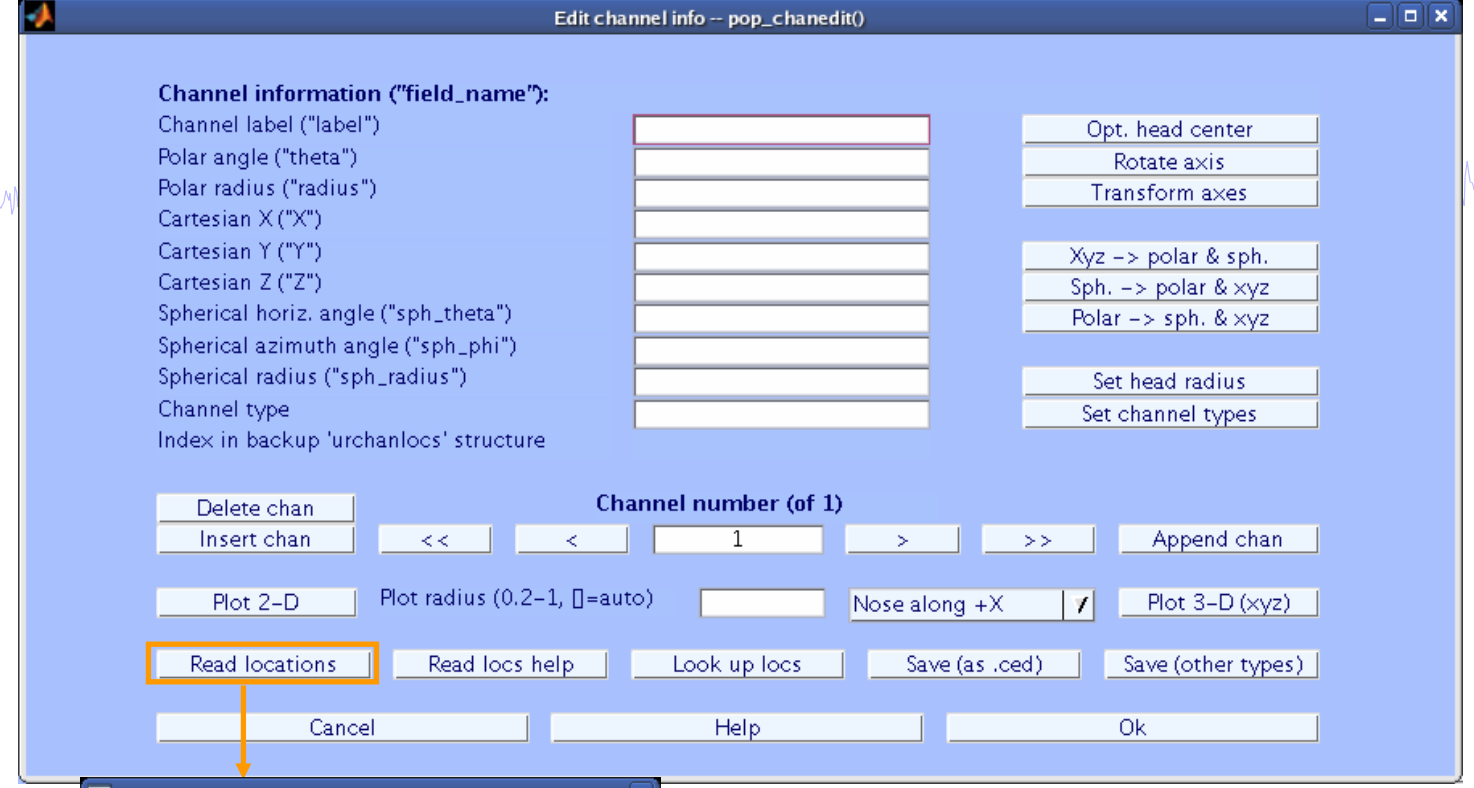


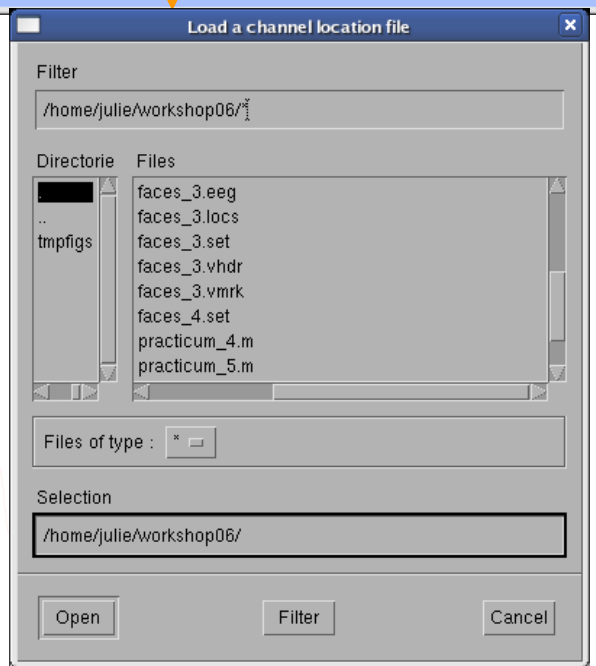


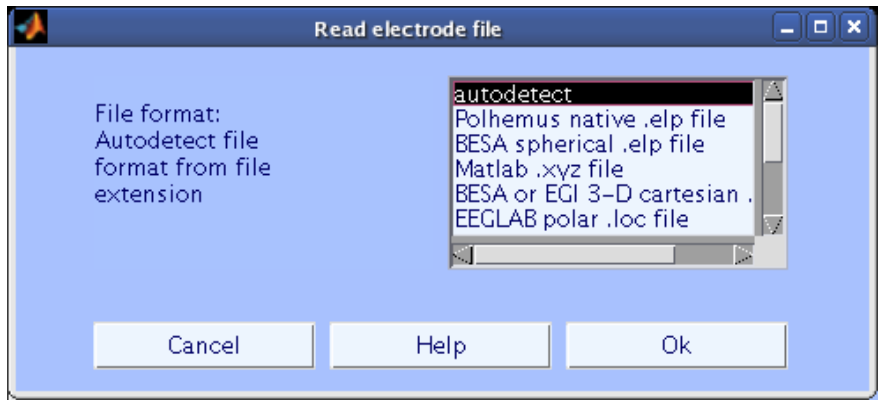


- Use channel names and automatically assign channel location
- Import channel location file
- Modify/stretch/rotate channel locations
- Set channel types…

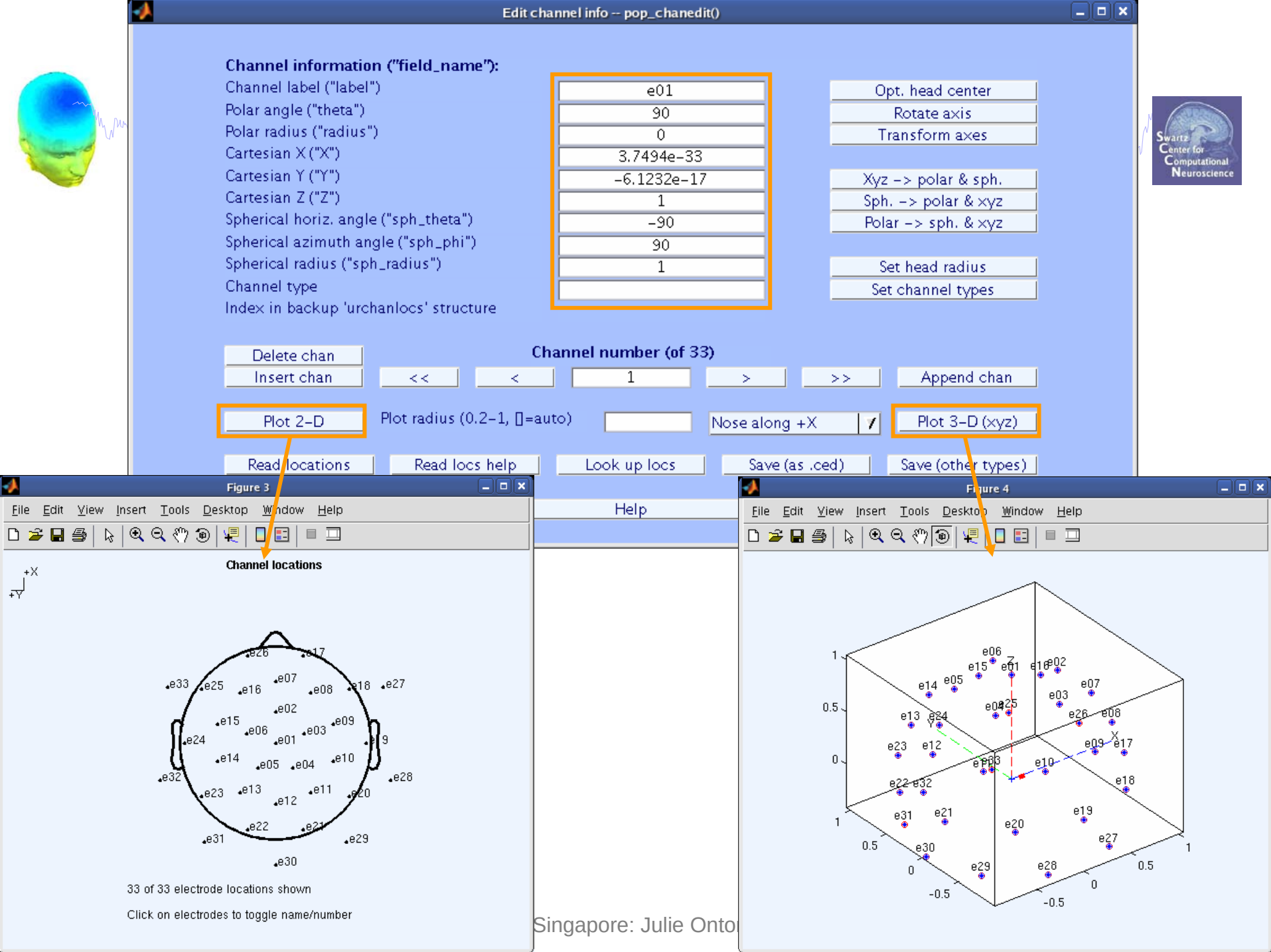






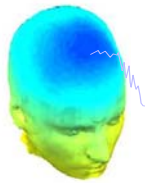


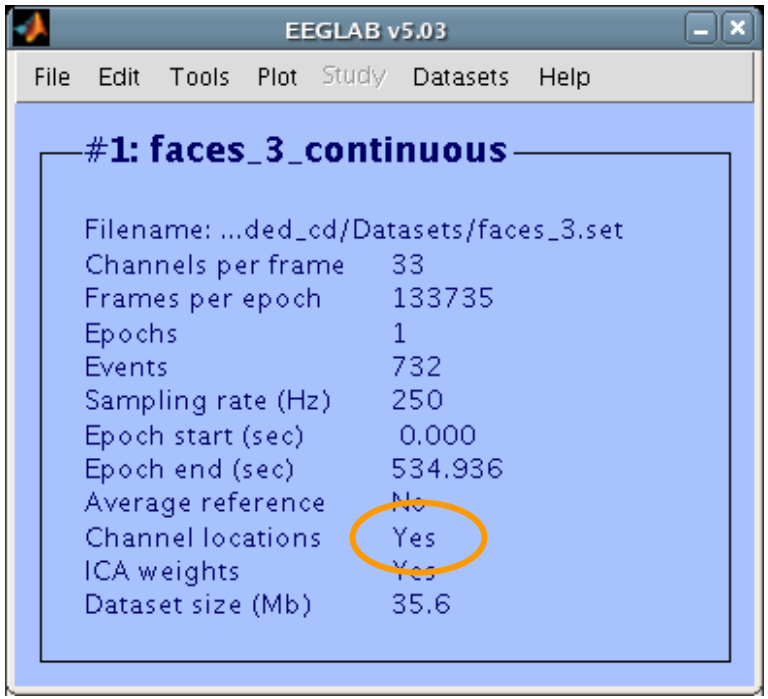
7 file formats supported
(Polhemus, BESA, …)



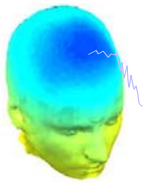
Singapore: Julie Onto

Import channel locations





Data preprocessing and epoching



Task 1

Import raw data

Re-reference data

Scroll channel data

Task 2

Import channel location file

Task 3

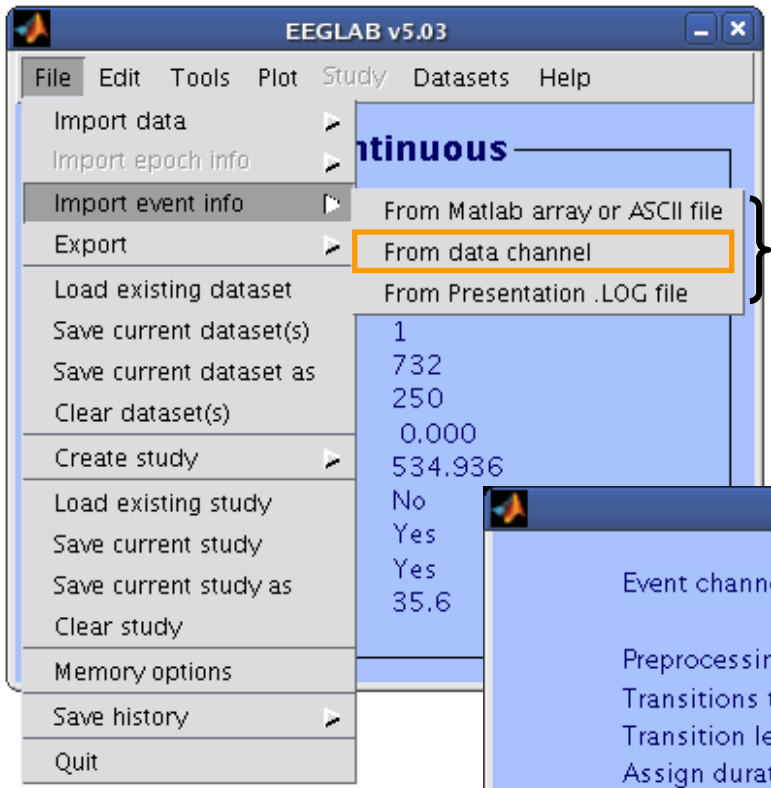
Import data events

Task 4

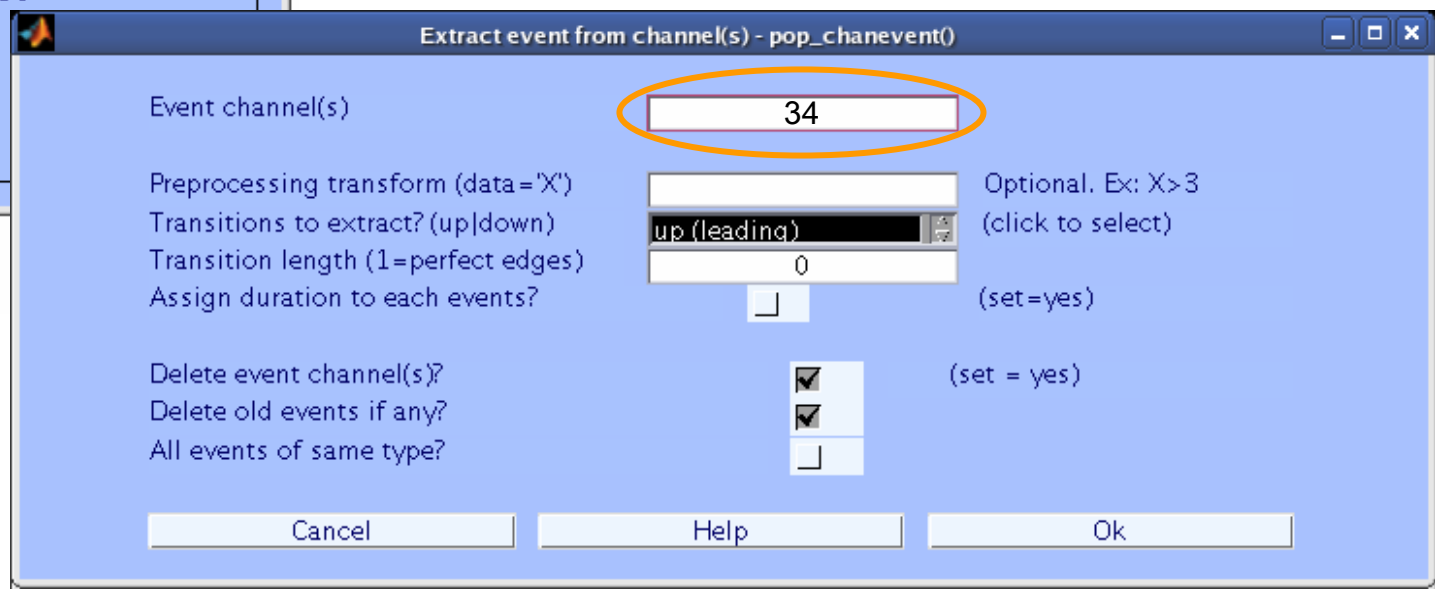
Extract data epochs

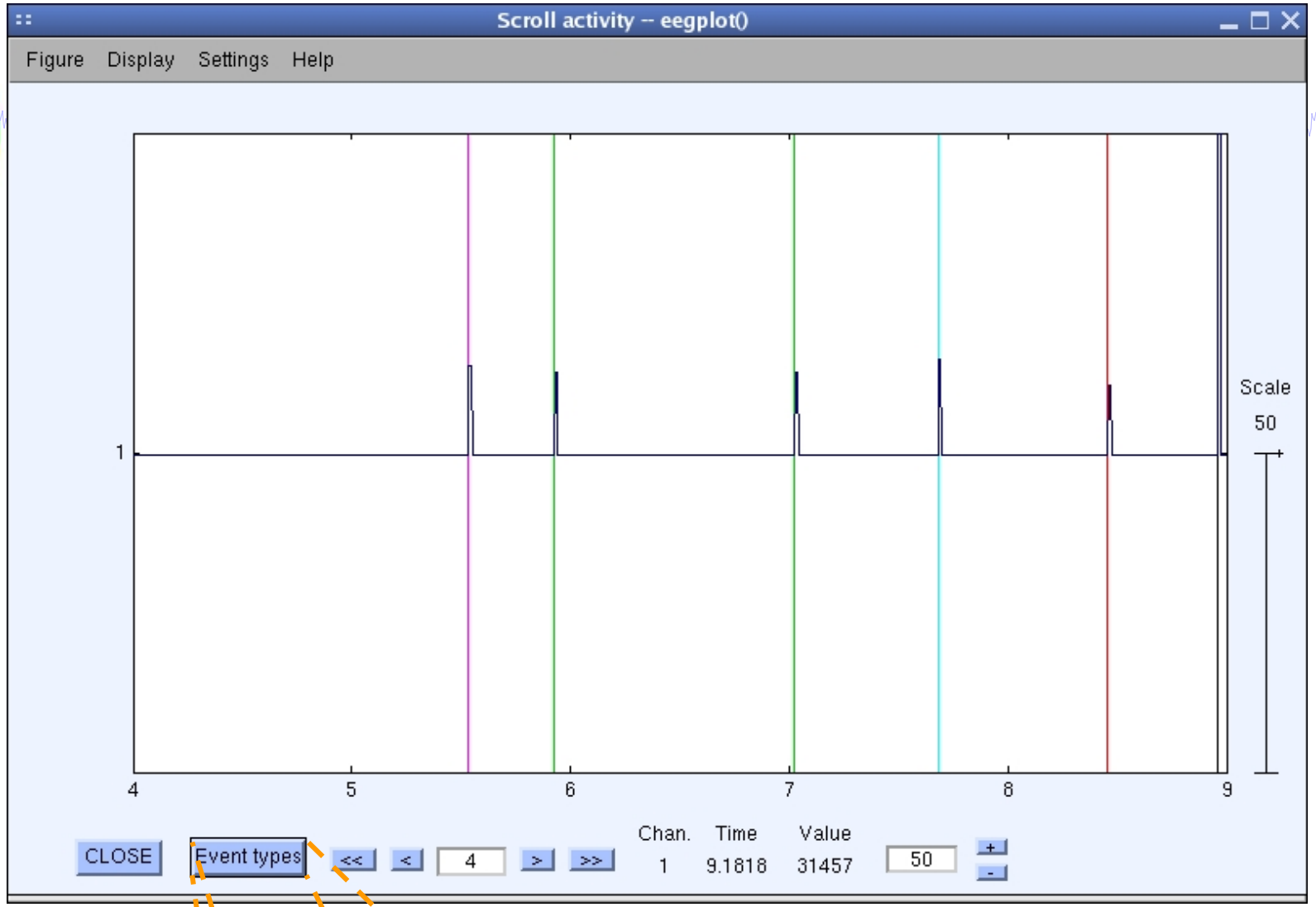
Select epochs/events

Exercise...

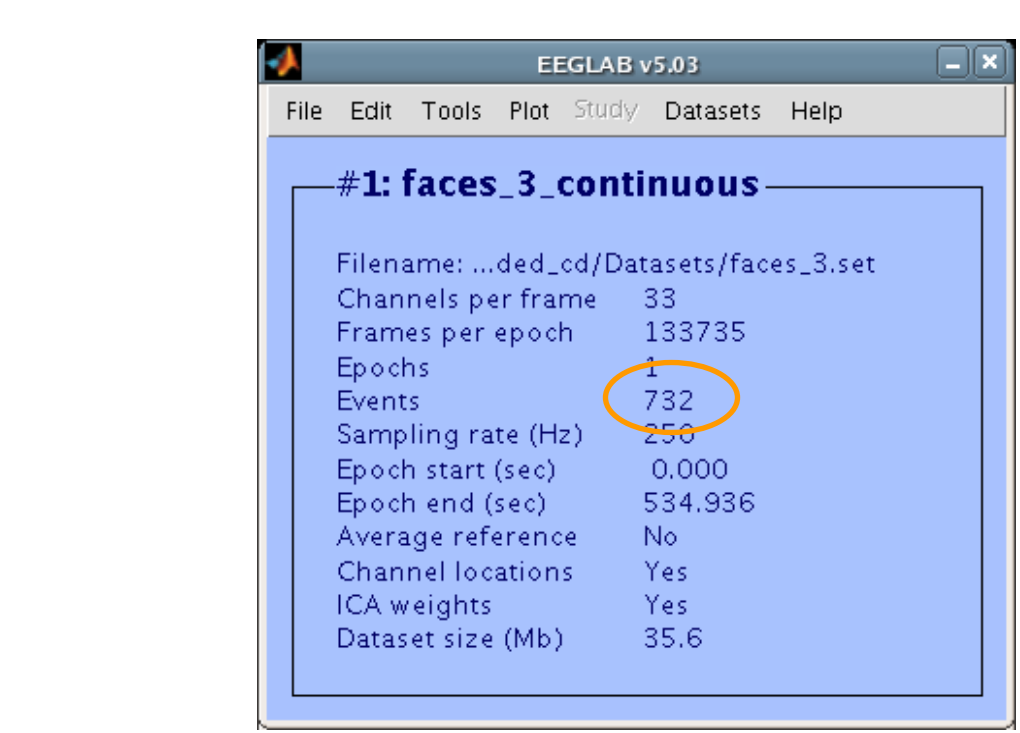


- Import event from Matlab array or ASCII file
- Import event from data channel
- Import event from Presentation event file

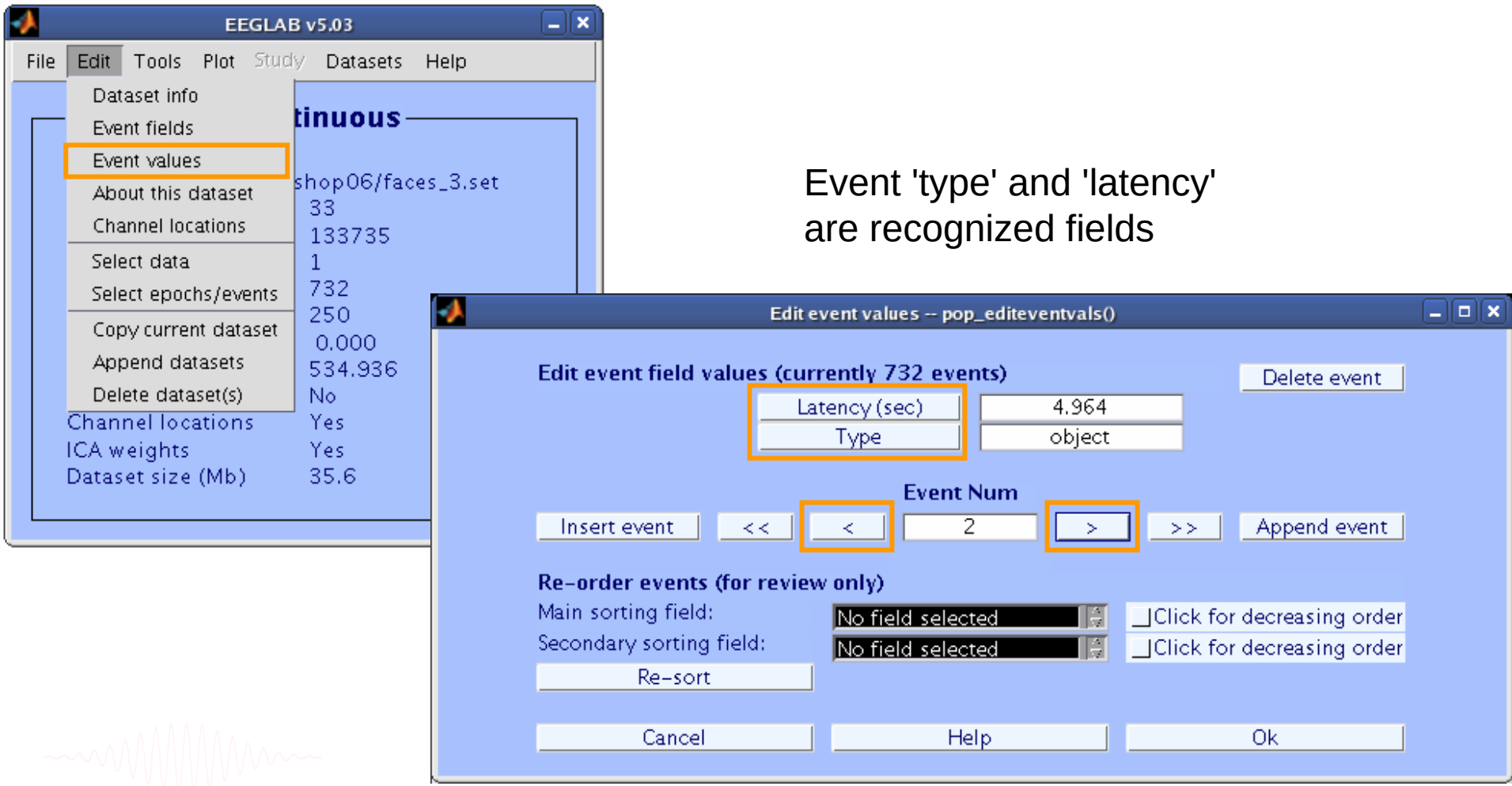



Scroll activity -- eegplot()
Figure
Display
Settings
Help
Scale
50
1
4
5
6
7
8
9
CLOSE
Event types
<<
<
4
>
>>
Chan.
Time
Value
1
9.1818
31457
50
+
-
3145929
3145743
3145742
3145741
3145739

Import data events

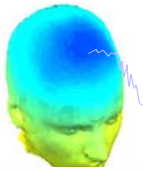


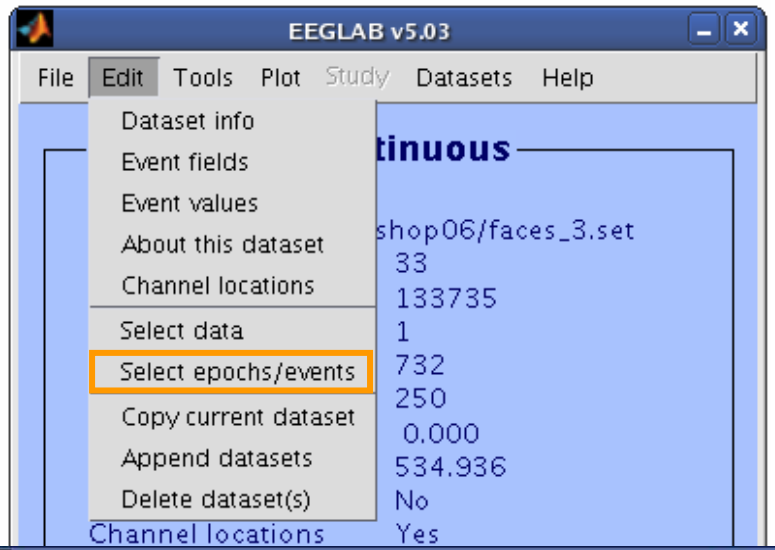
Review/edit event values



Event 'type' and 'latency' are recognized fields

Renaming events

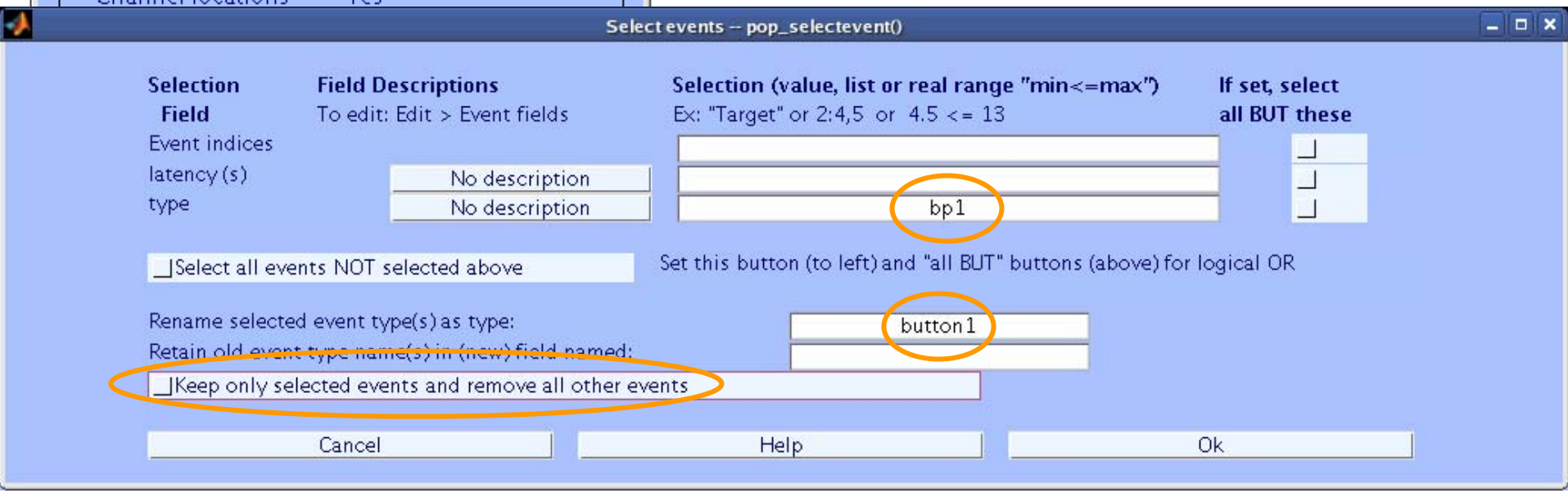




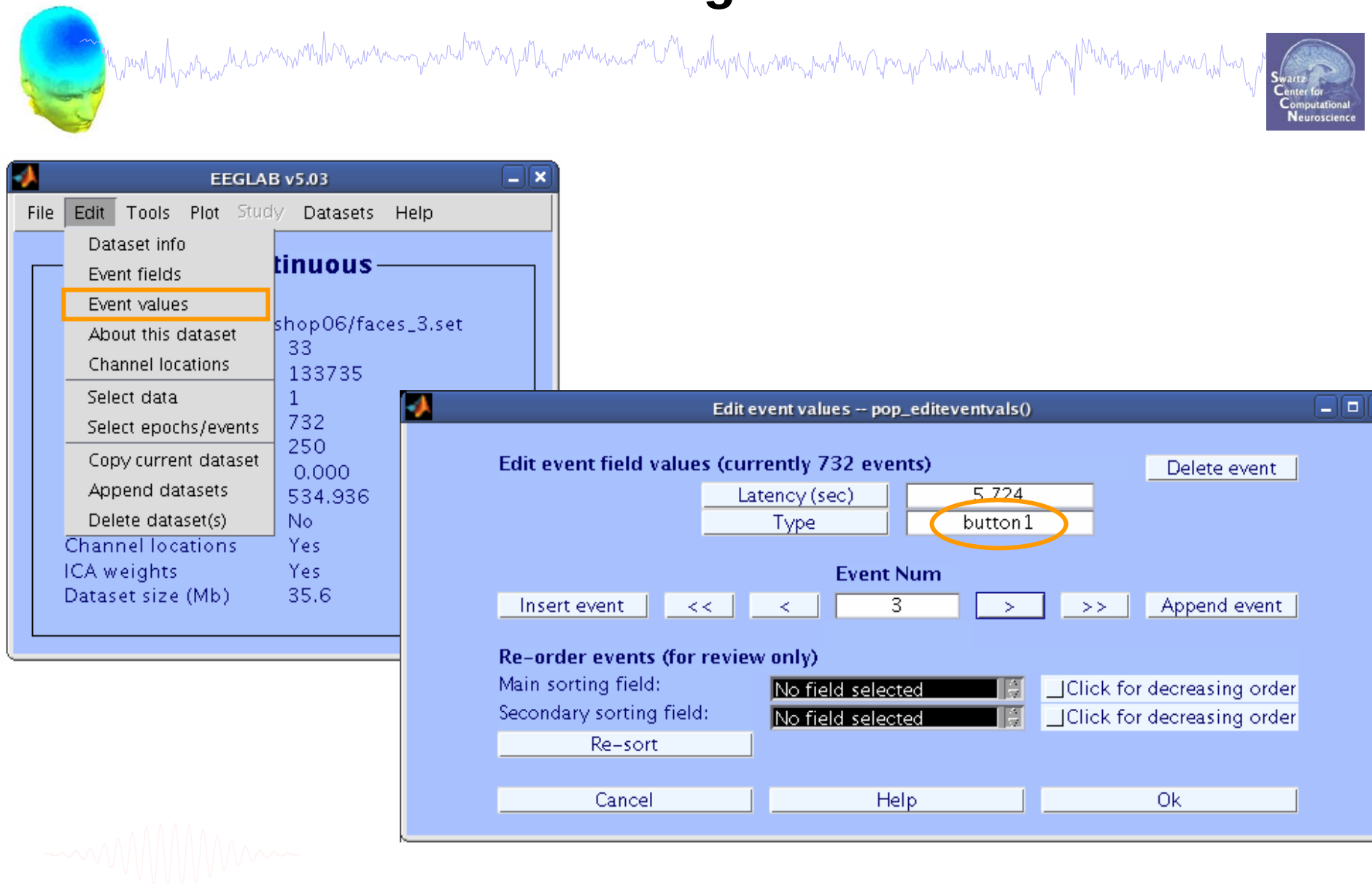
1) input original 'type' code

2) input new 'type' code

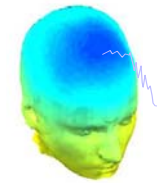
3) keep all other events!

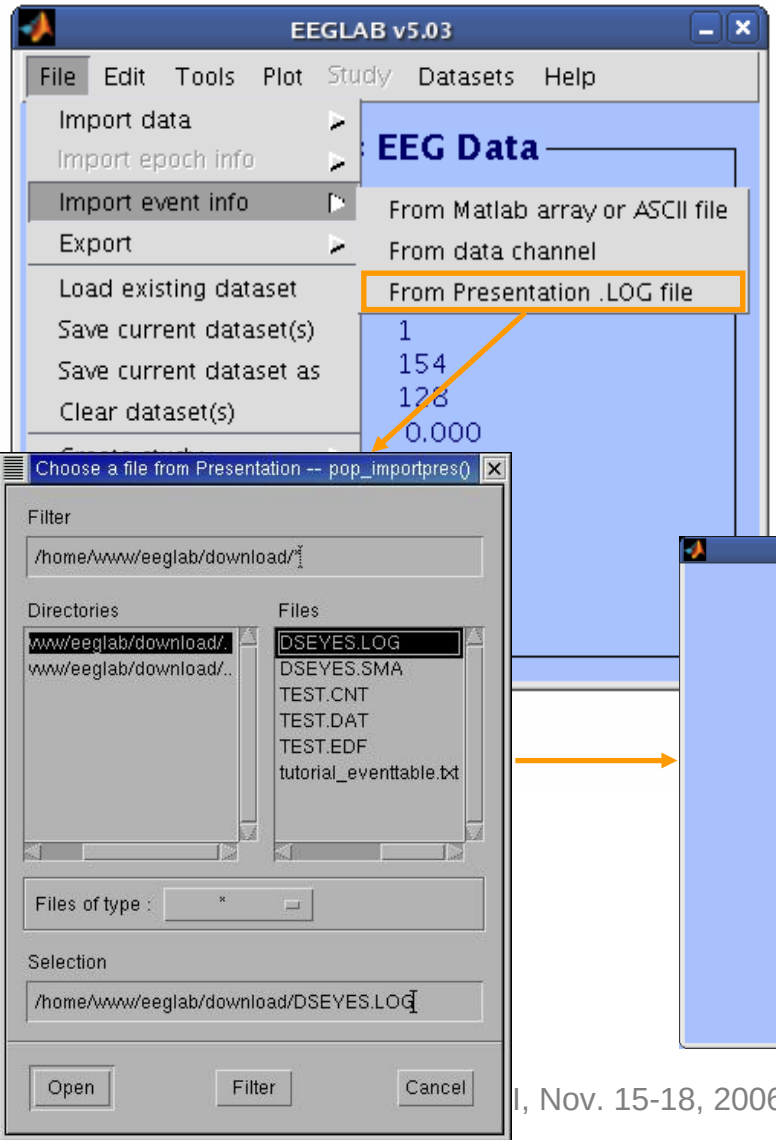


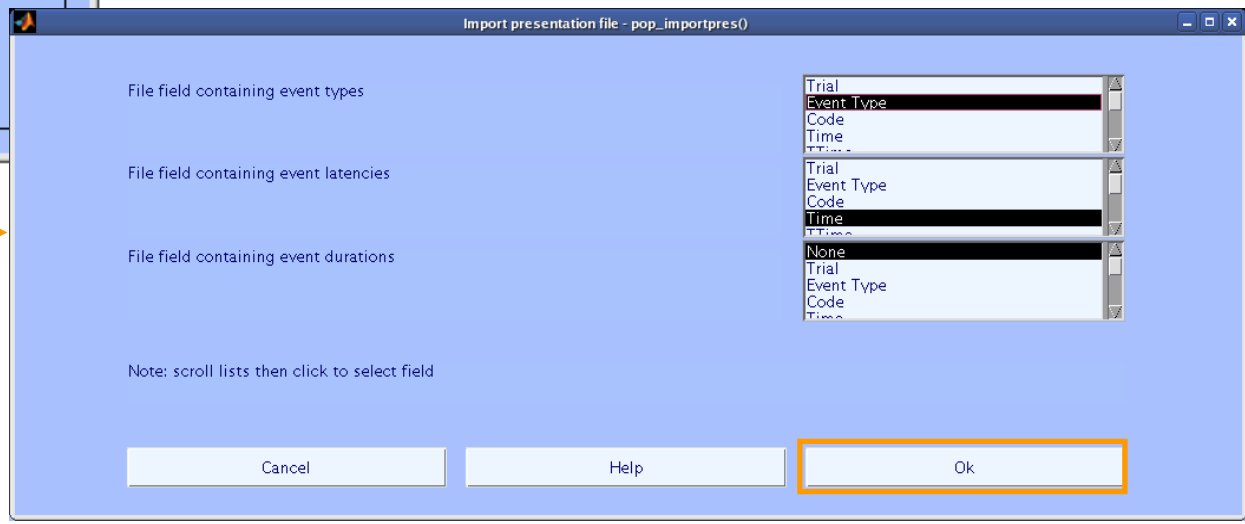
Renaming events



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 ...

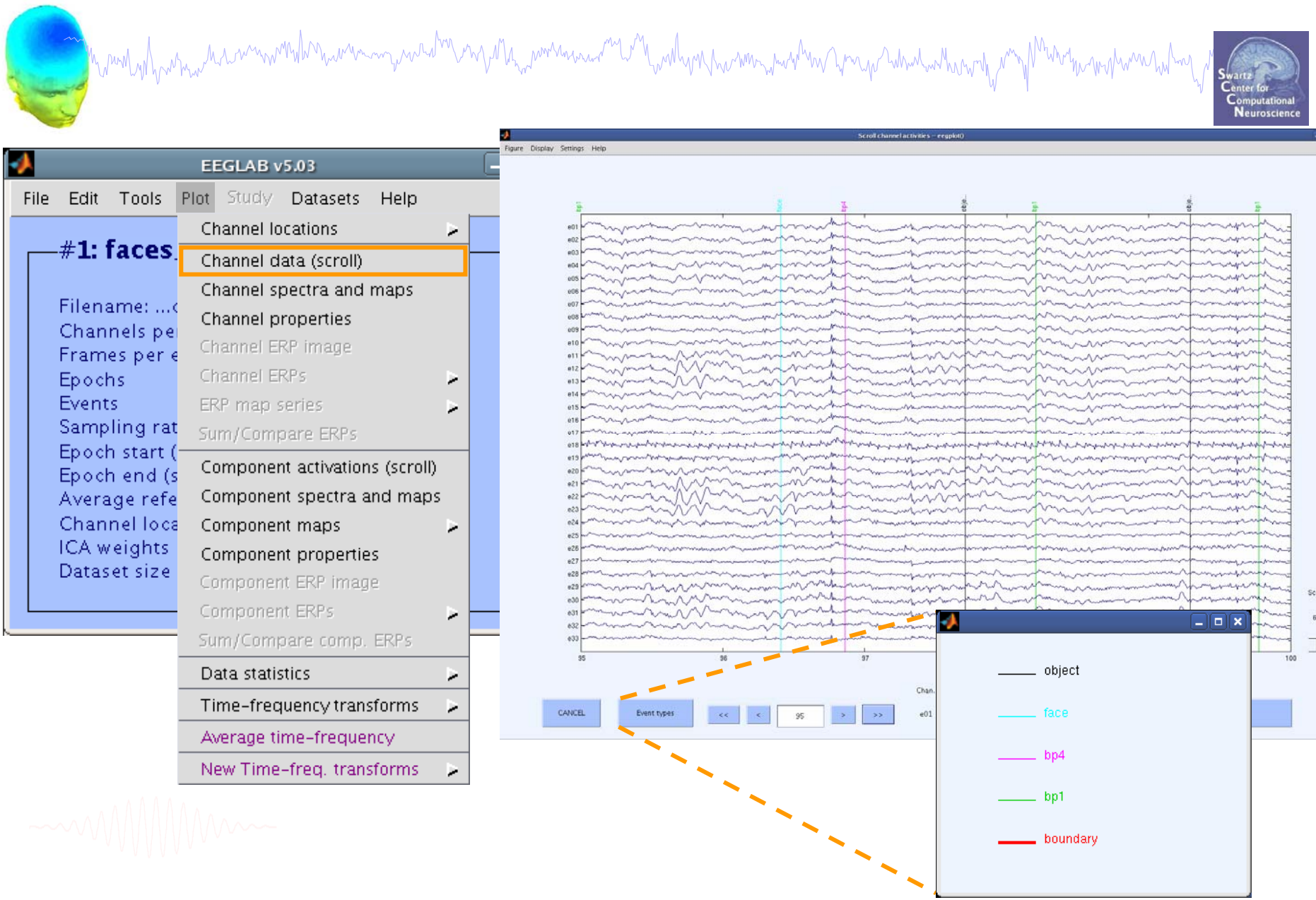
Best sampling rate ratio found is 0.9999895. Below latencies after adjustment

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

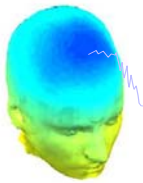
New event latencies (10 first): 10789 21315 31375 41902 51962 62489 ...

...

Scroll data with events



Data preprocessing and epoching



Task 1

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

Task 2

- Import channel location file

Task 3

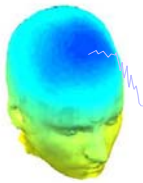
- Import data events

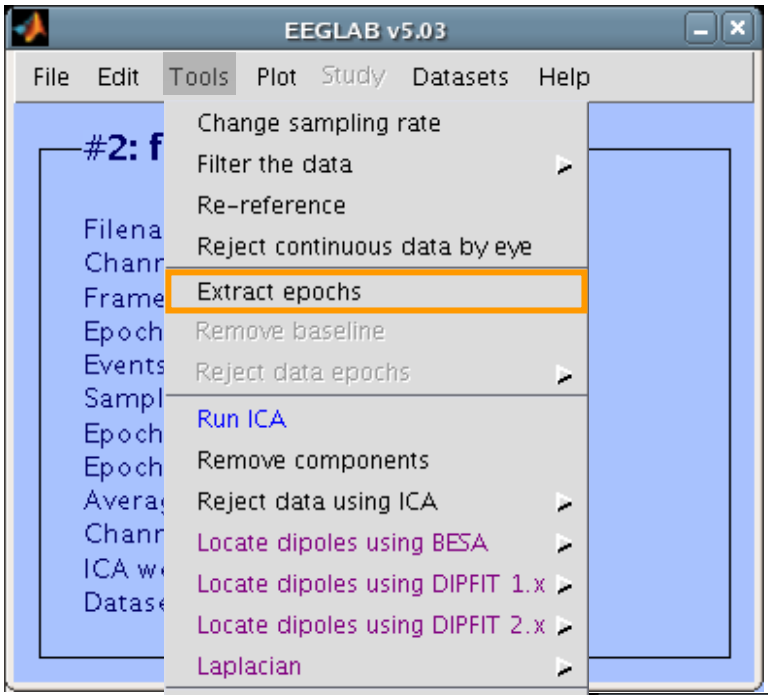
Task 4

- Extract data epochs
- Select epochs/events

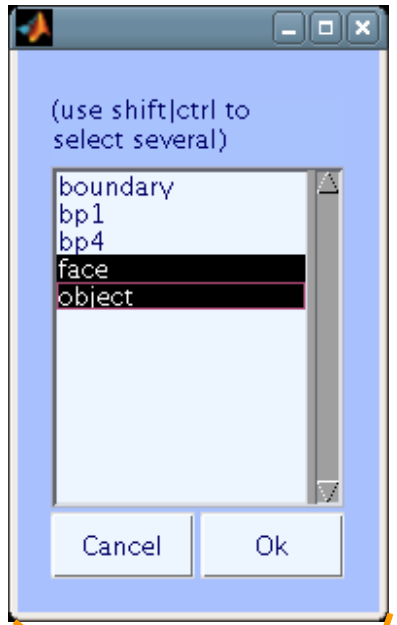
Exercise...

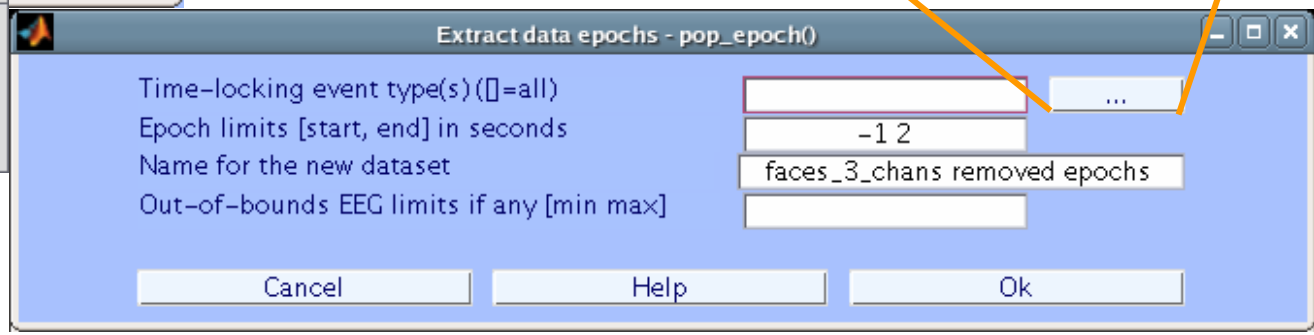
Extract epochs



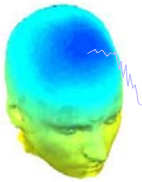


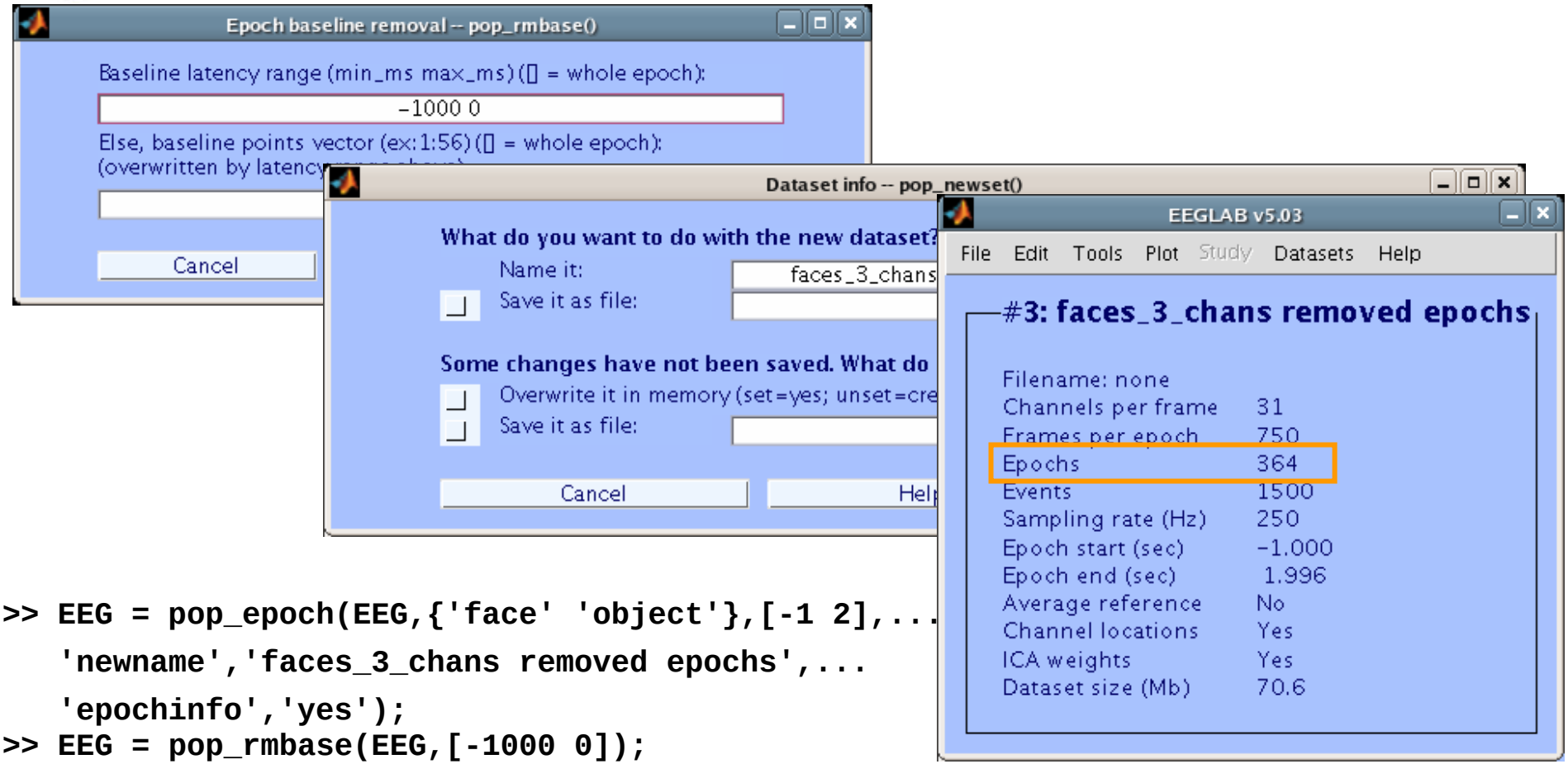

```
>> eeg_eventtypes(EEG)

boundary    1
bp1         183
bp4         184
face        182
object      182
```





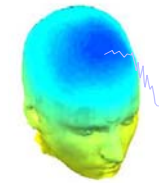
Extract epochs

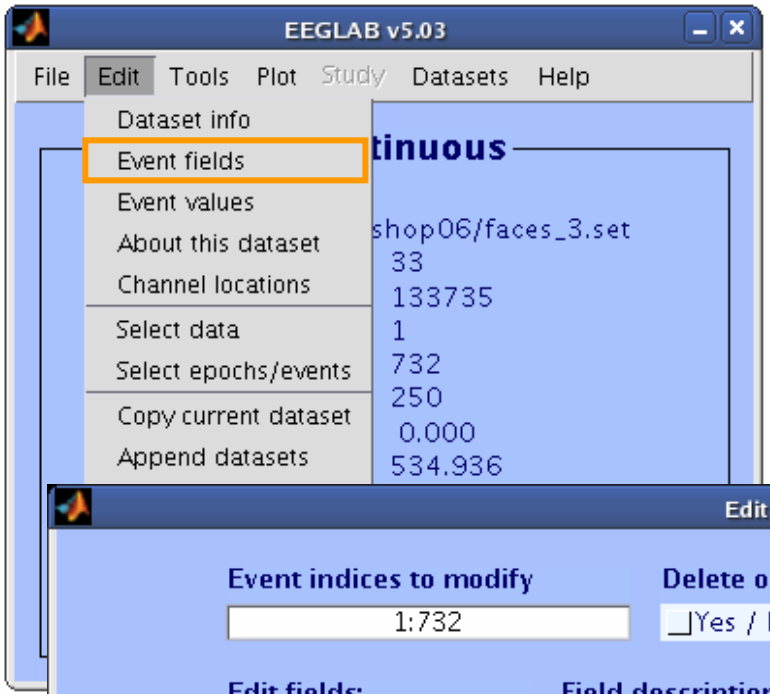




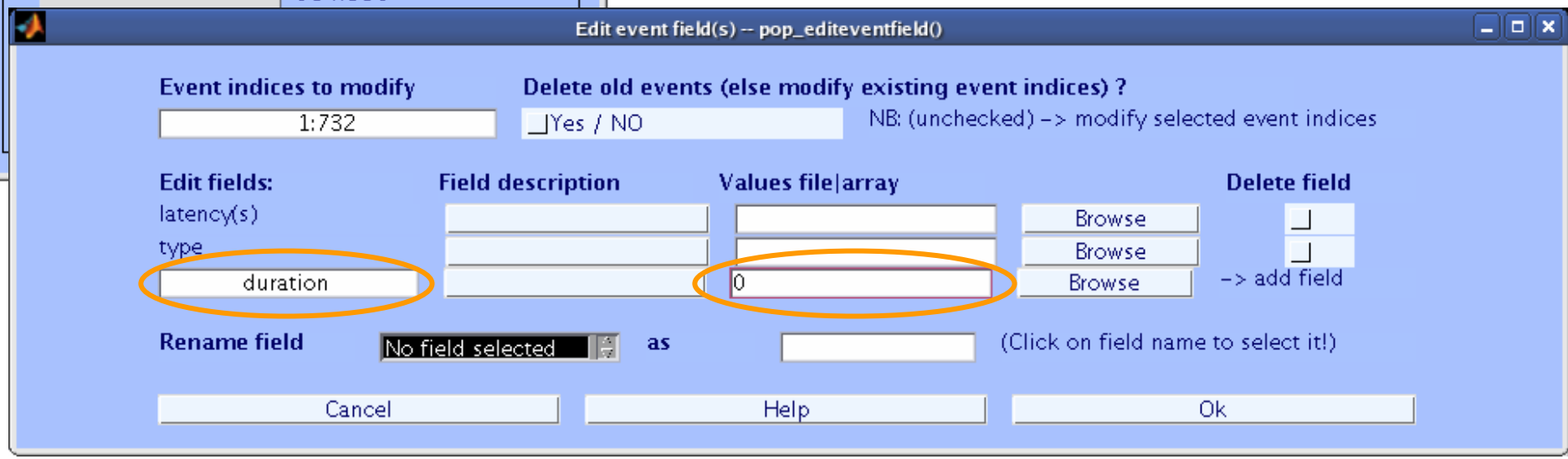

```
>> EEG = pop_epoch(EEG,{'face' 'object'},[-1 2],...
   'newname','faces_3_chans removed epochs',...
   'epochinfo','yes');
>> EEG = pop_rmbase(EEG,[-1000 0]);
>> [ALLEEG EEG CURRENTSET] = pop_newset(ALLEEG,EEG,...
   CURRENTSET,'setname','faces_3_chans removed epochs');
```

Create new event field

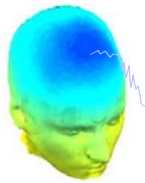


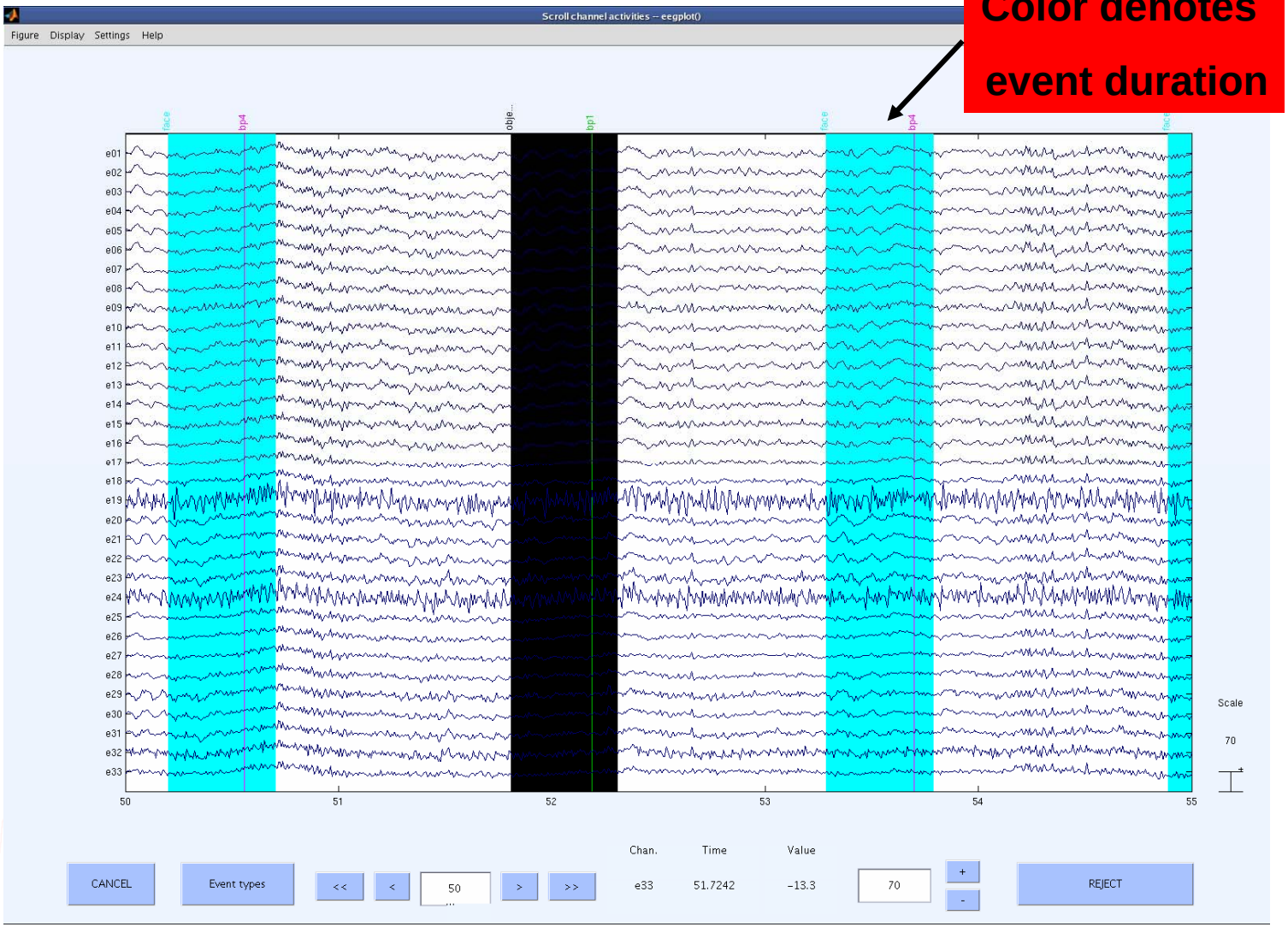



```
EEG = pop_editeventfield( EEG,…
 'indices','1:732','latencyinfo',…
 [],'typeinfo',[],'duration','0');
[ALLEEG EEG] = eeg_store(ALLEEG,…
 EEG, CURRENTSET);
```

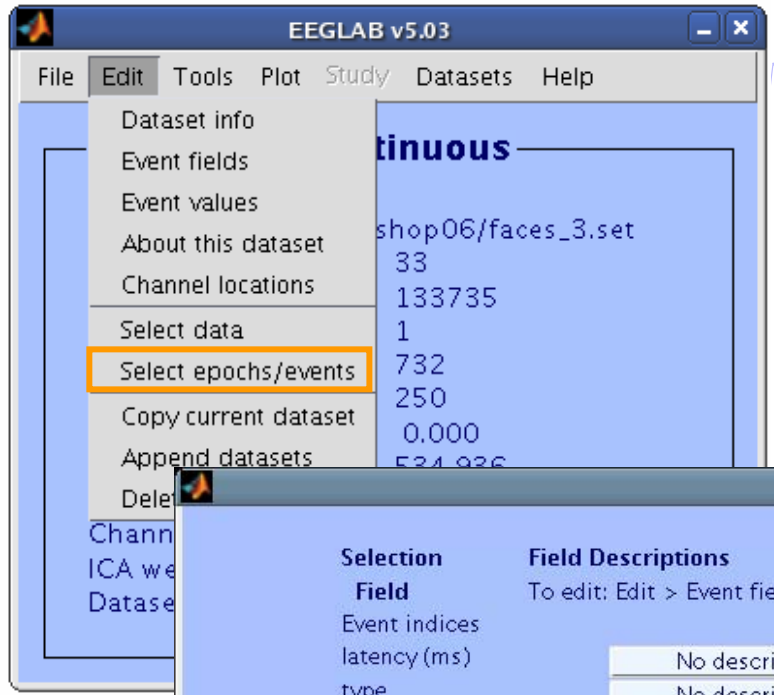


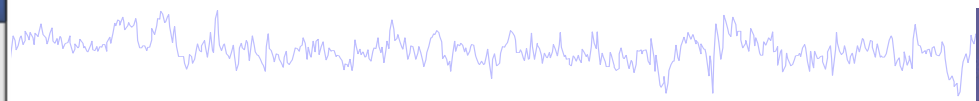
Event durations

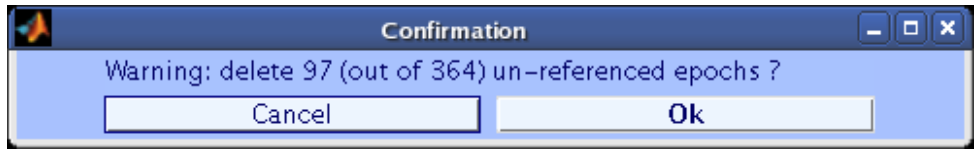


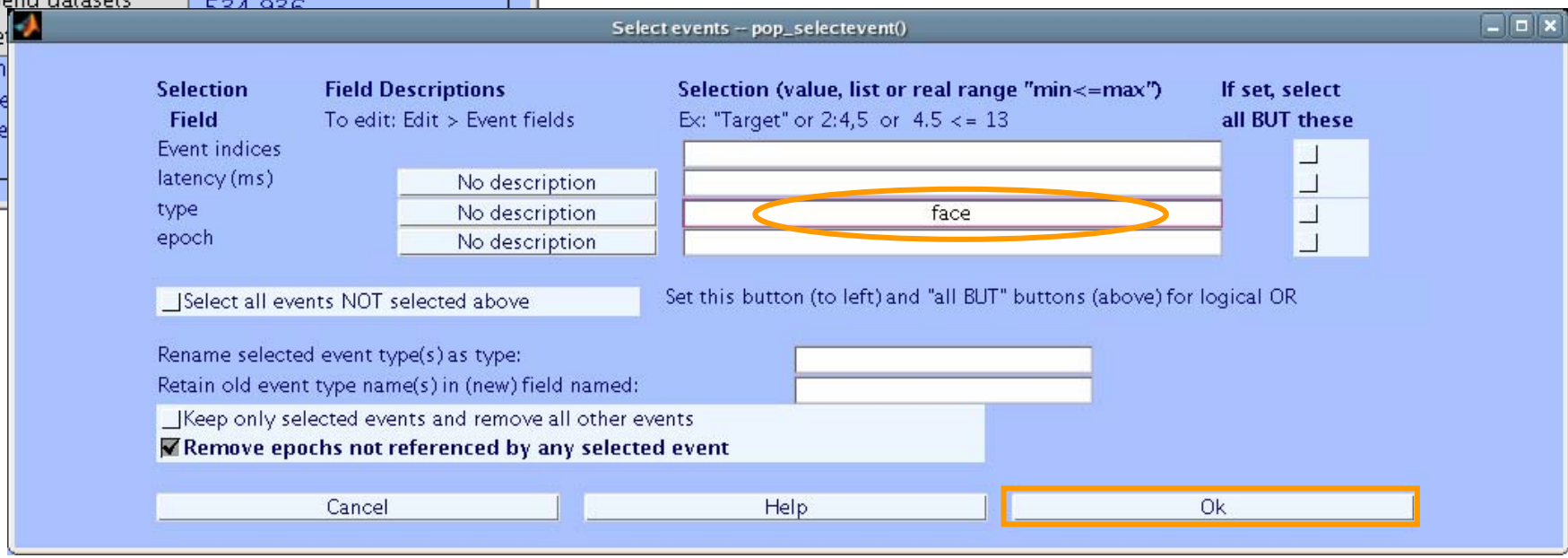


Select epochs

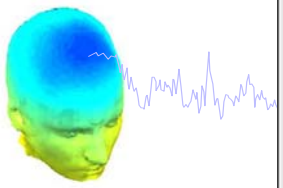


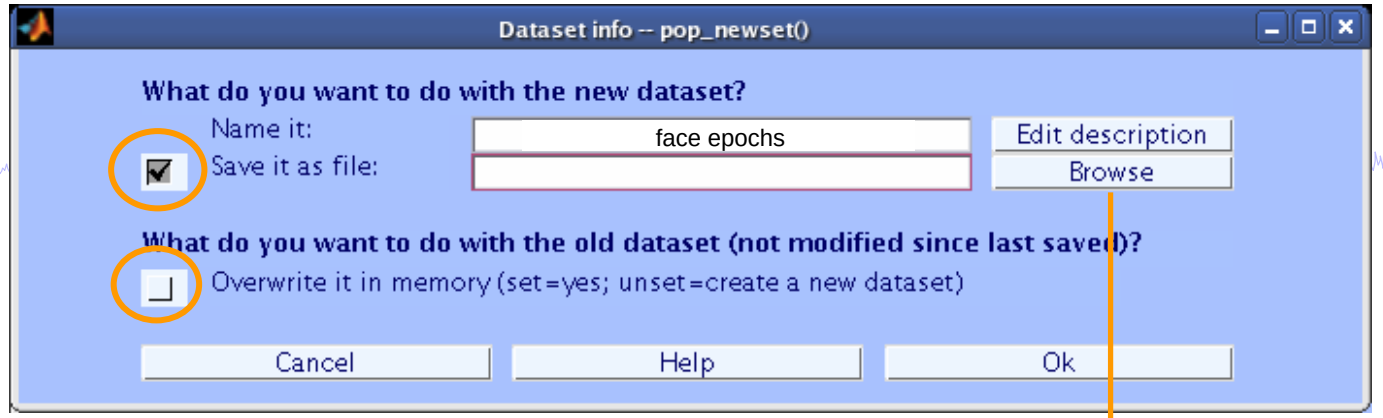




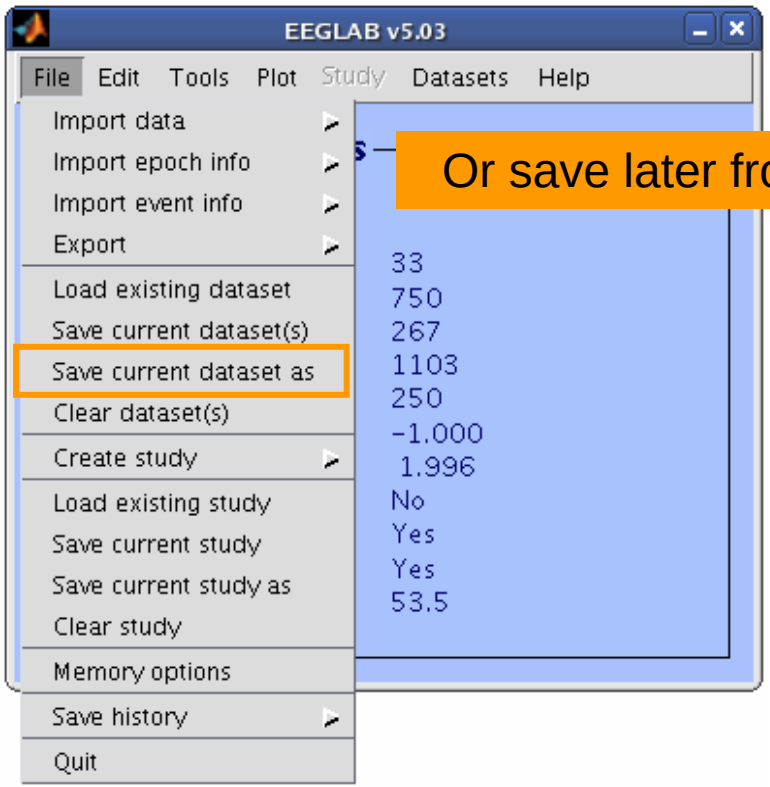



```
>> EEG=pop_selectevent(EEG,'type',{'face'},'deleteevents', ...
  'off','deleteepochs','on');
>> [ALLEEG EEG CURRENTSET]=pop_newset(ALLEEG,EEG,4,...
  'setname','faces only epochs');
```

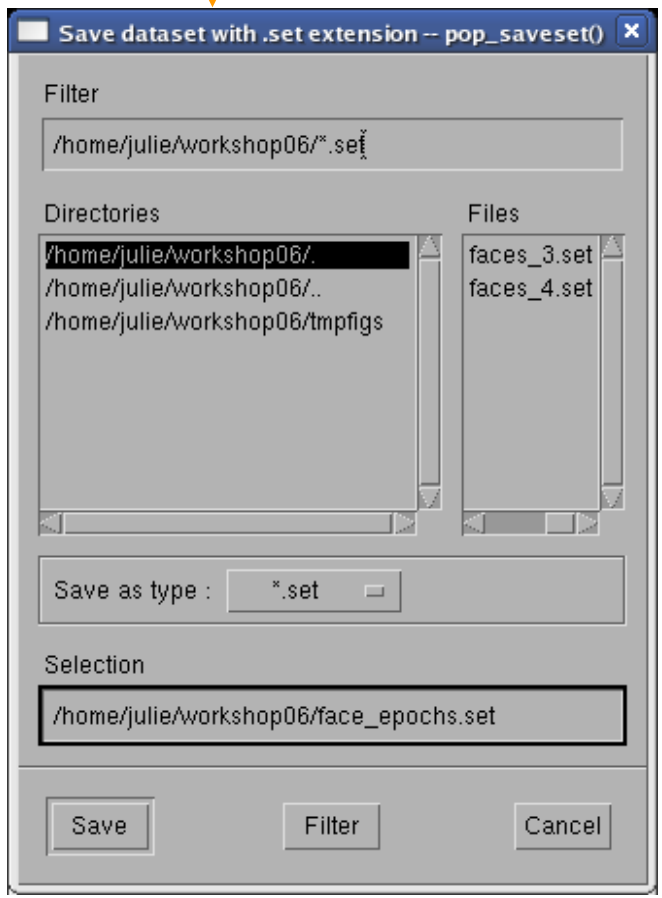


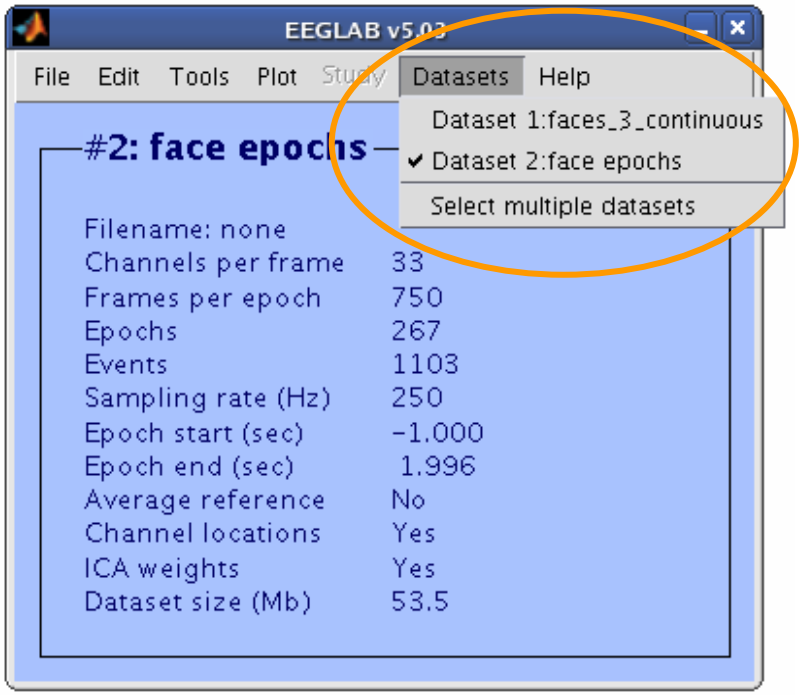


Save dataset (optional)

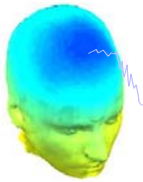


Or save later from menu




EEGLAB v5.03
File
Edit
Tools
Plot
Study
Datasets
Help
Dataset 1:faces_3_continuous
Dataset 2:face epochs
Select multiple datasets
#2: face epochs
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

Exercise



- Load dataset ***'.../data/faces_3.set'***
- Scroll channel data
- remove channel location information. Type:

- **`>> EEG.chanlocs = [];`**
- **`>> eeglab redraw`**

- Import electrode locations ***'faces_3.locs'*** from **'.../data/'**
  - Plot in channel locations in 2D/3D
  - Try rotating axis
  - Optimize the head center
- Review events in pop_menu (**Edit → Event values**)
  - Practice renaming an event type
- Do **not** save your changes!!