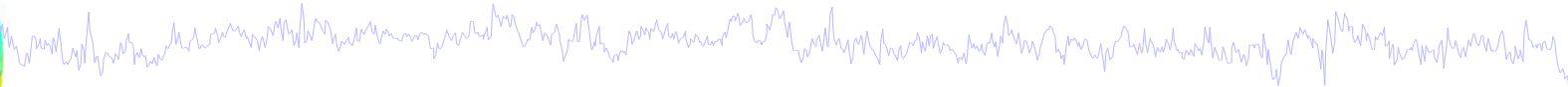
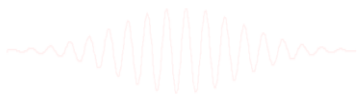


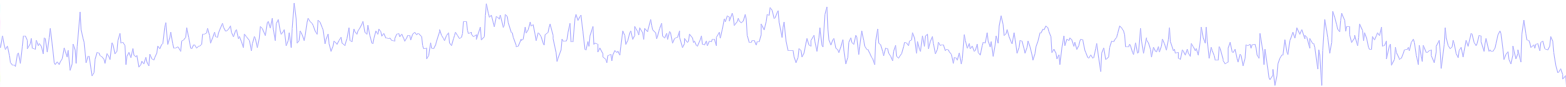
# Running ICA and Plotting Measures



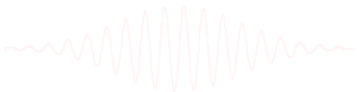
- 1) Run ICA**
- 2) Plot IC ERPs**
- 3) IC spectral power**
- 4) IC ERP images**
- 5) IC ERSP**



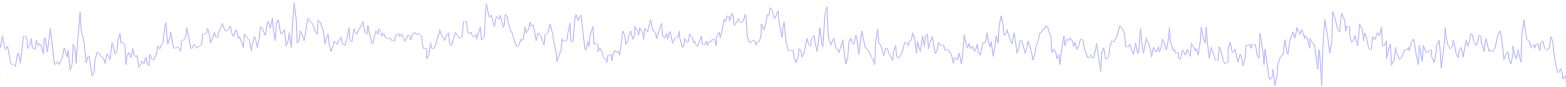
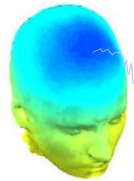
# Running ICA and Plotting Measures



- 1) Run ICA**
- 2) Plot IC ERPs**
- 3) IC spectral power**
- 4) IC ERP images**
- 5) IC ERSP**



# Retrieve or reload continuous EEG dataset



**RETRIEVE**

**RELOAD**

EEGLAB v11.0.5.4b

File Edit Tools Plot Study **Datasets** Help

**#3: SimpleOddball**

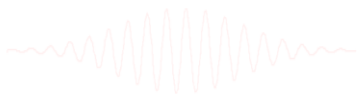
Filename:	none
Channels per frame	
Frames per epoch	282
Epochs	60
Events	120
Sampling rate (Hz)	256
Epoch start (sec)	-0.102
Epoch end (sec)	0.996
Reference	unknown
Channel locations	Yes
ICA weights	No
Dataset size (Mb)	4.6

- Dataset 1: SimpleOddball hipass0.5 CL
- Dataset 2: SimpleOddball nontargets rej
- Dataset 3: SimpleOddball targets rej
- Select multiple datasets

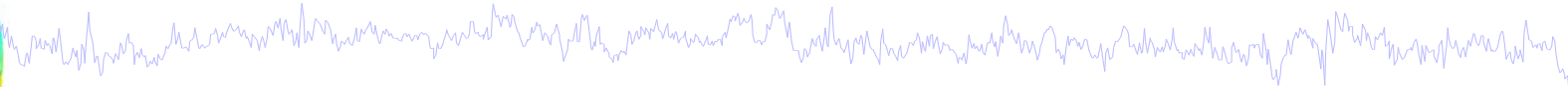
EEGLAB v11.0.5.4b

File Edit Tools Plot Study Datasets Help

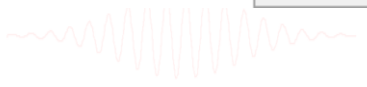
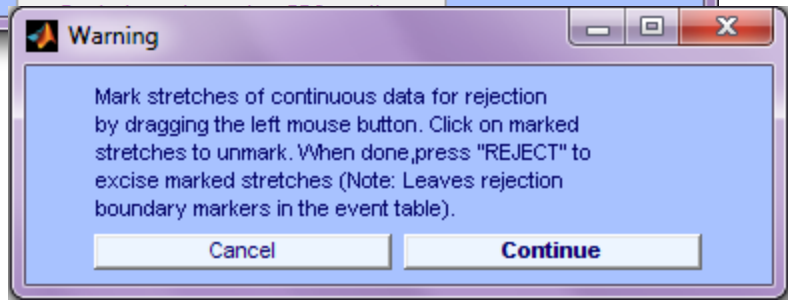
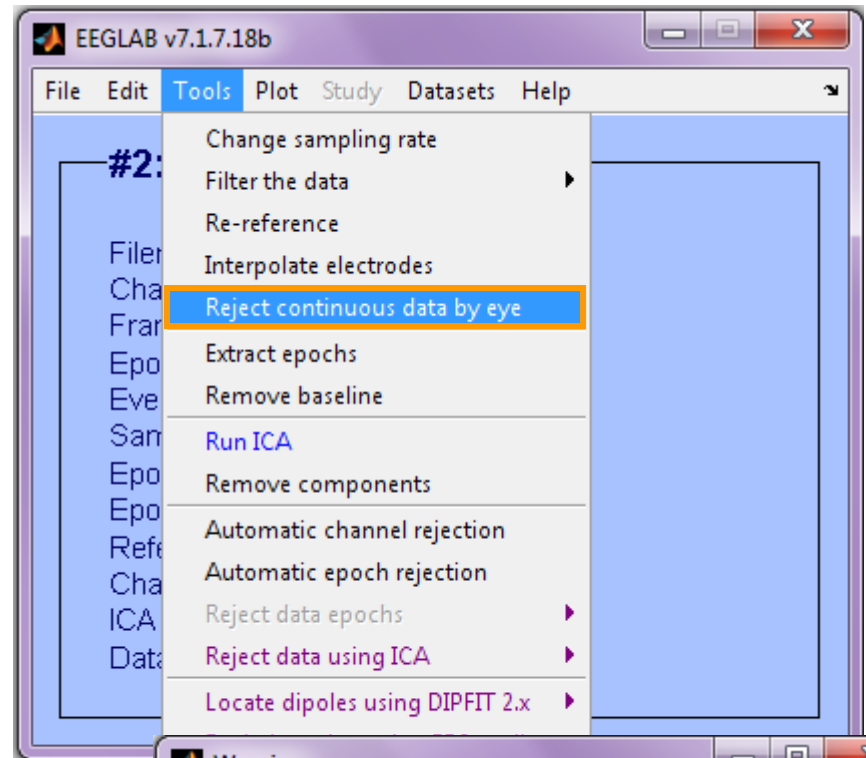
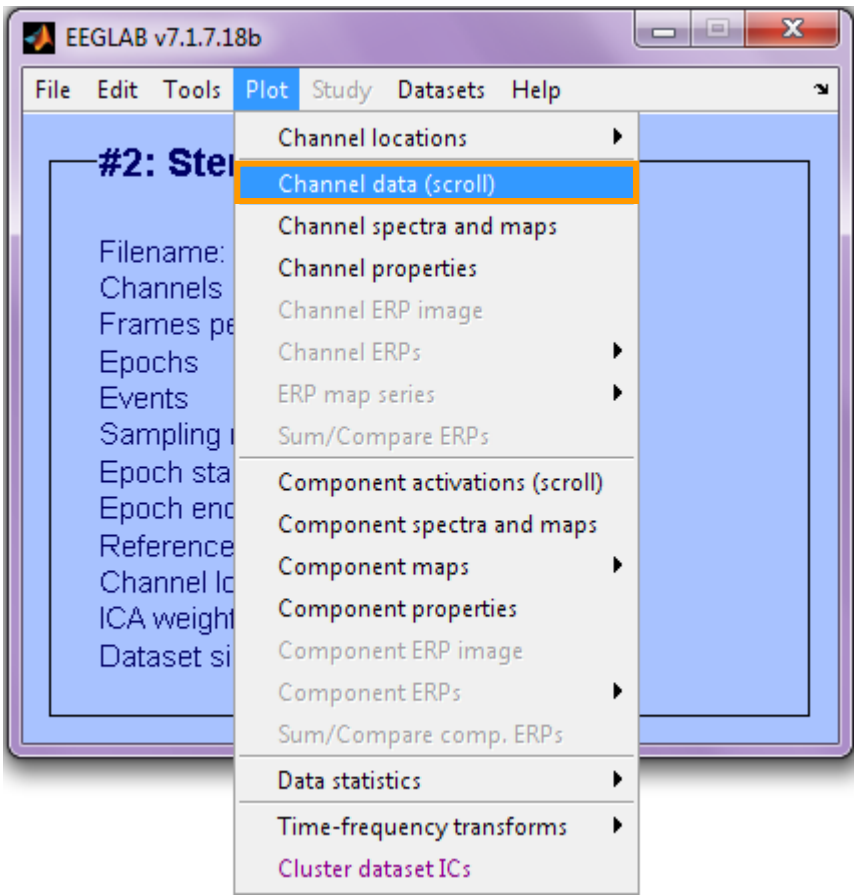
- Import data
- Import epoch info
- Import event info
- Export
- Load existing dataset**
- Save current dataset(s)
- Save current dataset as
- Clear dataset(s)
- Create study
- Load existing study
- Save current study
- Save current study as
- Clear study
- Memory and other options
- History scripts
- Quit



# Reject continuous data



Equivalent



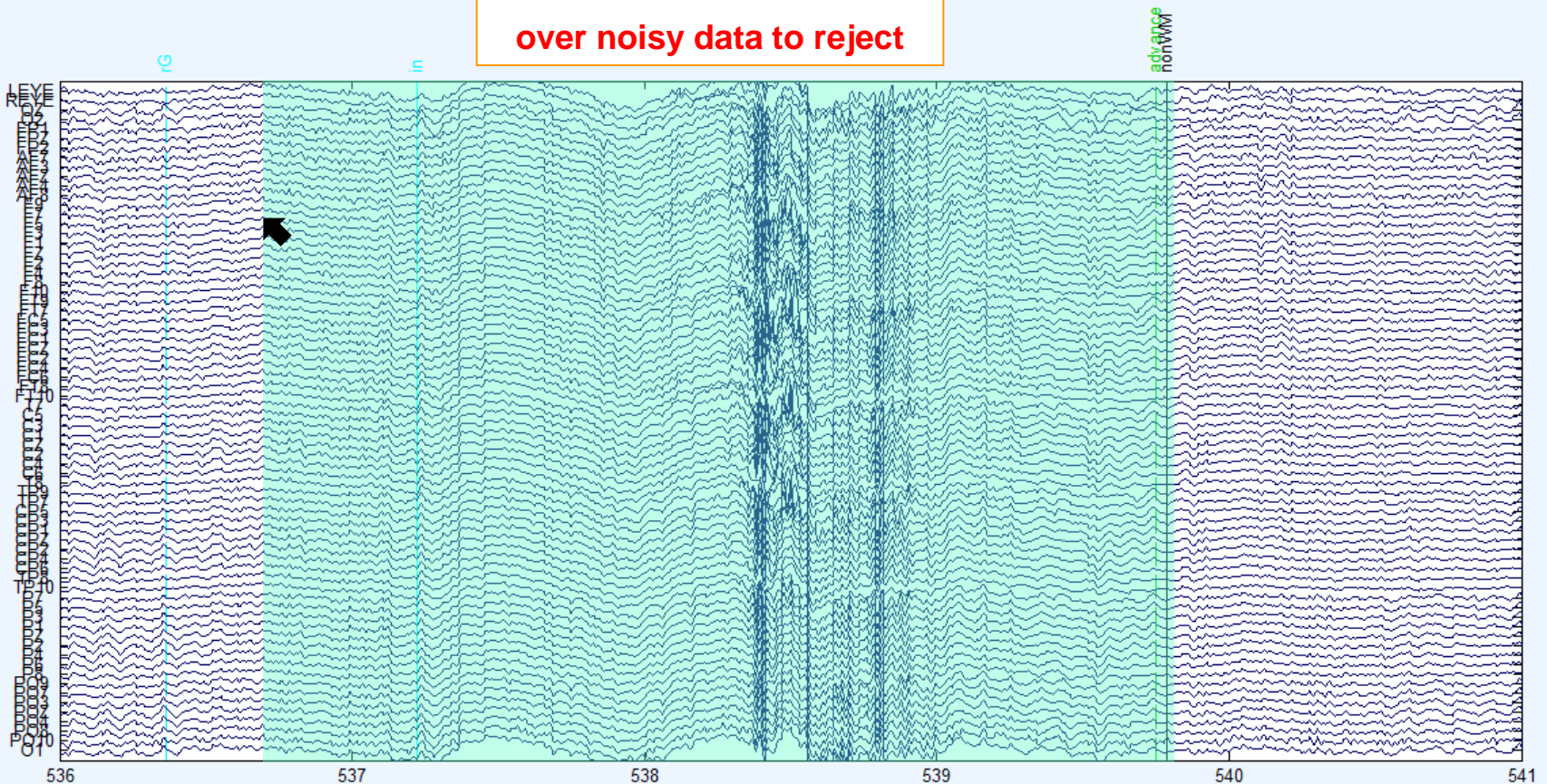
# Reject continuous data



Scroll channel activities -- eegplot()

Figure Display Settings Help

Click and drag with mouse  
over noisy data to reject



Scale

35



CANCEL

Event types

<<

<

536

>

>>

Chan.

Time

Value

FC6

539.9355

4.8773

35

+

-

REJECT

5

# Rejecting data for ICA



To prepare data for ICA:

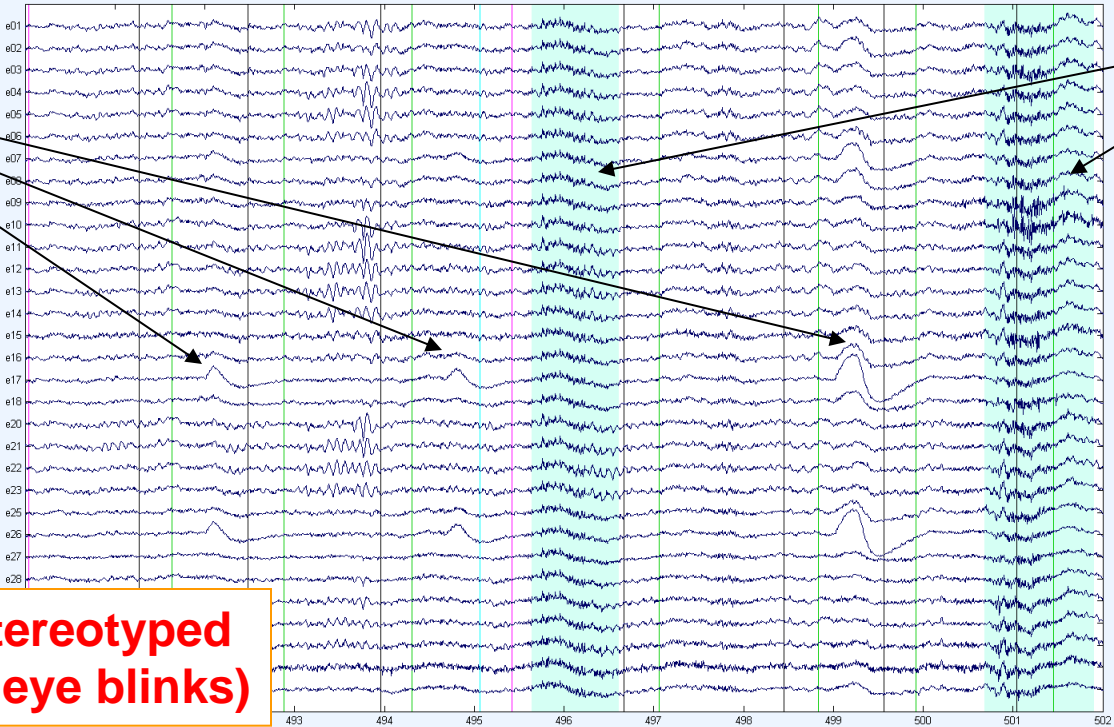
Reject large muscle or otherwise strange events...

Scroll channel activities -- eegplot()  
Figure Display Settings Help

Keep

Reject

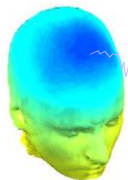
... but keep stereotyped artifacts (like eye blinks)



Scale  
100

CANCEL Event types << < 480 > >> Chan. Time Value e01 502.3519 -9.7 100 + - REJECT

# Independent Component Analysis

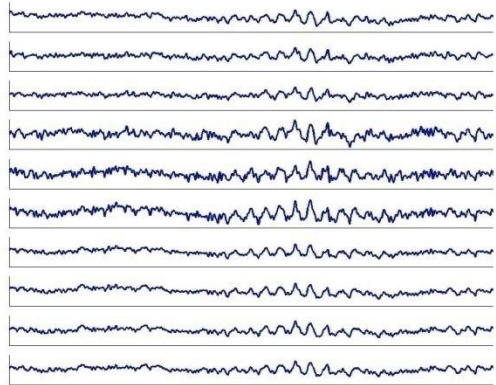


$x$  = scalp EEG

$W$  = unmixing matrix

$u$  = sources

Channels

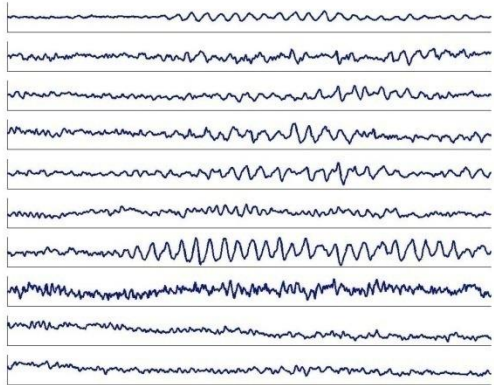


Time

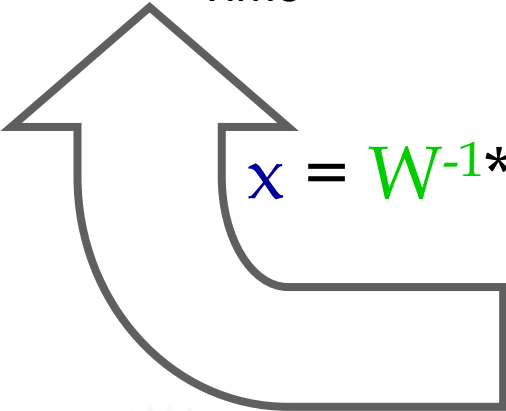
$$W^*x = u$$

ICA

Components

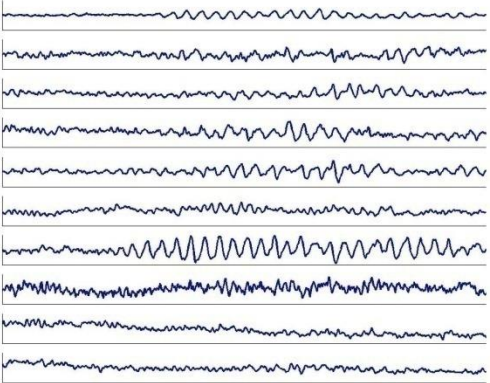


Time



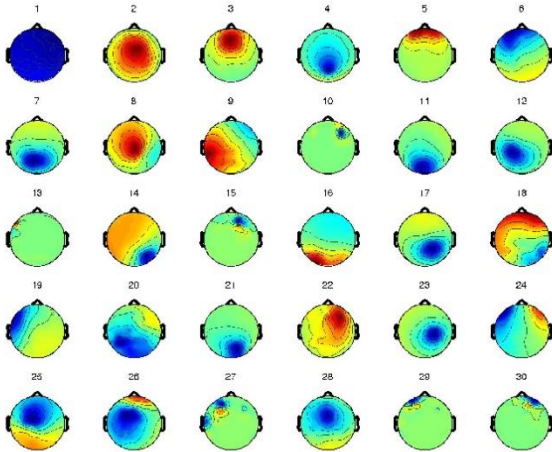
$$x = W^{-1} * u$$

$u$  = sources



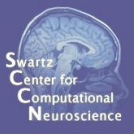
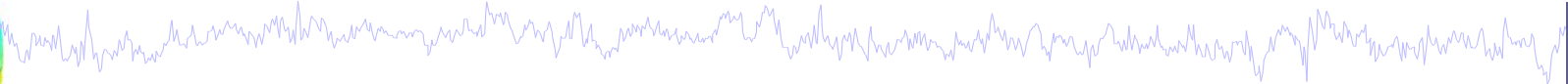
$W^{-1}$  (scalp projections)

\*



ICA Components

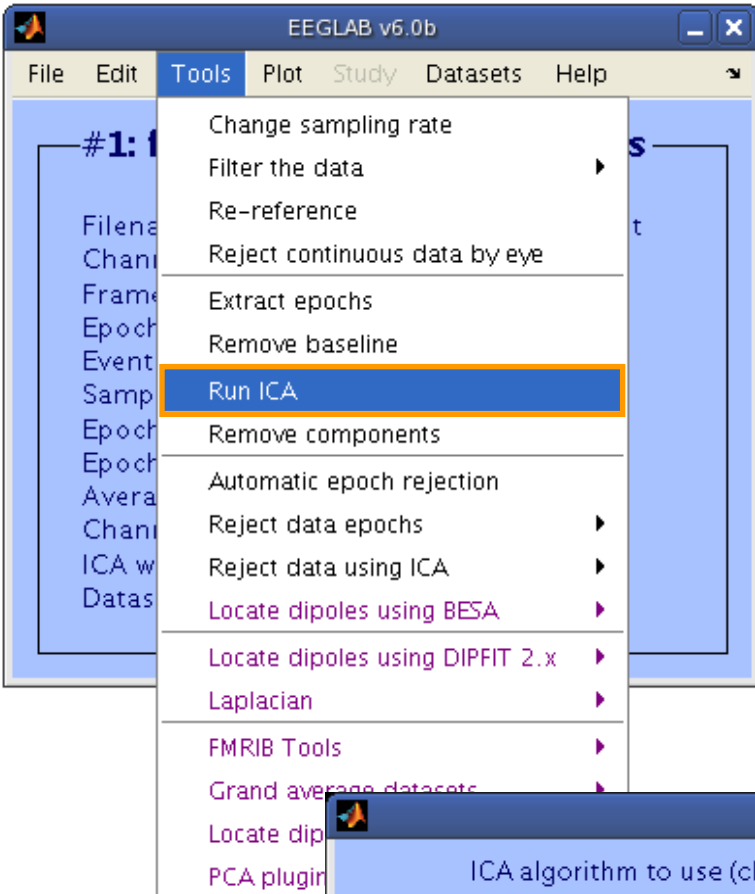
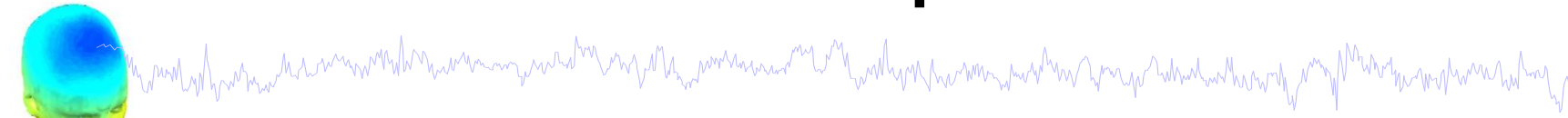
# “Secrets” to a good ICA decomposition



- Garbage in... garbage out (it's not magic)
- Remove large, non-stereotyped artifacts
- Do you have enough data? (based mostly on time, not frames)
- High-pass filter to remove slow drifts (no low-pass filter needed)
- Remove bad channels
- Data must be in double precision (not single)

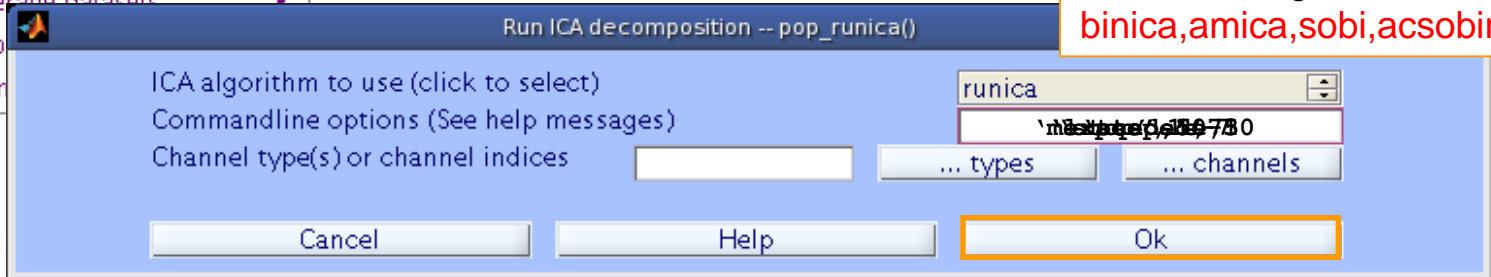


# Runica options



Option	Default	Comments
'extended'	0	1 is recommended to find sub-gaussians
'stop'	1e-7	final weight change → stop
'lrate'	determined from data	too small → too long... too large → wts blow up
'maxsteps'	512	more channels → more steps
'pca'	0 or EEG.nbchan	Decompose only a principal data subspace

Other algorithms:  
**binica, amica, sobi, acsobi**



# Runica progress...



Press Button to interrupt runica

Interrupt

```
Input data size [33,133175] = 33 channels, 133175 frames/nFinding 33 ICA components using extended ICA.
Kurtosis will be calculated initially every 1 blocks using 6000 data points.
Decomposing 122 frames per ICA weight ((1089)^2 = 133175 weights, Initial learning rate will be 0.001, block size
Learning rate will be multiplied by 0.98 whenever angledelta >= 60 deg.
More than 32 channels; default stopping weight change 1E-7
Training will end when wchange < 1e-07 or after 512 steps.
Online bias adjustment will be used.
Removing mean of each channel ...
Final training data range: -171.806 to 179.094
Computing the sphering matrix...
Starting weights are the identity matrix ...
Sphering the data ...
Beginning ICA training ... first training step may be slow ...
step 1 - lrate 0.001000, wchange 16.85061324, angledelta 0.0 deg
step 2 - lrate 0.001000, wchange 0.26760405, angledelta 0.0 deg
step 3 - lrate 0.001000, wchange 0.79058323, angledelta 104.0 deg
step 4 - lrate 0.000980, wchange 0.66700031, angledelta 147.2 deg
step 5 - lrate 0.000960, wchange 0.62849071, angledelta 146.5 deg
step 6 - lrate 0.000941, wchange 0.73967955, angledelta 150.7 deg
step 7 - lrate 0.000922, wchange 0.73727229, angledelta 151.6 deg
step 8 - lrate 0.000904, wchange 0.74051387, angledelta 137.9 deg
step 9 - lrate 0.000886, wchange 0.74536137, angledelta 156.0 deg
step 10 - lrate 0.000868, wchange 0.72101402, angledelta 143.7 deg
step 11 - lrate 0.000851, wchange 0.14690114, angledelta 102.5 deg
step 12 - lrate 0.000834, wchange 0.11822100, angledelta 114.3 deg
step 13 - lrate 0.000817, wchange 0.75552966, angledelta 100.6 deg
step 14 - lrate 0.000801, wchange 0.26739750, angledelta 109.1 deg
step 15 - lrate 0.000785, wchange 0.12123251, angledelta 94.2 deg
step 16 - lrate 0.000769, wchange 0.10285606, angledelta 110.7 deg
step 17 - lrate 0.000754, wchange 0.09770499, angledelta 118.6 deg
step 18 - lrate 0.000739, wchange 0.09544428, angledelta 117.1 deg
```

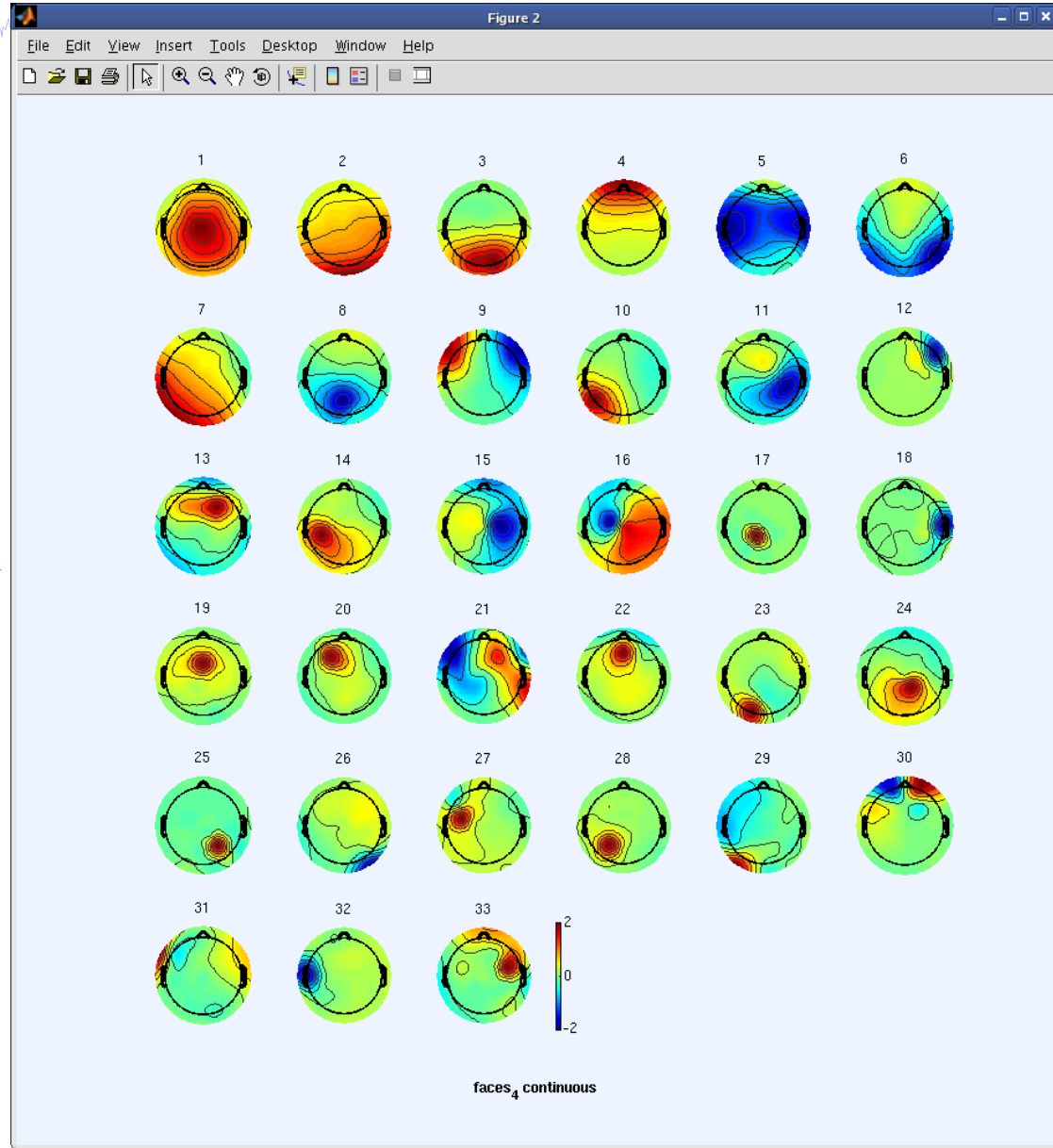
```
step 241 - lrate 0.000002, wchange 0.00000082, angledelta 101.5 deg
step 242 - lrate 0.000001, wchange 0.00000061, angledelta 96.1 deg
step 243 - lrate 0.000001, wchange 0.00000057, angledelta 97.5 deg
step 244 - lrate 0.000001, wchange 0.00000054, angledelta 93.7 deg
step 245 - lrate 0.000001, wchange 0.00000055, angledelta 100.3 deg
step 246 - lrate 0.000001, wchange 0.00000047, angledelta 96.9 deg
step 247 - lrate 0.000001, wchange 0.00000046, angledelta 91.3 deg
step 248 - lrate 0.000001, wchange 0.00000045, angledelta 101.5 deg
step 249 - lrate 0.000001, wchange 0.00000041, angledelta 103.1 deg
step 250 - lrate 0.000001, wchange 0.00000036, angledelta 95.5 deg
step 251 - lrate 0.000001, wchange 0.00000033, angledelta 92.1 deg
step 252 - lrate 0.000001, wchange 0.00000029, angledelta 97.4 deg
step 253 - lrate 0.000001, wchange 0.00000030, angledelta 95.8 deg
step 254 - lrate 0.000001, wchange 0.00000023, angledelta 94.2 deg
step 255 - lrate 0.000001, wchange 0.00000023, angledelta 97.6 deg
step 256 - lrate 0.000001, wchange 0.00000023, angledelta 97.1 deg
step 257 - lrate 0.000001, wchange 0.00000021, angledelta 92.0 deg
step 258 - lrate 0.000001, wchange 0.00000020, angledelta 99.1 deg
step 259 - lrate 0.000001, wchange 0.00000019, angledelta 95.0 deg
step 260 - lrate 0.000001, wchange 0.00000015, angledelta 98.3 deg
step 261 - lrate 0.000001, wchange 0.00000014, angledelta 99.0 deg
step 262 - lrate 0.000001, wchange 0.00000014, angledelta 94.3 deg
step 263 - lrate 0.000001, wchange 0.00000013, angledelta 95.4 deg
step 264 - lrate 0.000001, wchange 0.00000012, angledelta 94.1 deg
step 265 - lrate 0.000001, wchange 0.00000011, angledelta 96.1 deg
step 266 - lrate 0.000001, wchange 0.00000010, angledelta 94.8 deg
step 267 - lrate 0.000001, wchange 0.00000010, angledelta 94.5 deg
step 268 - lrate 0.000001, wchange 0.00000010, angledelta 97.7 deg
step 269 - lrate 0.000001, wchange 0.00000008, angledelta 95.1 deg
Sorting components in descending order of mean projected variance ...
Permuting the activation wave forms ...
>>
>>
```

# ICA weights in EEG structure

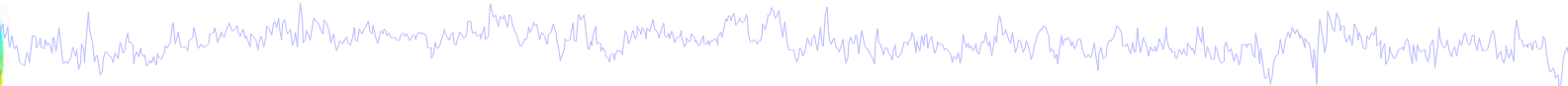
```
Terminal
File Edit View Terminal Tabs Help
>> EEG
EEG =

    setname: 'faces_4 continuous'
    filename: 'faces_4.set'
    filepath: '/home/julie/workshop06/'
    subject: ''
    group: ''
    condition: ''
    session: []
    comments: [15x48 char]
    nbchan: 33
    trials: 1
    pnts: 133175
    srate: 250
    xmin: 0
    xmax: 532.6960
    times: []
    data: [33x133175 single]
    icaact: [33x133175 single]
    icawinv: [33x33 double]
    icasphere: [33x33 double]
    icaweights: [33x33 double]
    icachansind: [1x33 double]
    chanlocs: [1x33 struct]
    urchanlocs: []
    chaninfo: [1x1 struct]
    ref: 'common'
    event: [1x731 struct]
    urevent: [1x731 struct]
    eventdescription: ([] [])
    epoch: []
    epochdescription: {}
    reject: [1x1 struct]
    stats: [1x1 struct]
    specdata: []
    specicaact: []
    splinefile: ''
    icasplinefile: ''
    dipfit: [1x1 struct]
    history: [1x1633 char]
    saved: 'no'
    etc: []

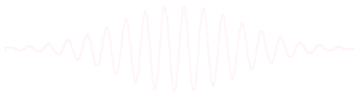
>>
```



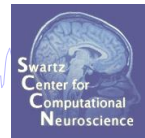
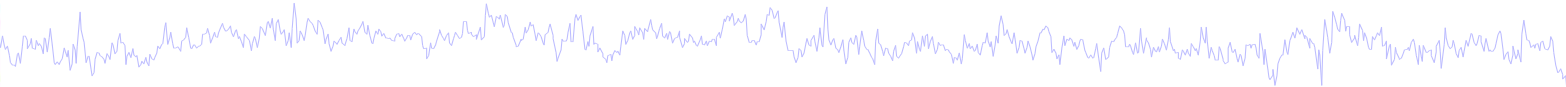
# Running ICA and Plotting Measures



- 1) Run ICA**
- 2) Plot IC ERPs**
- 3) IC spectral power**
- 4) IC ERP images**
- 5) IC ERSP**



# Component ERPs



EEGLAB v7.1.7.18b

File Edit Tools **Plot** Study Datasets Help

#2: Sternberg: Memorize epochs

Channels: chs

- 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**
  - With component maps
  - With comp. maps (contour)
  - In rectangular array**
- Sum/Compare comp. ERPs
- Data statistics
- Time-frequency transforms
- Cluster dataset ICs

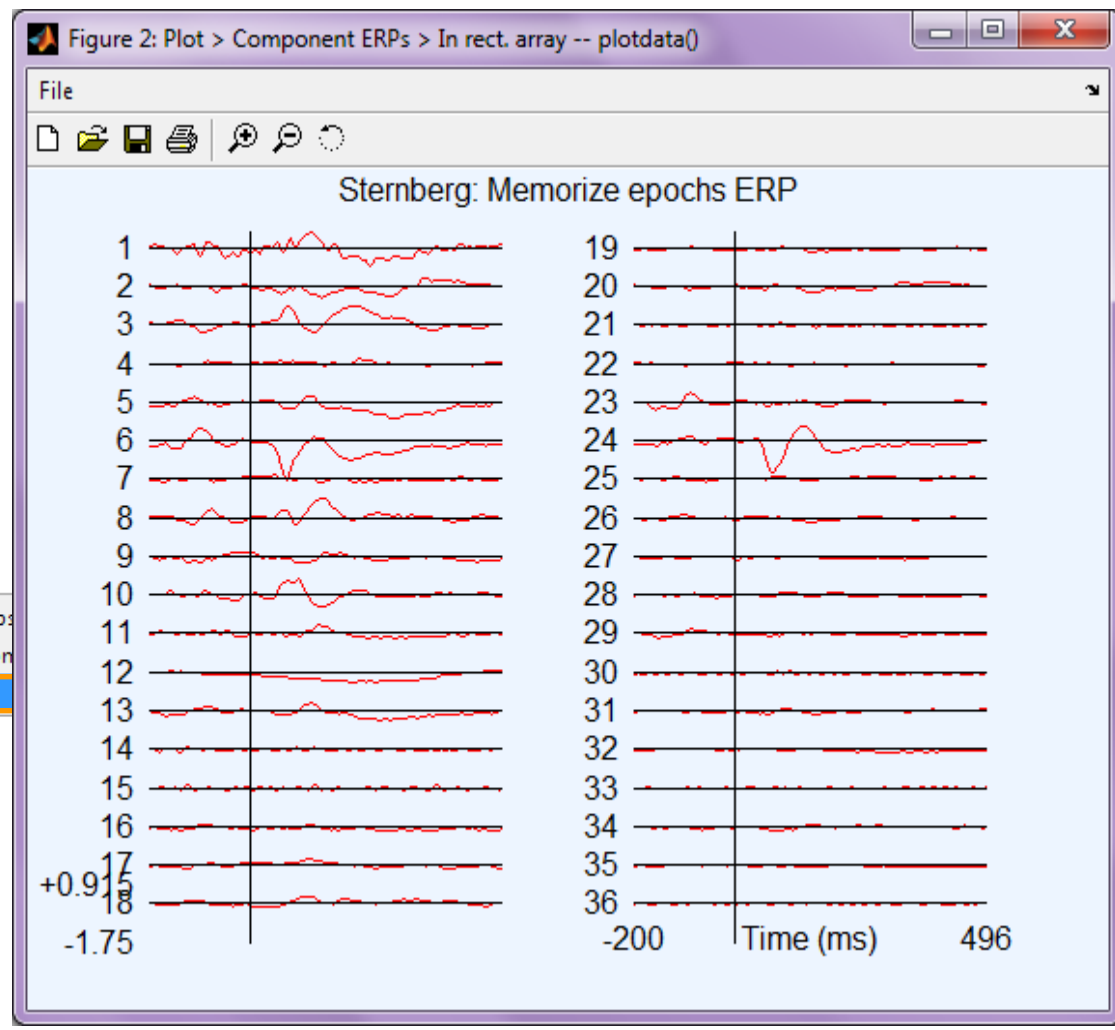
Component ERPs in rect. array -- pop\_plotdata()

Component number(s): 1:71

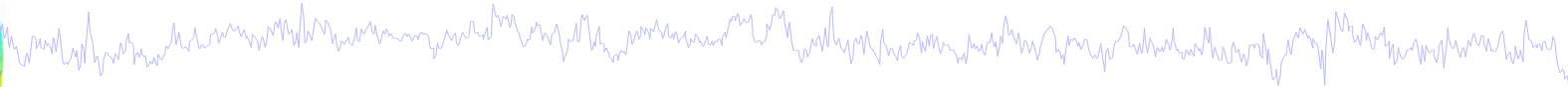
Plot title: Sternberg: Memorize epochs

Vertical limits ([0 0]-> data range): 0 0

Cancel Help Ok



# Component ERP envelope



EEGLAB v7.1.7.18b

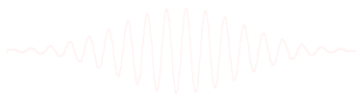
File Edit Tools **Plot** Study Datasets Help

**#2: Step**

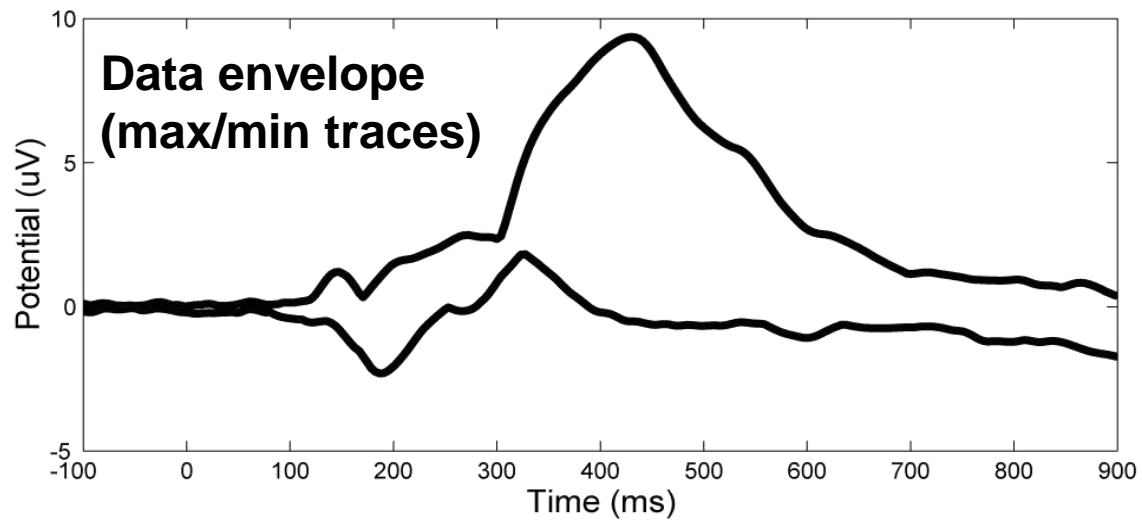
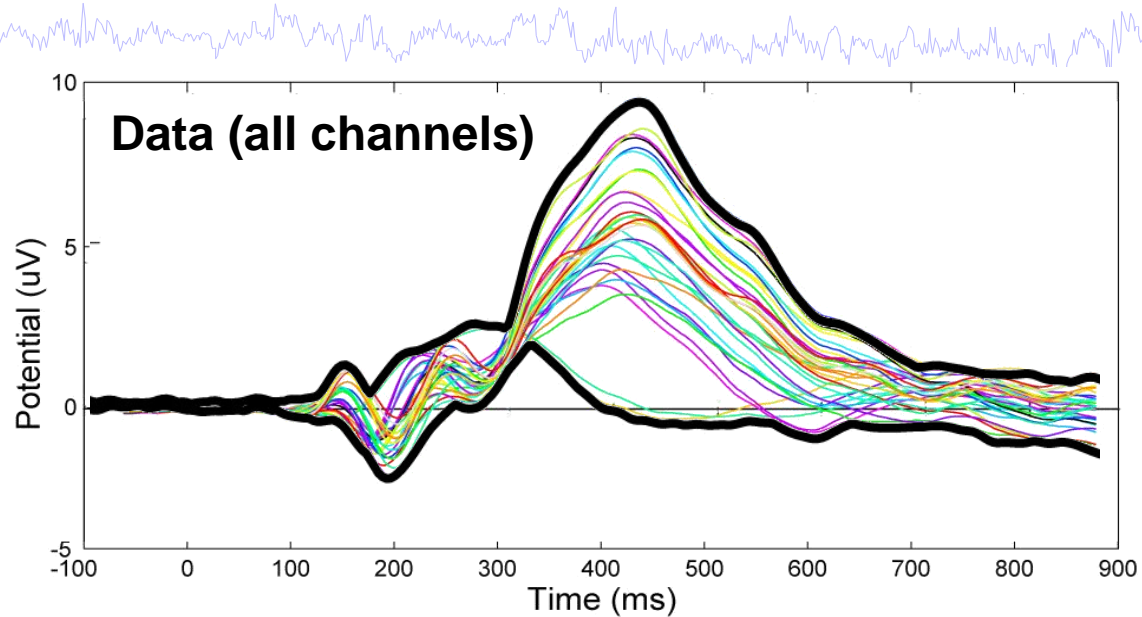
Filename:  
Channels  
Frames per  
Epochs  
Events  
Sampling  
Epoch start  
Epoch end  
Reference  
Channel loc  
ICA weight  
Dataset si

chs

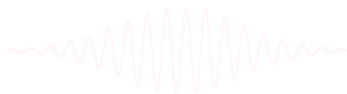
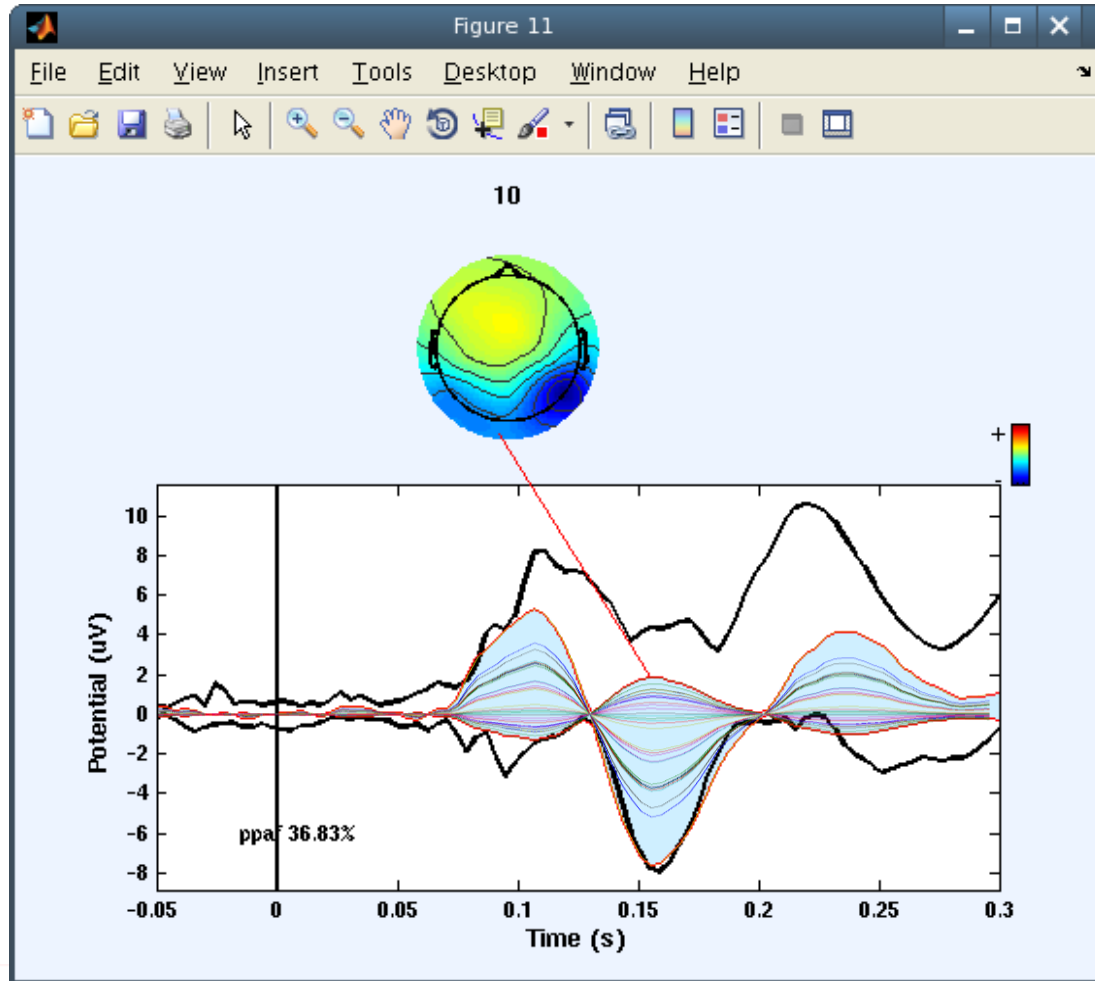
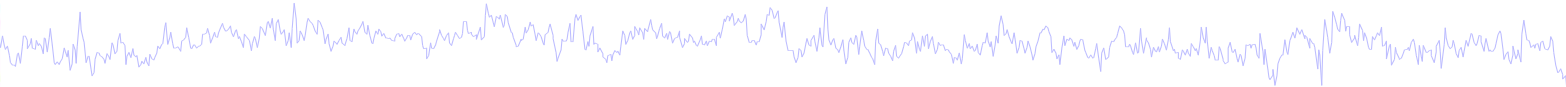
- Channel locations
- Channel data (scroll)
- Channel spectra and maps
- Channel properties
- Channel ERP image
- Channel ERPs
- ERP map series
- Sum/Compare ERPs
- Component activations (scroll)
- Component spectra and maps
- Component maps
- Component properties
- Component ERP image
- Component ERPs**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



# Definition: The data envelope

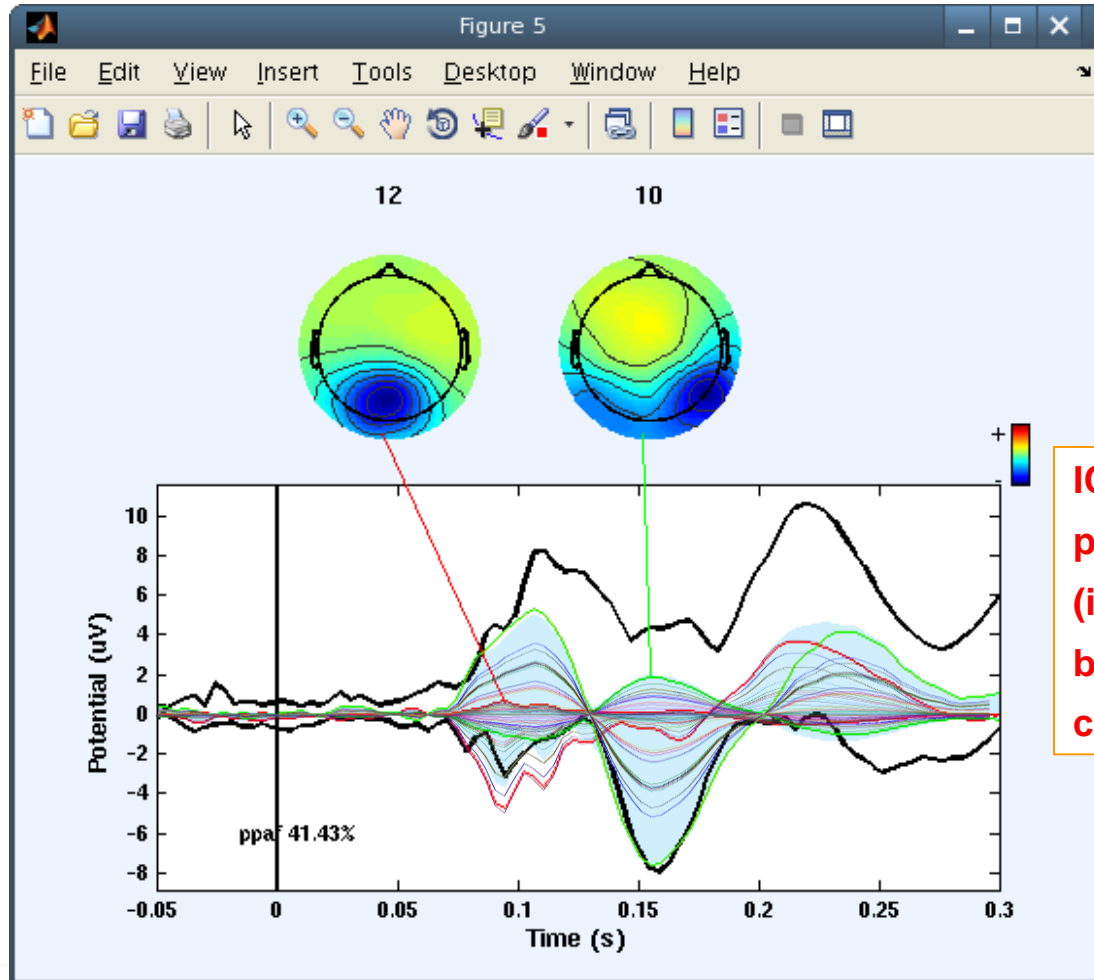


# IC back-projection envelope

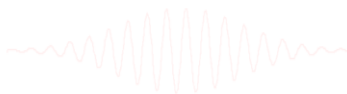




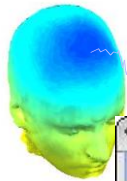
# IC back-projection envelope



IC envelopes  
plotted for simplicity  
(instead of all  
back-projected  
channels)



# IC contributions to ERP envelope



Plot component and ERP envelopes – pop\_envtopo()

Enter time range (in ms) to plot: -100 1000

Enter time range (in ms) to rank component contributions: 0 600

Number of largest contributing components to plot (1-20): 6

Else plot these component numbers only (<21) (Ex: 2;4,7):

Component numbers to remove from data before plotting:

Plot title: ERP components of faces\_4 epochs

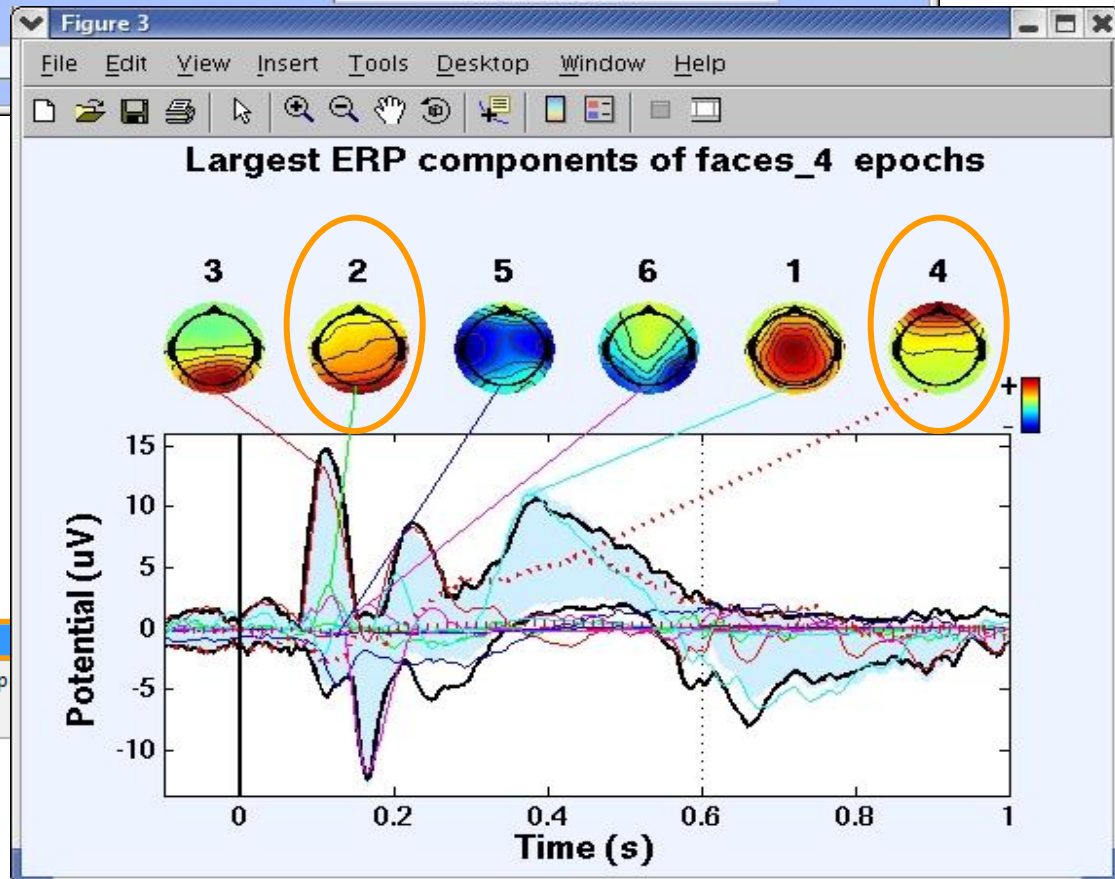
Optional topoplot() and spectopo() arguments: 'electrodes','off'

EEGLAB v7.1.7.18b

- File
- Edit
- Tools
- Plot**
- Study
- Datasets
- Help

#2: Step

- 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**
  - With component maps
- Sum/Compare comp. ERPs
  - With comp. maps (comp)
- Data statistics
  - In rectangular array
- Time-frequency transforms
- Cluster dataset ICs



# Component contribution to the dataset ERP



Plot component and ERP envelopes -- pop\_envtopo()

Enter time range (in ms) to plot: -100 1000

Enter time range (in ms) to rank component contributions: 0 600

Number of largest contributing components to plot (1-20): 6

Else plot these component numbers only (<21) (Ex: 2;4,7): **2, 4, 7, 9, 12, 17,18,25**

Component numbers to remove from data before plotting:

Plot title: ERP components of faces\_4 epochs

Optional topoplot() and spectopo() arguments: 'electrodes','off'

Cancel

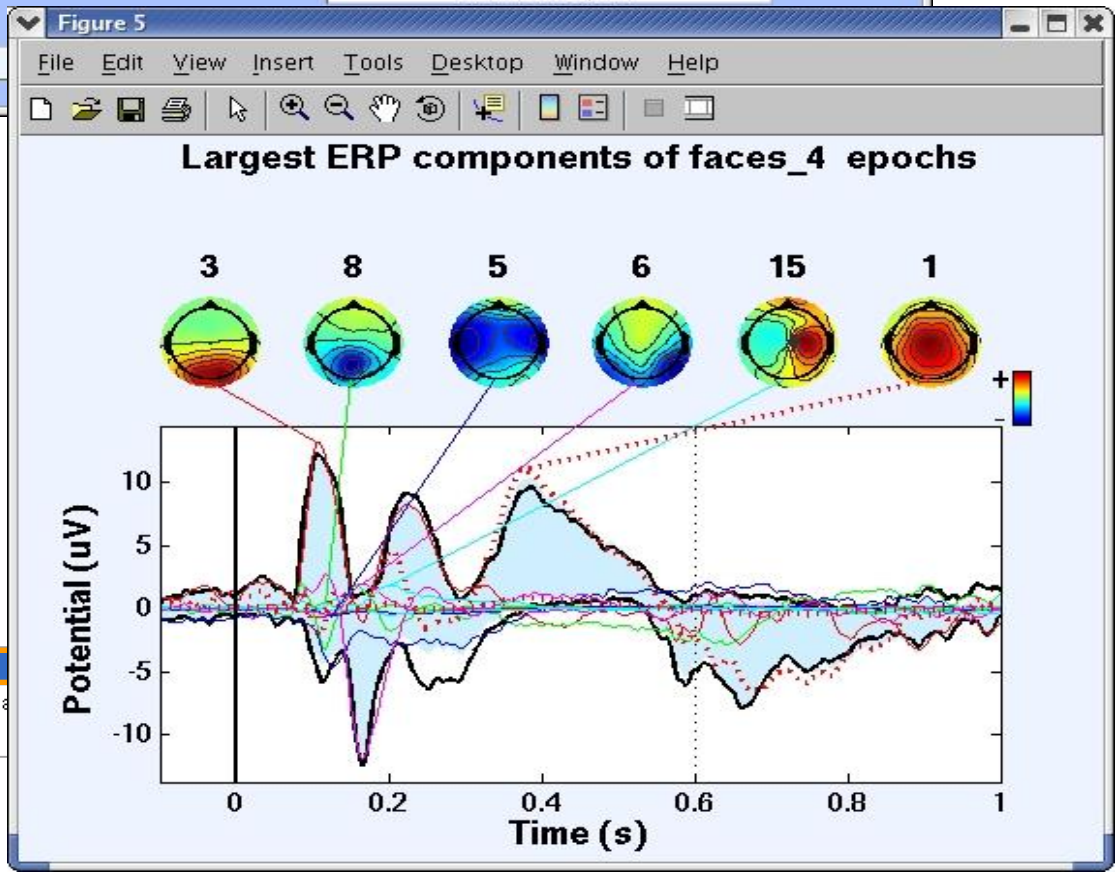
**Artifact components**

EEGLAB v6.0b

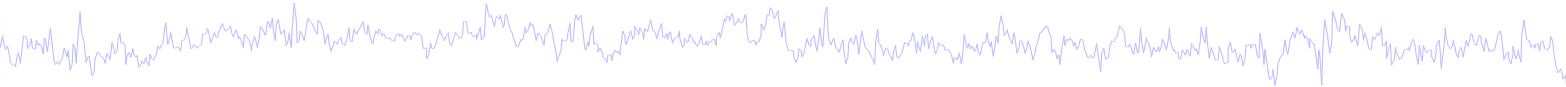
File Edit Tools Plot Study Datasets Help

#1: faces

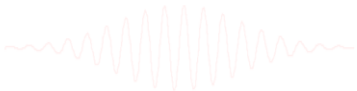
- Channel locations
- Channel data (scroll)
- Channel spectra and maps
- Channel properties
- Channel ERP image
- Channel ERPs
- ERP map series
- Sum/Compare ERPs
- Component activations (scroll)
- Component spectra and maps
- Component maps
- Component properties
- Component ERP image
- Component ERPs**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



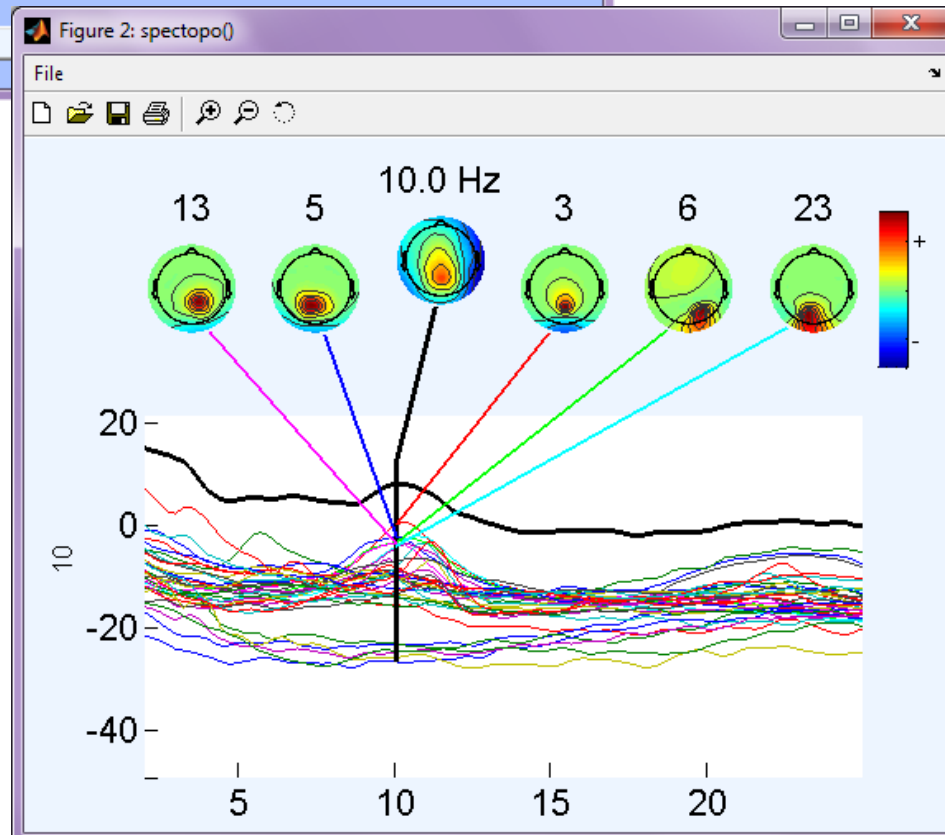
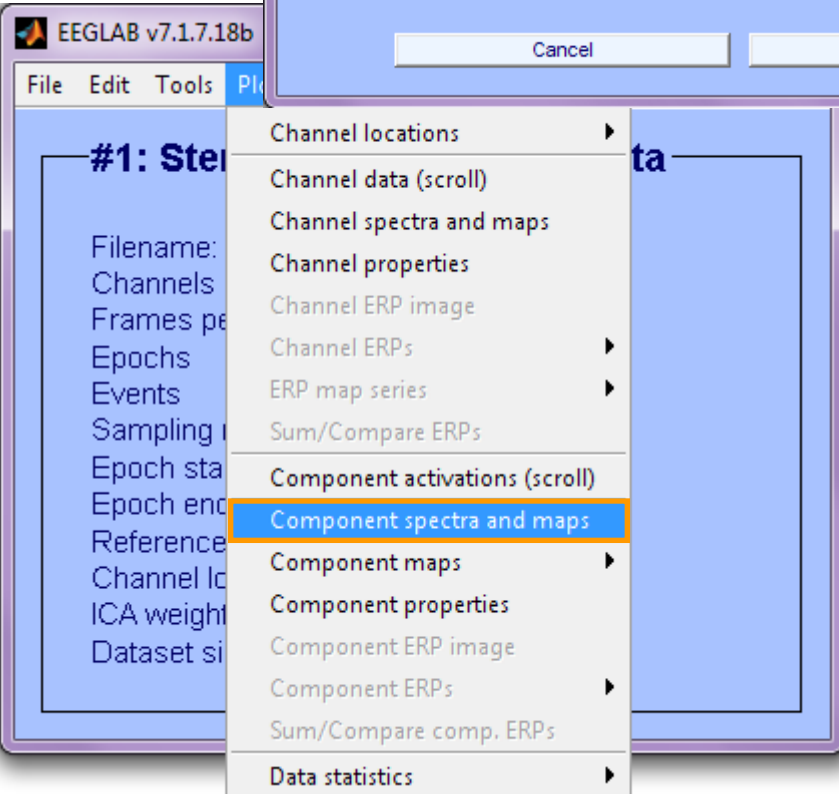
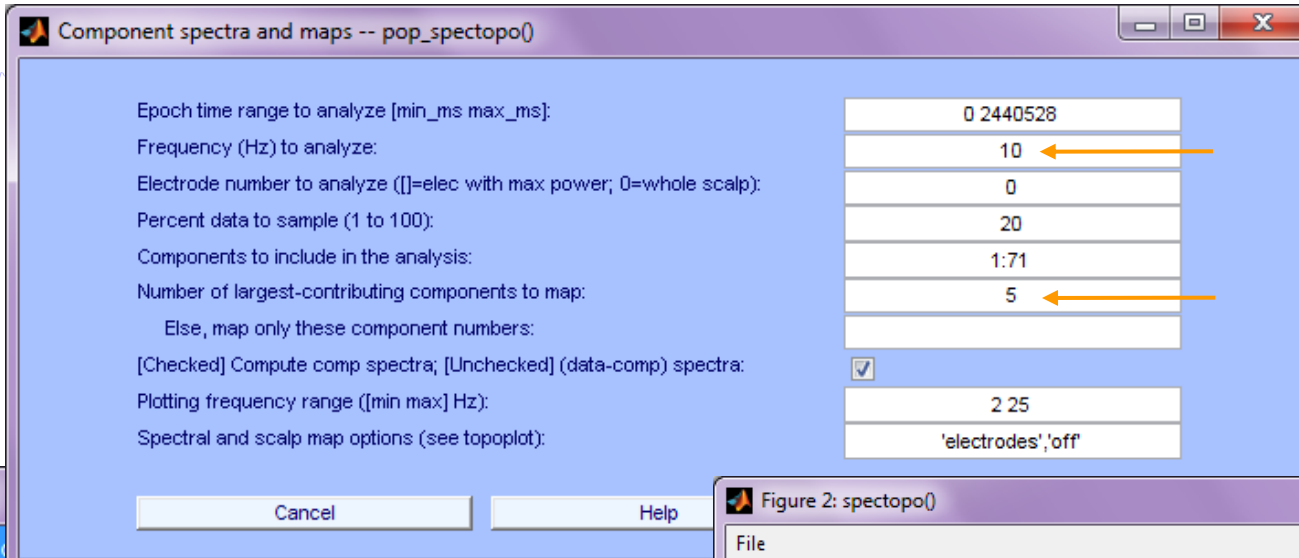
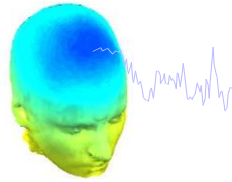
# Running ICA and Plotting Measures



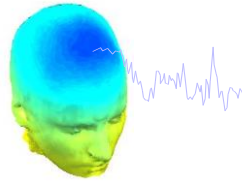
- 1) Run ICA**
- 2) Plot IC ERPs**
- 3) IC spectral power**
- 4) IC ERP images**
- 5) IC ERSP**



# Plot component power



# Plot component power



Component spectra and maps -- pop\_spectopo()

Epoch time range to analyze [min\_ms max\_ms]: 0 2440528

Frequency (Hz) to analyze: 6 ←

Electrode number to analyze ([]=elec with max power; 0=whole scalp): 0

Percent data to sample (1 to 100): 20

Components to include in the analysis: 1:71

Number of largest-contributing components to map: 5

Else, map only these component numbers:

[Checked] Compute comp spectra; [Unchecked] (data-comp) spectra:

Plotting frequency range ([min max] Hz): 2 25

Spectral and scalp map options (see topoplot):

Cancel

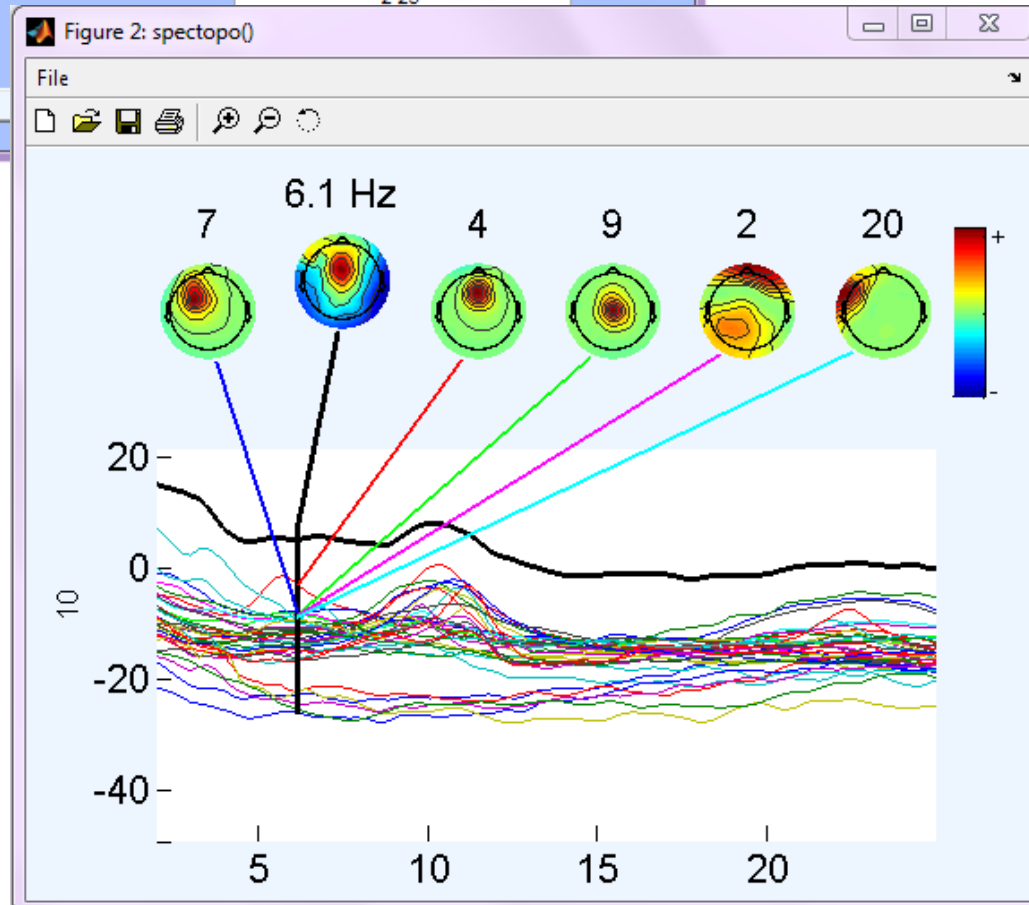
EEGLAB v7.1.7.18b

File Edit Tools Plot

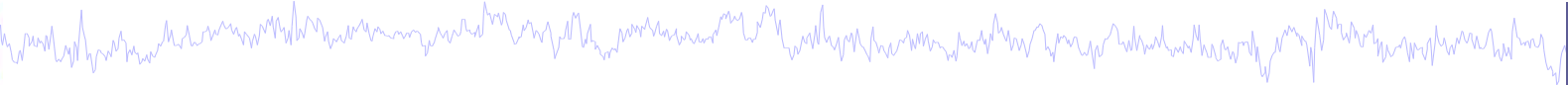
#1: Step

Filename:  
Channels  
Frames per  
Epochs  
Events  
Sampling rate  
Epoch start  
Epoch end  
Reference  
Channel locations  
ICA weights  
Dataset size

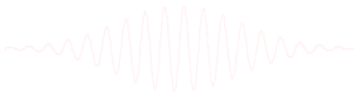
- Channel locations
- Channel data (scroll)
- Channel spectra and maps
- Channel properties
- Channel ERP image
- Channel ERPs
- ERP map series
- Sum/Compare ERPs
- Component activations (scroll)
- Component spectra and maps**
- Component maps
- Component properties
- Component ERP image
- Component ERPs
- Sum/Compare comp. ERPs
- Data statistics



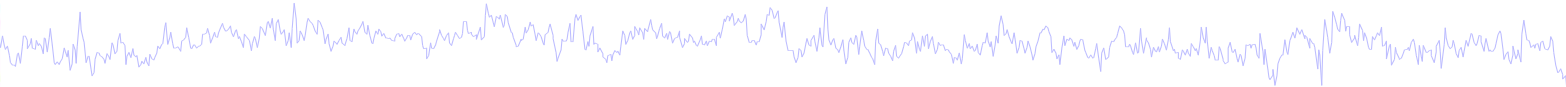
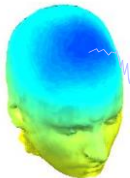
# Running ICA and Plotting Measures



- 1) Run ICA**
- 2) Plot IC ERPs**
- 3) IC spectral power**
- 4) IC ERP images**
- 5) IC ERSP**



# Component ERP image



EEGLAB v7.1.7.18b

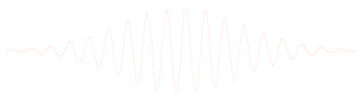
File Edit Tools **Plot** Study Datasets Help

**#2: Ste**

Filename:  
Channels  
Frames pe  
Epochs  
Events  
Sampling  
Epoch sta  
Epoch enc  
Reference  
Channel lo  
ICA weight  
Dataset si

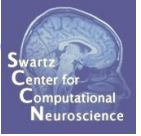
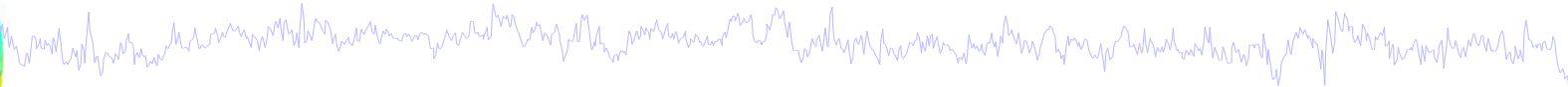
chs

- 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
- Cluster dataset ICs

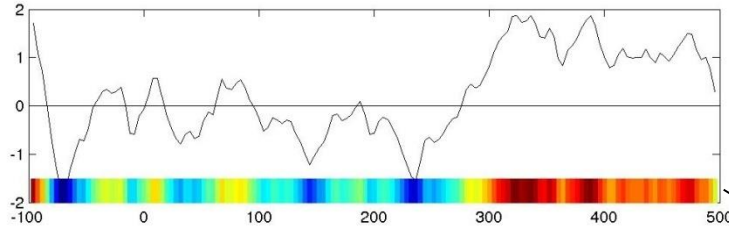




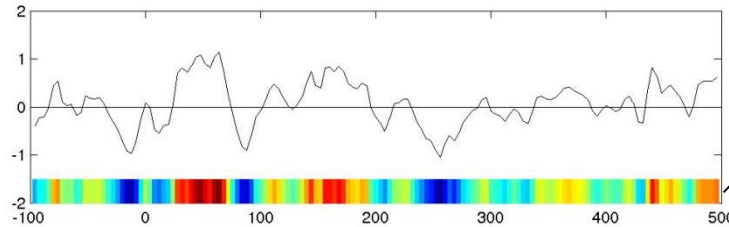
# ERP Image basics



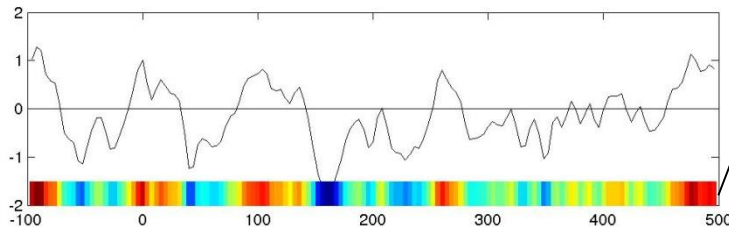
Trial 1



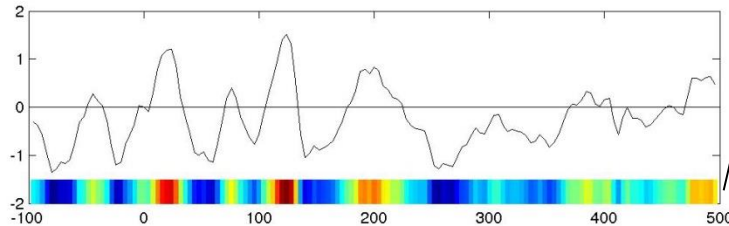
Trial 2



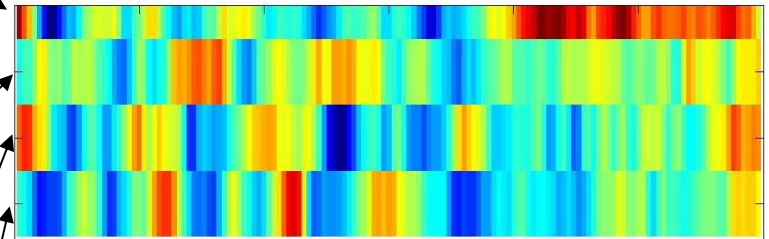
Trial 3



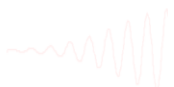
Trial 4



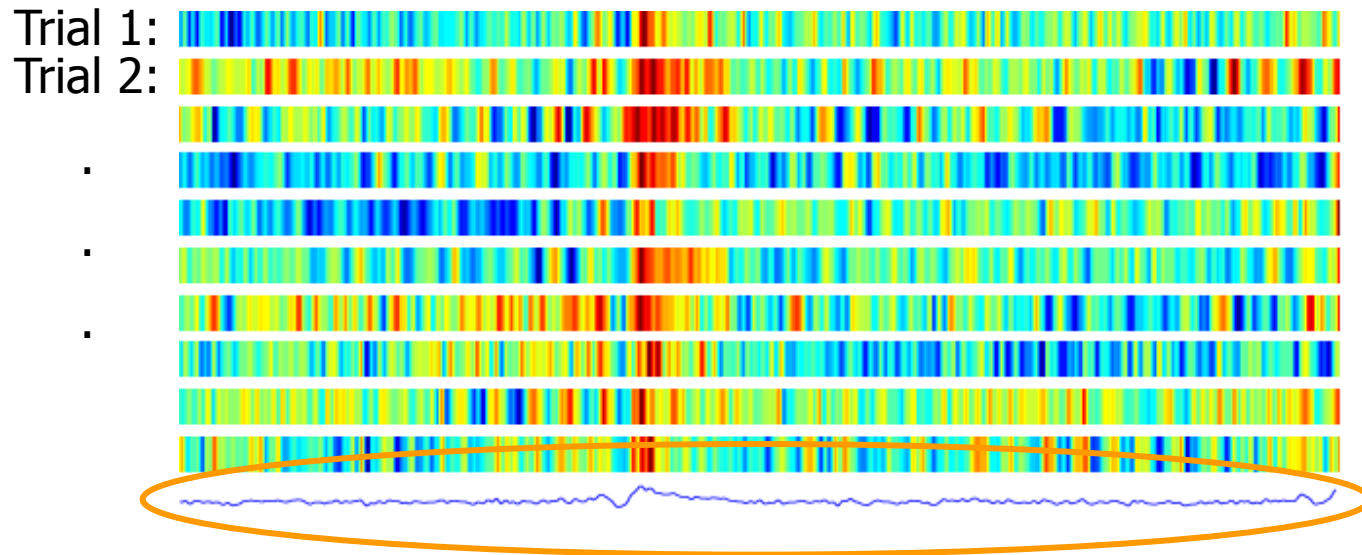
ERP Image



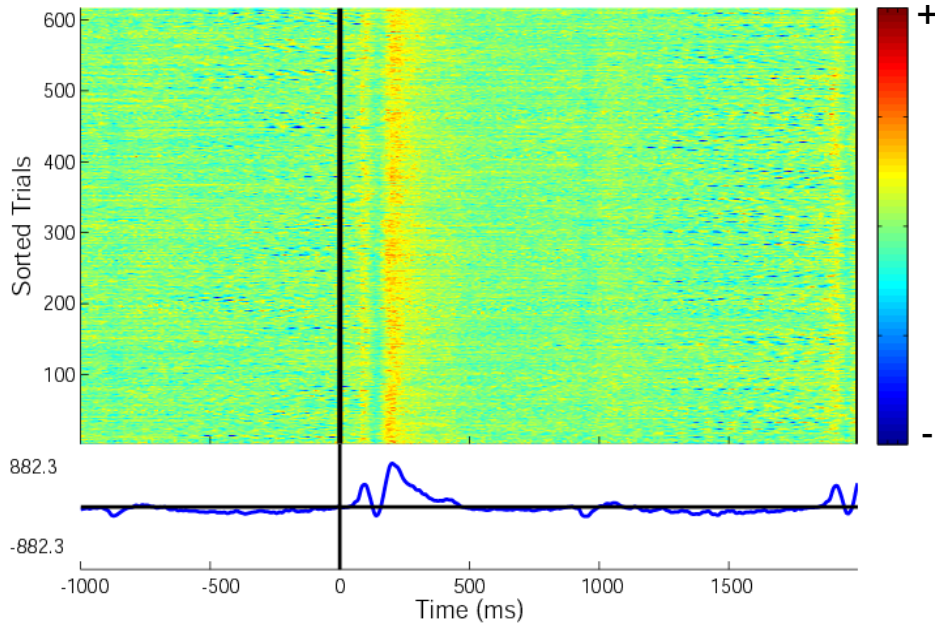
by default, sorted by  
time-on-task  
(1<sup>st</sup> trial, 2<sup>nd</sup> trial, ...)



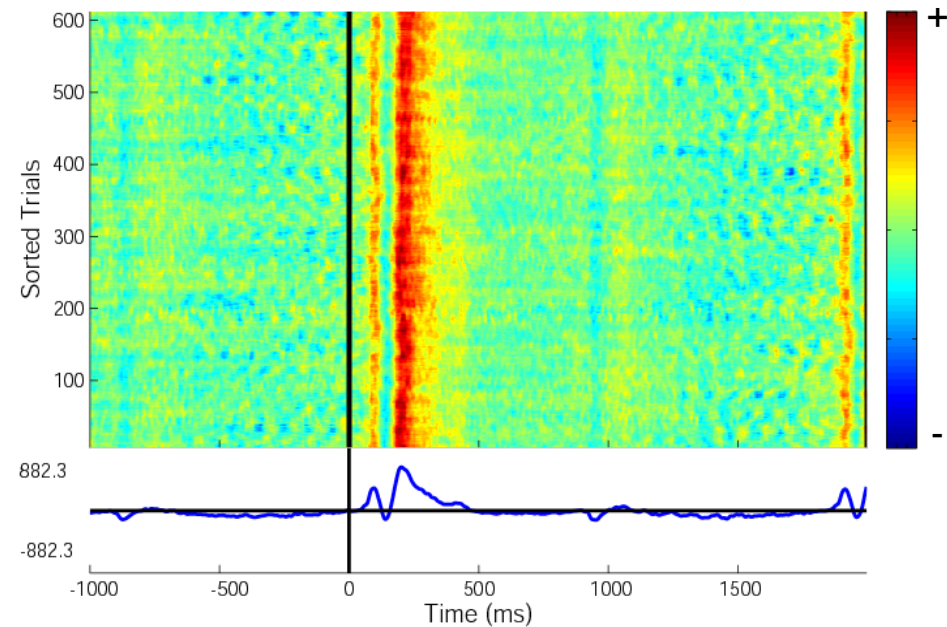
# ERP Image basics



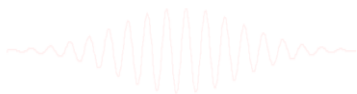
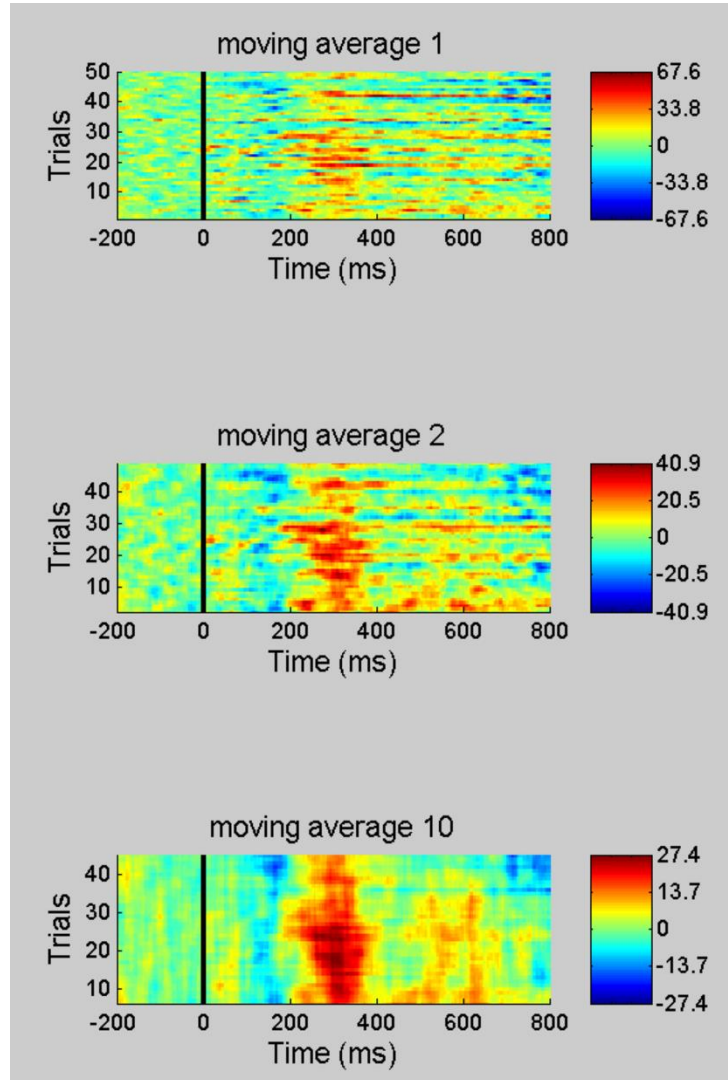
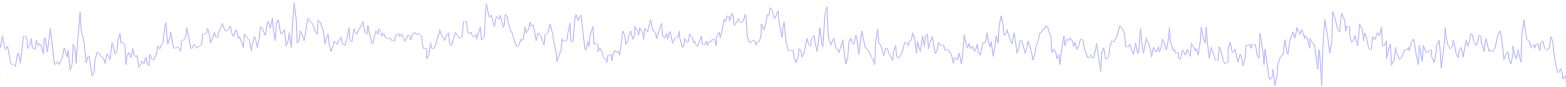
No Smoothing



Smoothed across 10 Trials



# ERP Images: smoothing across trials



# Component ERP Images

**select fields**

latency  
type  
epoch

Cancel Ok

11  
10  
1  
-1000 1996

**Figure title**

Plot scalp map  
 Plot ERP  
 Plot colorbar

ERP limits  
Color limits (see Help)

**Sort/align trials by epoch event values**

Epoch-sorting field: latency  
Event type(s): bp1' 'bp4  
Event time range: 0 2000

Rescale: no  
Align:   
\_Don't sort by value  
\_Don't plot values

**Sort trials by phase**

Frequency (Hz | minH  
amp. trials to ig

**Inter-trial coherence**

Frequency (Hz | minH  
(<0.20)

**Other options**

Plot spectrum (minHz  
l. (dB)

**select fields**

bp1  
bp4  
face  
object

Cancel Ok

**Figure 5: erpimage()**

File Edit View Insert Tools Desktop Window Help

Comp. 11

Sorted Trials

Time (ms)

EEGLAB v6.0b

File Edit Tools Plot Study Datasets Help

#2: face

- 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
- Cluster dataset ICs

# Component ERP Images

Component ERP image -- pop\_erpimage()

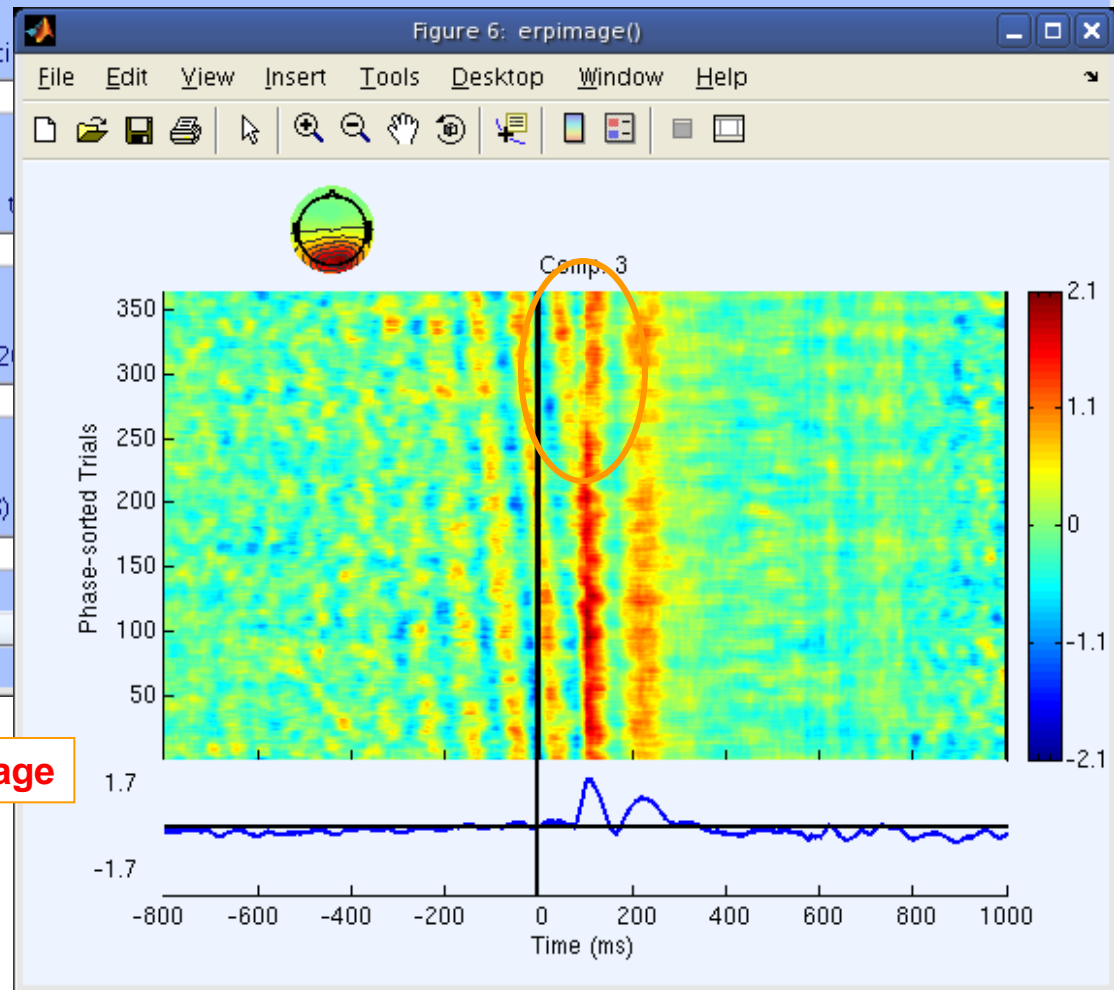
Component(s)   
Project to channel #   
Smoothing   
Downsampling   
Time limits (ms)

Figure title   
 Plot scalp map  
 Plot ERP  
 Plot colorbar  
ERP limits   
Color limits (see Help)

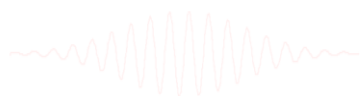
Sort/align trials by epoch event values  
Epoch-sorting field  Event type(s)  Event time

Sort trials by phase  
Frequency (Hz | minHz maxHz)  Percent low-amp.   
Inter-trial coherence options  
Frequency (Hz | minHz maxHz)  Signif. level (<0.2)   
Other options  
Plot spectrum (minHz maxHz)  Baseline ampl. (dB)

Cancel



Phase-sorted image



# Component ERP Images

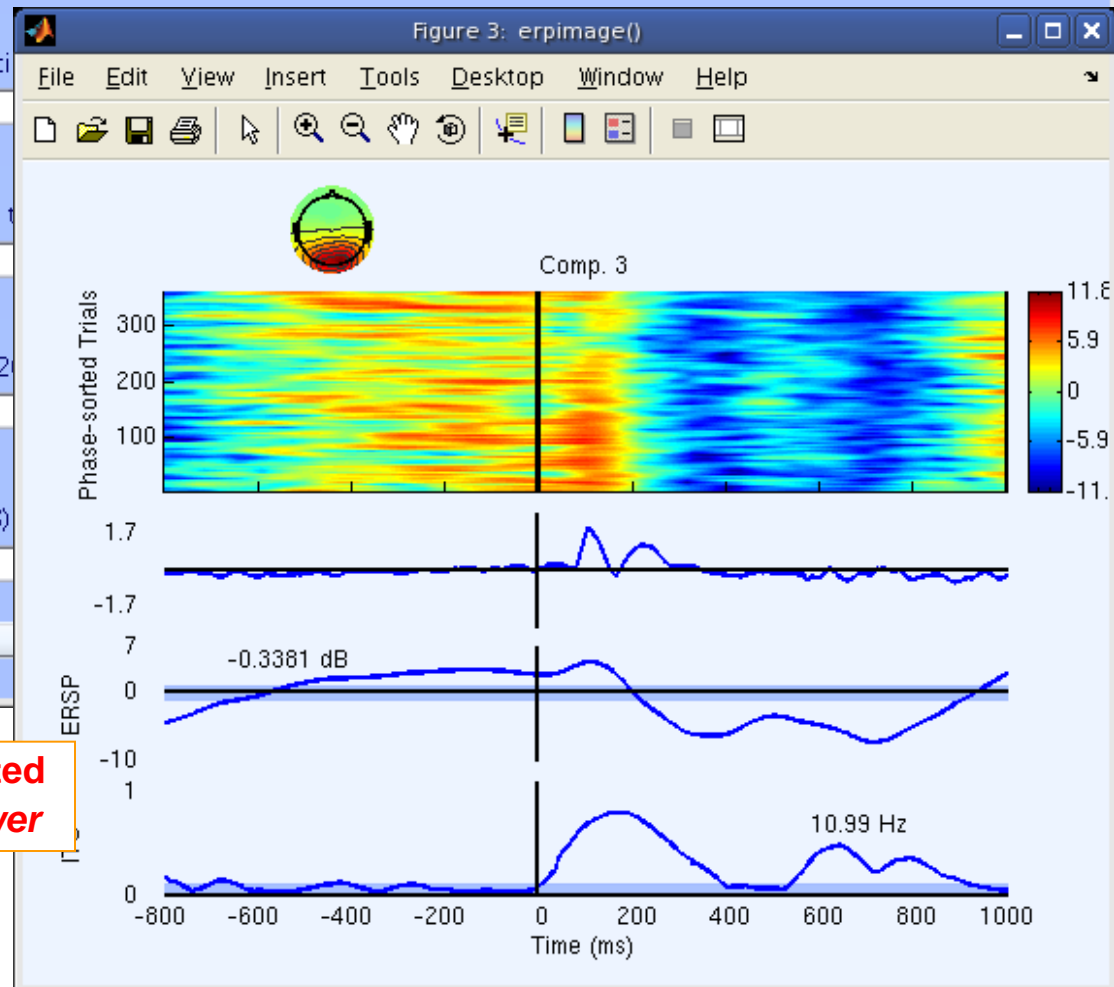
Component ERP image -- pop\_erpimage()

Component(s)   
Project to channel #   
Smoothing   
Downsampling   
Time limits (ms)

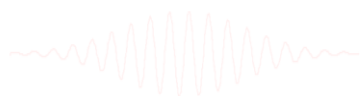
Figure title   
 Plot scalp map  
 Plot ERP  
 Plot colorbar  
ERP limits   
Color limits (see Help)

Sort/align trials by epoch event values  
Epoch-sorting field  Event type(s)  Event time

Sort trials by phase  
Frequency (Hz | minHz maxHz)  Percent low-amp.   
Inter-trial coherence options  
Frequency (Hz | minHz maxHz)  Signif. level (<0.2)   
Other options  
Plot spectrum (minHz maxHz)  Baseline ampl. (dB)



Phase-sorted  
alpha power



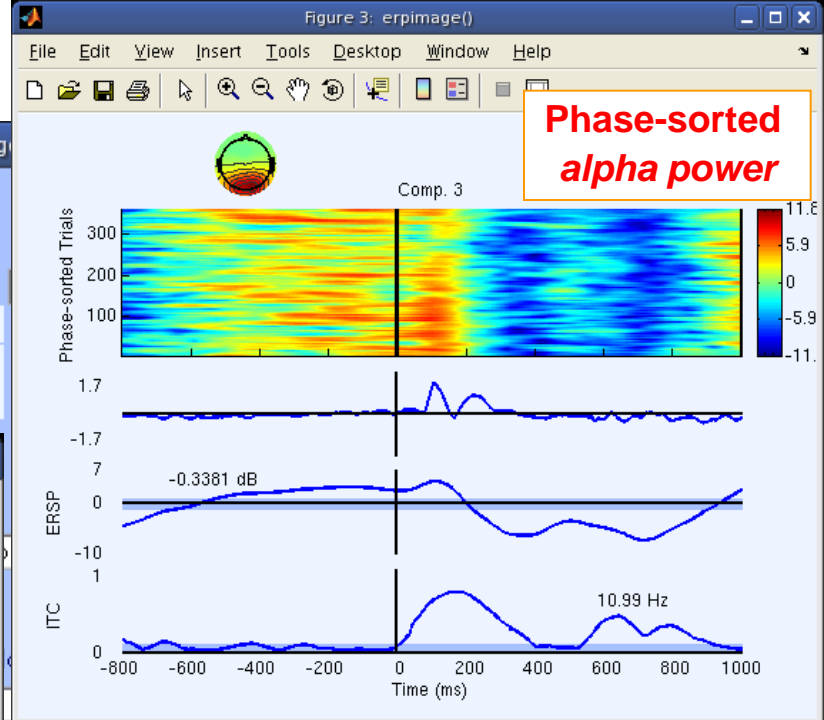
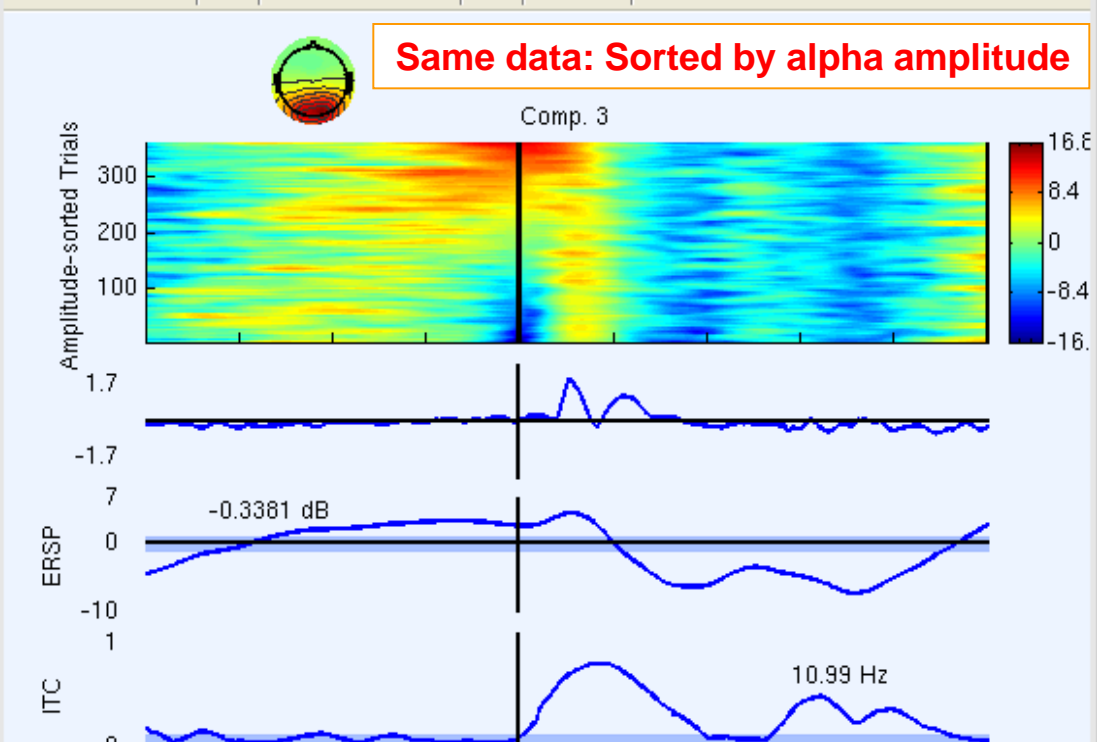
# Component ERP

Component ERP image -- pop\_erpimage

Component(s)	3	Figure title
Project to channel #		
Smoothing	10	
Downsampling	1	
Time limits (ms)	-800 1000	<input checked="" type="checkbox"/> Plot scalp map <input checked="" type="checkbox"/> Plot ERP <input checked="" type="checkbox"/> Plot colorbar

Figure 10: erpimage()

File Edit View Insert Tools Desktop Window Help



Coher limits ( $\leq 1$ )

Image amps (Requires signif.)

More options (see >> help erpimage)

'ampsort', [0 0 10 12]

Ok

>> help erpimage

'ampsort' = [center\_ms, prcnt, freq, maxfreq] Sort epochs by amplitude.

# Component ERP Images

Component ERP image -- pop\_erpimage()

Component(s)	3
Project to channel #	
Smoothing	10
Downsampling	1
Time limits (ms)	-800 1000

Figure title

Plot scalp map

Plot ERP

Plot colorbar

ERP limits

Color limits (see Help)

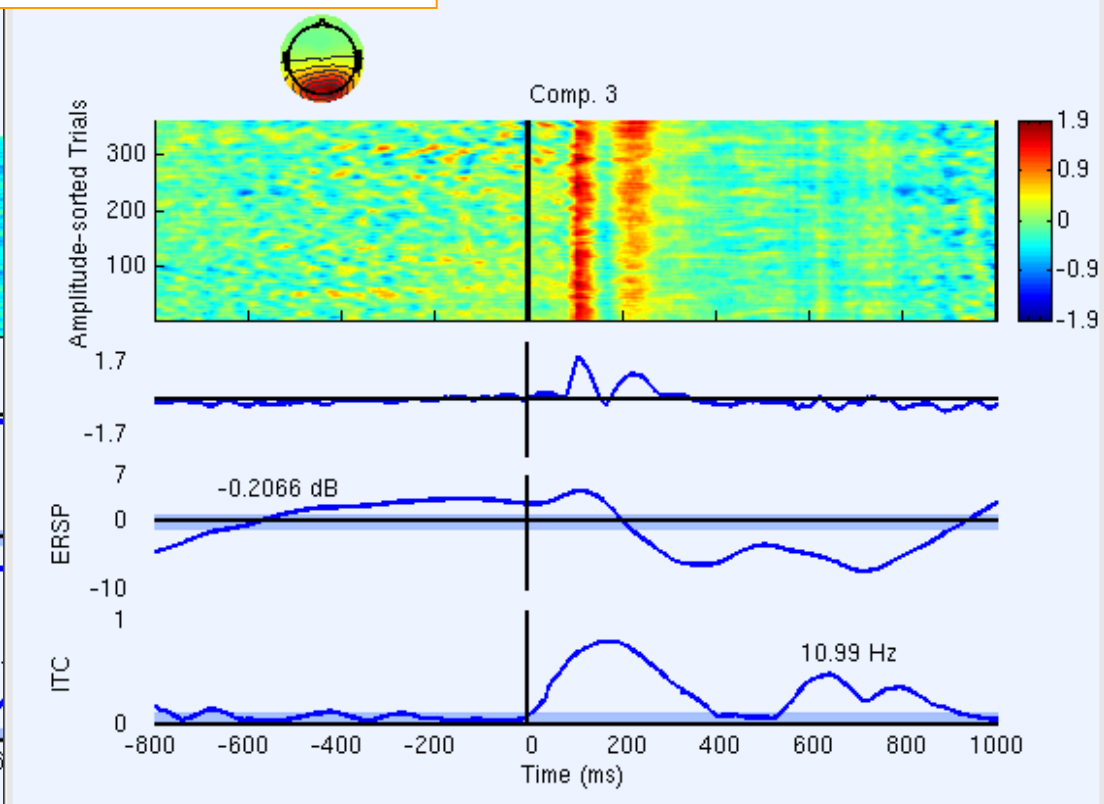
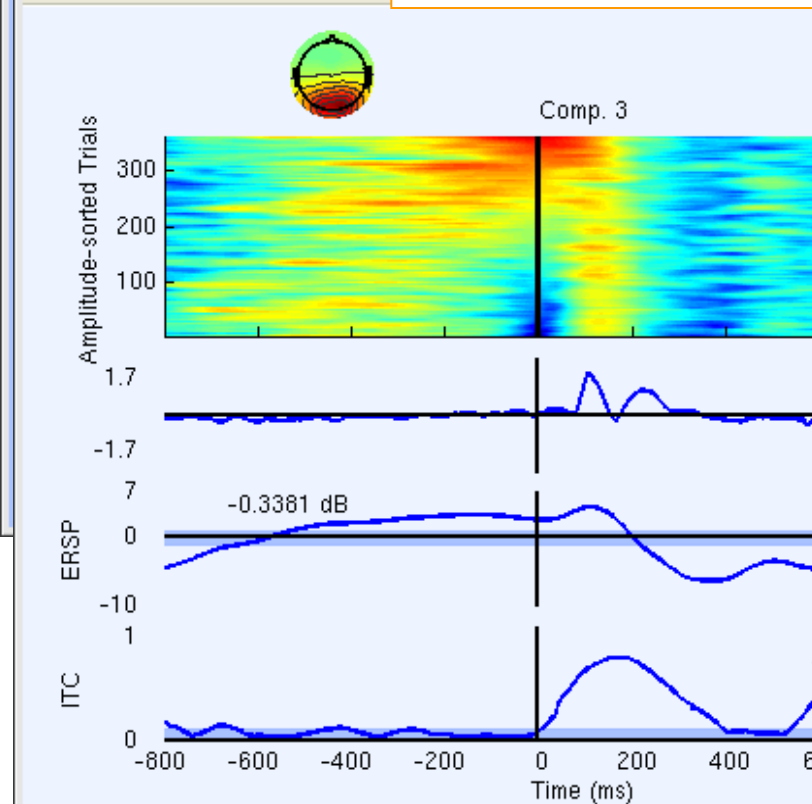
Figure 10: erpimage()

File Edit View Insert Tools Desktop Window Help

Figure 11: erpimage()

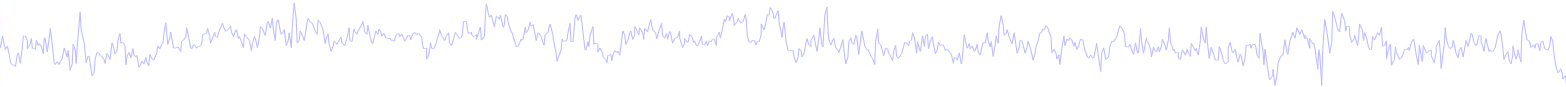
File Edit View Insert Tools Desktop Window Help

Same sorting order: Amplitude vs. activations

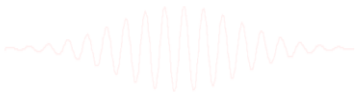




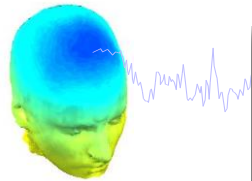
# Running ICA and Plotting Measures



- 1) Run ICA**
- 2) Plot IC ERPs**
- 3) IC spectral power**
- 4) IC ERP images**
- 5) IC ERSP**



# Plot IC ERSP



Plot component time frequency -- pop\_newtimef()

Component number: 3

Sub epoch time limits [min max] (msec): -1000 1996

Frequency limits [min max] (Hz) or sequence: [empty]

Baseline limits [min max] (msec) (0->pre-stim.): 0

Wavelet cycles [min max/fact] or sequence: 3 0.5

ERSP color limits [max] (min=-): [empty]

ITC color limits [max]: [empty]

Bootstrap significance level (t): [empty]

Optional newtimef() argument: [empty]

Plot Event Related Spectral Power

Cancel

Use 200 time points

Use limits, padding 1

Use divisive baseline

Use limits

Log spaced

No baseline

Use FFT

EEGLAB v7.1.7.18b

File Edit Tools Plot

#2: Step

Filename:

Channels

Frames per

Epochs

Events

Sampling

Epoch start

Epoch end

Reference

Channel loc

ICA weight

Dataset si

Sum/Compare ERPs

Component activations (scroll)

Component spectra and maps

Component maps

Component properties

Component ERP image

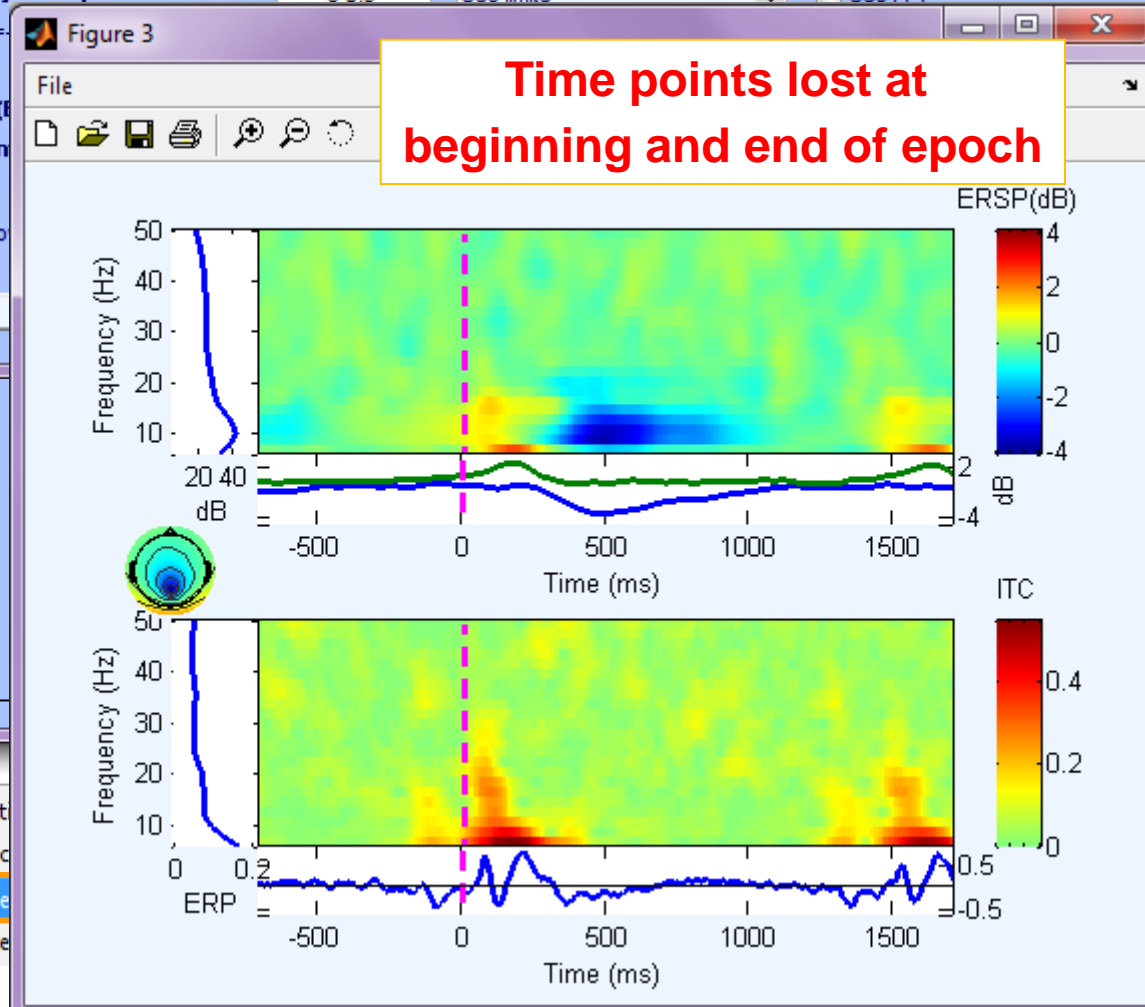
Component ERPs

Sum/Compare comp. ERPs

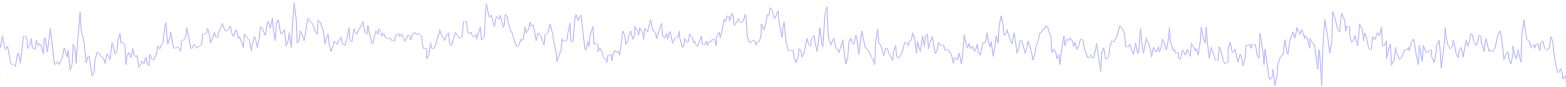
Data statistics

Time-frequency transforms

Cluster dataset ICs



# Plot IC ERSP

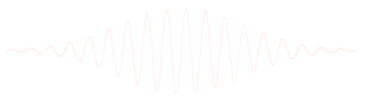
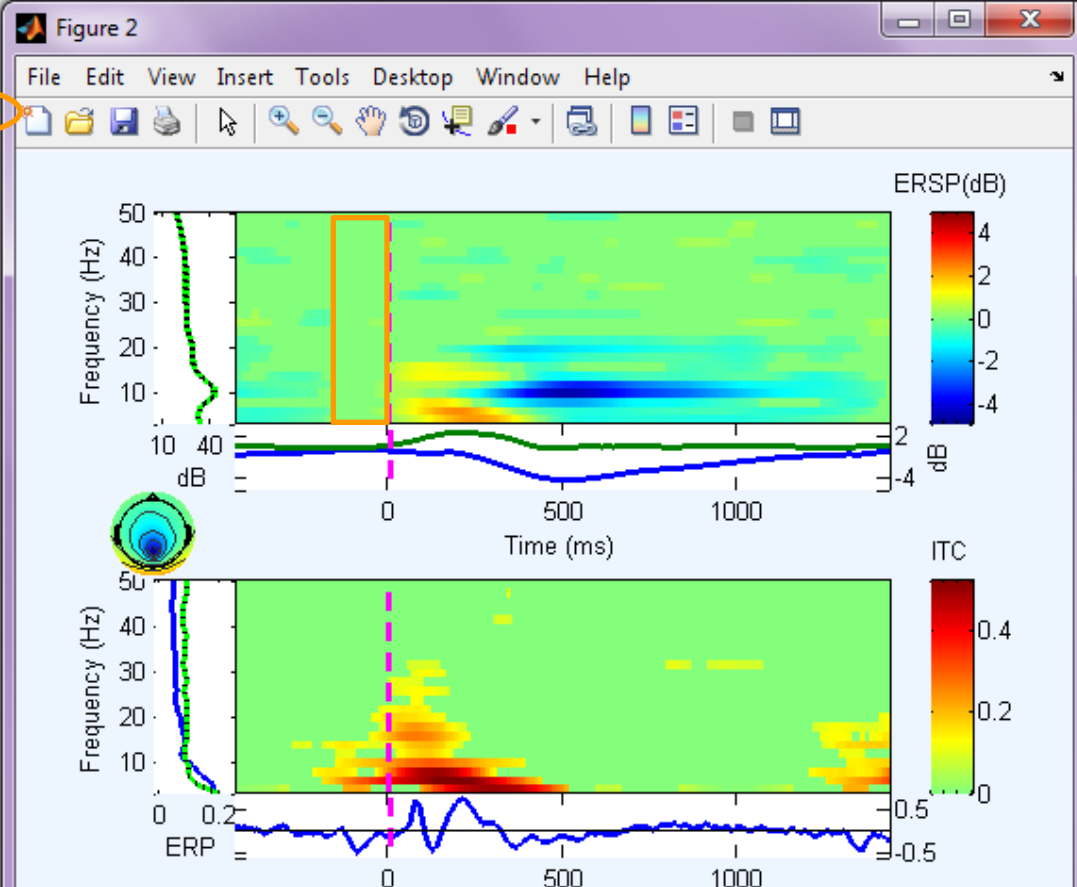


Plot component time frequency -- pop\_newtimef()

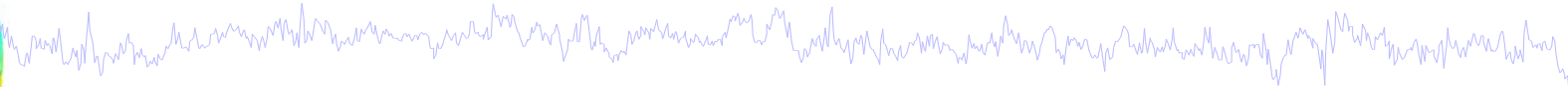
Component number	3
Sub epoch time limits [min max] (msec)	-1000 1996
Frequency limits [min max] (Hz) or sequence	3 50
Baseline limits [min max] (msec) (0->pre-stim.)	-200 0
Wavelet cycles [min max/fact] or sequence	3 0.5
ERSP color limits [max] (min=-max)	
ITC color limits [max]	
Bootstrap significance level (Ex: 0.01 -> 1%)	.01
Optional newtimef() arguments (see Help)	

Plot Event Related Spectral Power     Plot Inter Trial Coherence

Cancel    Help



# Exercise



- **ALL**
  - Load stern\_125Hz.set (has ICA weights already) or SimpleOddball.set
  - Epoch on Memorize letters (or event of choice), reject noise
- **Novice / Intermediate**
  - From the GUI, plot component ERPs with maps
  - Pick an interesting IC and plot an ERP image of it
  - Try sorting by phase, is there any relationship to the IC activation pattern? What about power in a frequency band of choice?
  - Plot ERSPs for selected ICs
    - ~ Compare FFT, wavelet(s), and multi-taper methods for ERSP

