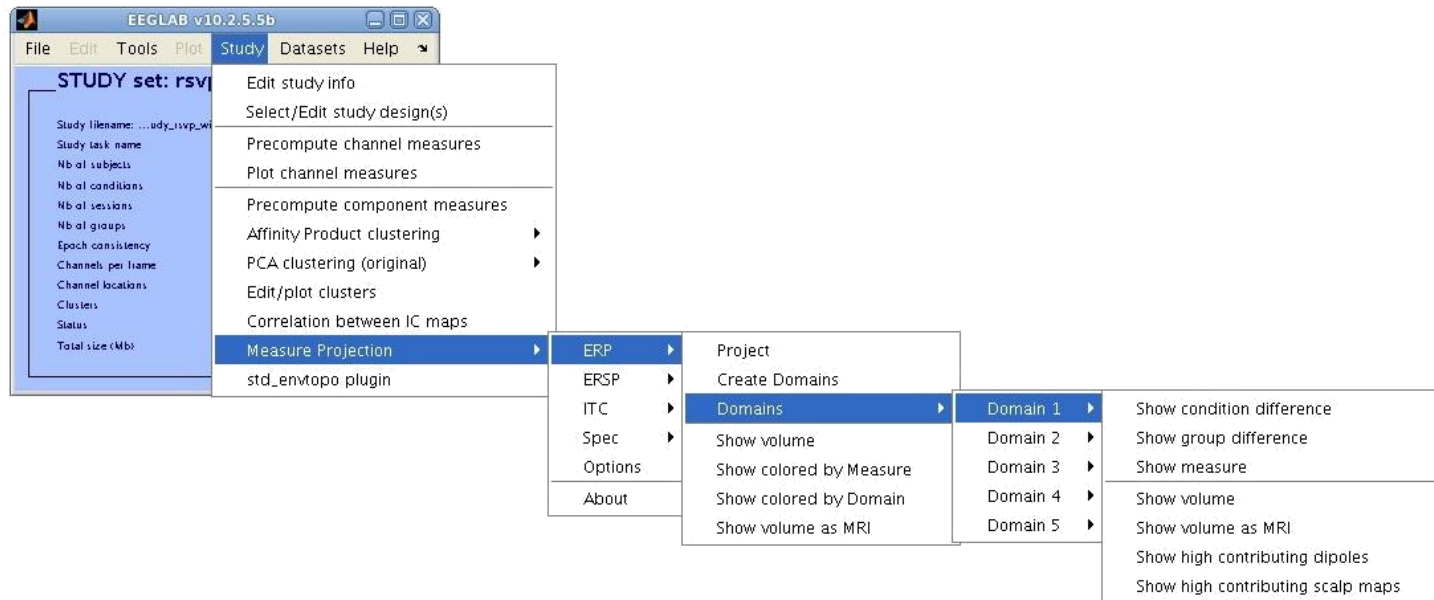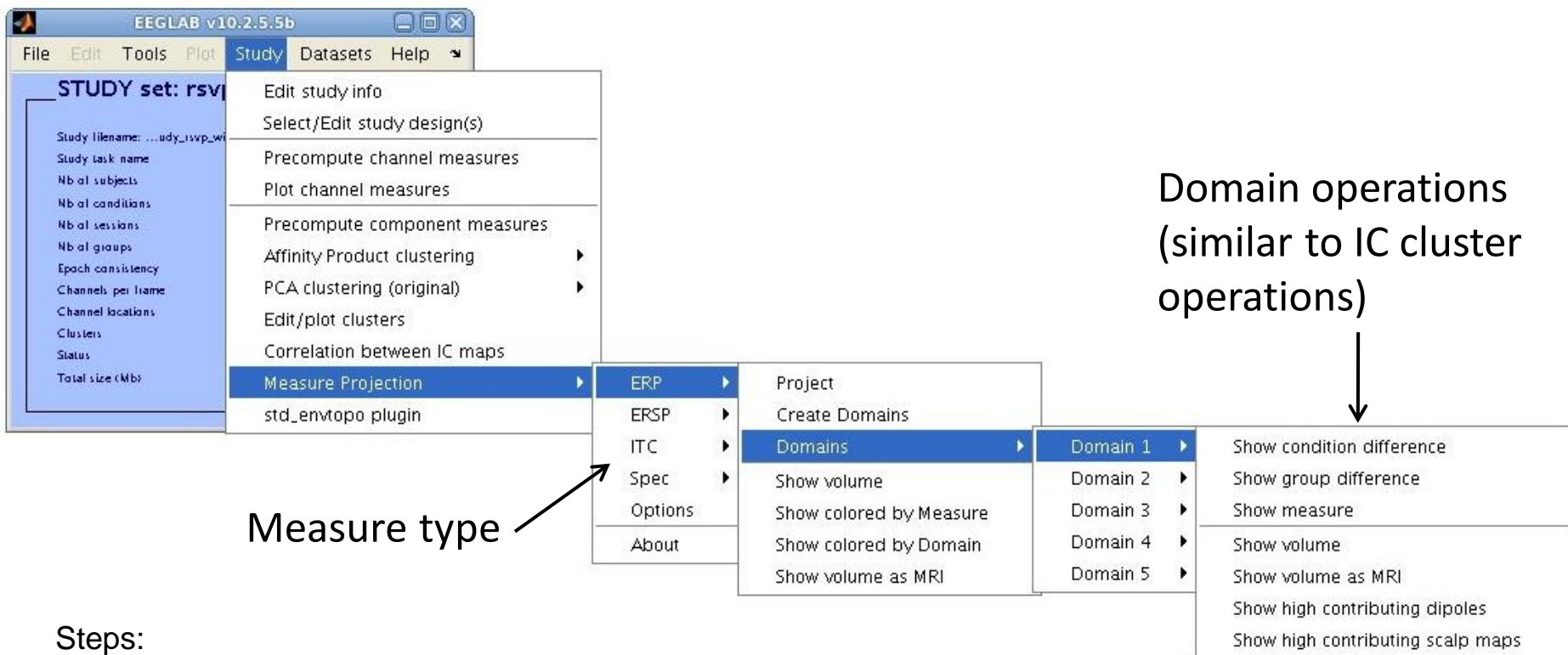# Measure Projection Analysis: Practicum

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GUI Overview

Domain operations (similar to IC cluster operations)

Measure type

Steps:

1. Select a measure and 'Project'.
2. Visualize the result and select significance threshold (optional).
3. Create Domains: cluster projections
4. Analyze Domains: compare conditions, groups... similar to operations performed on IC clusters.

Each commands runs the chain of pre-required commands.

Installation

1. Installation: unzip [USB drive content]/**eeglab10_2_5_5a/** folder into your home directory . If you already have this version (but not from this USB), copy unzipped **/eeglab10_2_5_5a/plugins/measure_projection/** folder from to your computer.

2. Run EEGLAB in Matlab from [home directory]**/eeglab10_2_5_5a/.** If this version was already running, type **>> eeglab rebuild;**

3. In EEGLAB, go to **File->Memory and other options** and make sure that the option indicated below is checked:
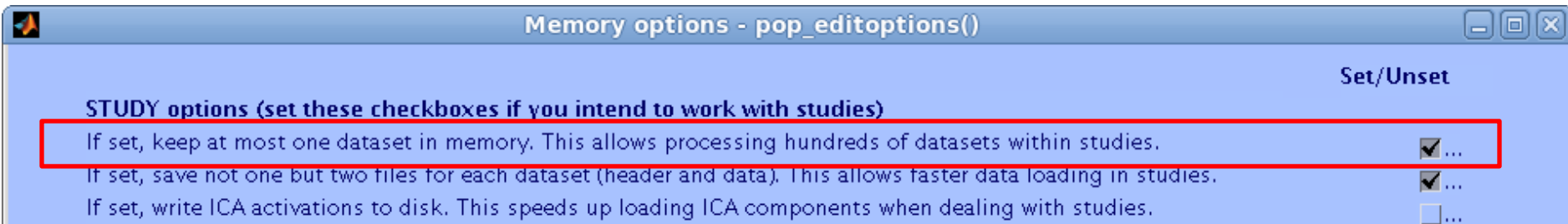
Loading Sample Study

4. Load **study_rsvp.study** from [USB driver]**/Advanced_EEGLAB_Workshop/Session C - MPA/Data/rsvp_study** in EEGLAB**.**

5. Check if can you see **Measure Projection** under **Study** menu**.**
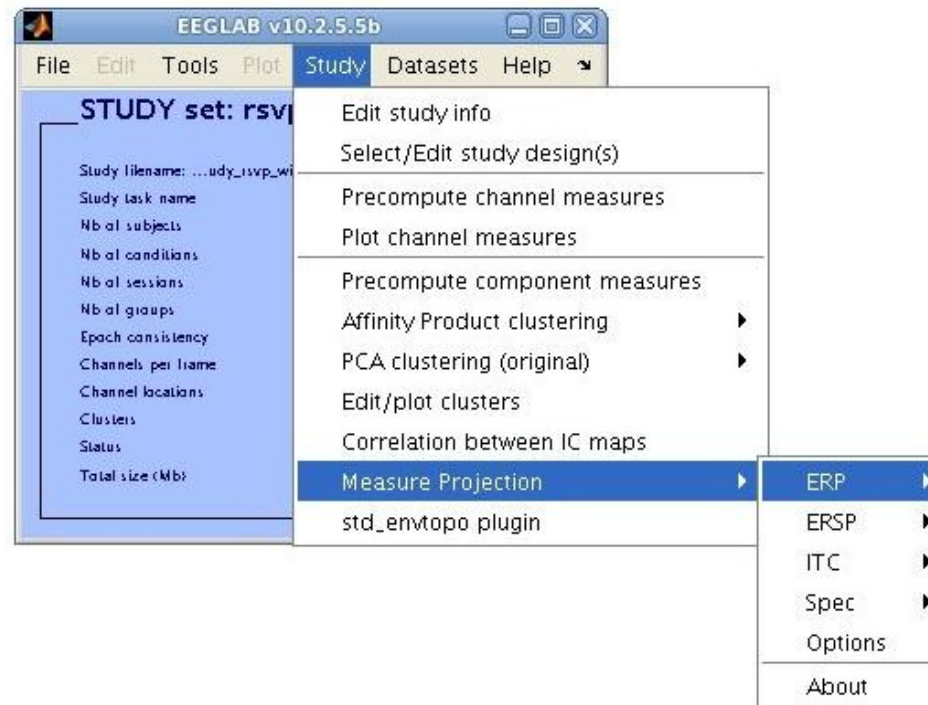
GUI

1. Go to ***Study->Measure Projection -> ERSP -> Project***

2. Click **Show colored by Measure** under ERSP menu (result A).

3. Click **Create Domains** under ERSP menu. Notice 'Domains' submenu become available, this will take some time to finish...
   (you may alternatively load
   study_rsvp_with_ersp_domains.study to save time, although it can crash Matlab 2009a on 32 bit Windows)

4. Click **Show colored by Domain** under ERSP menu (result B).


(A)

(B)
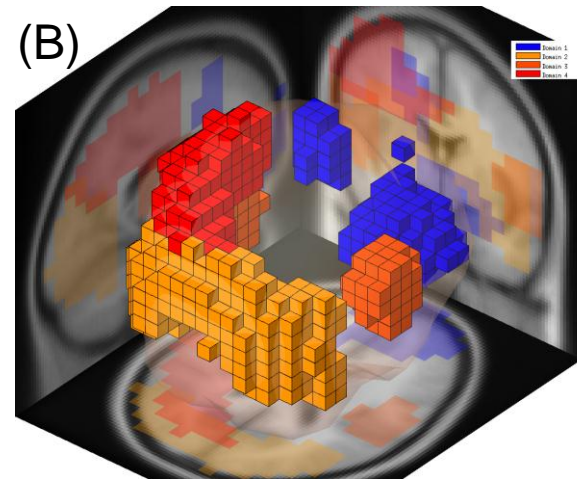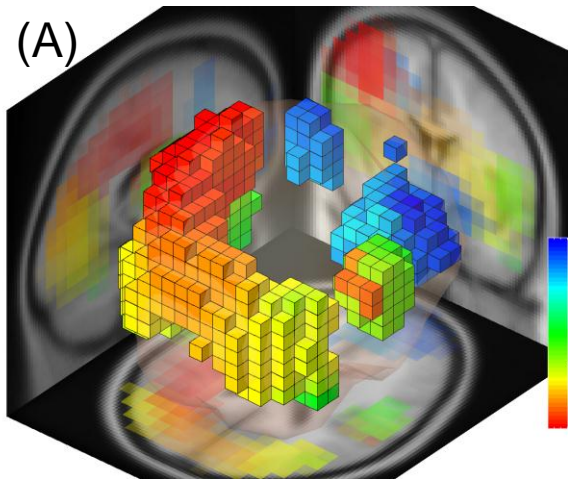
GUI

if your Matlab crashed while loading
study_rsvp_with_ersp_domains.study or
study_rsvp_with_domains.study , try loading
study_rsvp_with_erp_domains.study which is considerably smaller.

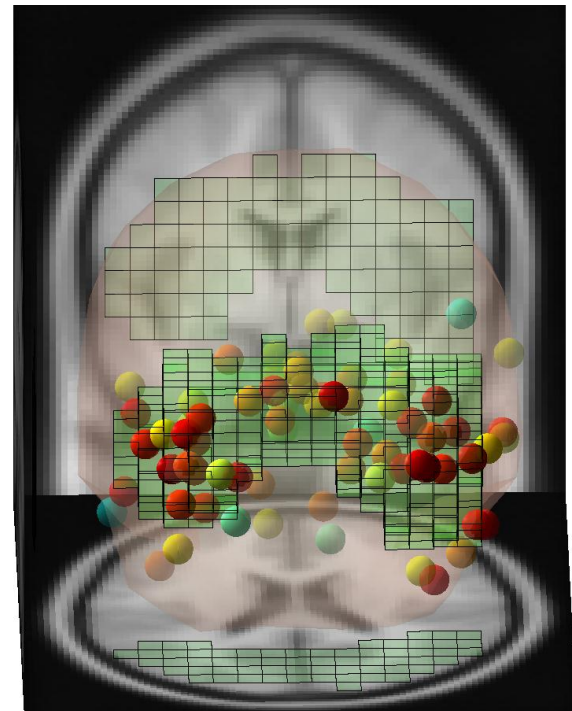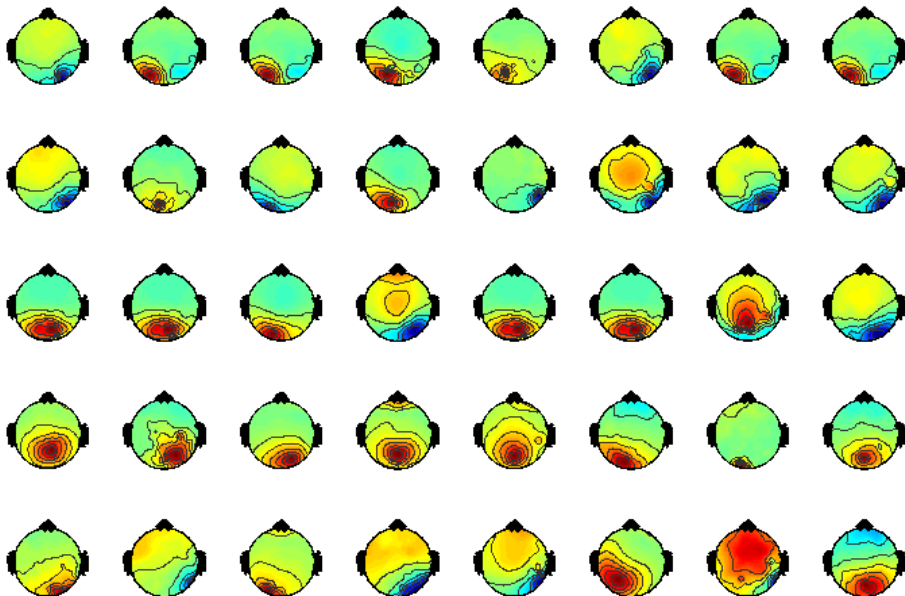You can now follow practicum steps for ERP, instead of ERSP.
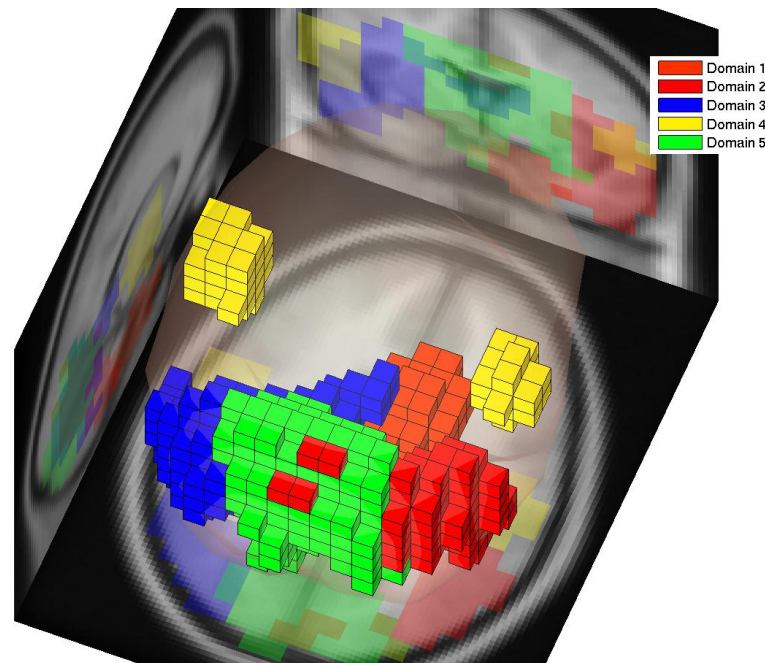
GUI: Condition Differences

- Click on **ERSP->*Domains -> Domain 2 -> Show Measure***

- Click on **ERSP->*Domains -> Domain 2 -> Show condition difference***.
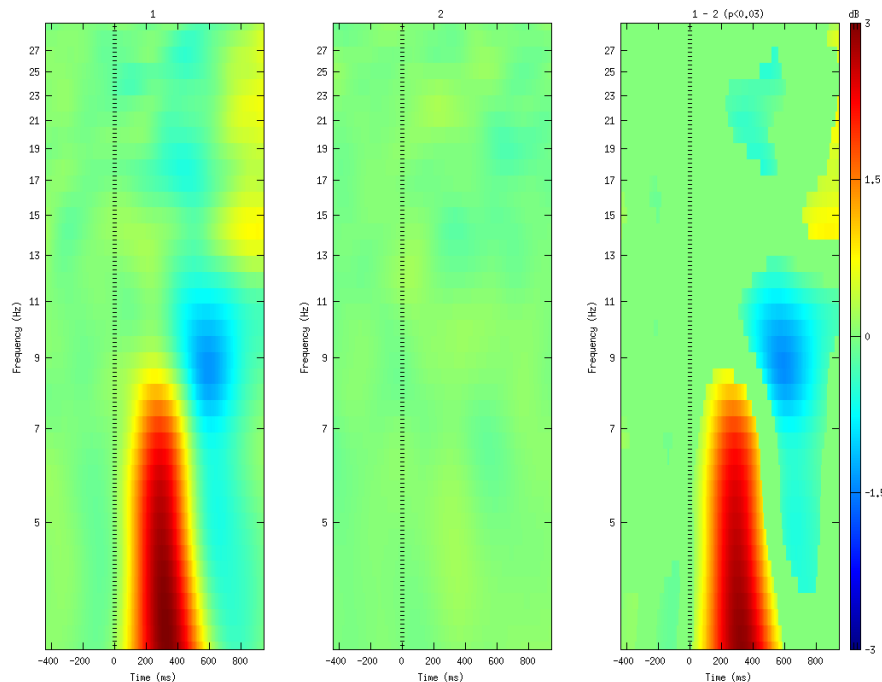
GUI: Domain Dipoles

- Click on **ERSP->*Domains -> Domain 2 -> Show high contributing scalp maps***

- Click on **ERSP->*Domains -> Domain 2 -> Show high contributing dipoles***

GUI

1. Load **study_rsvp_with_domains.study** in EEGLAB.

2. On Windows 32 bit with old Matlab (2009a), this operation may crash Matlab, instead you can try loading files named **study_rsvp_with_[measure name: erp, ersp...]_domains.study** separately.

3. All domain for different measures (ERP, ERSP, ITC..) are already created, choose different measures and run commands on their domains.
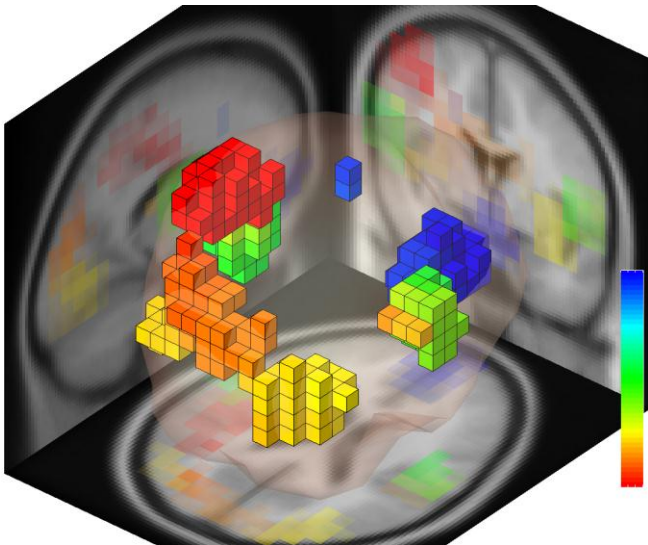
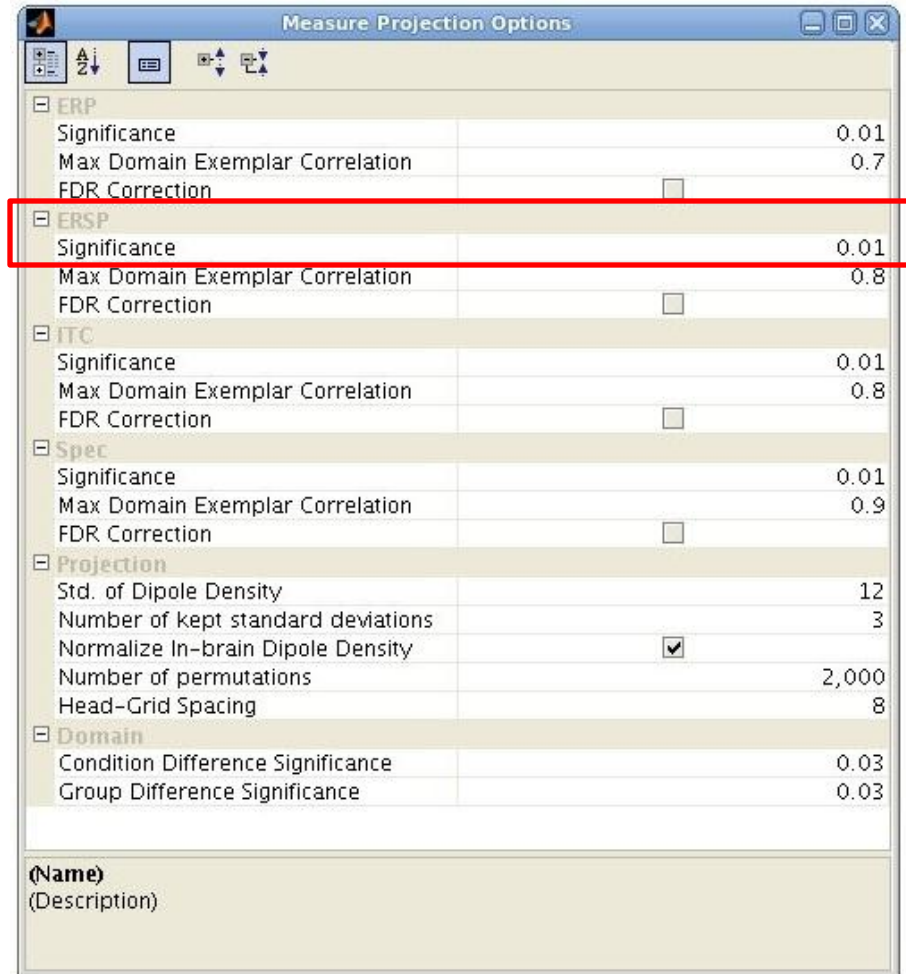ERP Domain 3
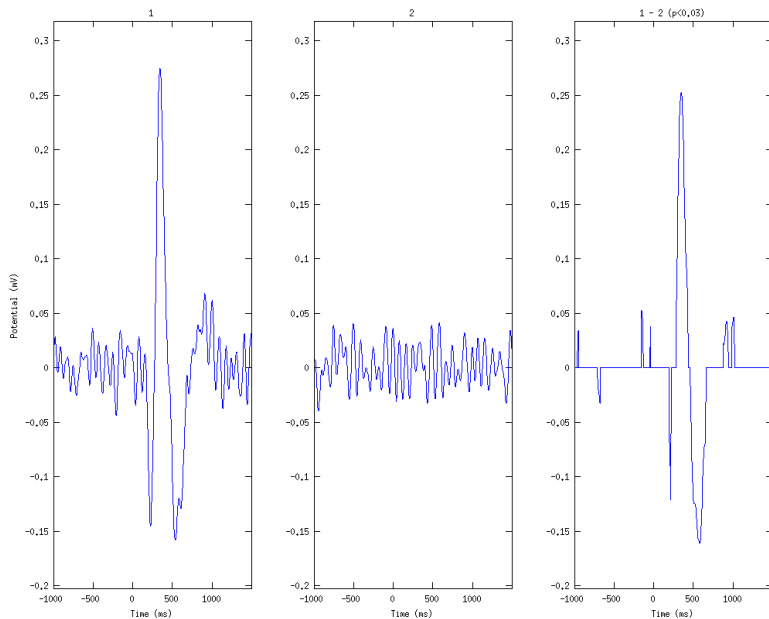
ITC Domain 1
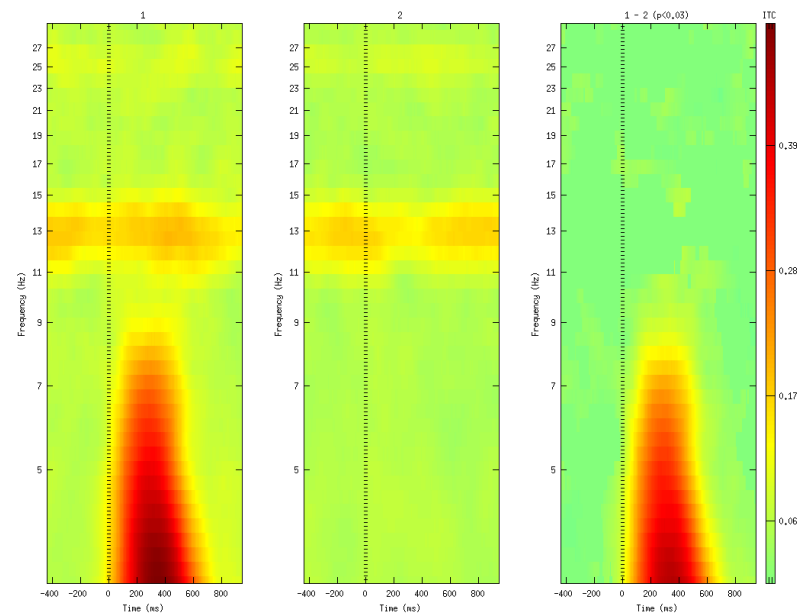
Setting Options from GUI

1. Select **Measure Projection->Options**

2. Change **ERSP->Significance** from 0.01 to 0.001

3. Close the figure.

4. Select **STUDY -> Measure Projection->ERSP-> Show colored by Measure**

Scripting

1) Load ERSP data into MPT (creates a Matlab object):

>> erspInfo = pr.dipoleAndMeasureOfStudyErsp(STUDY, ALLEEG);

Type **>> erspInfo** to see what information is contained in the object.

2) Create a head grid:

>> headGrid = pr.headGrid;

(you can run **headGrid .plot;** to see the grid)

3) Project ERSP (using this head grid) and calculate significance of projections:

>> erspProjection = pr.meanProjection(erspInfo, erspInfo.getPairwiseCorrelationSimilarity, headGrid);

(all in one line, press Tab key to autocomplete)

4) Visualize significant locations:

>> erspProjection.plotVolume(0.01);

Scripting

5) To see the list of function of measure projection object **erspInfo** type:

>> **methods(erspProjection)**

6) Visualize ERSP domain 4 (calculated before and saved in the STUDY.measureProjection):

>> domain4 = STUDY.measureProjection.ersp.projection.domain(4).plotVolume;

>> domain4.plotVolume;

>> domain4.plotMeasure;
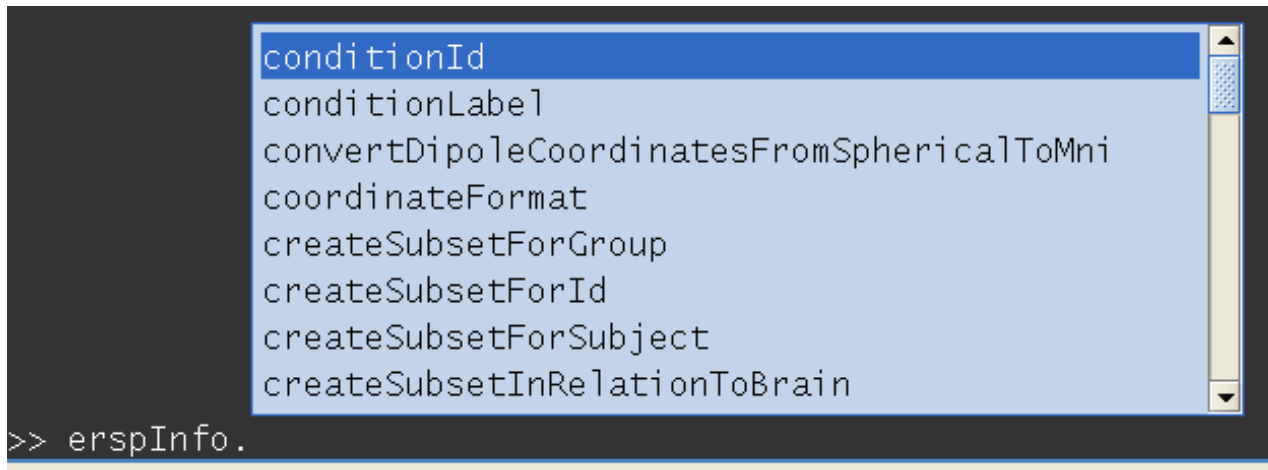
7) Create subject space with domain 4 as an ROI:

>> **subjectSpace = pr.subjectSpace(erspInfo, headGrid, erspProjection.projectionParameter, domain4.membershipCube);**

8) Plot subject space in 2D:

>> **subjectSpace.plot;**

Scripting

- MPT uses Matlab object classes, so it is easy to find functions that act on each object. (place a dot after the name of the object and press the Tab key

- Variable and function names are descriptive.

- MPT objects have minimal interdependency (almost all related information is encapsulated in the properties of each object to simply scripting).

- You can extend the toolbox by deriving new classes from current object.

New Versions

- New versions of MPT can be downloaded directly from our repository: https://bitbucket.org/bigdelys/measure-projection/get/default.zip

- Please report bugs/feature request using our issue tracking system (no login necessary):

  https://bitbucket.org/bigdelys/measure-projection/issues?status=new&status=open

- A Wiki is under construction and located at:
- http://sccn.ucsd.edu/wiki/MPT

- These links are available under **Measure Projection->About** menu.