

Clustering Examples

CLUSTERING EXAMPLES

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EEGLAB Workshop 2009

Outline

- clustering parameters
- How should my clusters look?
- clustering ambiguity

Outline

✓ clustering parameters

□ How should my clusters look?

□ clustering ambiguity

Choosing data measures

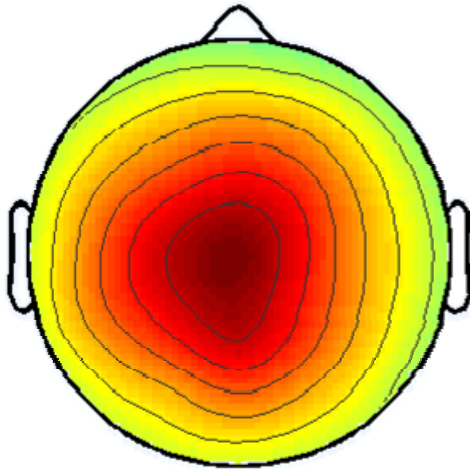
What measure(s) should you use?

- It depends on your final cluster criteria...
 - If for example, your priority is dipole location, then cluster only based on dipole location...

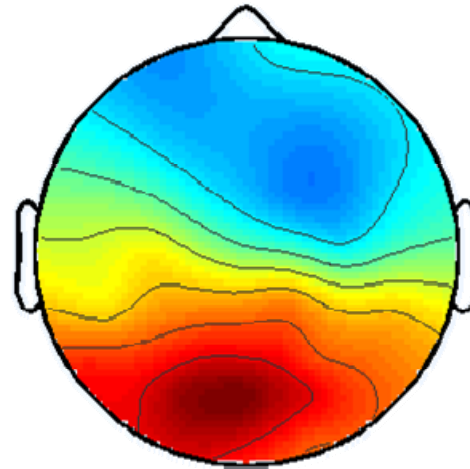
But consider:

- What is the difference between these two components?

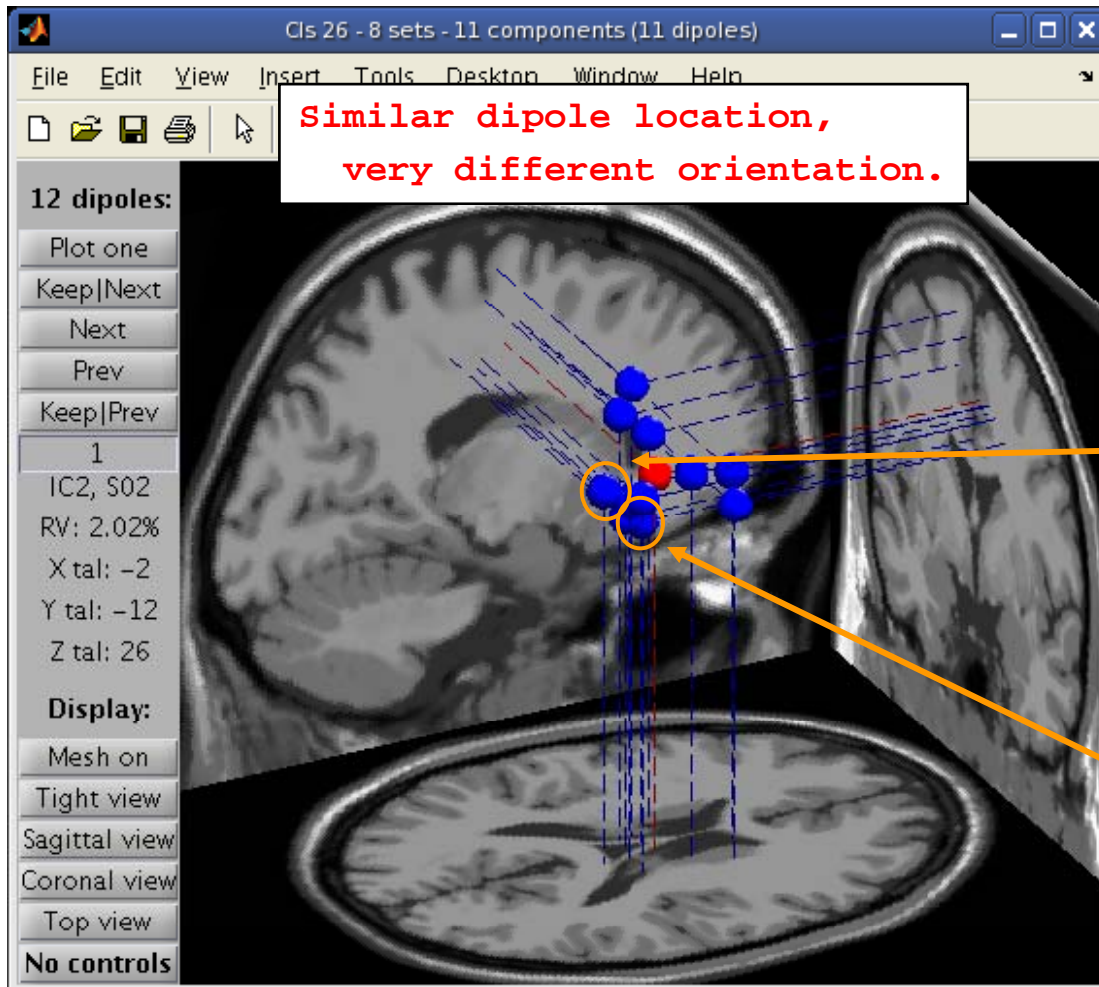
IC2 / S02, Cls 26



IC5 / S05, Cls 26

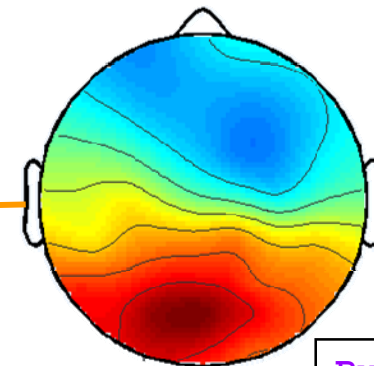


Choosing data measures

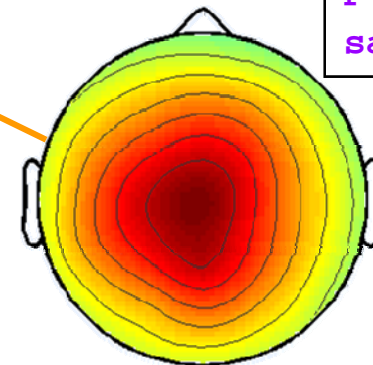


Obvious dramatic effect on
scalp map topography:

IC5 / S05, Cls 26

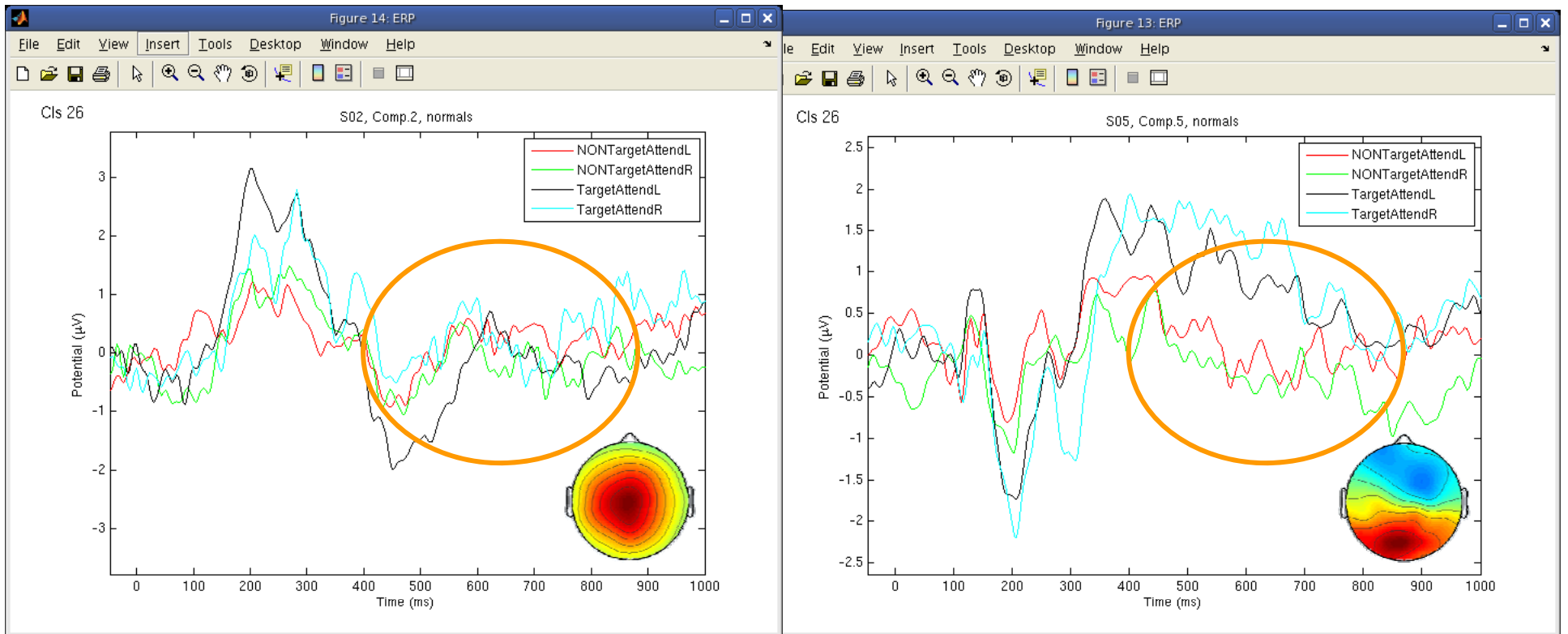


IC2 / S02, Cls 26



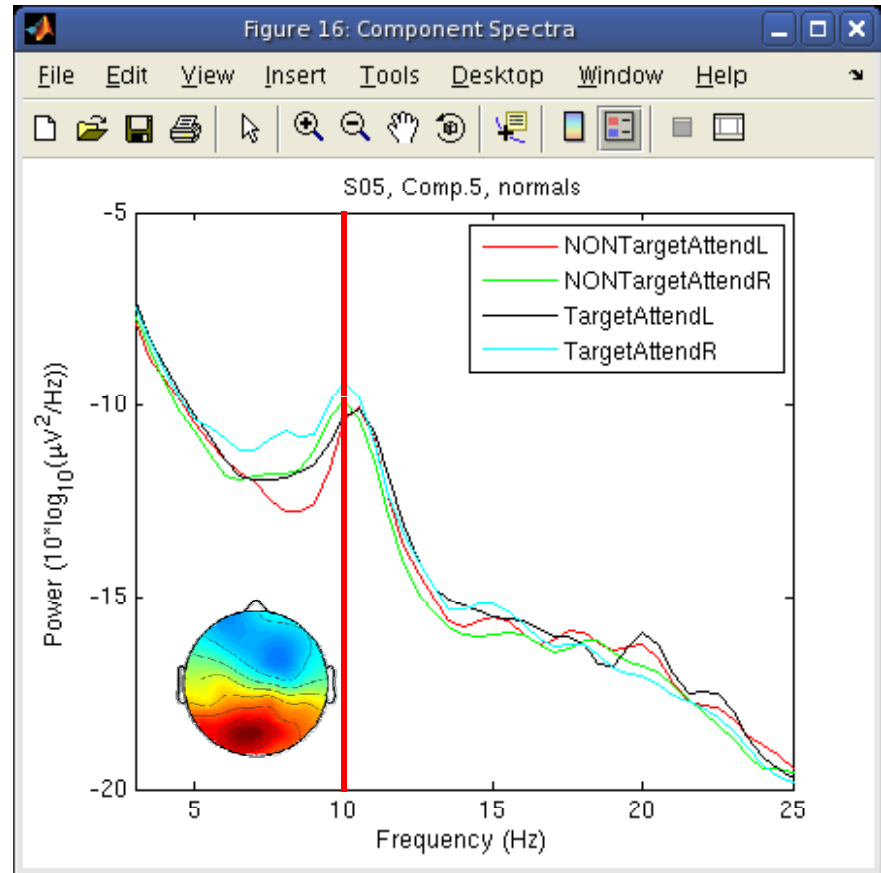
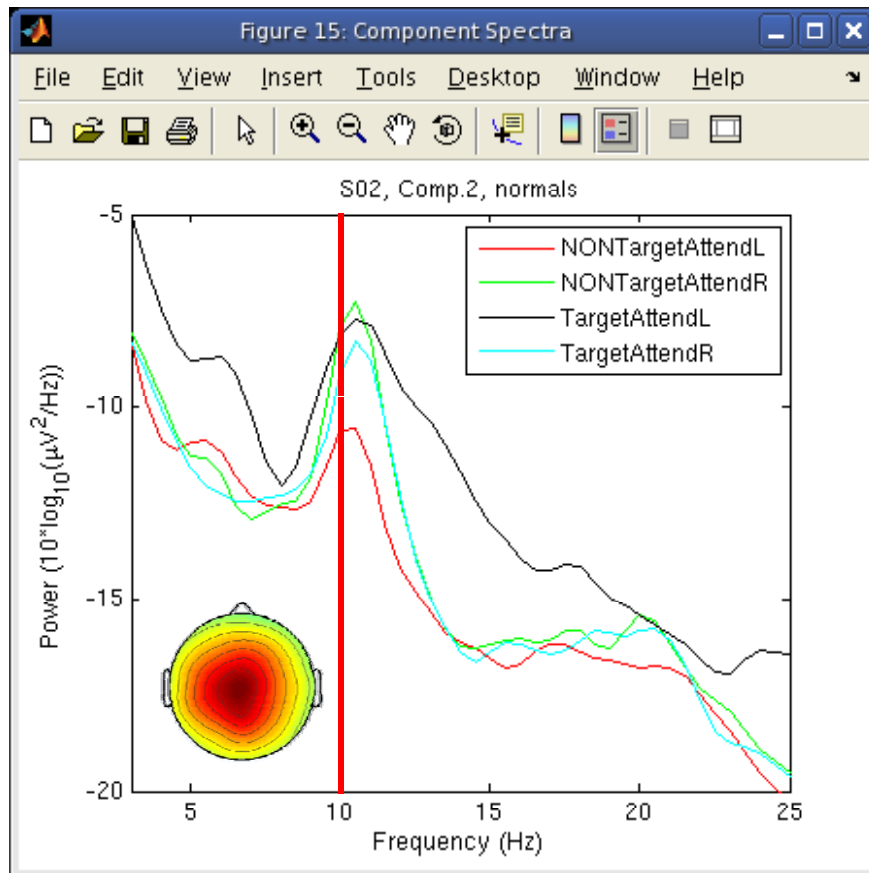
But, do they
perform the
same functions?

Choosing data measures



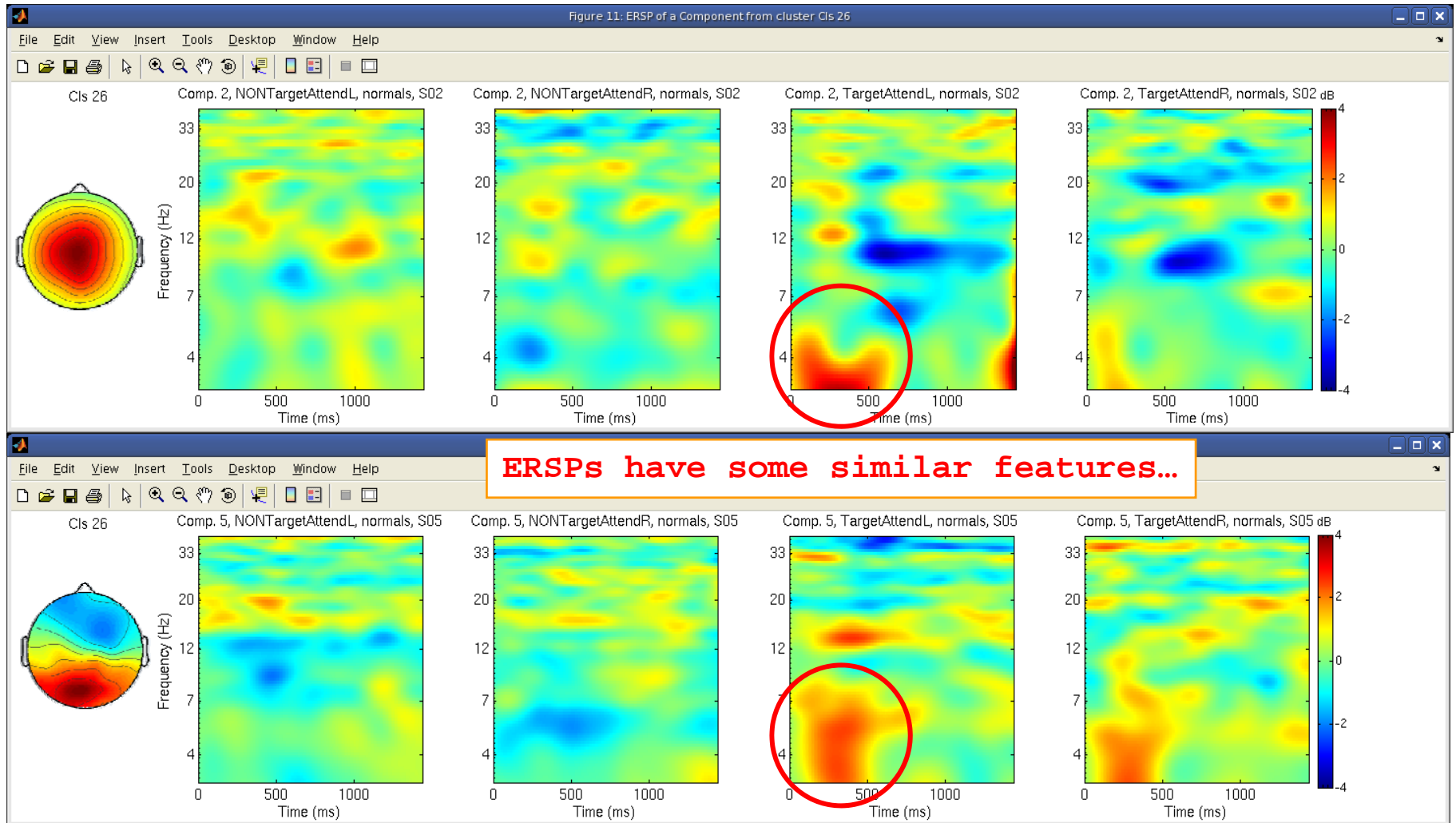
ERPs seem different...

Choosing data measures



Spectra are similar, but they have variable responses to different conditions..

Choosing data measures

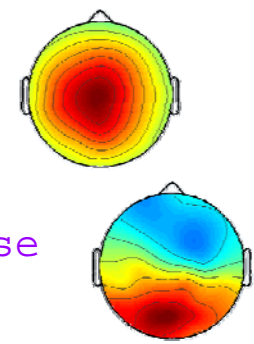
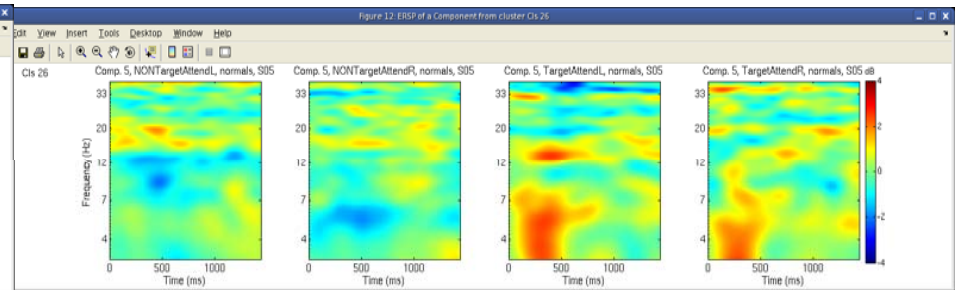
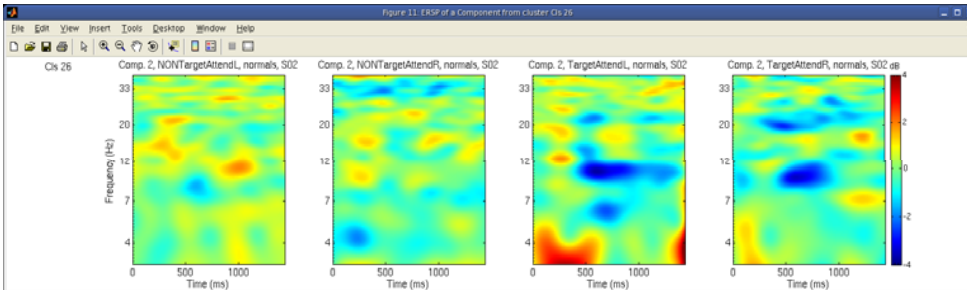
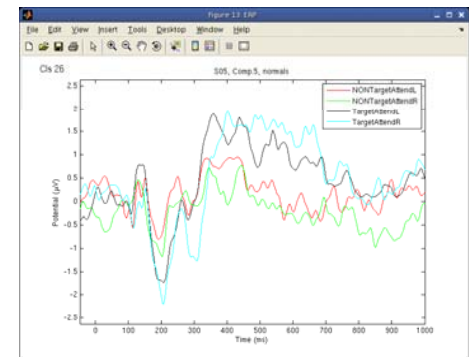
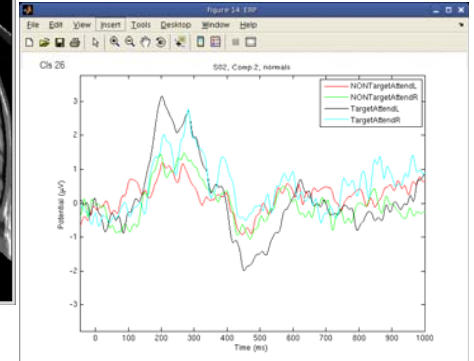
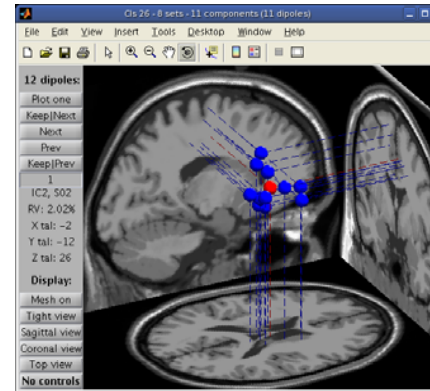
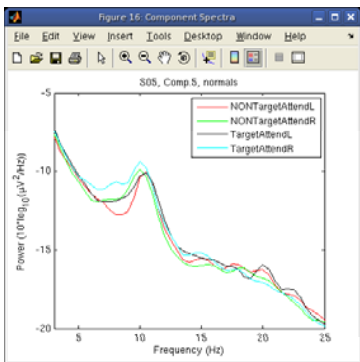
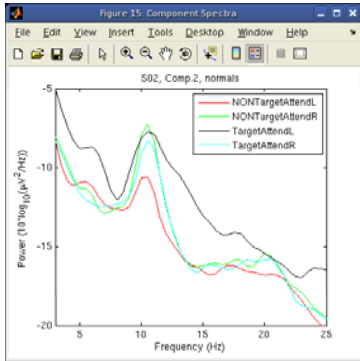


Choosing data measures

What data measures should you use?

It depends...

- broadly-matched ICs: use many/all of the measures.
- specifically-matched ICs: use one/few of the measures.



Outline

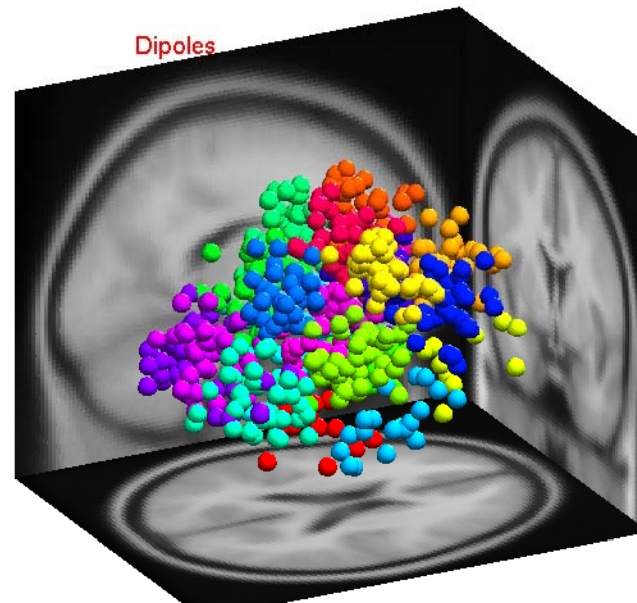
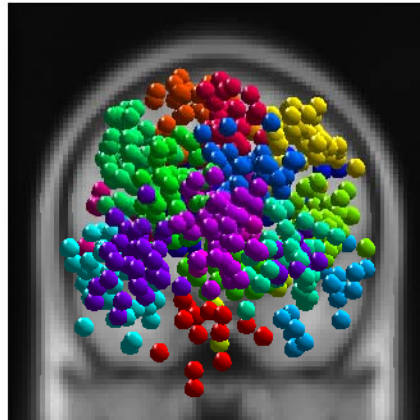
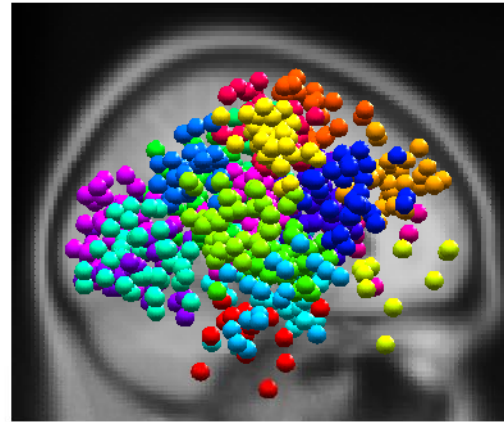
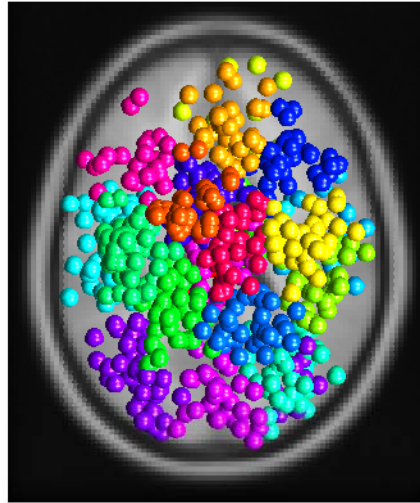
Clustering parameters

✓ How should my clusters look?

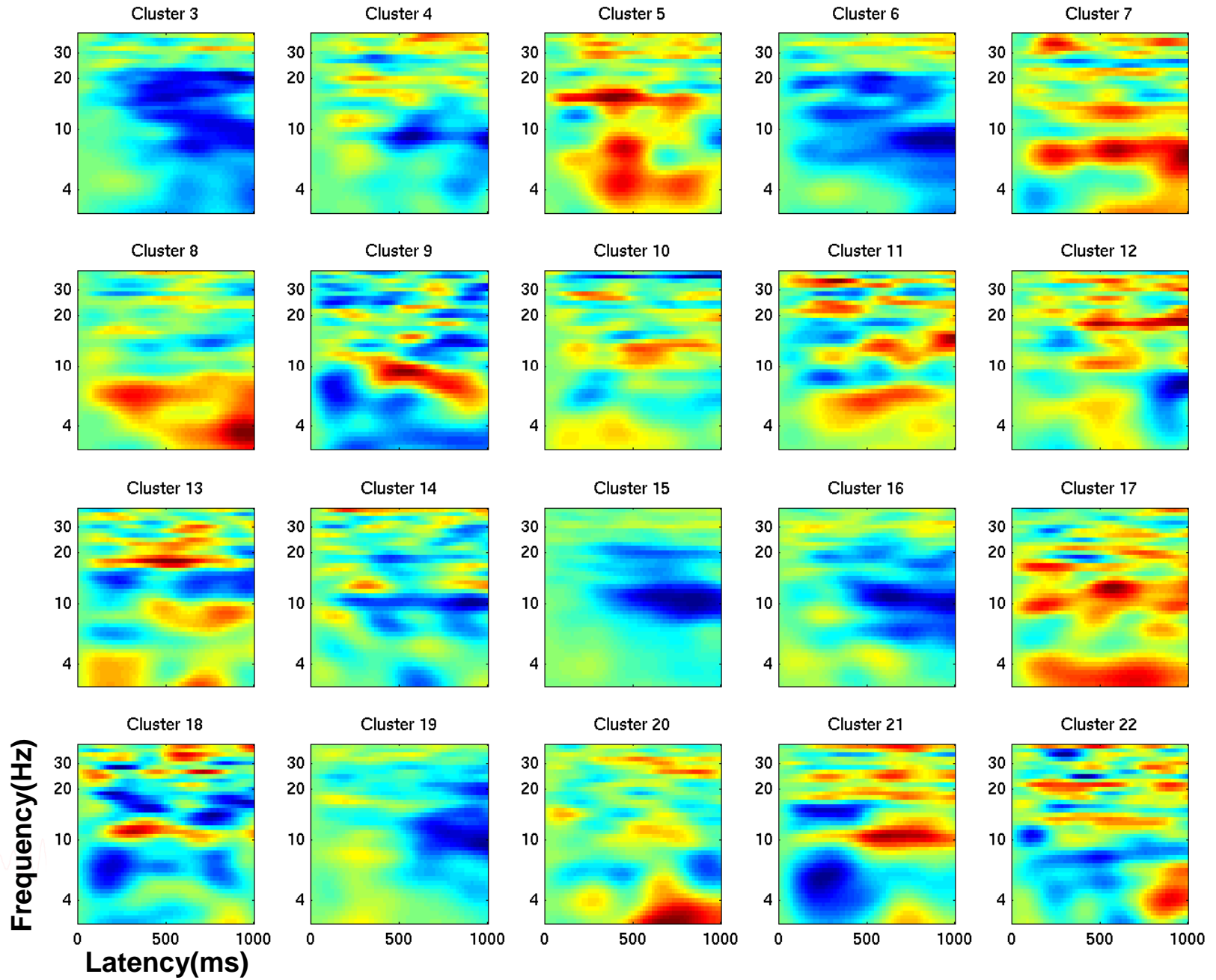
Clustering ambiguity

Cluster on dipoles only

Spatially
distinct
IC clusters

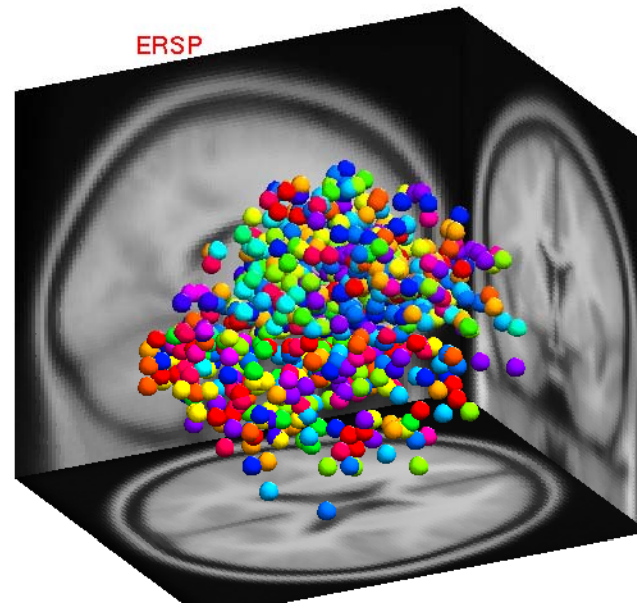
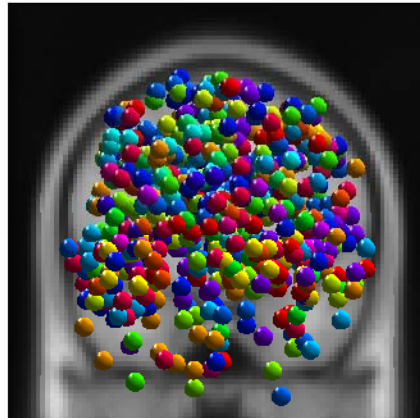
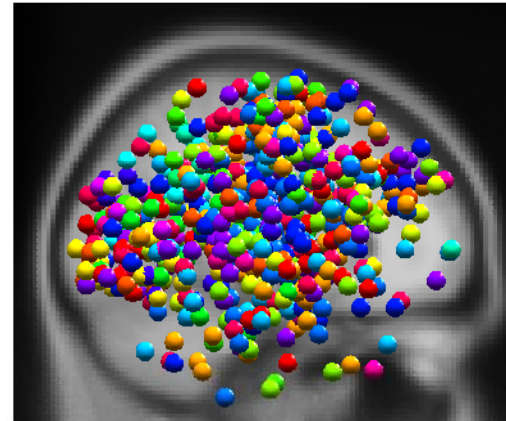
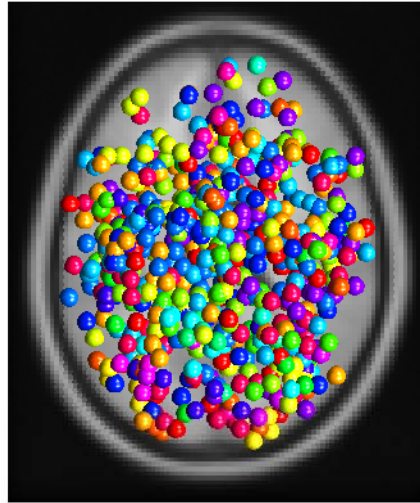


Cluster on dipoles only

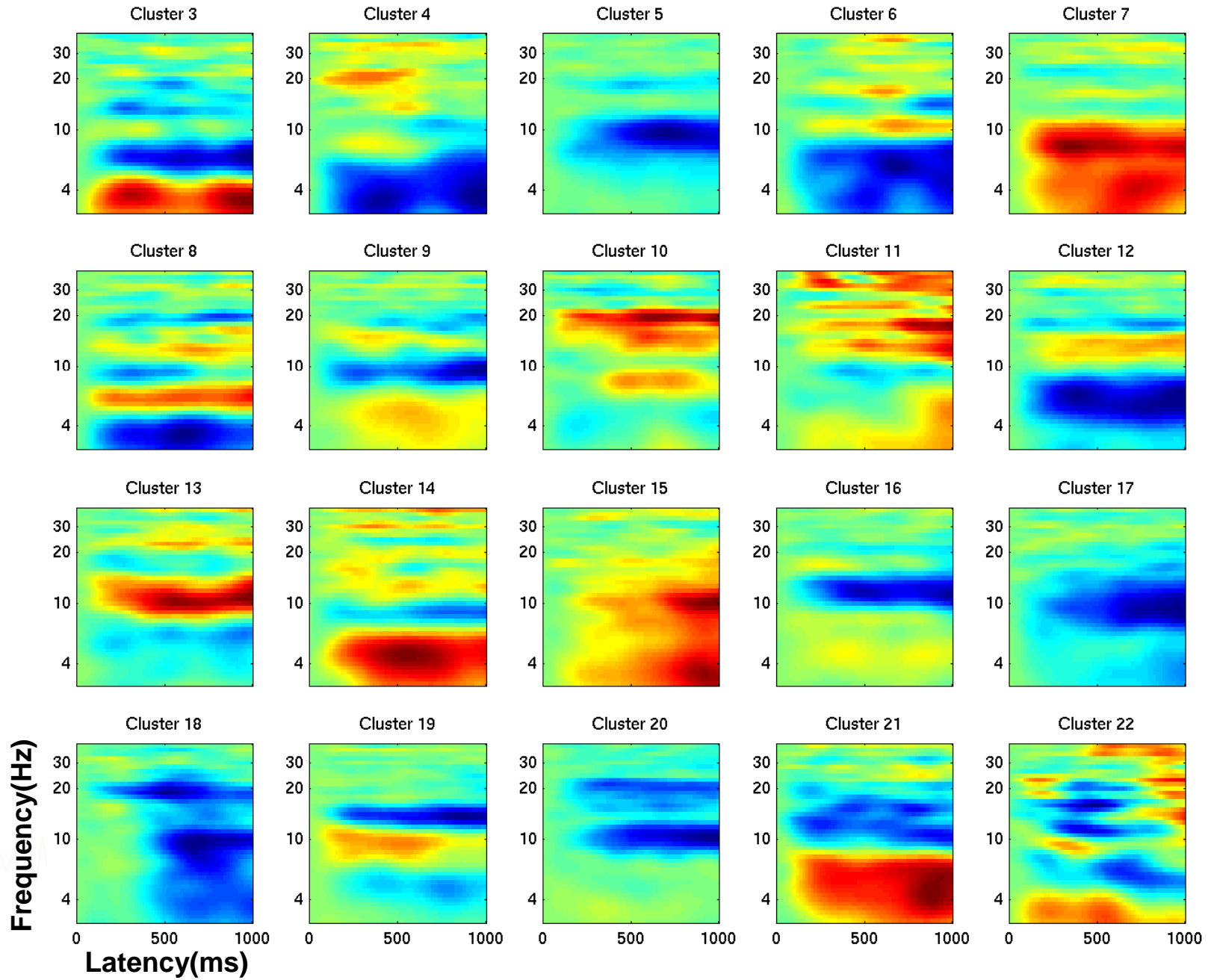


Cluster on ERSP only

Spatially
NON-distinct
IC clusters,
but highly
matched
activity

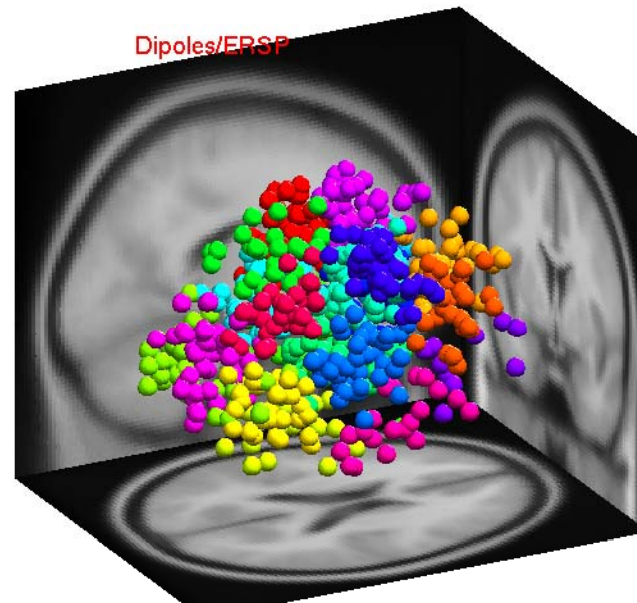
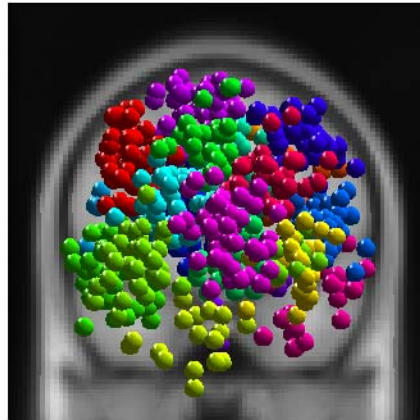
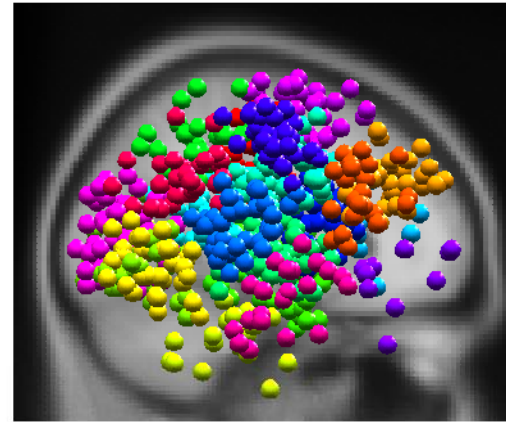
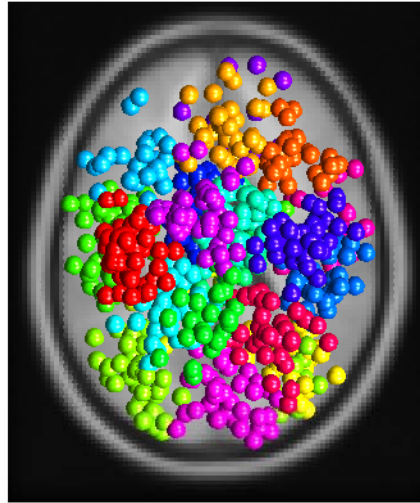


Cluster on ERSP only

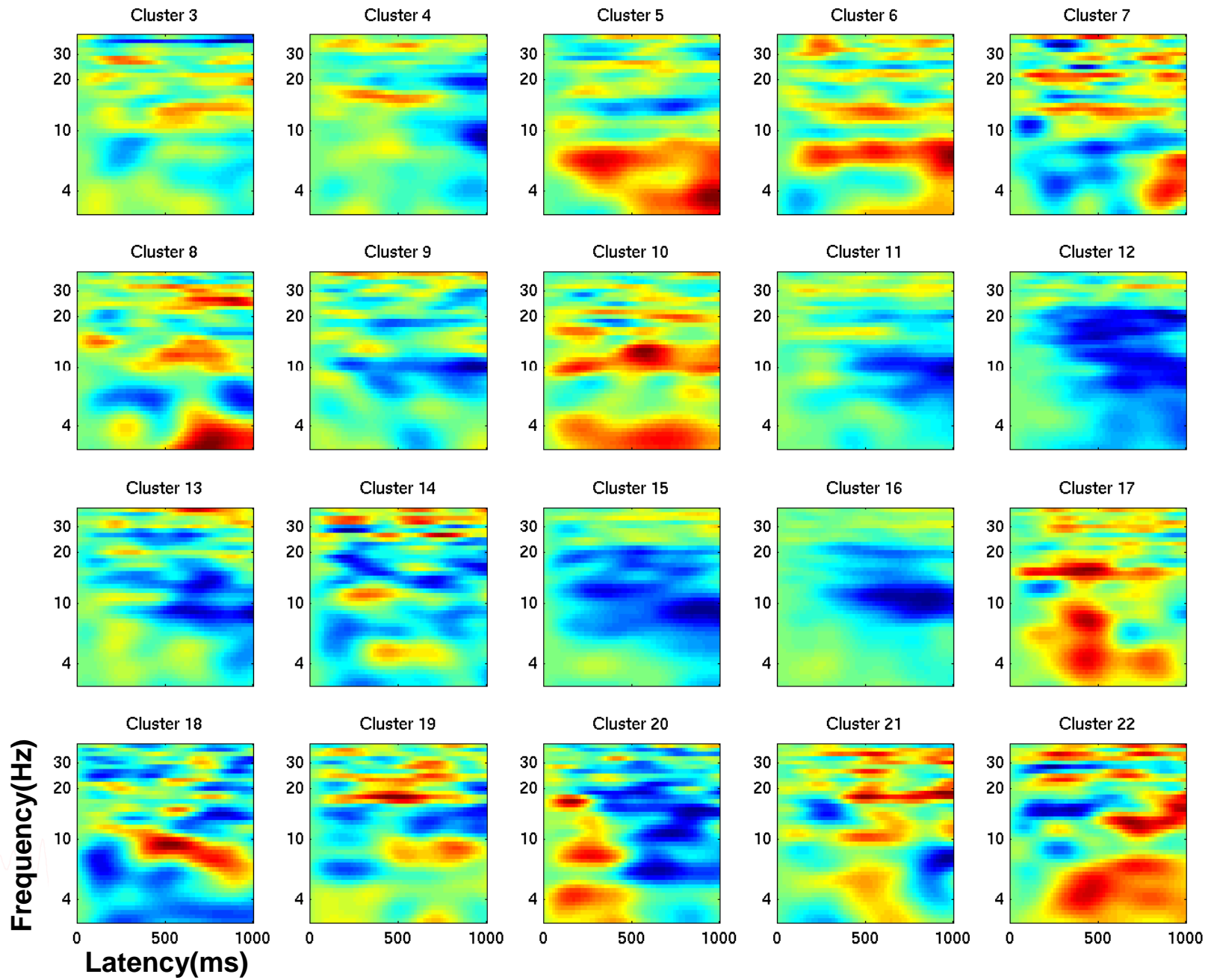


Cluster on dipoles AND ERSP

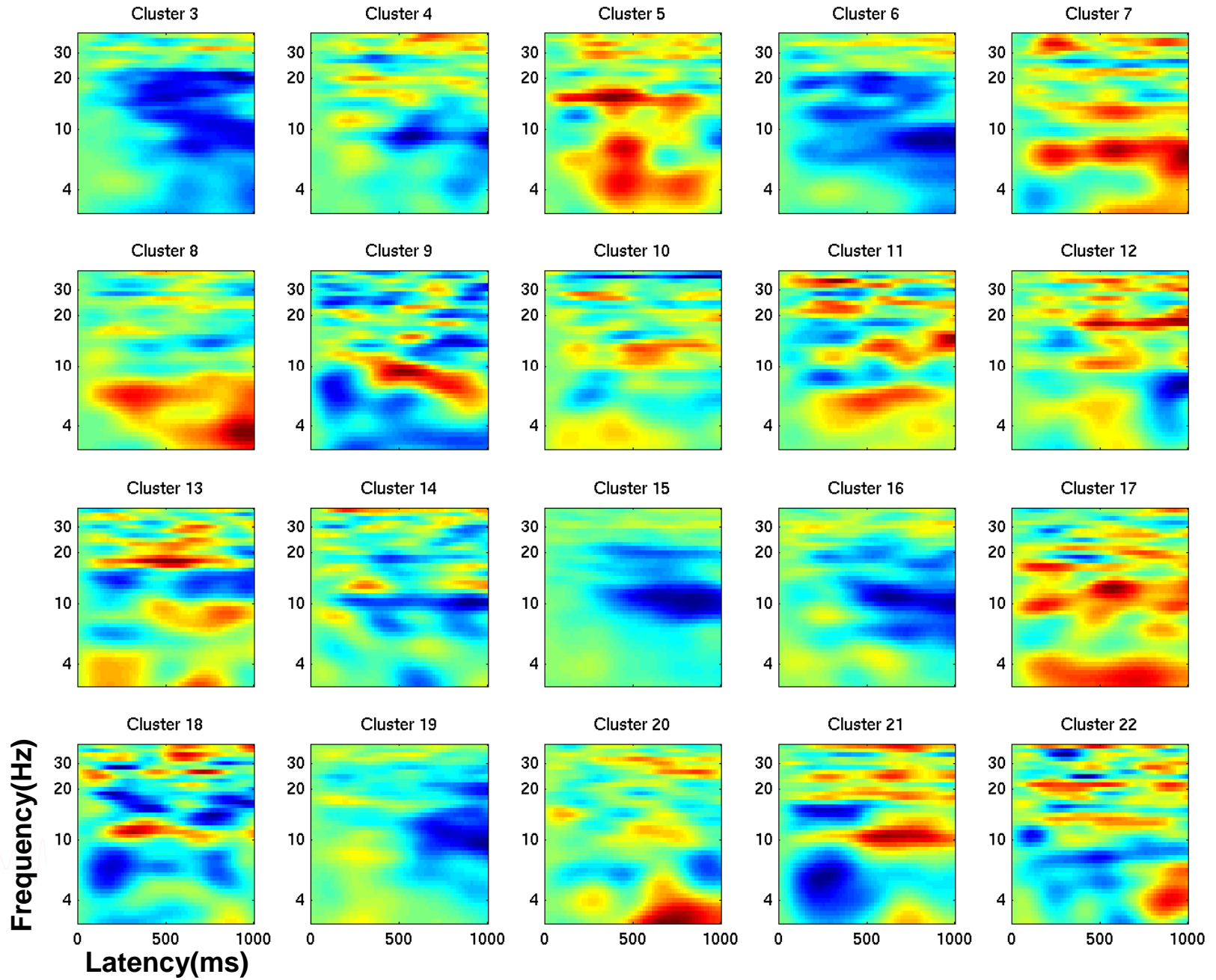
Spatially
distinct
IC clusters,
relatively
matched
activity



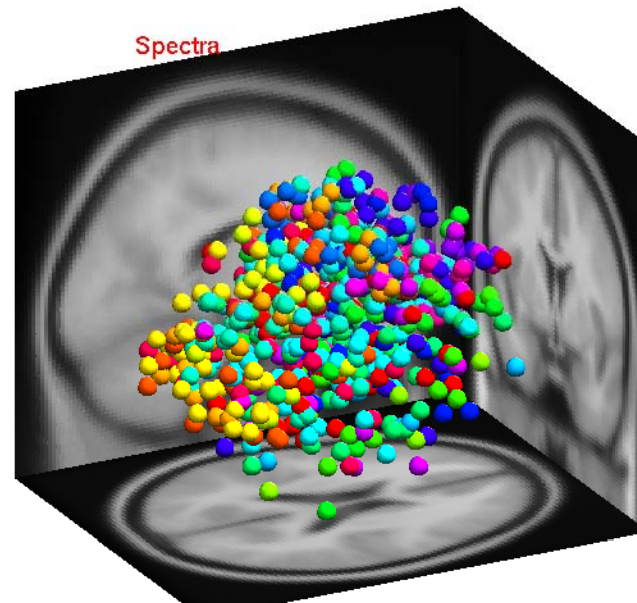
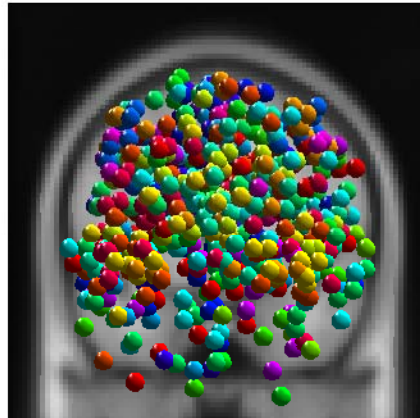
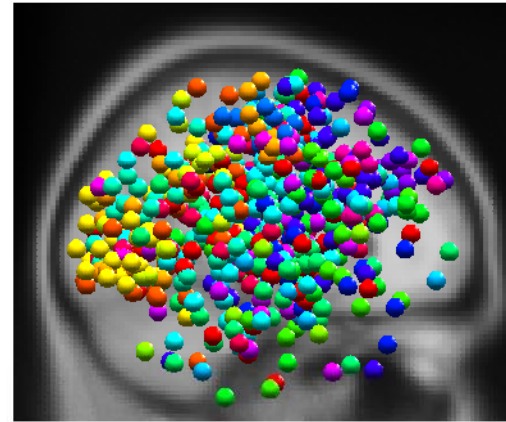
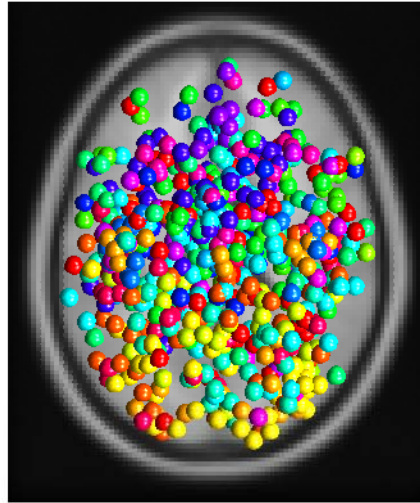
Cluster on dipoles/ERSP



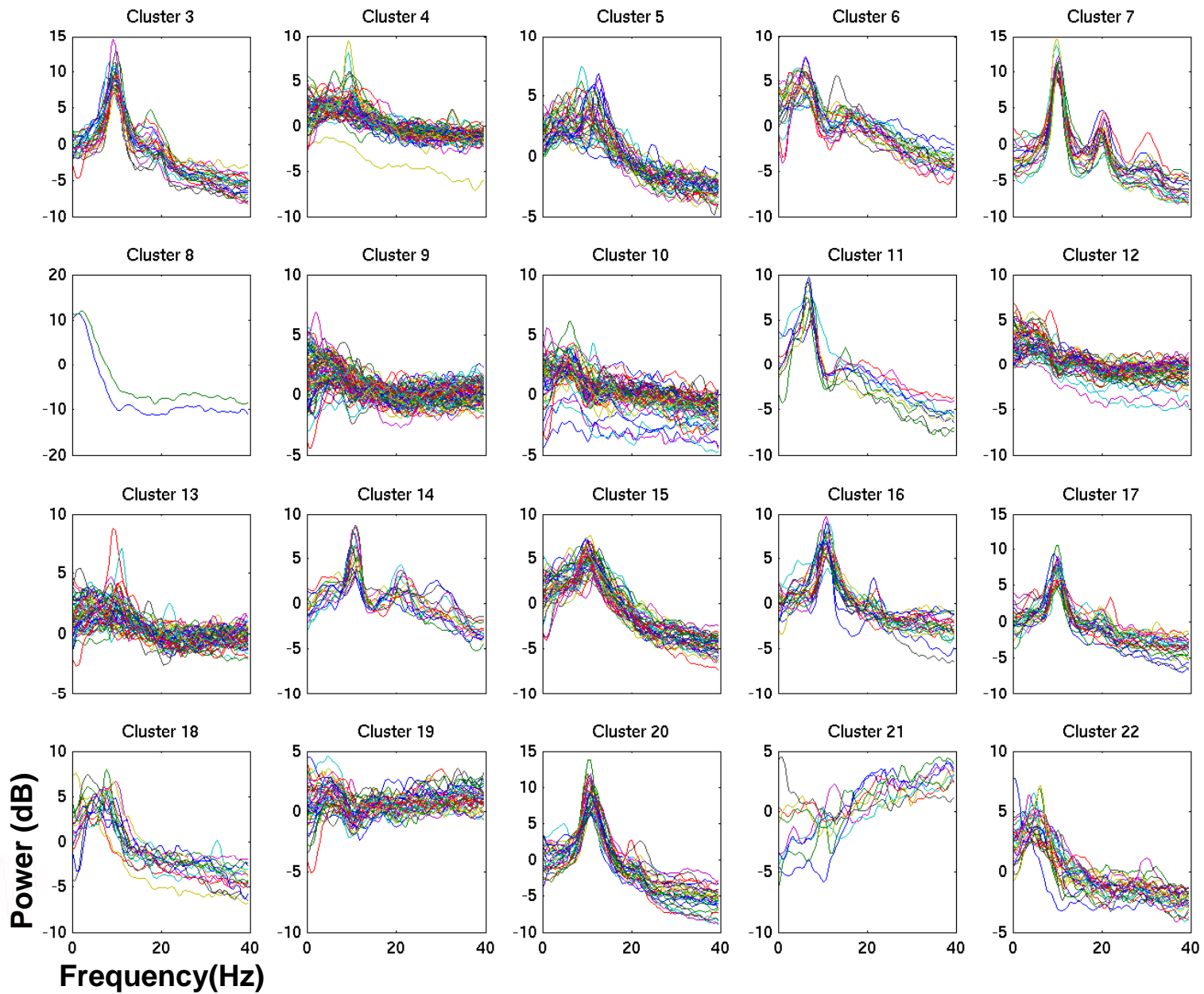
Cluster on dipoles only



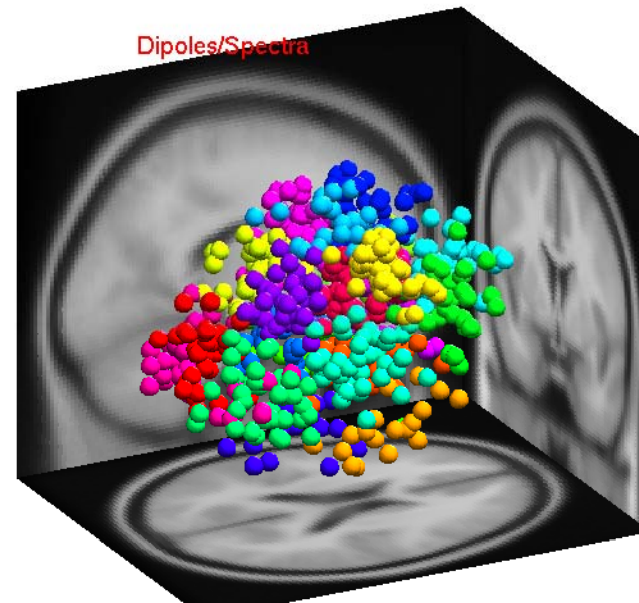
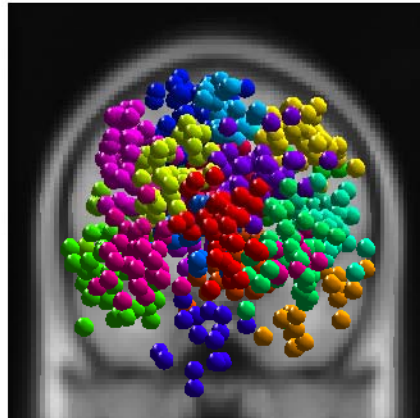
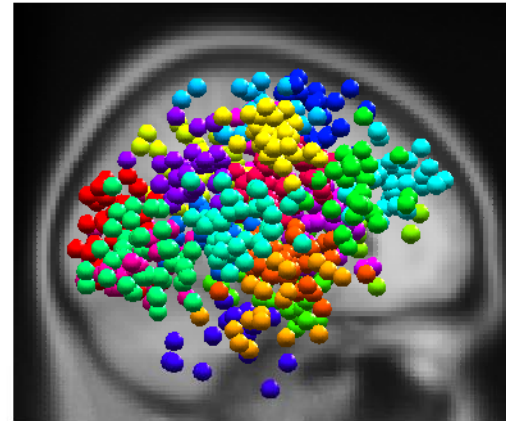
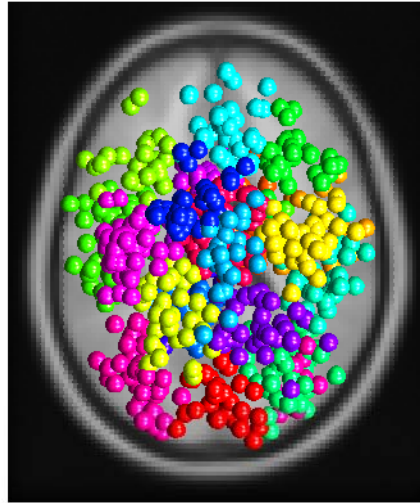
Cluster on spectra only



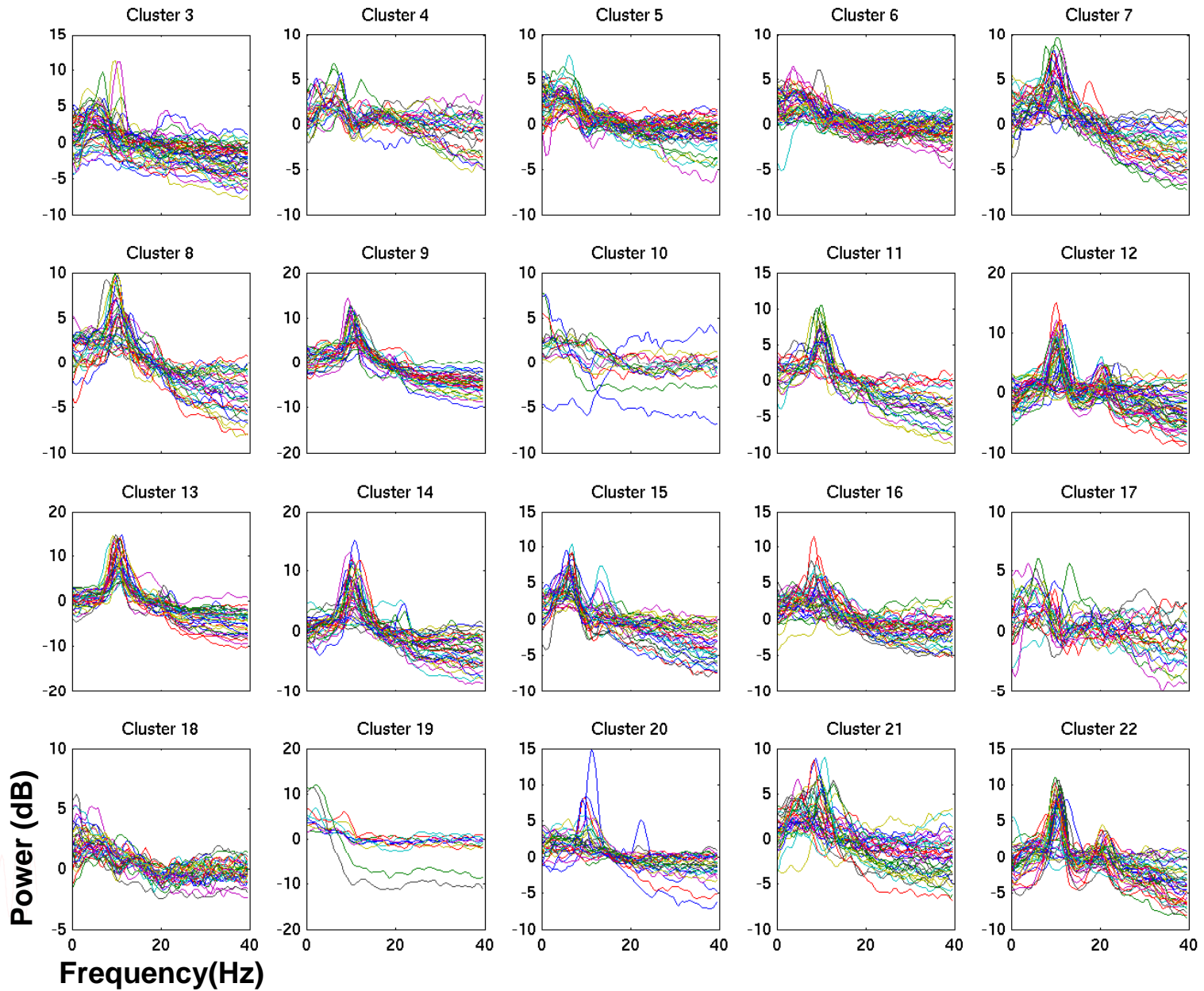
Cluster on spectra only



Cluster on dipoles AND spectra



Cluster on dipoles/spectra



Plot STUDY dipoles

```
% std_diopleclusters() variables:  
  
cols = hsv(length(STUDY.cluster)-2);  
clusters = [3:length(STUDY.cluster)]; % clusters to plot  
title = 'Dipole Clustering Only'; % figure title  
plot_params = [2,2,1]; % [nrows,ncols,subplot]  
views = [1,2,3,4]; % 1=top,2=side,3=rear,4=oblique  
  
% std_dipoleclusters function call:  
  
std_dipoleclusters(STUDY,ALLEEG,'clusters',clusters,...  
'title',title,'viewnum',views,'rowcolplace',plot_param,...  
'centroid','off','colors',cols);
```

Script can be found in [practicum_11.m](#)

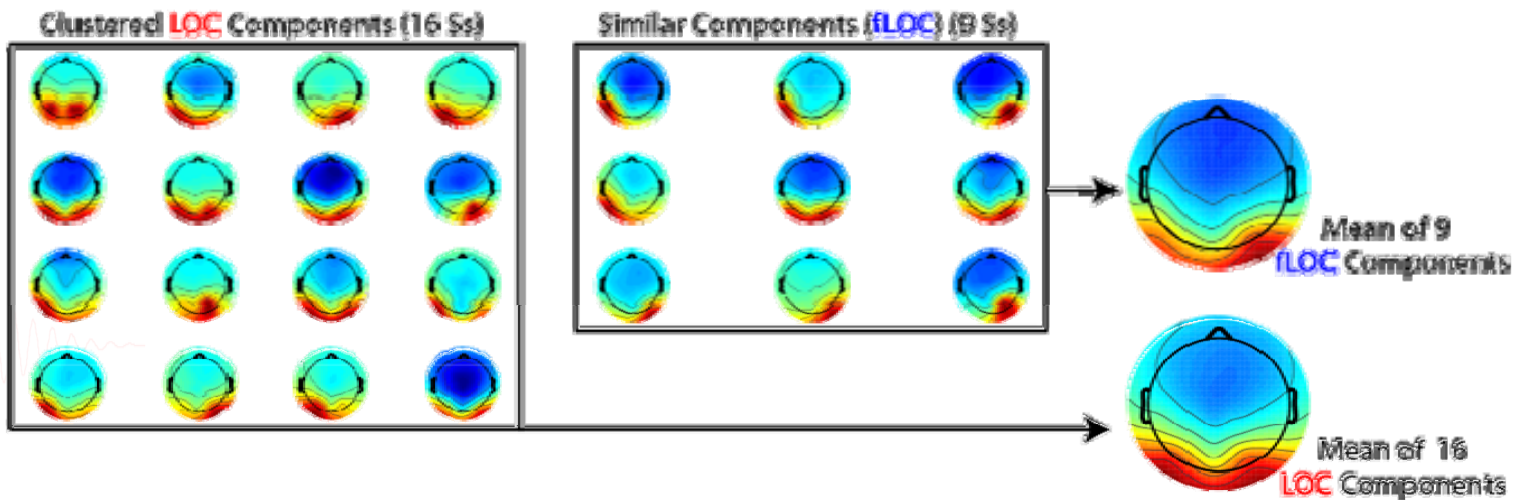
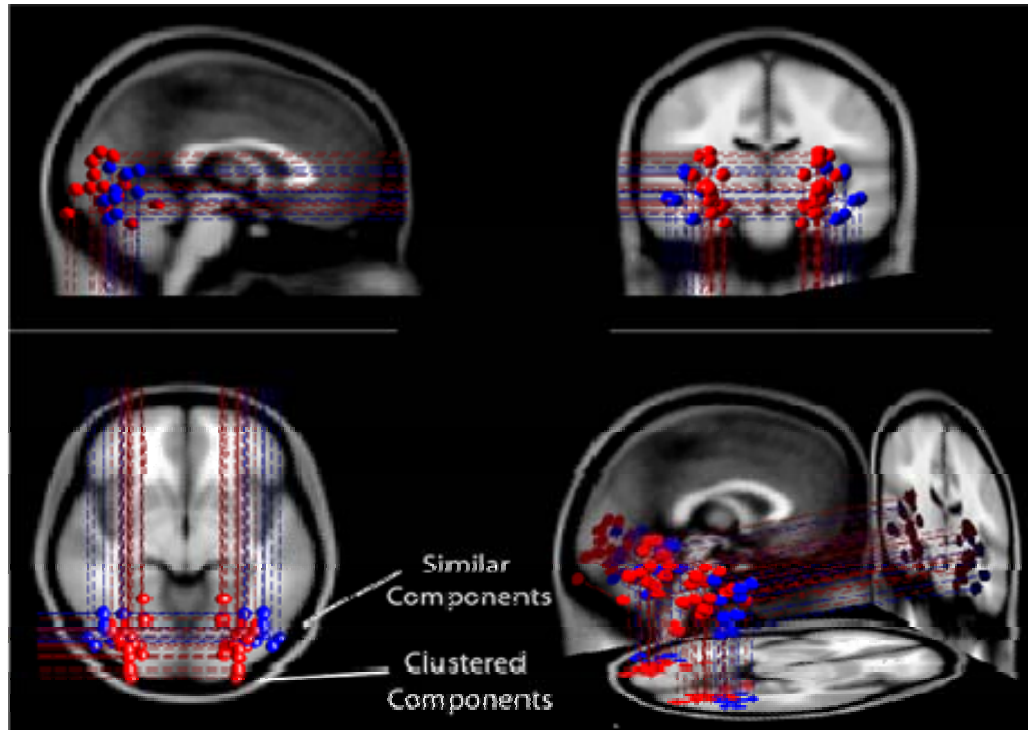
Outline

☑ clustering parameters

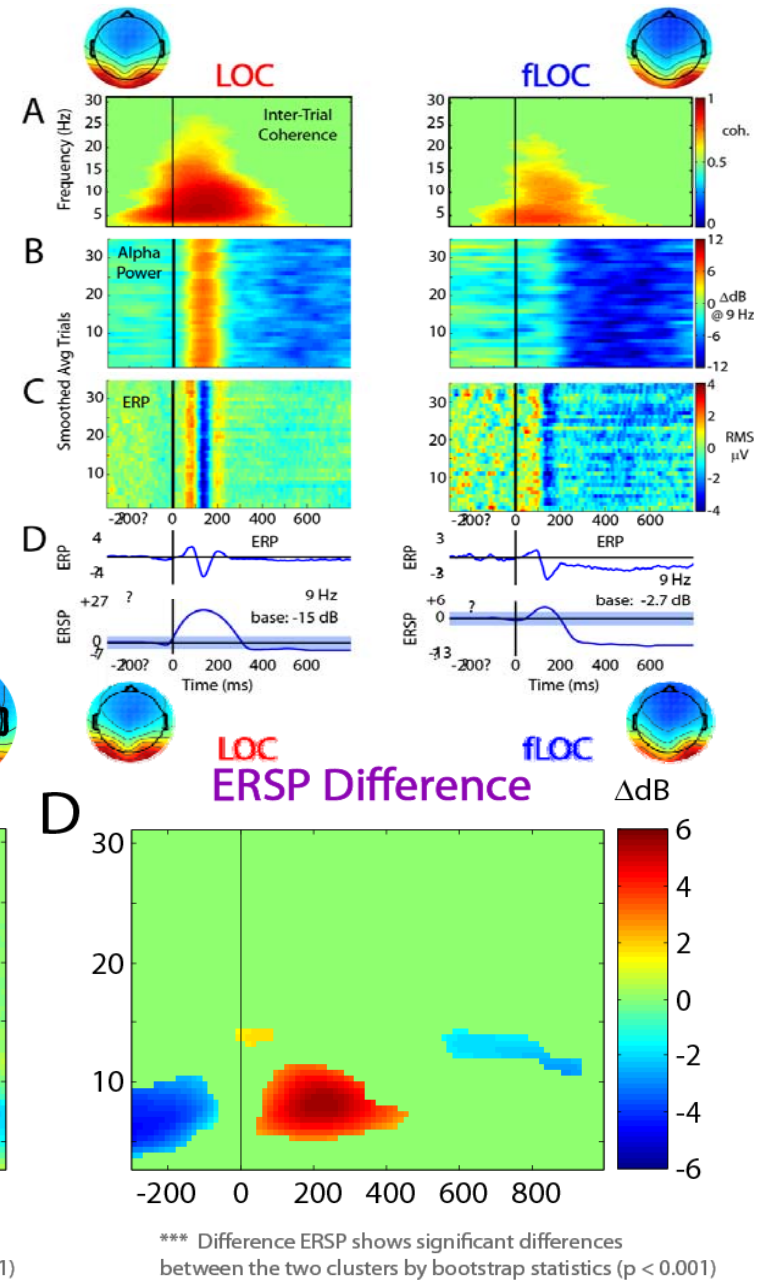
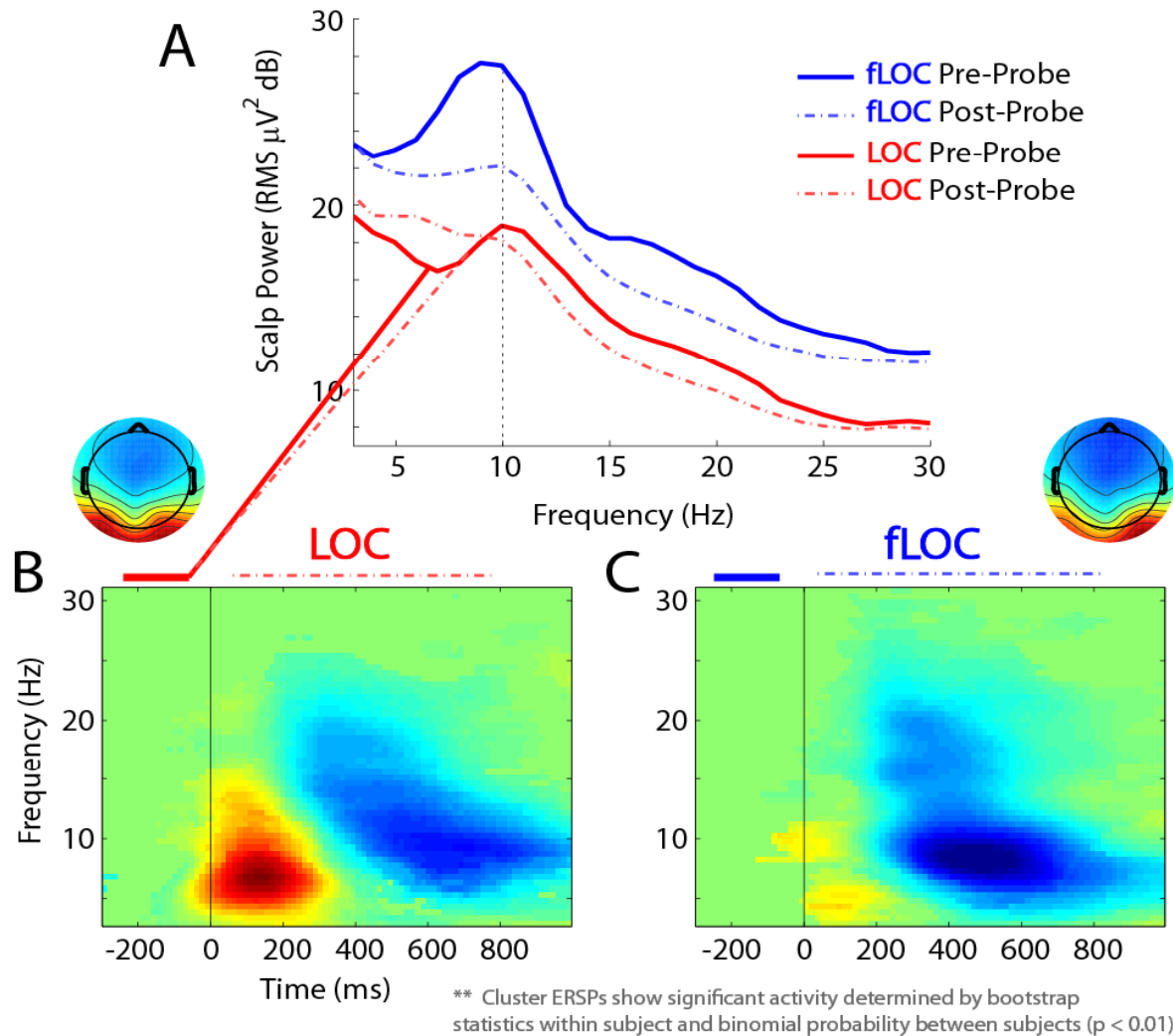
☑ How should my clusters look?

✓ clustering ambiguity

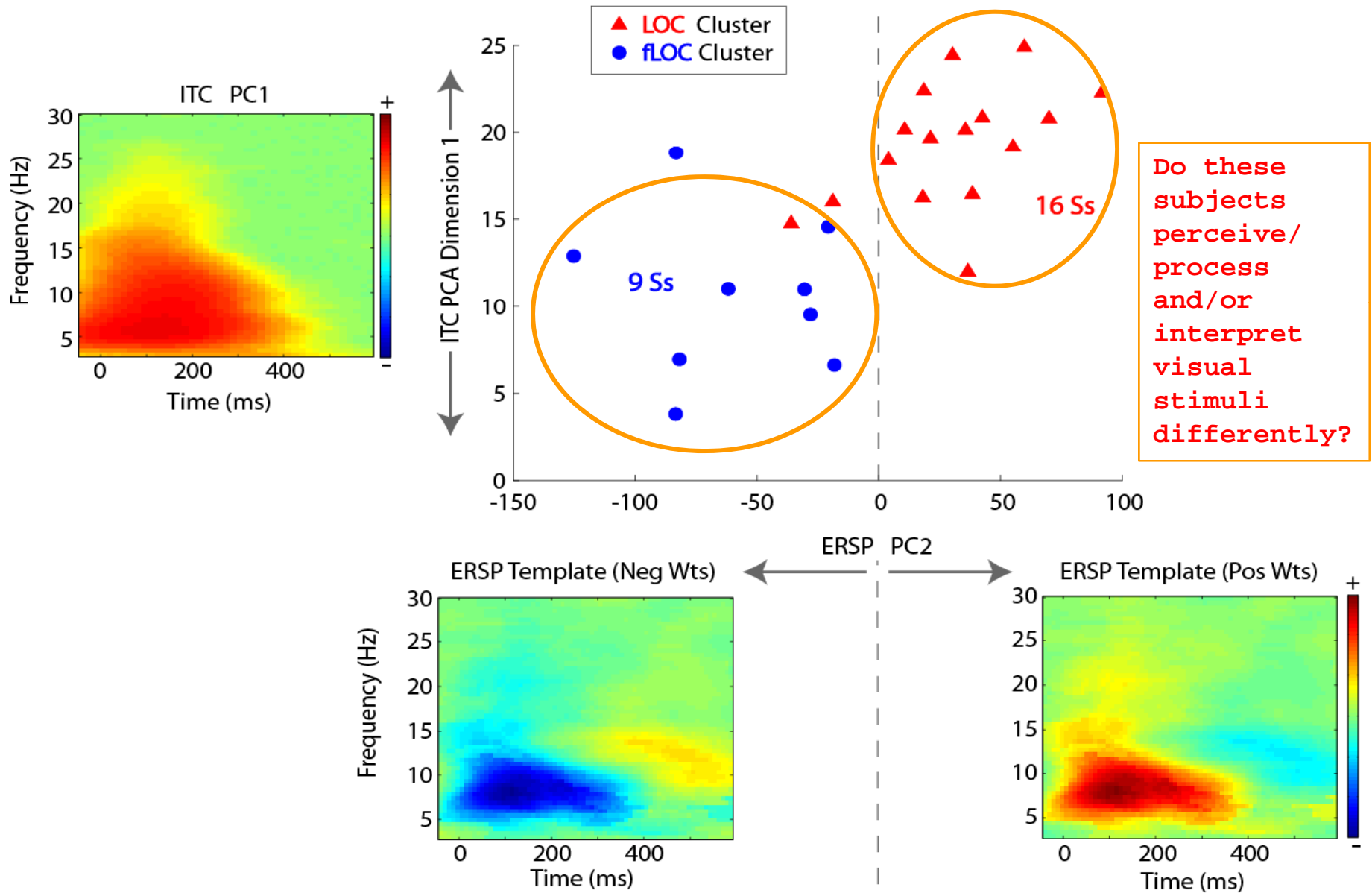
Clustering ambiguities



Alpha power and ITC differences



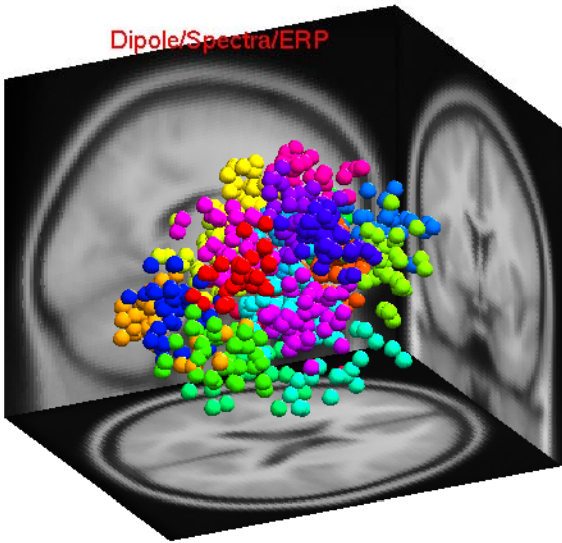
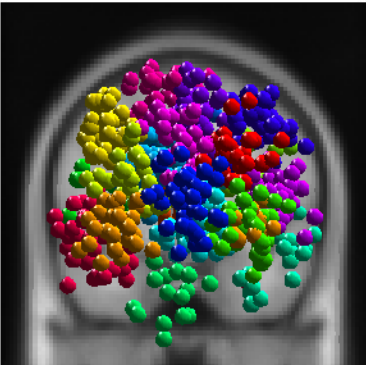
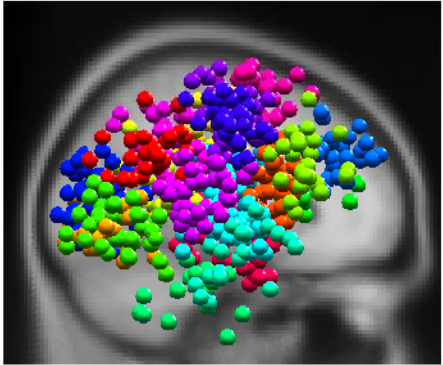
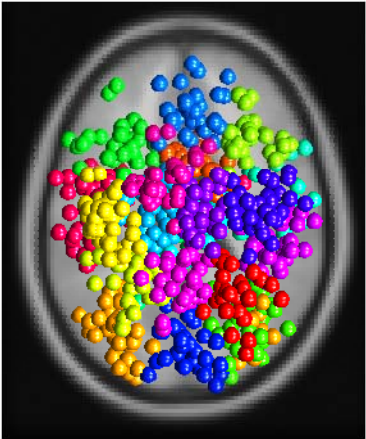
Subject differences?



Conclusions

- ✓ Parameters/measures to use for clustering depends on your goal, but generally activity AND location are important.
- ✓ Clustering can be frustrating because of inter-subject differences that you never noticed before.

Cluster on dipoles/spectra/ERP



Cluster on dipoles/spectra/ERP/scalp maps

