

# Visualizing Earthquake Simulation Data

Zhenge Zhao  
zhengezhao@email.arizona.edu

Youhao Wei  
youhaowei@email.arizona.edu

Joshua Levine  
josh@email.arizona.edu

Ismail Bahadir  
ibk2@email.arizona.edu

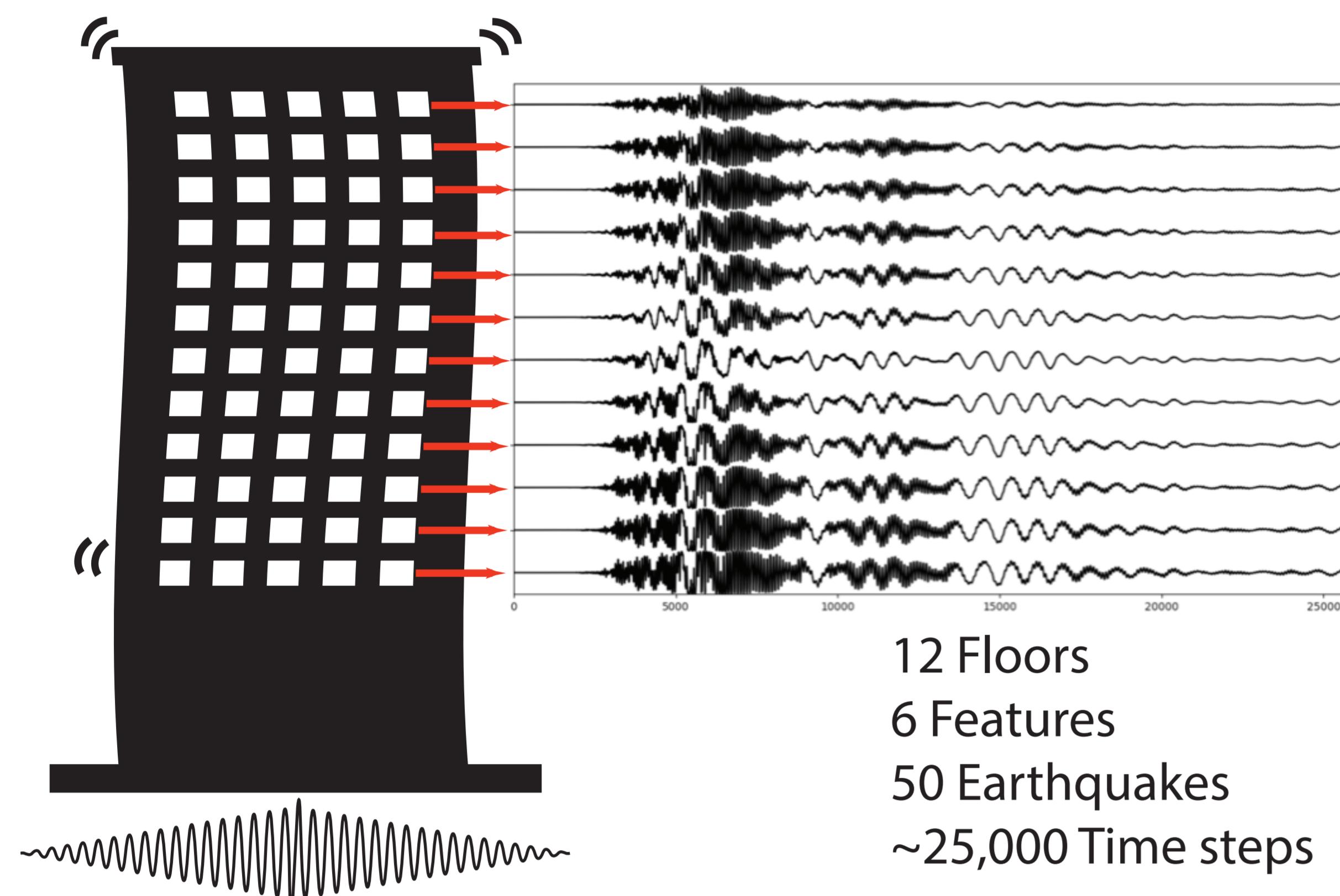
Danilo Motta  
daniloam@icmc.usp.br

Matthew Berger  
matthewberger@email.arizona.edu

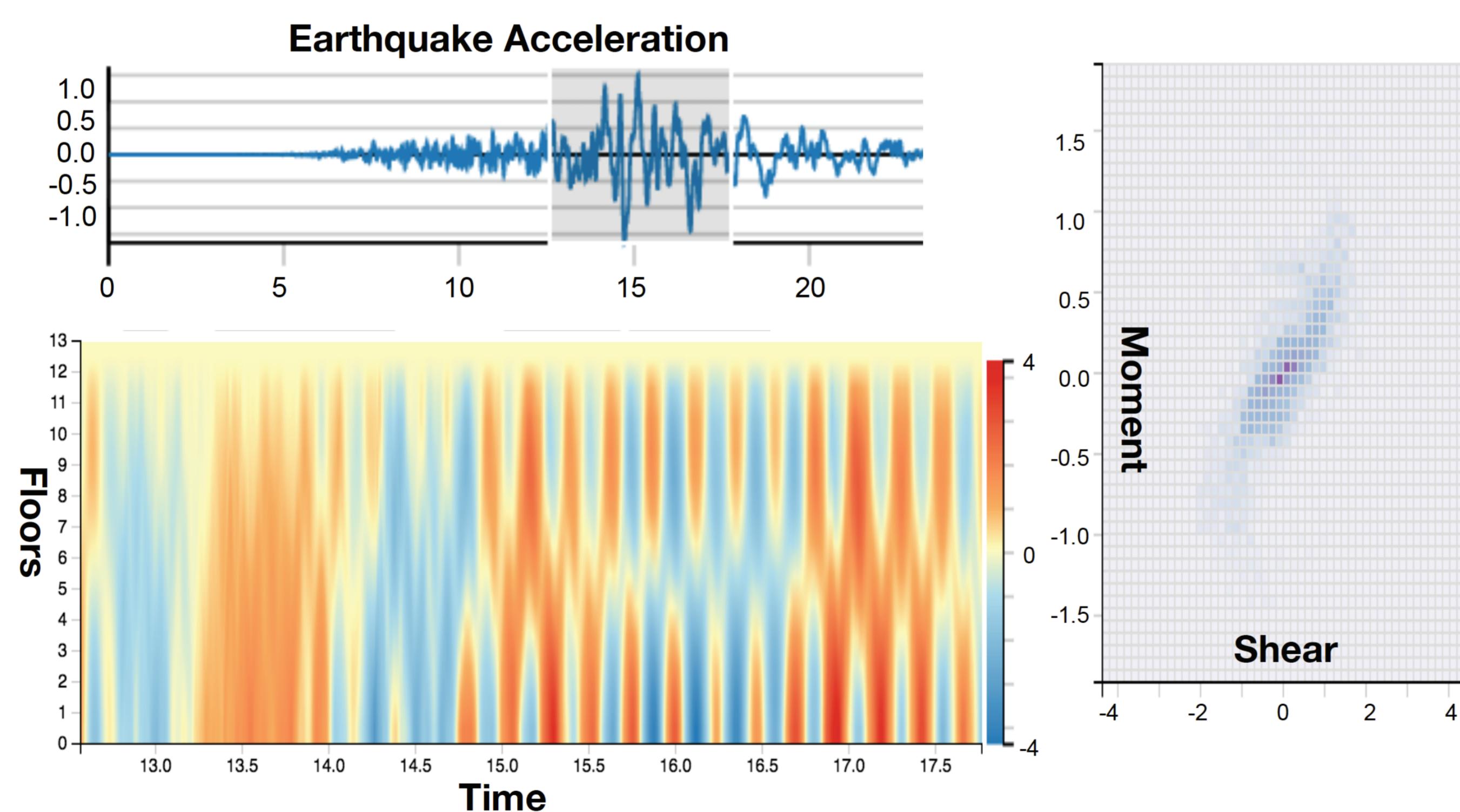
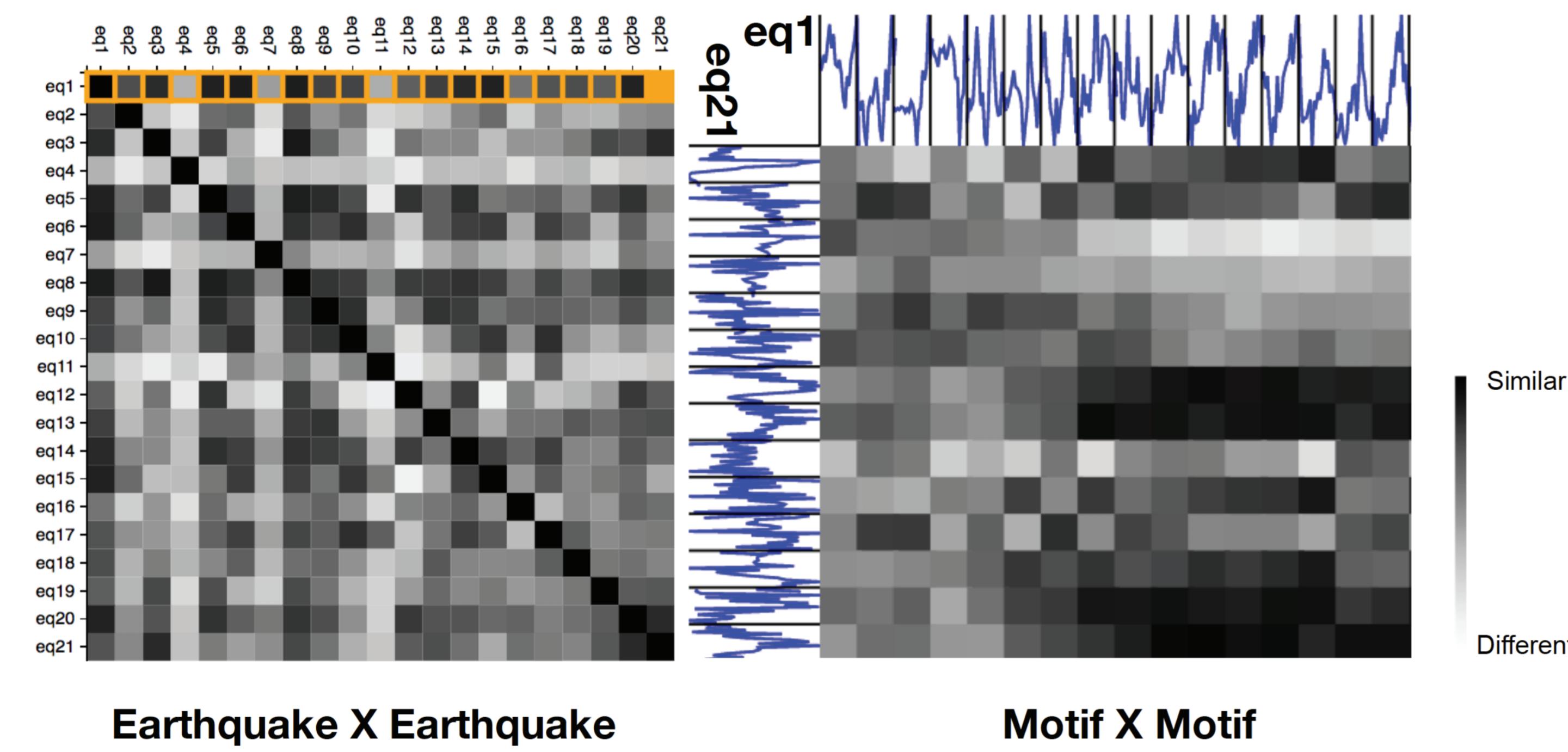
Carlos Scheidegger  
cscheid@email.arizona.edu

Robert Fleischman  
rfleisch@email.arizona.edu

## Dataset



## Partial Views are Insufficient



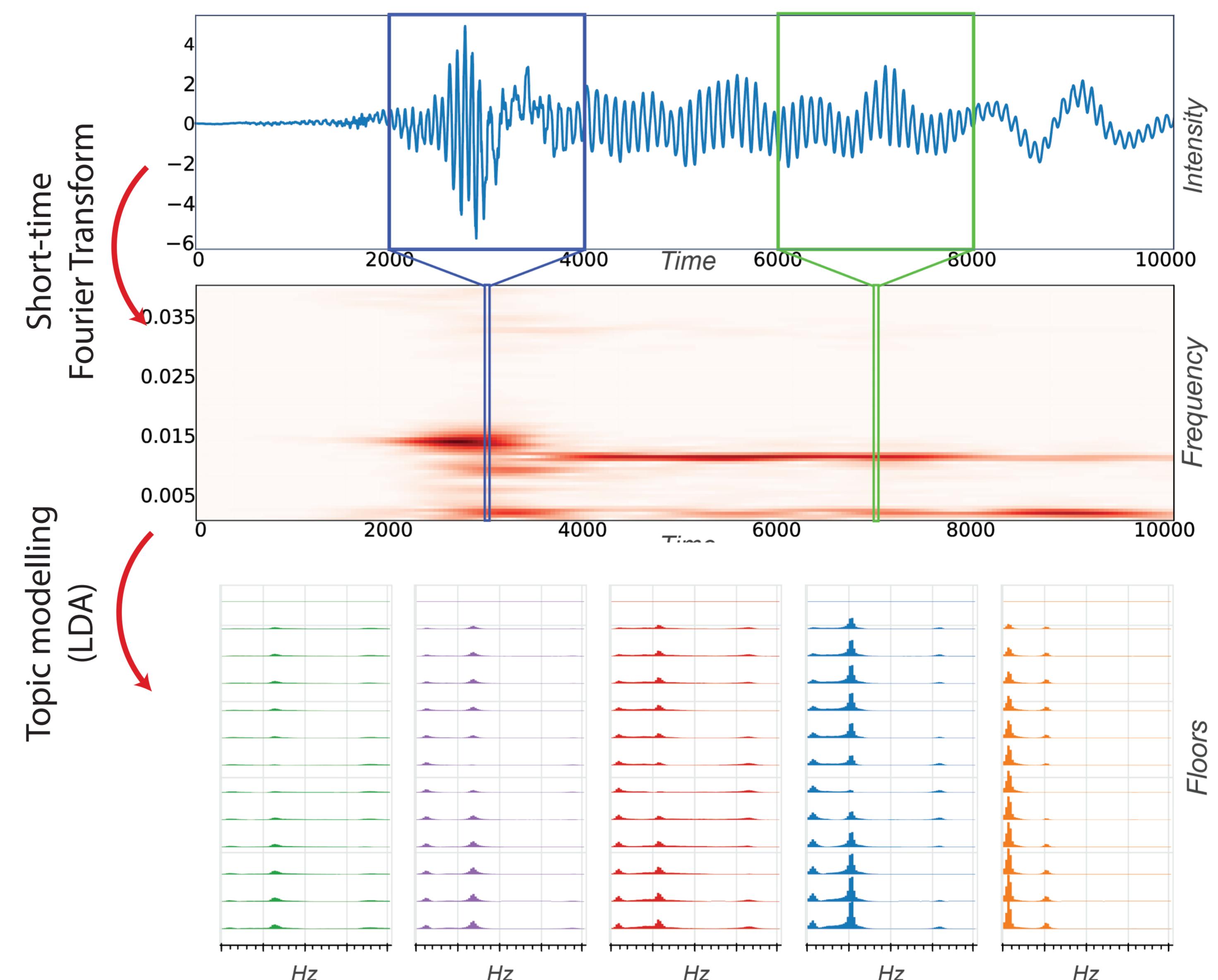
Although these views are helpful, some features are not captured. Specifically, visual comparisons of repeating features within an earthquake – and especially across earthquakes – are hard, and so novel techniques are necessary.

## References

- [1] Blei DM, Ng AY, Jordan MI. "Latent dirichlet allocation." *Journal of Machine Learning Research*, 3(Jan):993–1022, 2003.
- [2] Rodriguez ME, Restrepo JI, Blandon JJ. "Seismic design forces for rigid floor diaphragms in precast concrete building structures." *Journal of Structural Engineering*, 133(11):1604–1615, 2007.

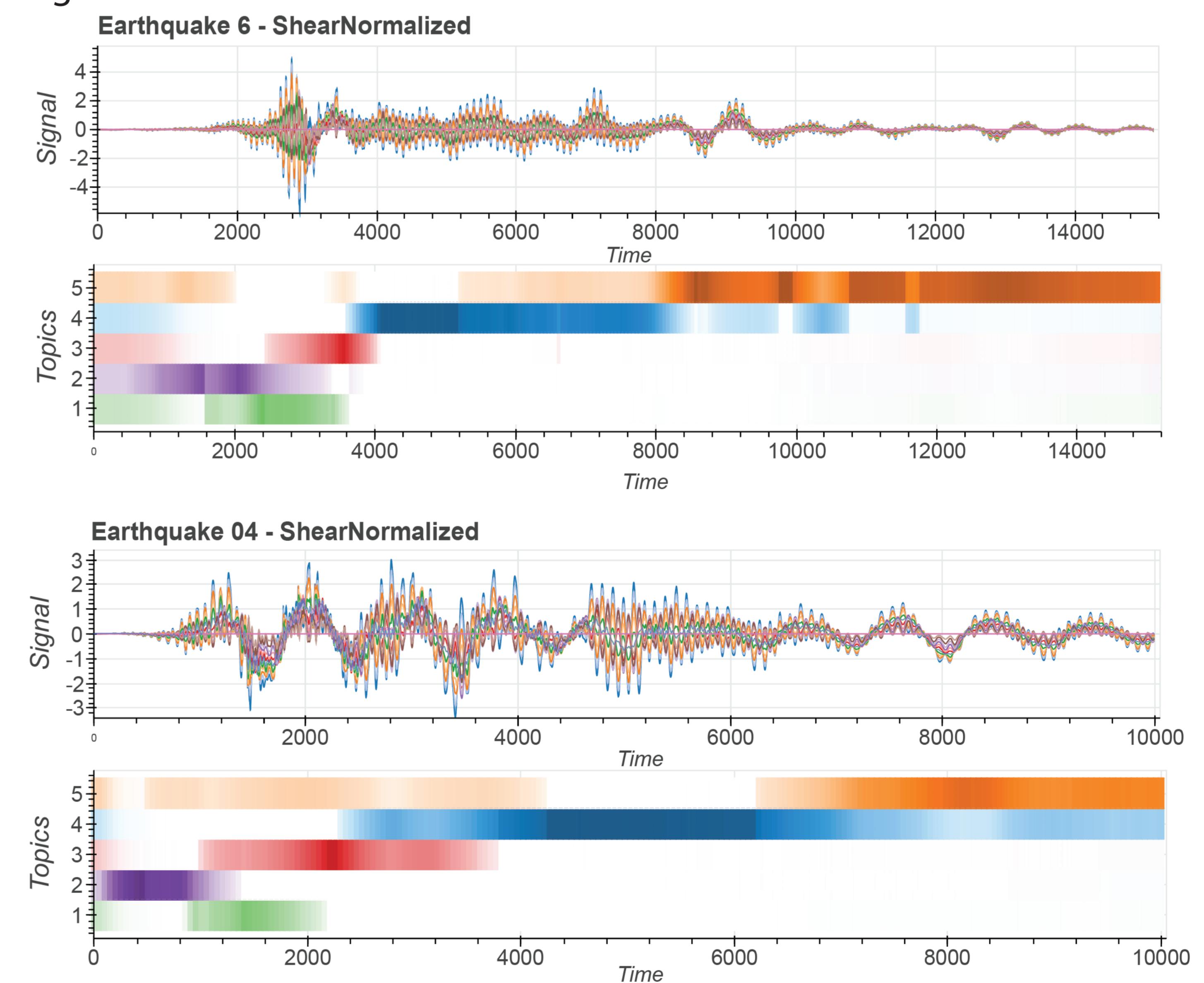
## Time-varying, multi-signal topic patterns

Our methodology applies topic modelling to time series visualization where words are frequencies and documents are multi-signal motifs.



## Comprehensive View

The topic view enables visual comparisons within and across earthquakes, and shows the temporal evolution of the behavior of the building.



## Ongoing Work

We are currently implementing a querying mechanism based on the extracted topics, so engineers can quickly search for related patterns across the entire database.