

# Welcome

## Lecture 01

Dr. Colin Rundel

# Course Details

# Course Team

## Instructor

- Dr. Colin Rundel
  - [colin.rundel@duke.edu](mailto:colin.rundel@duke.edu) *or* [rundel@gmail.com](mailto:rundel@gmail.com)

## TA

- Olivier Binette

# Course website(s)

- GitHub pages - <https://sta344-fa22.github.io>
  - HTML, PDF, and qmds of Slides
  - Lecture screencasts (youtube)
  - Suggested Readings
- Sakai - <https://sakai.duke.edu>
  - Link to GitHub page
  - Announcements
  - Gradebook

# Course Timetable

- Lectures (weekly) - Social Sciences 124
  - Wednesdays, 12:00 - 1:15 pm -
  - Fridays, 12:00 - 1:15 pm -
- Labs (weekly) - Perkins LINK 087 (Classroom 3)
  - Lab 01 - Tuesdays, 5:15 to 6:30 pm

# Labs

- Attendance is expected
- Opportunity to work on course assignments with TA support
- Labs will begin in Week 2 (September 6th)
  - no lab Week 1

# Announcements

Will be posted on Sakai (Announcements tool) and sent via email, be sure to check both regularly.

# Grading

We will be assessing you based on the following assignments,

Assignment	Type	Value	n	Assigned
Homeworks	Individual	40%	~7	~ Every other week
Midterms	In class	40%	2	~ Week 7 and 15
Project	Team	20%	1	~ Week 10



# Collaboration policy

- Homeworks are to be completed individually but you are strongly encouraged to work together.
- All solutions should be “in your own words”
- i.e. you should not directly share complete answers / code with others.

# Sharing / reusing code policy

- We are aware that a huge amount of code is available on the web, and many tasks may have solutions posted.
- Unless explicitly stated otherwise, this course's policy is that you may make use of any online resources (e.g. Google, StackOverflow, etc.) but you must explicitly cite where you obtained any code you directly use or use as inspiration in your solution(s).
- Any recycled code that is discovered and is not explicitly cited will be treated as plagiarism, regardless of source.

# Academic integrity

To uphold the Duke Community Standard:

- I will not lie, cheat, or steal in my academic endeavors;
- I will conduct myself honorably in all my endeavors; and
- I will act if the Standard is compromised.

# Course Tools

# RStudio

[rstudio.stat.duke.edu:8787](https://rstudio.stat.duke.edu:8787)

- Browser based, departmental RStudio instance(s)
- Requires Duke VPN or on campus connection to access
- Provides consistency in hardware and software environments
- Local R installations are fine but we will not guarantee support

# Common issues:

- If `This site can't provide a secure connection` change `https` to `http` in the url.
- If `This site can't be reached` make sure you are on a Duke network and are not use an alternative DNS service.
- Anything more exotic please reach out for help.

# Local R + RStudio

If working locally you should make sure that your environment meets the following requirements:

- latest R (4.2.1)
- latest RStudio (2022.07.1+554)
- working git installation
- ability to create ssh keys (for GitHub authentication)
- *All* R packages updated to their latest version from CRAN

# GitHub

- We will be using an organization specifically to this course [github.com/sta344-fa22](https://github.com/sta344-fa22)
- All assignments will be distributed and collected via GitHub
- All of your work and your membership (enrollment) in the organization is private
- We will be distributing a survey this week to collection your account names
  - Before lab next week you will be invited to the course organization.



# Before next Tuesday

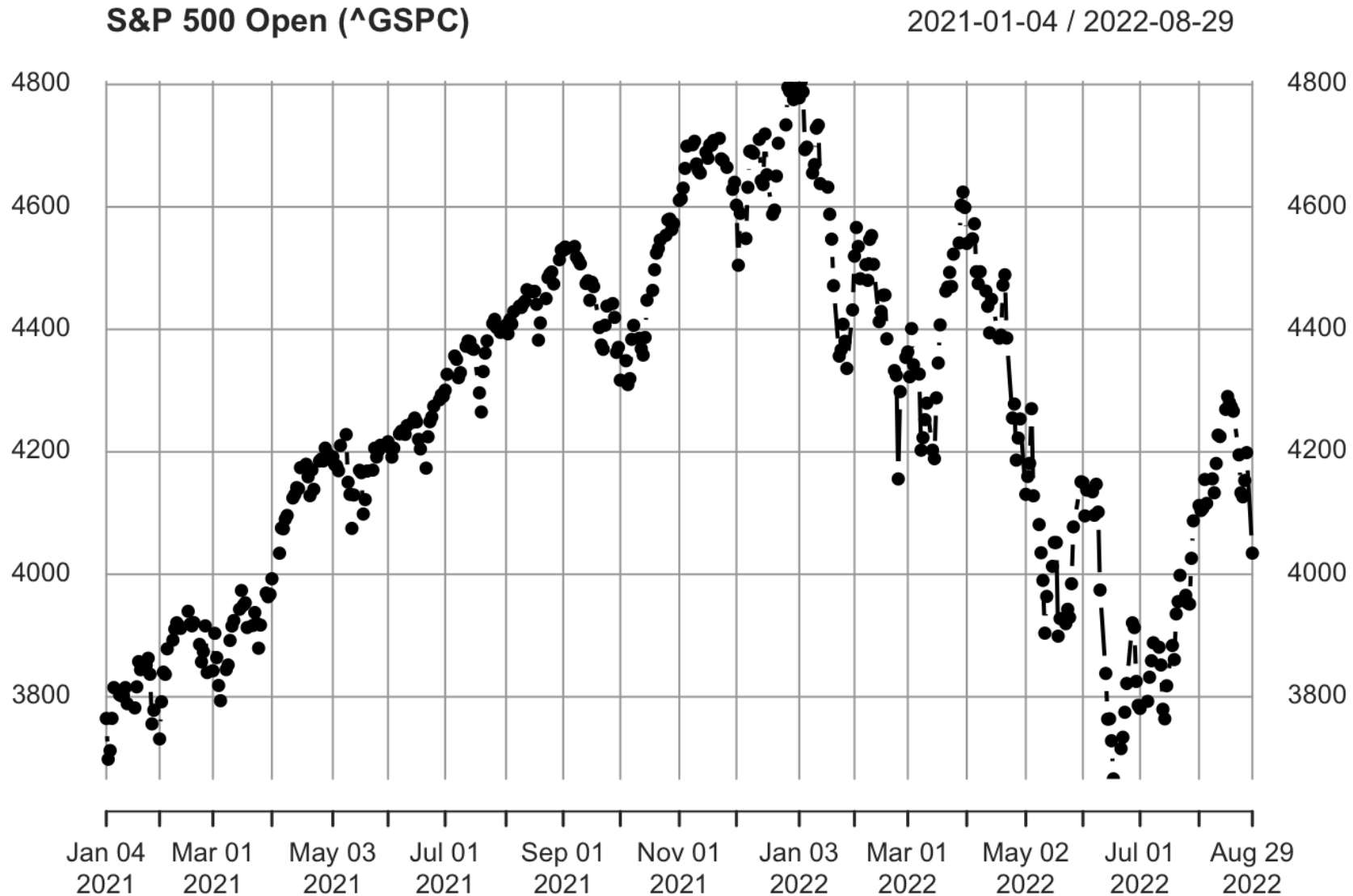
- Create a GitHub account if you don't have one
- Complete the course survey (you will receive before next Monday)
- make sure you can login in to the Department's RStudio server
  - [rstudio.stat.duke.edu:8787](https://rstudio.stat.duke.edu:8787)

# Spatio-temporal data

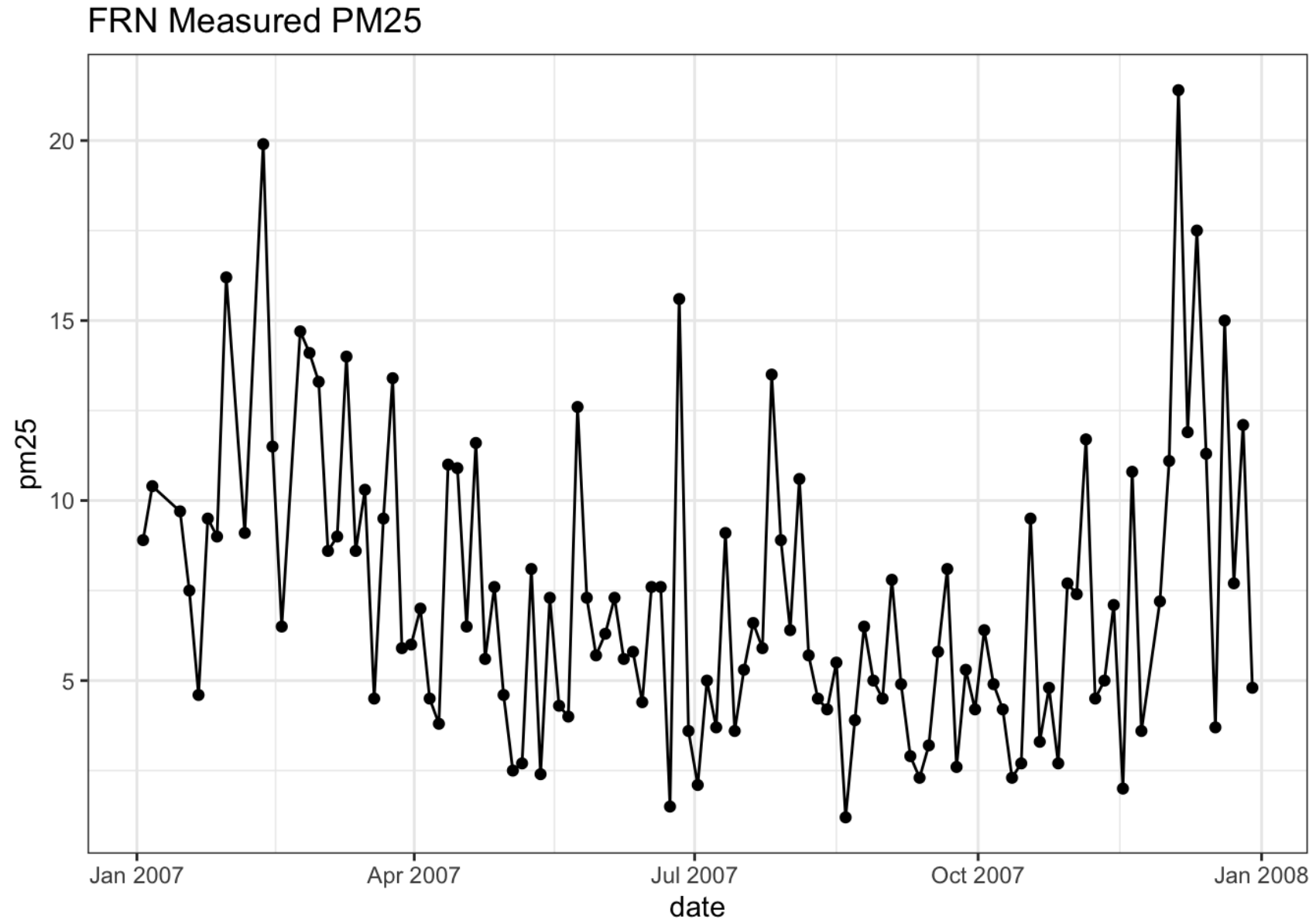
# Course content

- ~ 1/3 theory
- ~ 1/3 application
- ~ 1/3 computation

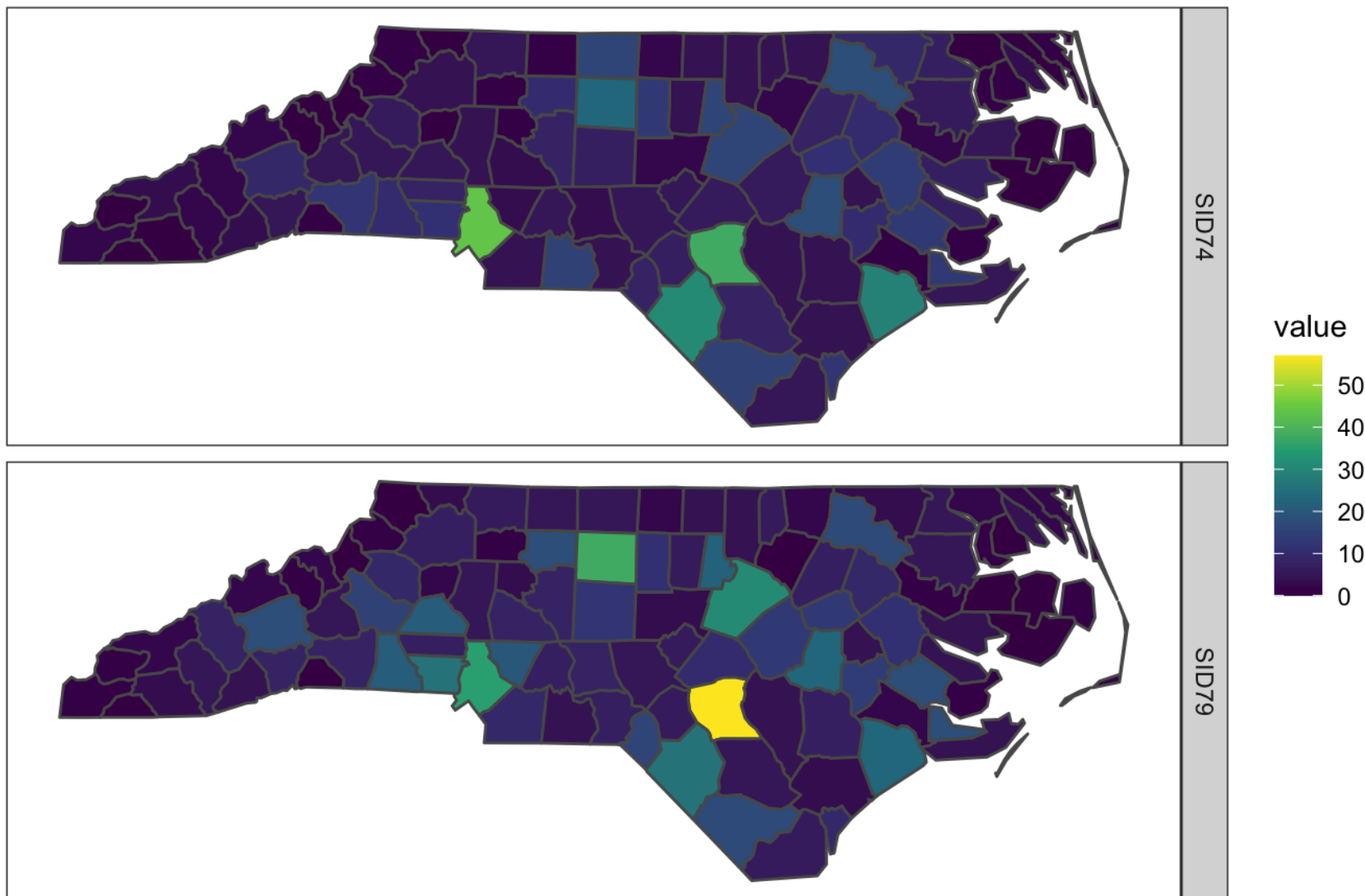
# Time Series Data - Discrete



# Time Series Data - Continuous

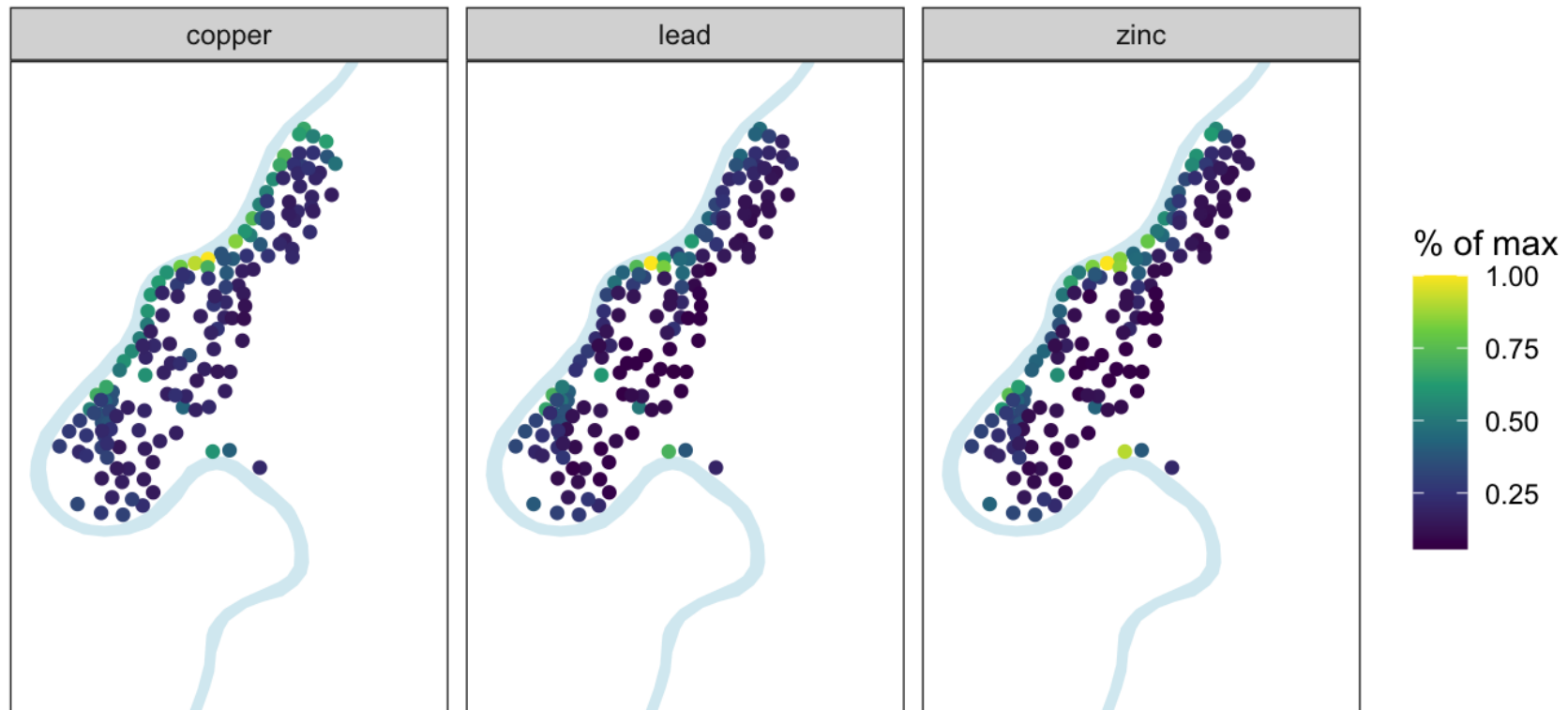


# Spatial Data - Areal

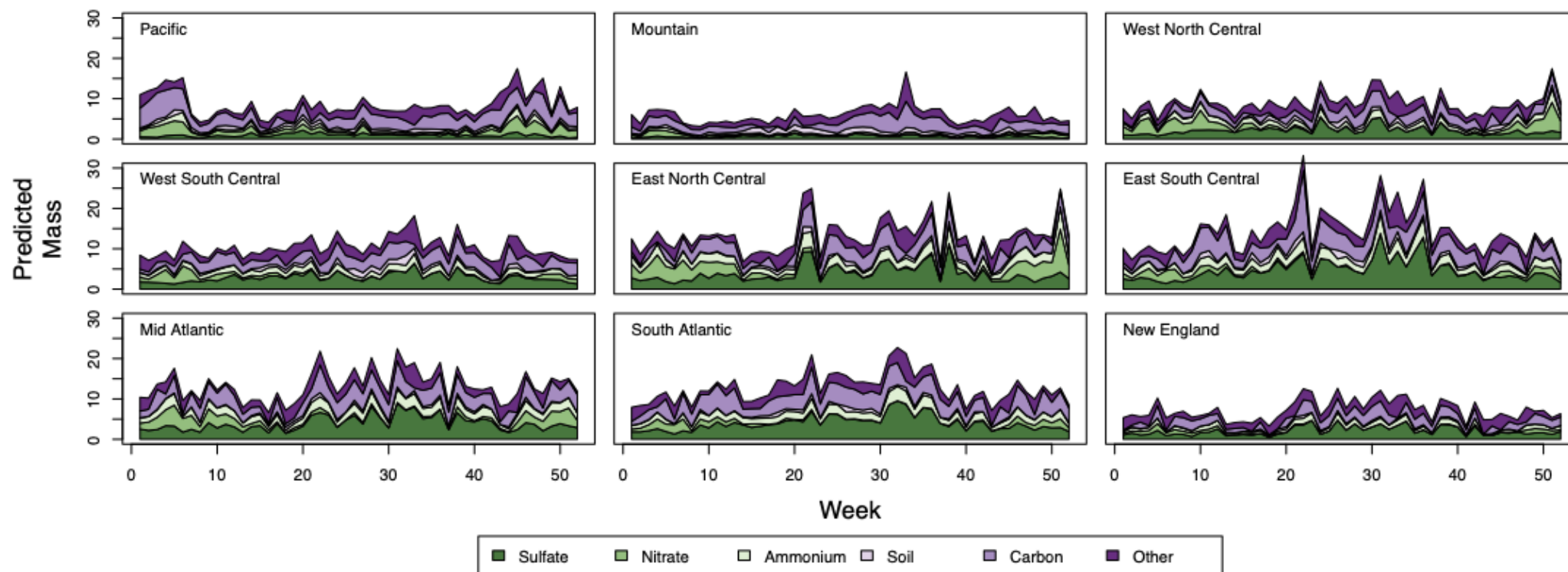


# Spatial Data - Point referenced

Meuse River



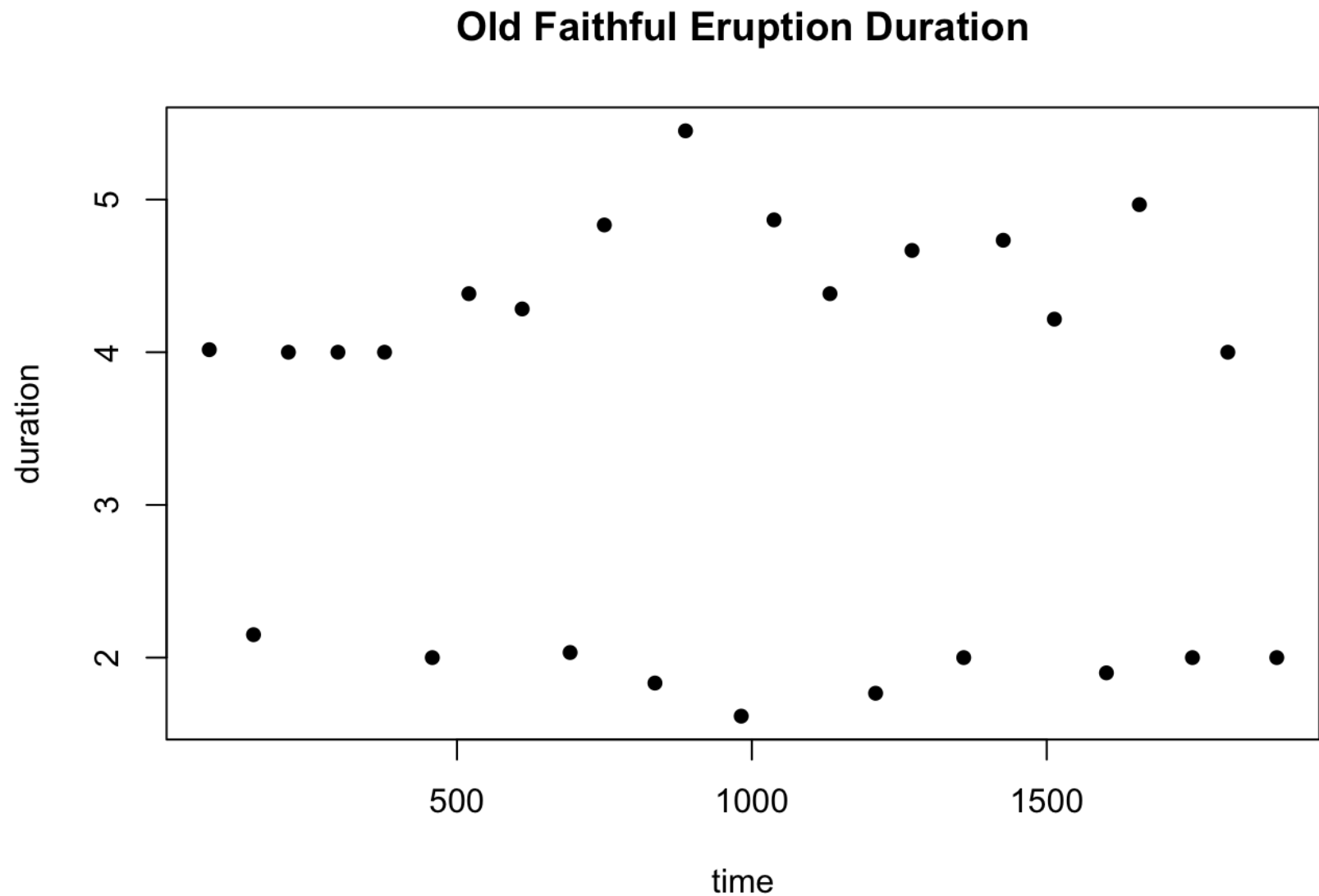
# Spatial-temporal Data - Continuous (time)



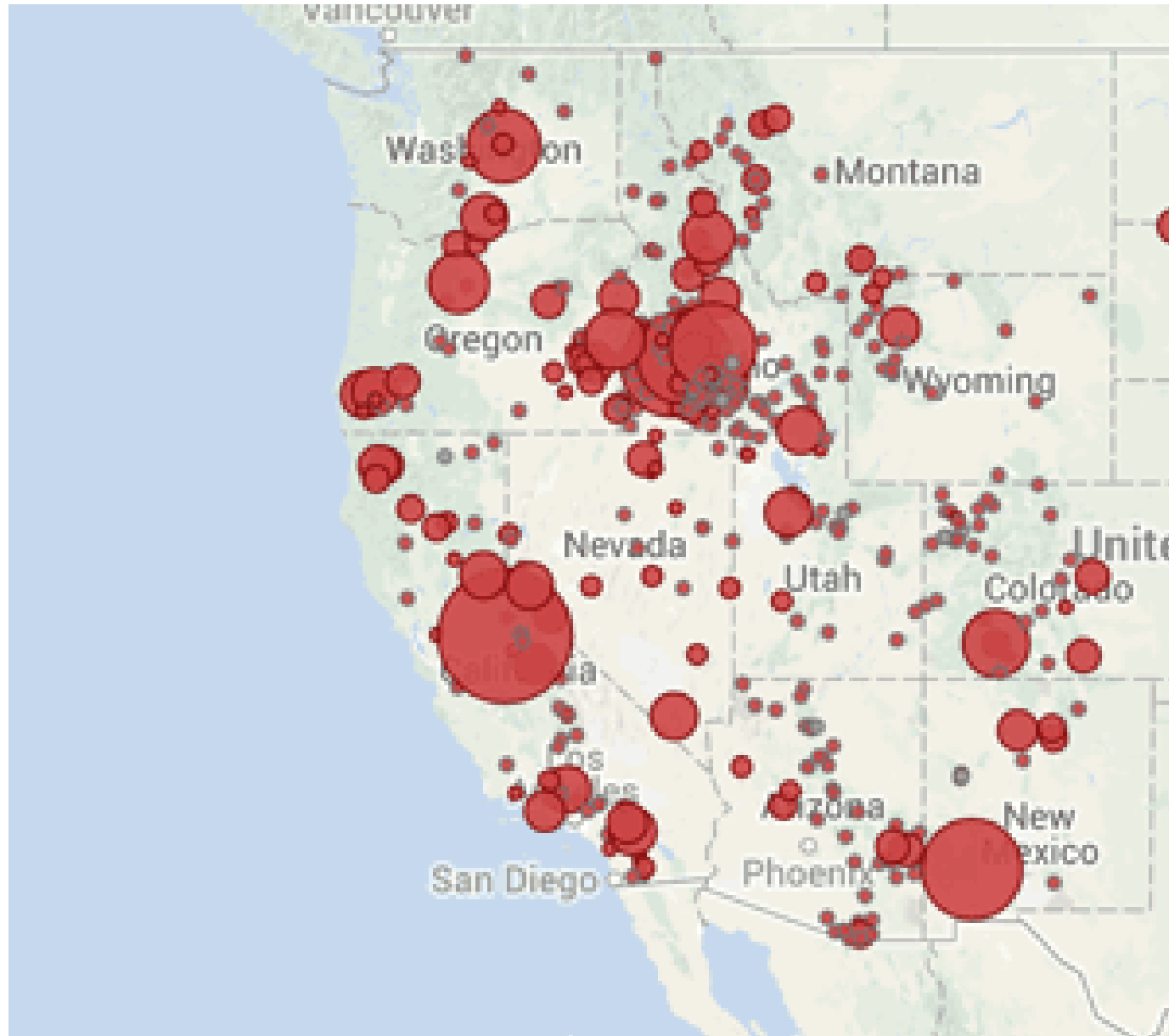


# Spatial-temporal Data - Continuous (space)

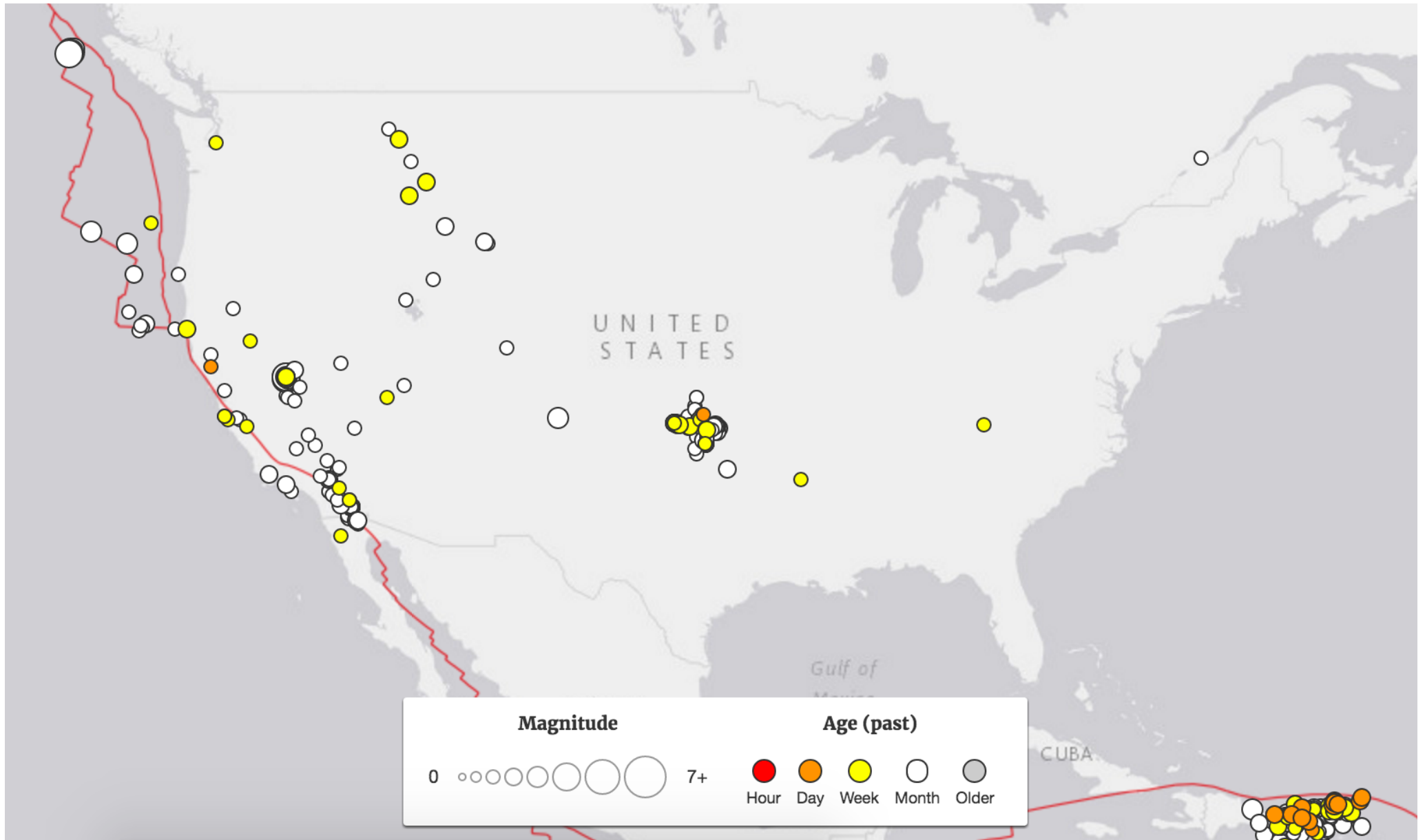
# Point Pattern Data - Time



# Point Pattern Data - Space



# Point Pattern Data - Space + Time



Sta 344 - Fall 2022