Introduction & Syllabus

Lecture 01

Dr. Colin Rundel

Course Details

Course Team

Instrutor

- Dr. Colin Rundel
  - colin.rundel@duke.edu / cr173@duke.edu / rundel@gmail.com

TAs

- Cathy Lee
- Braden Scherting

Course website(s)

- GitHub pages - https://sta344-644-fa23.github.io
  - HTML, PDF, and qmds of Slides
  - Lecture screencasts (youtube)
  - Suggested Readings
- Canvas - https://canvas.duke.edu/courses/7711
  - Announcements
  - Gradebook

Course Timetable

- Lectures (weekly) - Reuben-Cooke Building 130
  - Wednesdays, 11:45 - 1:00 pm
  - Fridays, 11:45 - 1:00 pm
- Labs (weekly) - Physics 130
  - Lab 01 - Mondays, 11:45 - 1:00 pm

Labs

- Attendance is expected
- Opportunity to work on course assignments with TA support
- Q&A + Worked examples
- Labs will begin in Week 3 (September 11th)

Announcements

Will be posted on Canvas (Announcements tool)

- Recent announcements available on overview page
- Check canvas regularly

Grading

We will be assessing you based on the following assignments,

Assignment	Type	Value	n	Assigned
Homeworks	Individual	50%	~6	~ Every other week
Midterms	In class	40%	2	~ Week 7 and 14
Project	Team	10%	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 or solutions policy

- We are aware that a huge amount of code 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 / solutions that are not explicitly cited will be treated as plagiarism, regardless of source.
- The same applies to the use of LLM like ChatGPT or GitHub Copilot - you are welcome to make use of these tools as the basis for your solutions but you must cite the tool when using it.

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

https://rstudio.stat.duke.edu

- 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 (4.3.1)
- latest RStudio (2023.06.2+561)
- 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 https://github.com/sta344-644-fa23
- 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 next week

- 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

Spatio-temporal data

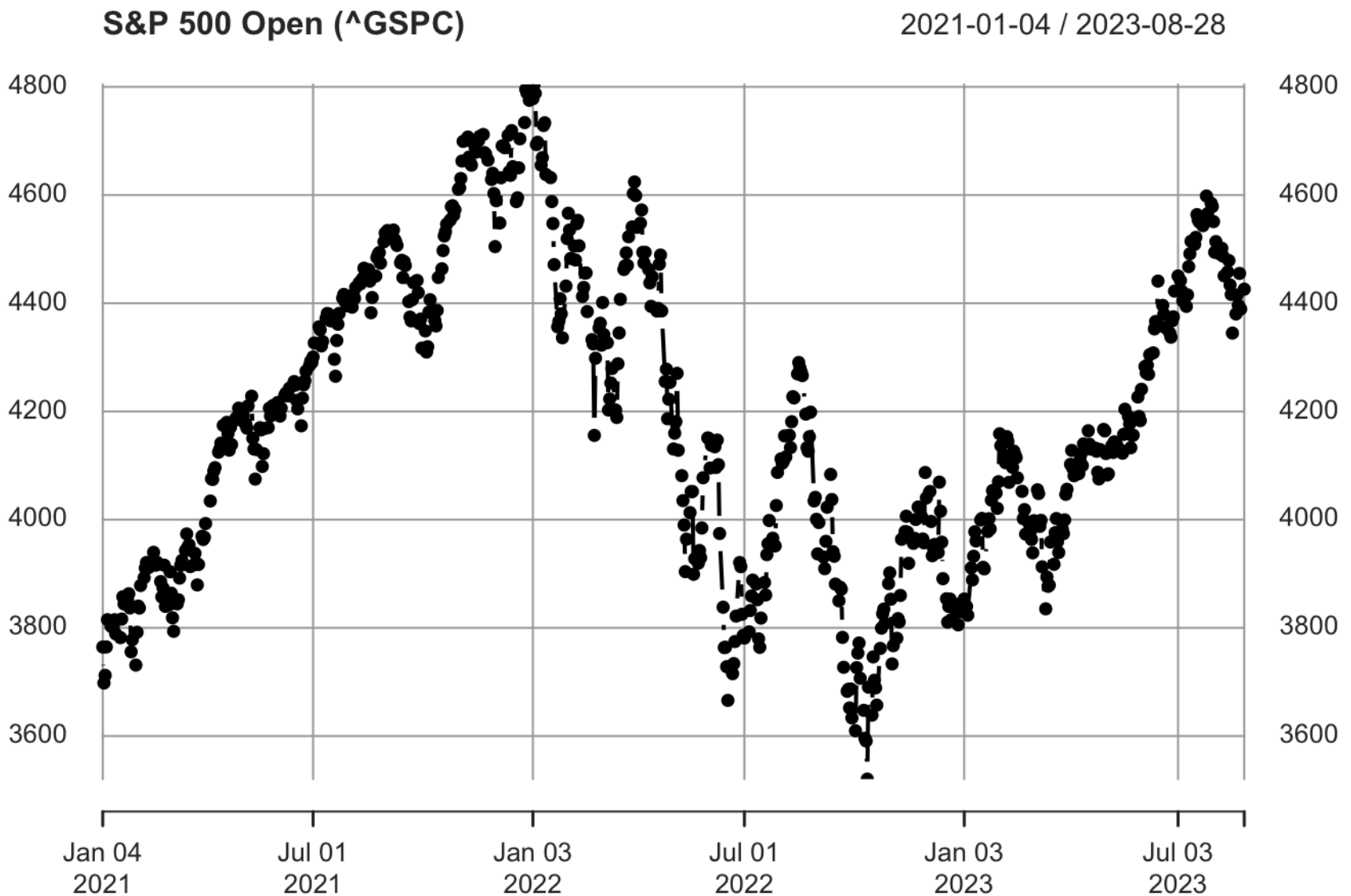
Course content

~ 1/3 theory

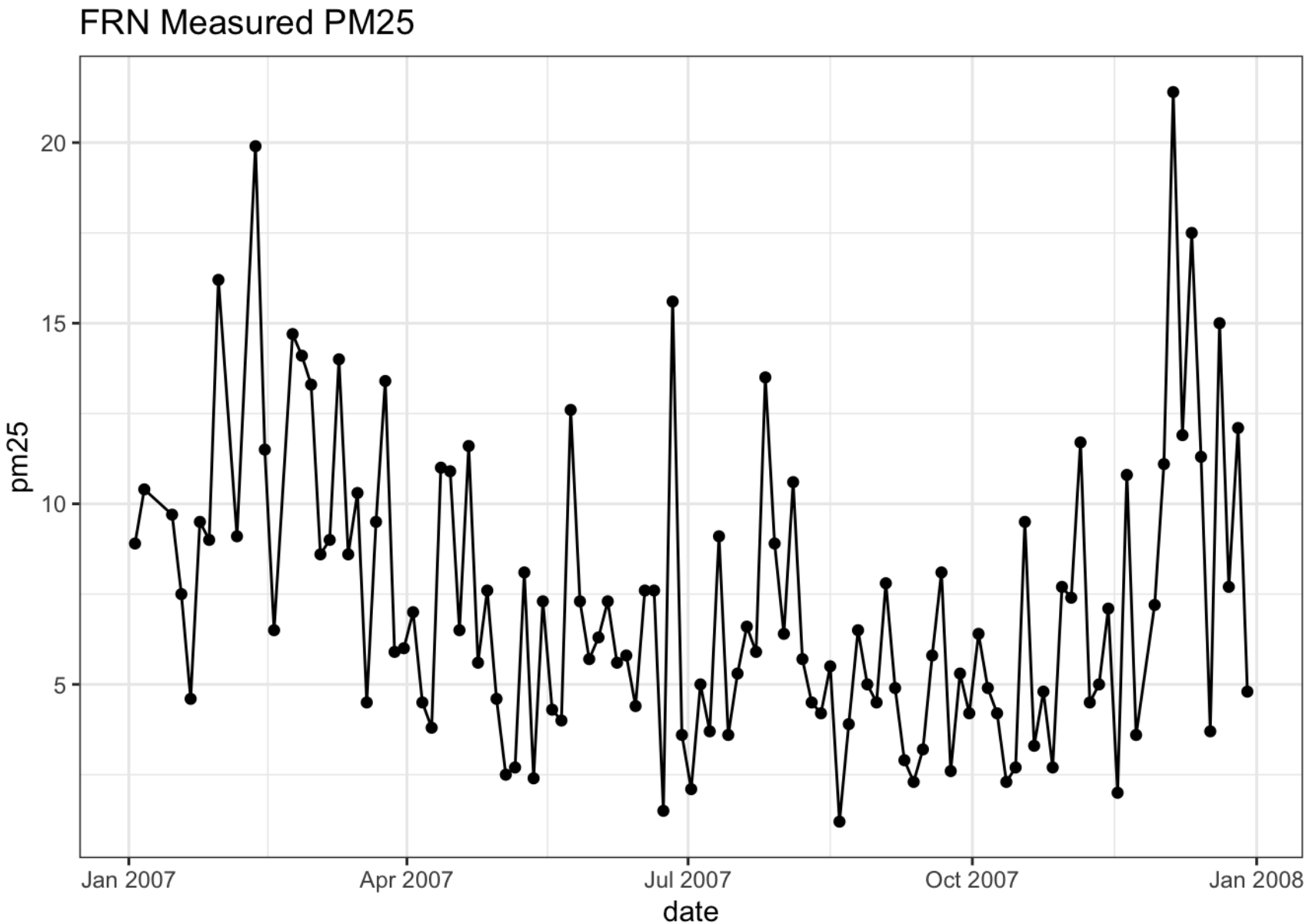
~ 1/3 application

~ 1/3 computation

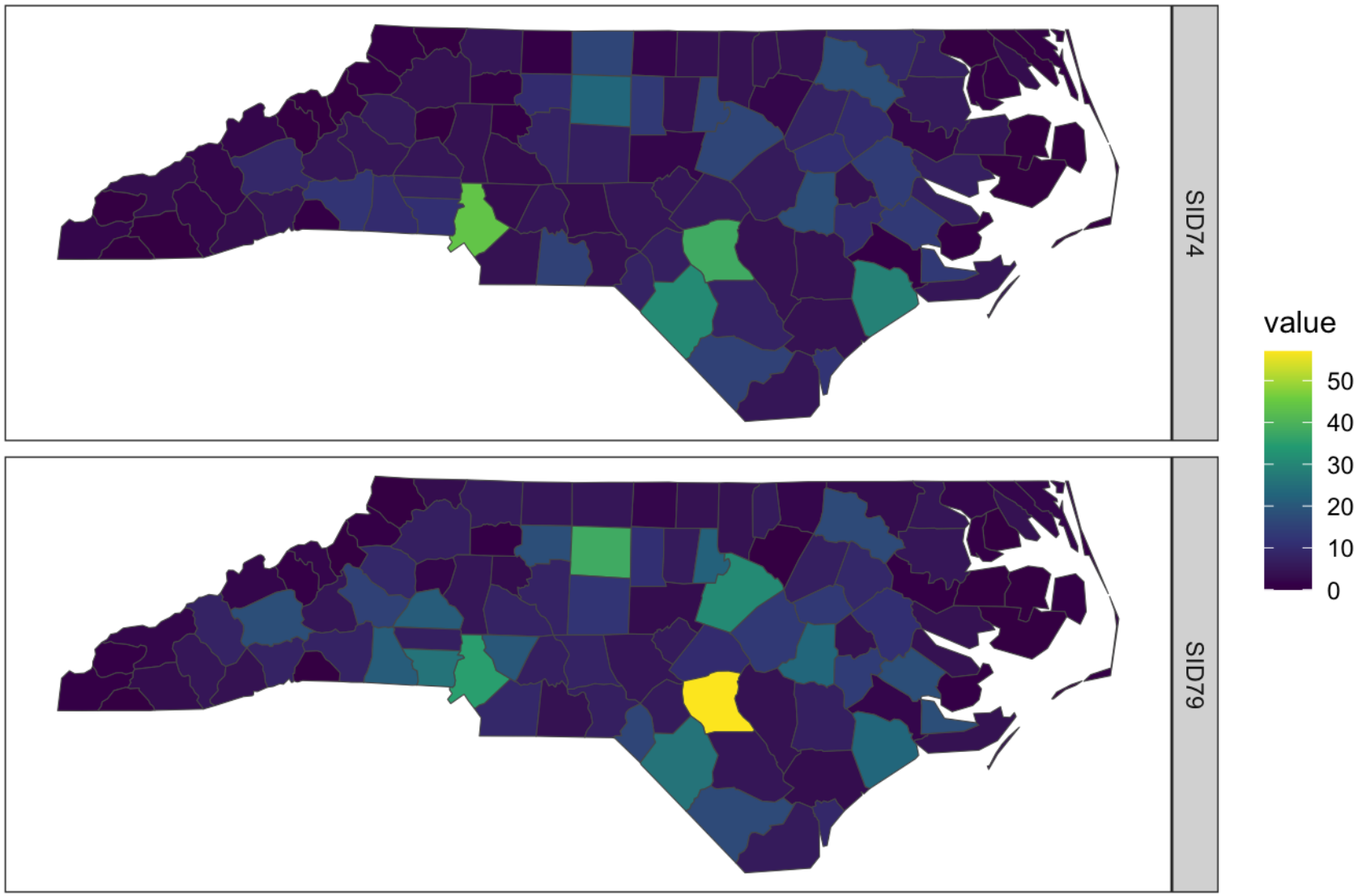
Time Series Data - Discrete



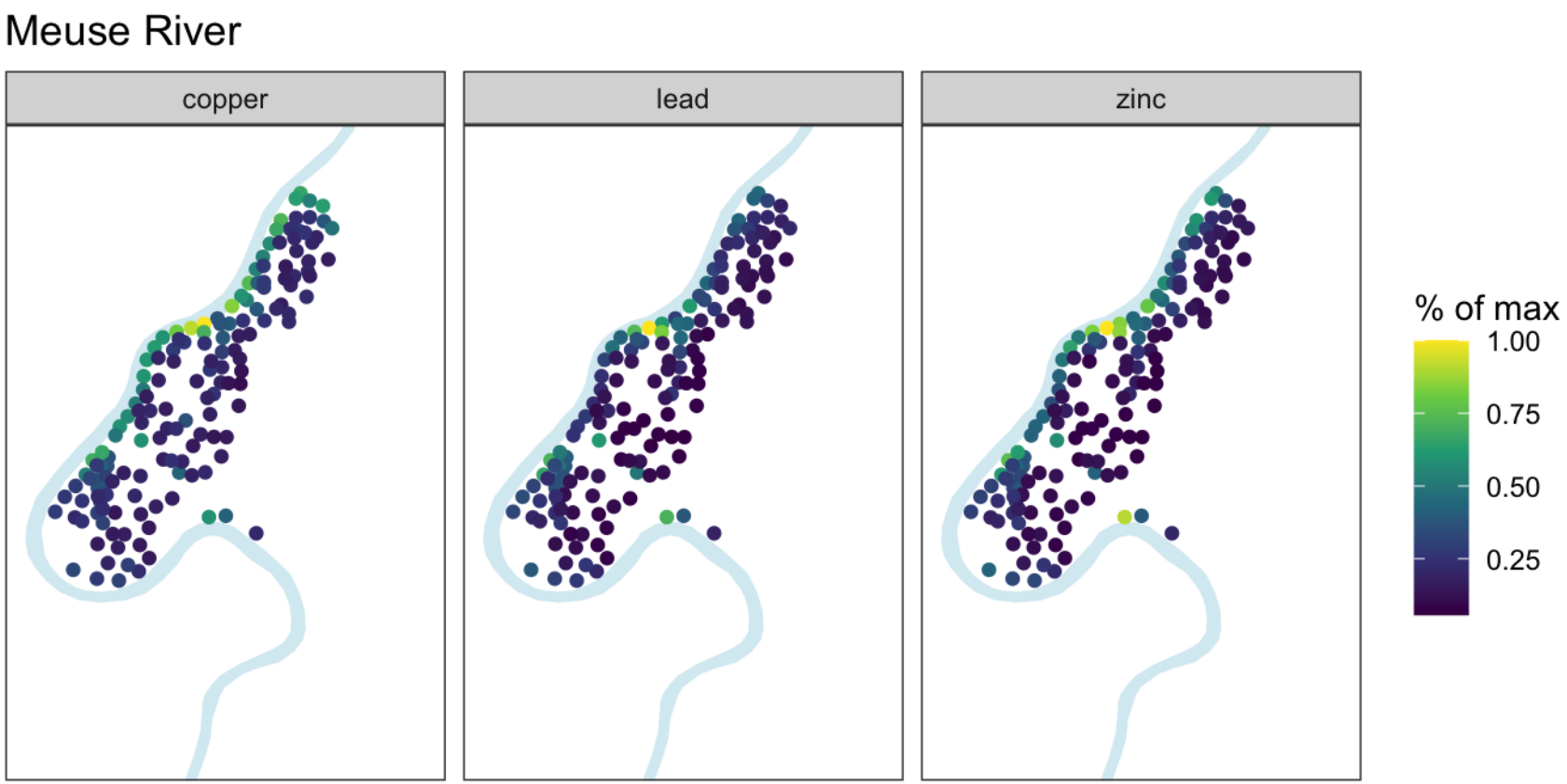
Time Series Data - Continuous



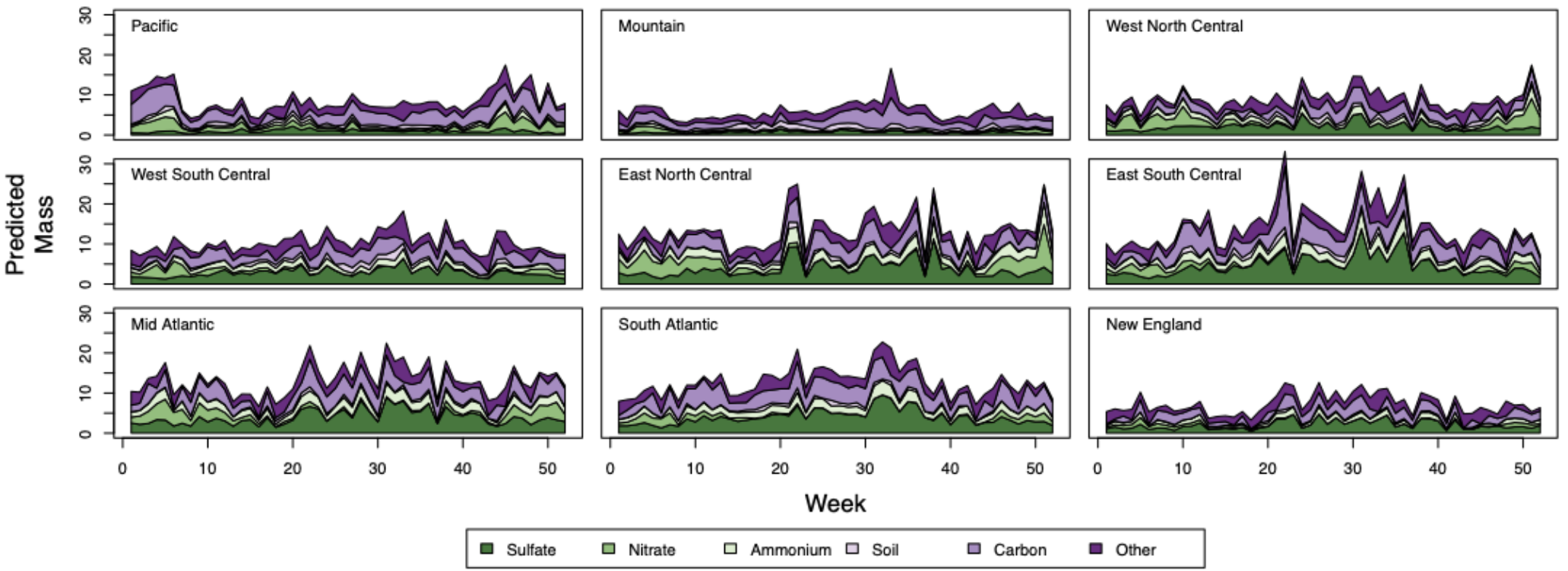
Spatial Data - Areal



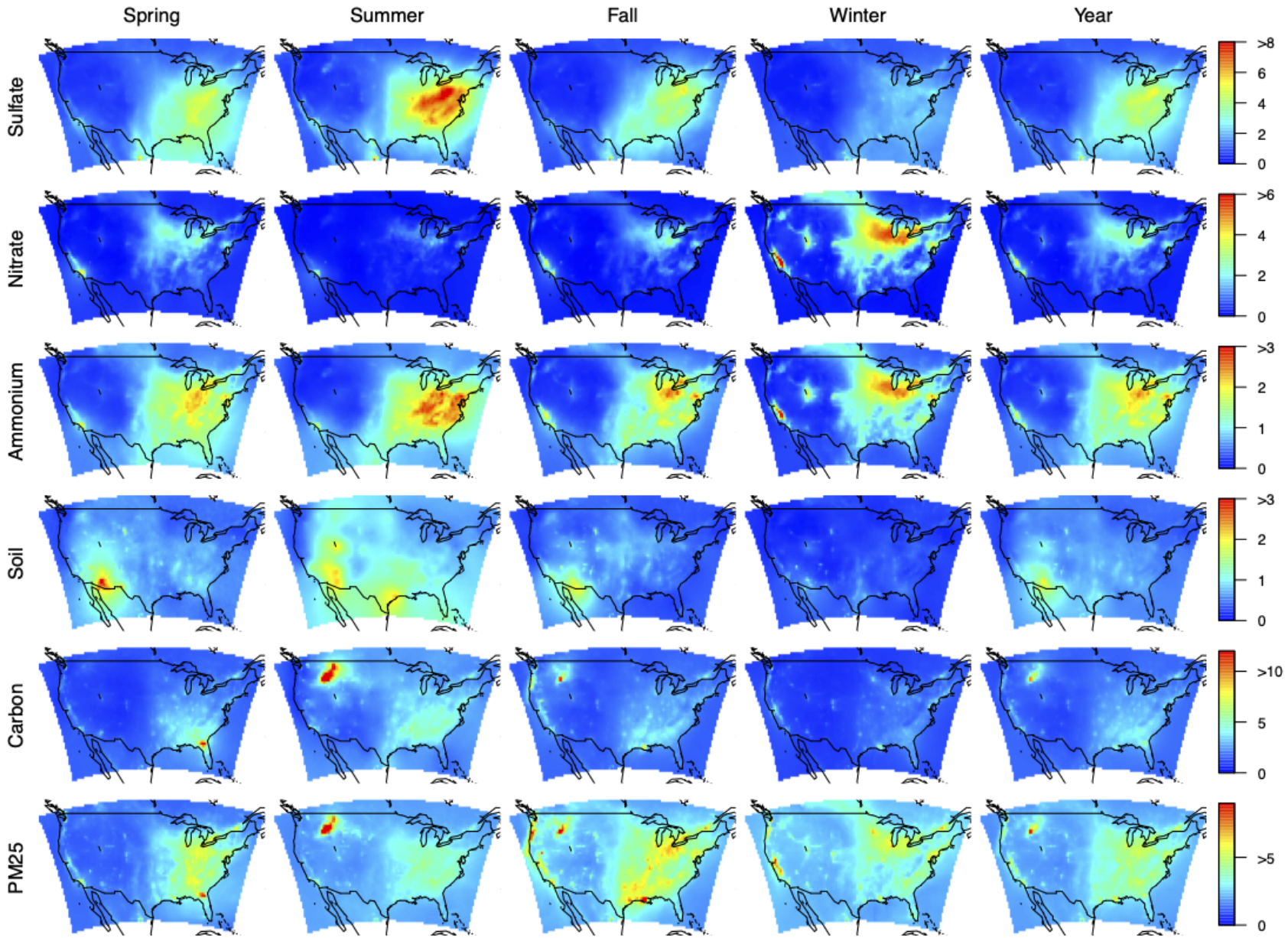
Spatial Data - Point referenced



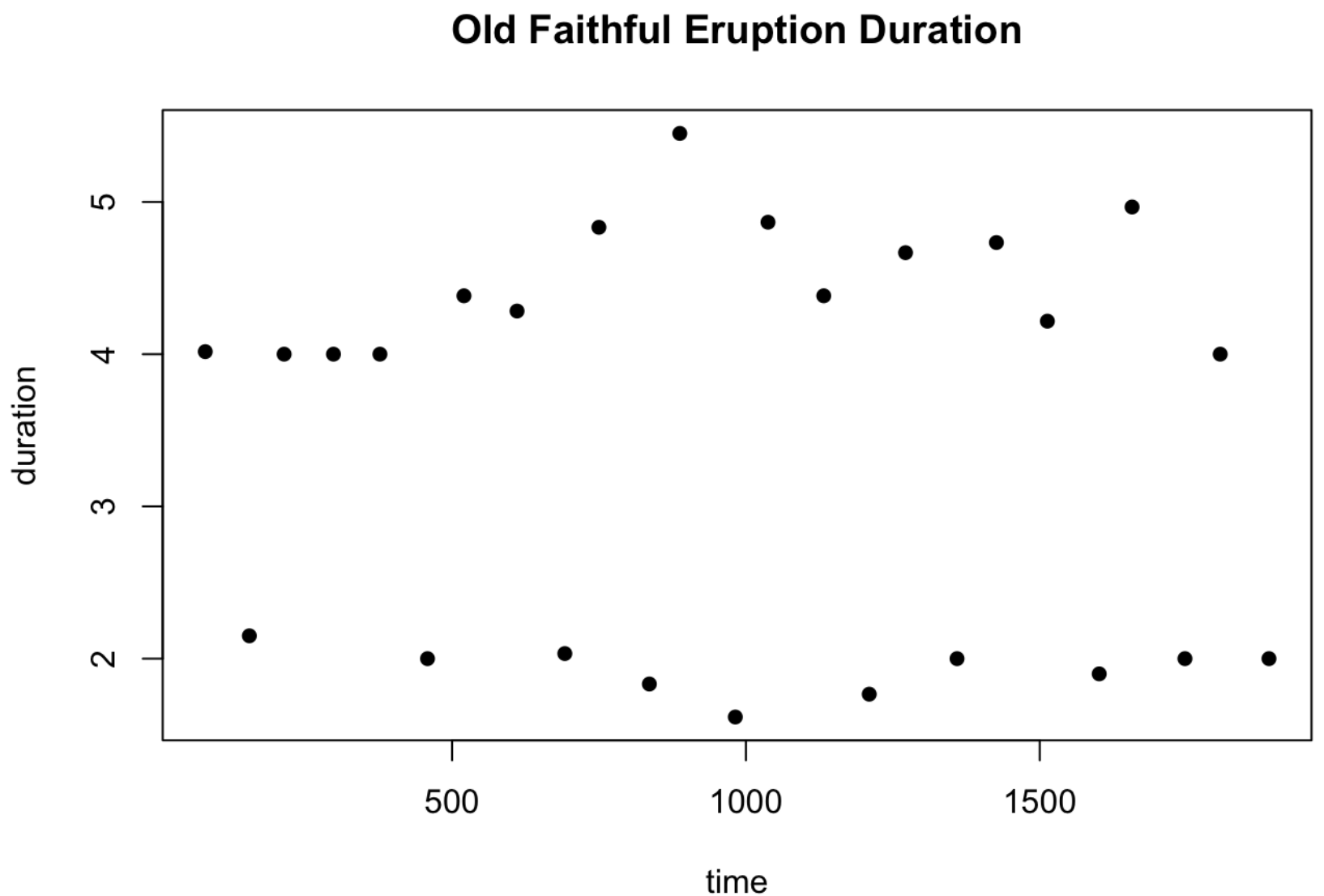
Spatial-temporal Data - Continuous (time)



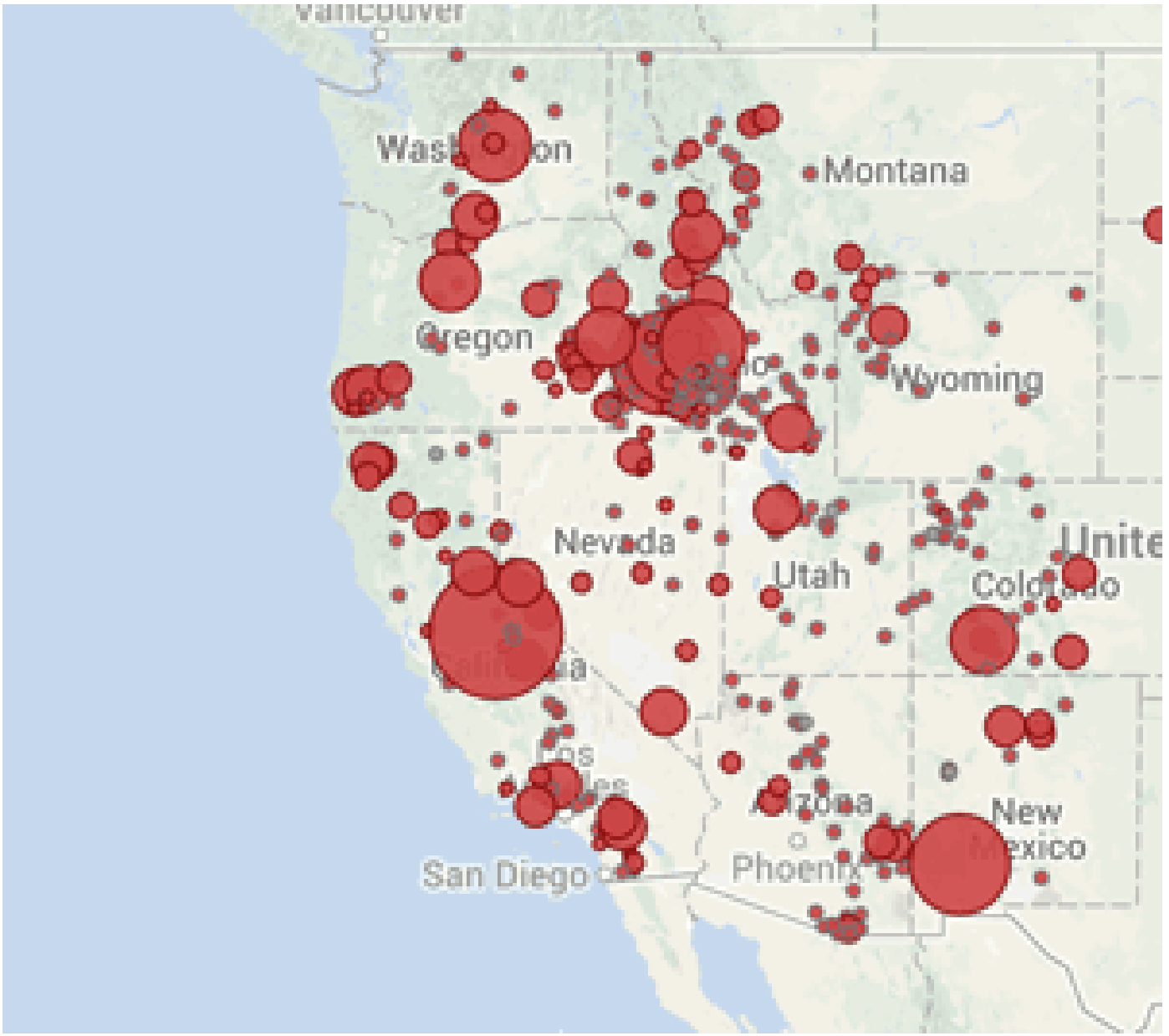
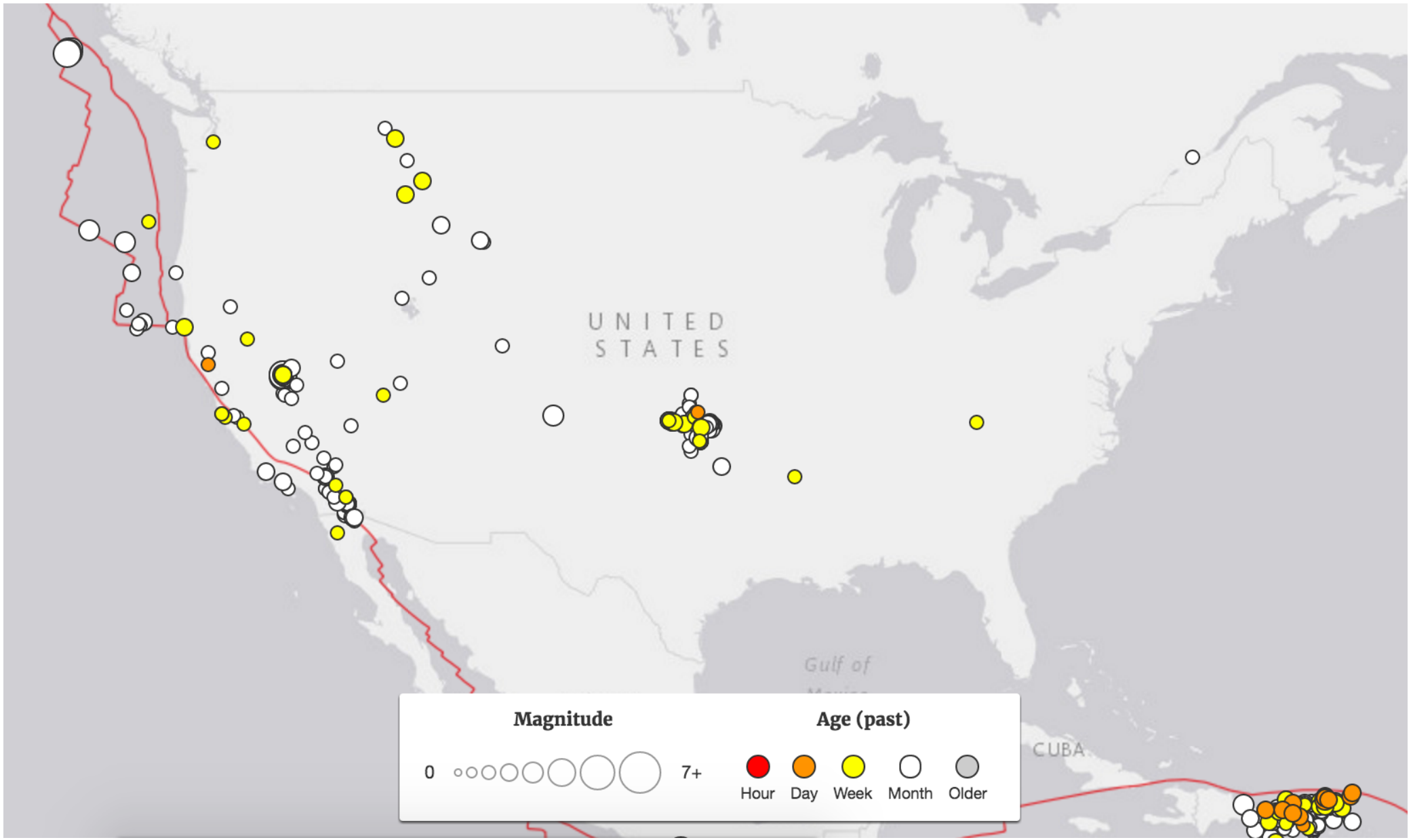
Spatial-temporal Data - Continuous (space)



Point Pattern Data - Time



Point Pattern Data - Space



Point Pattern Data - Space + Time