# Hands-On Vis

**Laura Garrison**, University of Bergen
laura.garrison@uib.no

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# What?

## Datasets

### Data Types

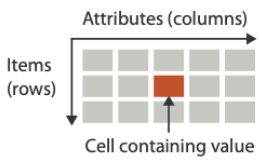
- Items
- Attributes
- Links
- Positions
- Grids

### Data and Dataset Types

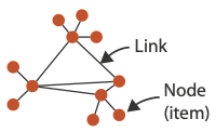
| Tables | Networks & Trees | Fields | Geometry | Clusters, Sets, Lists |
|---|---|---|---|---|
| Items | Items (nodes) | Grids | Items | Items |
| Attributes | Links | Positions | Positions | |
| | Attributes | Attributes | | |

### Dataset Types

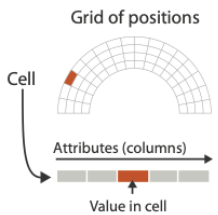
- Tables



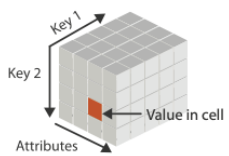

- Networks




- Fields (Continuous)




- *Multidimensional Table*




- *Trees*

- Geometry (Spatial)


### Dataset Availability

- Static

- Dynamic

## Attributes

### Attribute Types

- Categorical

- Ordered
  - *Ordinal*

  - *Quantitative*

### Ordering Direction

- Sequential

- Diverging

- Cyclic

# What?

# Why?

## Actions

### Analyze

- Consume
  - Discover
  - Present
  - Enjoy
- Produce
  - Annotate
  - Record
  - Derive

### Search

| | Target known | Target unknown |
|---|---|---|
| Location known | Lookup | Browse |
| Location unknown | Locate | Explore |

### Query

- Identify
- Compare
- Summarize

## Targets

### All Data

- Trends
- Outliers
- Features

### Attributes

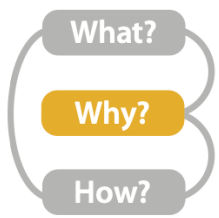
- One
  - Distribution
  - Extremes
- Many
  - Dependency
  - Correlation
  - Similarity

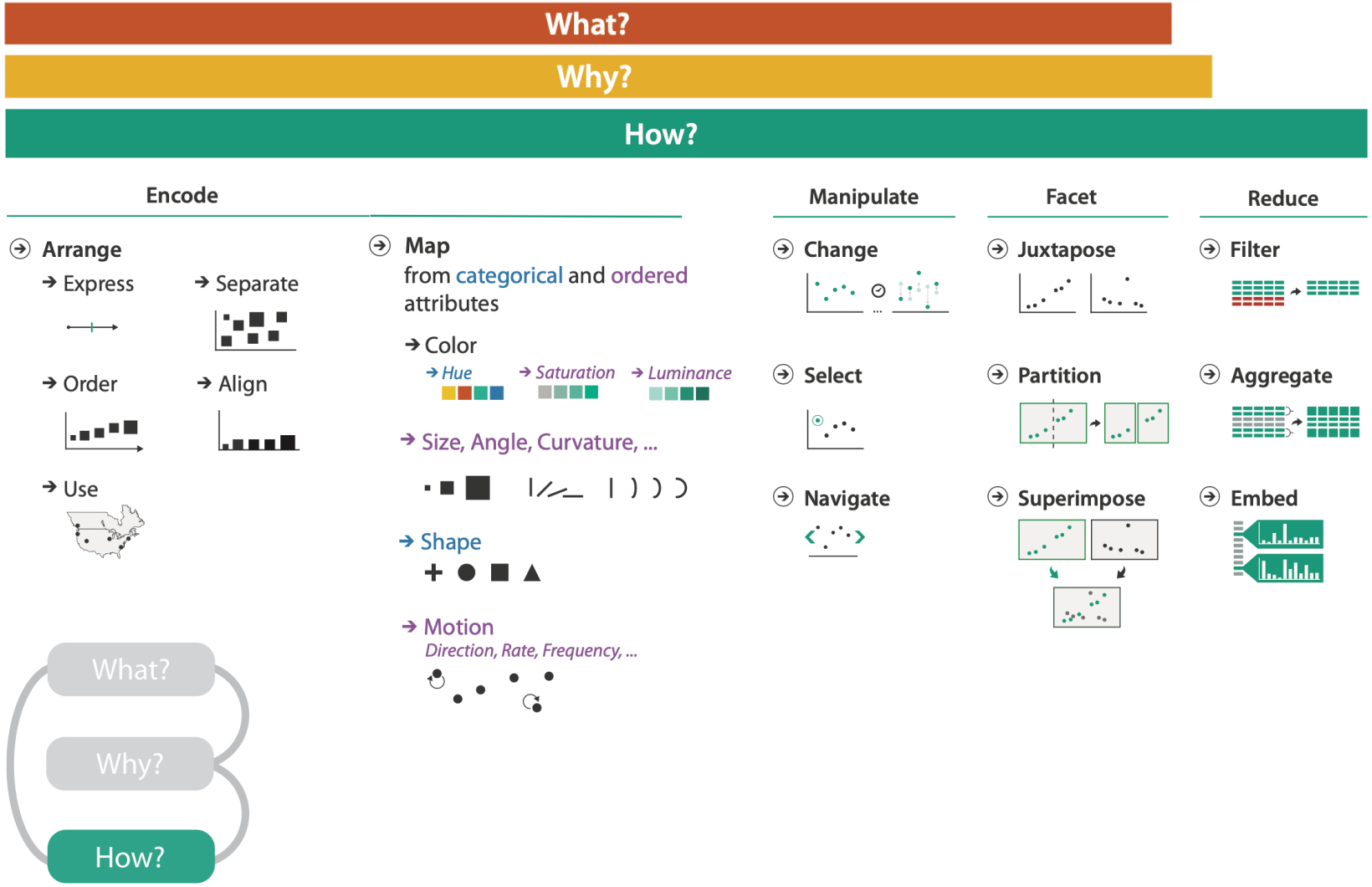
### Network Data

- Topology
- Paths

### Spatial Data

- Shape






# Data abstraction -> Task abstraction -> Visual + Interaction Encoding

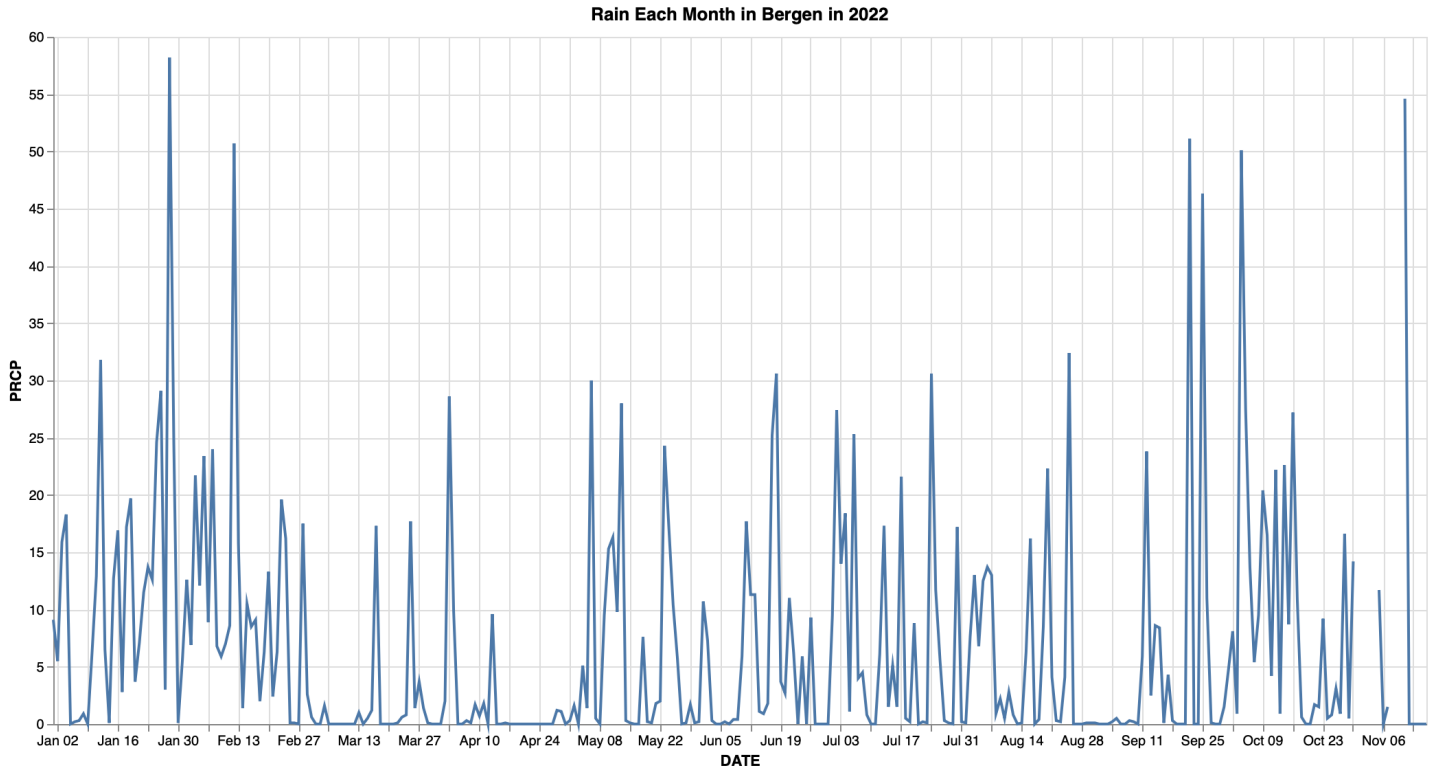
# Data & Context

- Weather in Bergen, Norway
- Dataset from NOAA Daily Summaries
  - https://www.ncdc.noaa.gov/cdo-web/search
  - Date range: *2022-01-01 to [most recent date available]*
  - City: *Bergen*
  - Data as a CSV

NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

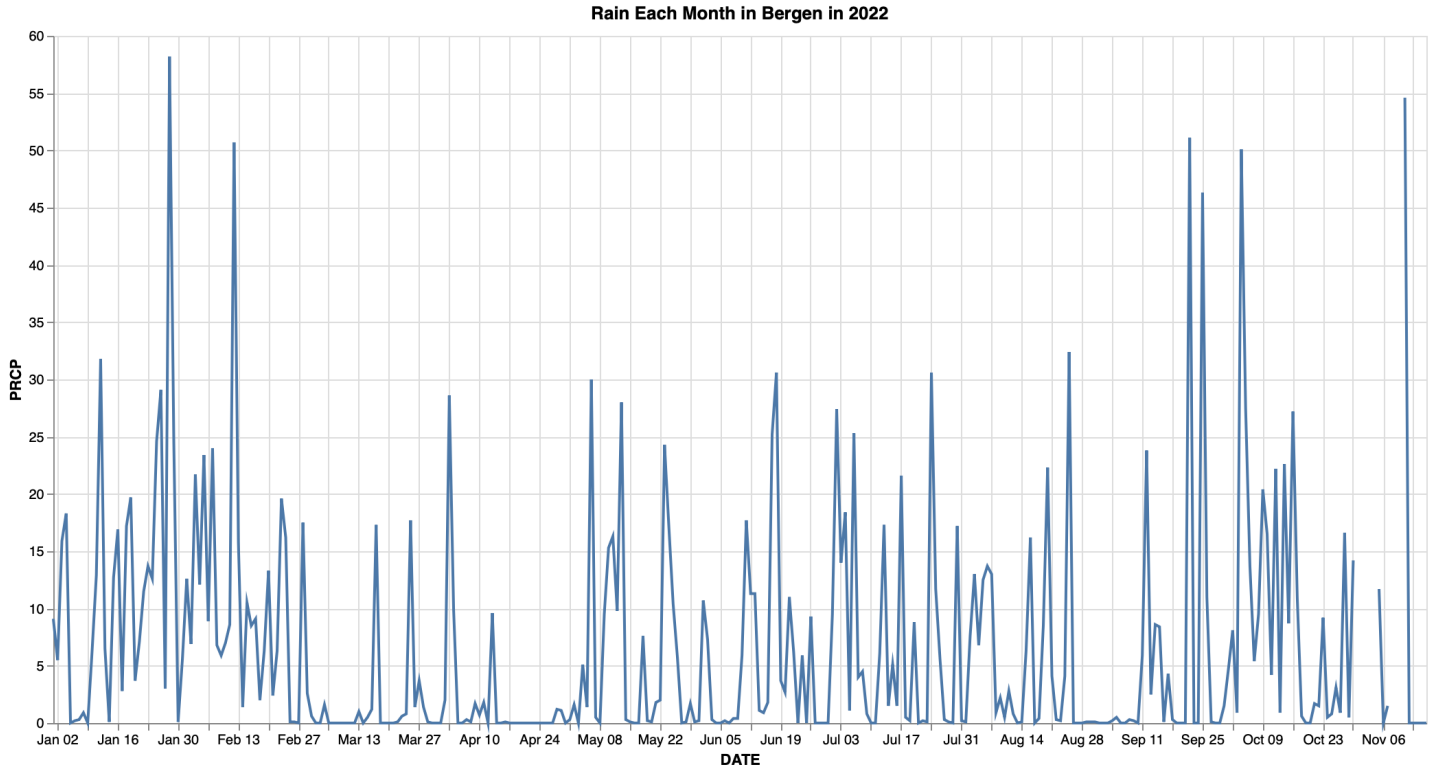
# Explore the data

- How much is it <u>really</u> raining in Bergen?
  - Target:
    - Bergen Florida weather station data for year 2022
  - Visual:
    - Time x-axis
    - Daily precip on y-axis



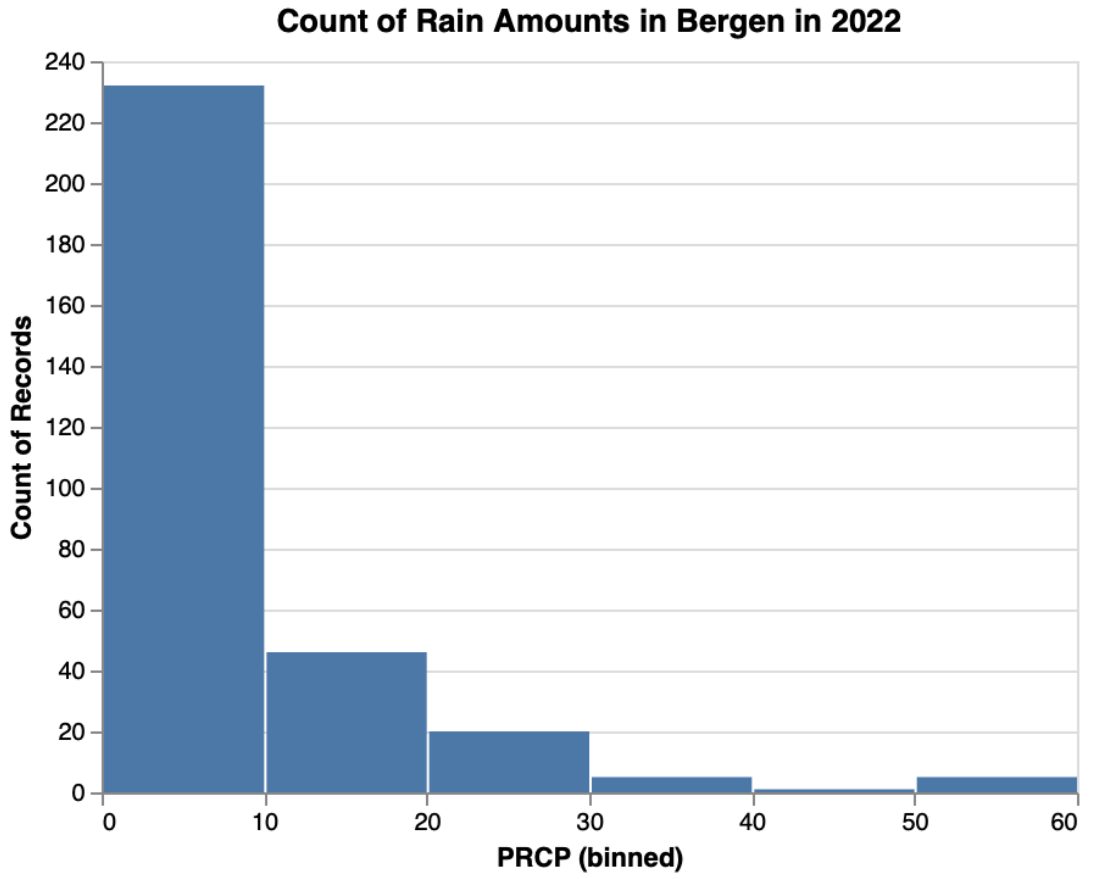
# Describe interesting finding(s)

- We seem to have a lot of days with no rain or small(er) amounts of rain.
- A few monster rain days...



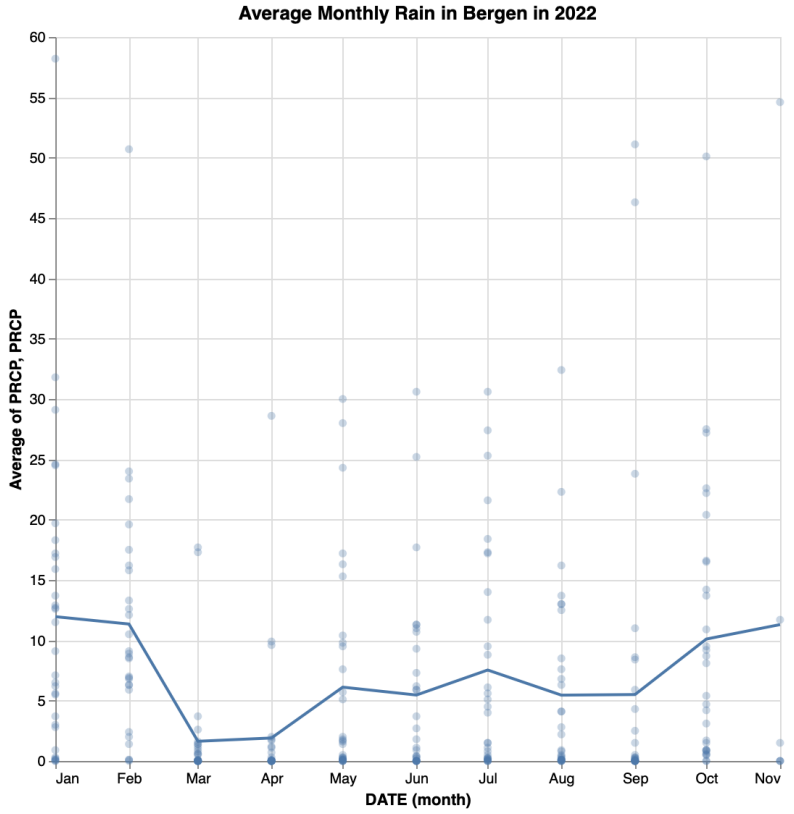
# Explain the unexpected finding(s)

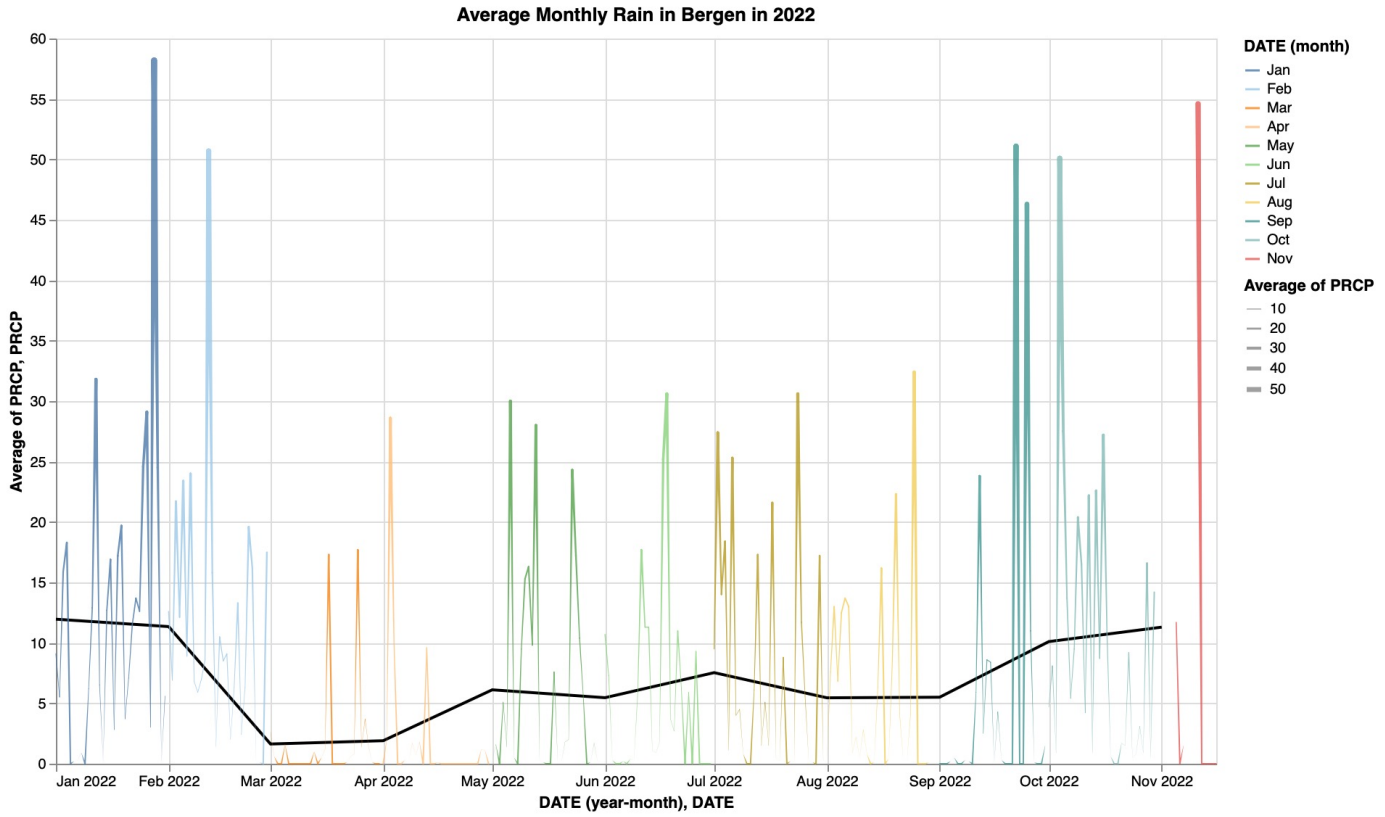
Find and summarize frequency distribution of precipitation over the dataset



# Explain the unexpected finding(s)

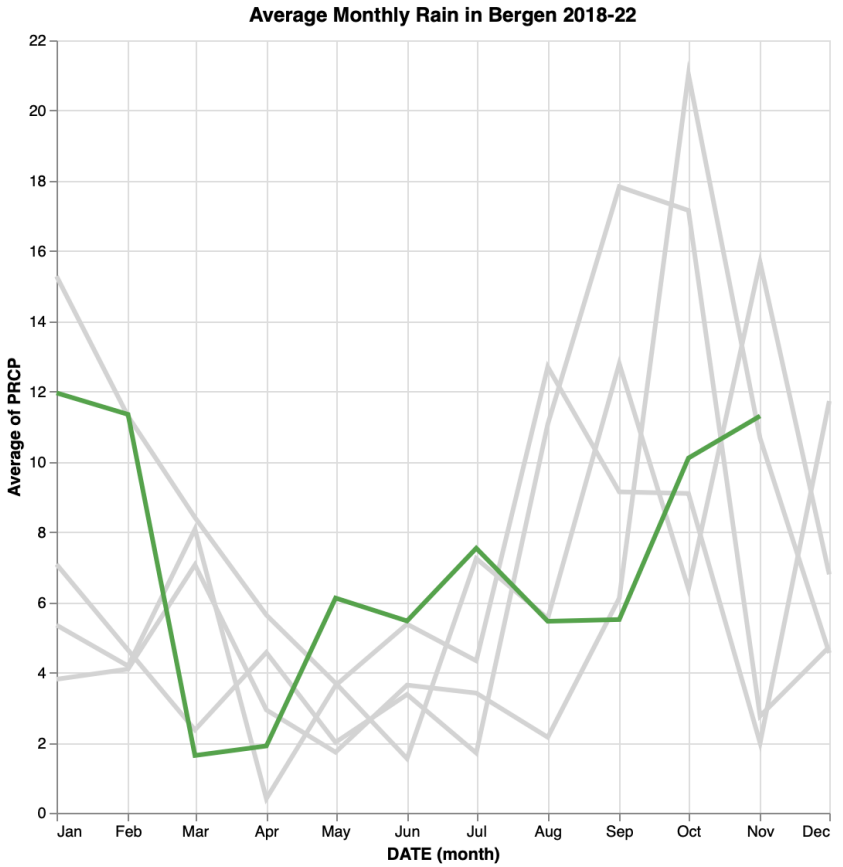
Identify the driest/wettest months (some alternatives to visualize):

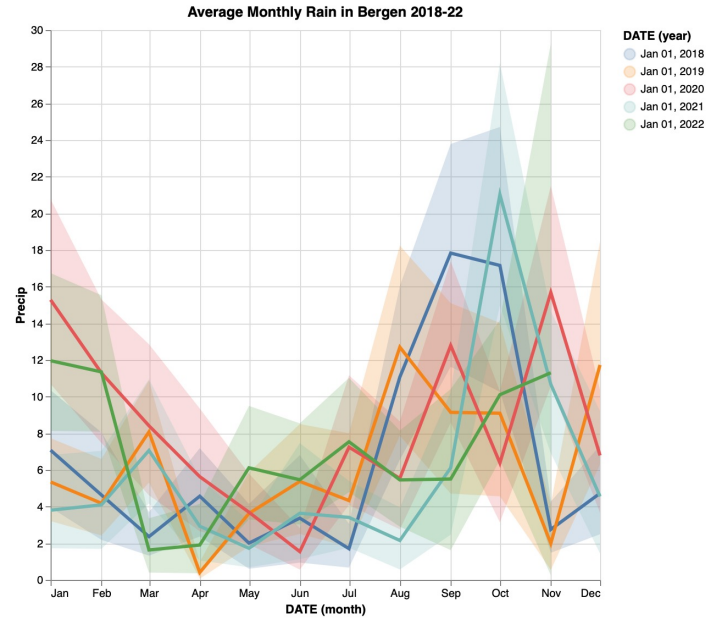


# Confirm if finding is unexpected

- What was precipitation like in previous years in Bergen?
- Do I see the same pattern?



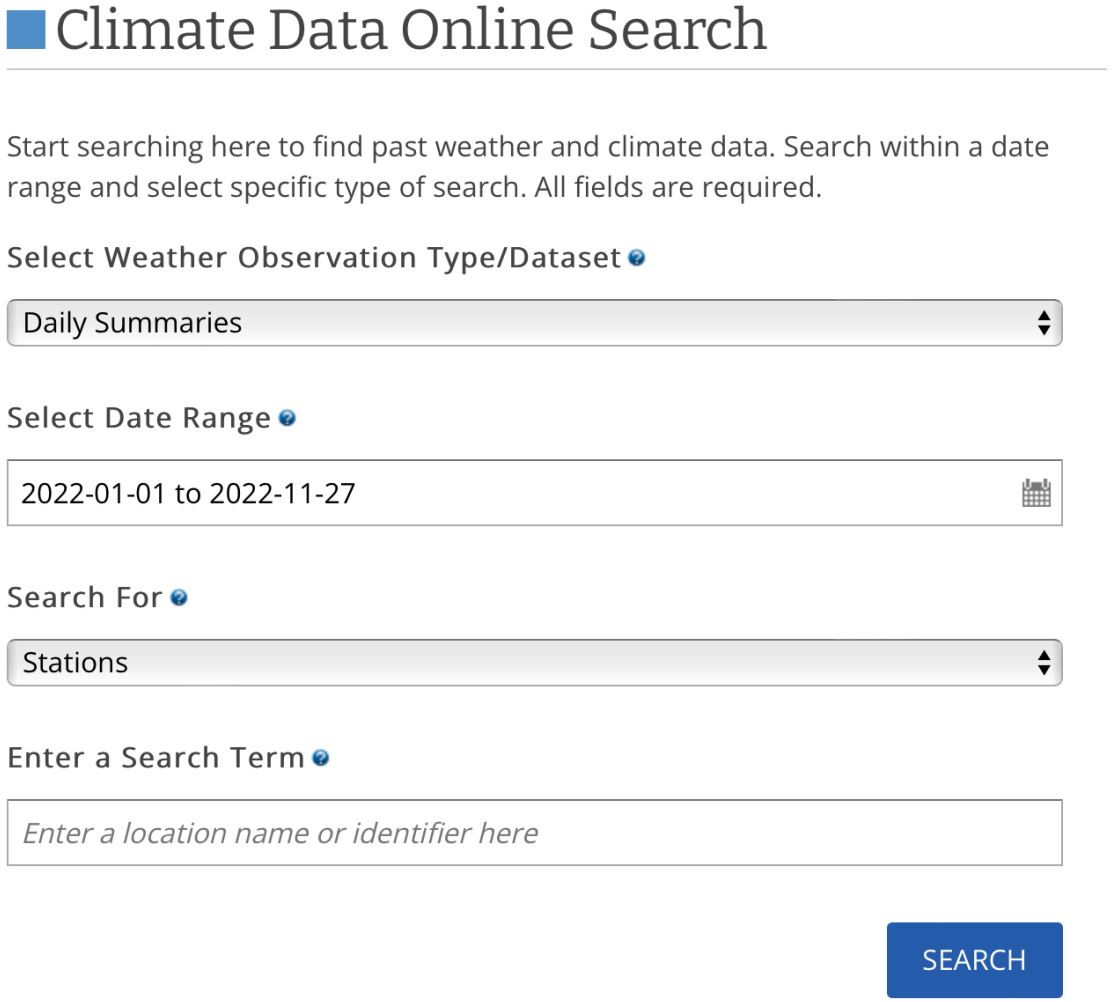
# More questions!

- How does **temperature** relate to these precipitation patterns?

# Your Turn ☺

# Data & Context

- Weather in your city (or another place you're interested in)
  - Daily Summaries weather from NOAA
    - https://www.ncdc.noaa.gov/cdo-web/search
- Helpful description of variables:
  - https://www.ncei.noaa.gov/pub/data/cdo/documentation/LCD_documentation.pdf



# Tasks

- In pairs, use Altair to visually:
  - ...explore the data
  - ...describe interesting finding(s)
  - ...explain the unexpected finding(s)
  - ...confirm if the finding(s) is unexpected
  - **Repeat as much/as often as you like with different questions from exploring the data
- at ~16:00 you will each have ~5 min to share your process and interesting findings with the group

# Useful Links

- Vega-Altair tutorial for setting up a basic vis: https://altair-viz.github.io/getting_started/starting.html
- Vega-Altair encodings reference: https://altair-viz.github.io/user_guide/encoding.html
- The basic charts directory of chart specifications in ./day_05/

# Questions?
# Have fun ☺

# Further Reading & Acknowledgement

- Web material for Visual Analysis & Design: https://www.cs.ubc.ca/~tmm/talks/vadbook (source material for many slides in this lecture)
- Interactive Visual Data Analysis


Munzner, T. (2014). Visualization analysis and design. AK Peters Visualization Series, CRC Press, Visualization Series. Chp 2.