Hands-On Vis

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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

Attributes (columns)
Items (rows)
Cell containing value

→ Networks

Link
Node (item)

→ Fields (Continuous)

Grid of positions
Cell
Attributes (columns)
Value in cell

→ Multidimensional Table

Key 1
Key 2
Value in cell
Attributes

→ Trees

→ Geometry (Spatial)

Position

Attributes

→ Attribute Types

→ Categorical

→ Ordered

→ *Ordinal*

→ *Quantitative*

→ Ordering Direction

→ Sequential

→ Diverging

→ Cyclic
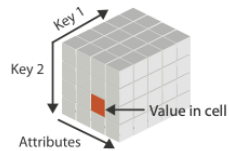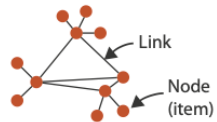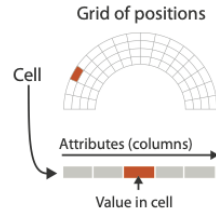
→ Dataset Availability

→ Static

→ Dynamic

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What?

Why?

✎ Actions

➔ Analyze
➔ Consume
- ➔ *Discover*
- ➔ *Present*
- ➔ *Enjoy*

➔ Produce
- ➔ *Annotate*
- ➔ *Record*
- ➔ *Derive*
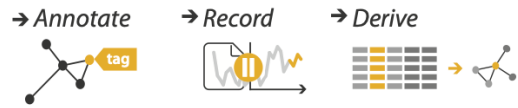
➔ Search

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

➔ Query
- ➔ Identify
- ➔ Compare
- ➔ Summarize

◎ Targets
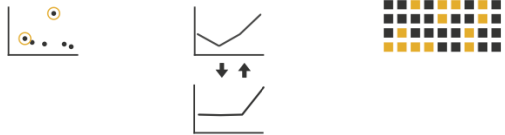
➔ All Data
- ➔ Trends
- ➔ Outliers
- ➔ Features

➔ Attributes
- ➔ One
  - ➔ *Distribution*
    - ➔ *Extremes*
- ➔ Many
  - ➔ *Dependency*
  - ➔ *Correlation*
  - ➔ *Similarity*
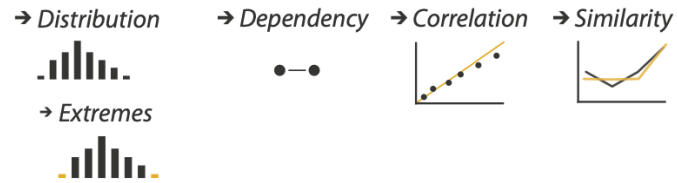
➔ Network Data
- ➔ Topology
  - ➔ *Paths*

➔ Spatial Data
- ➔ Shape
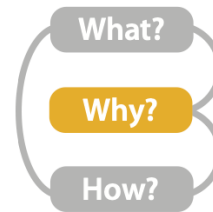
What?
Why?
How?

3

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

Explore the data

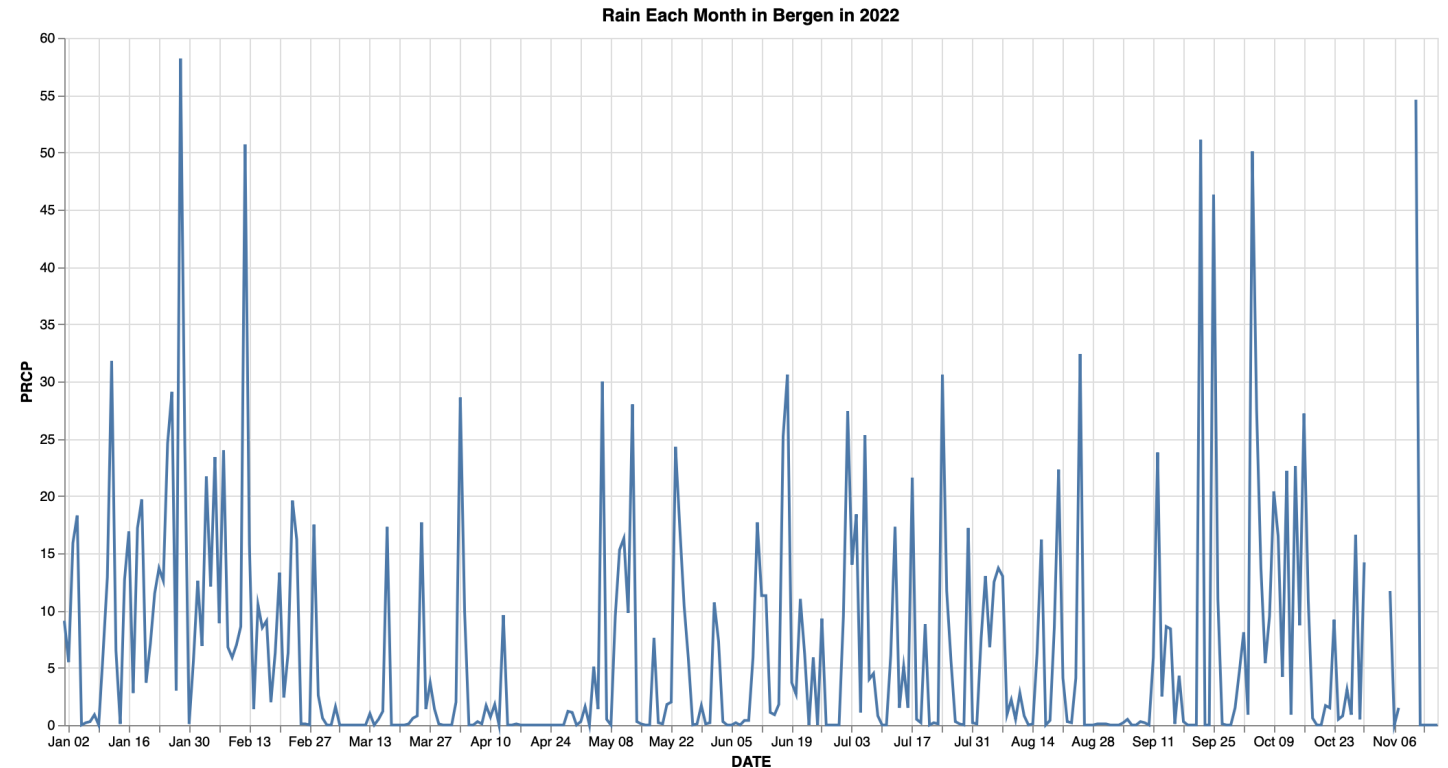- How much is it <u>really</u> raining in Bergen?
  - Target:
    - Bergen Florida weather station data for year 2022
  - Visual:
    - Time x-axis
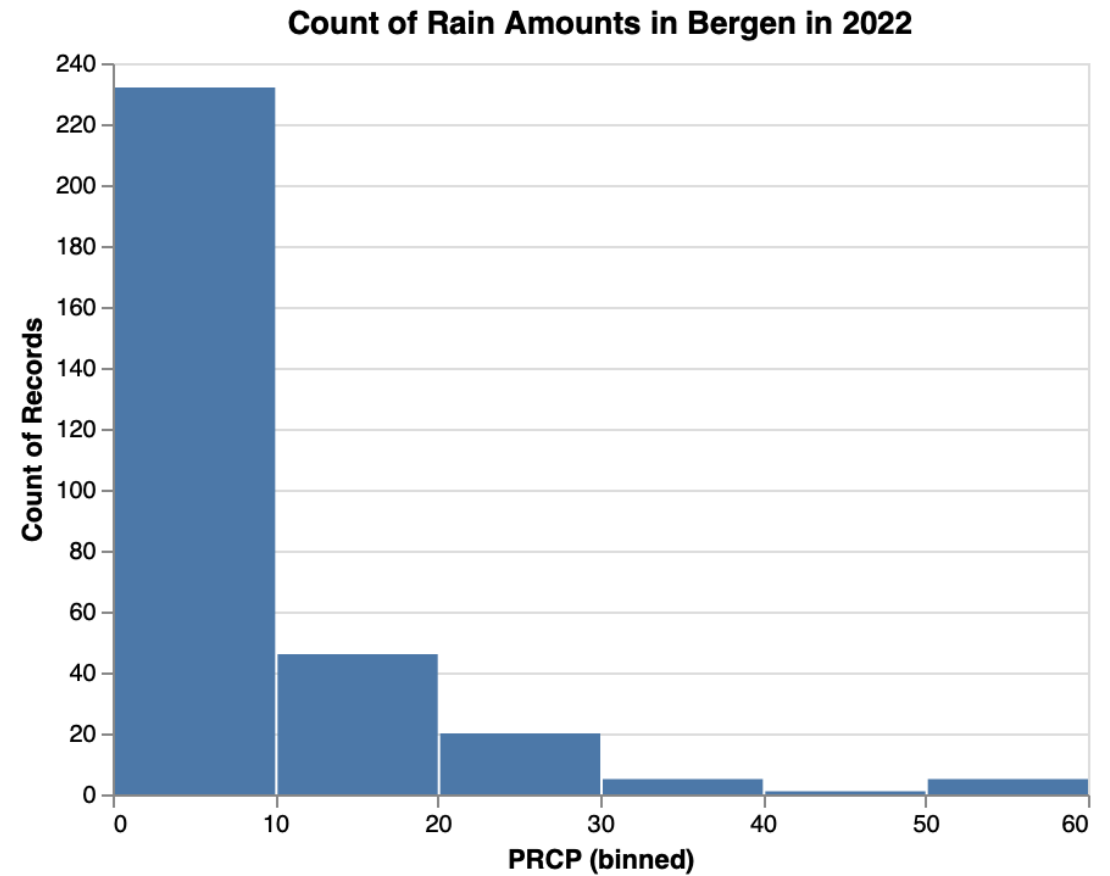   - Daily precip on y-axis

Rain Each Month in Bergen in 2022
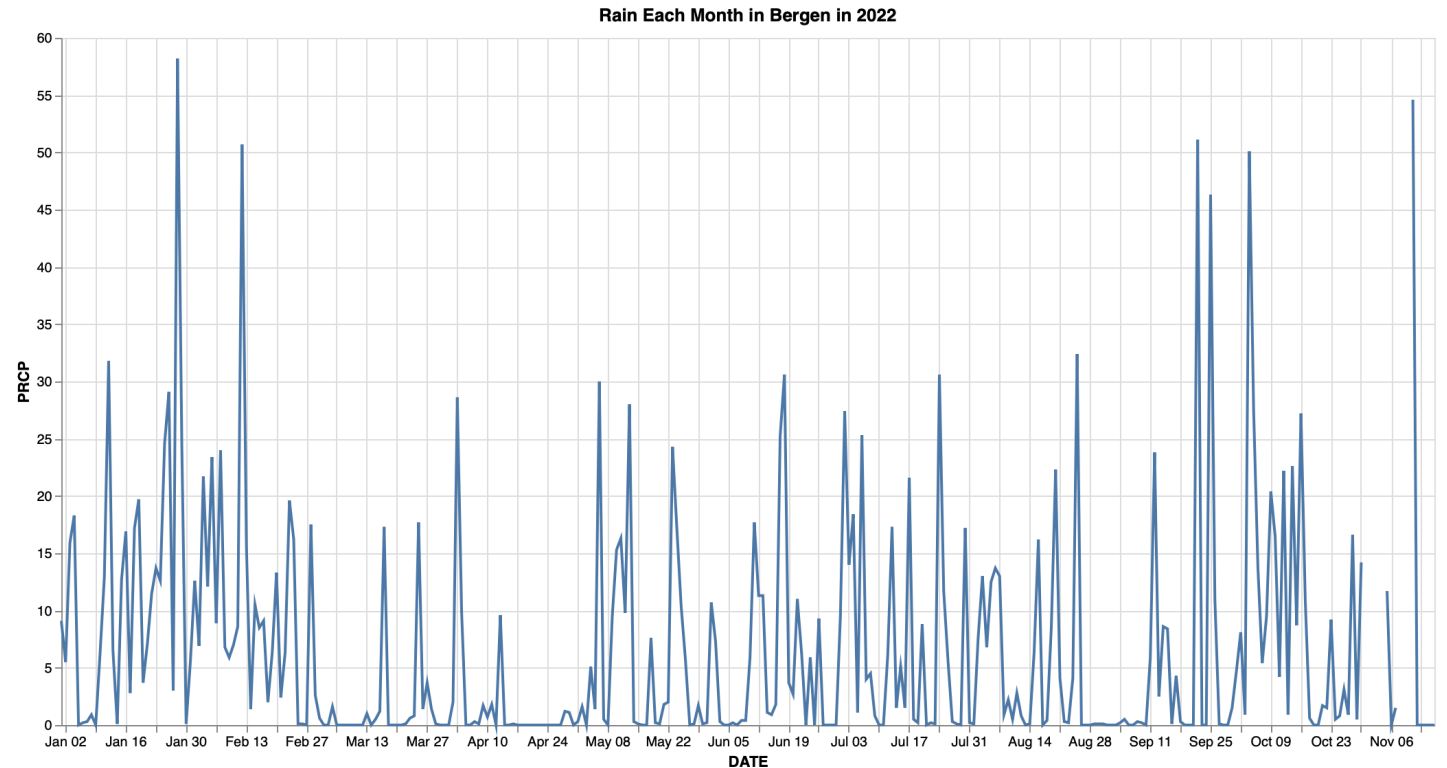
Describe interesting finding(s)

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

- A few monster rain days...

Rain Each Month in Bergen in 2022

Explain the unexpected finding(s)

Find and summarize frequency distribution of precipitation over the dataset

Count of Rain Amounts in Bergen in 2022

Explain the unexpected finding(s)

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

Average Monthly Rain in Bergen in 2022

Average Monthly Rain in Bergen in 2022
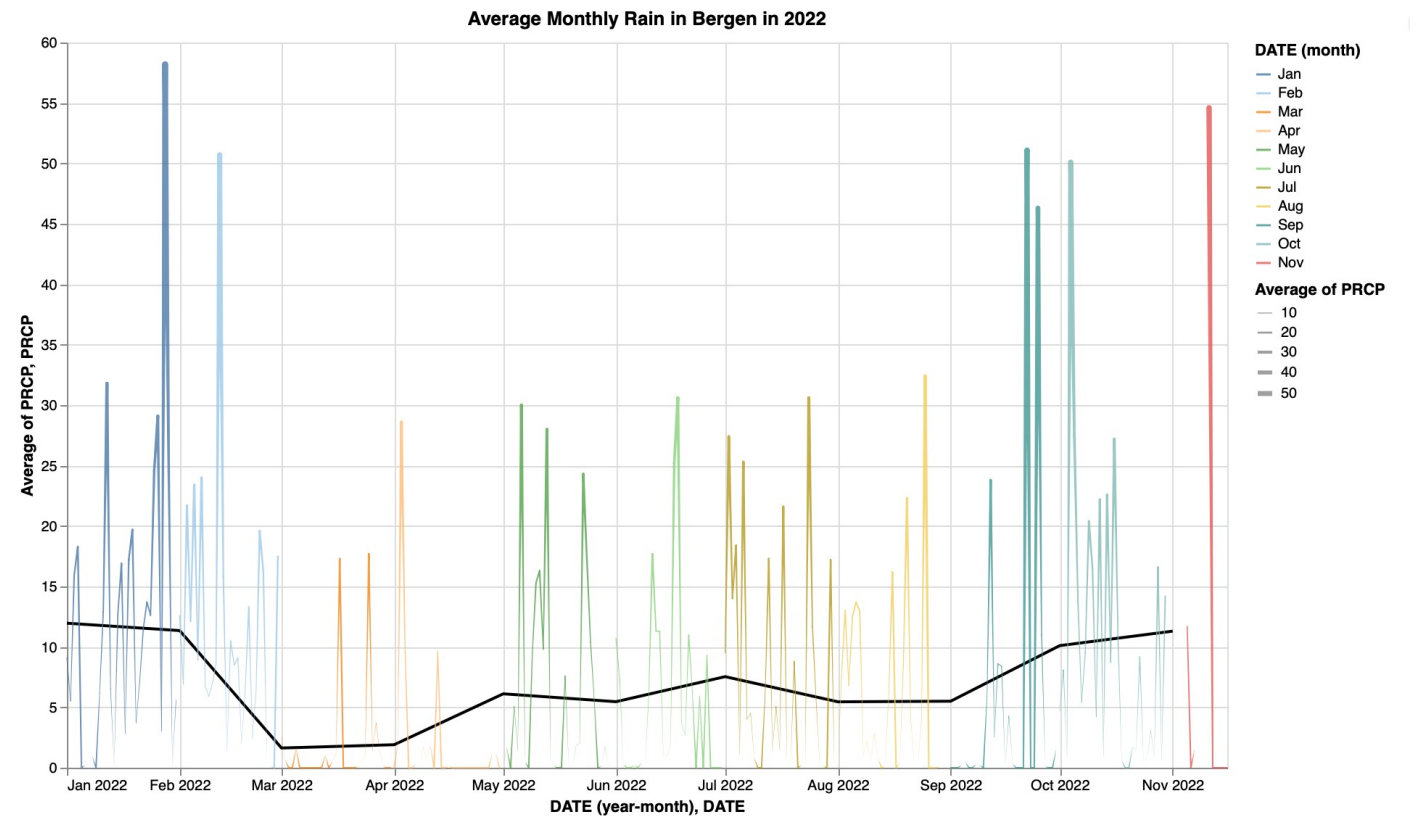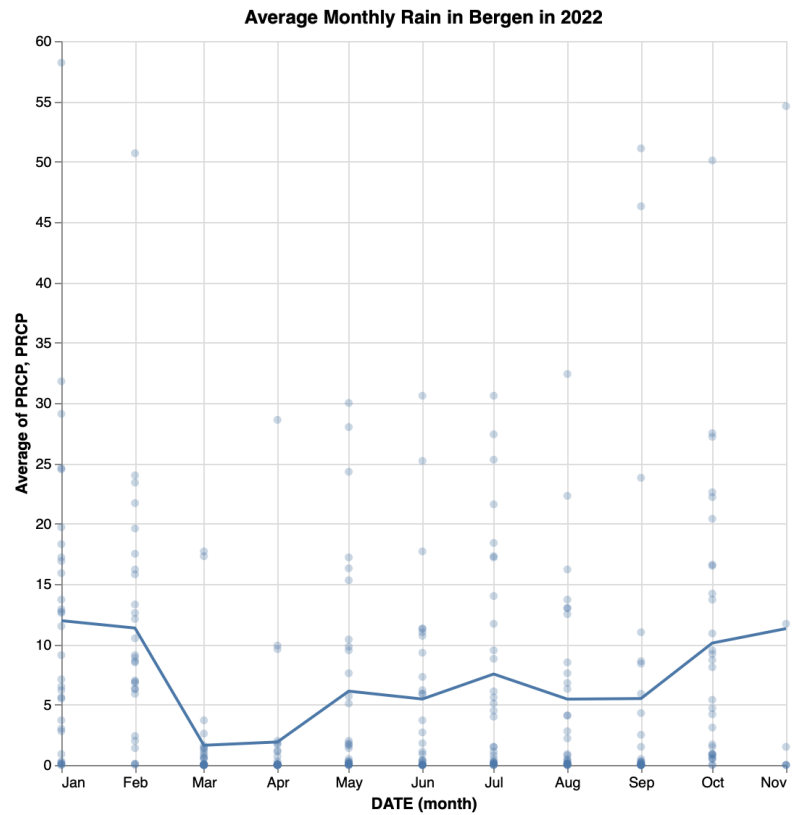
Confirm if finding is unexpected

- What was precipitation like in previous years in Bergen?

- Do I see the same pattern?

Average Monthly Rain in Bergen 2018-22

Average Monthly Rain in Bergen 2018-22
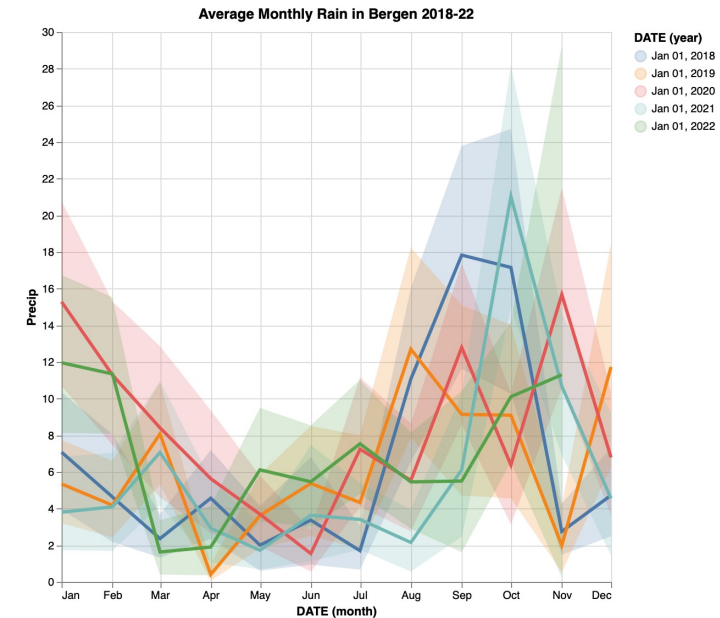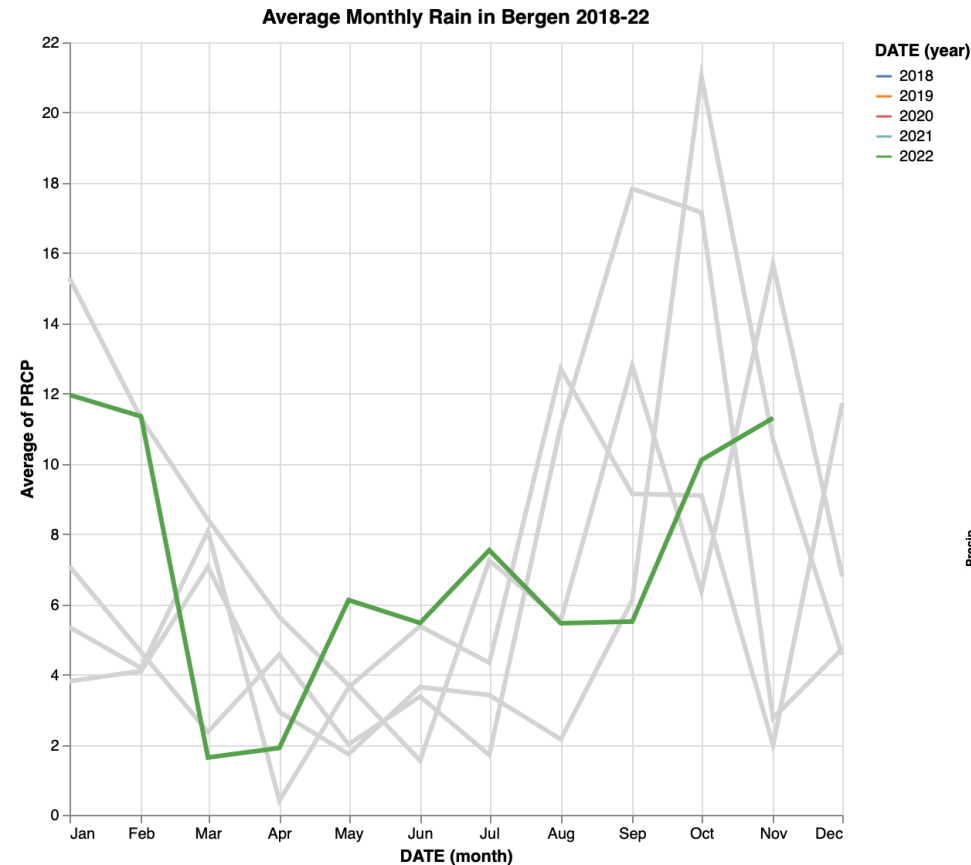
More questions!

- 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

■ Climate Data Online Search

Start searching here to find past weather and climate data. Search within a date range and select specific type of search. All fields are required.

Select Weather Observation Type/Dataset ❓

Daily Summaries

Select Date Range ❓

2022-01-01 to 2022-11-27

Search For ❓

Stations

Enter a Search Term ❓

Enter a location name or identifier here

SEARCH

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.