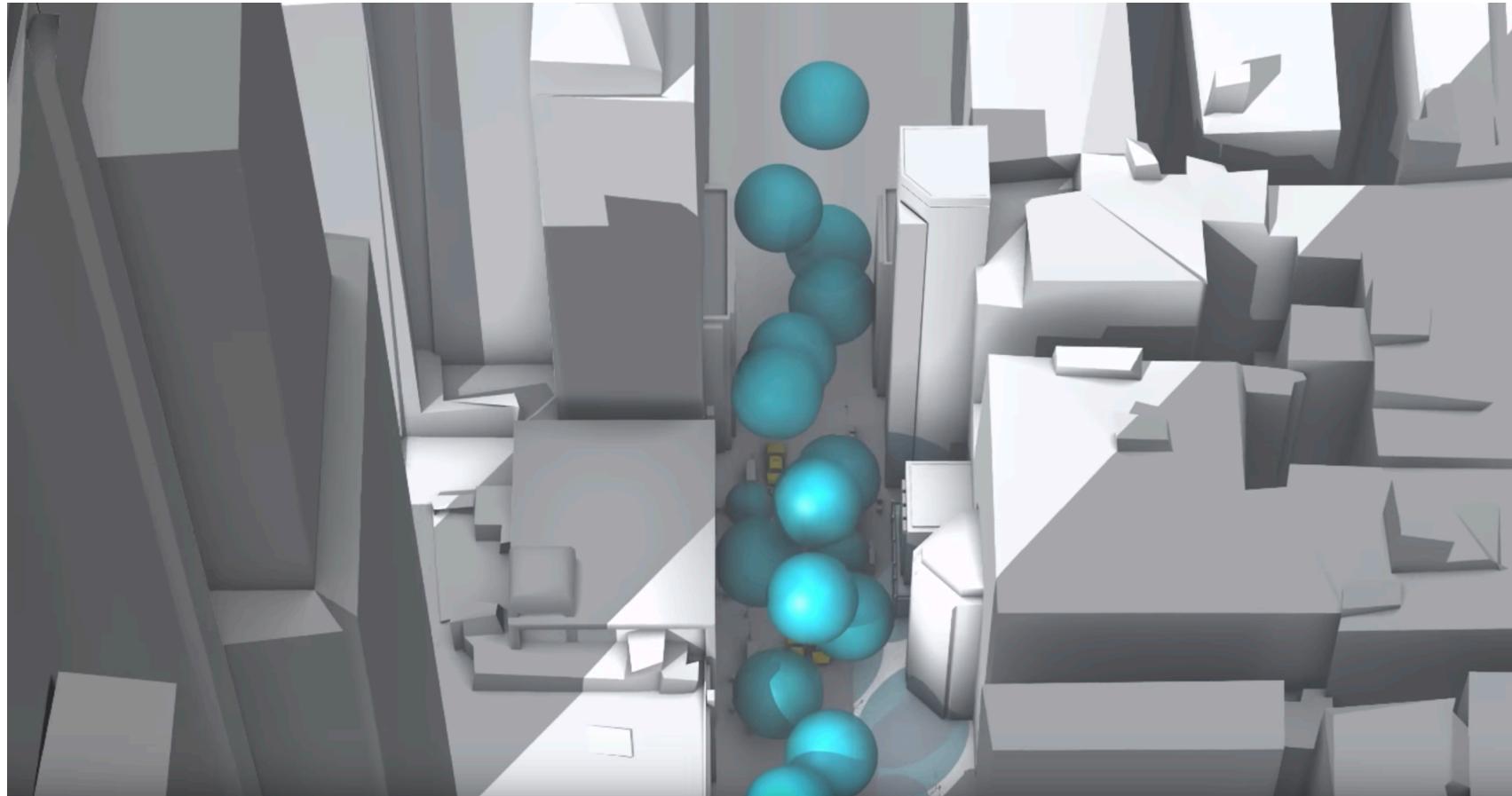




FIT5147 Data Exploration & Visualisation

Kim Marriott

Hall of Fame/Shame (Tue 2pm)



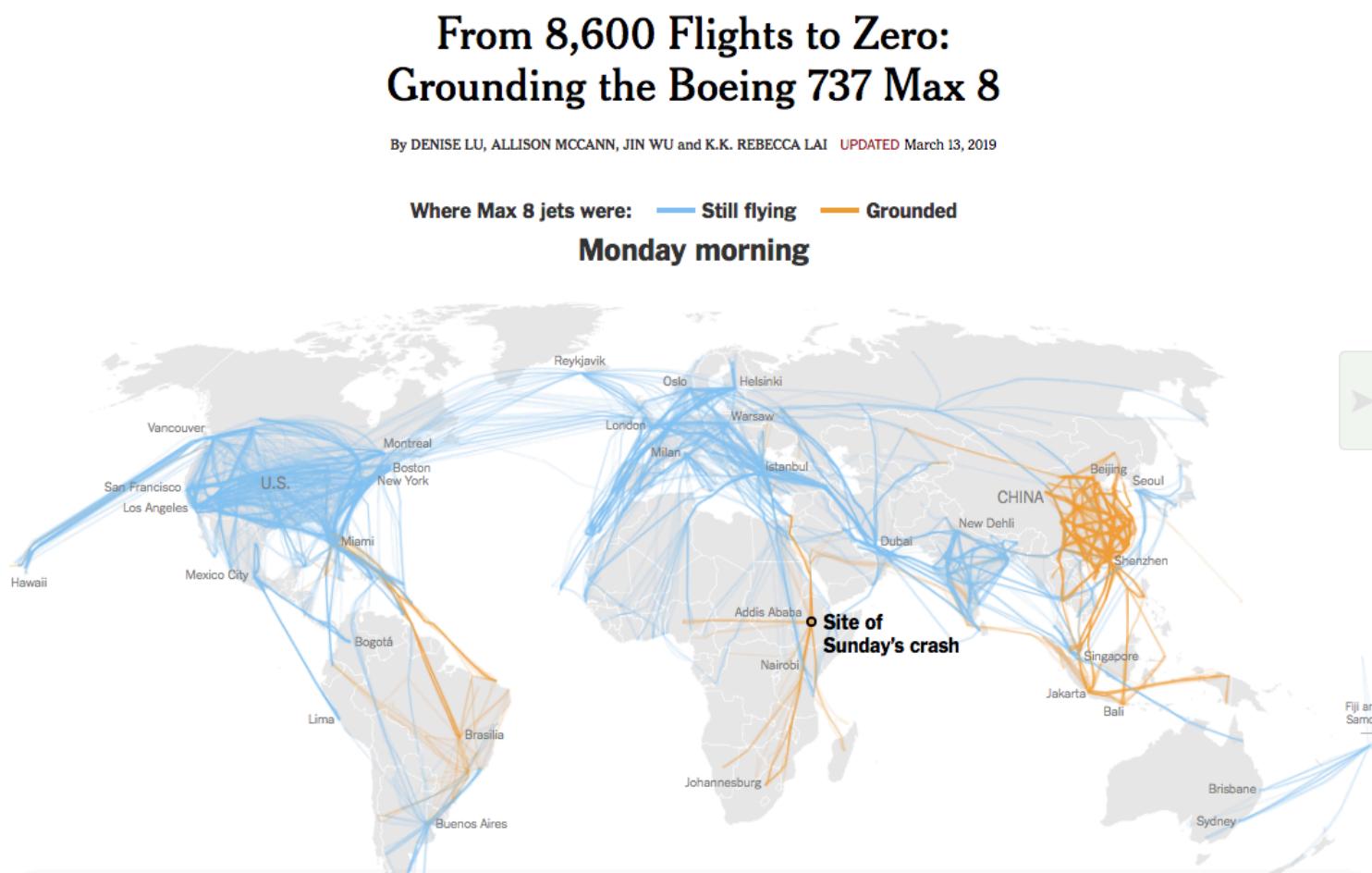
CO2 Emissions from NYC Carbon Visual's
video <https://www.youtube.com/watch?v=DtqSlpIGXOA>

Reynaldo Bonita Jr

Hall of Fame/Shame (Wed I Iam)

From 8,600 Flights to Zero:
Grounding the Boeing 737 Max 8

By DENISE LU, ALLISON MCCANN, JIN WU and K.K. REBECCA LAI UPDATED March 13, 2019



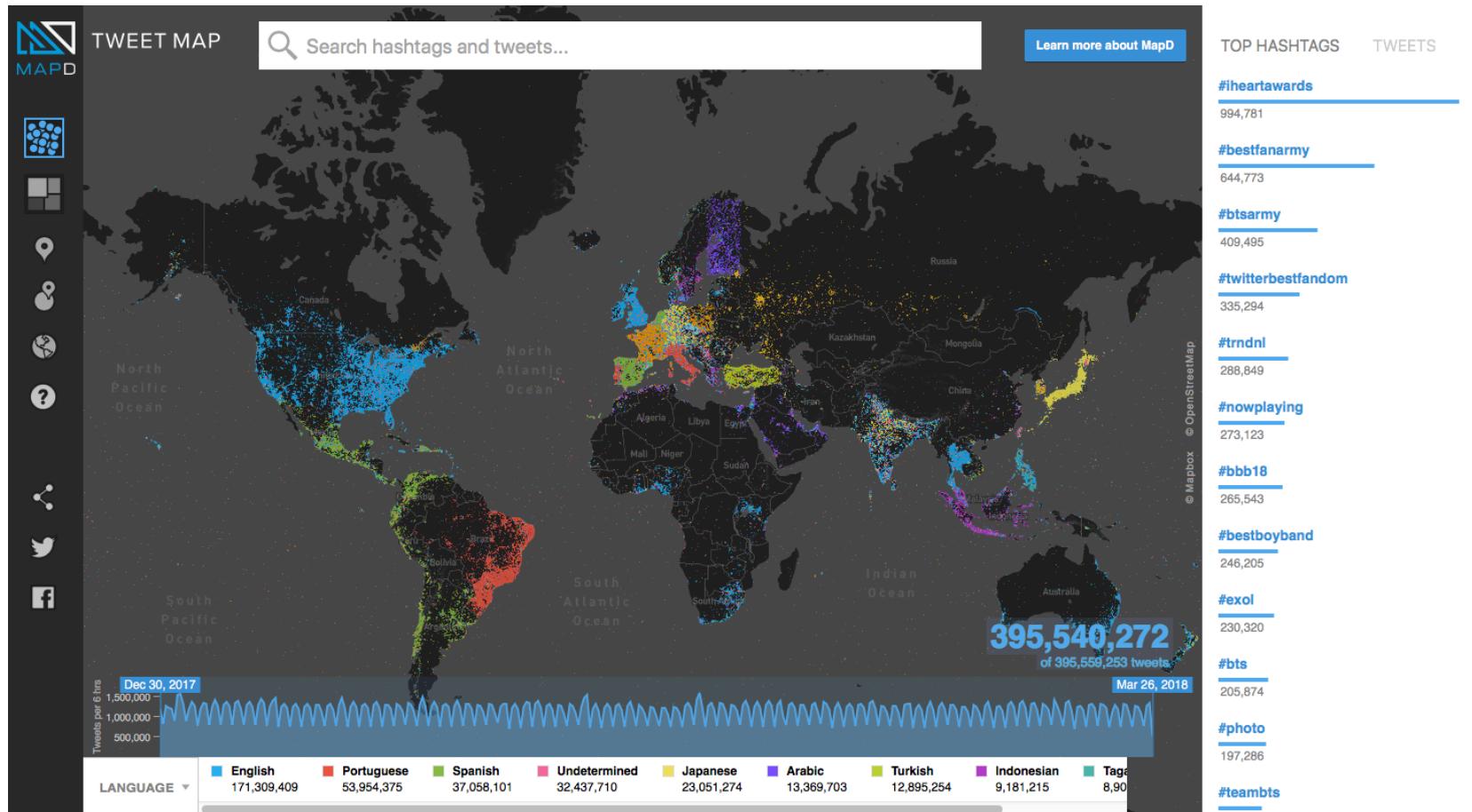
<https://www.nytimes.com/interactive/2019/03/11/world/boeing-737-max-which-airlines.html>

Christiana Gewerc

Hall of Fame/Shame



Hall of Fame/Shame



<https://www.mapd.com/demos/tweetmap/>

Syllabus

Week	Lecture material	Lab/Tute
. 1	Visual analytics; Tools for data exploration	Intro to Tableau; R; D3
. 2	Visualisation of tabular data	Advanced graphics with R
. 3	Analysis of trends & patterns in tabular data	Interactive graphics with R
. 4	Data maps;Tools for creating data maps	Data maps with R
. 5	Spatial analytics	MapBox; Data Exploration Project feedback
. 6	Network data analysis & visualisation	Relational data and text and text analytics with R
. 7	Textual data analysis & visualisation	Data Exploration Project Feedback
Break		
. 8	Visualisation design methodology	Five design sheet visualisation design methodology
. 9	Human visual system	Introduction to D3
. 10	Visual communication	More D3;Data VisProject Feedback
. 11	Interactive data visualisation	Data Vis Project Presentations
. 12	History and future of data visualisation	Five design sheet visualisation design methodology

Main Kinds of Data Sets

Tabular data: Data organised in tables, a row for each data item and a column for each of its attributes.

Spatial data: Data which is naturally organised and understood in terms of its spatial location or extent.

Network data: Nodes in the network are data items and links between the nodes are relations between. For instance a social network.

Sequential data: Data organised in a sequence. Text is an example of this.

Visualising Spatial Data



Data maps allow us to understand spatial data (called **thematic maps** by cartographers)

Maps have existed for a very long time but not data maps

This module

- Different kinds of data maps
- Map design basics
- Spatial analytics
- Tools for creating data maps.

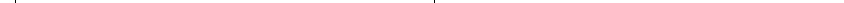
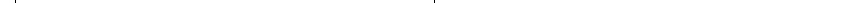
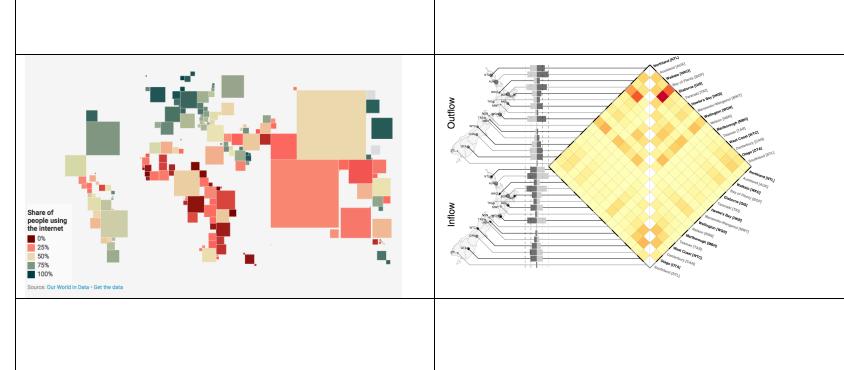
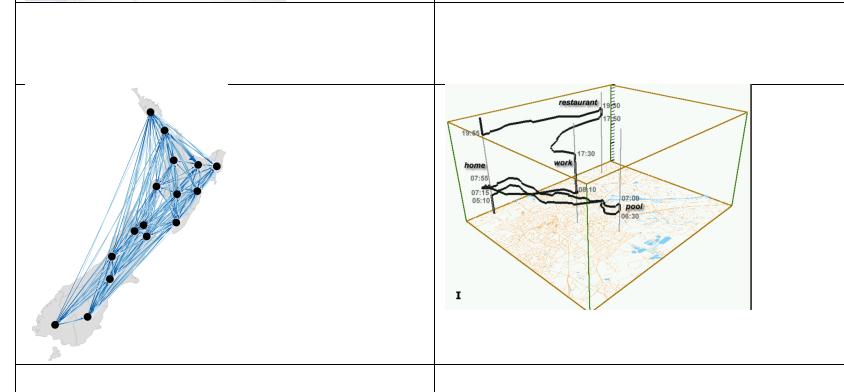
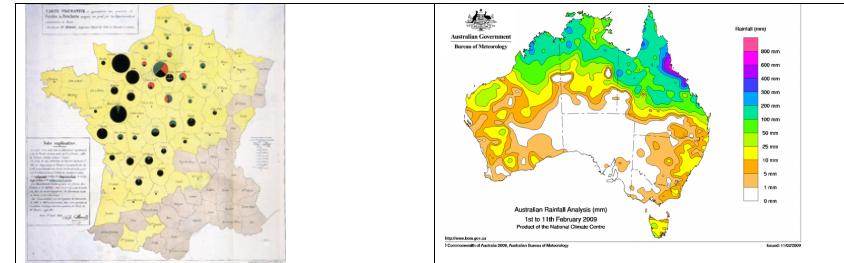
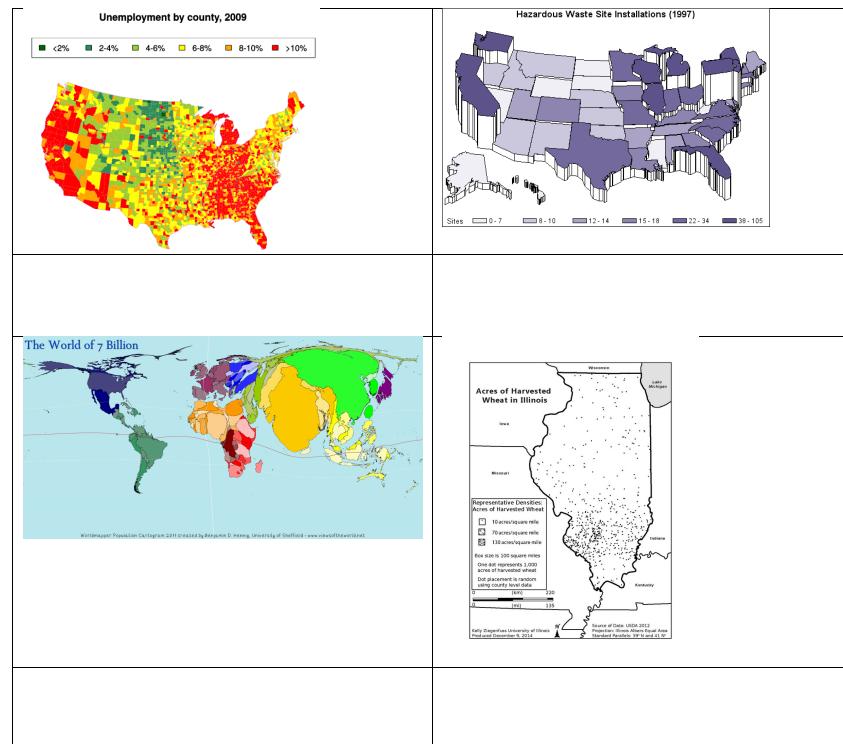
FIT5147 Data Map Trivia Quiz

- Work in groups of 2-3 to answer the Data Map Trivia Quiz.
- Match the name to the data map on the Quiz
- You have 15 minutes....

FIT5147 Trivia Quiz: Common Data Maps

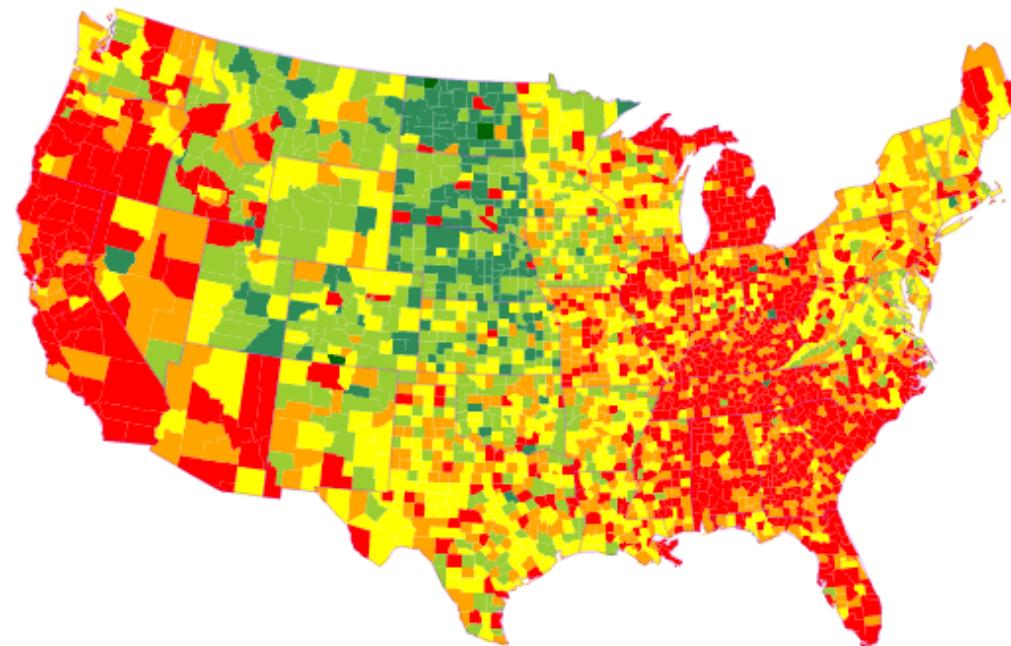
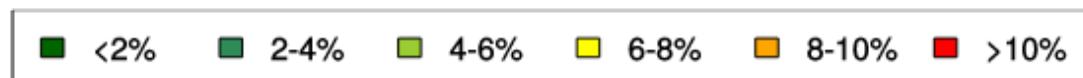
You are to match the following examples of a data map with its name. The possible names are

- Dot Density Map (Dot Distribution Map)
- Space-Time Cube
- Prism Map
- Isarithmic Map
- Contiguous Cartogram
- Choropleth Map
- MapTrix
- Flow Map
- Proportional Symbol Map
- Discrete Cartogram



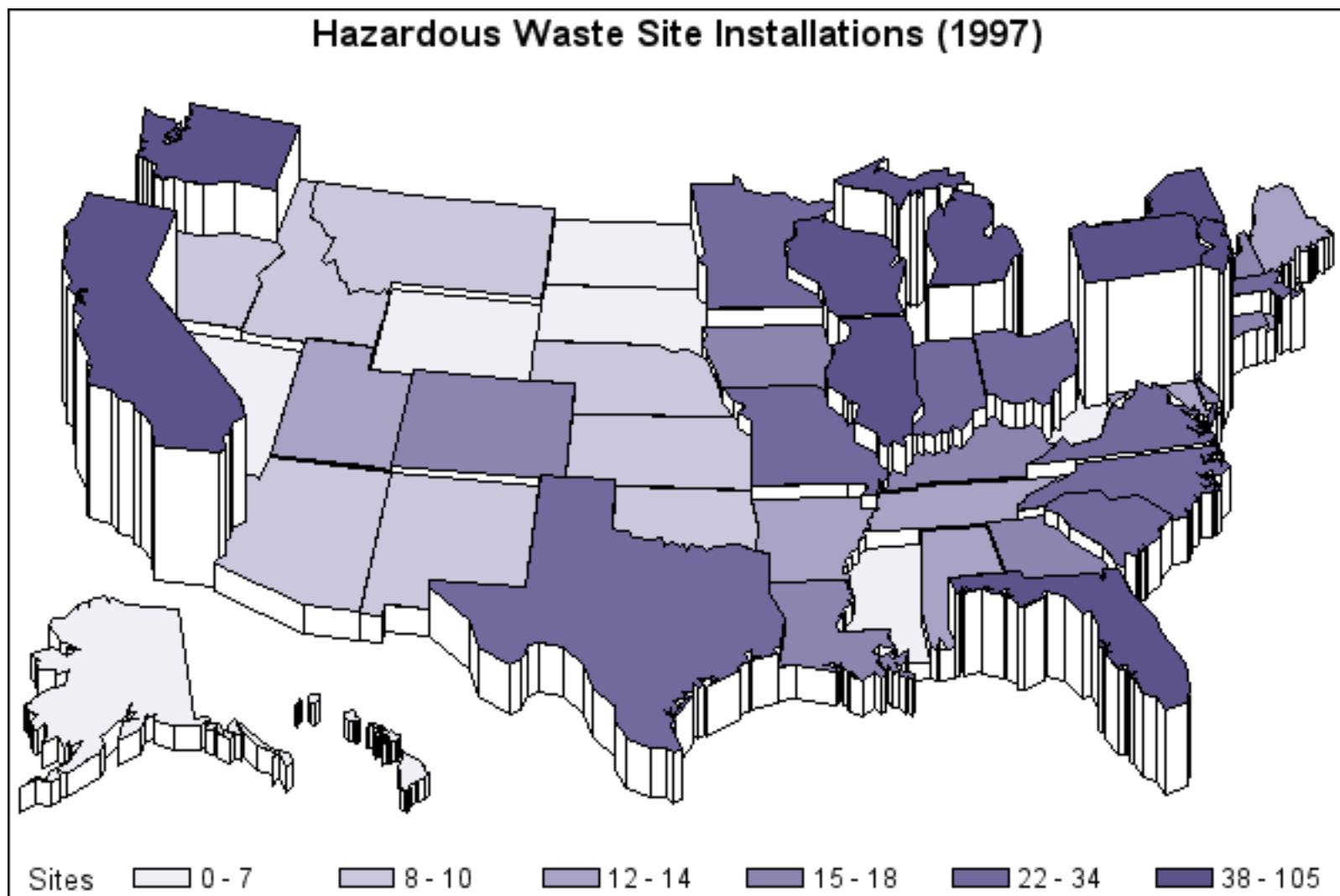
Common Data Maps

Unemployment by county, 2009



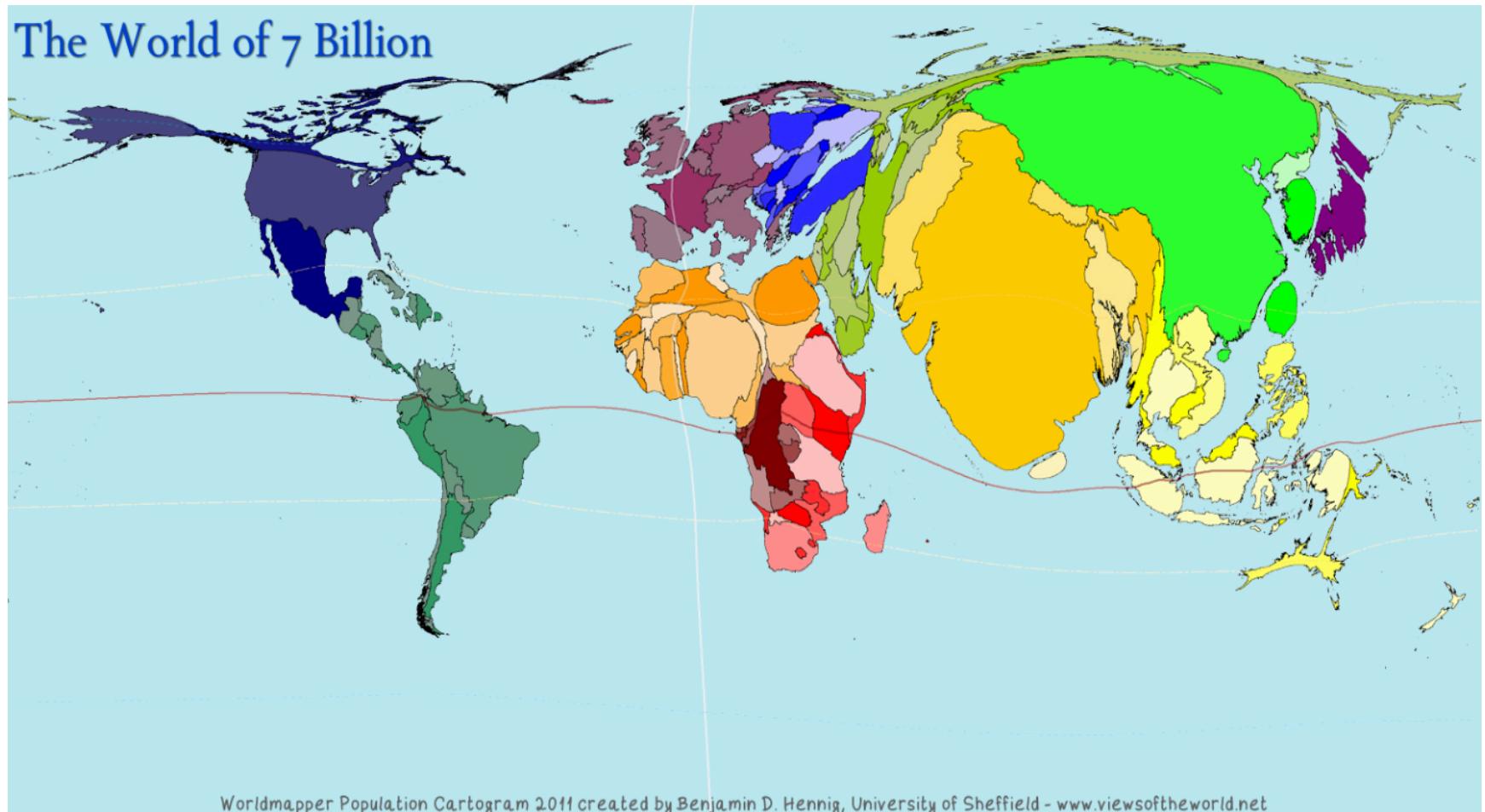
Choropleth map

Common Data Maps



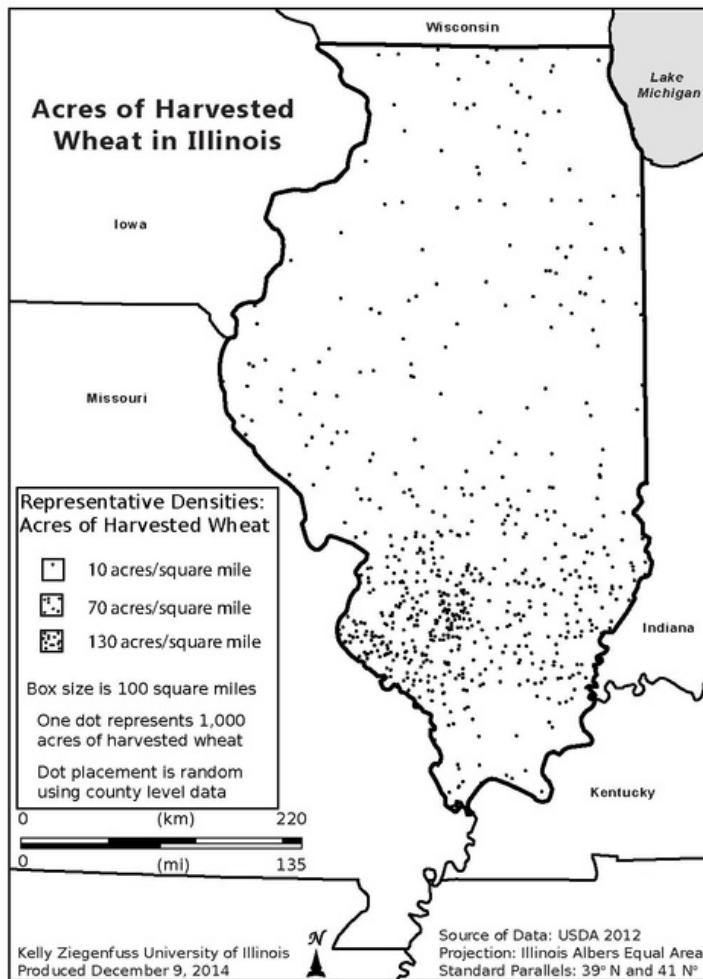
Prism Map

Common Data Maps



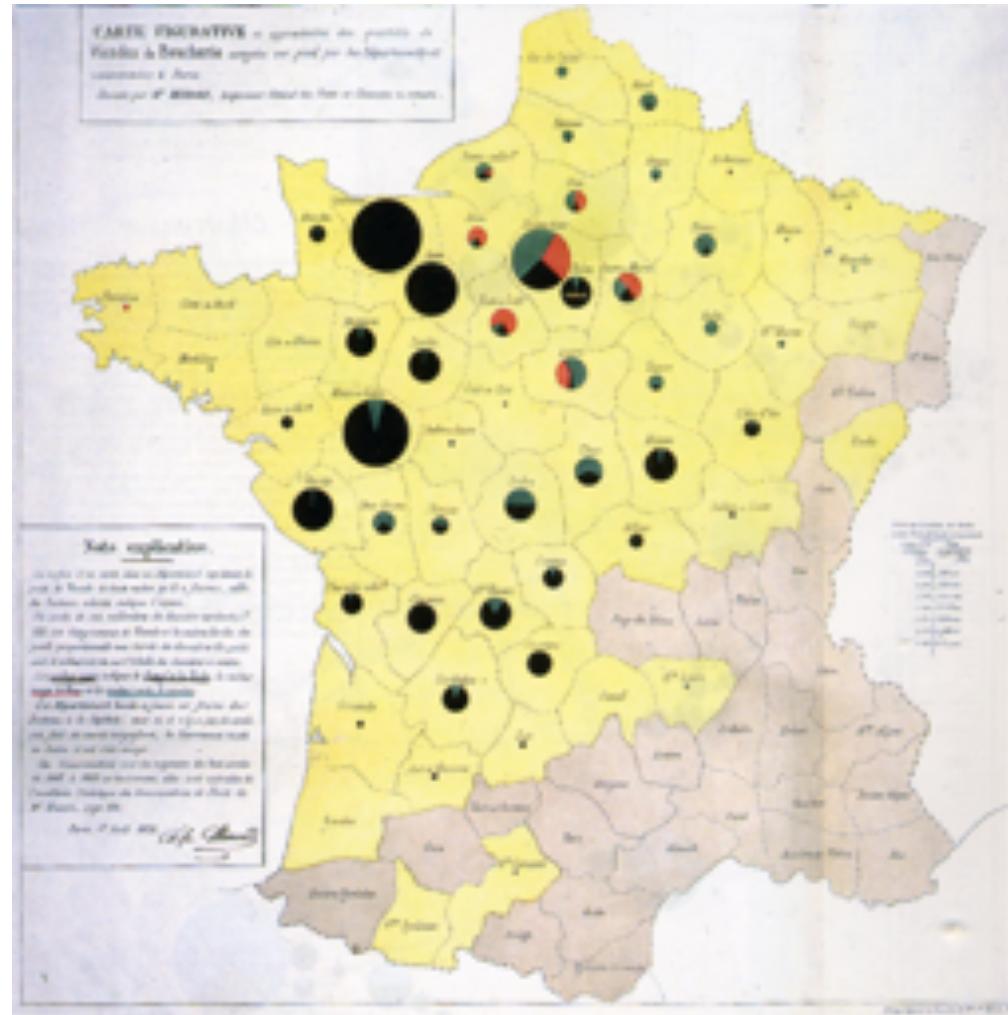
Contiguous Cartogram

Common Data Maps



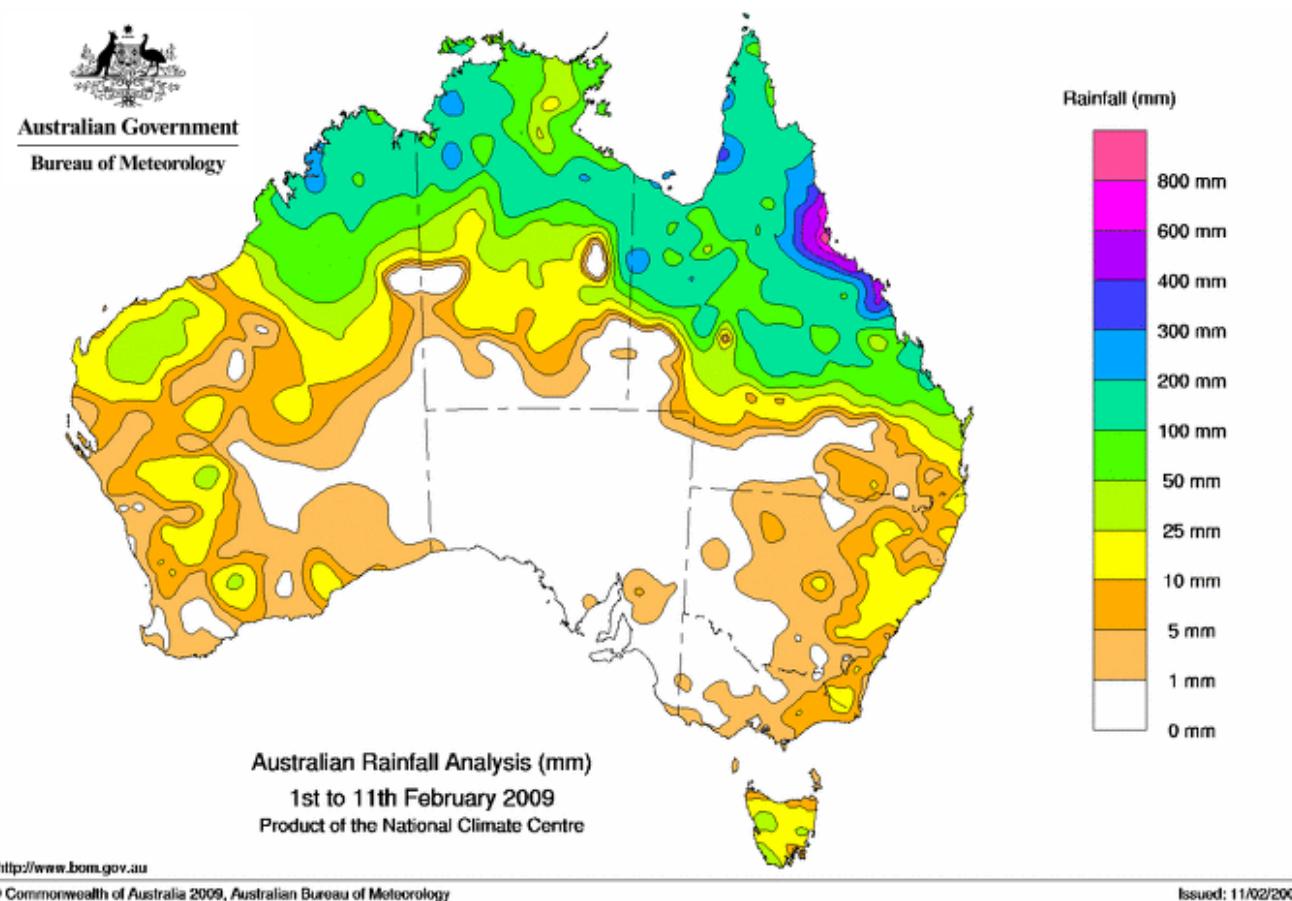
Dot density map (dot distribution map)

Common Data Maps



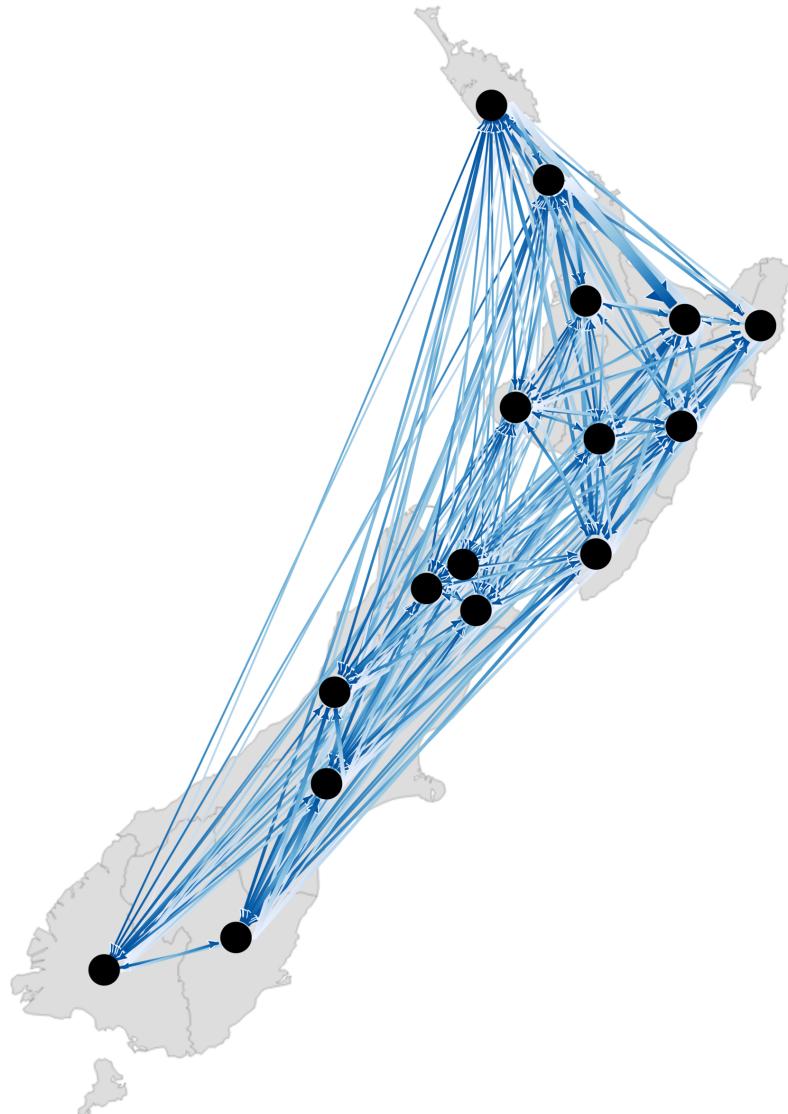
Proportional symbol map
(Can be any tabular graphic, not just pie chart)

Common Data Maps



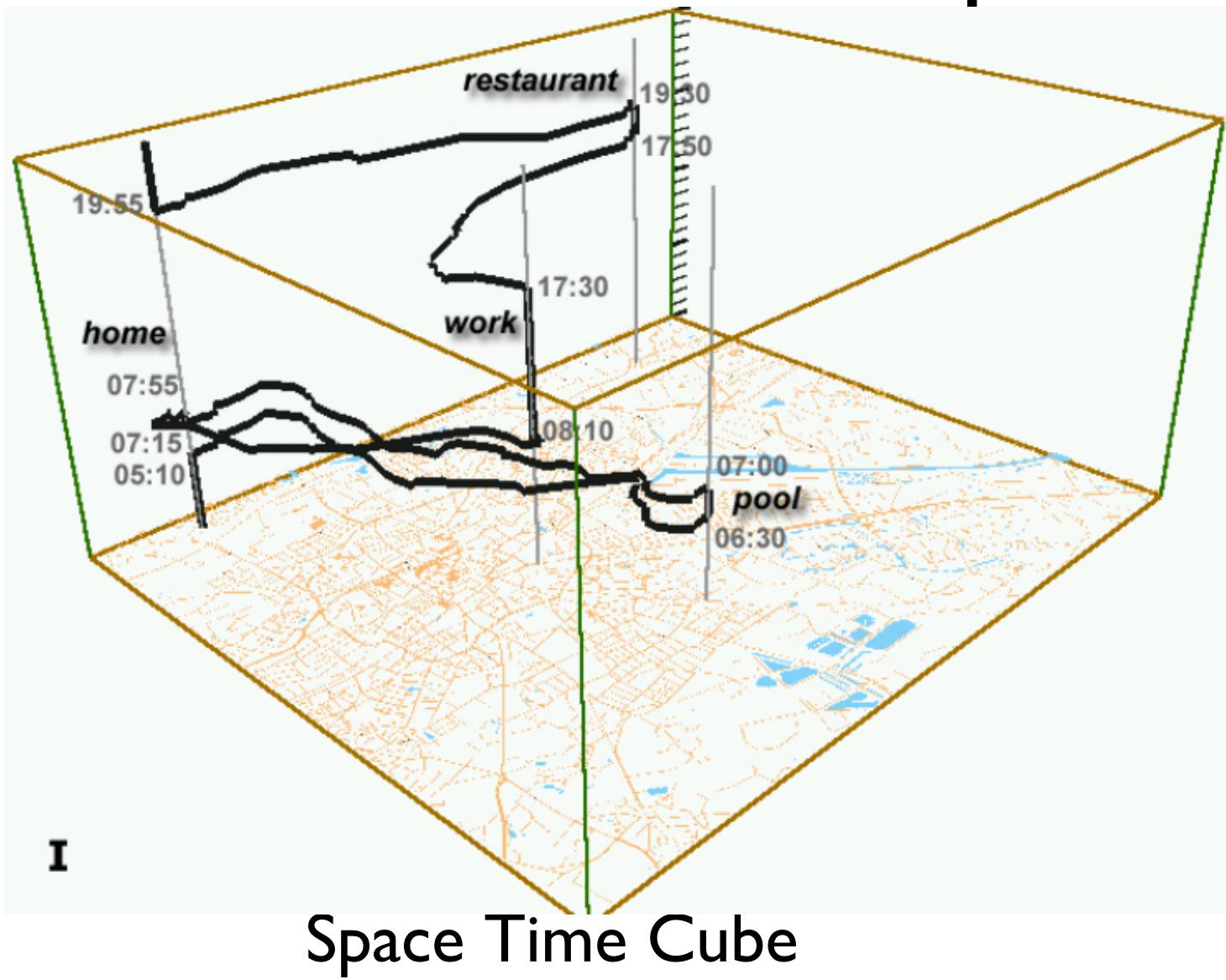
Isarithmic (Contour) map

Common Data Maps

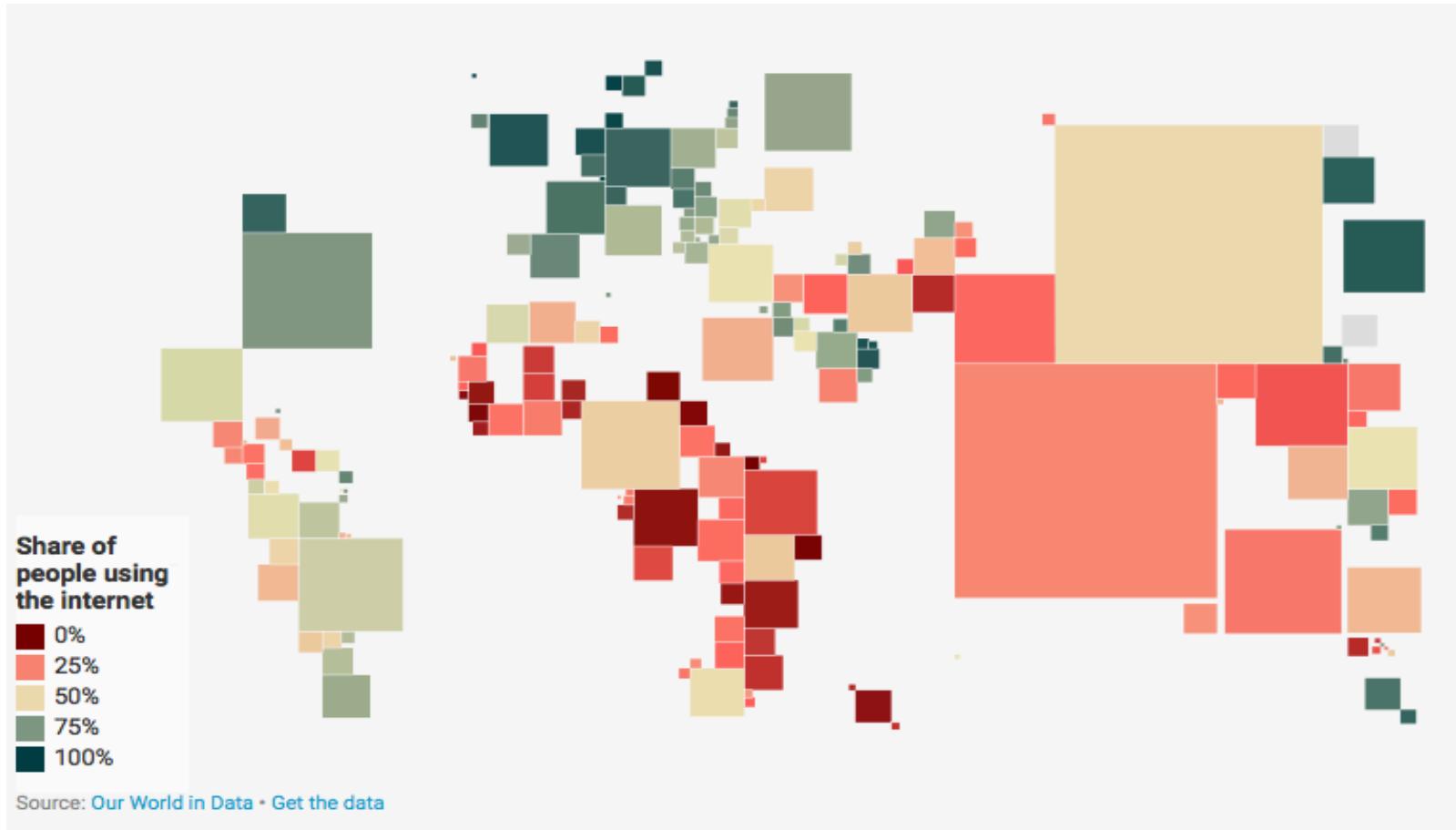


Flow Map

Common Data Maps

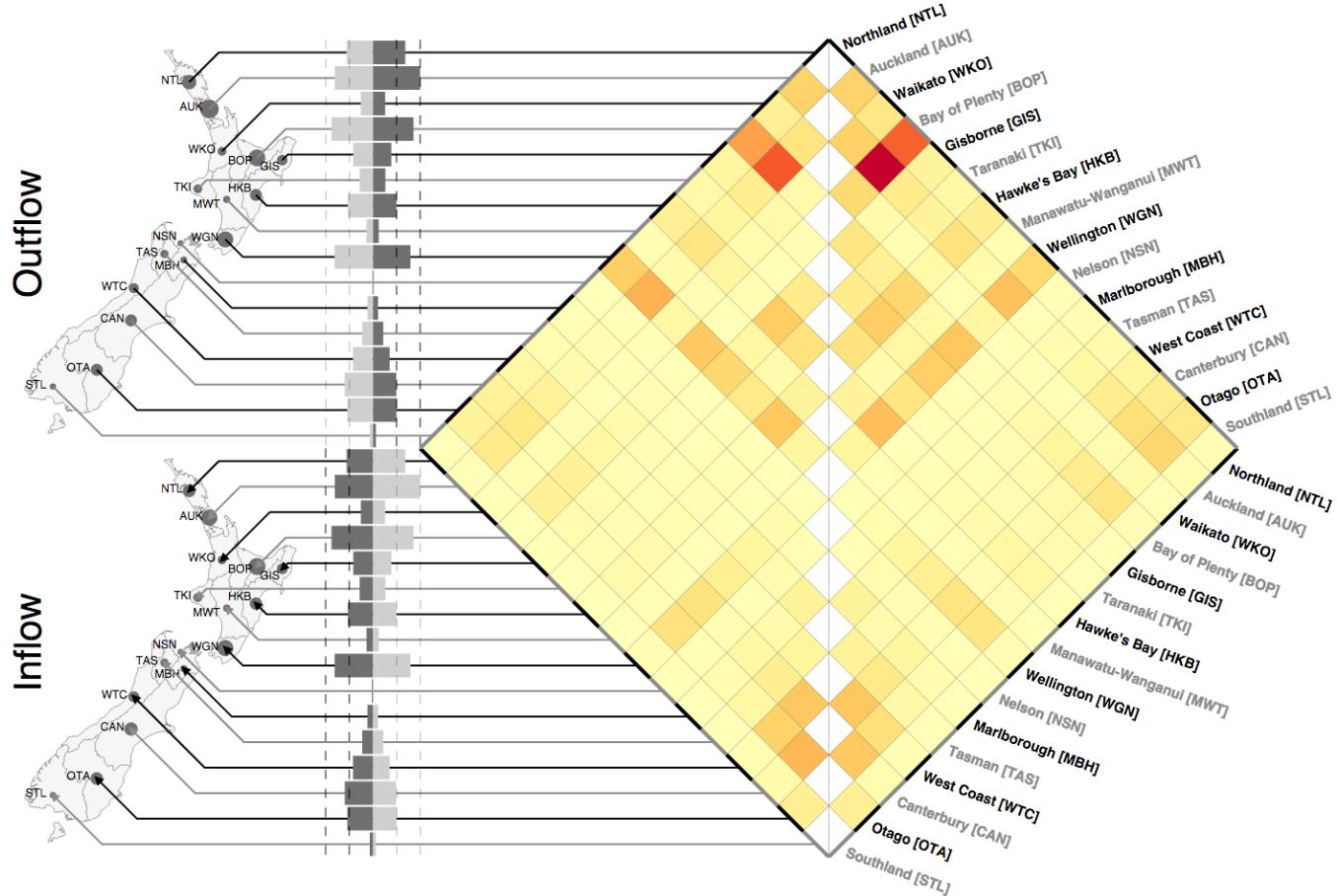


Common Data Maps



Discrete Cartogram

(Un)Common Data Maps



MapTrix

Basics of Data Map Design

Choose the right scale

- Aggregate if needed

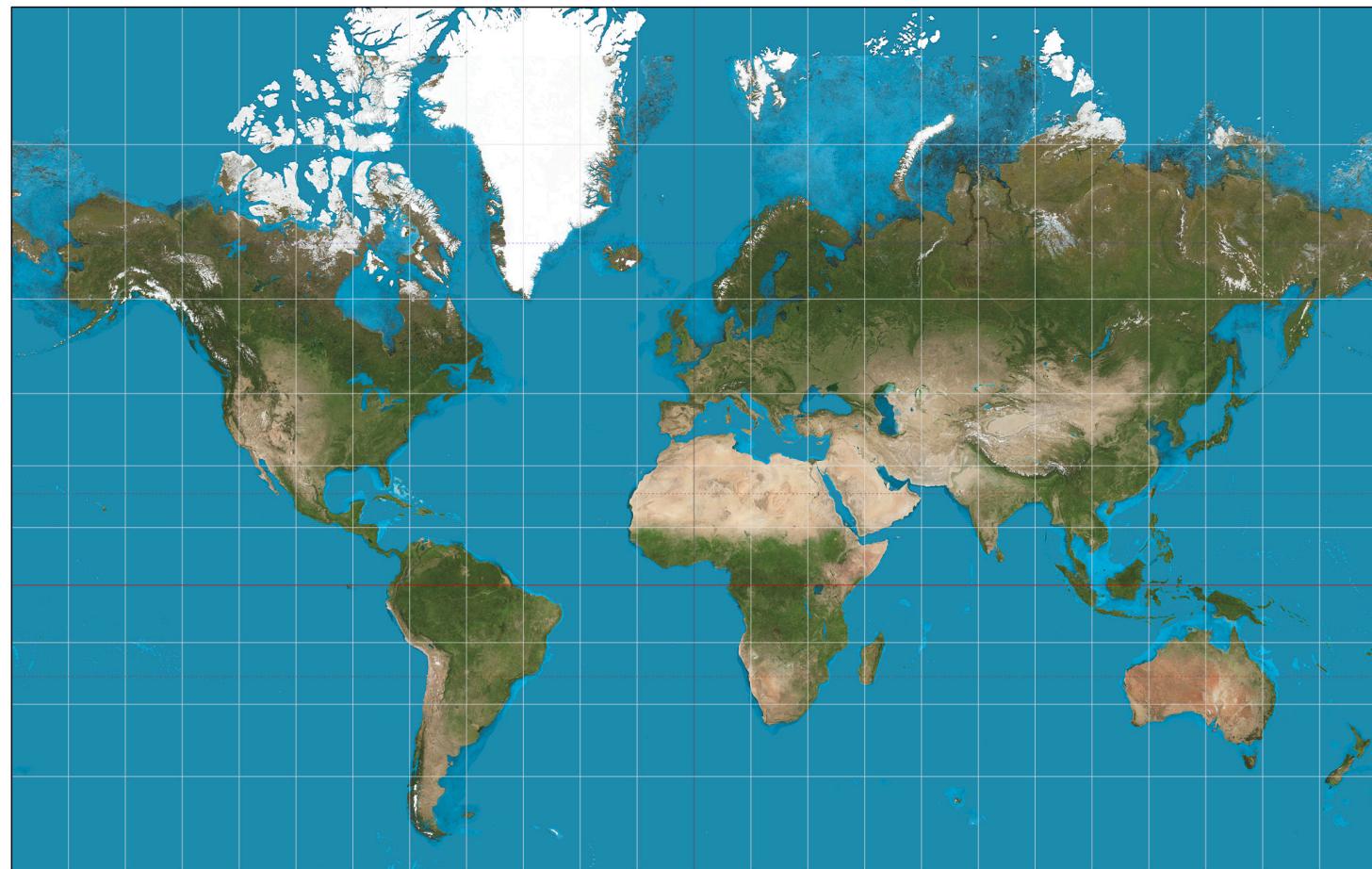
Choose the right kind of data map

Choose the right projection

Choose the right colours

Provide informative title, legend & scale (if needed)

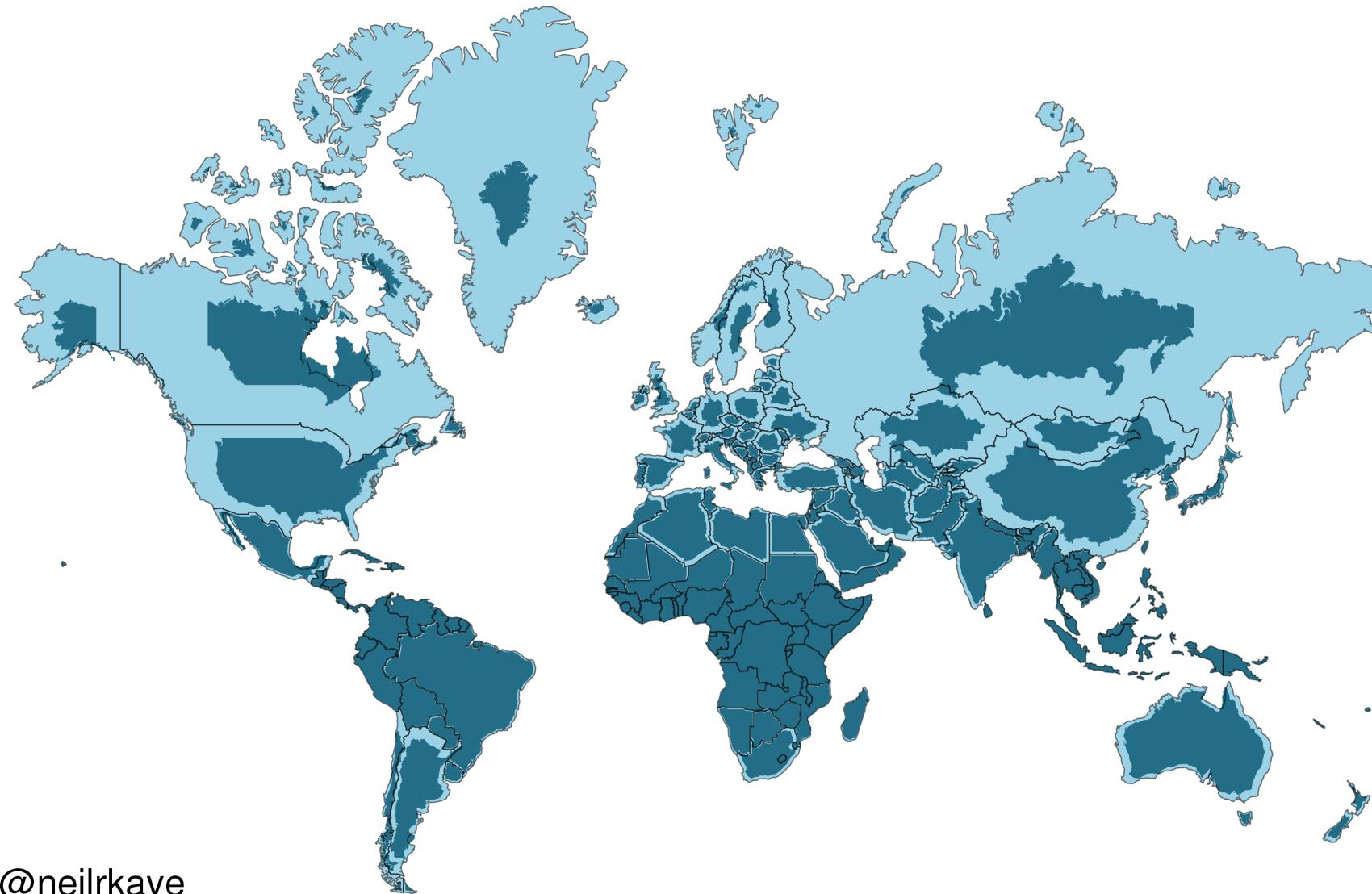
Projections



<https://www.youtube.com/watch?v=kIIID5FDi2JQ>

Projections

World Mercator projection with true country size added



Projections

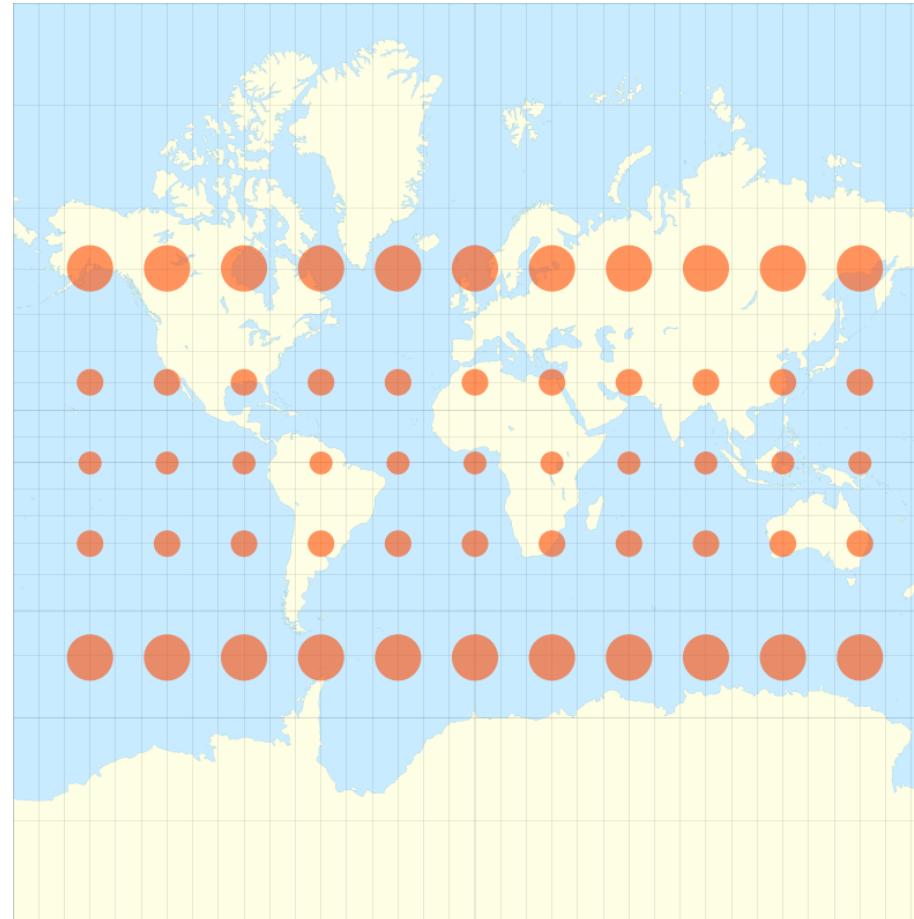
Impossible not to distort distances or to accurately show area and shape

Projections can be classified depending upon which property they preserve

- **Equal area** (or equivalent) projections preserve area.
- **Conformal** projections preserve angles locally,
- **Equidistant** projections preserve distance from a particular location (at most two)
- **Azimuthal** projections preserve directions from a particular location, while
- **Compromise** projections ensure that area and shape distortion is "not too bad."

Projections

Don't use
Mercator by
default!!!!

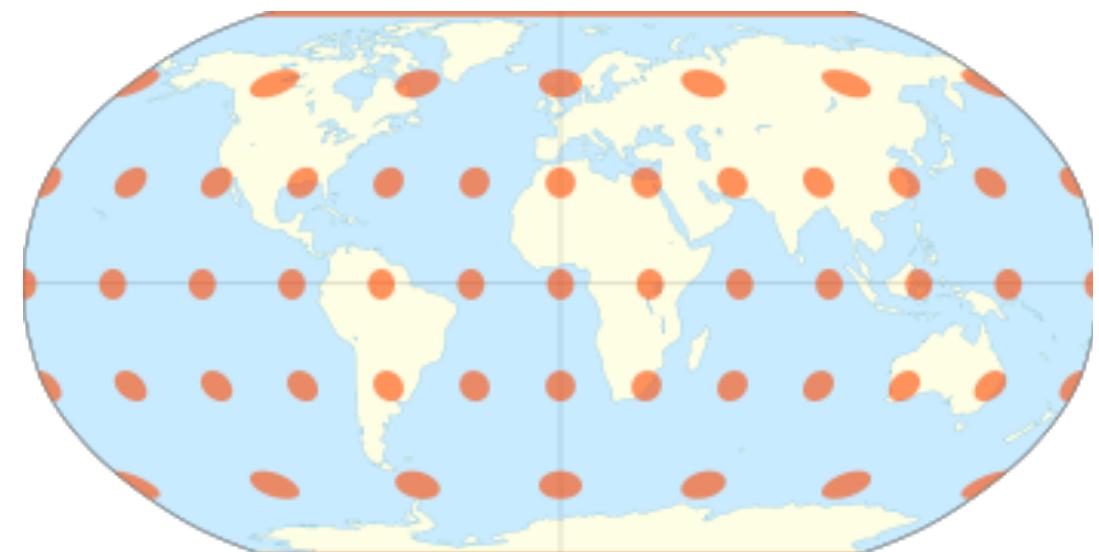
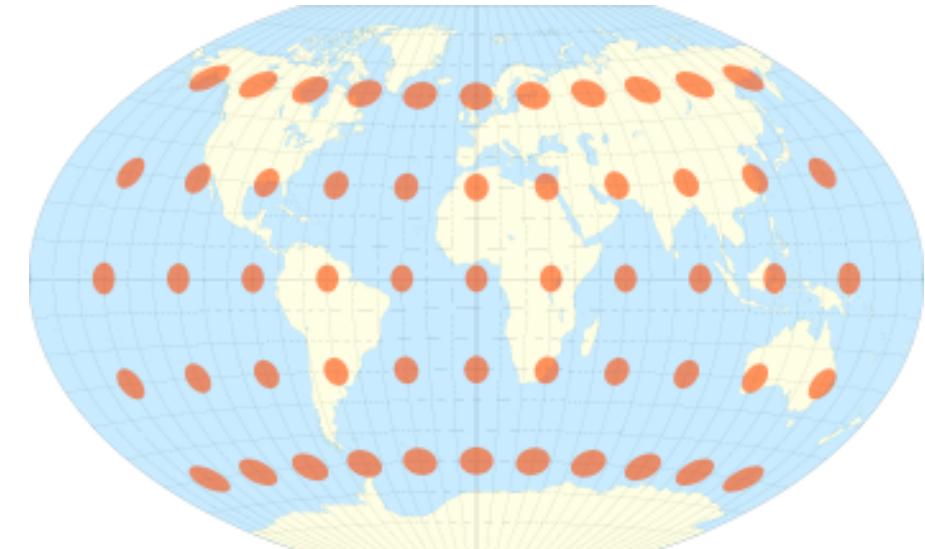


Mercator

Designed for navigation—not as a general purpose
projection!

Projections

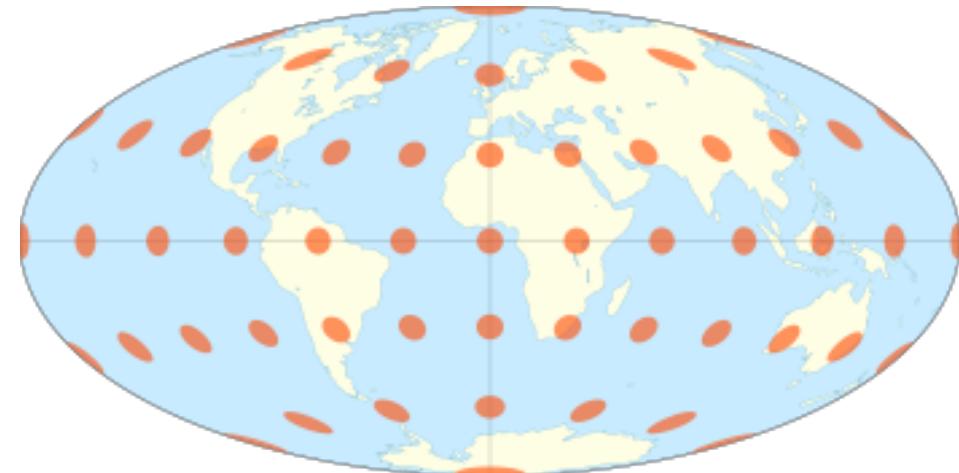
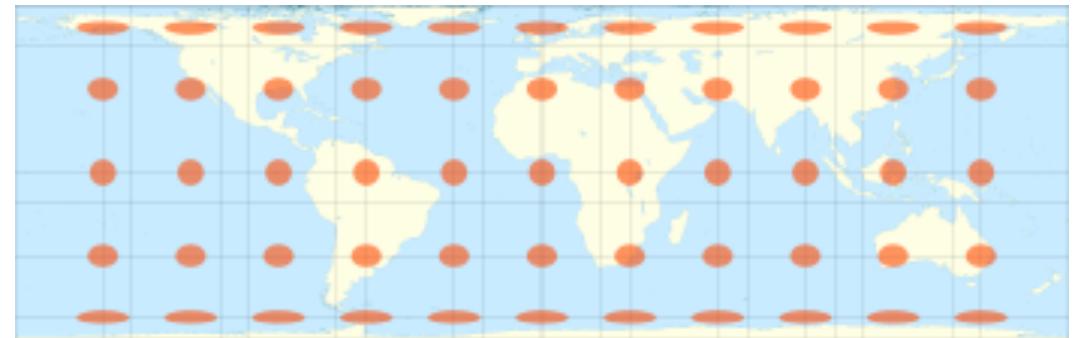
Winkel Tripel or
Robinson are
good compromise
projections



Projections

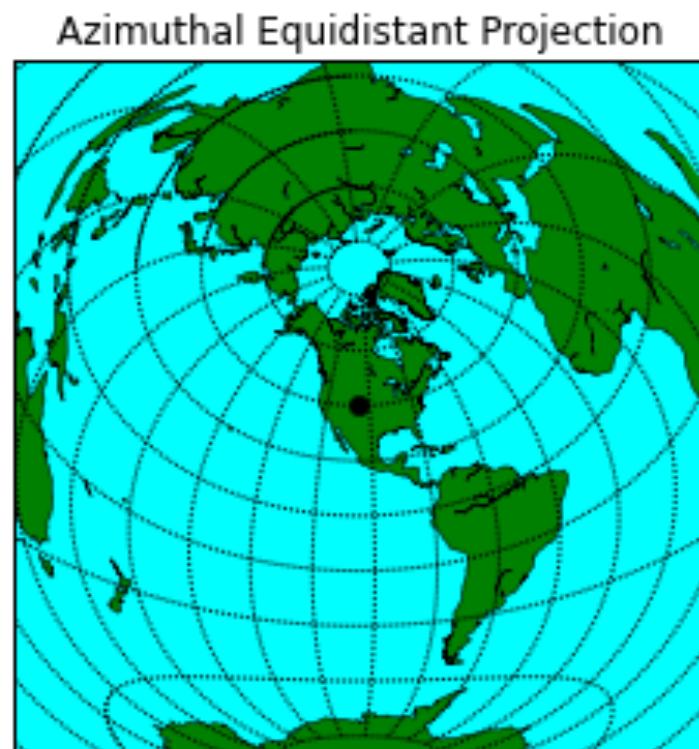
For choropleth or dot density maps use an equal-area projection:

- **Lambert's normal cylindrical equal area**
- **Hammer Projection**



Projections

For flow maps consider using
an **azimuthal
equidistant projection**
from the origin (if only one
origin)



Map Choice Exercise

Work in groups of 2-3:

You have three sets of data for the world

- Population density by country
- Total population by country
- Refugee migration between countries

Which kind of data maps are best-suited to show each data set

- Choropleth,
- Prism,
- Flow,
- Isarithmic (Contour),
- Dot density,
- Proportional symbol,
- Cartogram

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Map Choice Exercise

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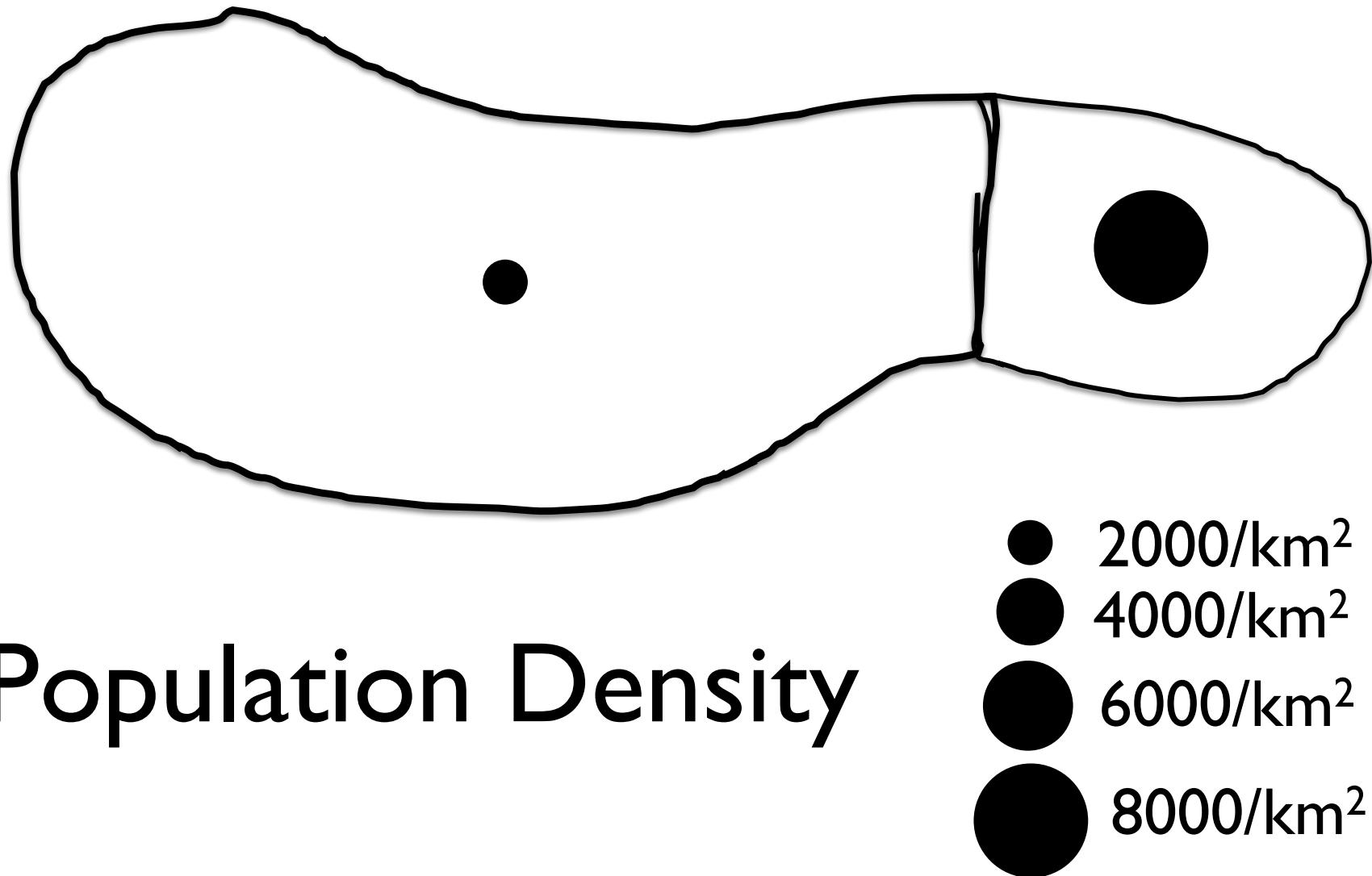
You have three sets of data for the world

- Population density by country
- Total population by country
- **Refugee migration between countries**

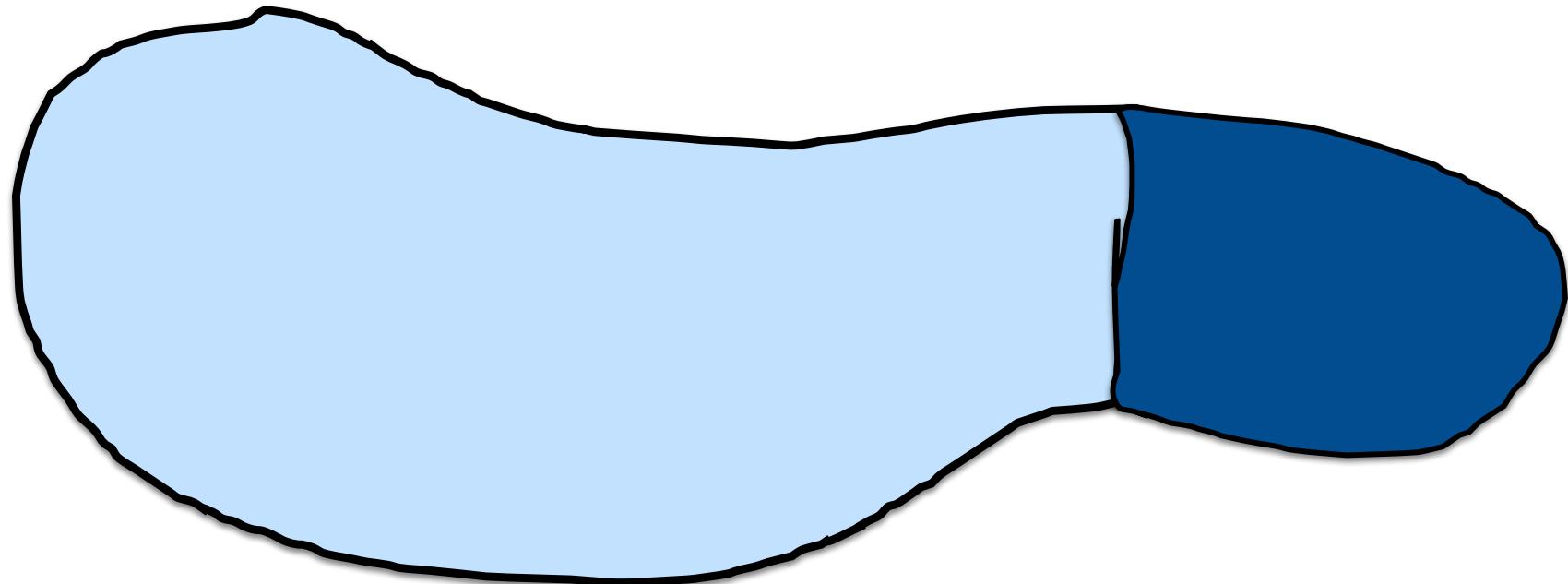
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Choropleth vs Proportional Symbol



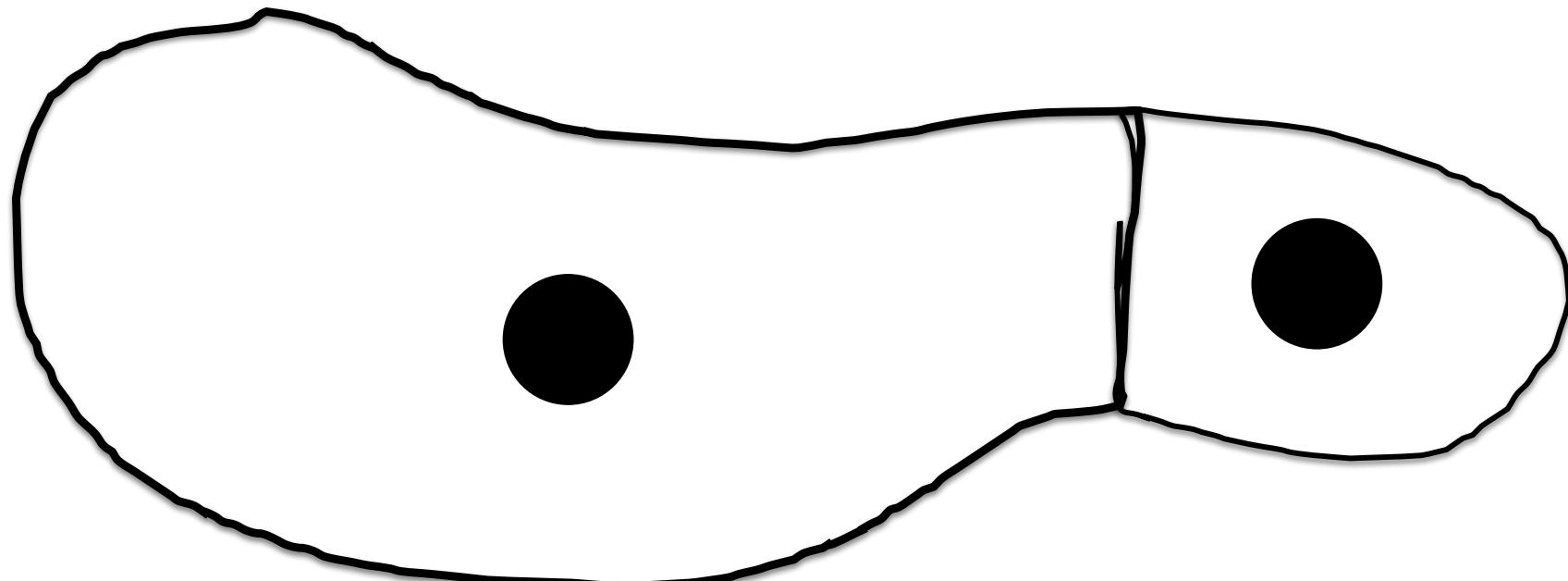
Choropleth vs Proportional Symbol



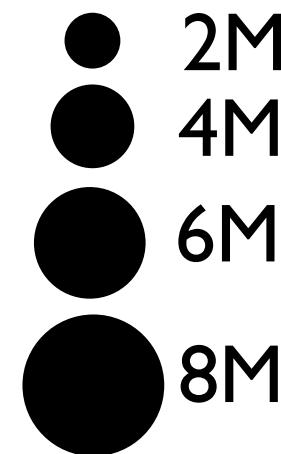
Population Density

- 2000/km²
- 4000/km²
- 6000/km²
- 8000/km²

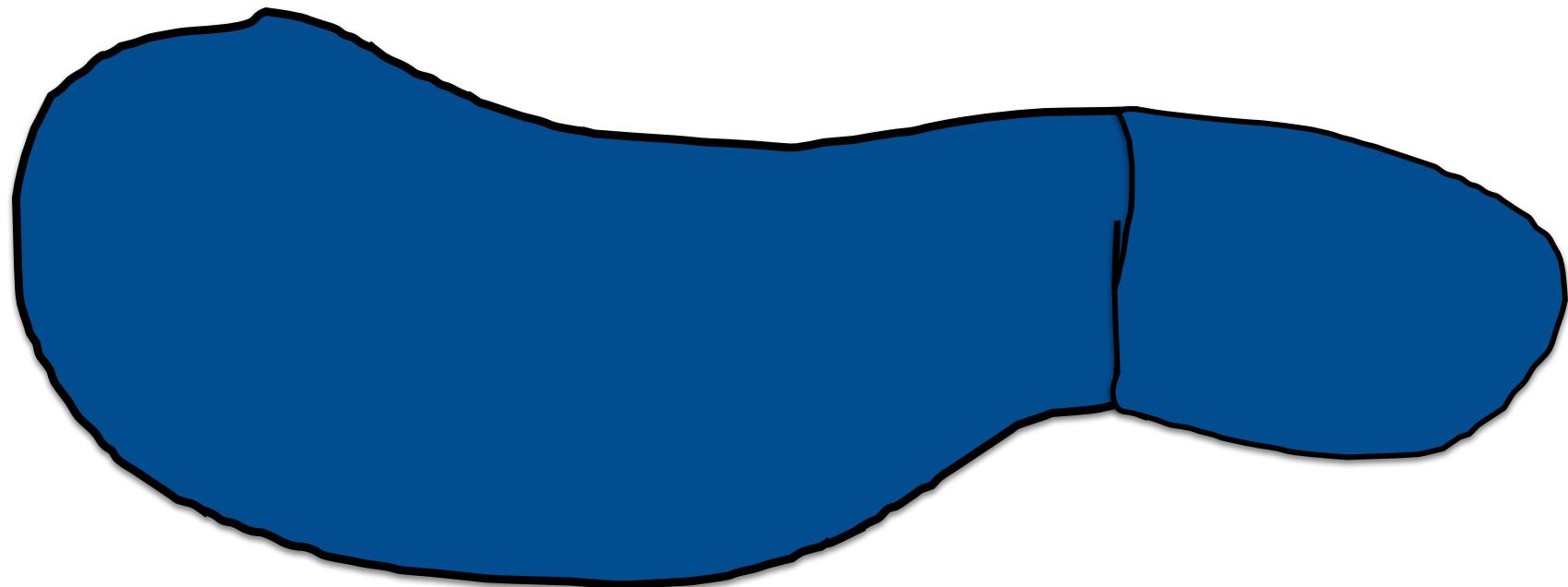
Choropleth vs Proportional Symbol



Total Population



Choropleth vs Proportional Symbol



Total Population

- 2M
- 4M
- 6M
- 8M

Announcements

Tutorial activities

- Maps with R

Online Quiz for Weeks 1-3

- Tue-Fri this week (1 attempt, 30 minutes)

Programming exercise 2: R

Due end Week 5 (5%)

Data exploration project

Continue exploring your data in R or Tableau