UNIVERSITY OF CALIFORNIA
UC RIVERSIDE

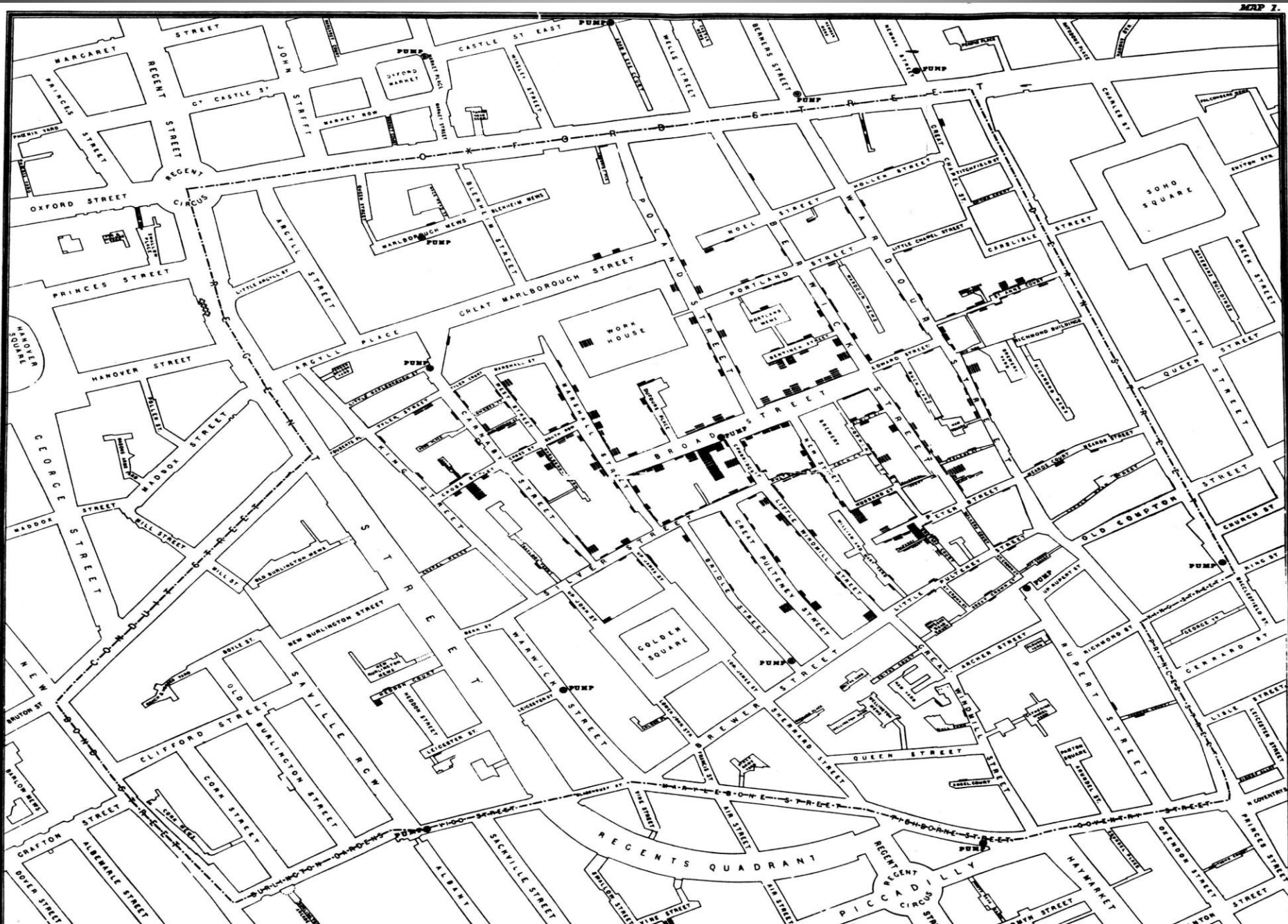
CS260-002: Spatial Data Modeling and Analysis

Geovisualization

Visual Perception

- Learning Styles & Personality Types: Visual, Auditory, Kinesthetic

Cholera cases in the London epidemic of 1854



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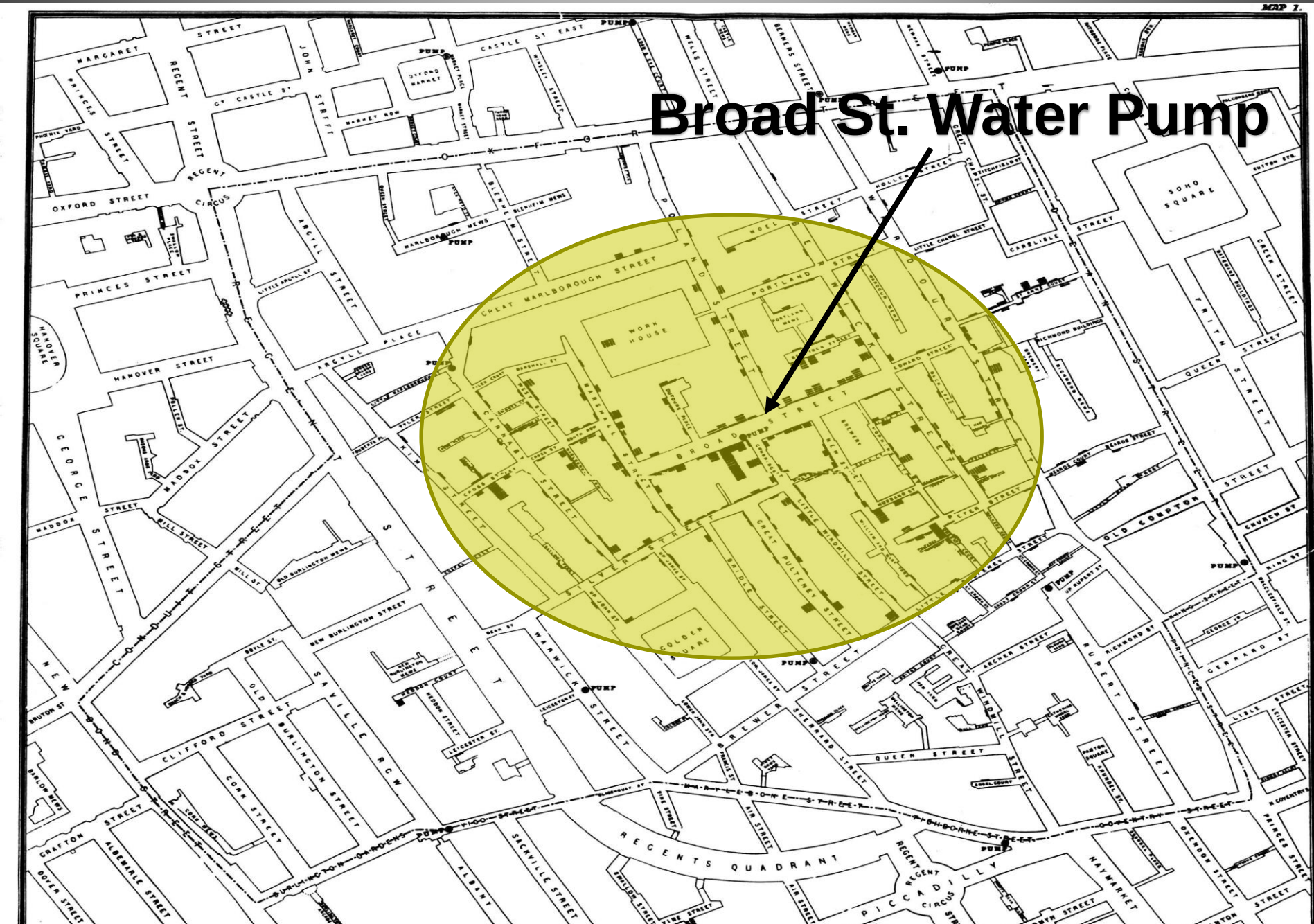
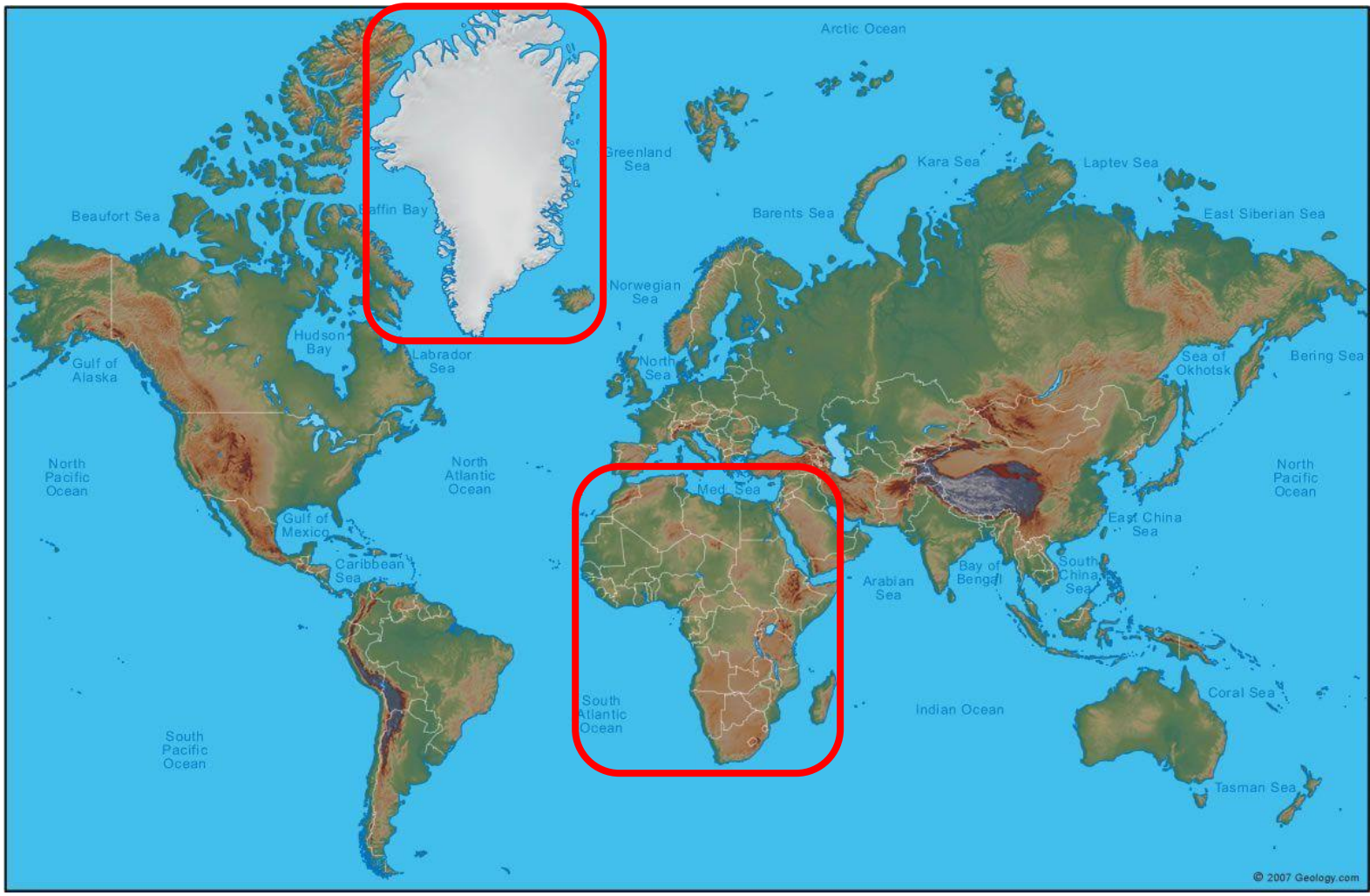


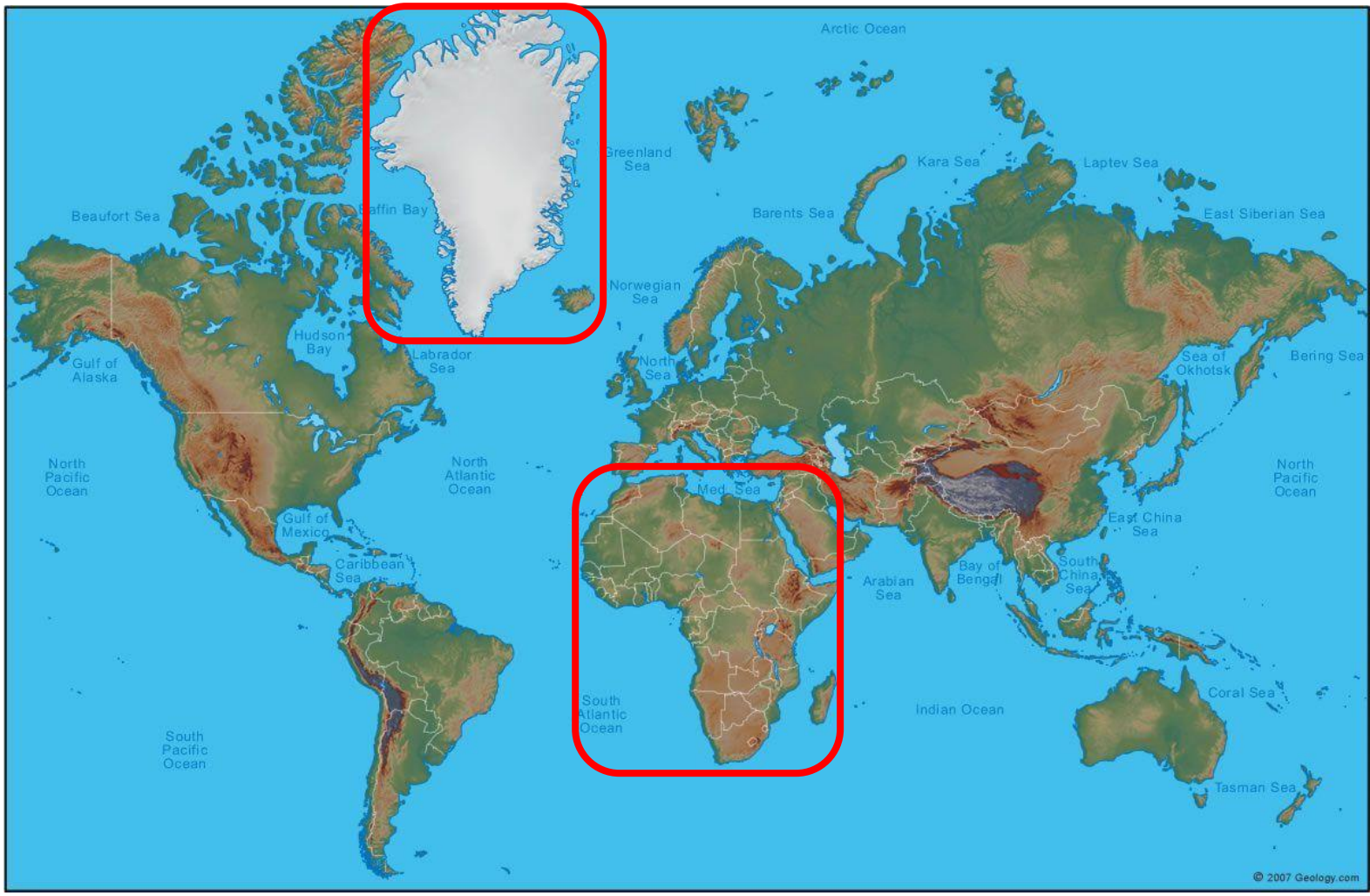
Geo-Visualization

- What is the ratio between areas of Africa and Greenland?



Geo-Visualization

- What is the ratio between areas of Africa and Greenland? 14:1



Map Orientation and Projections

- Mapping a 3D globe on a flat 2D plane
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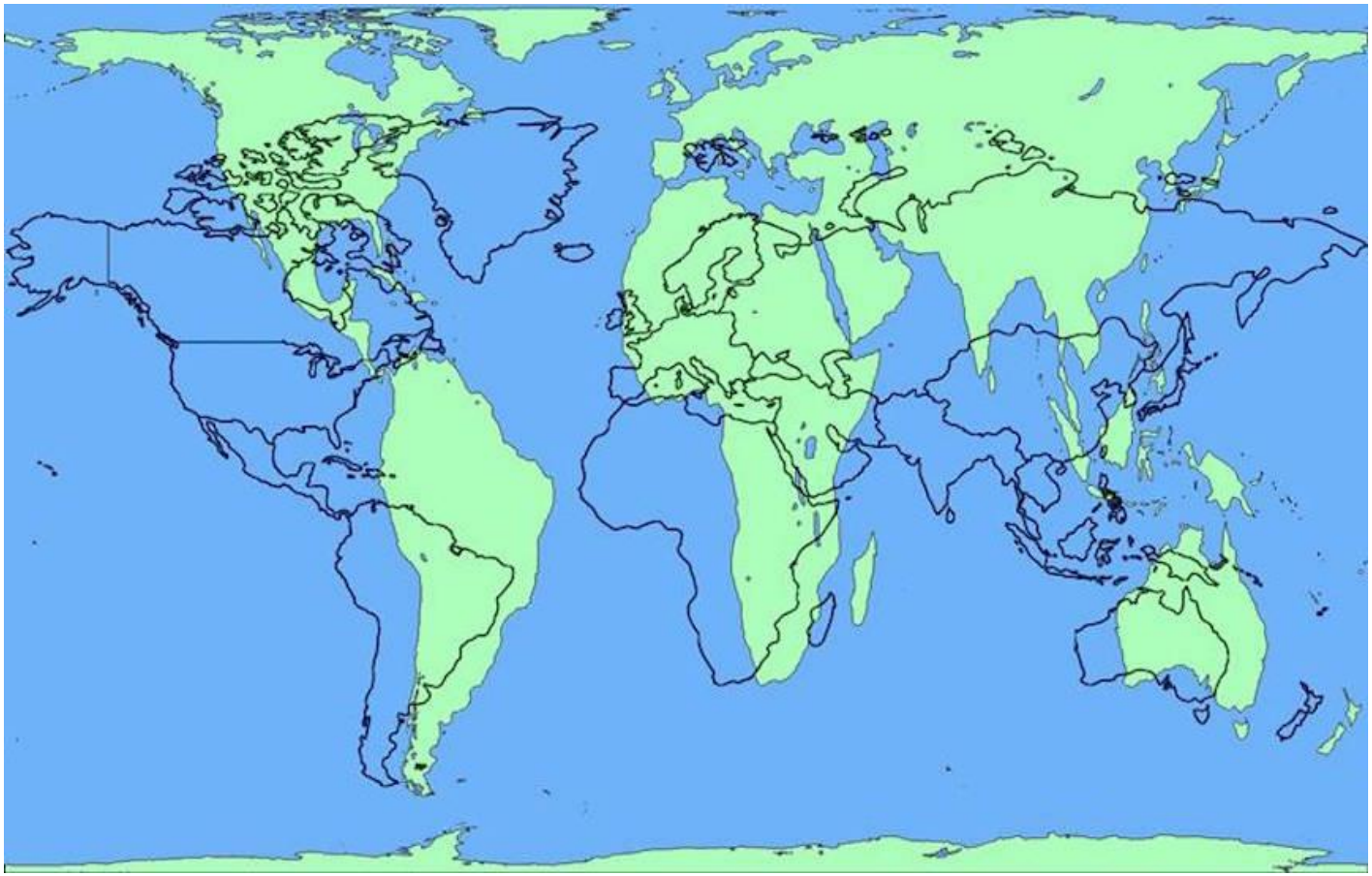

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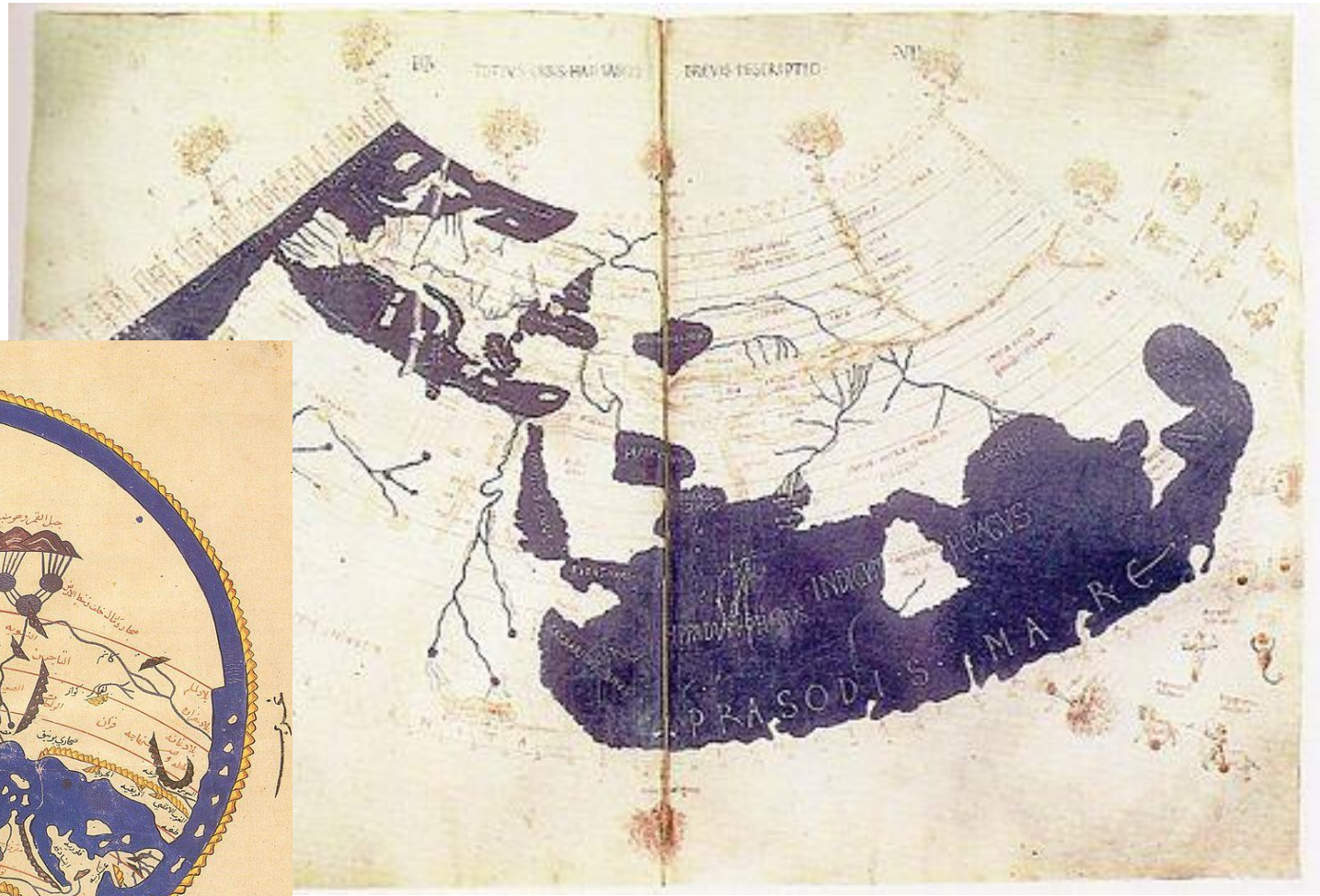

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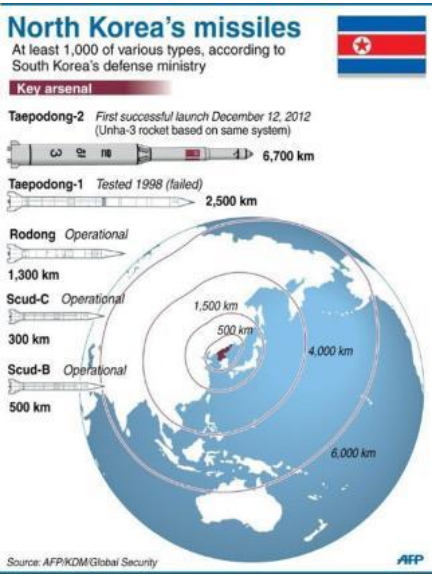
The Economist



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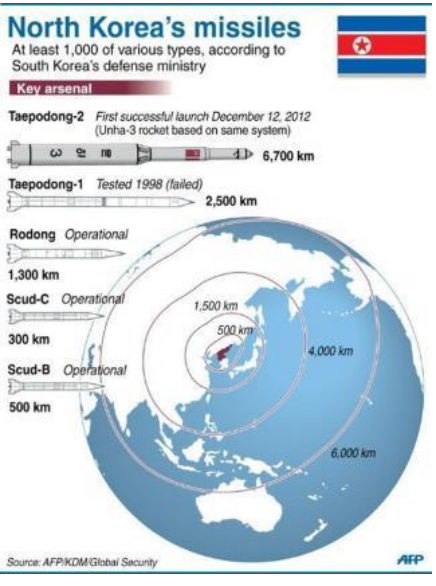

Correction

Why?

- Why visualization?
  - Get insights
  - Come up with hypotheses
  - Detect the expected, and discover the unexpected ®

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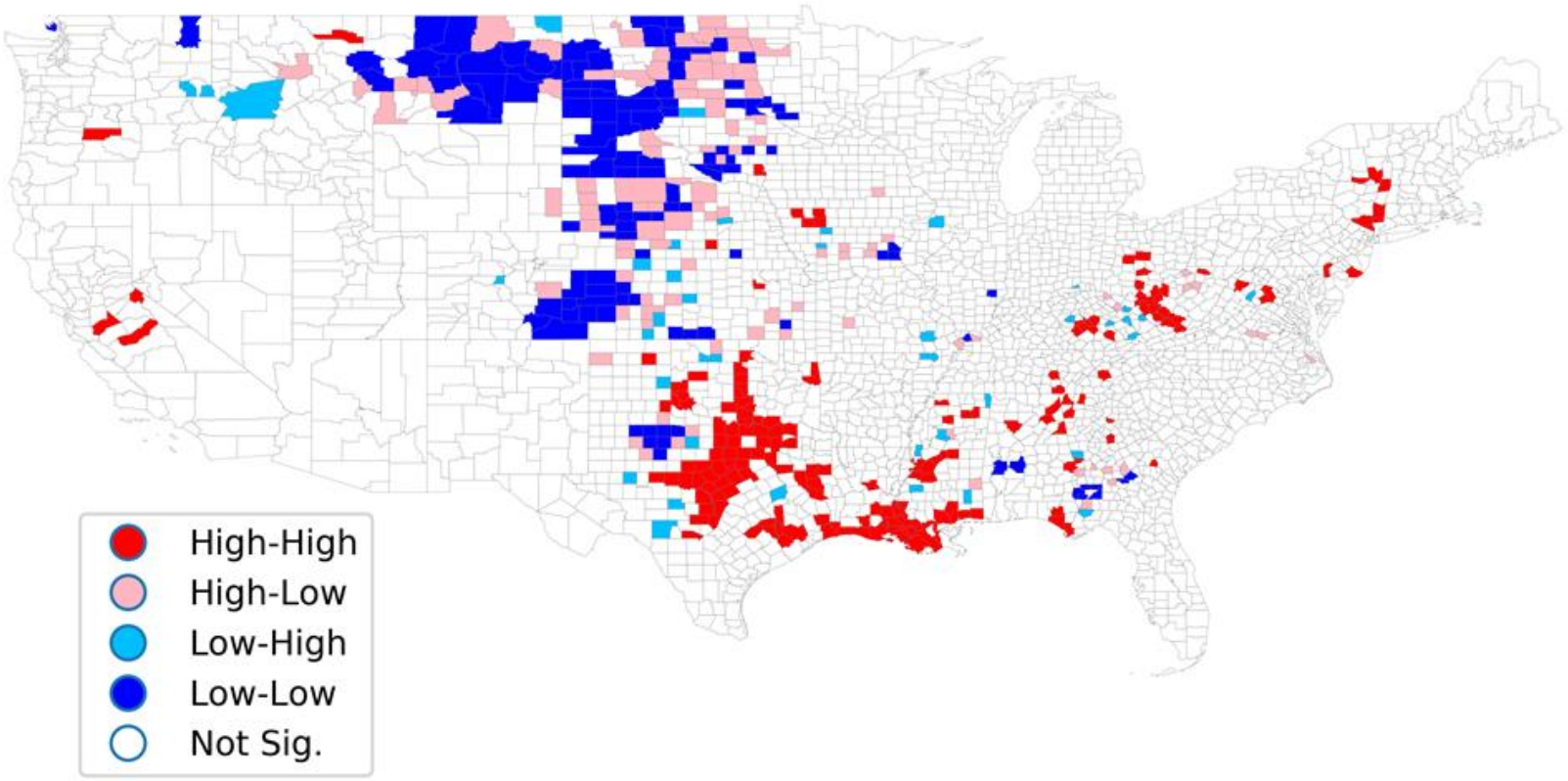

Applications

- Mapping
  - With all map applications throughout history
- Decision making
  - E.g., disease outbreaks, crimes, etc
- Real-time monitoring
  - E.g., traffic, security, etc
- Scientific analysis
  - E.g., climate change, vegetation analysis, etc
- …

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- Three elements
  - Data: what to visualize?
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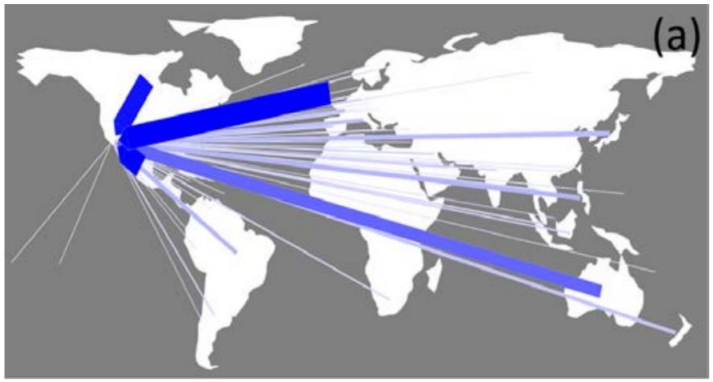

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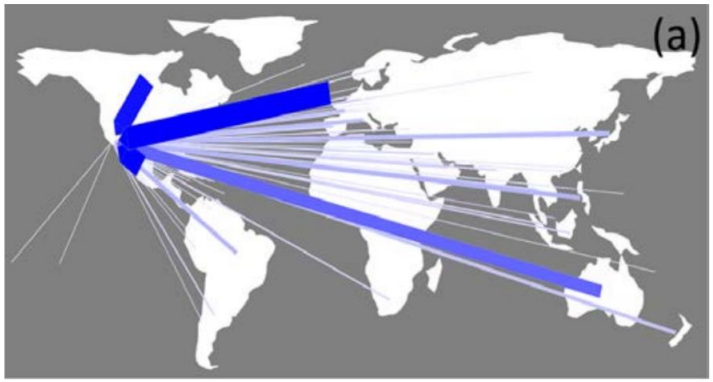
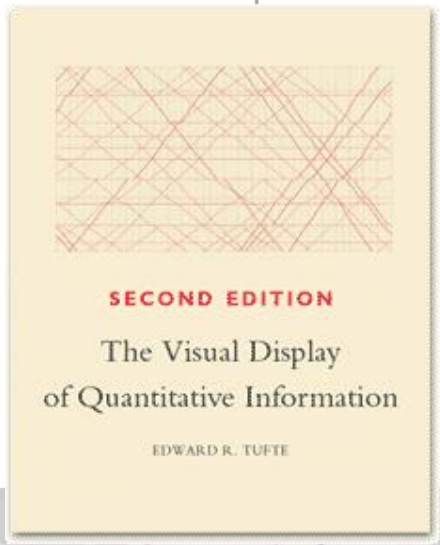
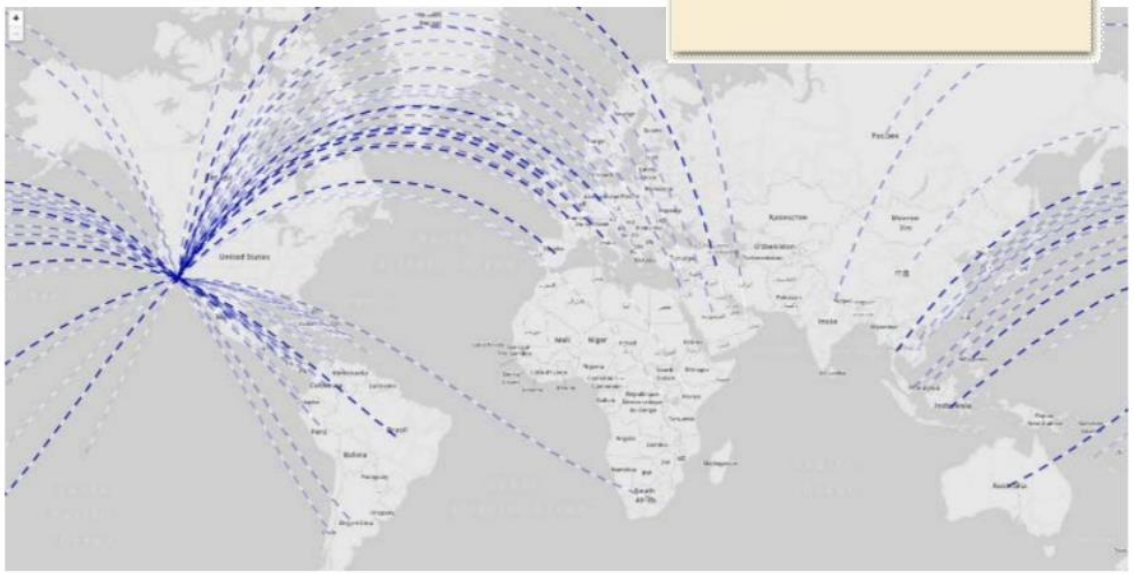
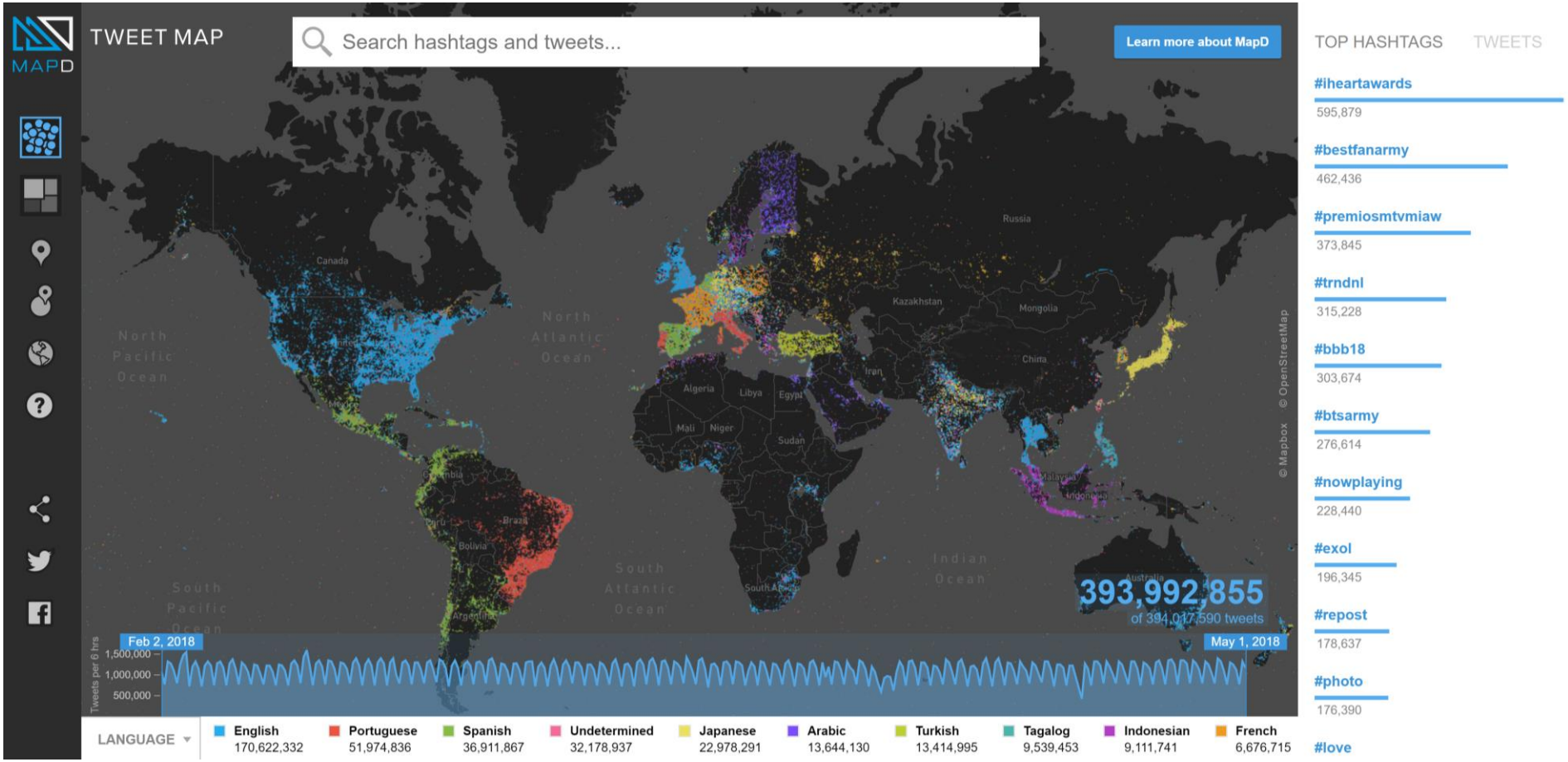






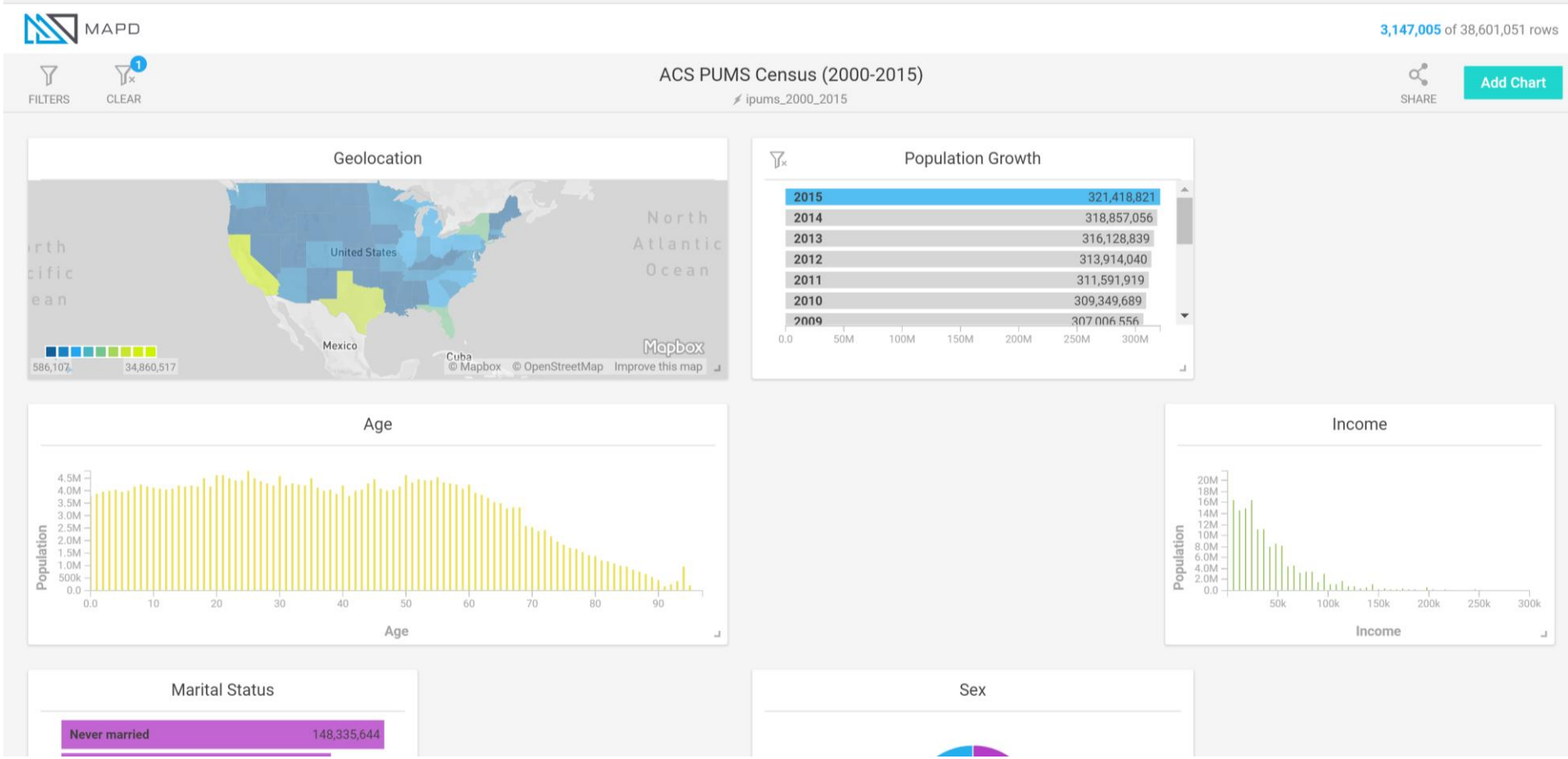
Interactive Maps

- MapD interactive demos
  - Tweet map: https://www.mapd.com/demos/tweetmap/



Interactive Maps

- MapD interactive demos
  - US Census: https://www.mapd.com/demos/census/#/dashboard?_k=uh03oy



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- Specification of interactive visualization
  - 200 ms response time (controversial)

Visualization in Virtual Reality

- https://www.youtube.com/watch?v=u76ww3NJFgE

Big Spatial Data Visualization

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  - How to put data on the map?
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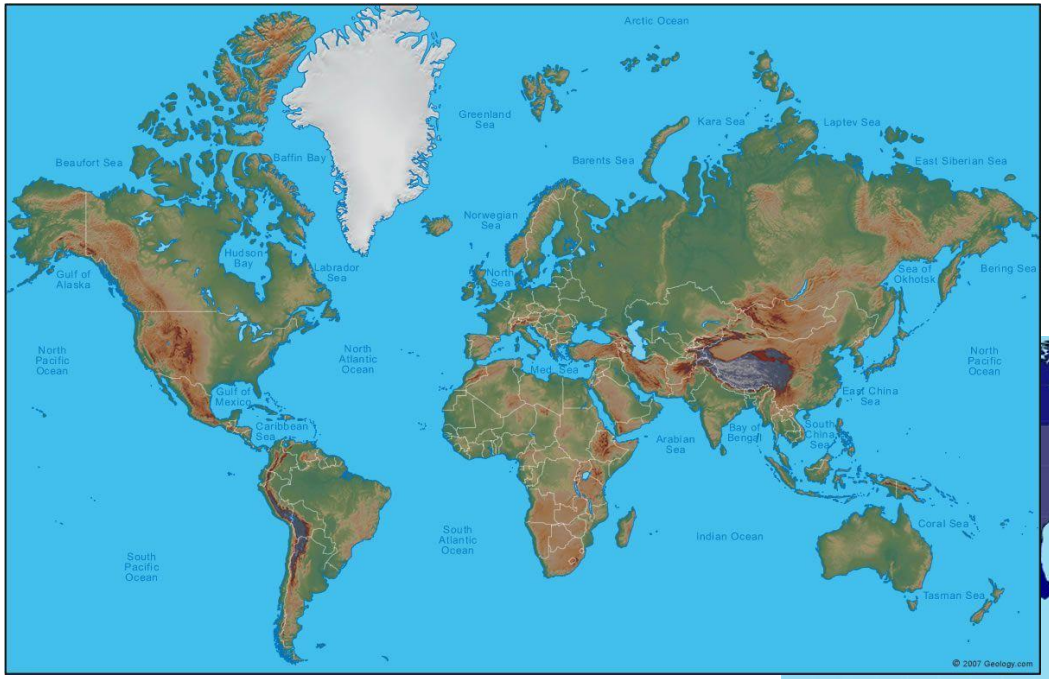
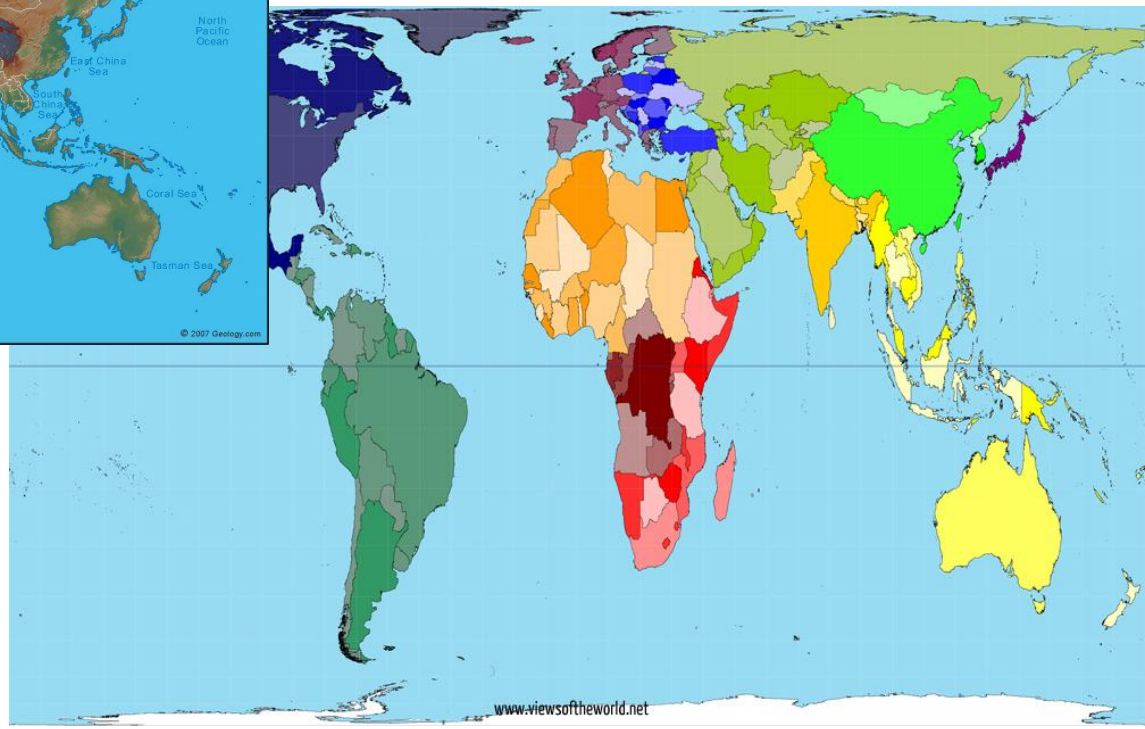
- High velocity
  - High velocity data visualization exploits pre-materialization
  - Still active research is on-going

Designing an Effective Visualization

- Need to take human perception into account





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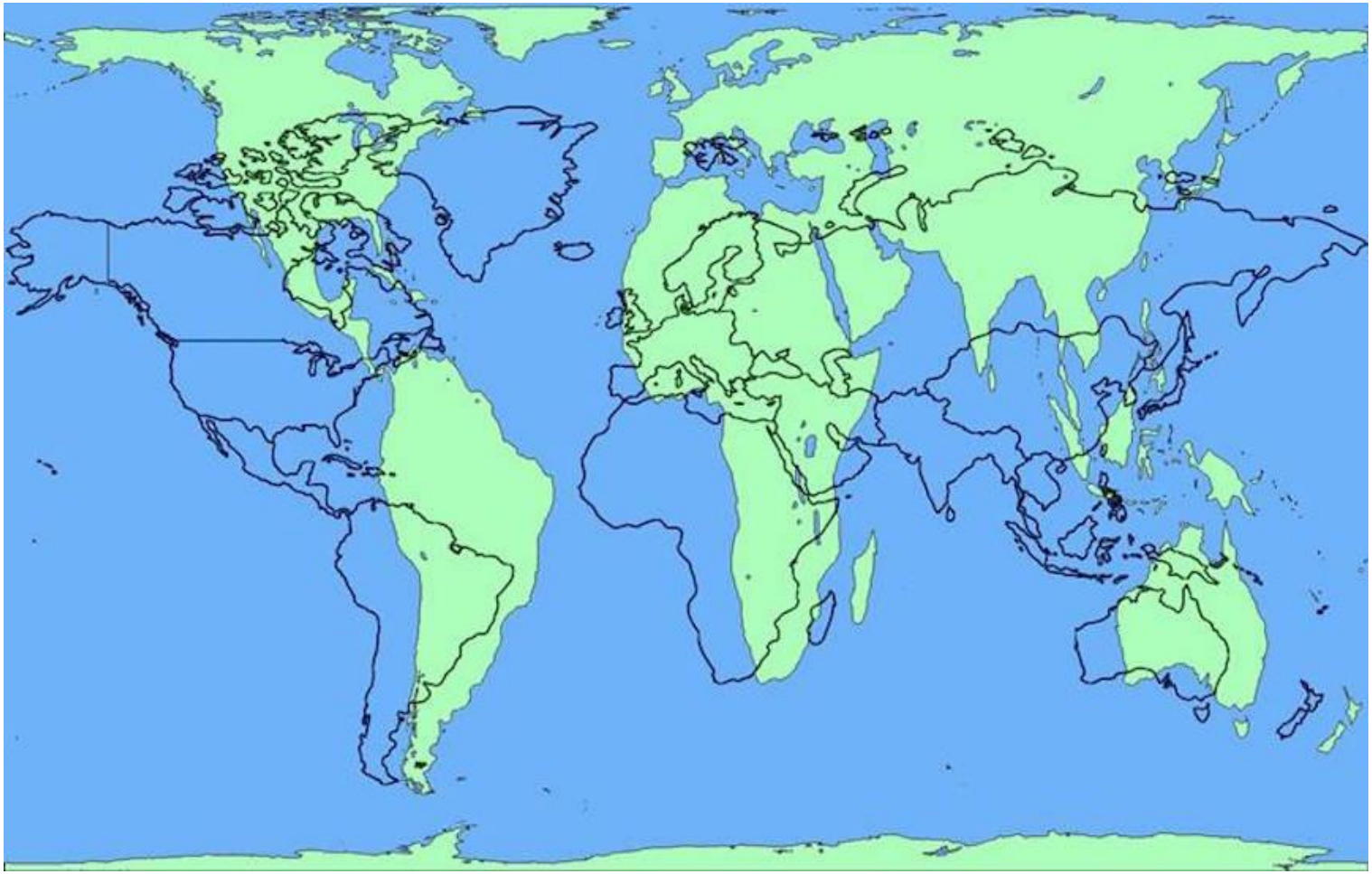
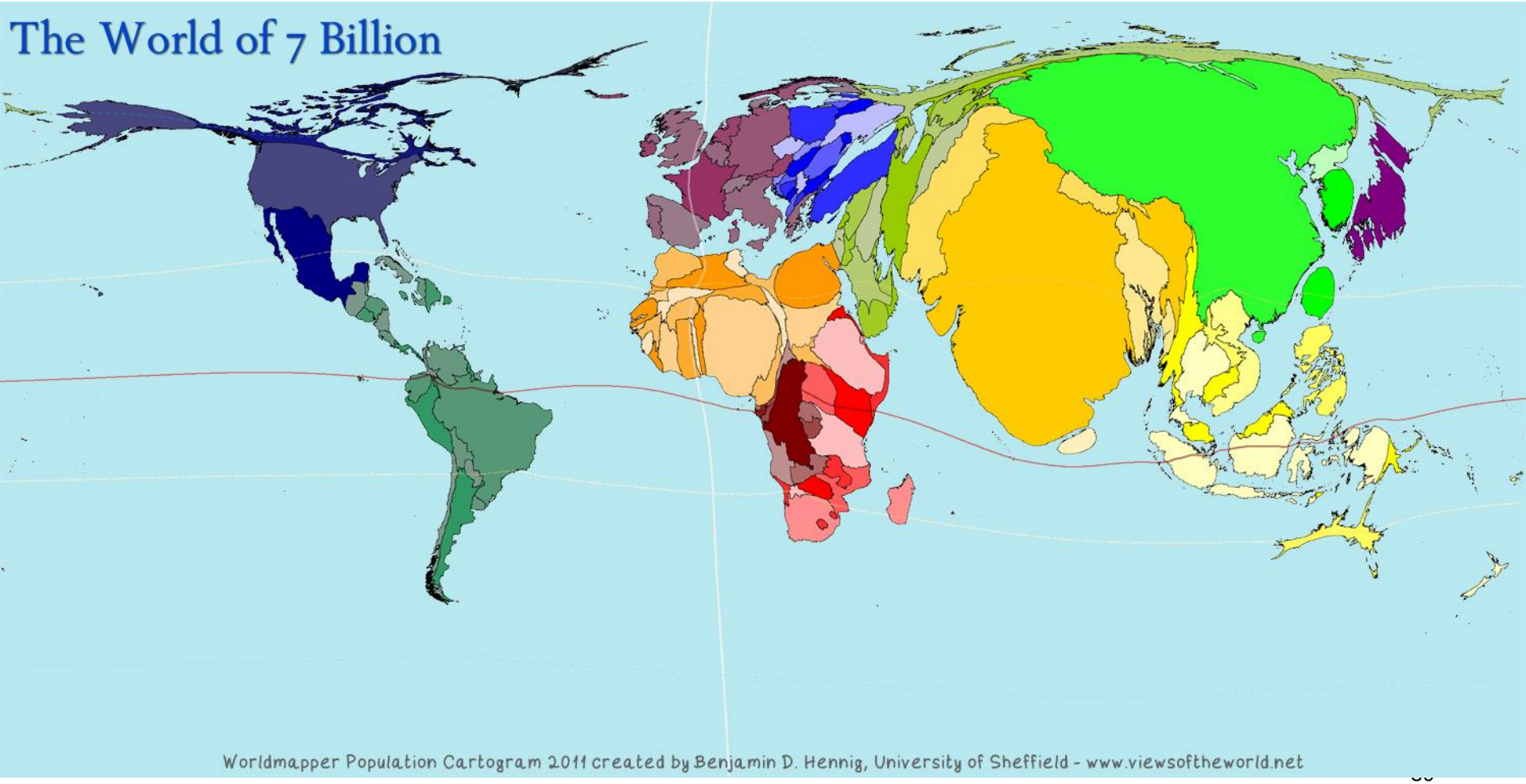


Designing an Effective Visualization

- Communicate the right message



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- Human perception is sensitive to:
  - Sizing
  - Colors perception (color choice, clarity, etc)
  - Conflicted entities (names, borders, etc)
  - Values, e.g., population vs population density
  - …

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  - …
- Visualization confusions might be caused by:
  - Too many colors
  - Inconsistent scales
  - Wrong chart types (e.g., continuous chart on discrete data)
  - ….

Credits

- Prof. Luc Anselin's lecture
  - https://www.youtube.com/watch?v=KJFSSET0Diw