Geographic Data Science

Spatial Data

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Data, data, data

- Everything produces data
- New dense quantitative representations of the world
- But data is not useful, insights are

Data Science

“gathering data messaging it into a tractable form, making it tell its story and presenting that story to others”

Loukides (2011) What is Data Science?

Spatial Data Science

- A lot of new data is spatial data
- Spatial is special
- We don’t want to reinvent the GIS wheel
- How do we bring both world together?

Good old spatial data (+)

Good old spatial data (+)

Traditionally, datasets used in social sciences are

- Collected for the purpose (carefully designed)
- Detailed and informative ("rich profile and portraits of the country")
- High quality

Good old spatial data (-)

But also

- Massive enterprises (very costly)
- Coarse in resolution (to preserve privacy they need to be aggregated)
- Slow - the more detailed, the less frequent they are available

Examples

- Decennial census (census geographies)
- Longitudinal surveys
- Custom collected surveys, interviews etc.
- Economic or well-being indicators

New Forms of spatial data

New Forms of spatial data

Tied into the geo-data revolution

- Accidental : created for different purposes but available for analysis as a side effect
- Very diverse in nature: resolution and quality but, potentially much more detailed in both space and time

We will look at this more in a few weeks!

Lazer & Radford (2017)

- Digital life: digital actions (Twitter, Facebook, WikiPedia…)
- Digital traces: record of digital actions (CDRs, metadata…)
- Digitalised life: nonintrinsically digital life in digital form (Government records, web…)

Arribas-Bel (2014)

Three levels, based on how they originate:

- Bottom up: “Citizens as sensors”
- Intermediate: Digital businesses/businesses going digital
- Top down: Open Government Data

Opportunities (Lazer & Radford, 2017)

- Massive, passive
- Nowcasting
- Data on social systems
- Natural and field experiments (“always-on” observatory of human behaviour)
- Making big data small

Challenges (Arribas-Bel, 2014)

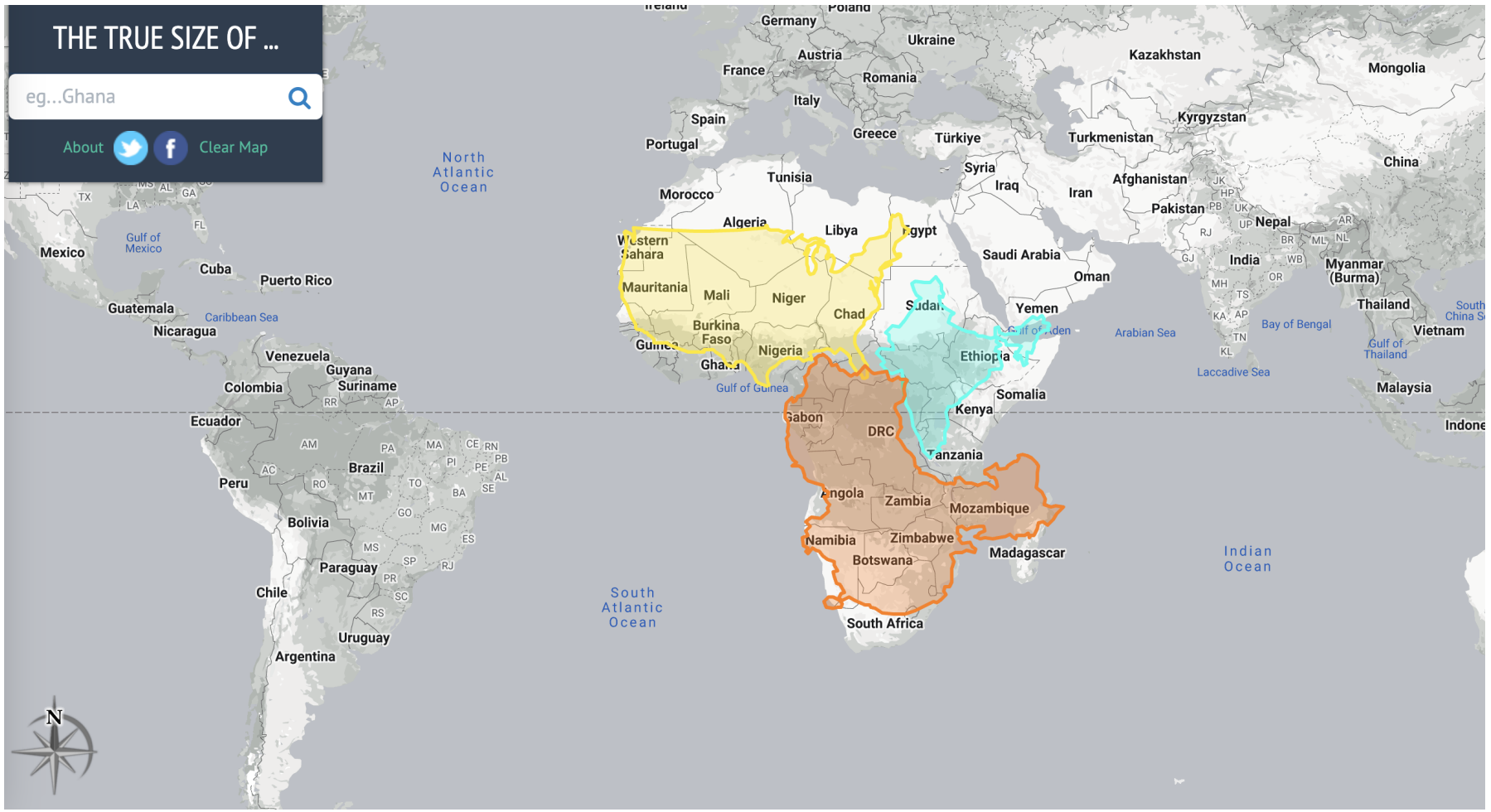
- Bias
- Technical barriers
- Methodological “mismatch”

All maps are wrong

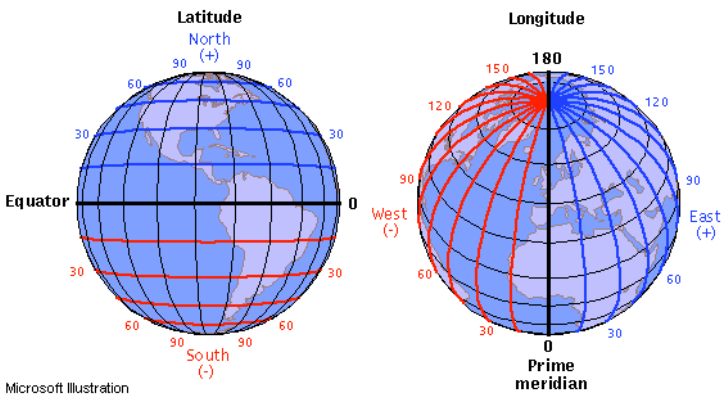
All maps are wrong

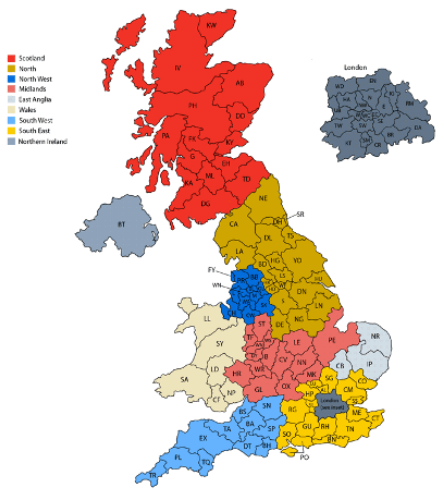
Tell your neighbour how maps can lie.

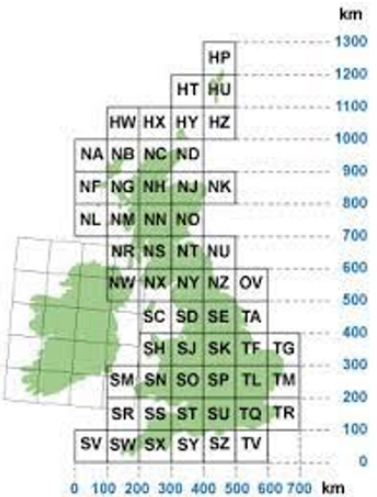
All maps are wrong



Linking Spatial Info







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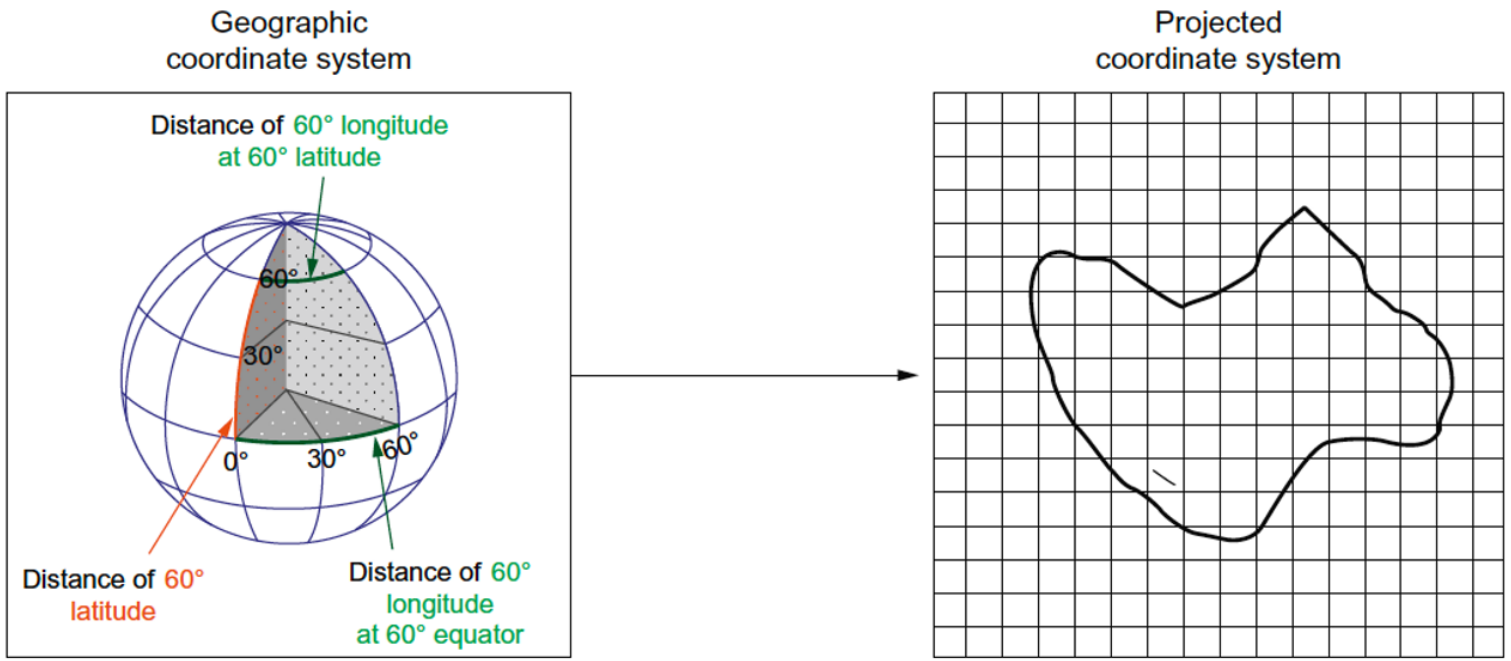

Coordinate Reference Systems

Coordinate reference systems provide the context of coordinates:

- They tell whether the coordinates are ellipsoidal (angles), or derived, projected (Cartesian) coordinates
- In case they are projected, they detail the kind of projection used, so that the underlying ellipsoidal coordinates can be recovered

Coordinate Reference Systems

- Convert between projected and unprojected, or to another projection
- Transform from one datum to another
- Combine the coordinates with any other coordinates that have a coordinate reference system

Have a better look at the concepts page

Questions