

# Maps

Jonas Schöley

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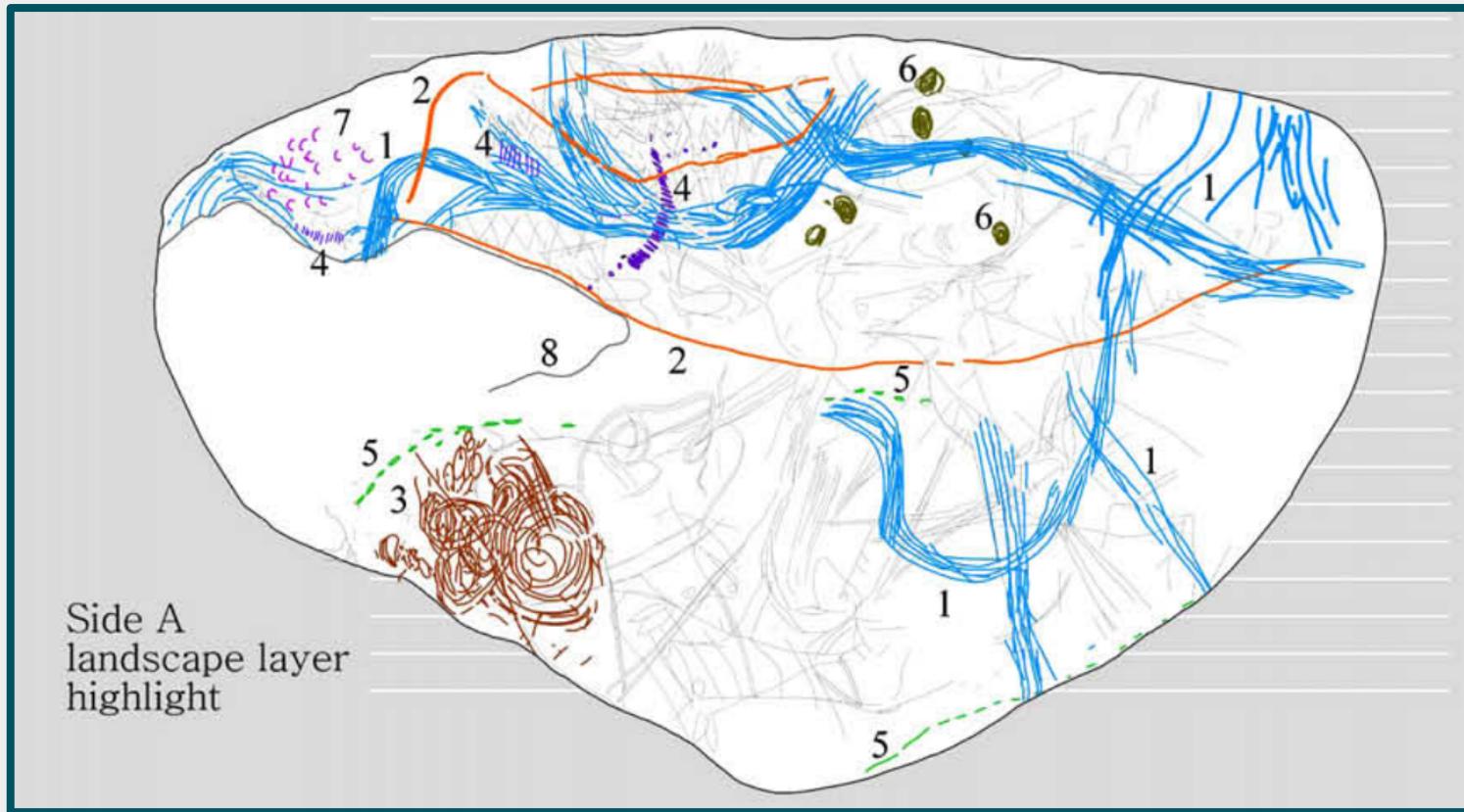


Max-Planck Odense Center on the  
Biodemography of Aging



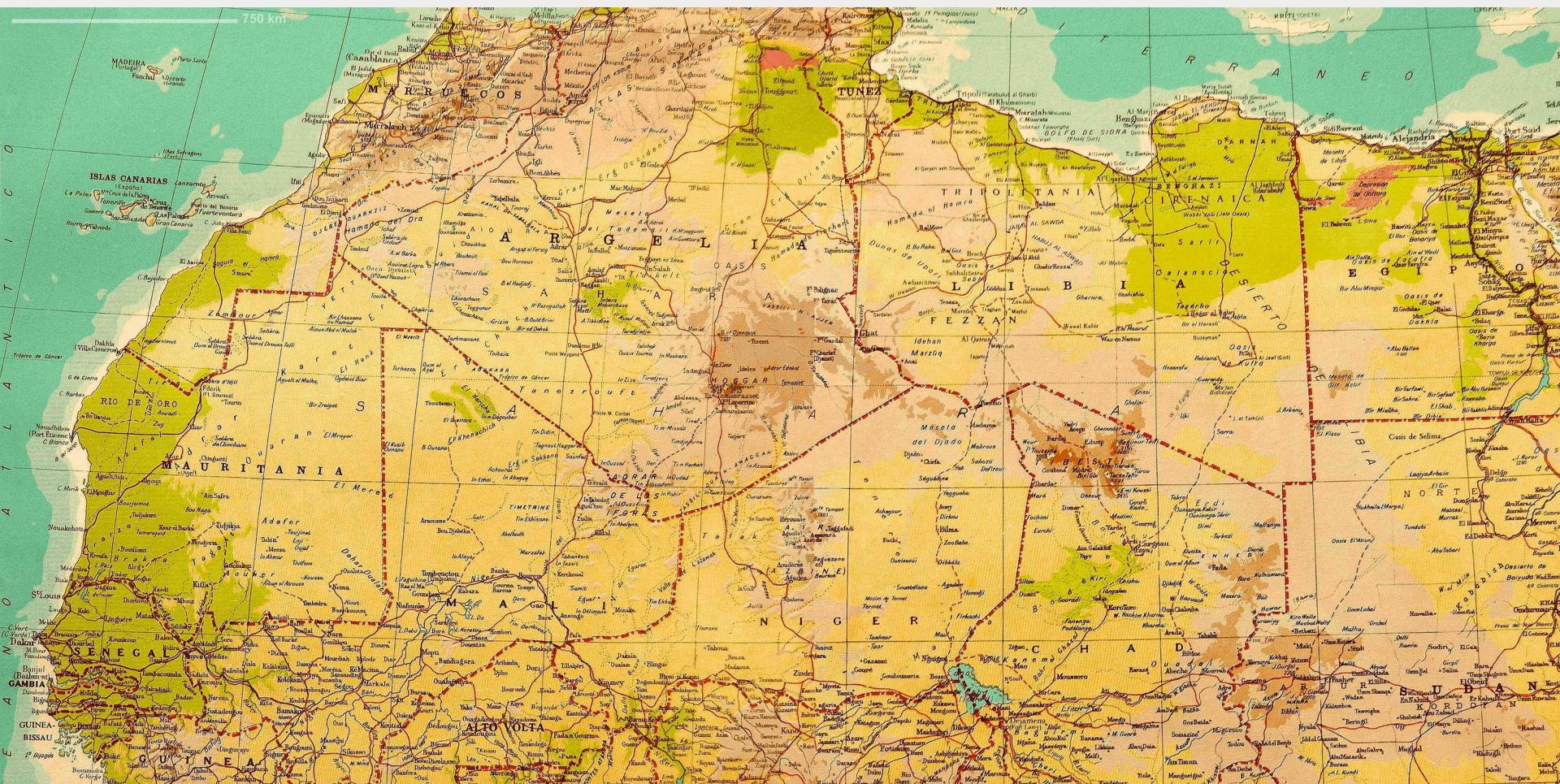
Department of Public Health  
University of Southern Denmark

# Cartography as ancient dataviz



Utrilla et al (2009). "A palaeolithic map from 13,660 calBP: engraved stone blocks from the Late Magdalenian in Abauntz Cave (Navarra, Spain)." *Journal of Human Evolution*, 57:99–111.

# Maps: Complex, dense, yet clear

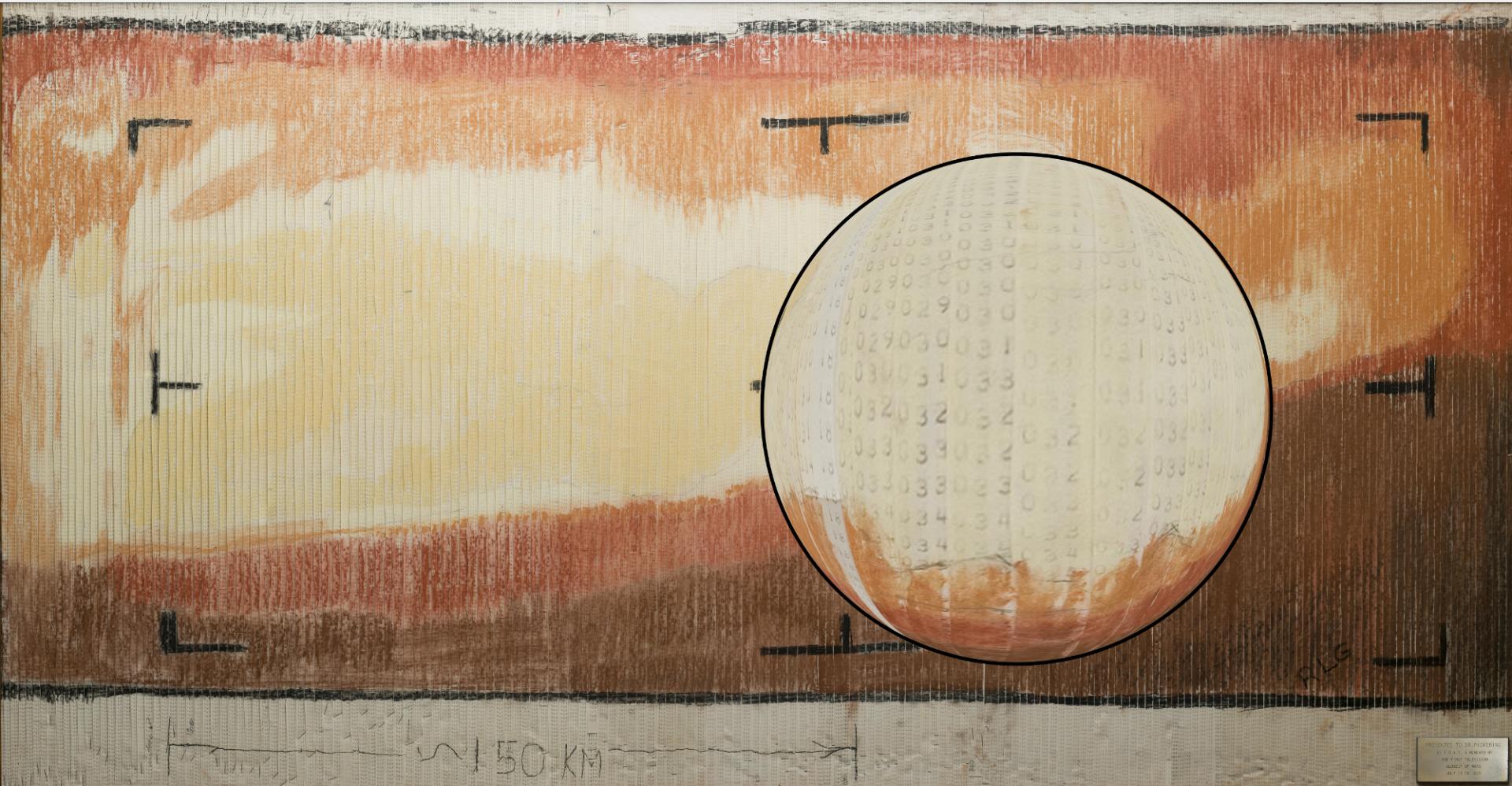


# Geography is data



NASA.

# Geography is data

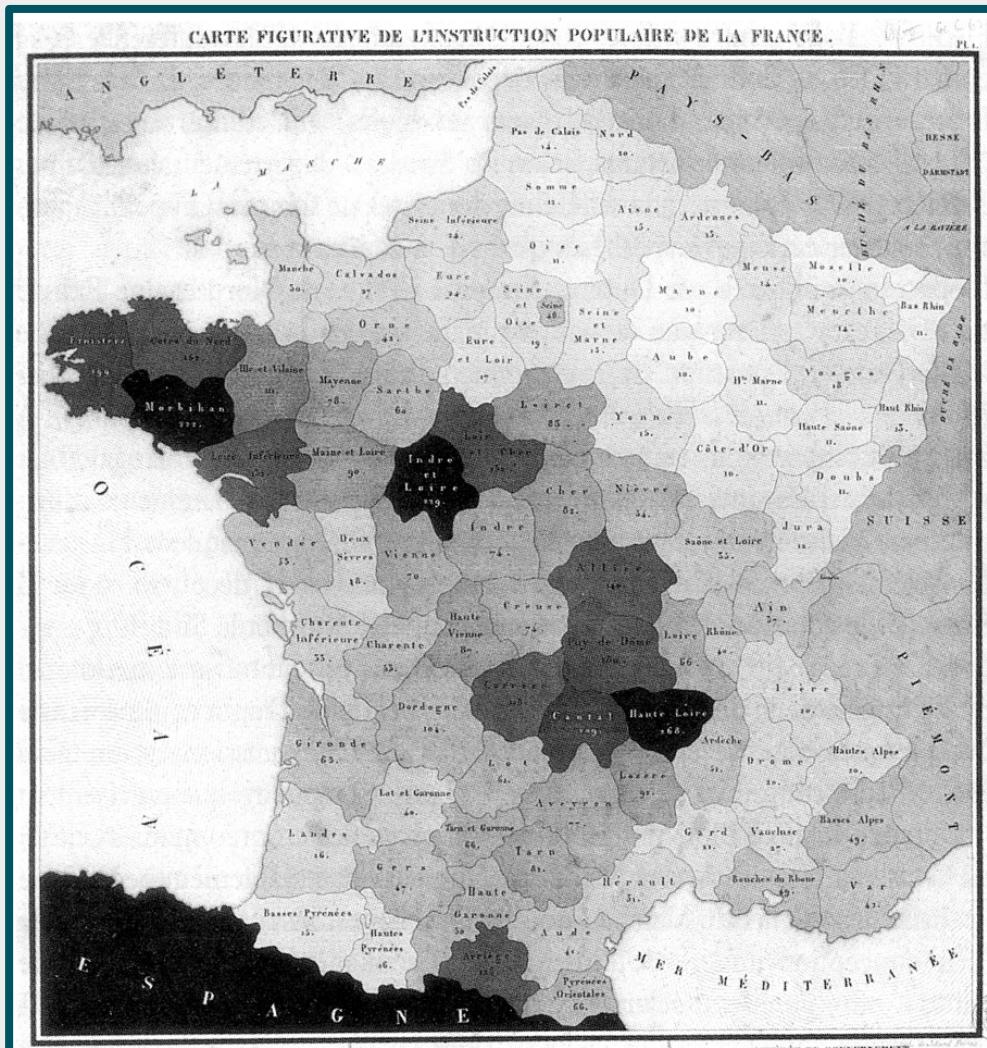


NASA.

# From geography as data to data by geography



# From geography as data to data by geography



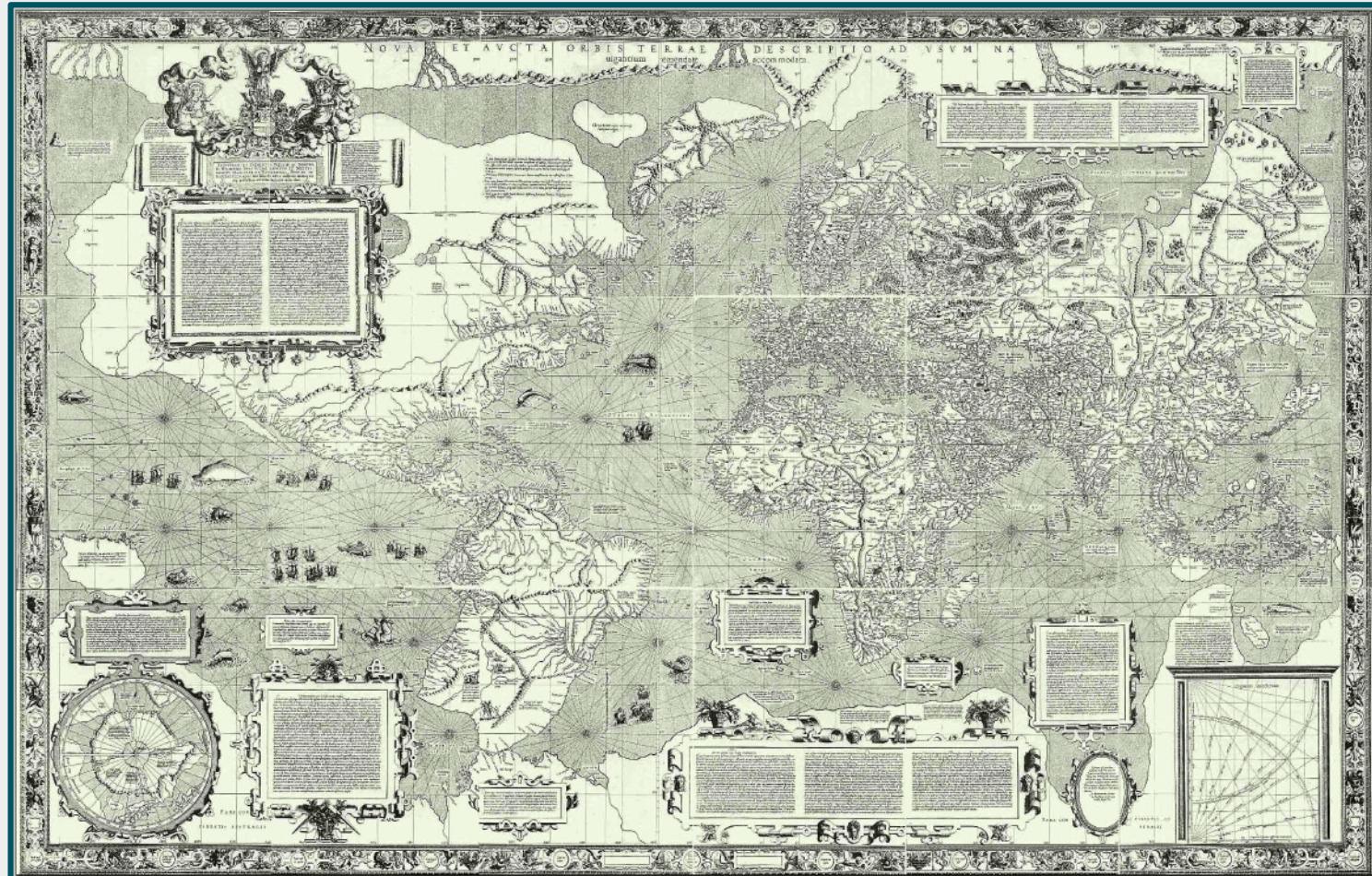
## Carte figurative de l'instruction populaire de la France.

# Map projections

# First picture of earths curvature

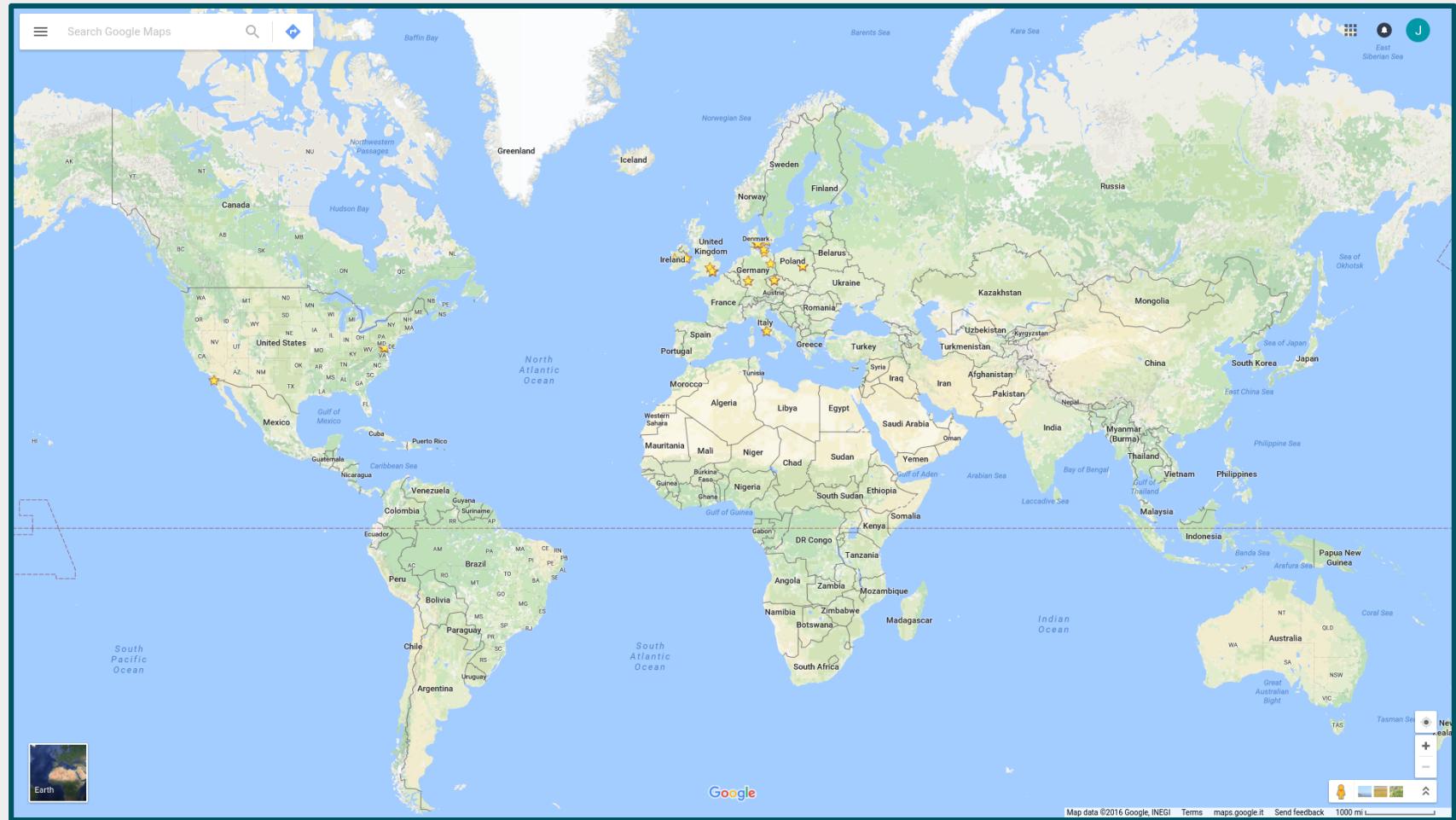


# The Mercator world map...



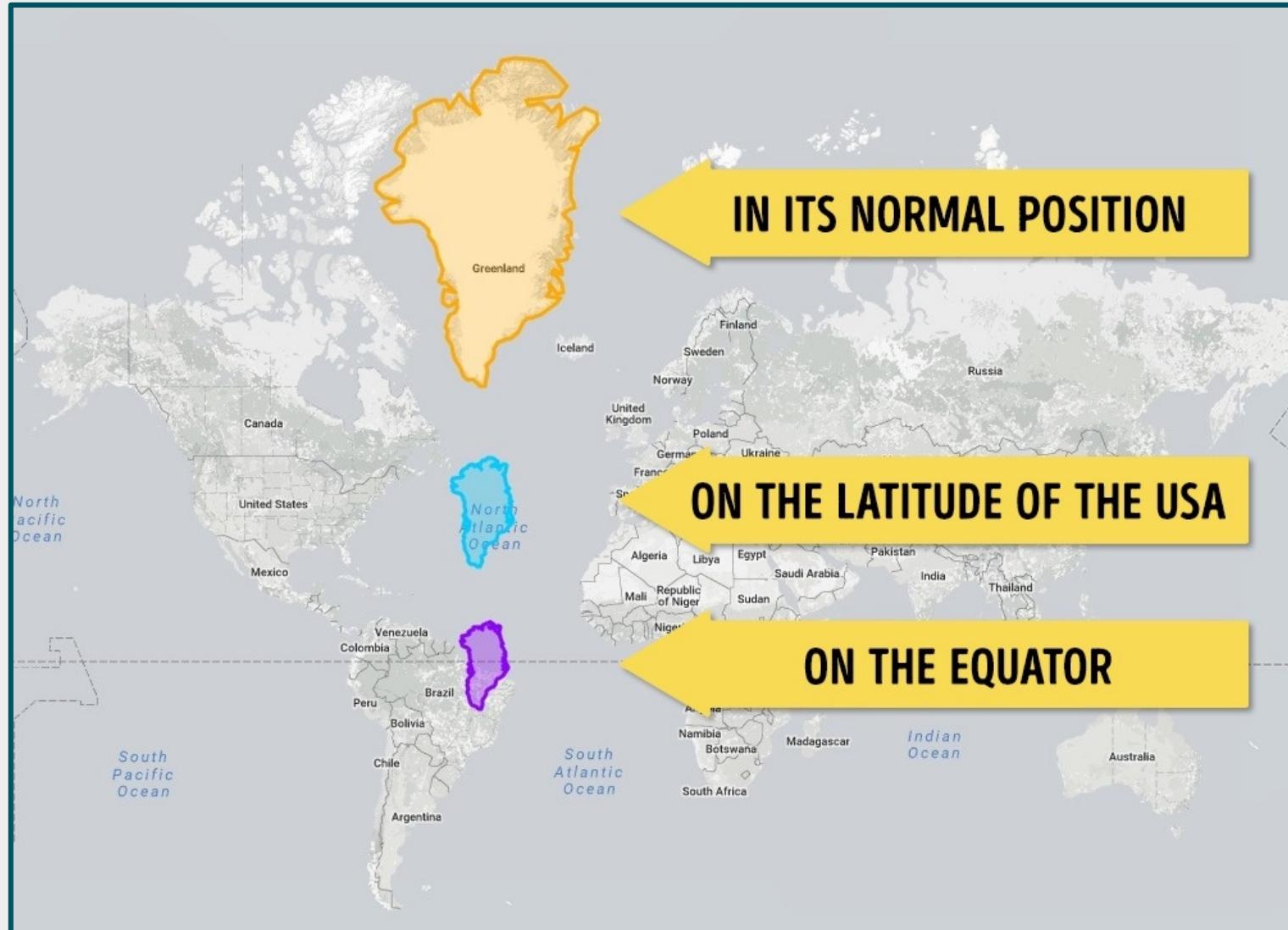
Carta do Mundo de Mercator (1569).

# Google uses Mercator projection



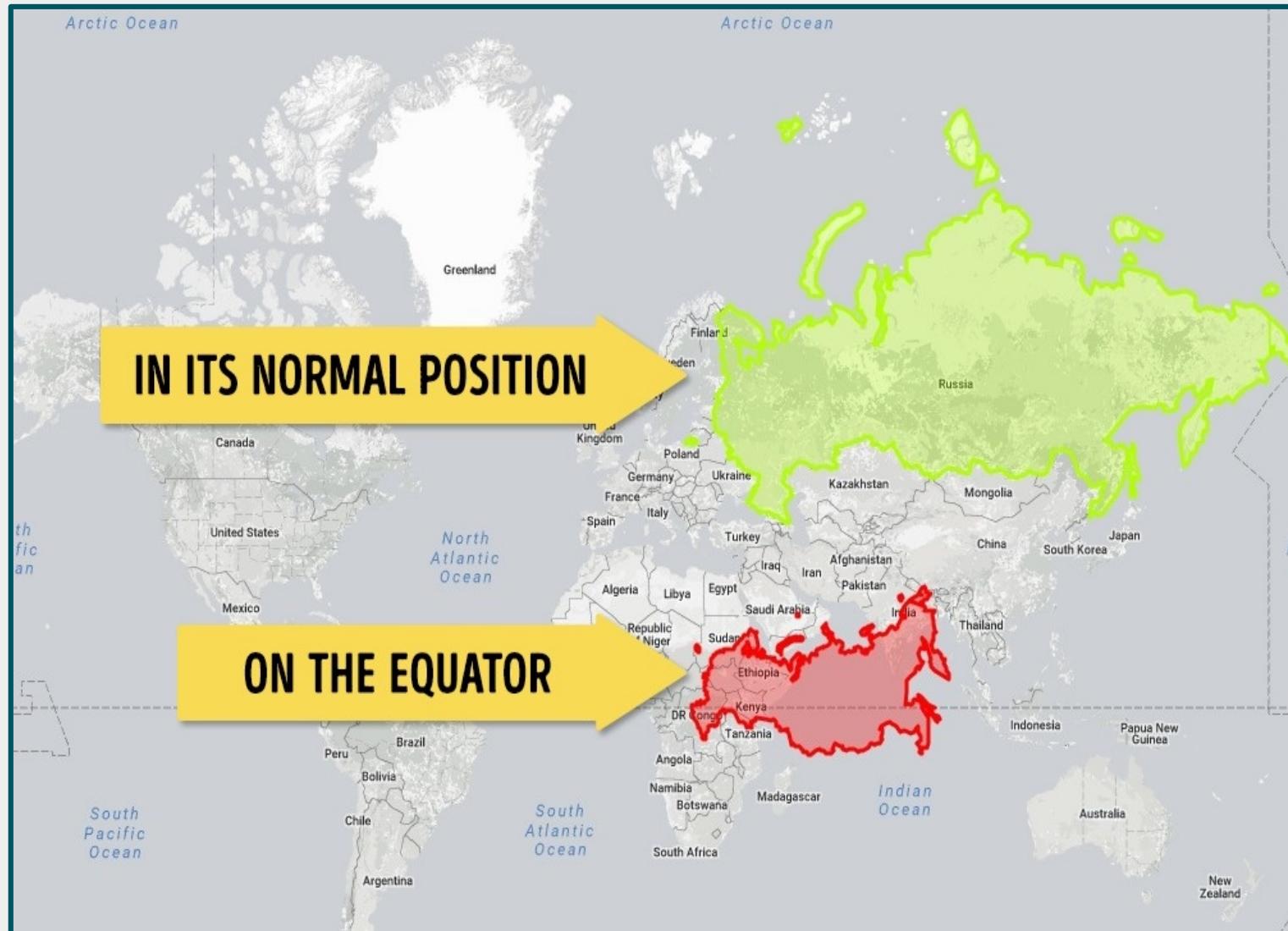
Google Maps.

# Mercator: Area increases with distance from equator



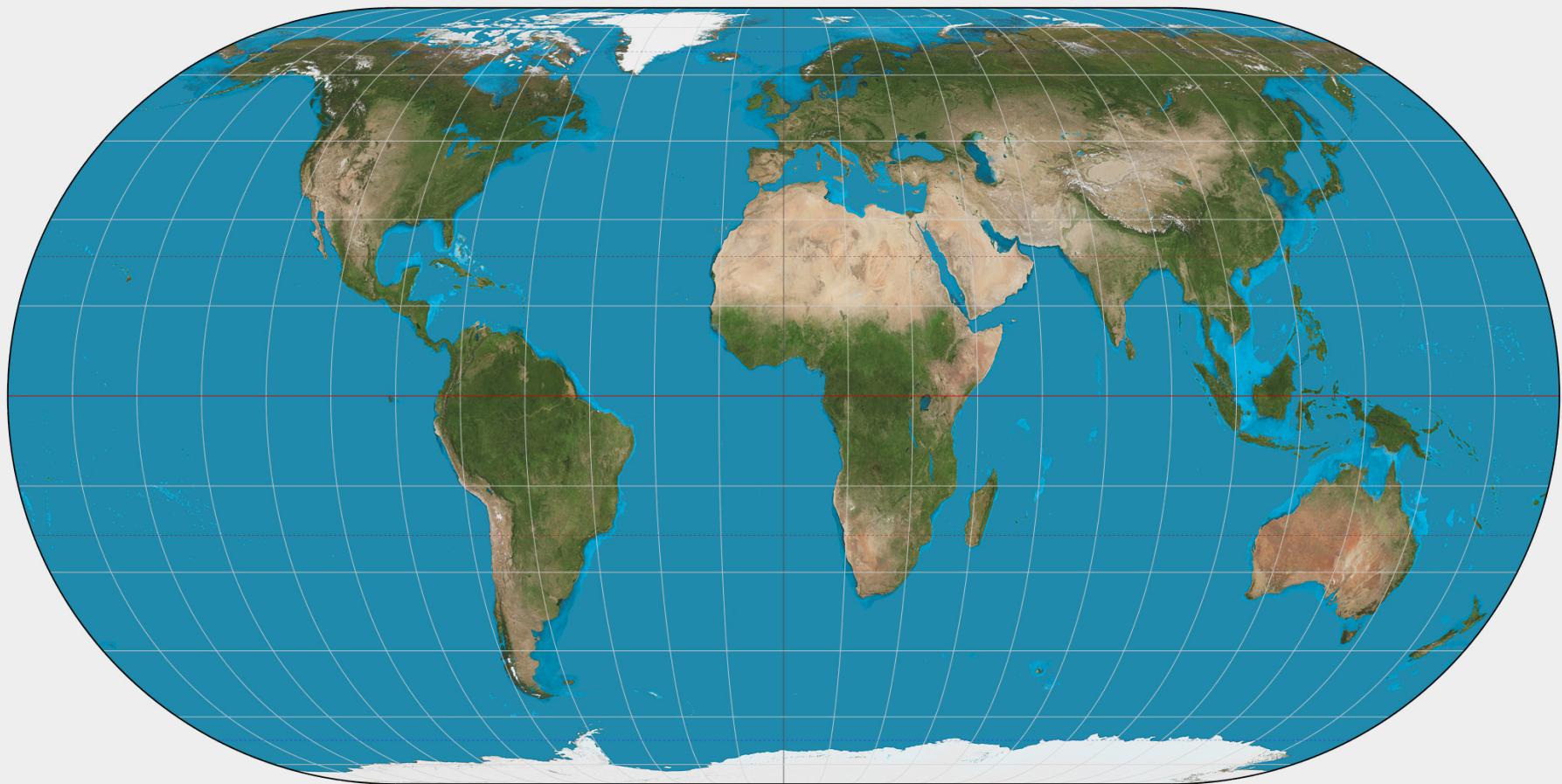
[thetruesize.com](http://thetruesize.com) via [brightside.me](http://brightside.me)

# Mercator: Area increases with distance from equator



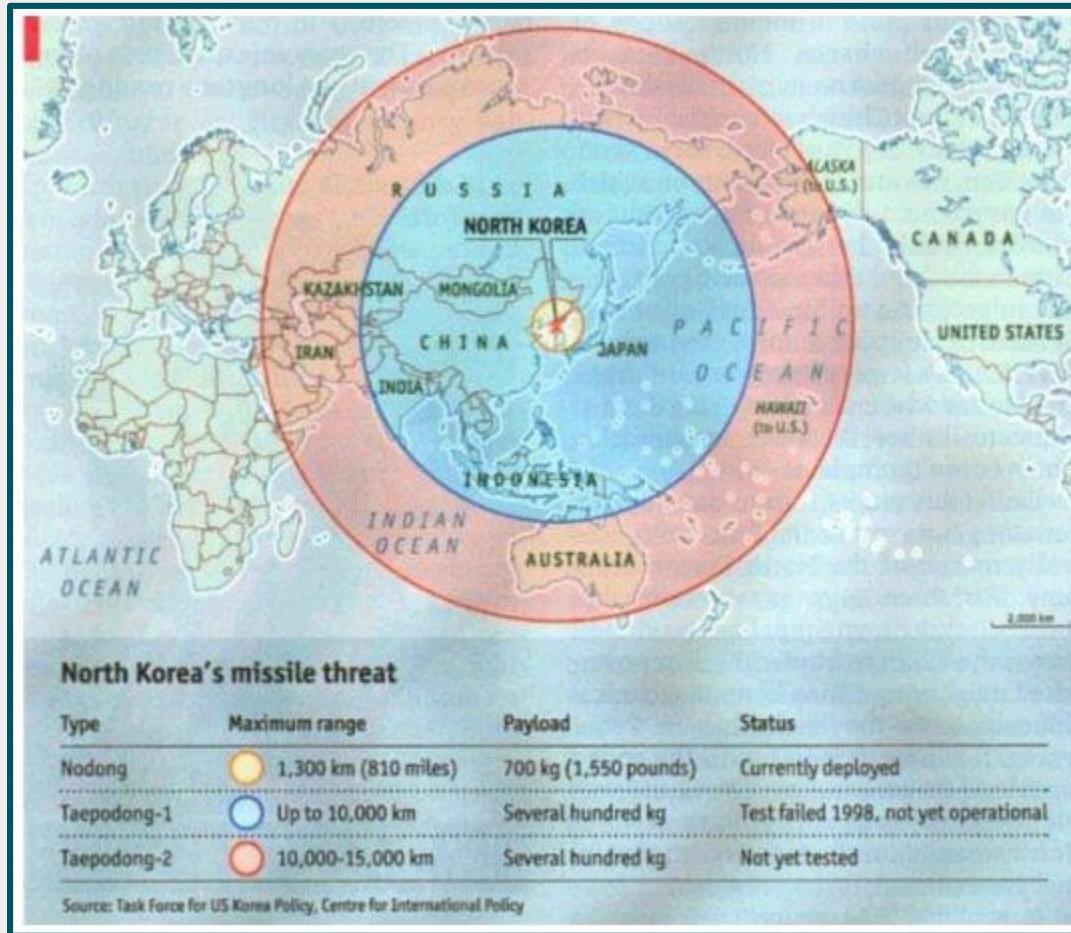
[thetruesize.com via brightside.me](http://thetruesize.com via brightside.me)

# An equal area projection



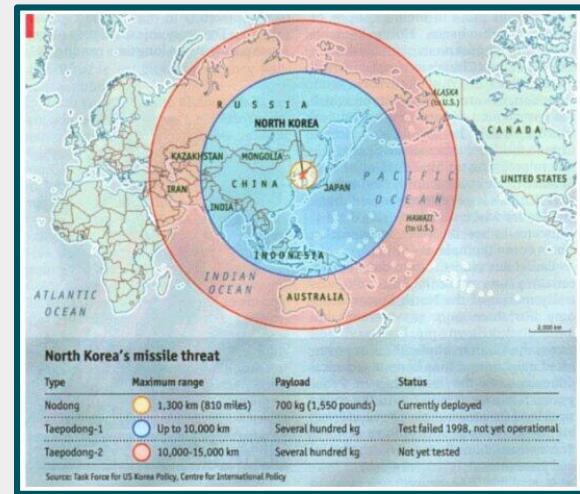
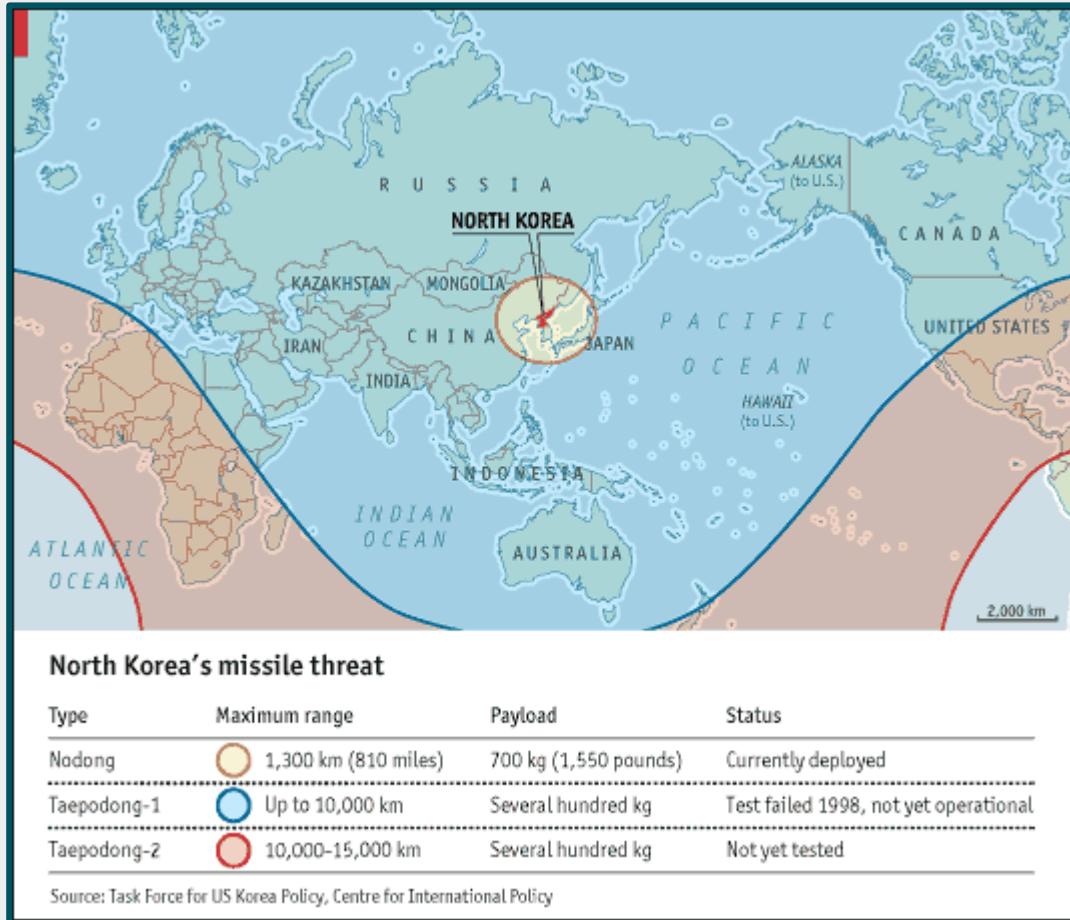
Eckert IV projection.

# Be mindful of your map projection



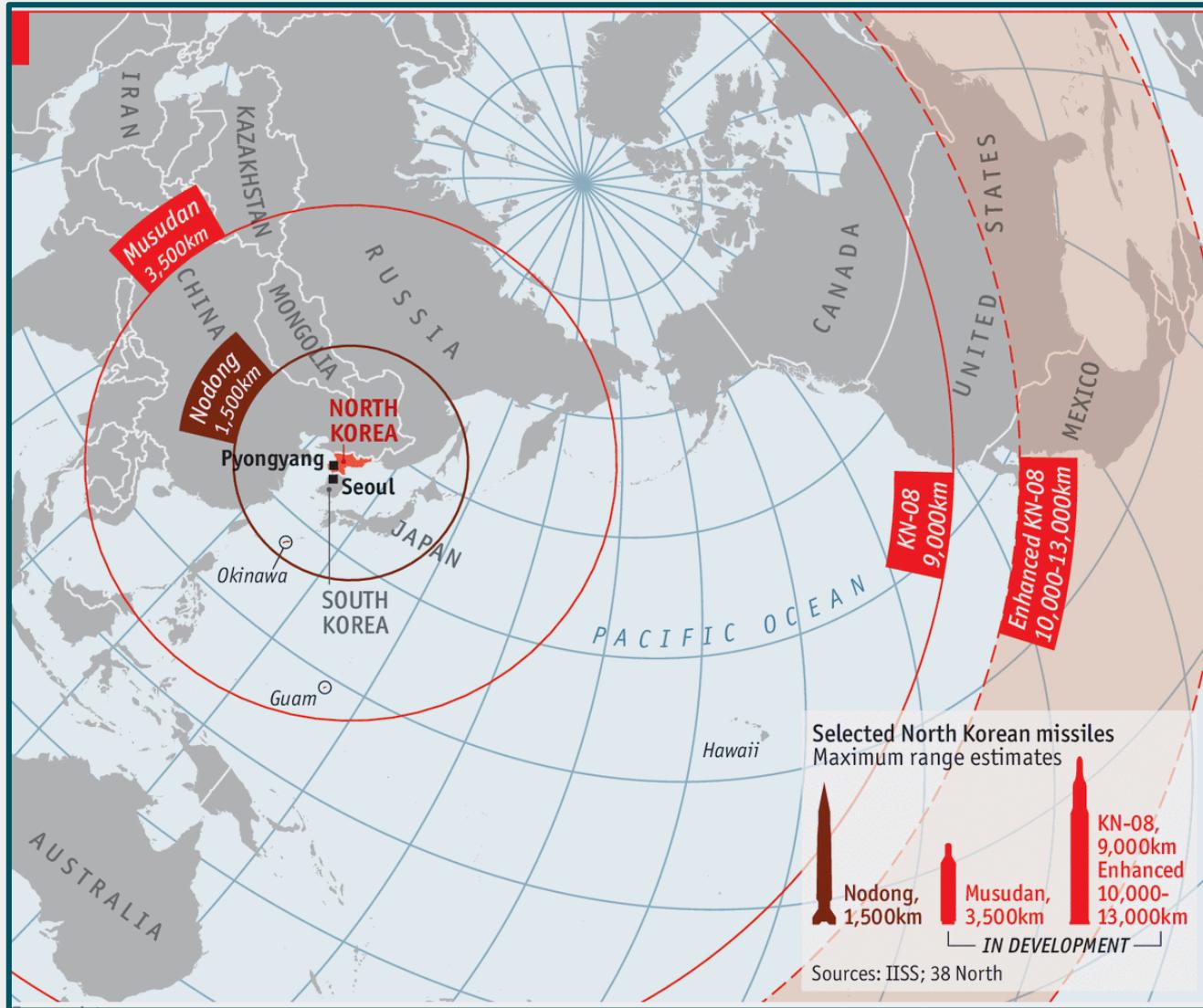
The economist (2003). North Korea's missiles

# Be mindful of your map projection



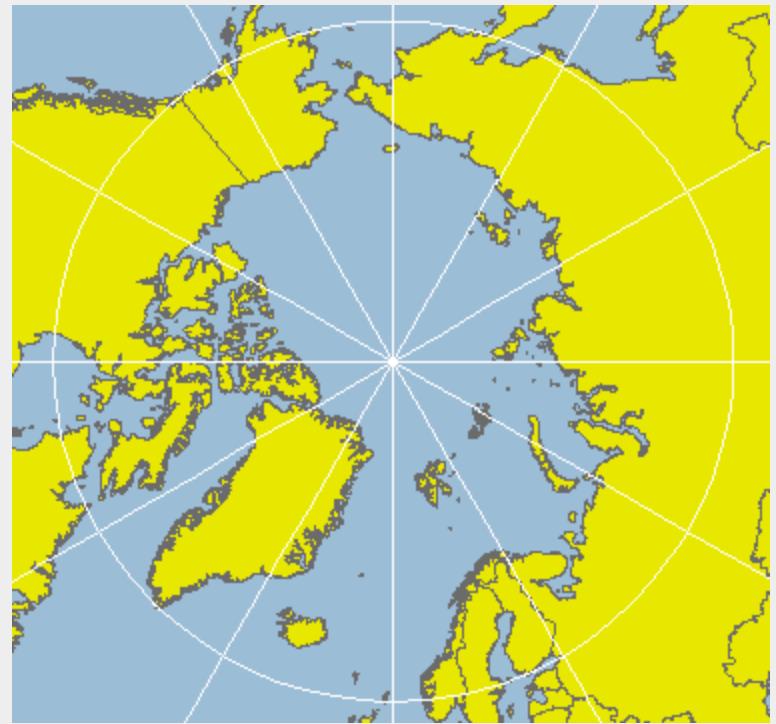
The economist (2003). North Korea's missiles. [corrected]

# Equal distance scaling in all directions



The Economist (2016). North Korea's nuclear weapons.

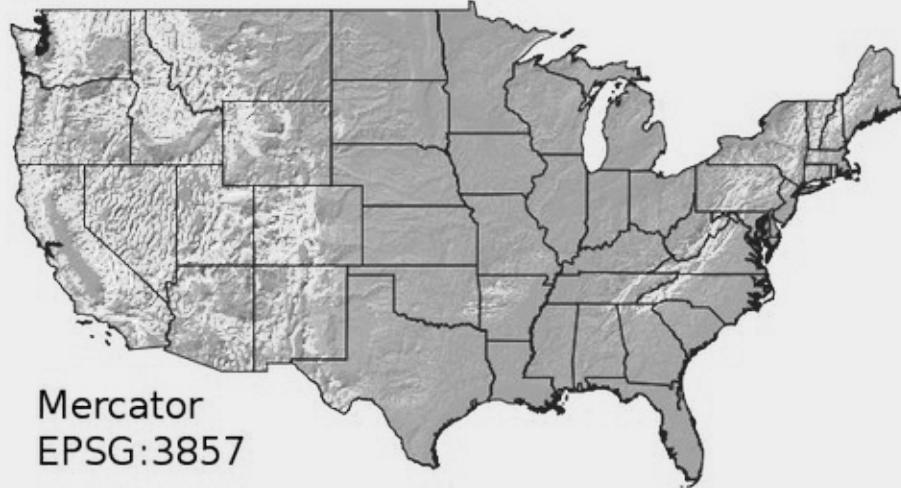
# Different parts of the world – different projections



Albrecht (2005). Choosing a projection.

**Azimuthal equidistant projections centered on the north pole**

# Different parts of the world – different projections



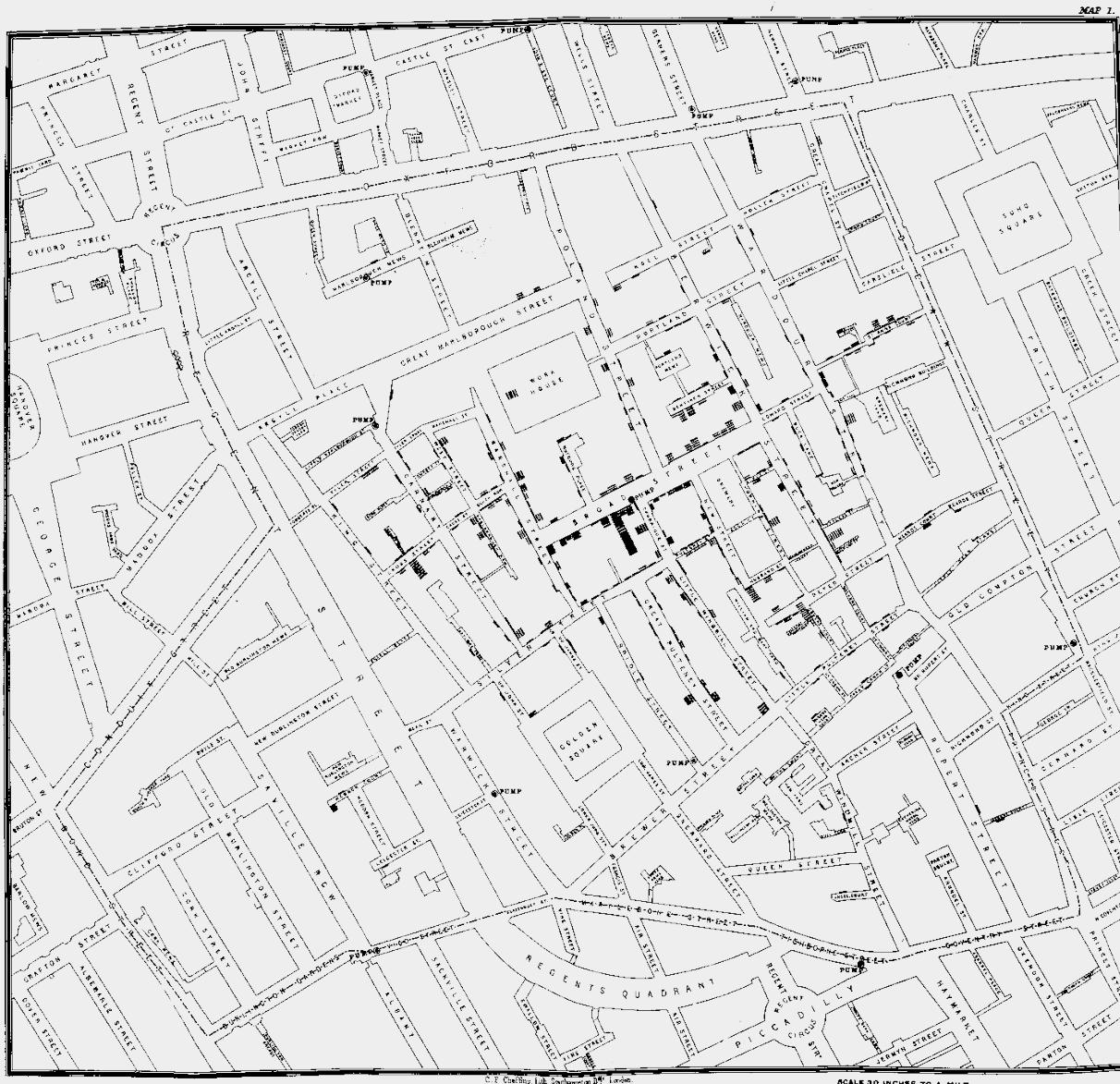
UTM Zone 11N  
EPSG:2955



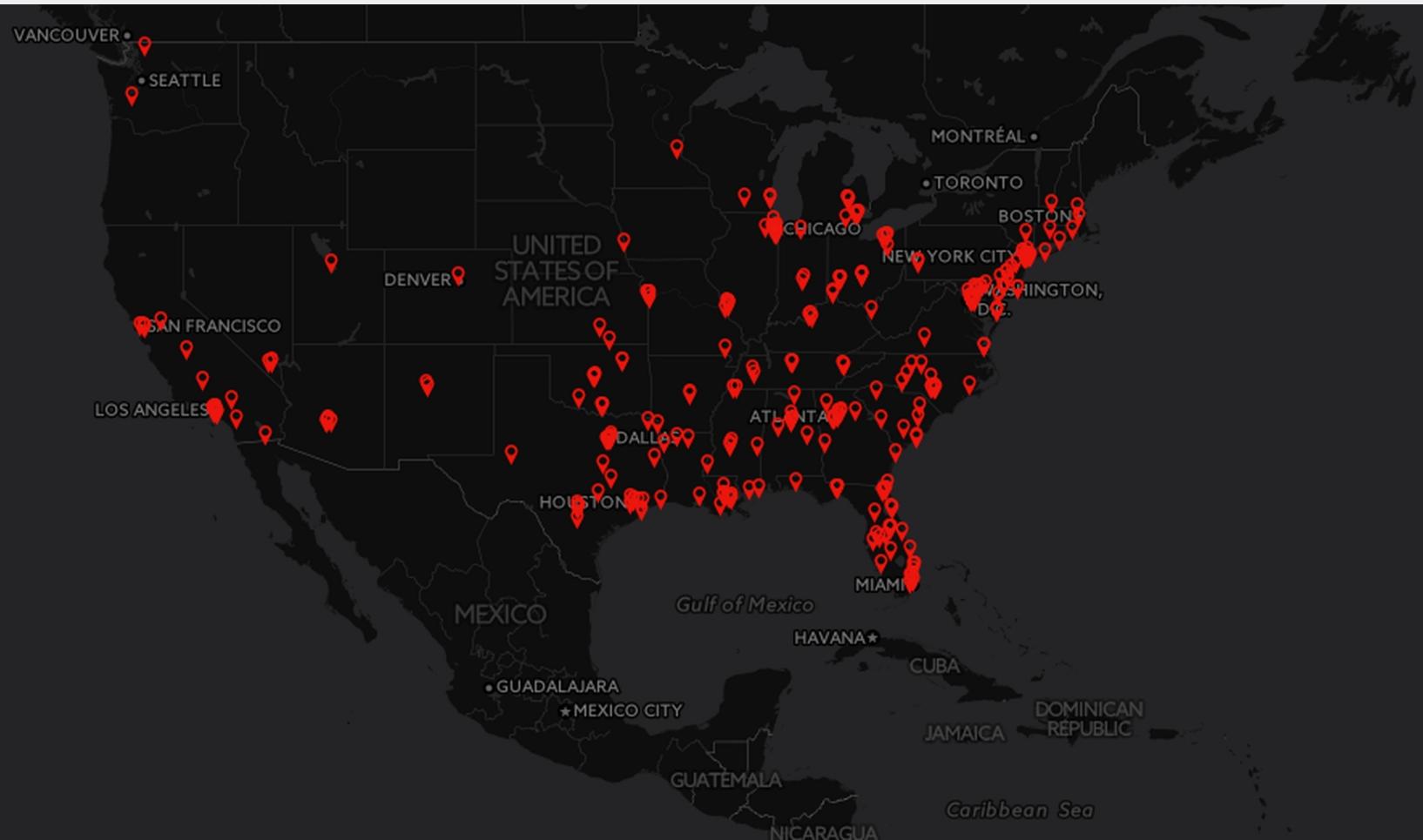
[Corey \(2013\). Choosing the Right Map Projection.](#)

# Confounding variables

# John Snows cholera map (1854)

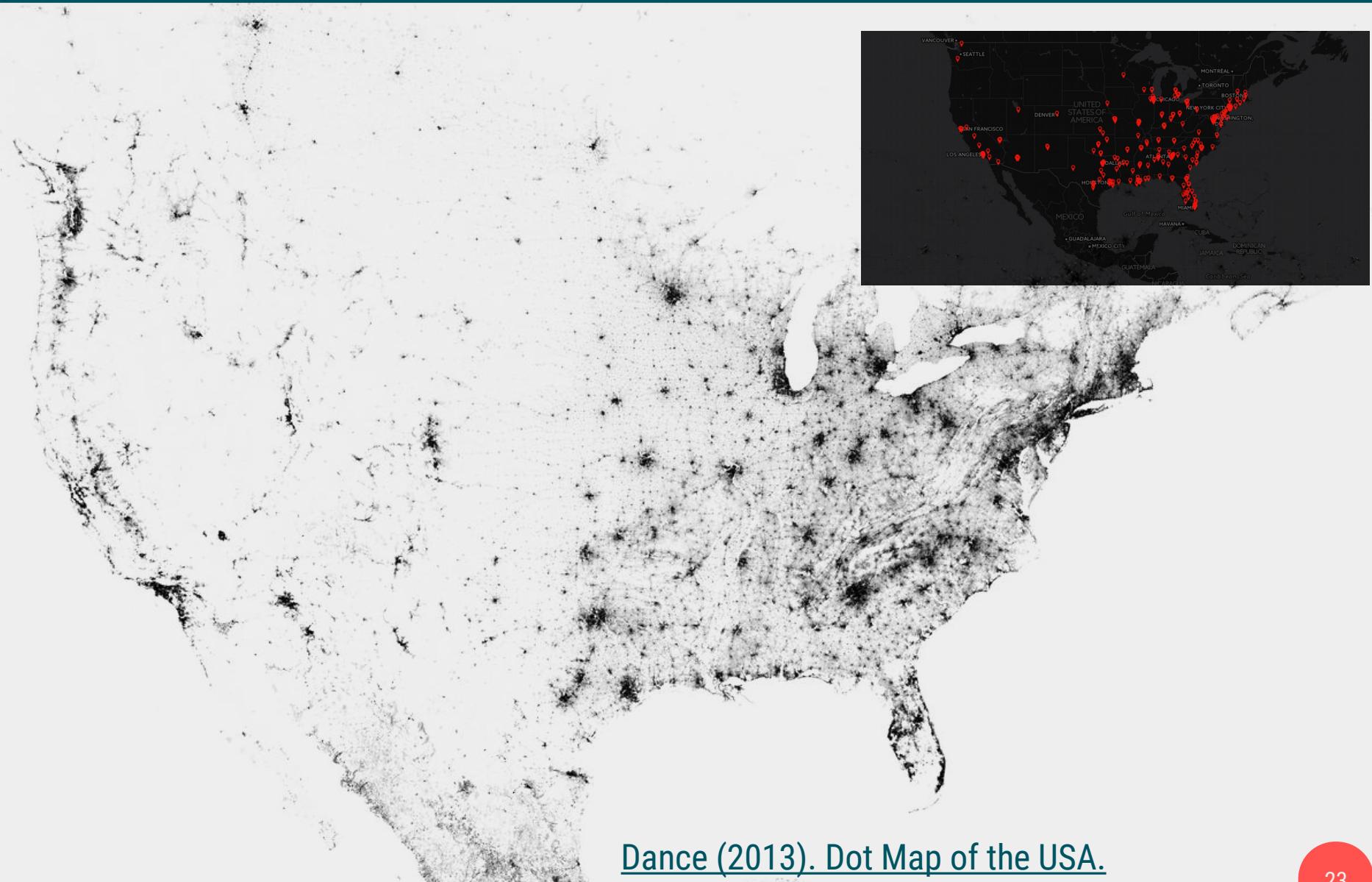


# Population density as confounding variable



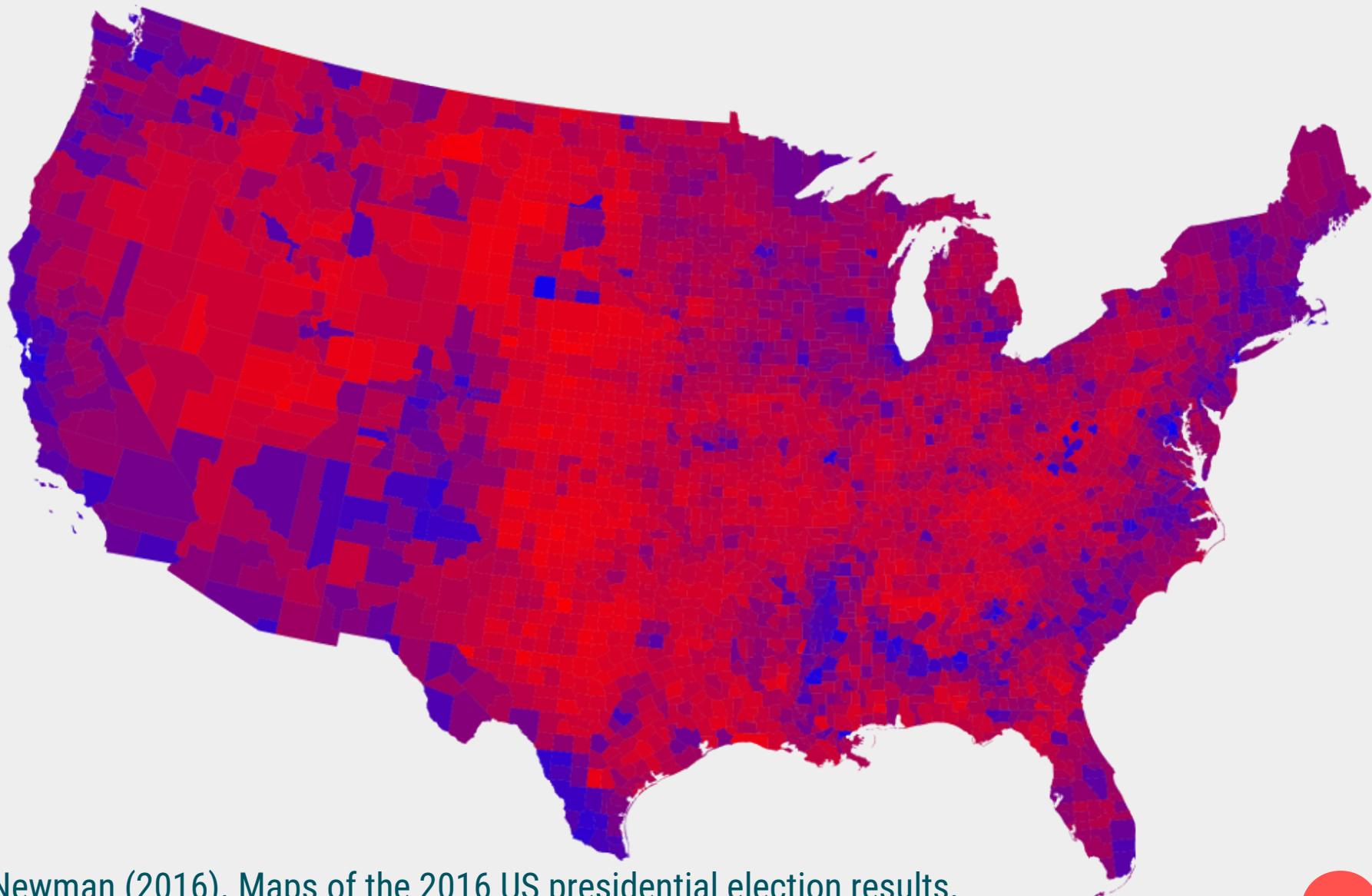
The Daily Dot (2015). The one map you need to understand police violence in the U.S.

# Reproducing population density



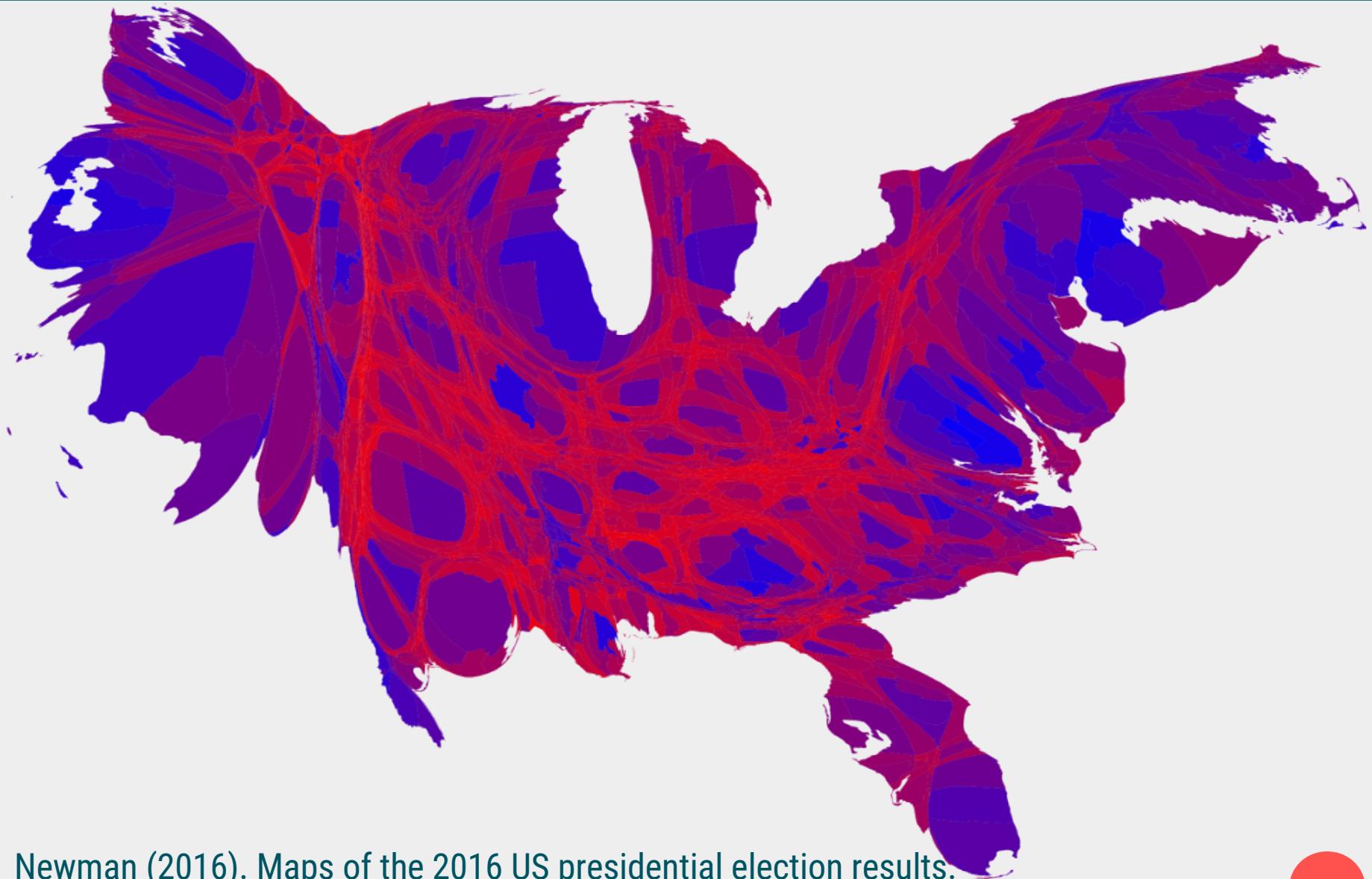
Dance (2013). Dot Map of the USA.

# Ignoring population density



Newman (2016). Maps of the 2016 US presidential election results.

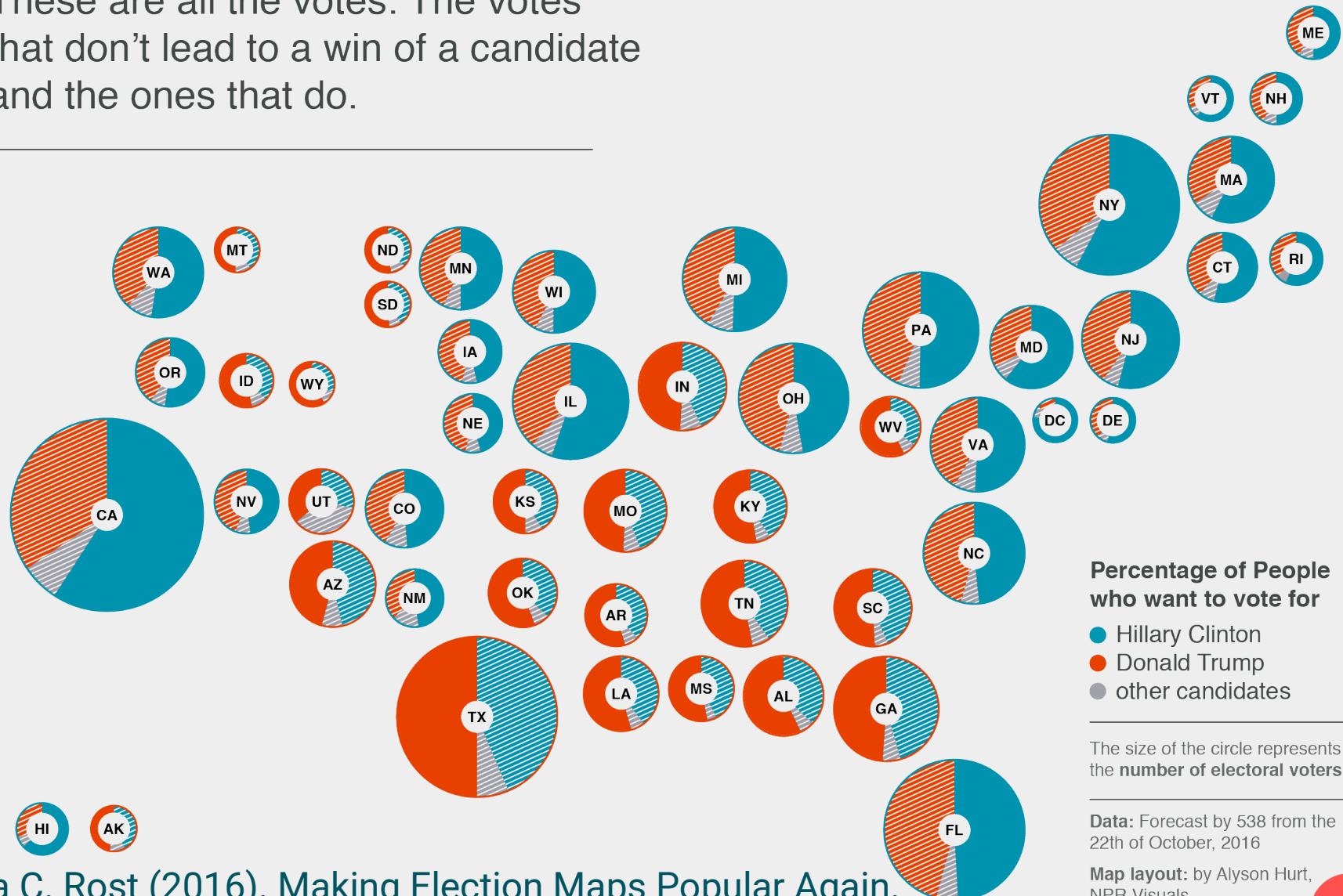
# Including population size & composition



Newman (2016). Maps of the 2016 US presidential election results.

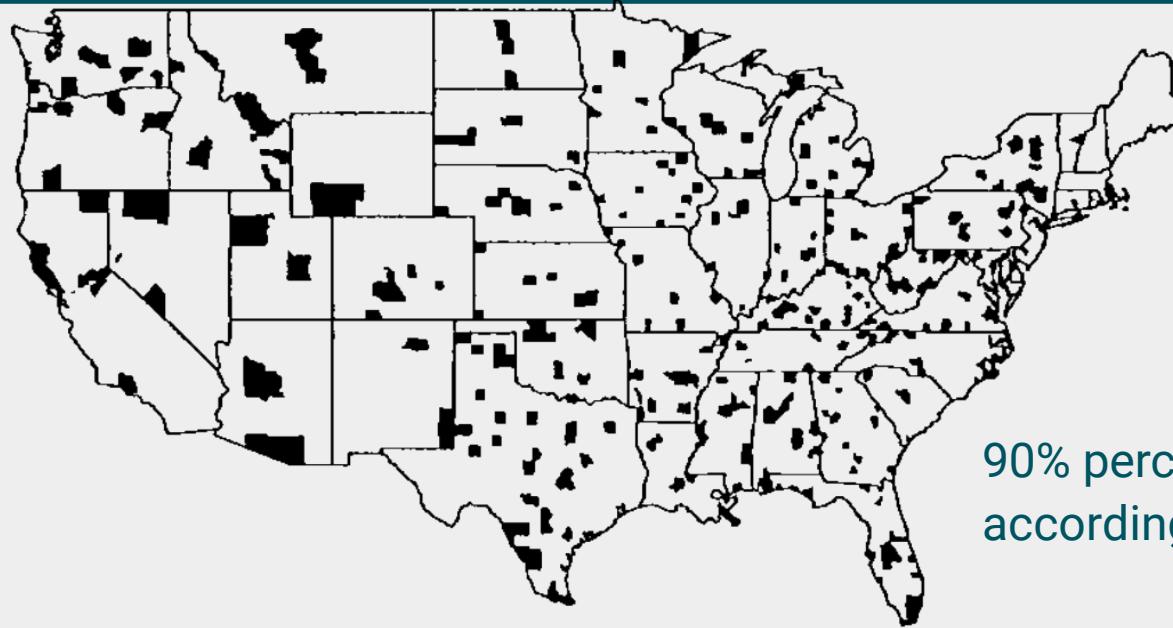
# Including population size & composition

These are all the votes: The votes that don't lead to a win of a candidate and the ones that do.



Lisa C. Rost (2016). Making Election Maps Popular Again.

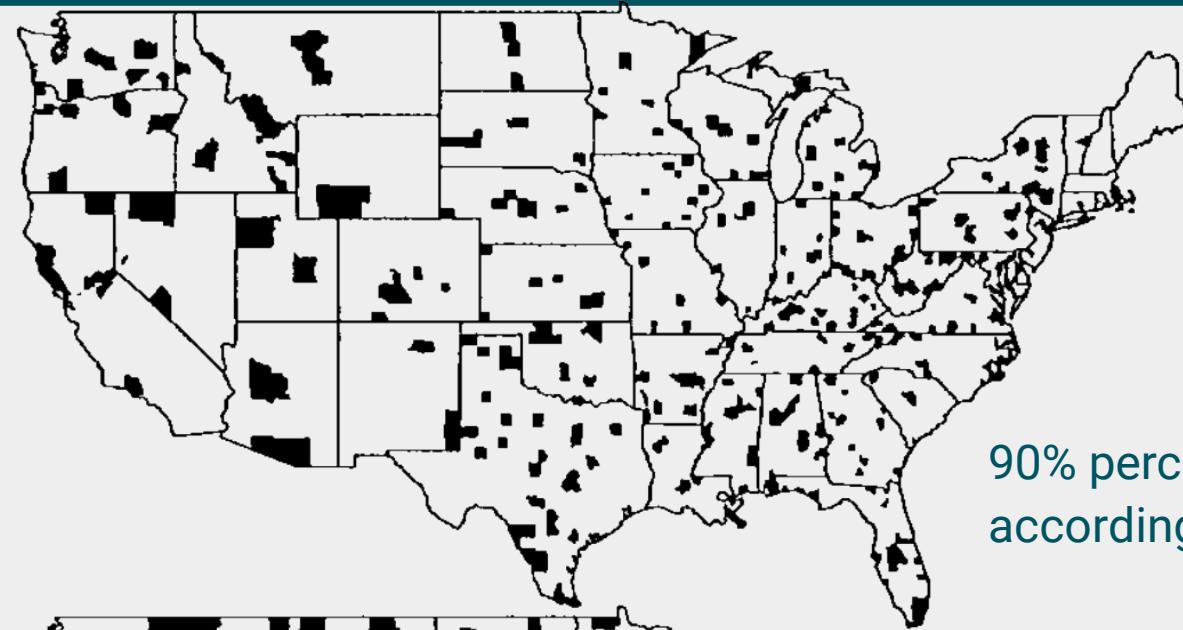
# Low sample size = extreme values



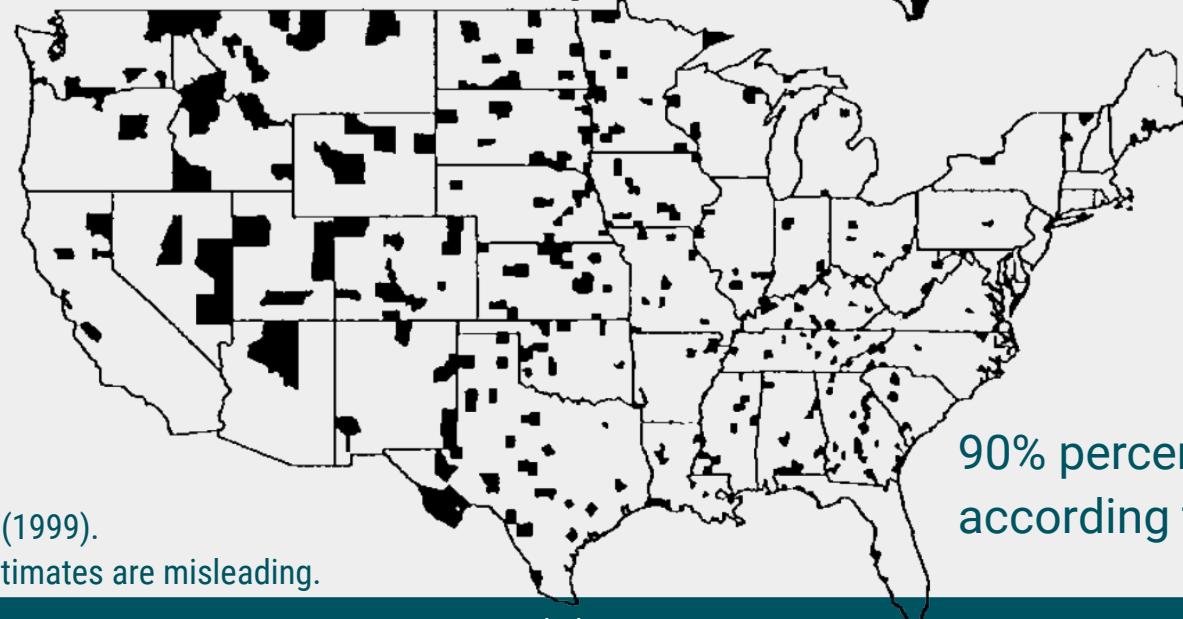
90% percentile counties  
according to “true” rates

Gelman, A., & Price, P. N. (1999).  
All maps of parameter estimates are misleading.

# Low sample size = extreme values



90% percentile counties  
according to “true” rates



90% percentile counties  
according to observed rates

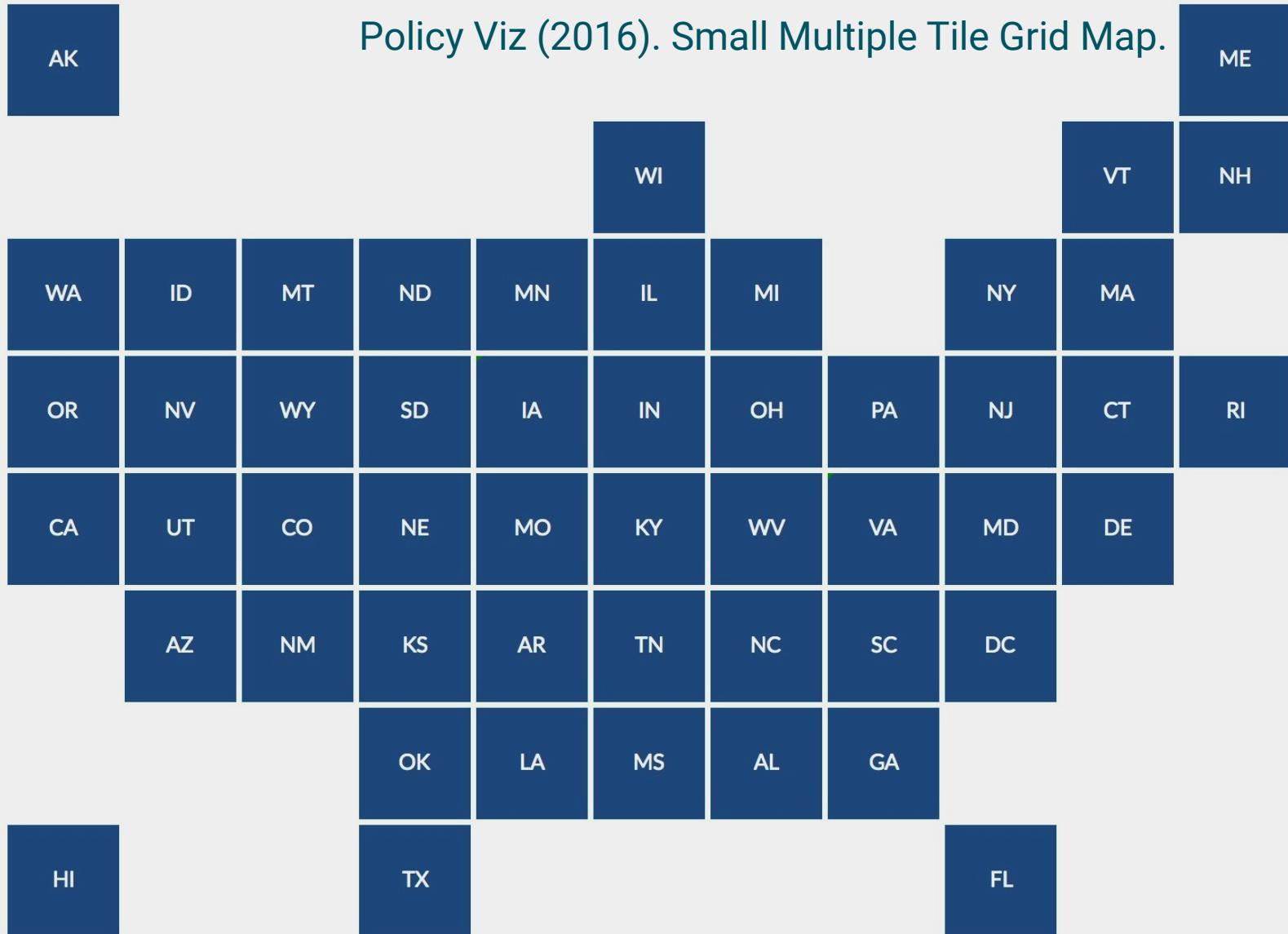
Gelman, A., & Price, P. N. (1999).

All maps of parameter estimates are misleading.

# Area as confounder



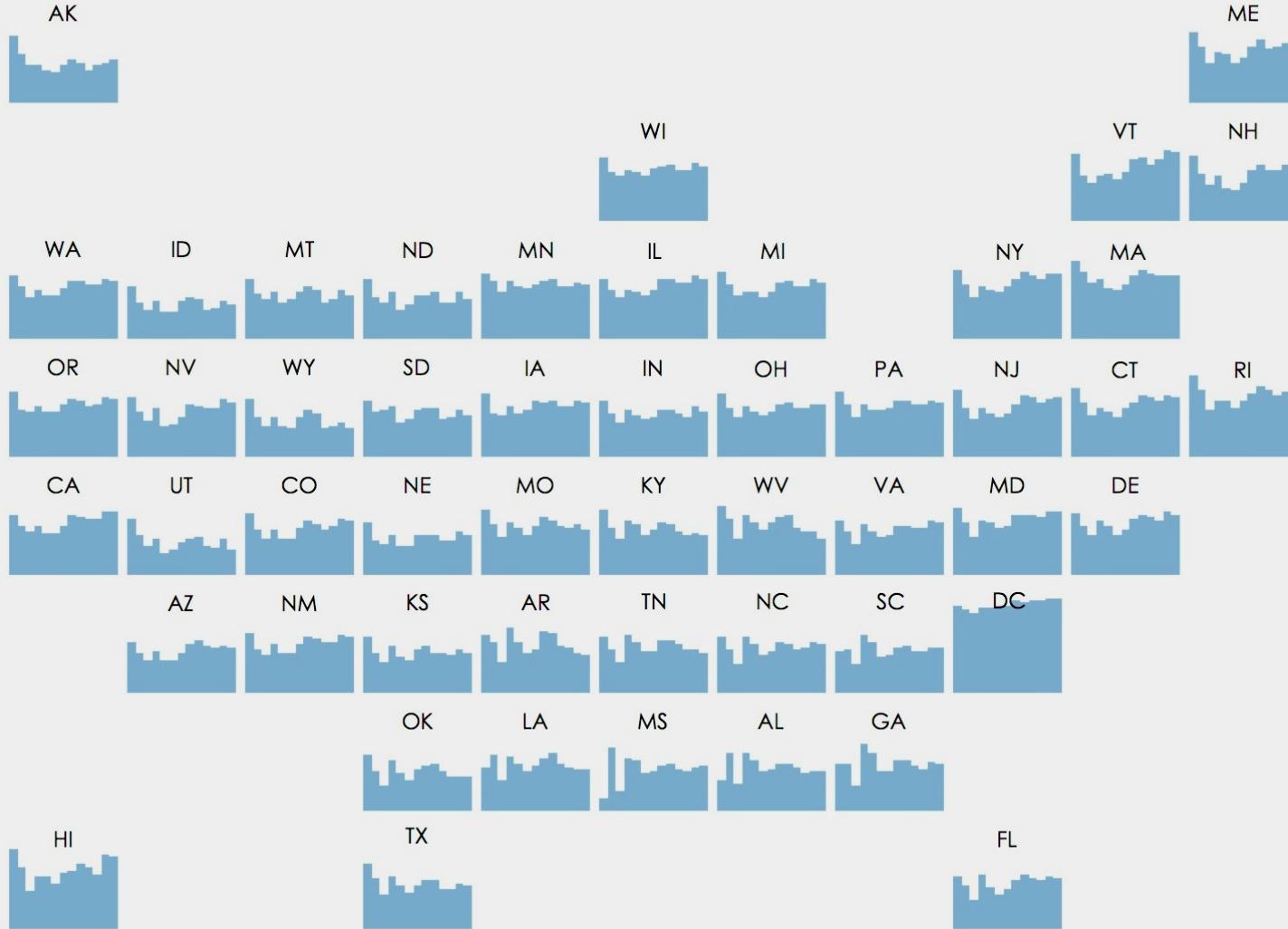
# Grid tile maps keep area constant



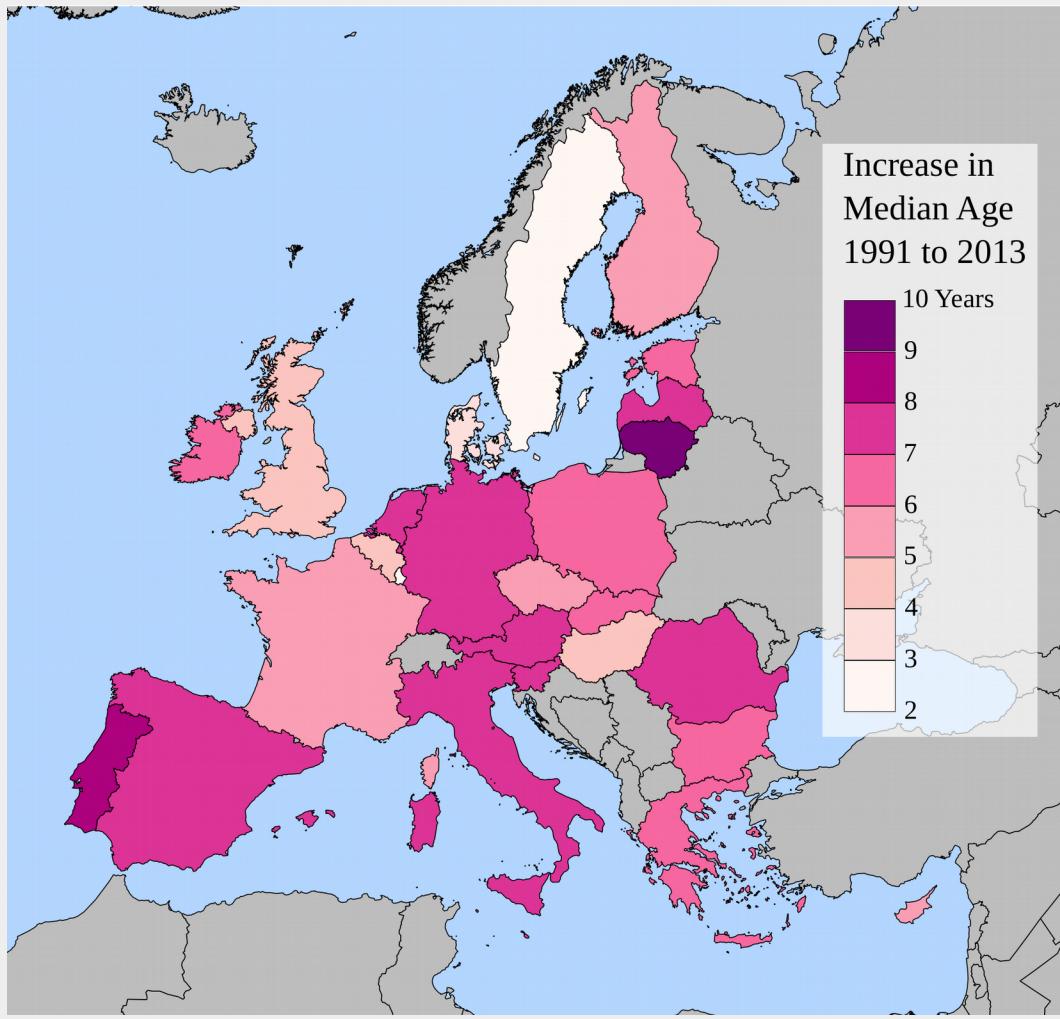
# Grid tile maps keep area constant

## red vs blue Policy Viz (2016). Small Multiple Tile Grid Map.

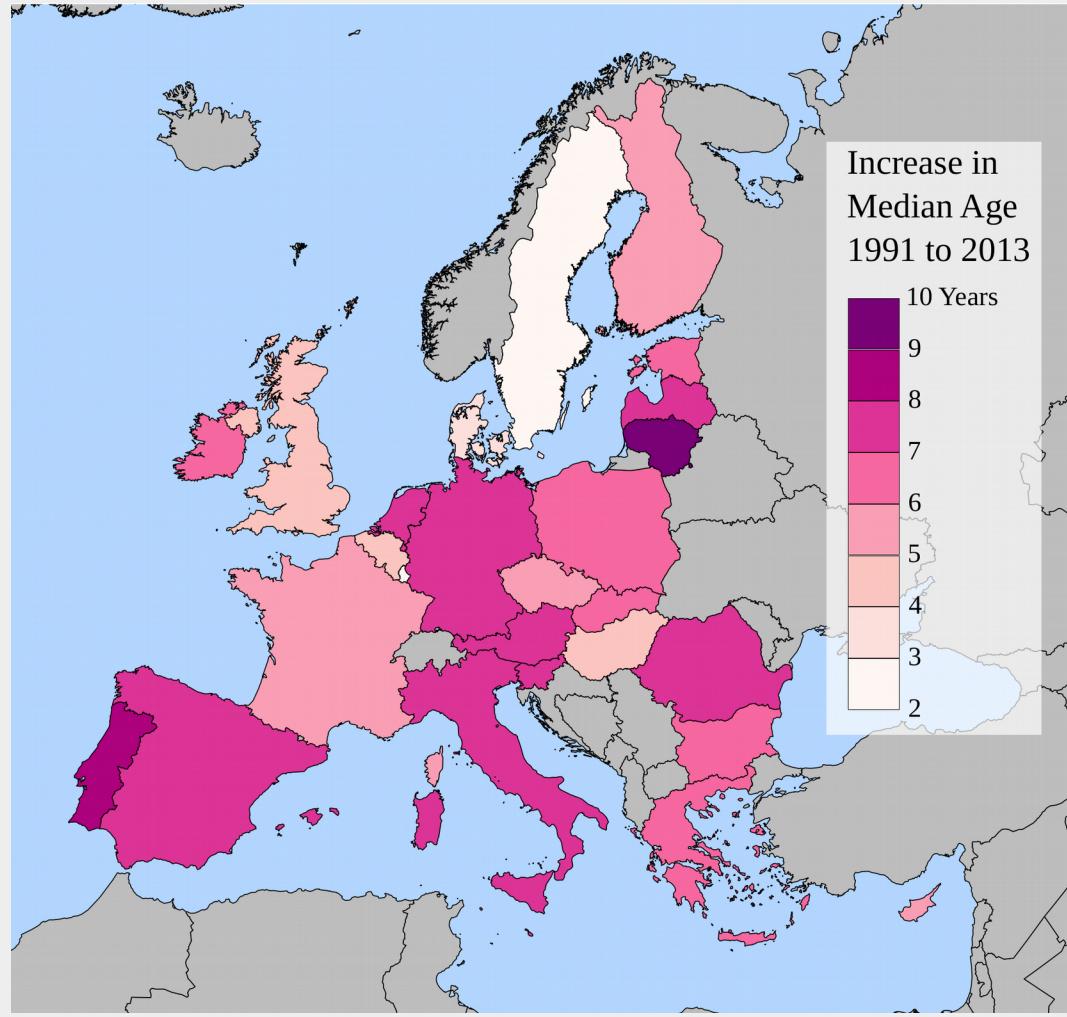
Democrat presidential voting 1964-2012



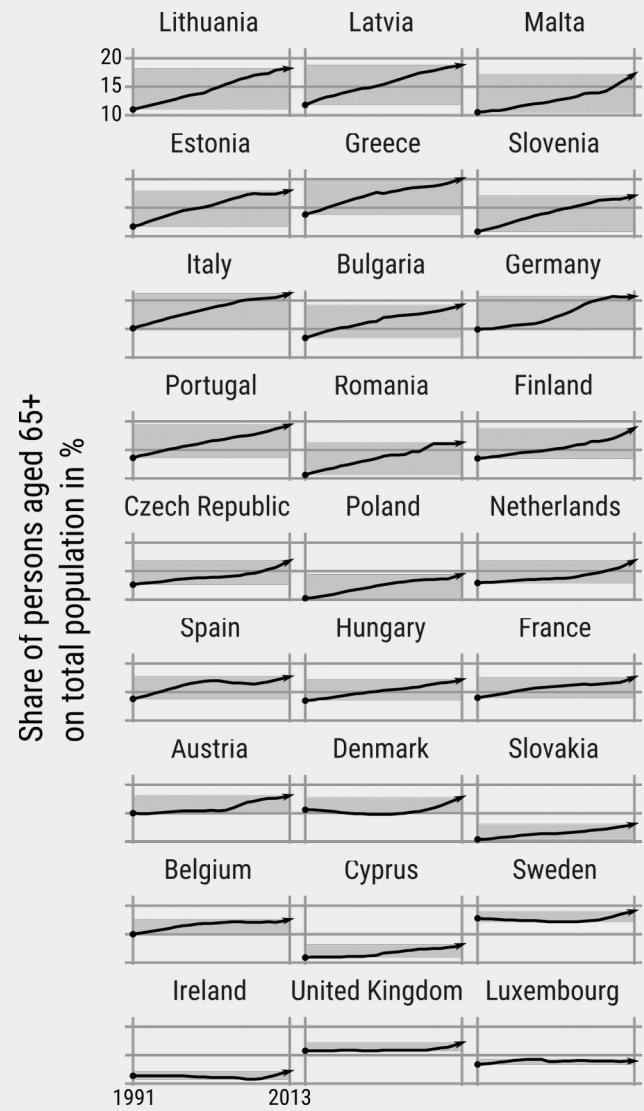
# Low spatial resolution: Is a map necessary?



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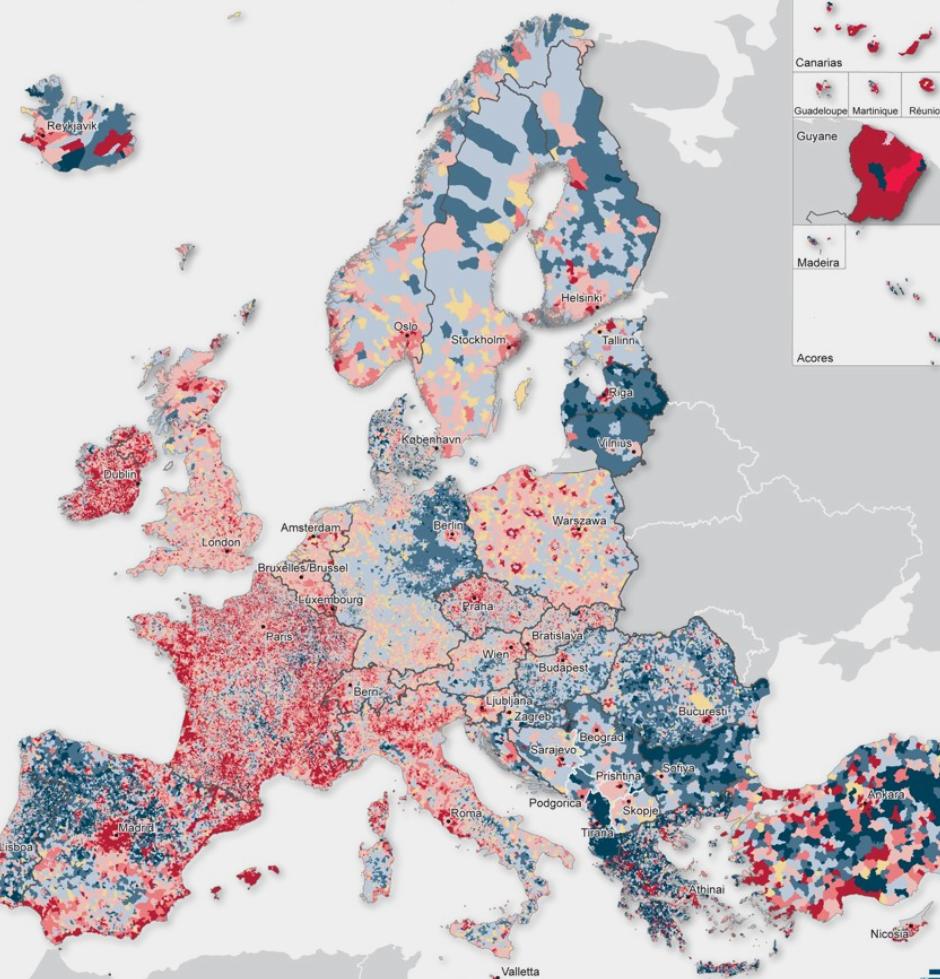


VS



# High spatial resolution: Maps rule

Durchschnittliche jährliche Bevölkerungsentwicklung in den Europäischen Lokalen Gebietseinheiten



Durchschnittliche jährliche Bevölkerungsentwicklung von 2001-2011\* in % in den Gemeinden (LAU2)\*\*



\* Bevölkerungsdaten: Zensus 2001, 2011;  
BG: 2004, 2011; FR: 1999, 2009; IT, IE, NL, PL, SI, RO: 2002, 2011;  
BA: 2007, 2014; ME: 2003, 2011; MK: 2007, 2013  
Rangfolge: DK, CZ, DE, ES, AT, PT, NO, FI, SE, GR, SI, HU, LV, RO, TR, 2013

\*\* Äquivalente Gebietseinheiten (LAU2, BG, LT, ME, MK, TR, LAU1);  
Äquivalente Gebietseinheiten (LAU2 Äquivalente AL, FO, GL;  
LAU1 Äquivalente: BA, KS, RS)

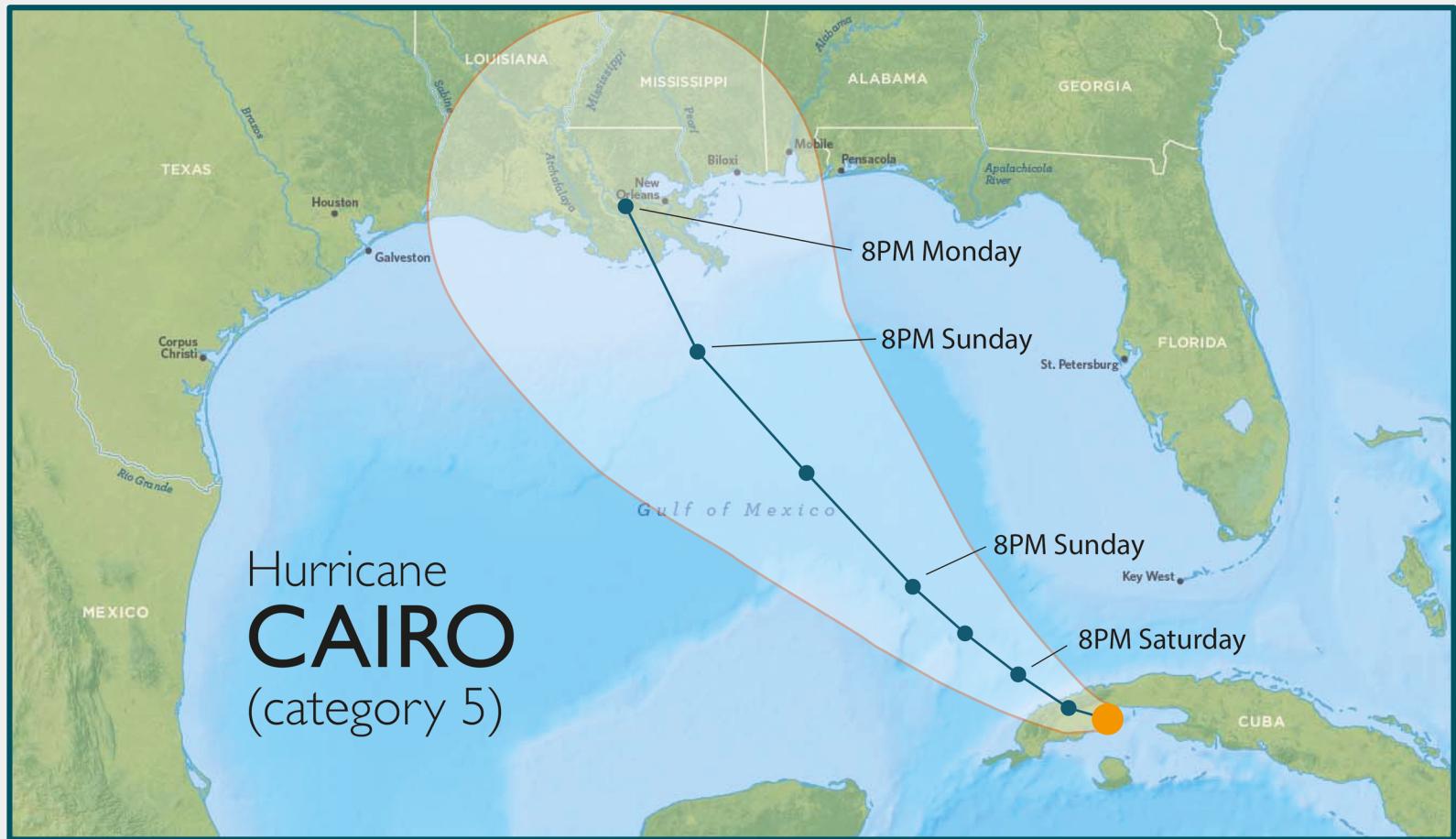
Datenbasis: Laufende Raumbeobachtung Europa,  
Daten und Methoden: Nationale Statistische Ämter  
Geometrische Grundlage: GME GeoMarketing,  
auter DLR: Geoservice für das Vereinigte Königreich  
und ION GEOFLA für die handelsüblichen Überseedepartements  
Bearbeitung: R. Binet, L. Bräder, N. Körner-Blätgen,  
T. Pawlik, V. Schmidt-Seiwert

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Bundesinstitut für Bau-, Stadt- und Raumforschung (2015).

# Uncertainty

# Uncertainty



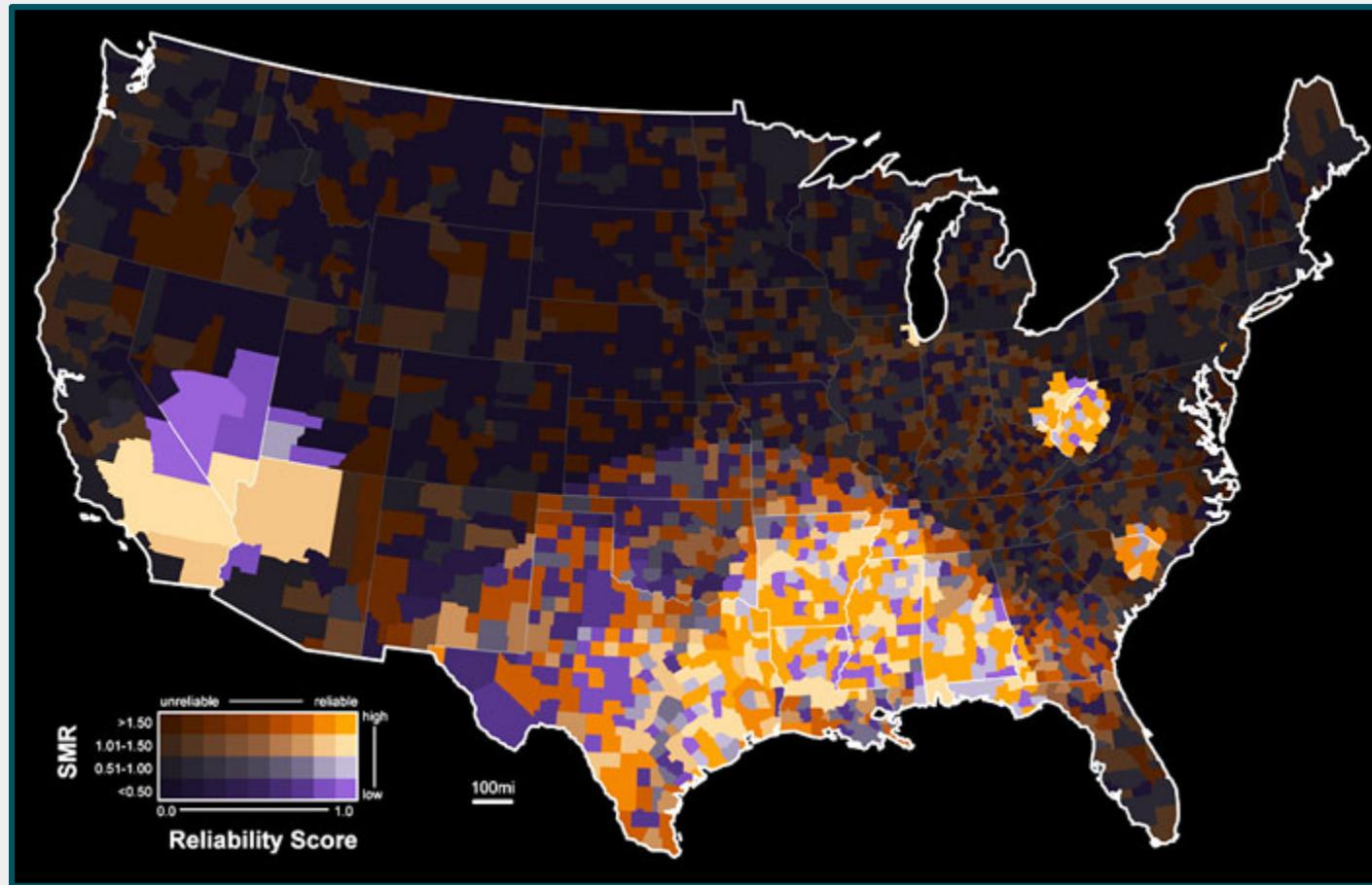
by Alberto Cairo.

# Uncertainty



by Alberto Cairo.

# Uncertainty



Roth et al. (2010). Value-by-alpha maps: An alternative technique to the cartogram.

**Slides available at**  
[github.com/jschoeley/idem\\_viz](https://github.com/jschoeley/idem_viz)

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Twitter: [@jschoeley](https://twitter.com/jschoeley)