



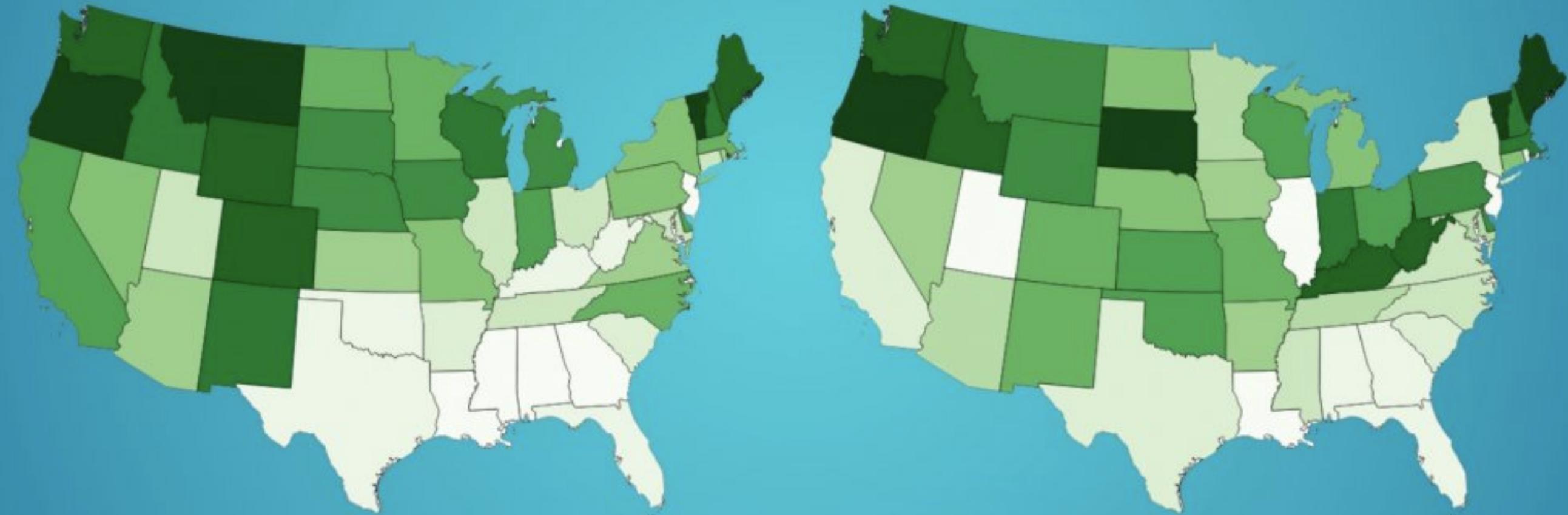
Day 2

memegenerator.net

**Review homework:
take a dataset
and create as
many visualisations
as you can.**

BREWERIES

CATS



$$r = 0.70$$

Maps

See Alberto Cairo *The Truthful Art*

**First rule about maps:
try not to use a map**

Main choices:

- Scale
- Projection
- Symbols used

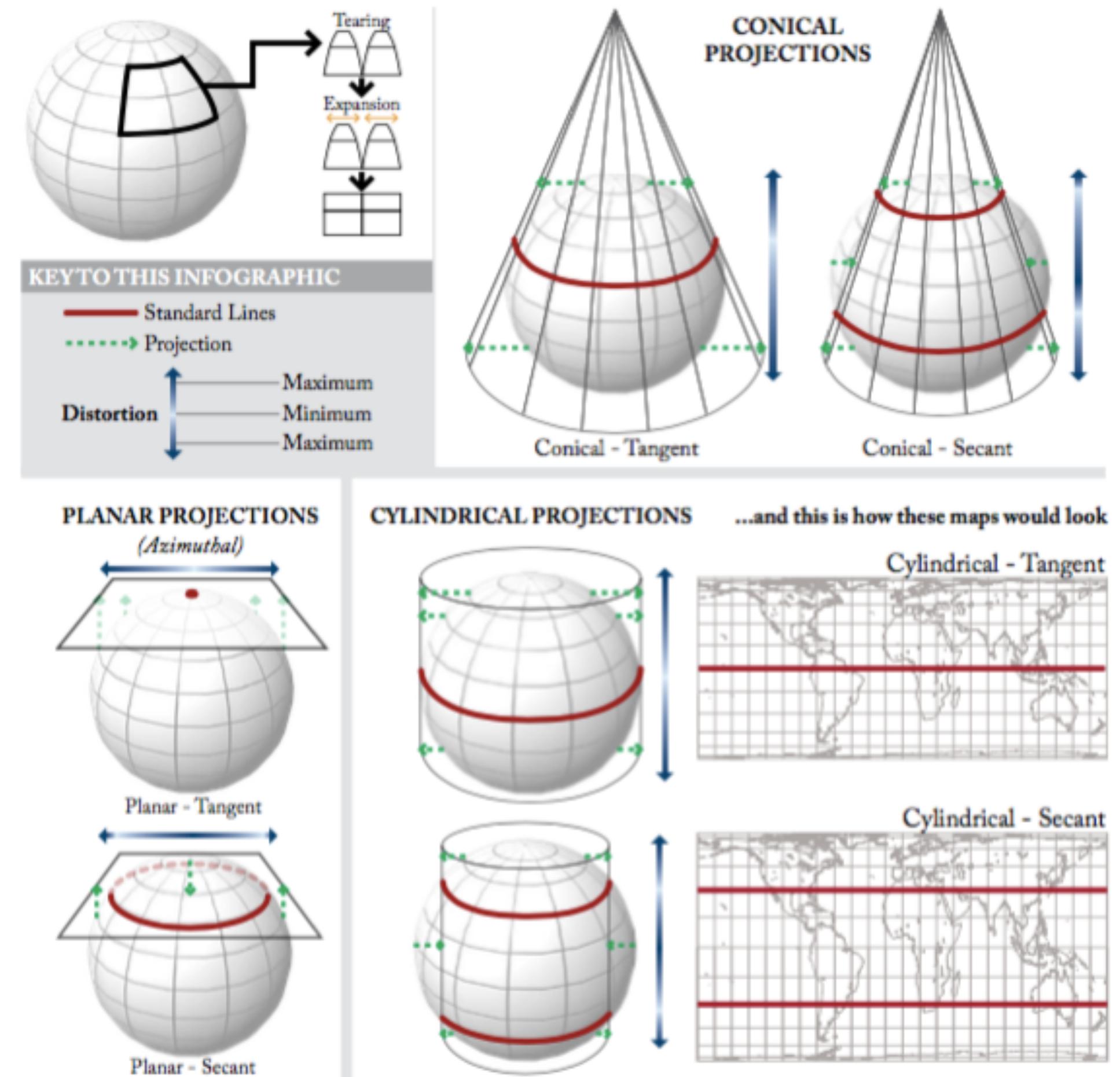
Scale depends
on user context



Still, good to
include a
reference

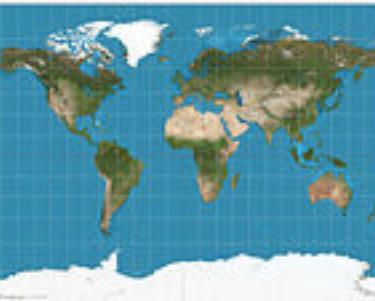


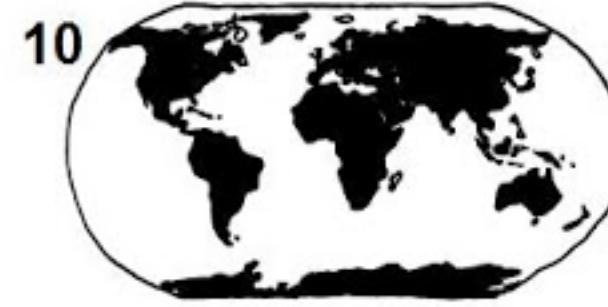
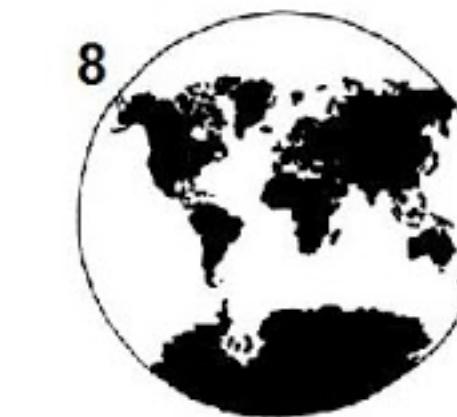
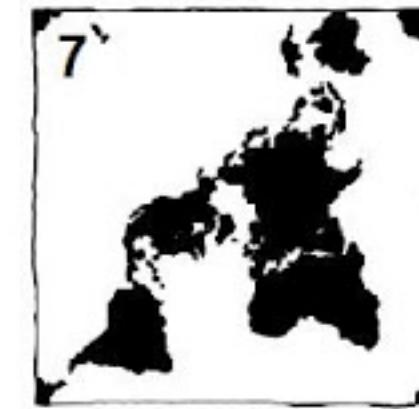
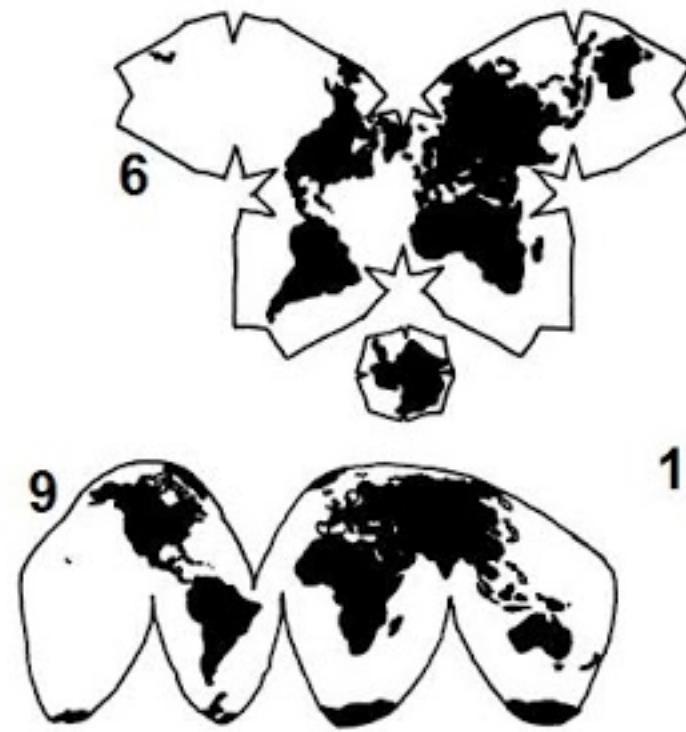
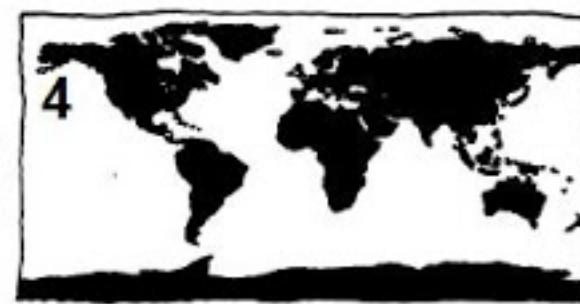
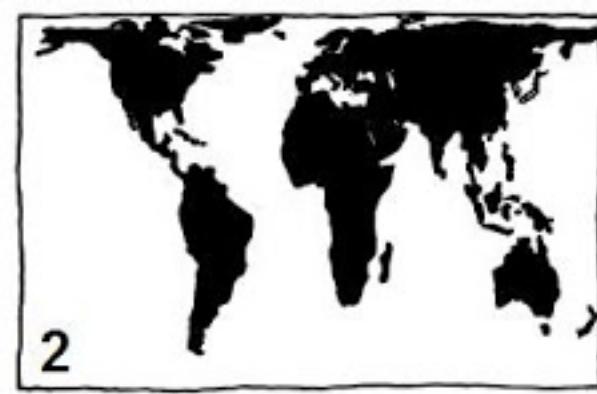
Projection maps a sphere to a plane



All projections distort at least one of:

- shape
- area
- angles
- distance
- direction

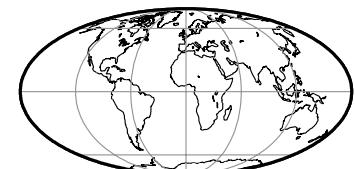
	Mercator = Wright		Cylindrical	Conformal	Gerardus Mercator	1569
	Web Mercator		Cylindrical	Compromise	Google	2005
	Gauss–Krüger = Gauss conformal = (Ellipsoidal) Transverse Mercator		Cylindrical	Conformal	Carl Friedrich Gauss Johann Heinrich Louis Krüger	1822
	Gall stereographic similar to Braun		Cylindrical	Compromise	James Gall	1855
	Miller = Miller cylindrical		Cylindrical	Compromise	Osborn Maitland Miller	1942



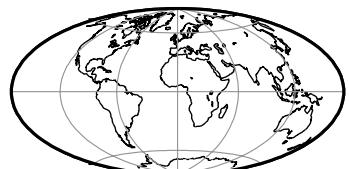
Pick the one that shows the area of interest best
(or is better recognised by users)

Which projections you could use if you're mapping...

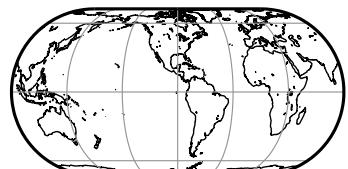
The World



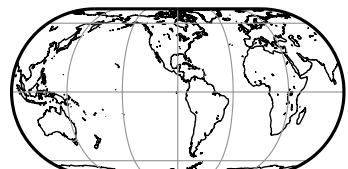
Mollweide



Hammer

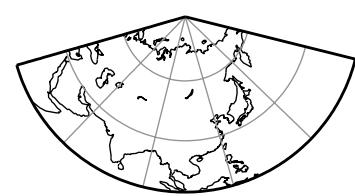


Eckert IV



Robinson

Continental areas: Asia & North America



Lambert azimuthal



Albers equal-area

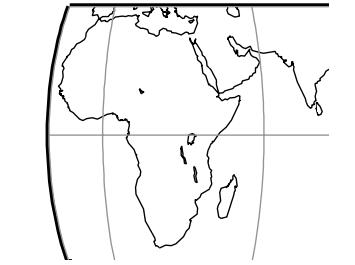


Lambert azimuthal



Albers equal-area

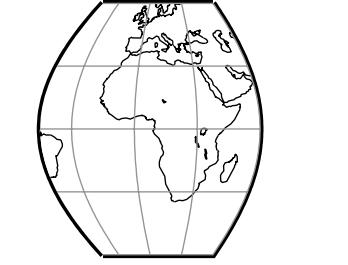
Continental areas: Africa and South America



Mollweide



Lambert azimuthal



Sinusoidal

Countries in mid-latitudes

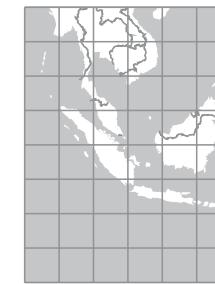
Large countries



Lambert azimuthal



Albers equal-area



Cylindrical equal-area*

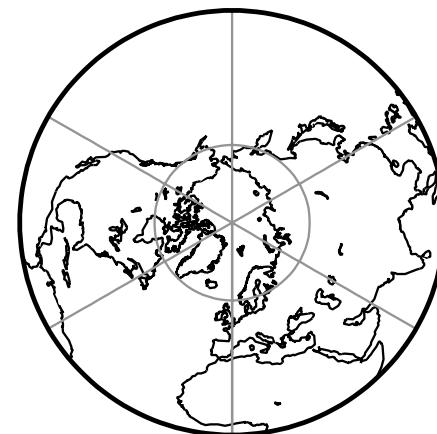
Small countries

Albers equal-area

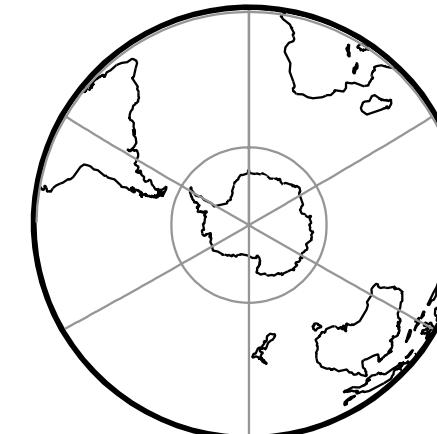
Cylindrical equal-area*

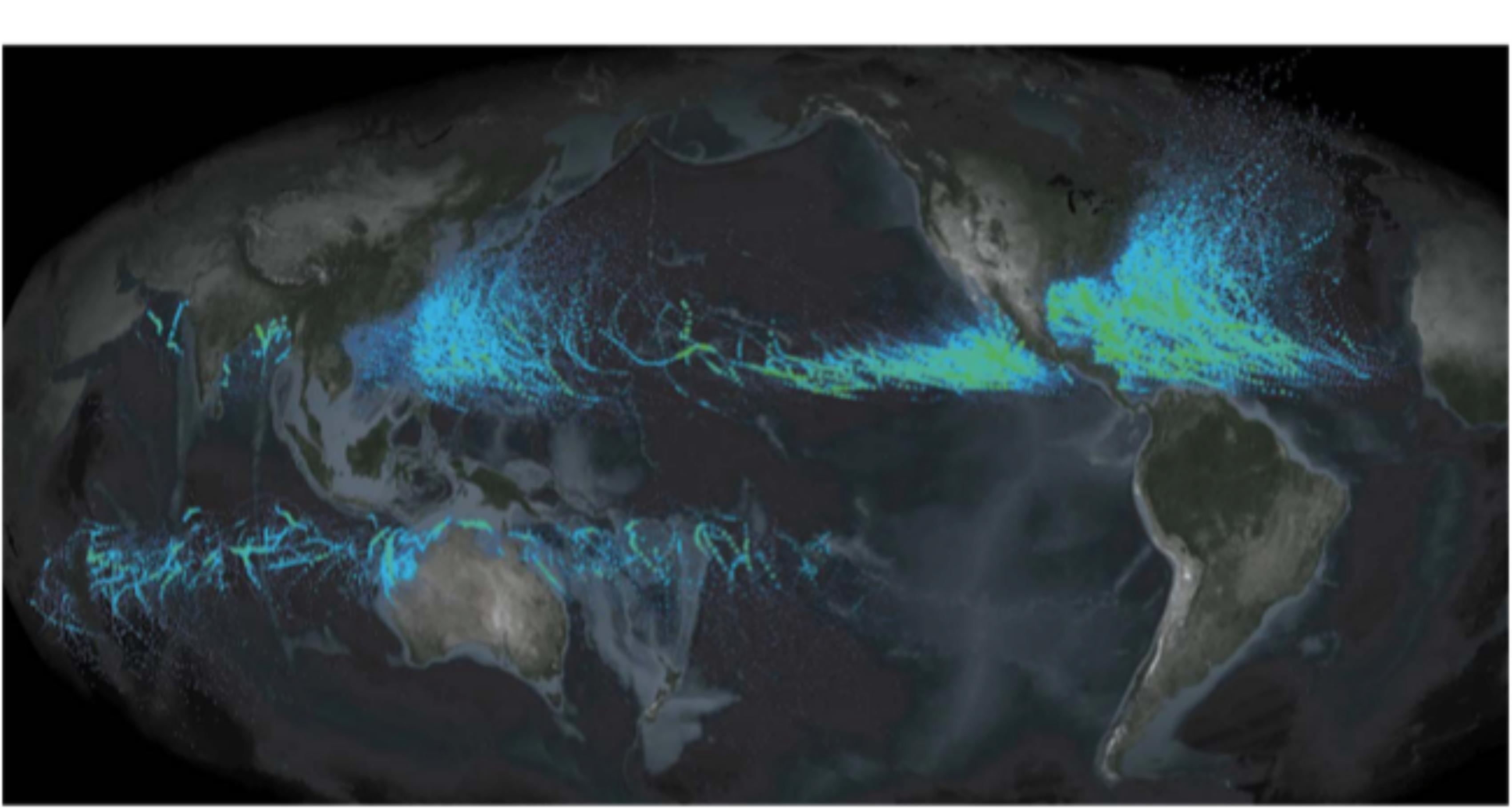
(*For areas with a North-South orientation)

Polar regions



Lambert azimuthal



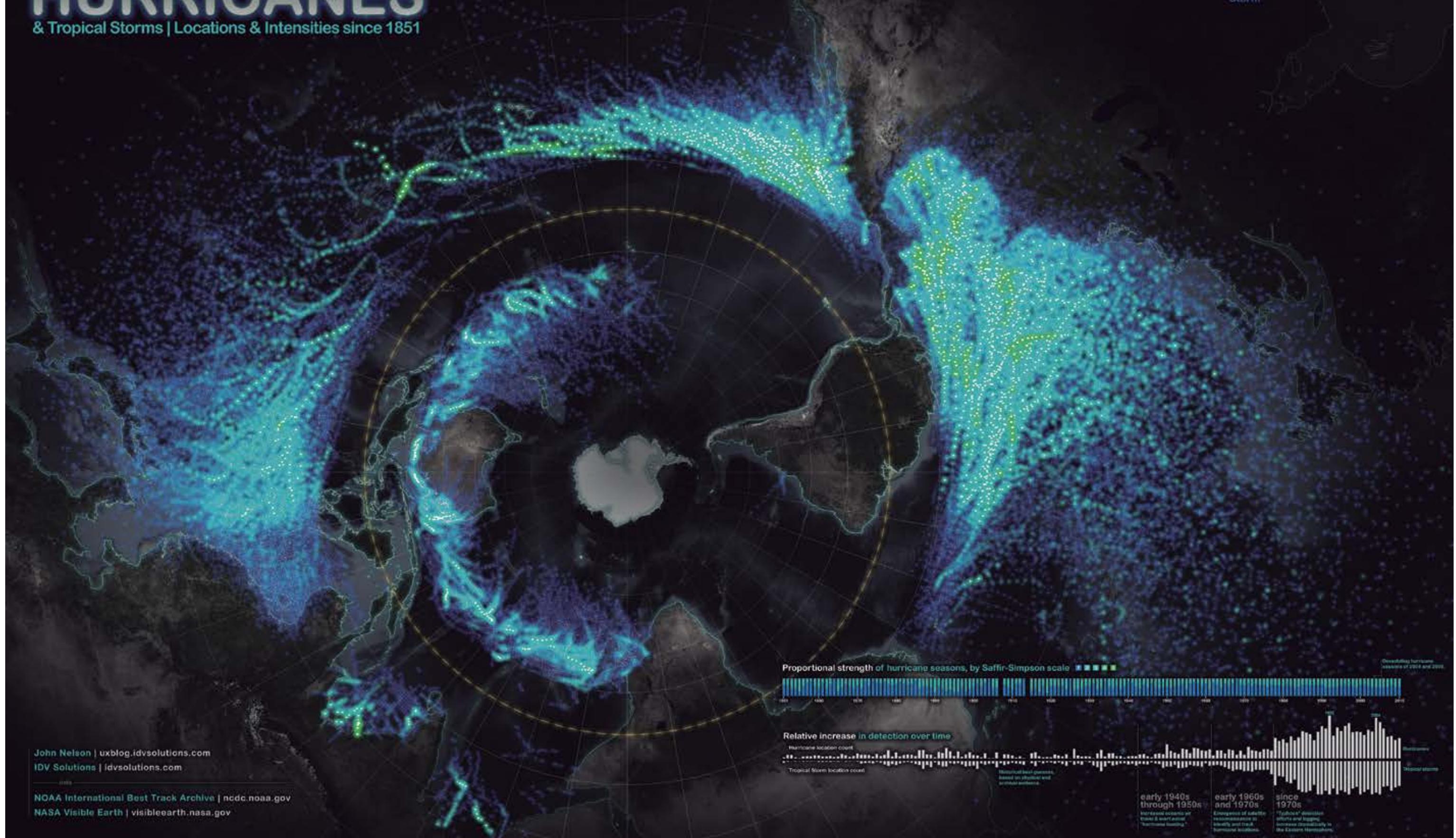


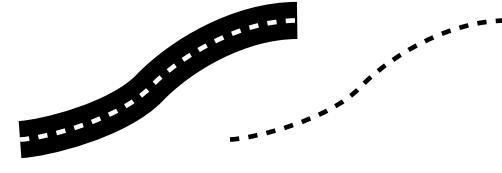
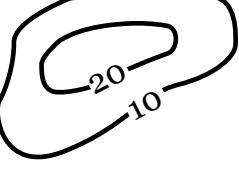
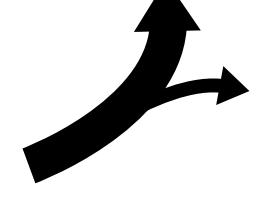
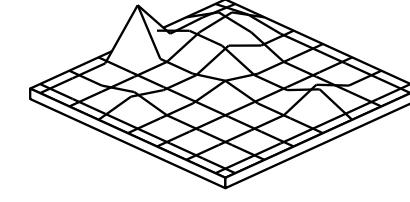
HURRICANES

& Tropical Storms | Locations & Intensities since 1851

Hurricane Category

Tropical Storm 1 2 3 4 5

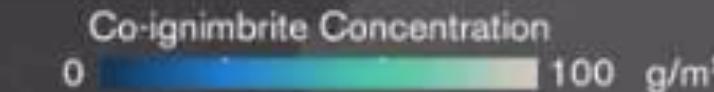
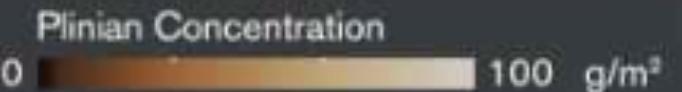
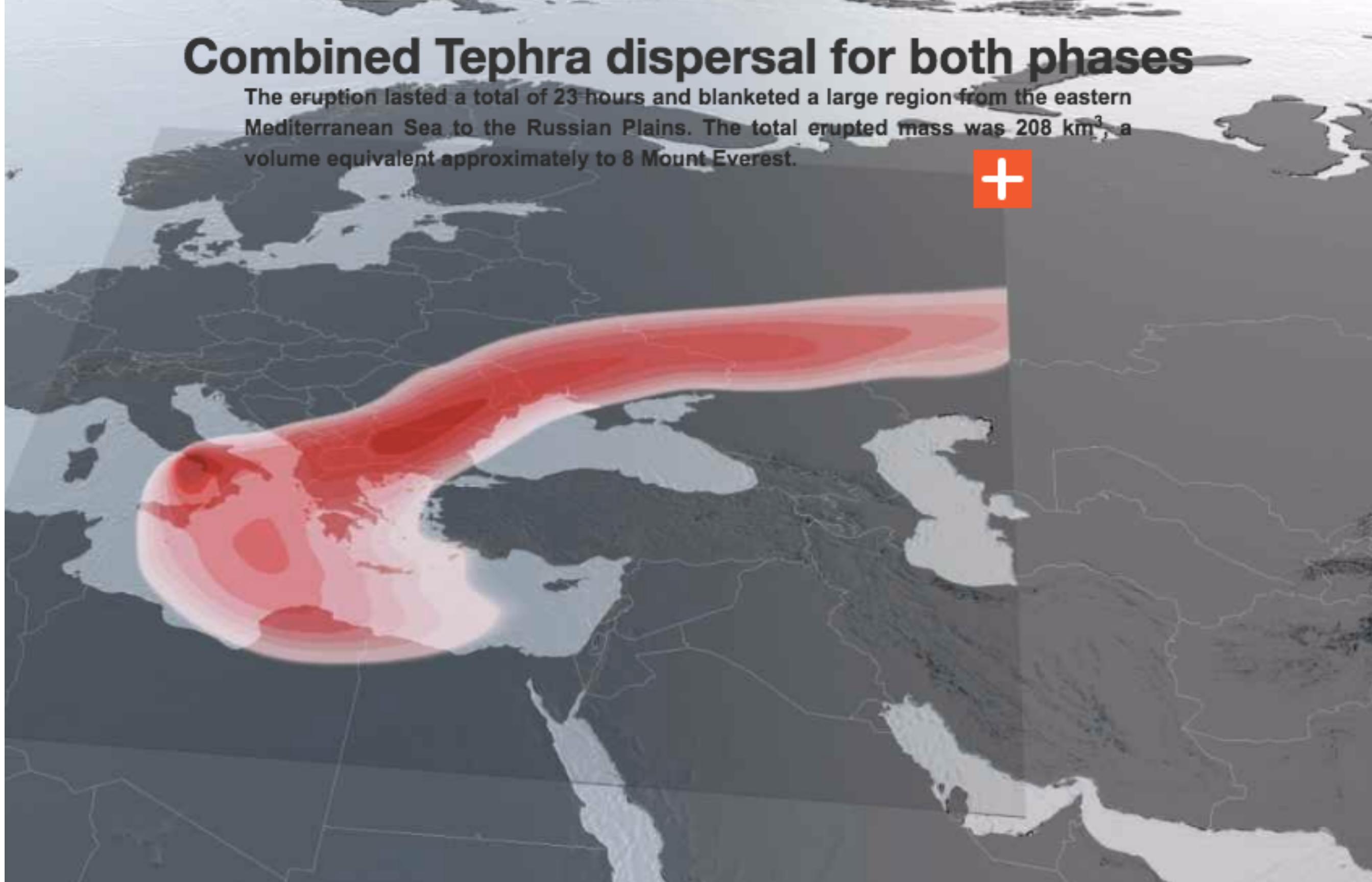


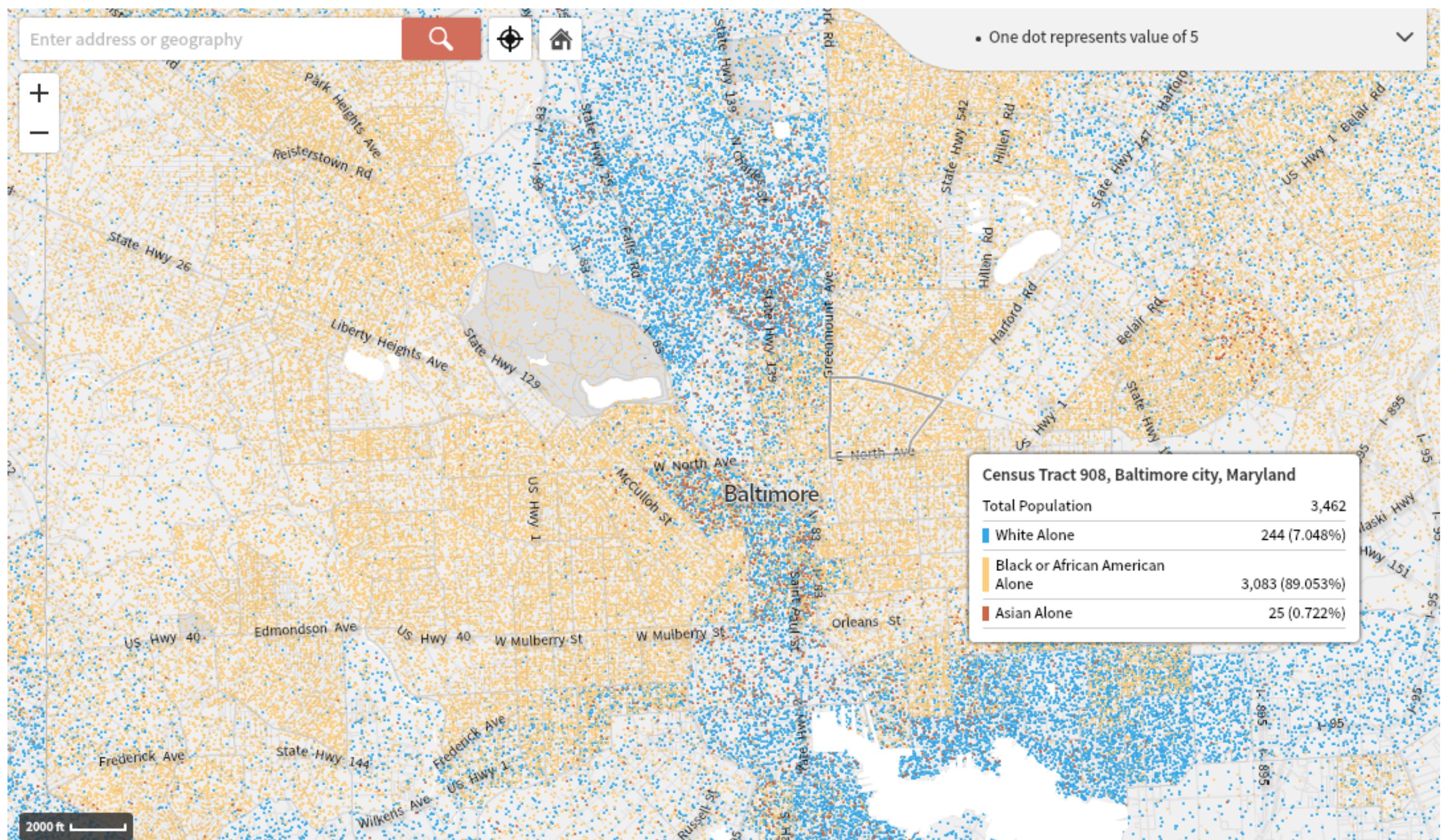
Point	Line	Area	Volume
Qualitative	Qualitative	Qualitative	Qualitative
<ul style="list-style-type: none"> ● ■ ▲ ★ 			<p>NONE</p>
Quantitative	Quantitative	Quantitative	Quantitative
 	 		

Data on maps

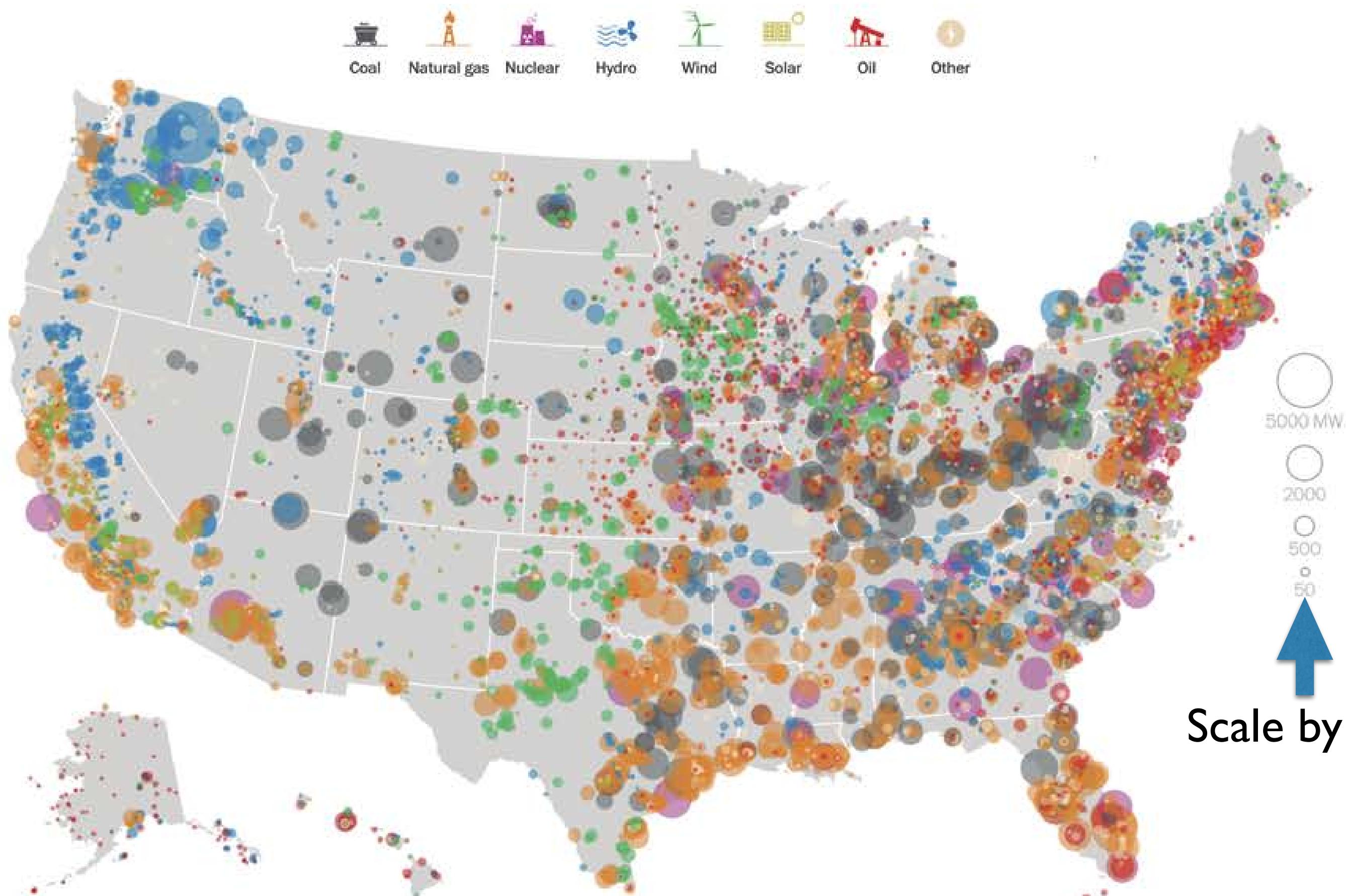
Combined Tephra dispersal for both phases

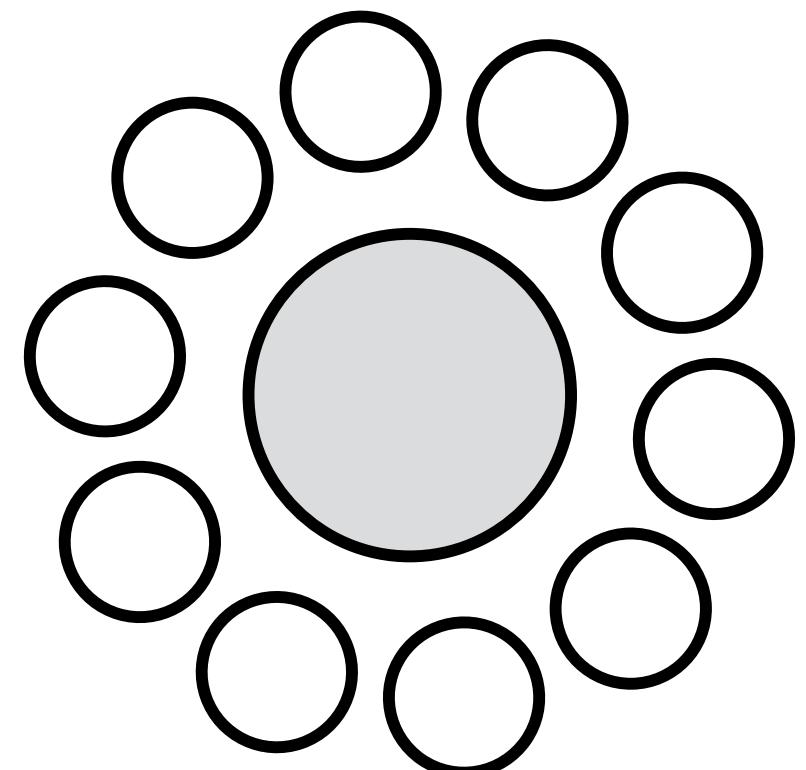
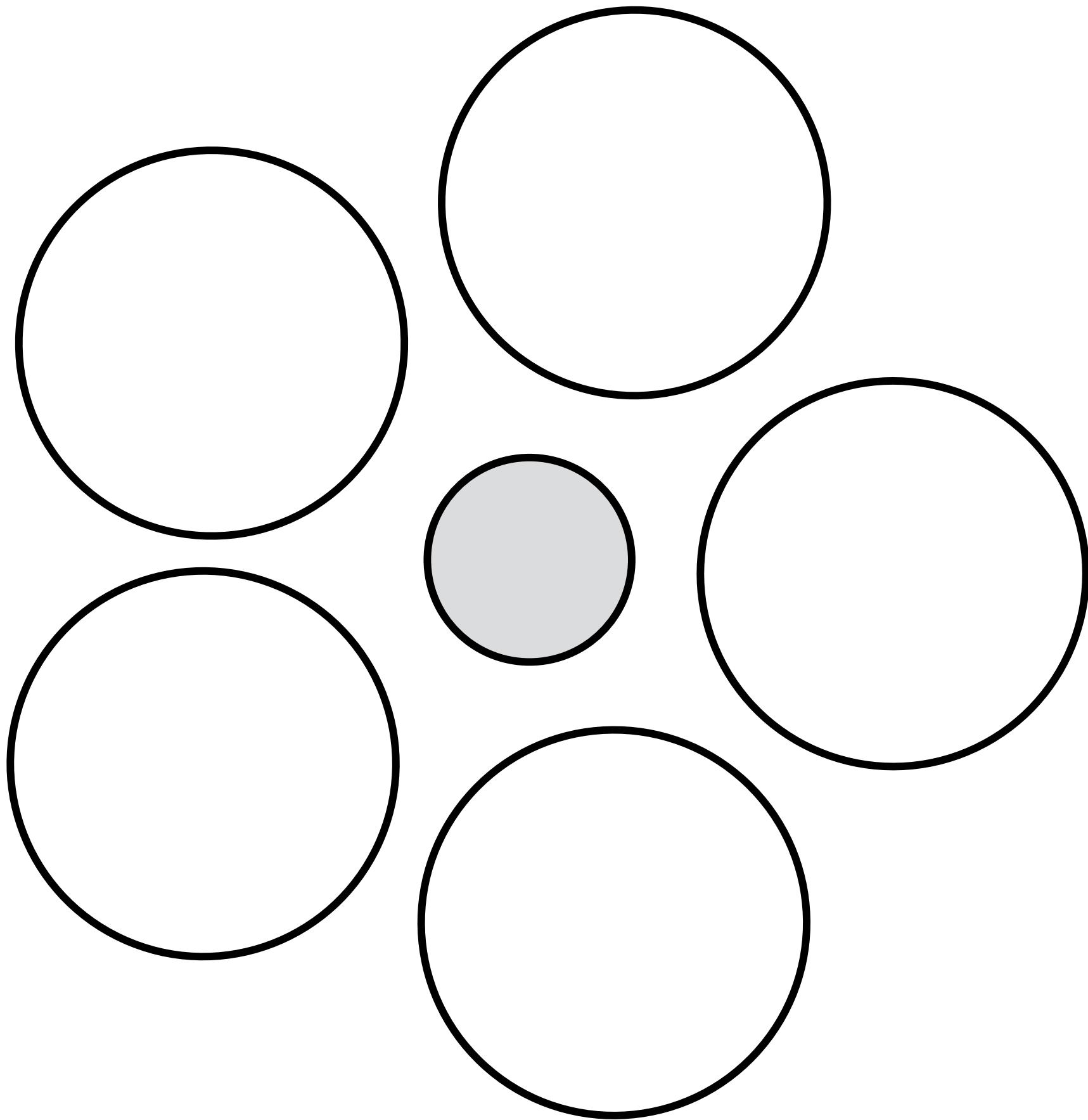
The eruption lasted a total of 23 hours and blanketed a large region from the eastern Mediterranean Sea to the Russian Plains. The total erupted mass was 208 km^3 , a volume equivalent approximately to 8 Mount Everest.



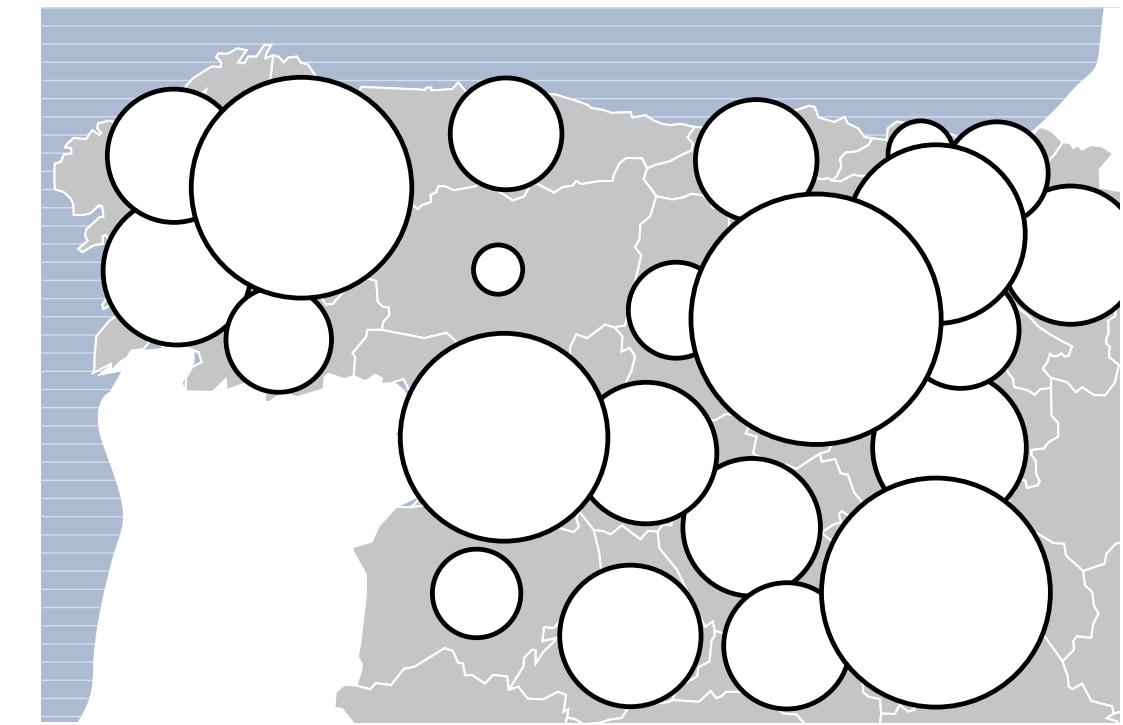


Plant capacity by power source in megawatts

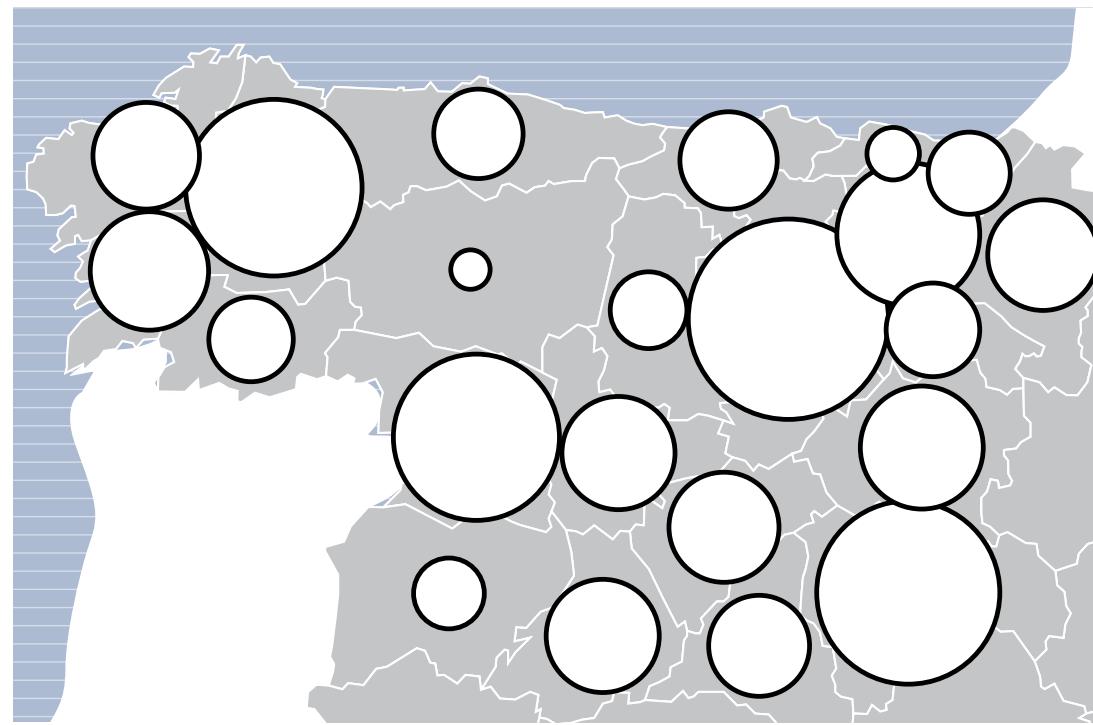




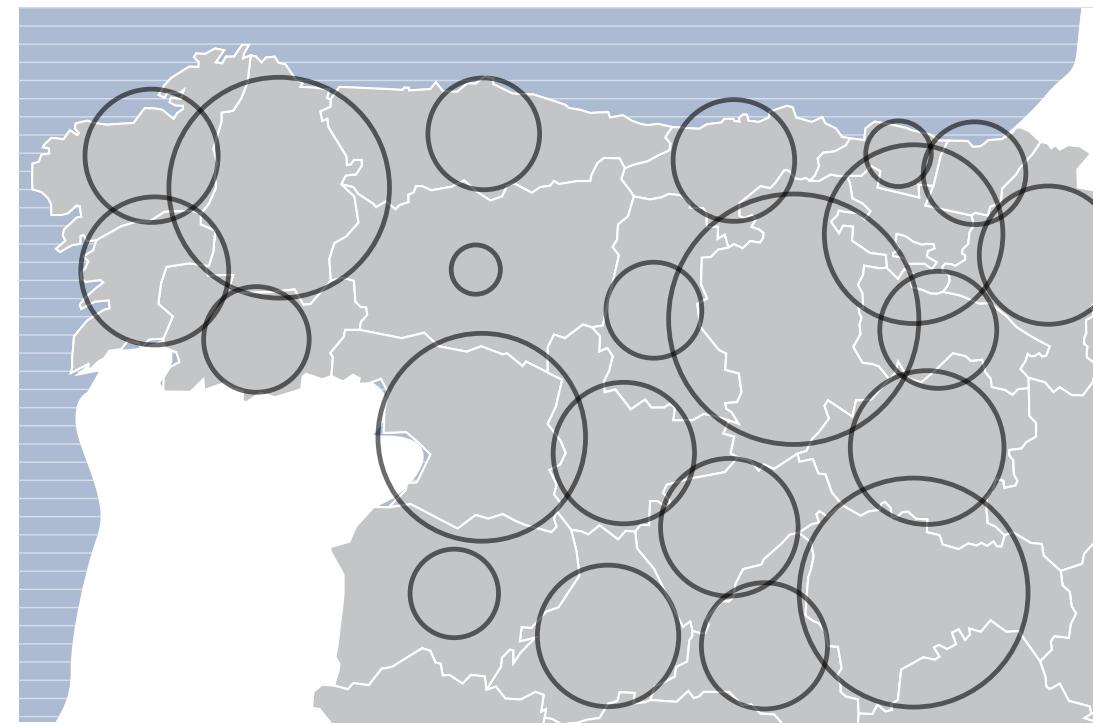
Don't do this.

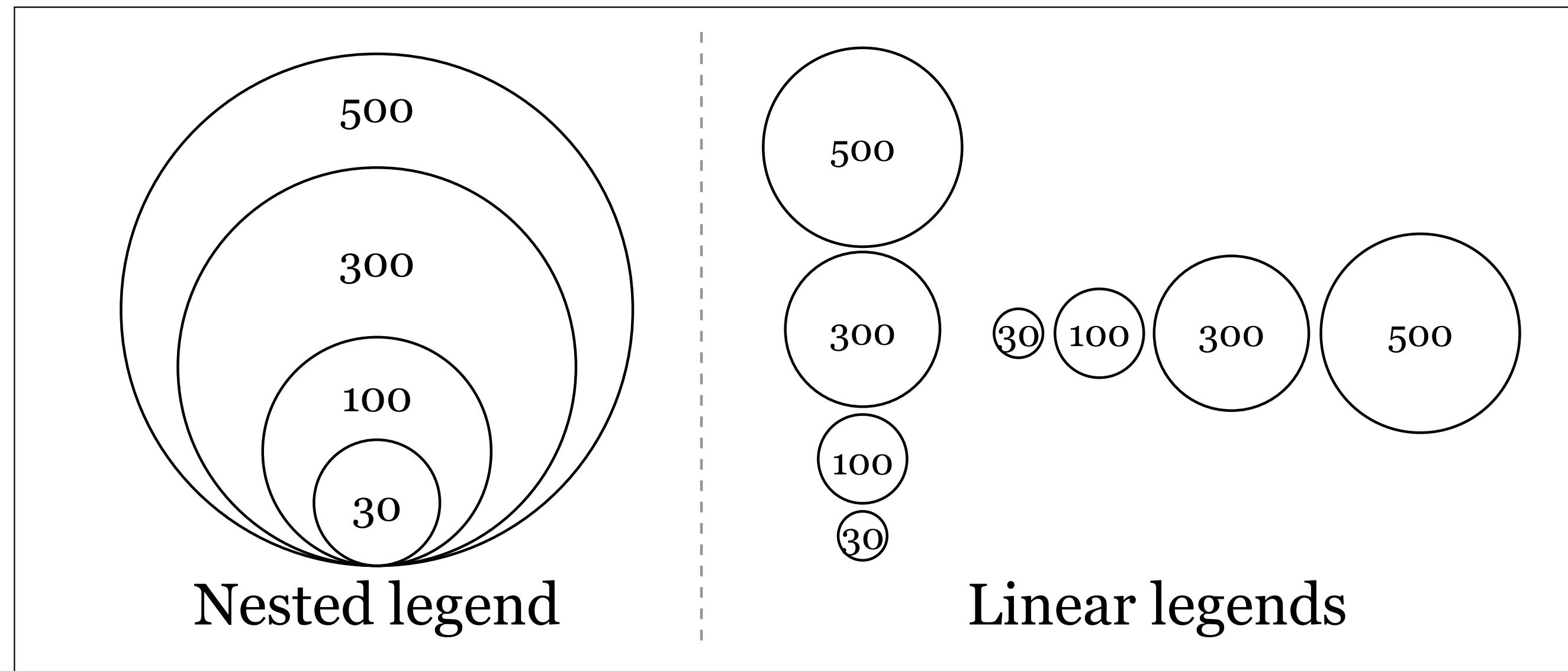


This is better.



This is better.





On treballen
o estudien els
residents de
Raval

48.800

Població Total
(desembre 2013).

Percentatge de desplaçaments
sobre total sortides.

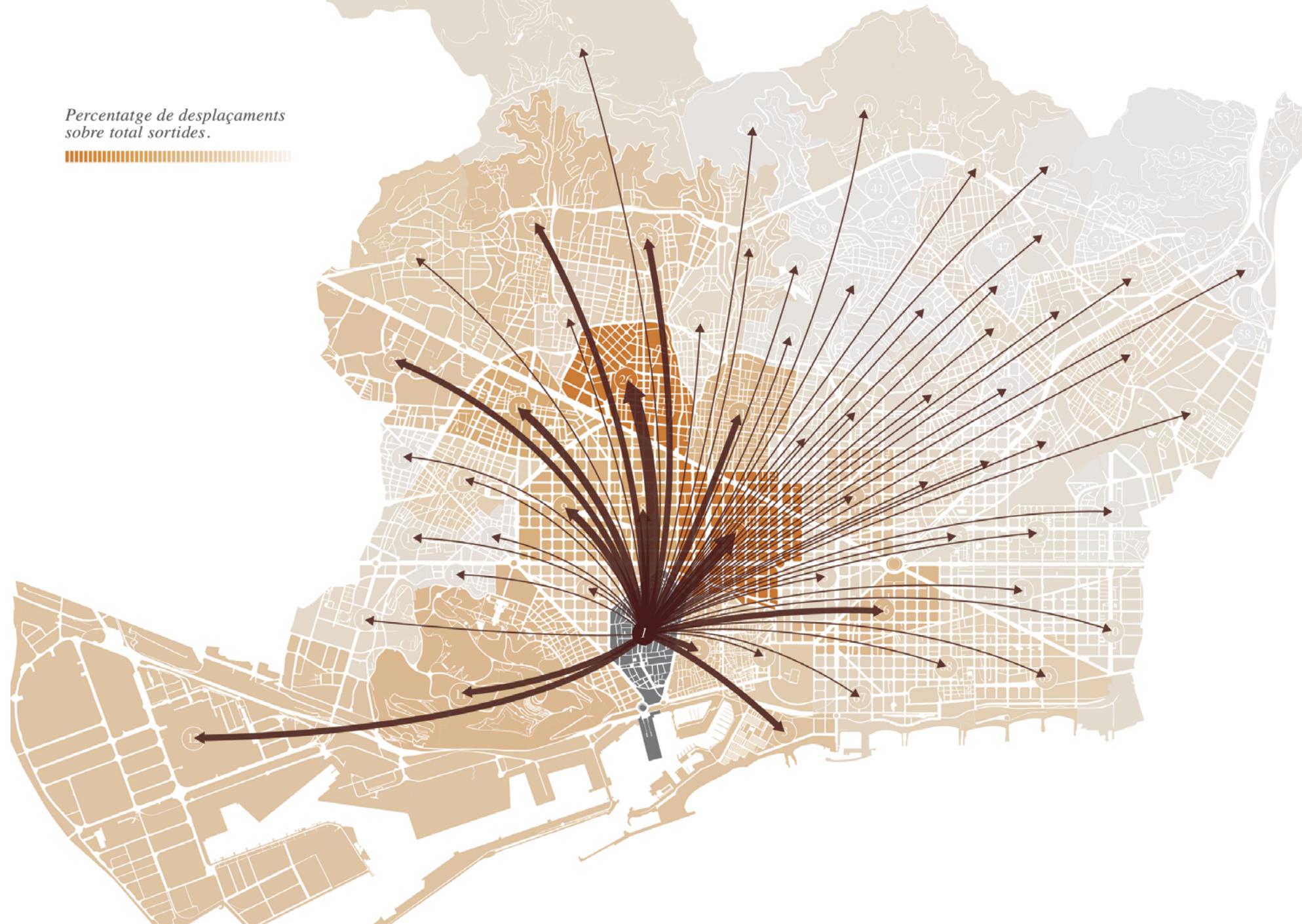
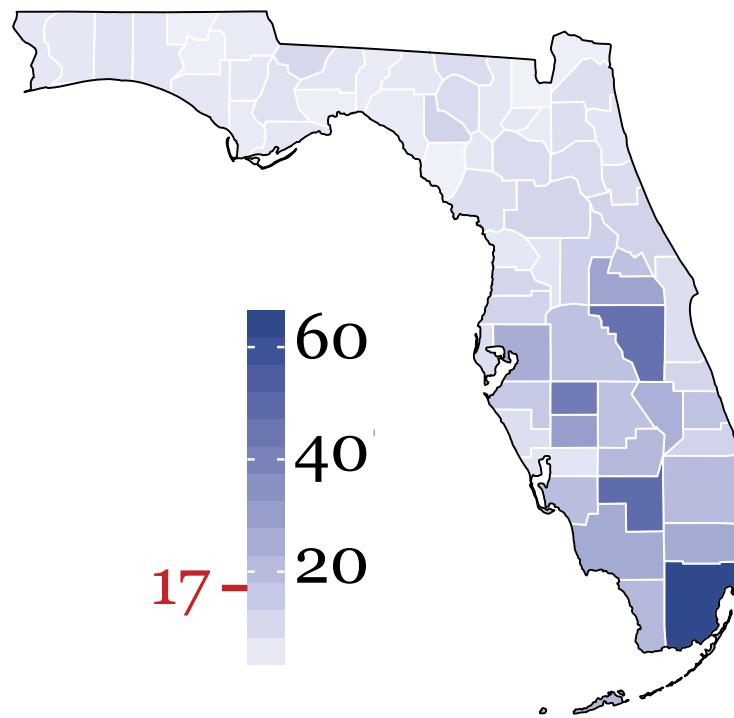
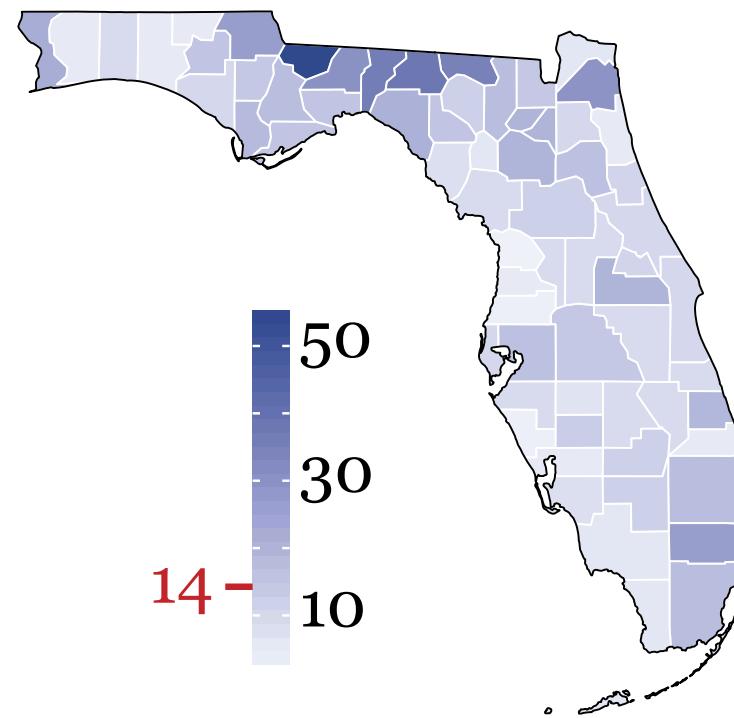


grafico de inmigraciones

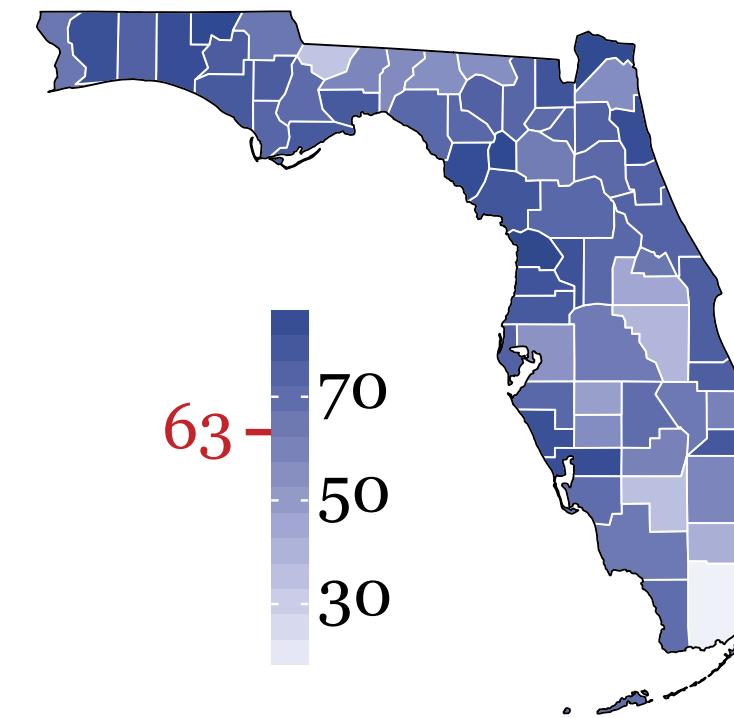
Hispanic (%)



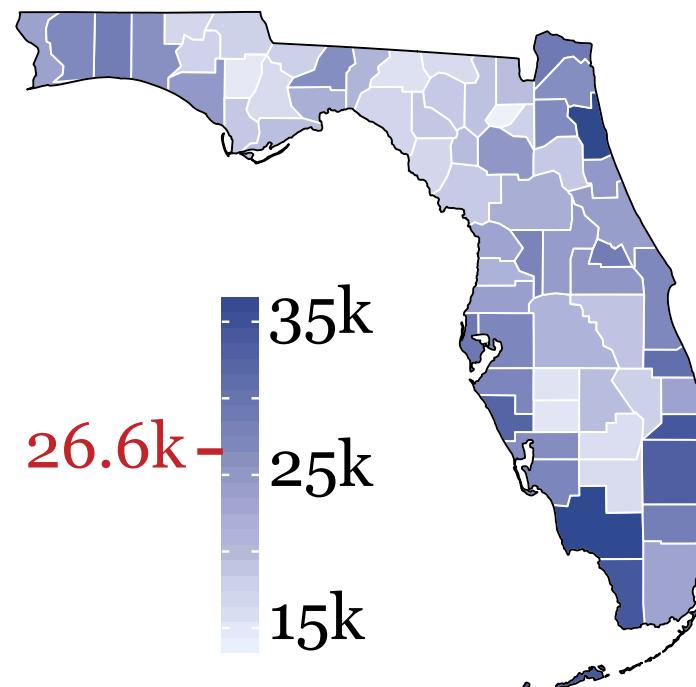
Black (%)



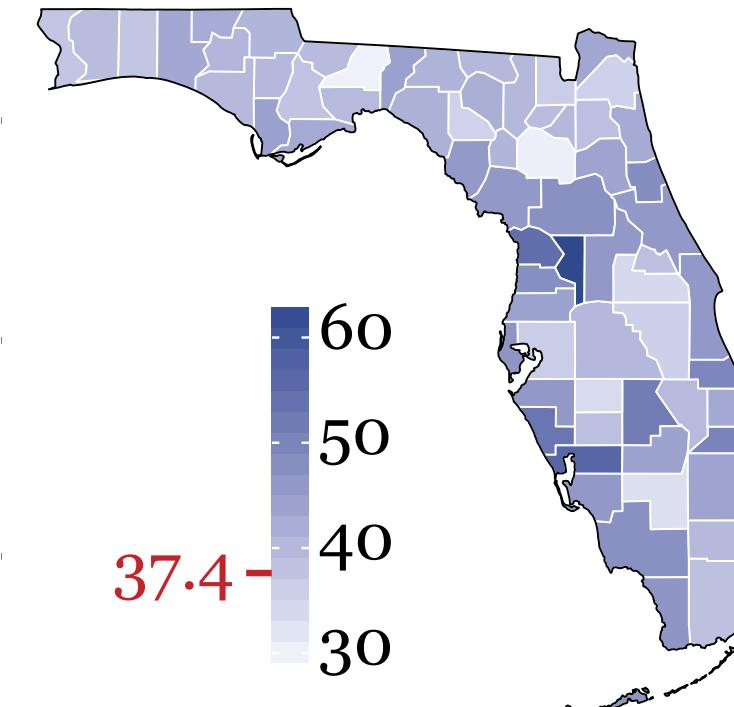
White (%)*



Per capita income



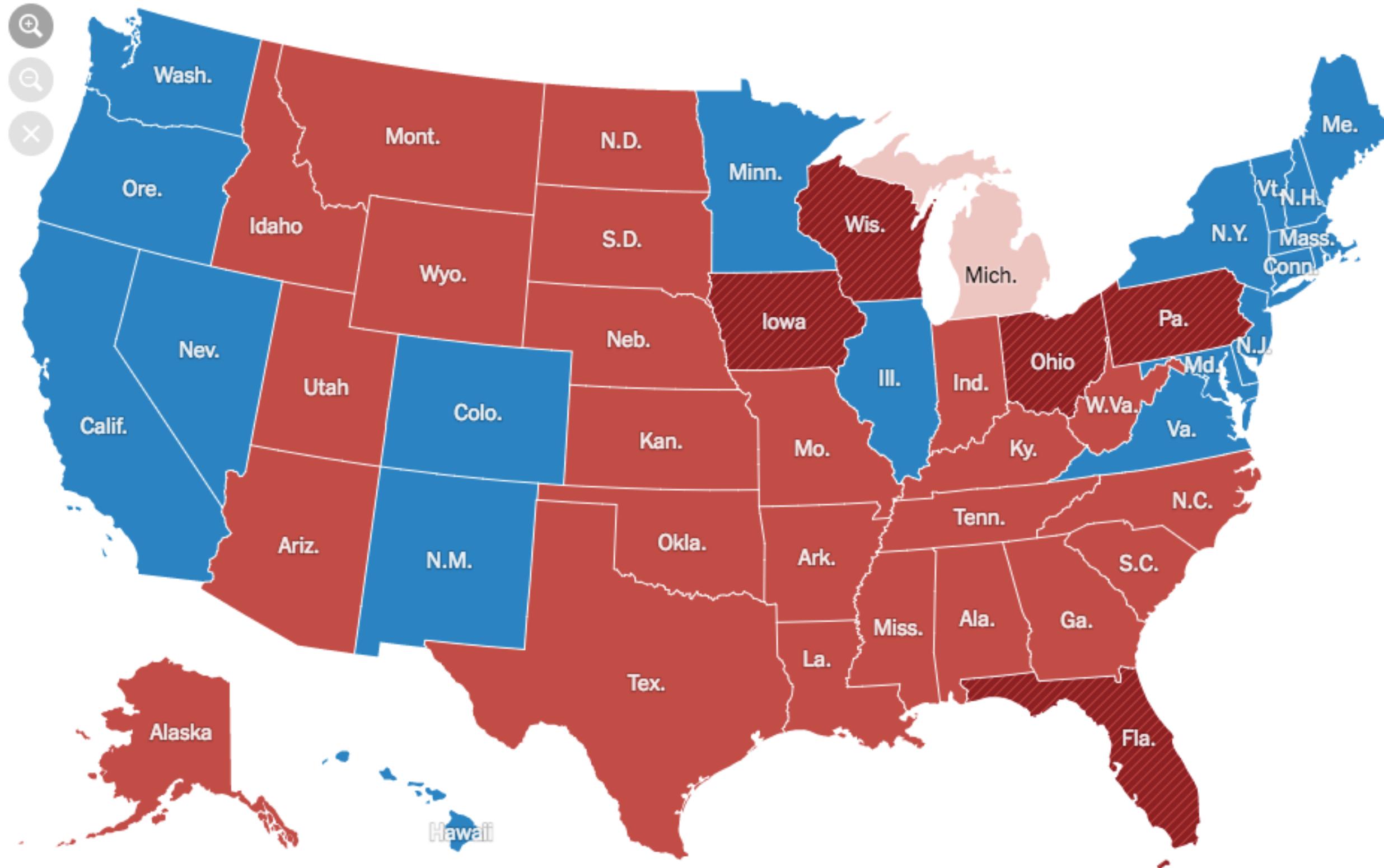
Median age



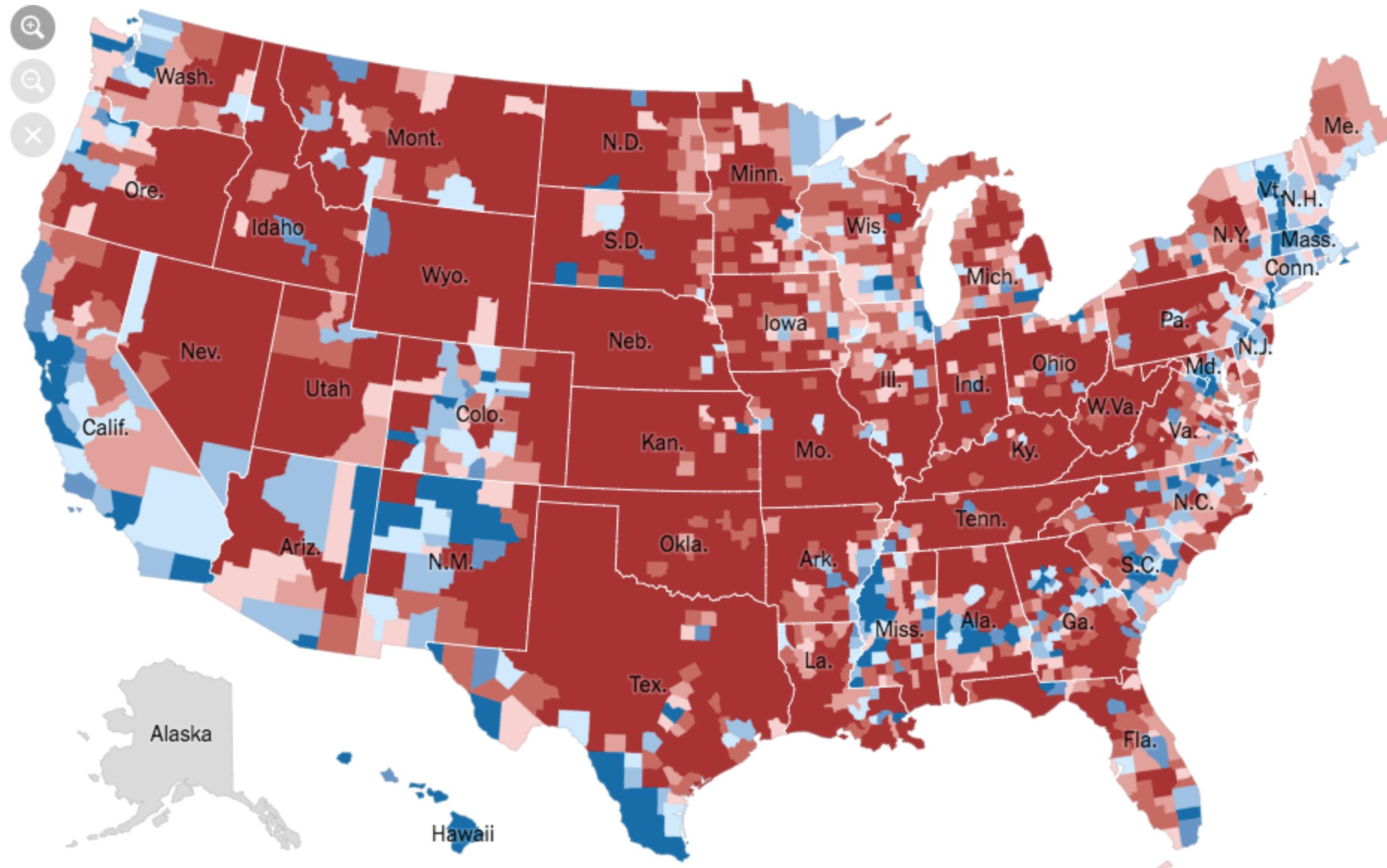
Data from the American Community Survey, 2013.
The **red line** on each scale is the U.S. average.

*White, non-Hispanic

Detalle: Comparativa



Dem. Rep. Other
Lead Win Flip Lead Win Flip Lead Win Flip No results



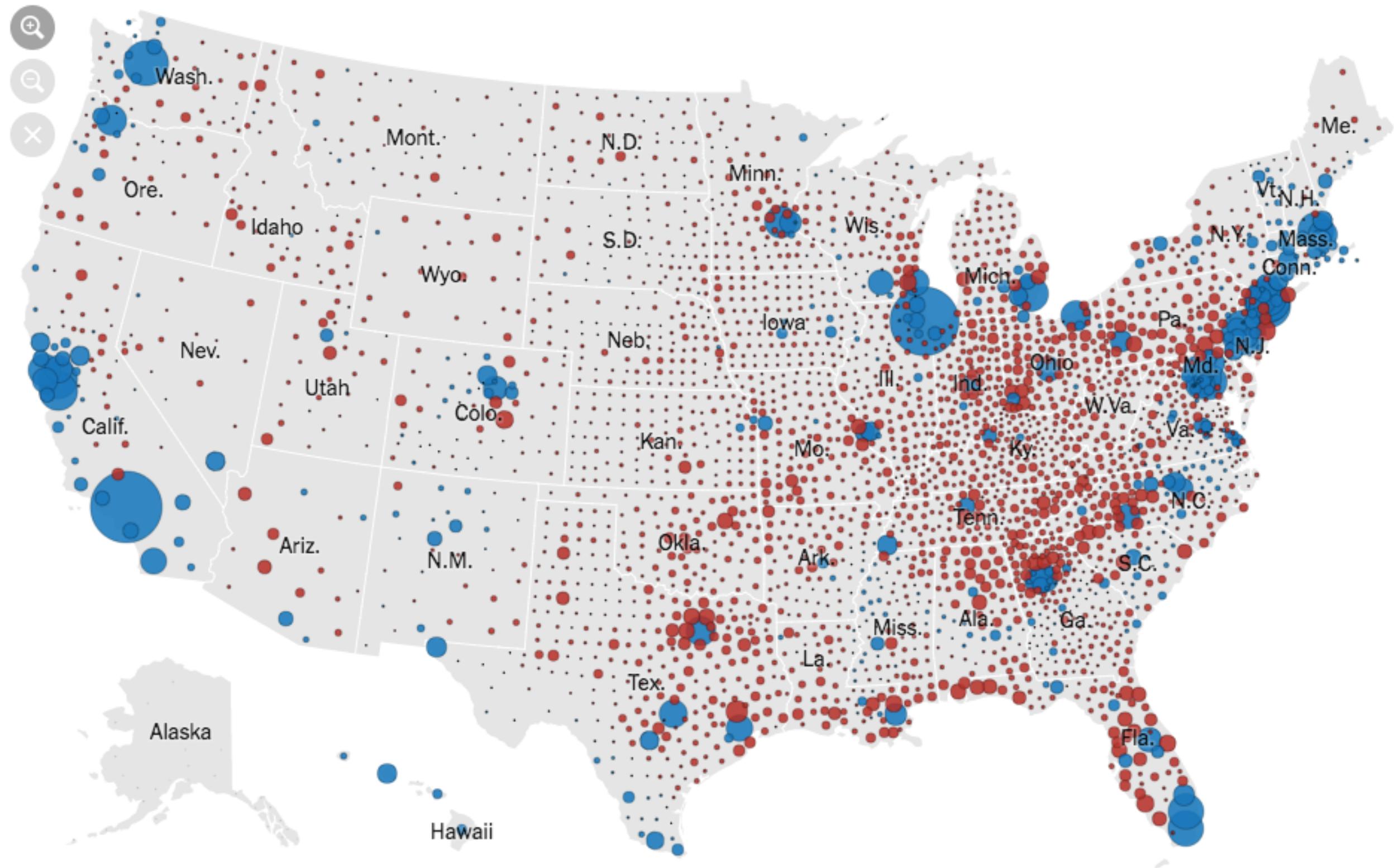
VOTE SHARE

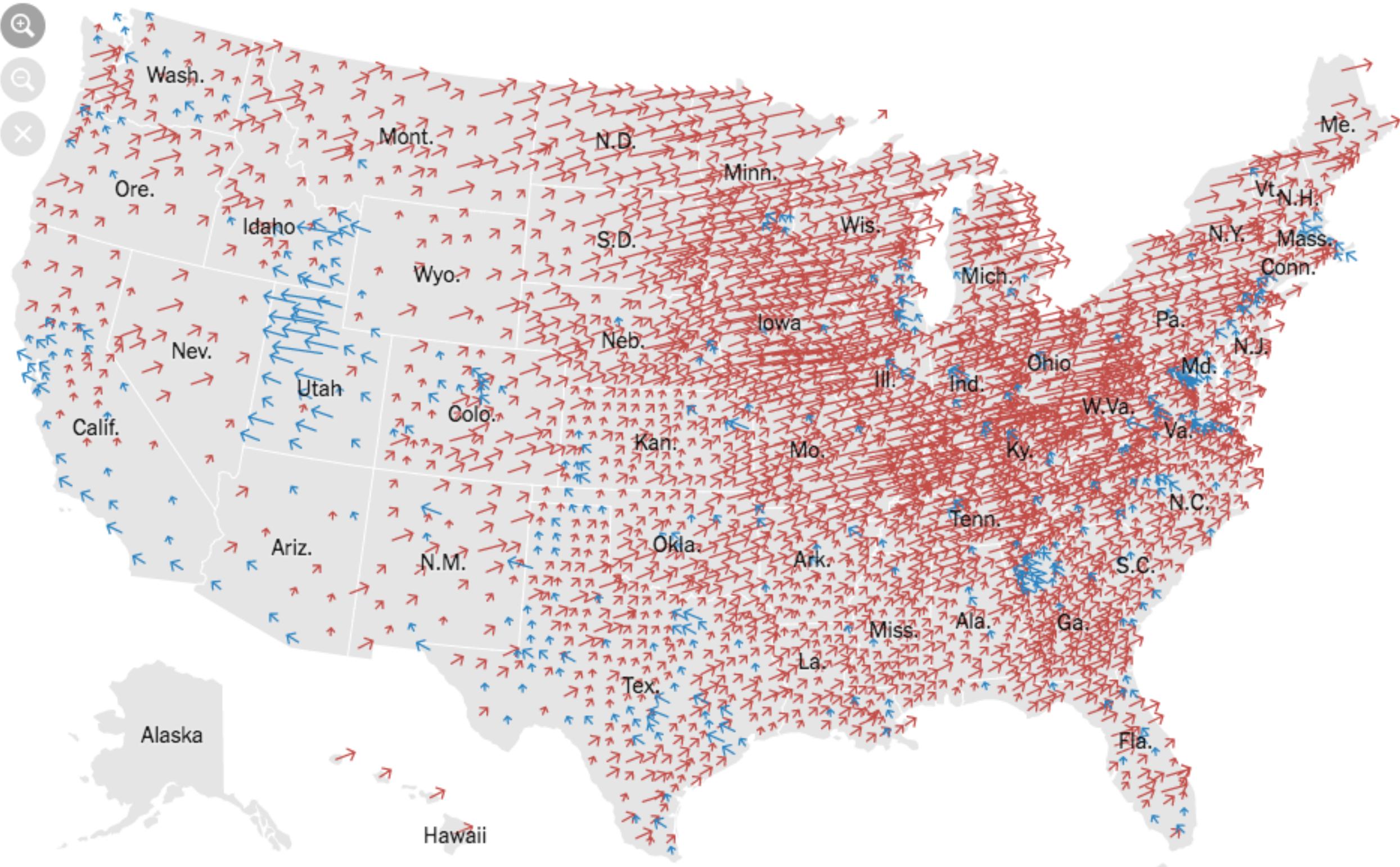
40 50 60% Dem.

40 50 60% Rep.

40 50 60% Other

No results





SHIFT IN MARGIN

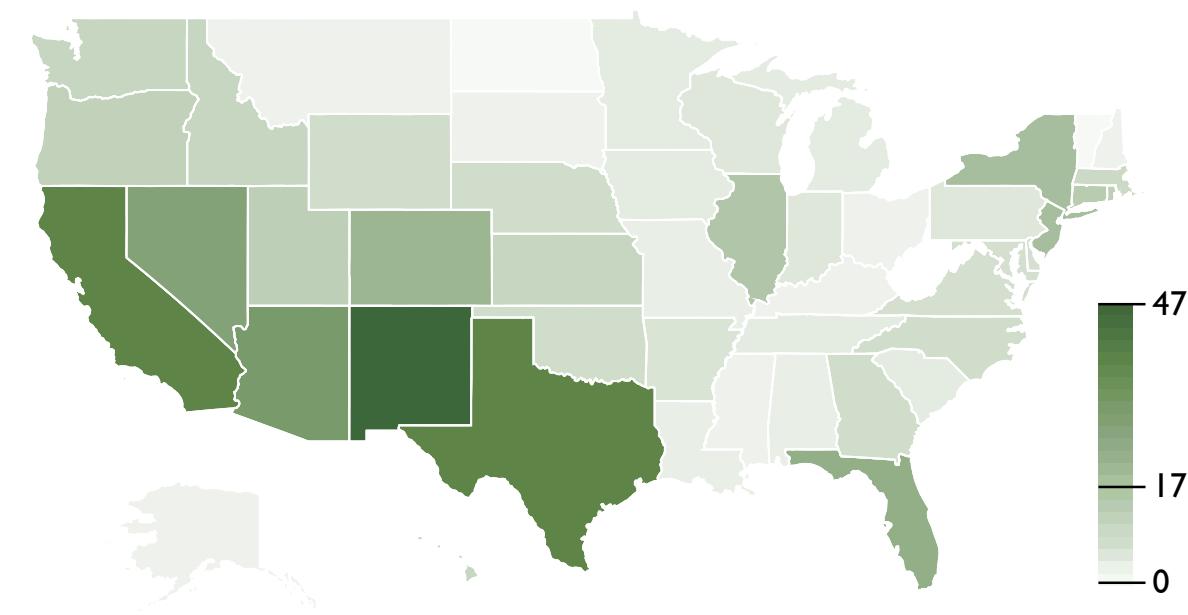
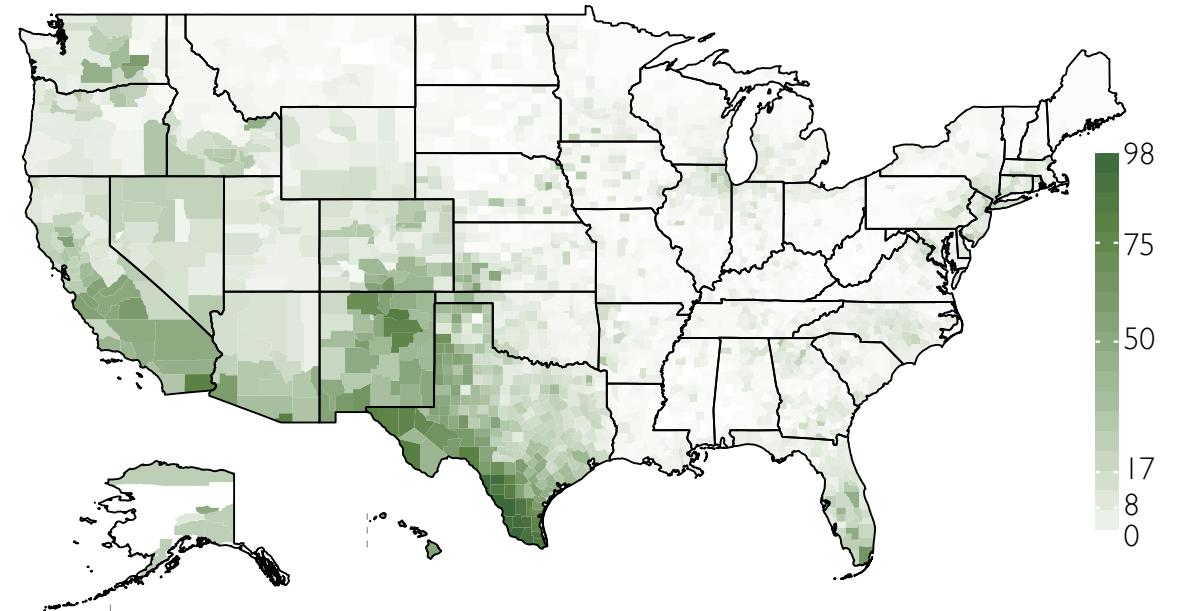
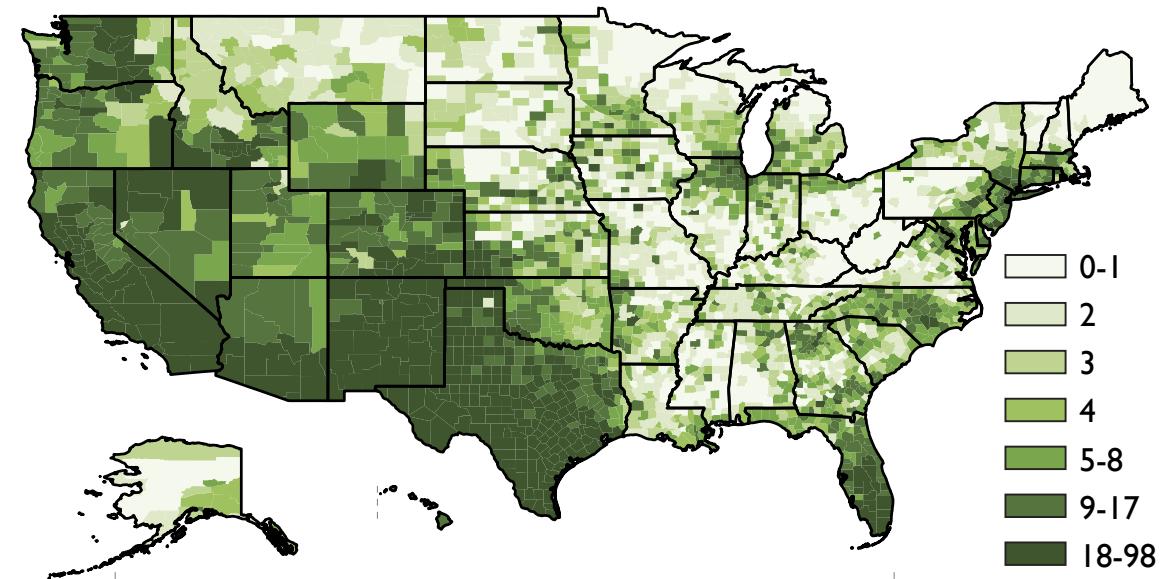
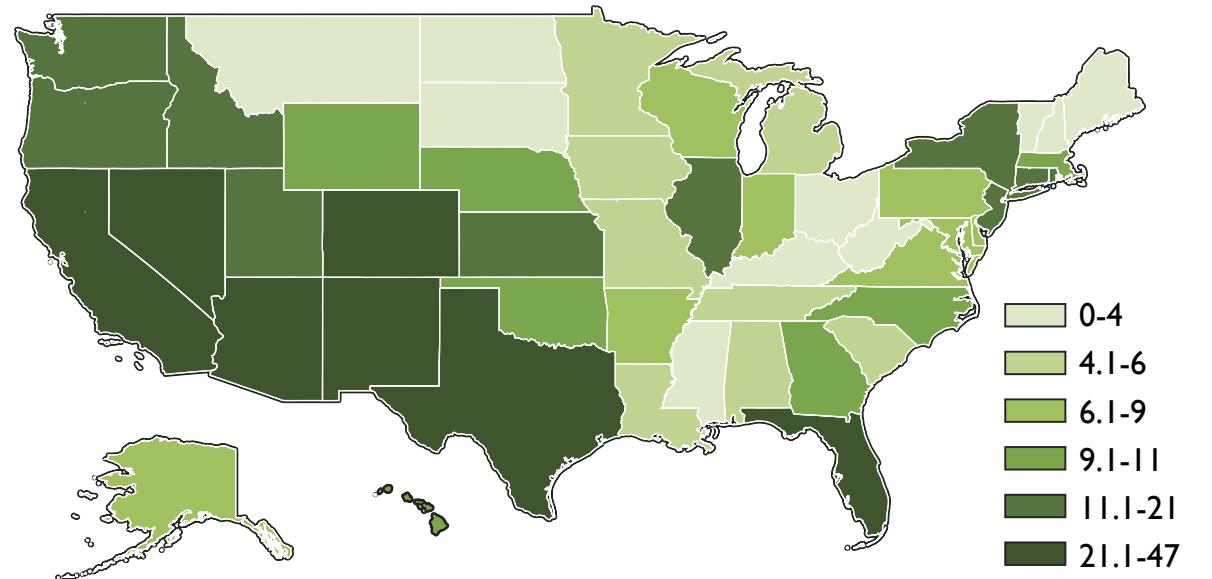


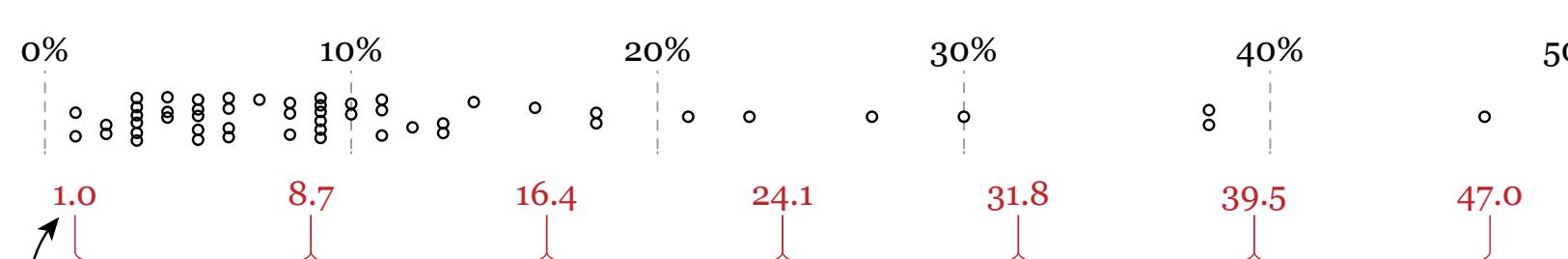
More Republican



More Democratic

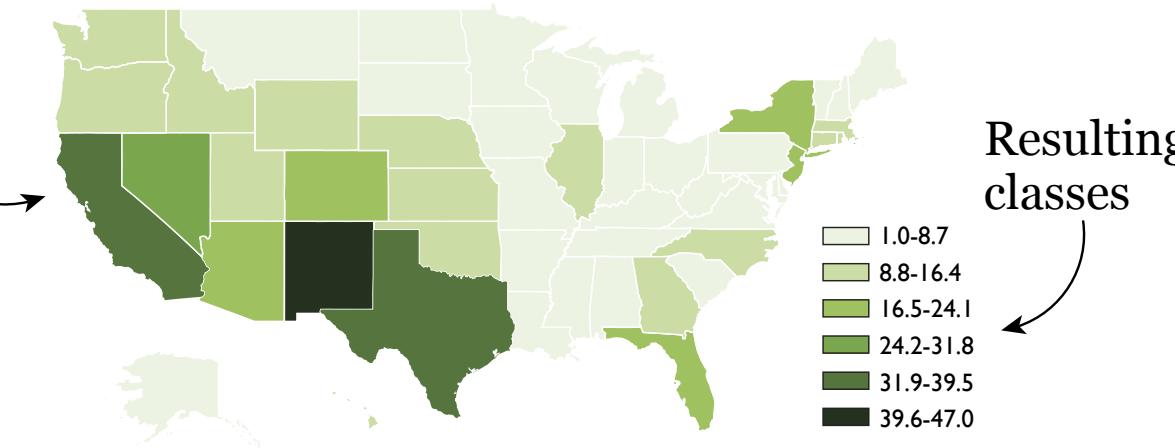
Hispanic population (%)



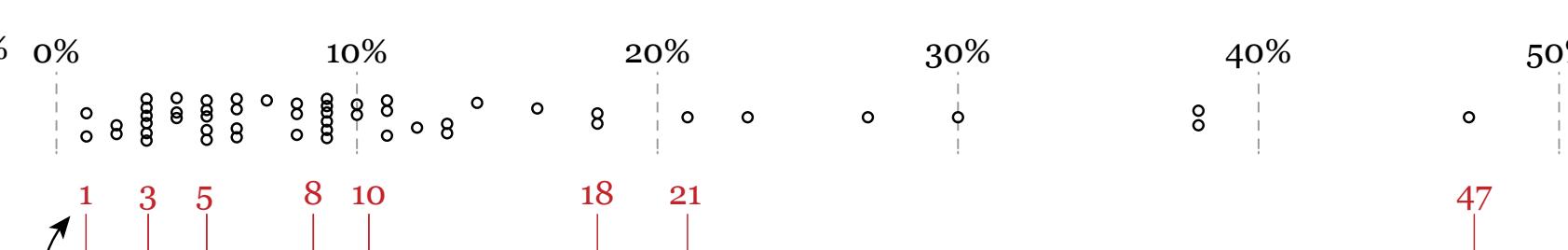


Hispanic population (%)

Map based on equal intervals

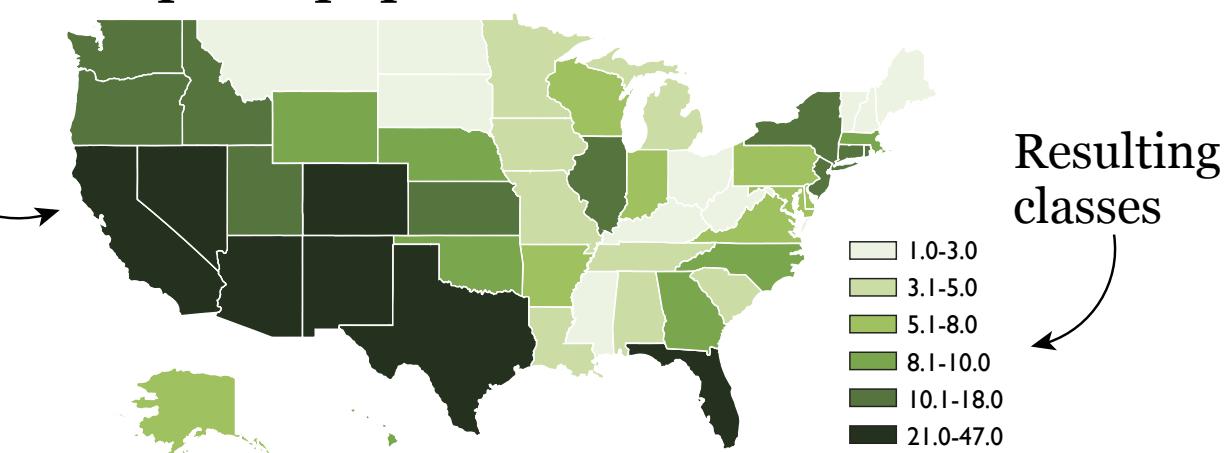


Resulting classes

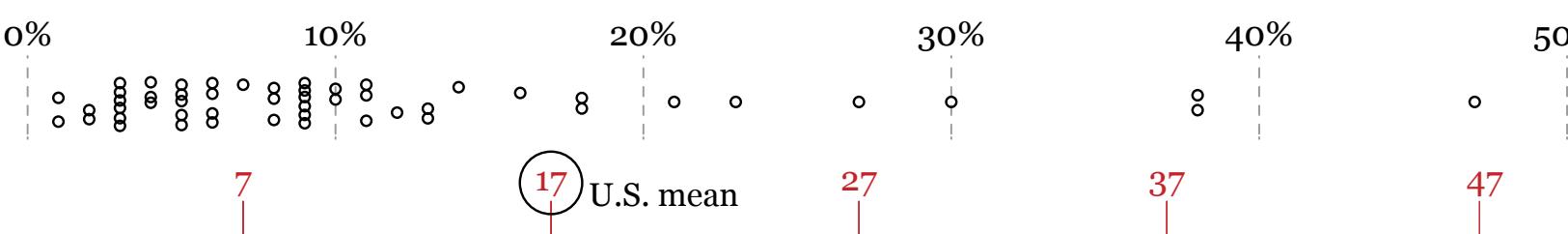


Hispanic population (%)

Map based on quantiles

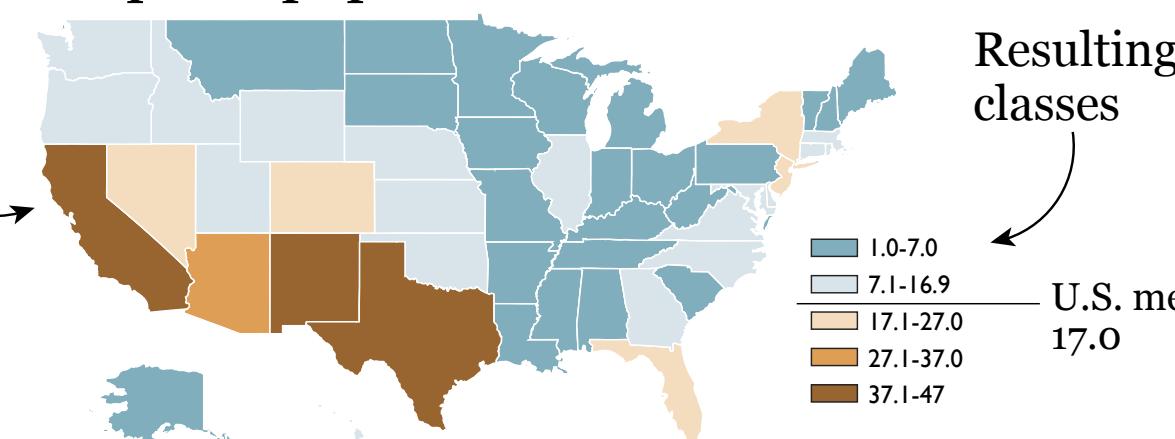


Resulting classes

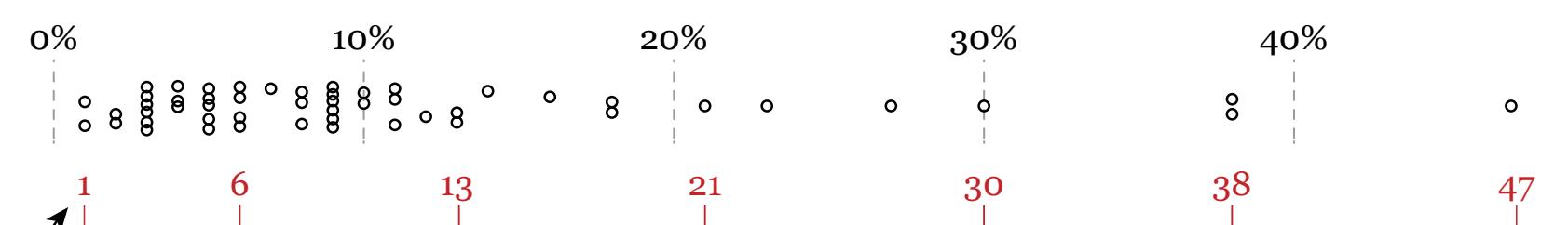


Hispanic population (%)

Map based on the mean and the standard deviation

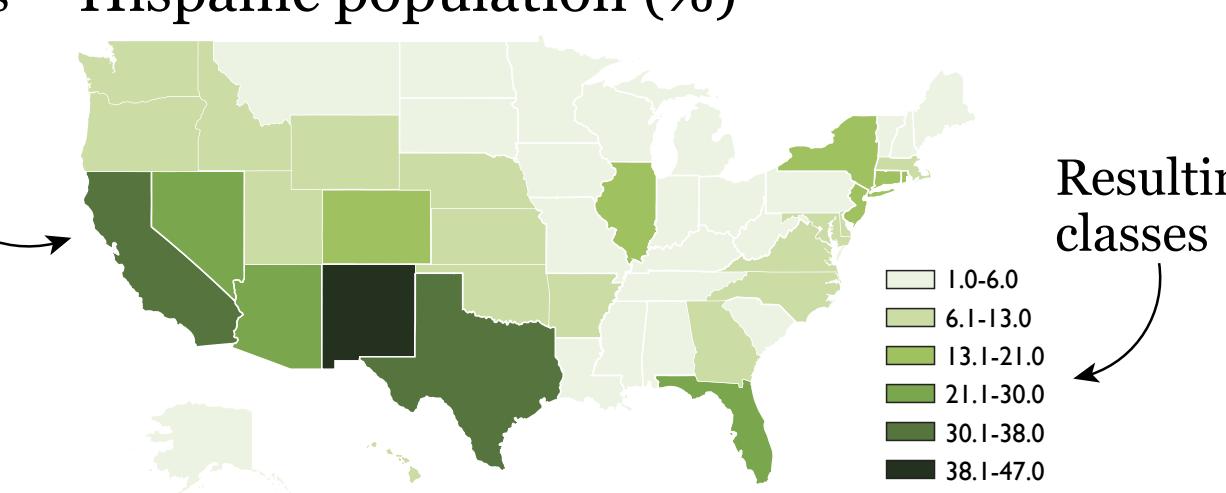


Resulting classes

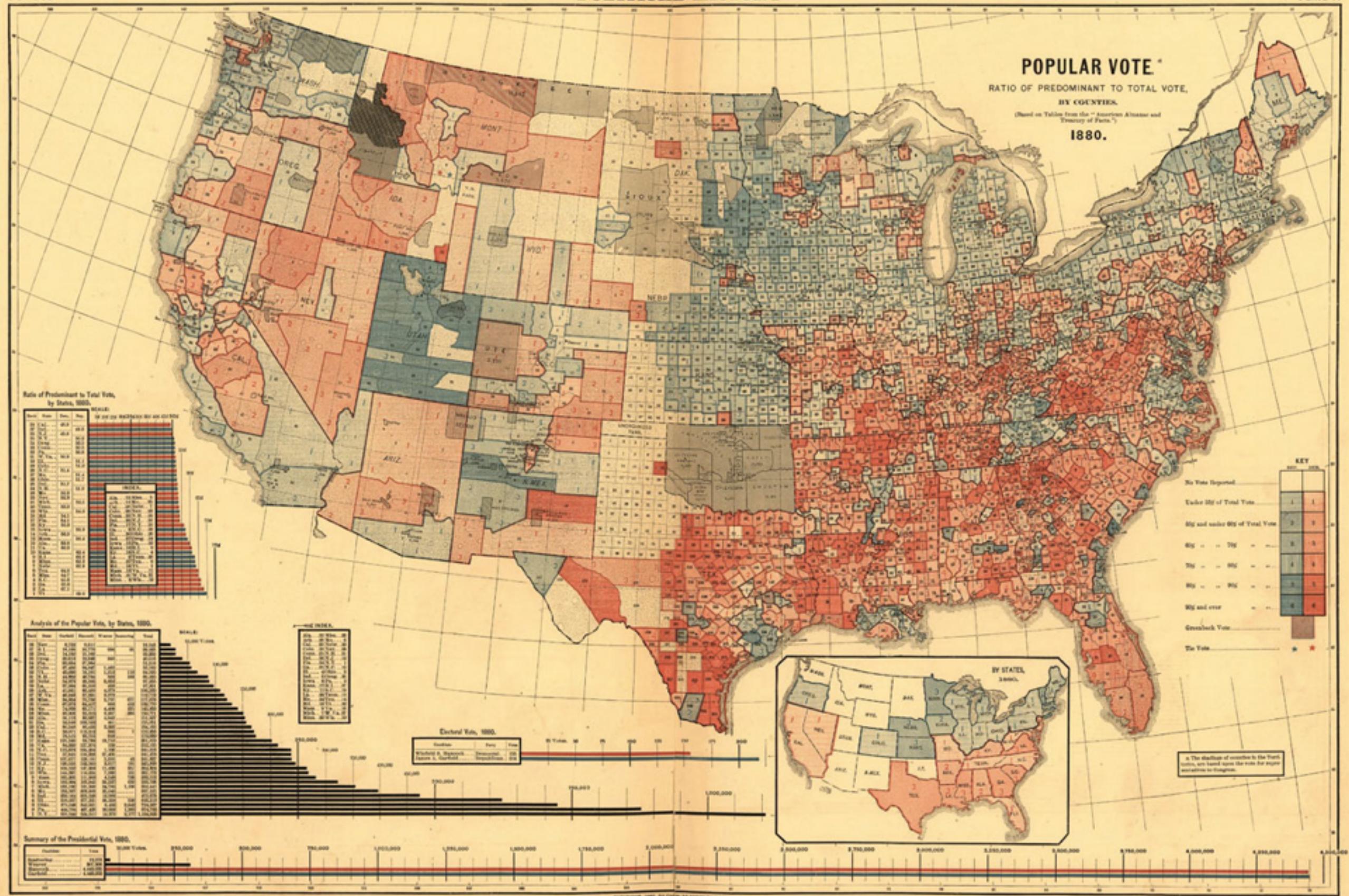


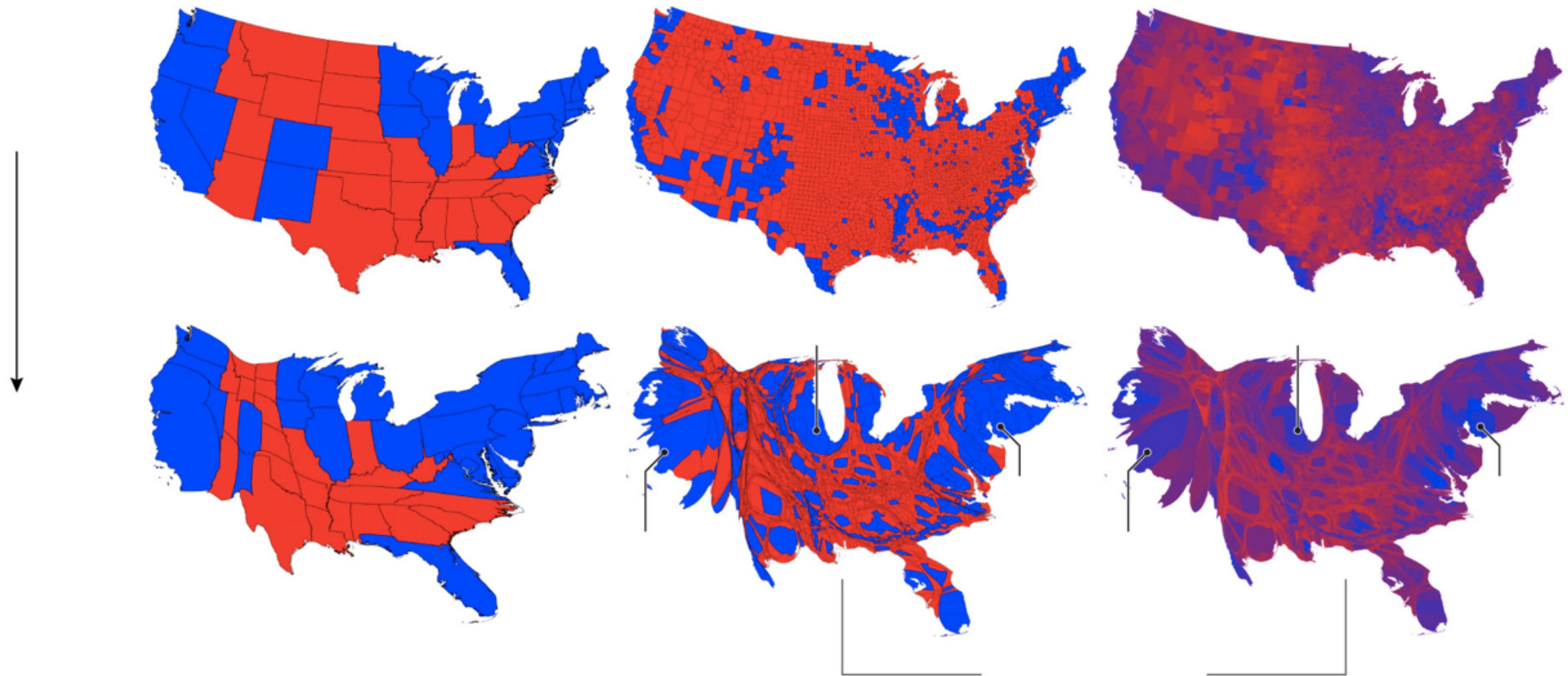
Hispanic population (%)

Map based on natural breaks



Resulting classes





US Presidential Election 2016

Results mapped at county level showing the candidate with the largest vote share in each area

Overall result:

Trump
60,265,858 votes (47.3%)
290 electoral votes

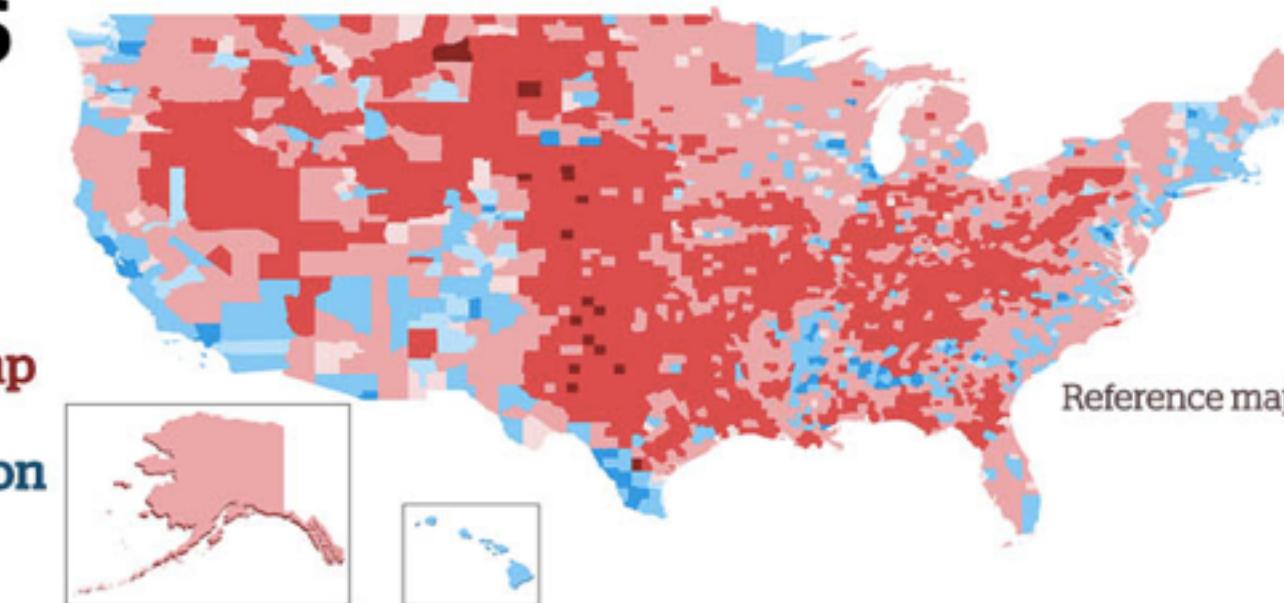
Clinton
60,839,922 votes (47.8%)
228 electoral votes

Other candidates
6,226,950 votes (4.9%)

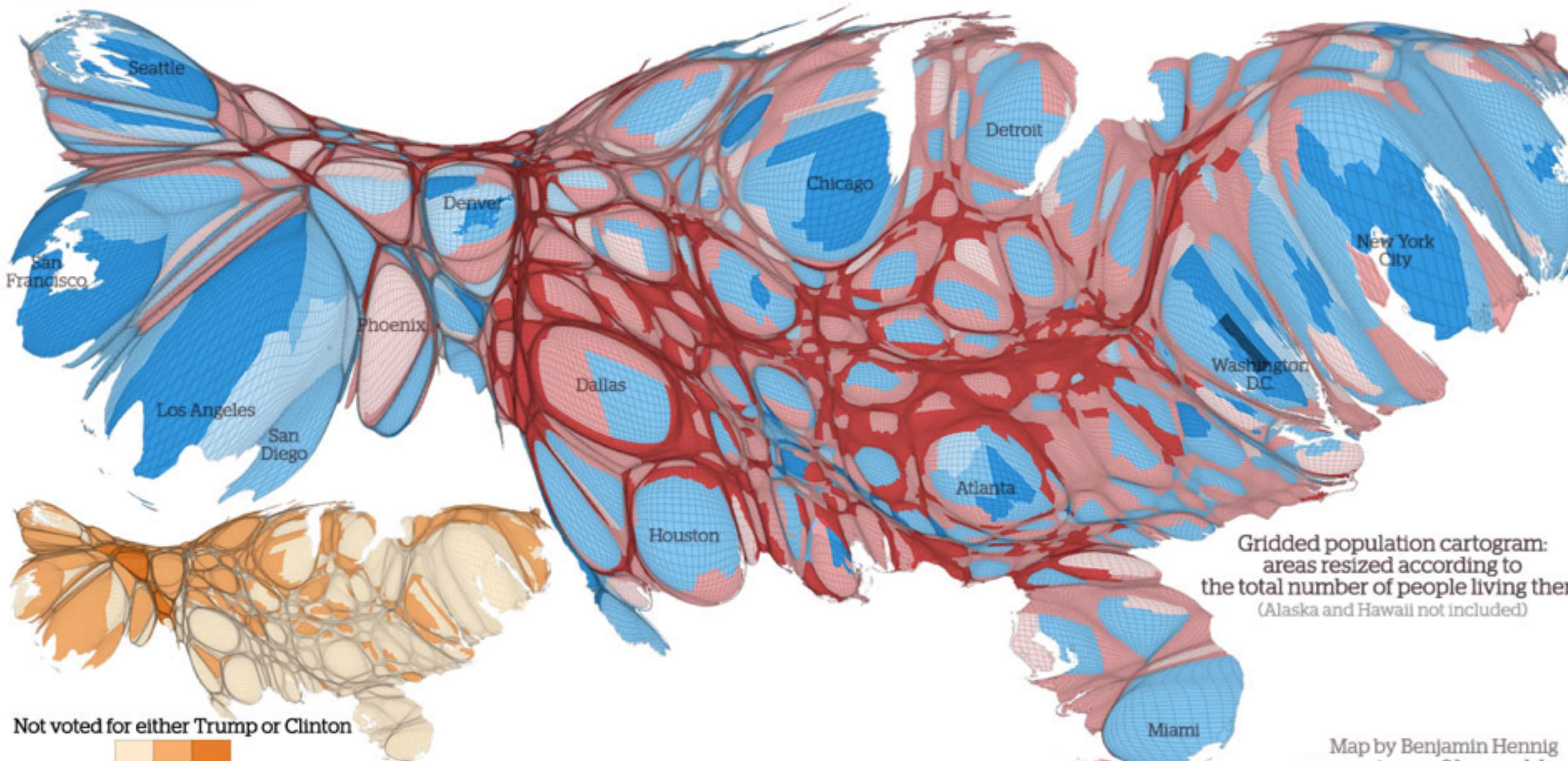
Vote share
of candidate with most votes

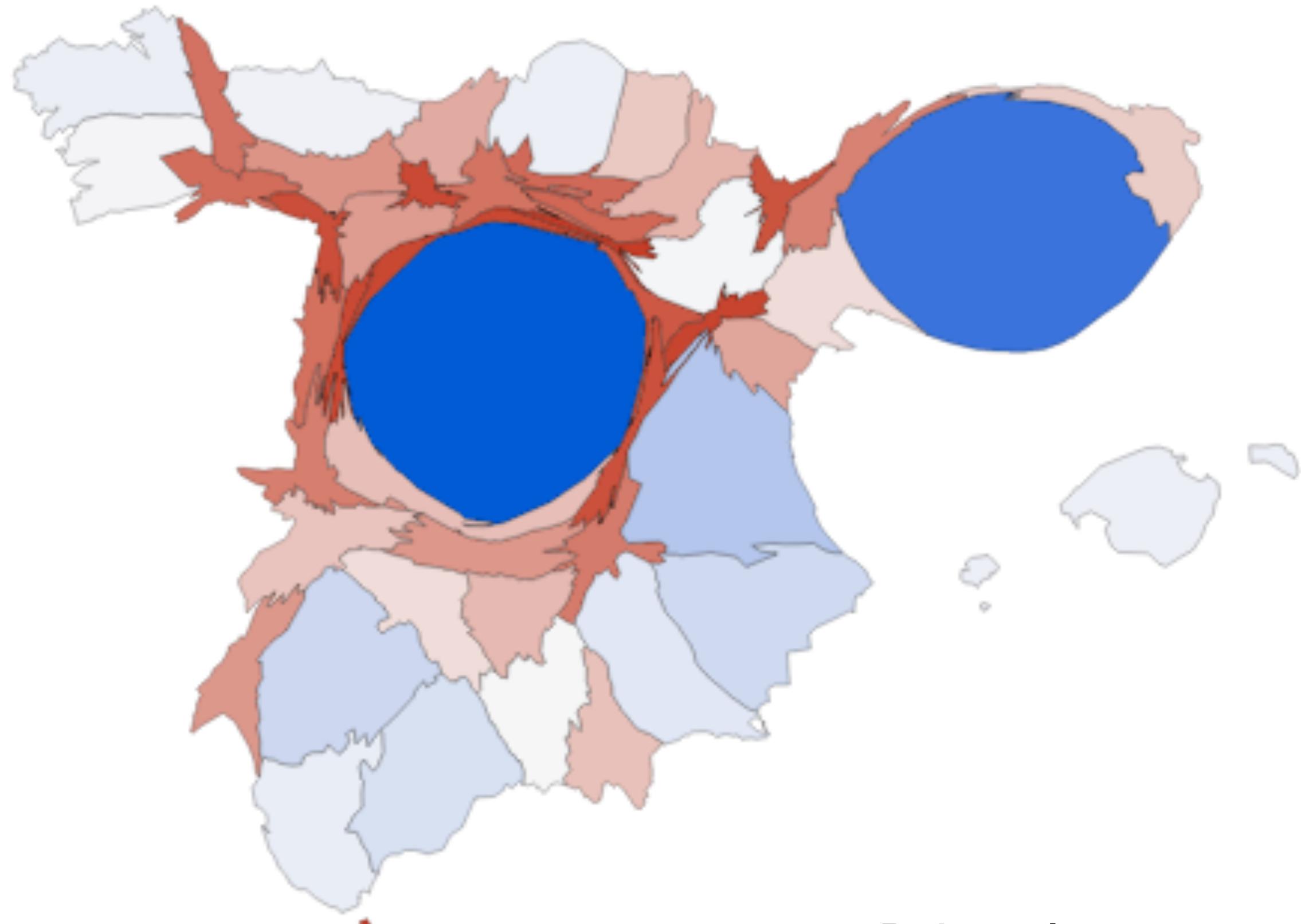
0 50 70 90%

Trump
Clinton

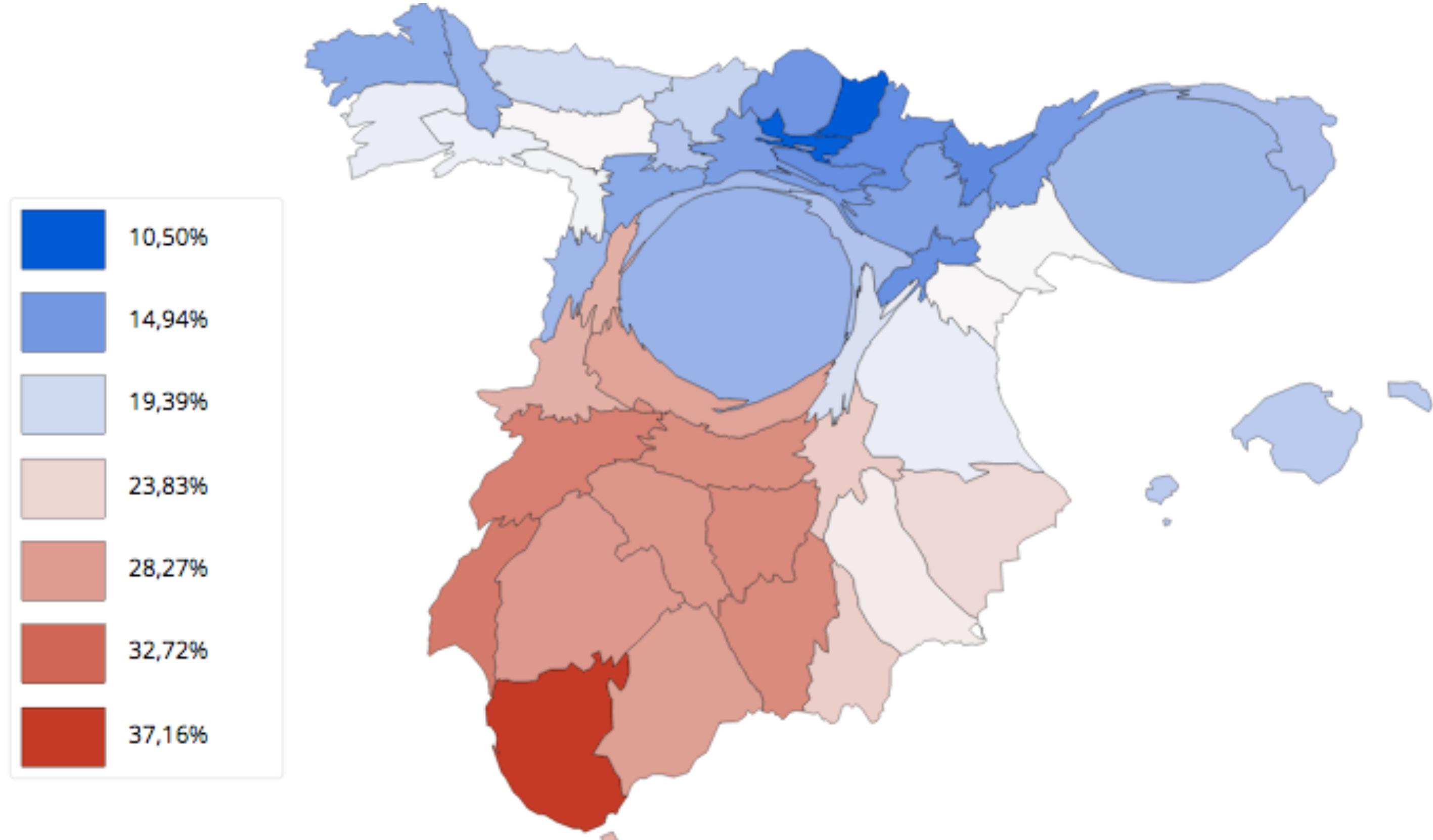


Reference map

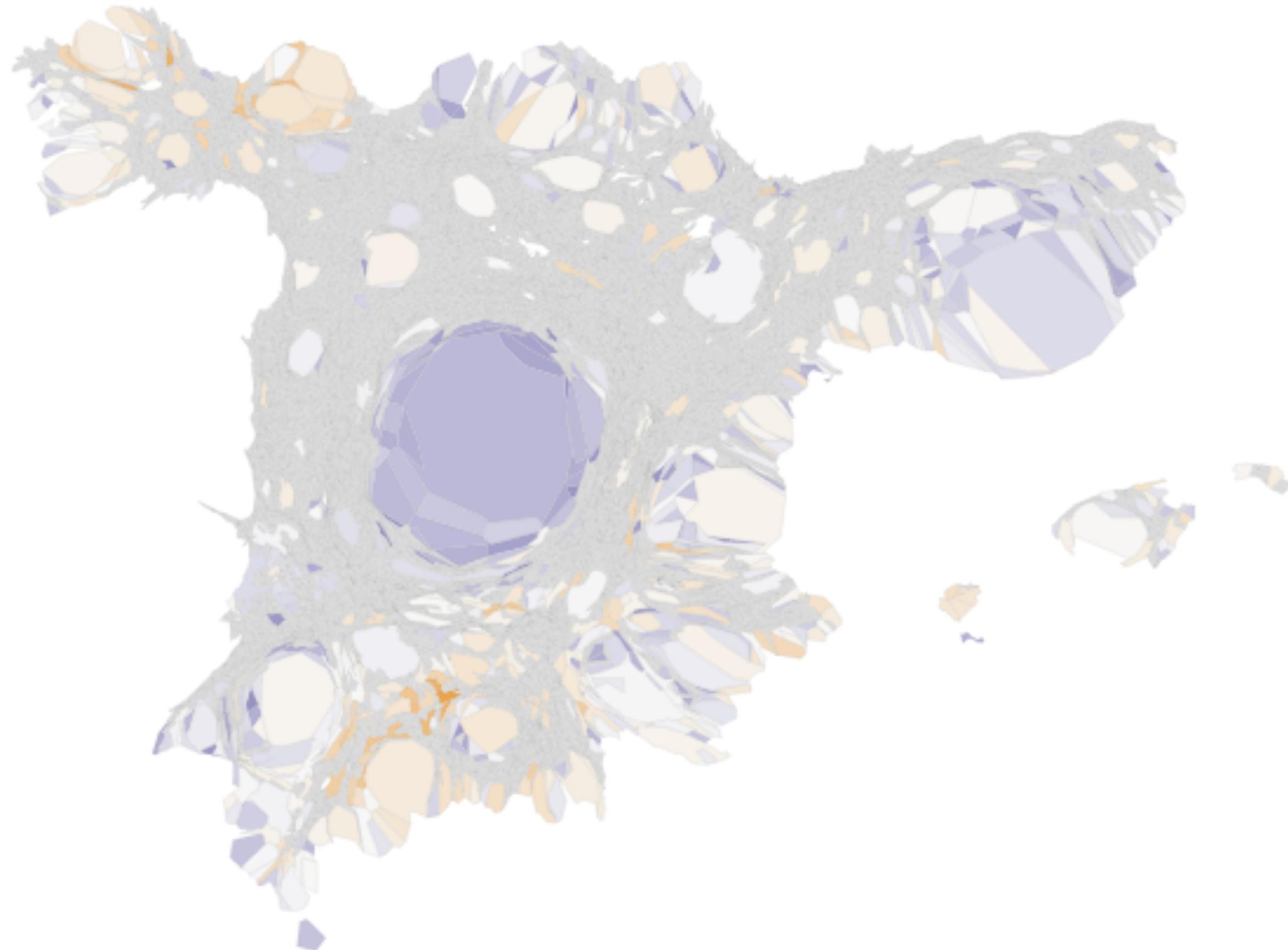


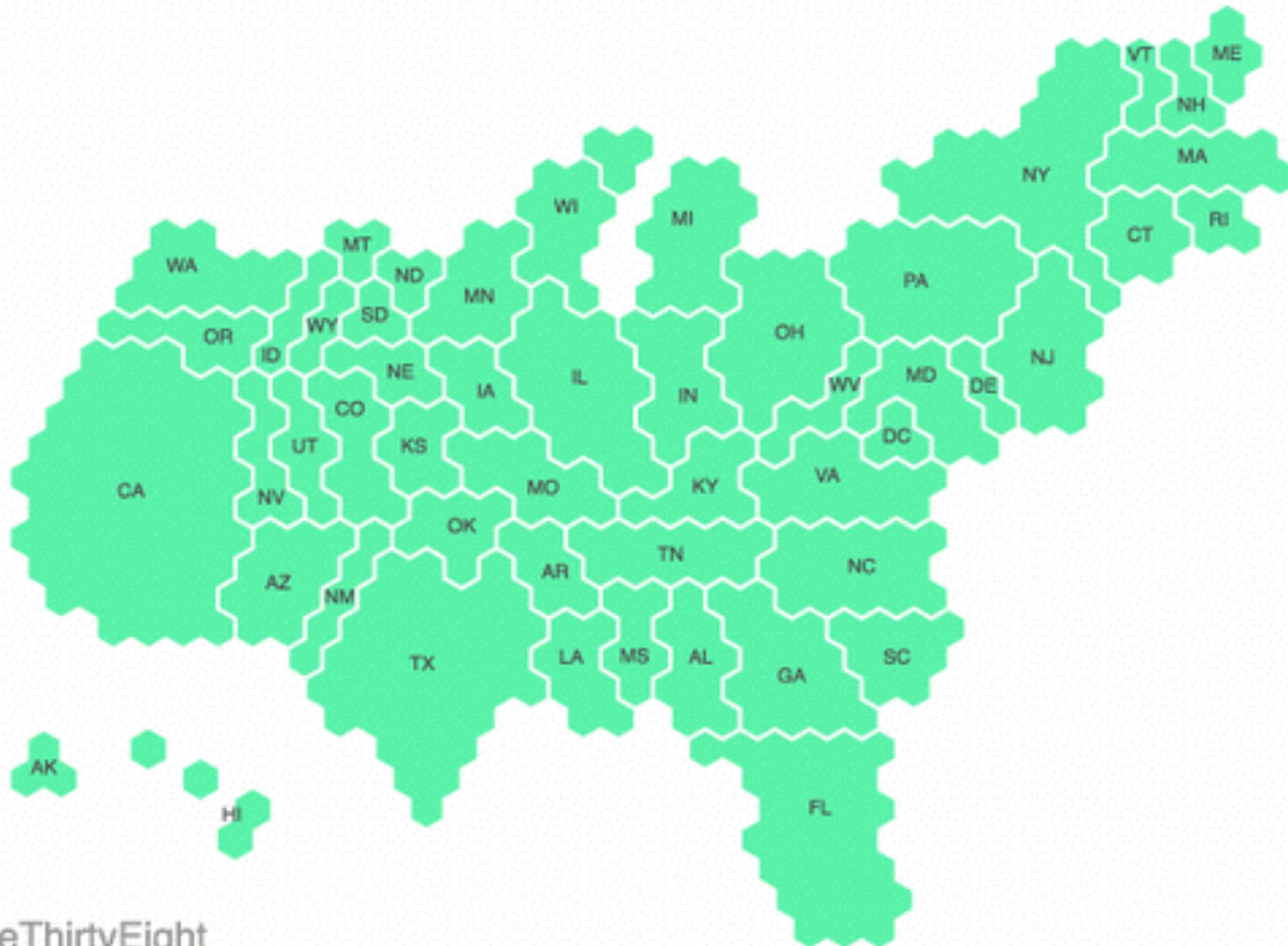


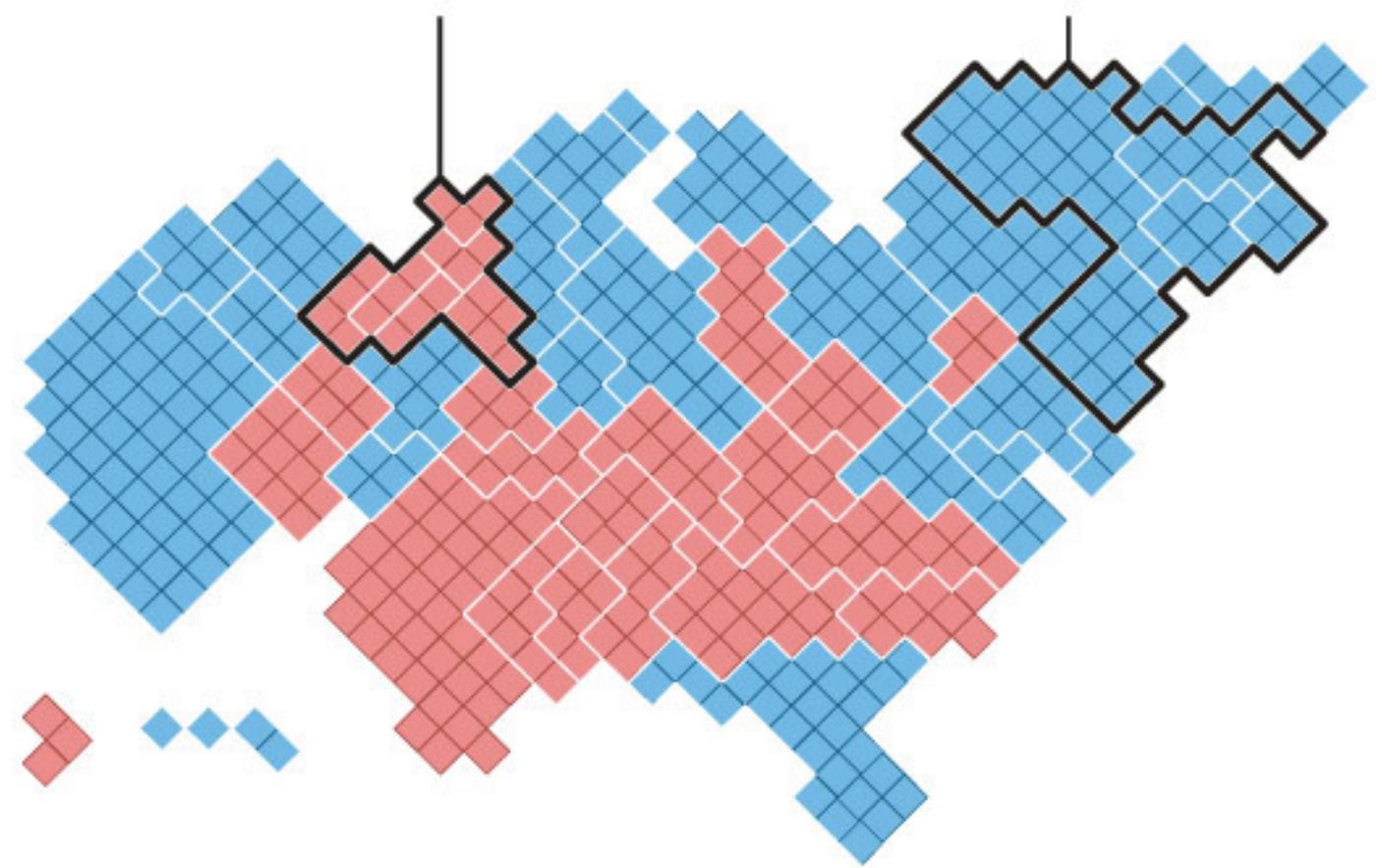
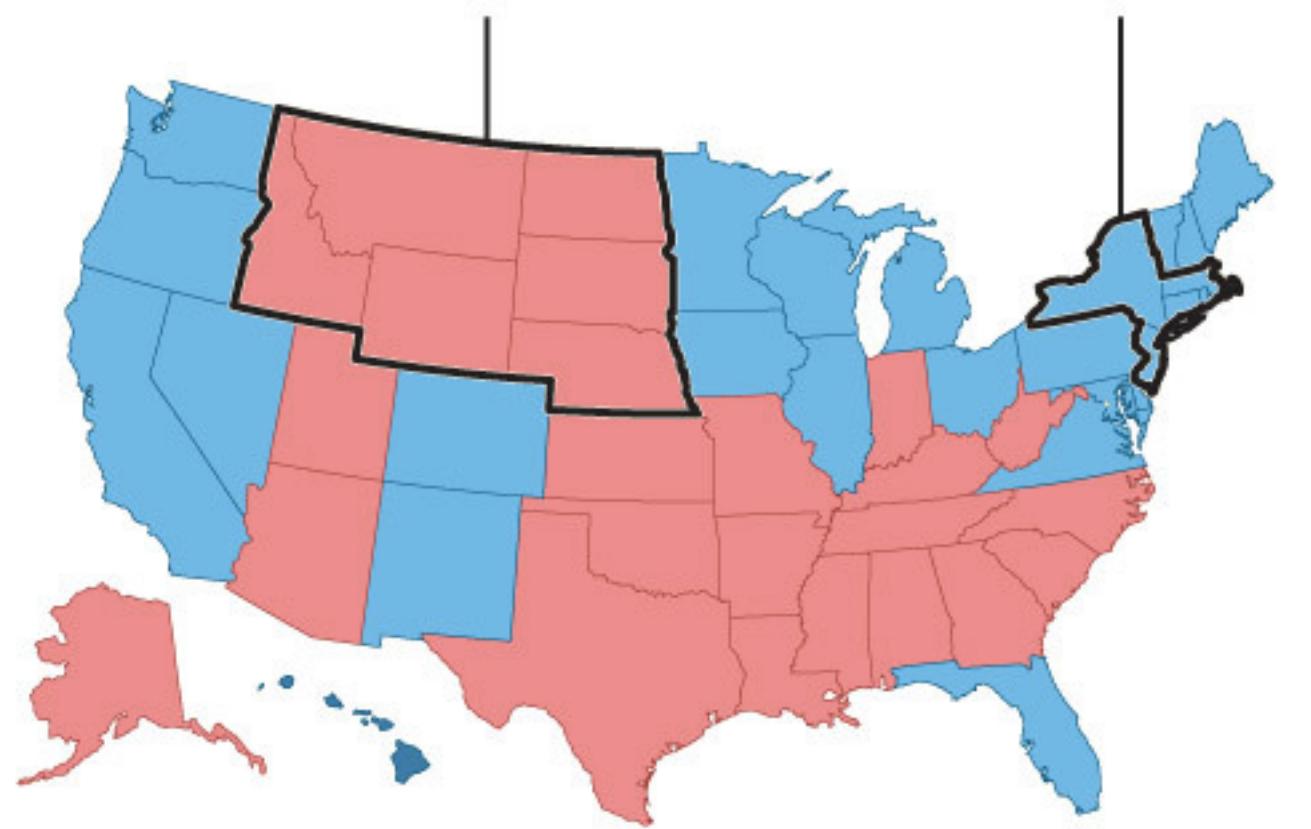
Población por provincias



Parados por provincias

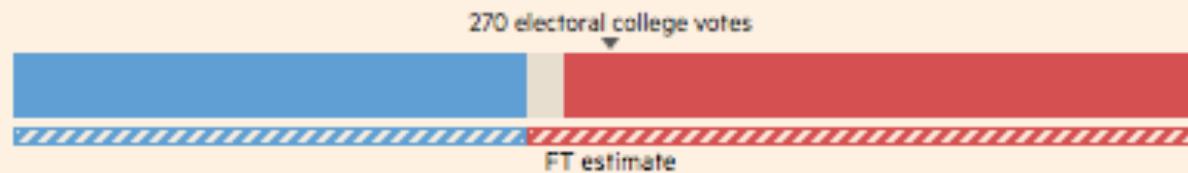








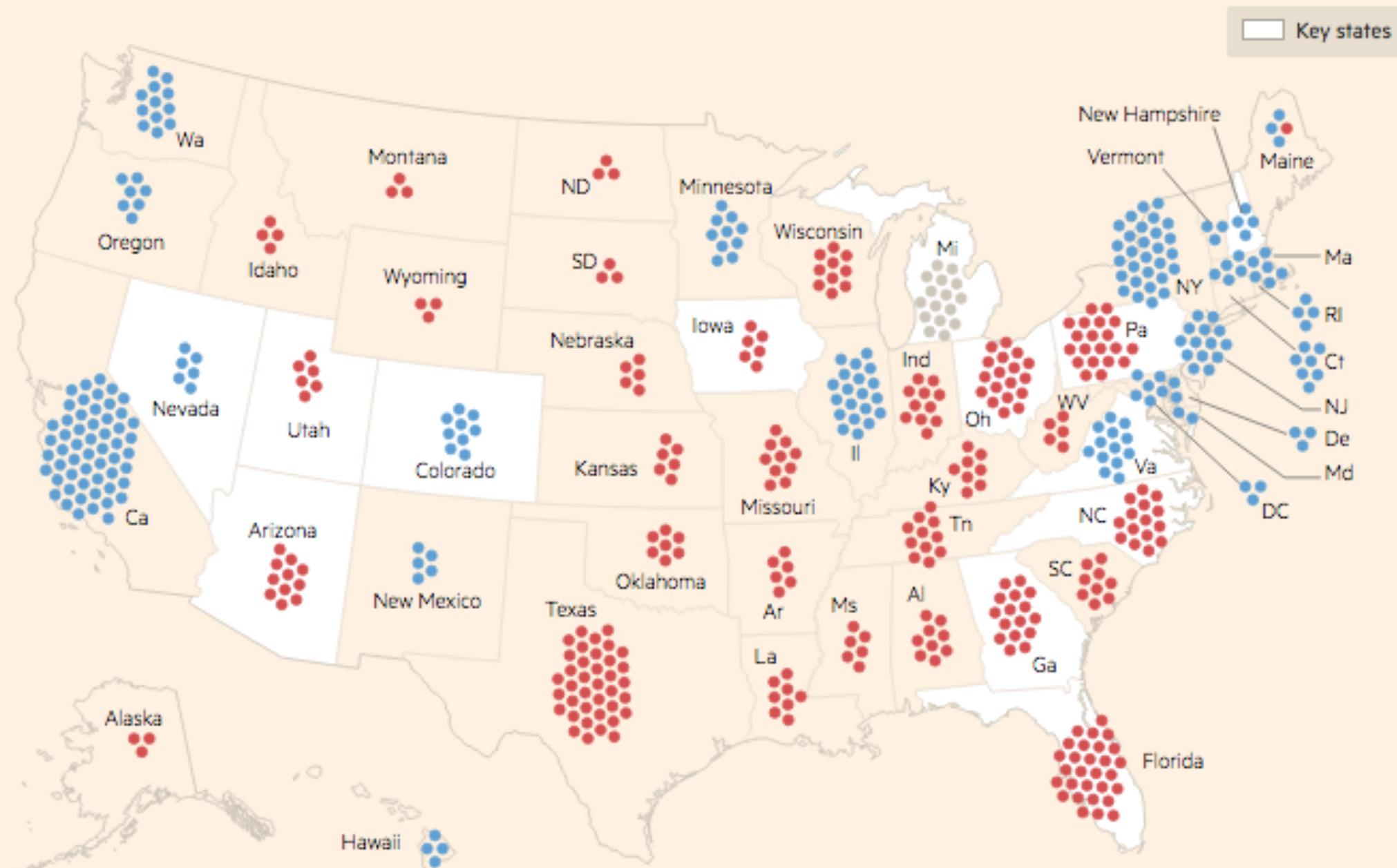
CLINTON
232



TRUMP
290

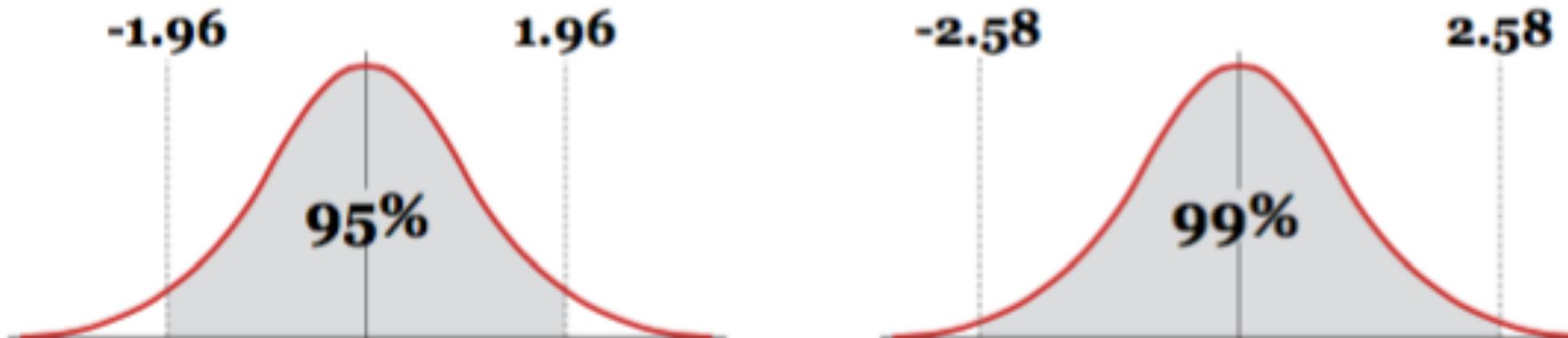
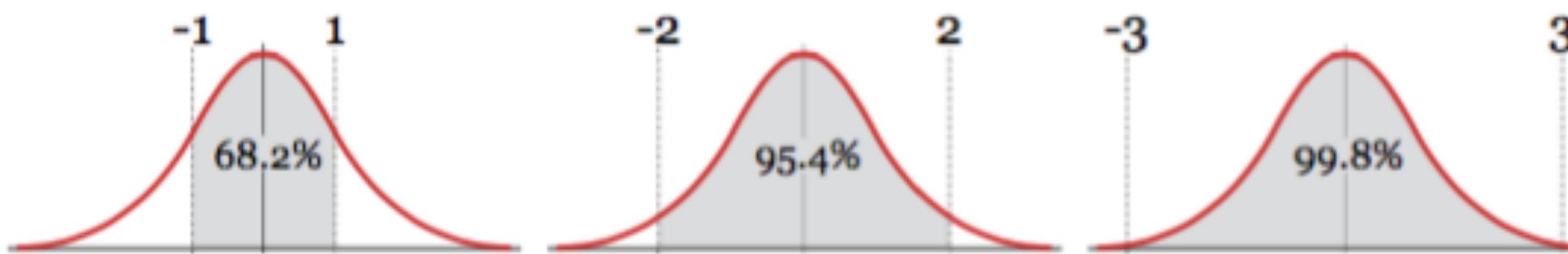
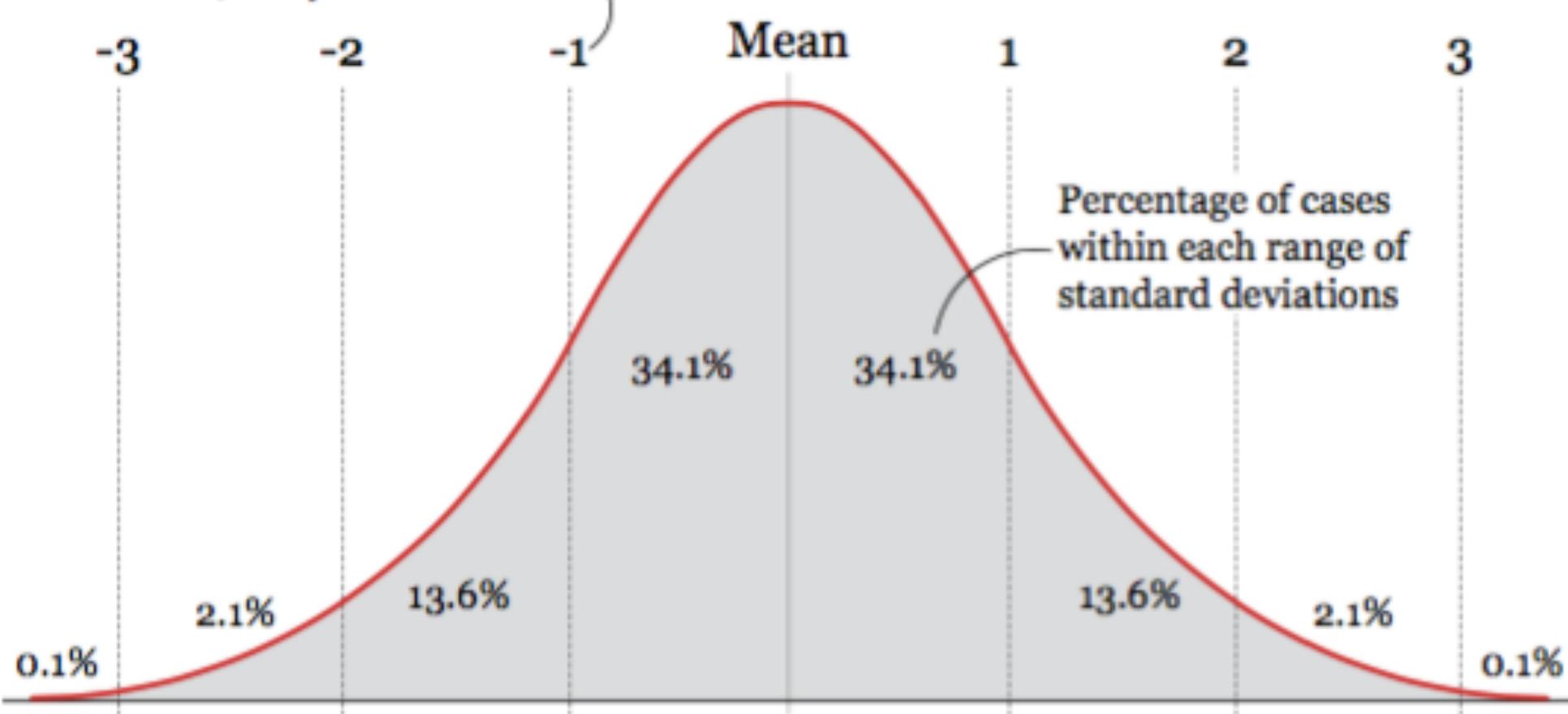
Electoral college votes by state

Each candidate needs 270 electoral college votes to win the presidency



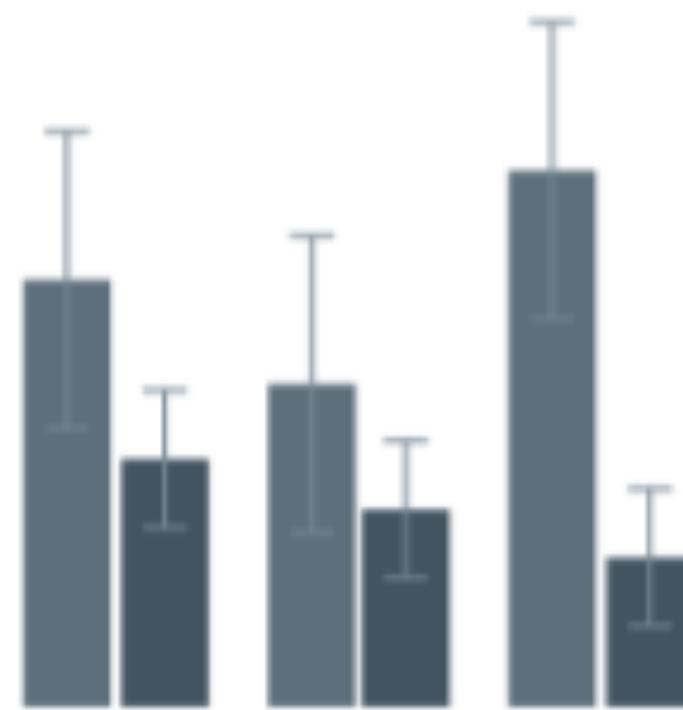
Plotting
uncertainty

Number of standard deviations (standard scores, or z-scores) away from the mean

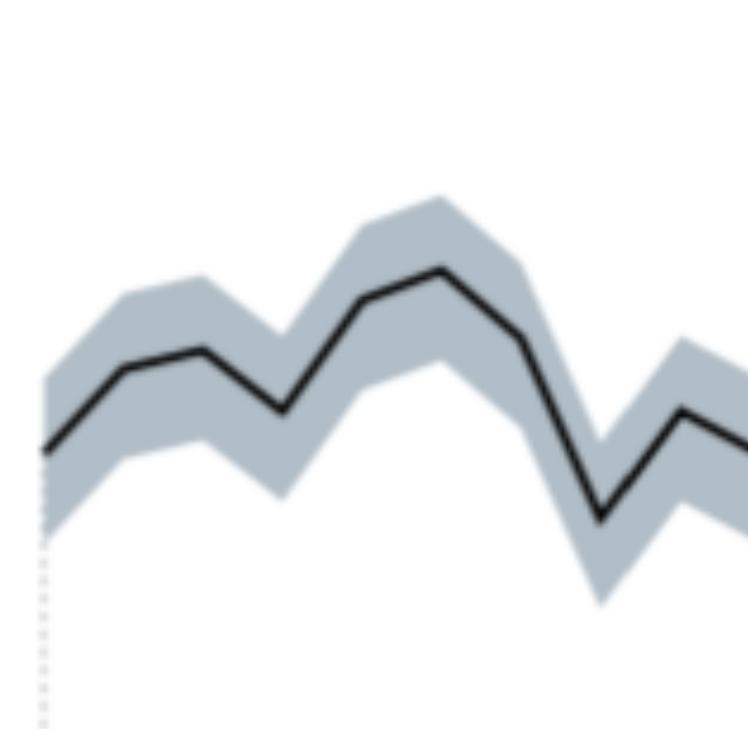




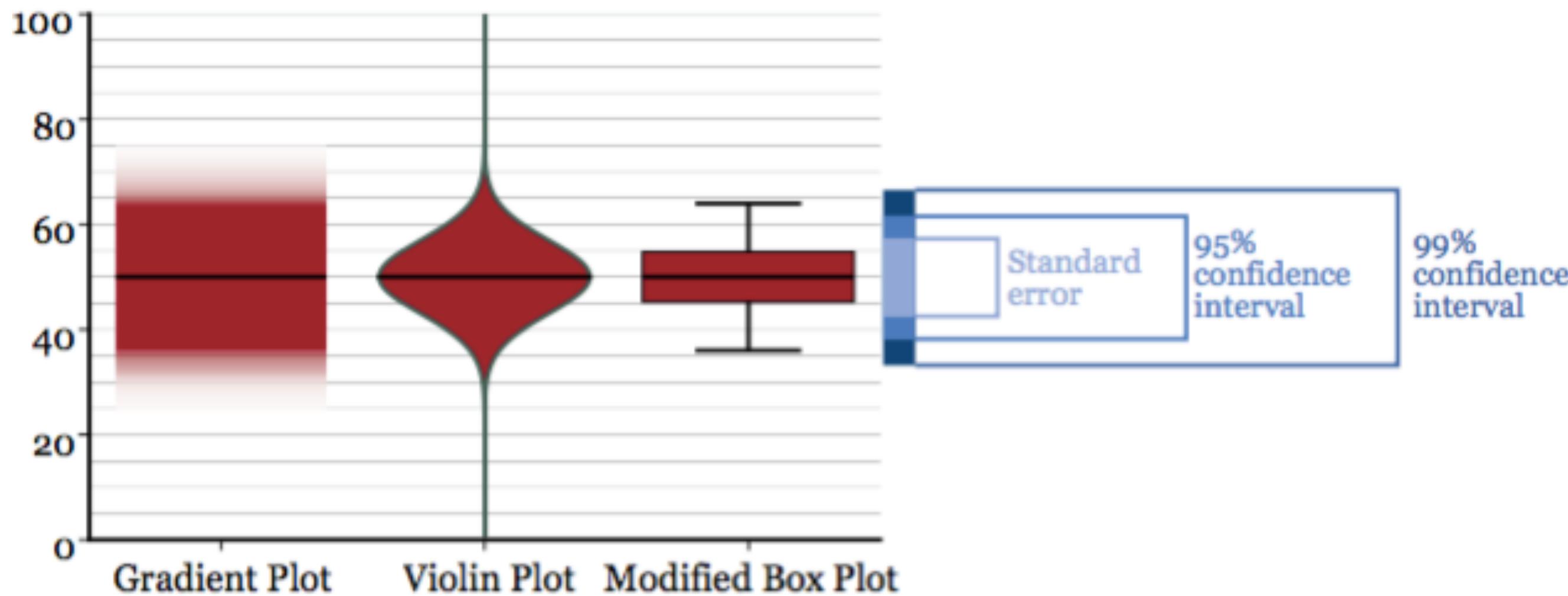
On a dot plot

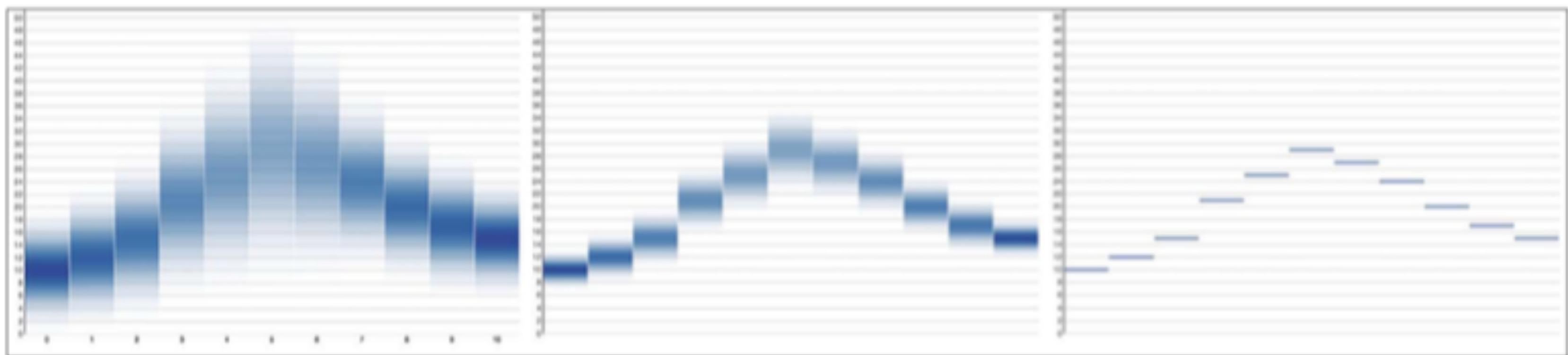


On a bar chart



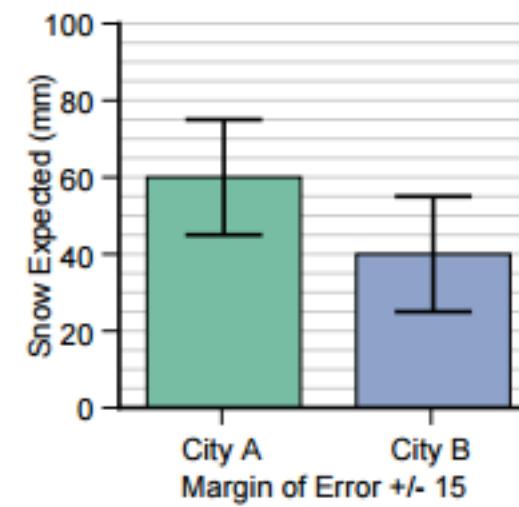
On a time-series chart



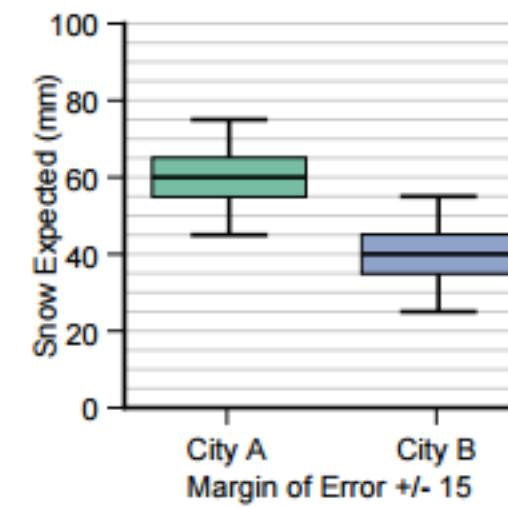


Error Bars Considered Harmful: Exploring Alternate Encodings for Mean and Error

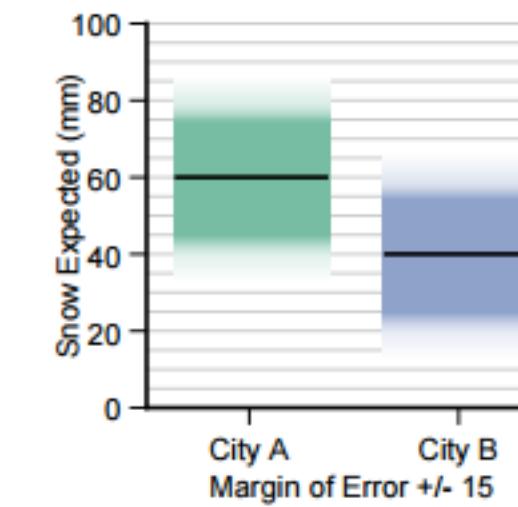
Michael Correll *Student Member, IEEE*, and Michael Gleicher *Member, IEEE*



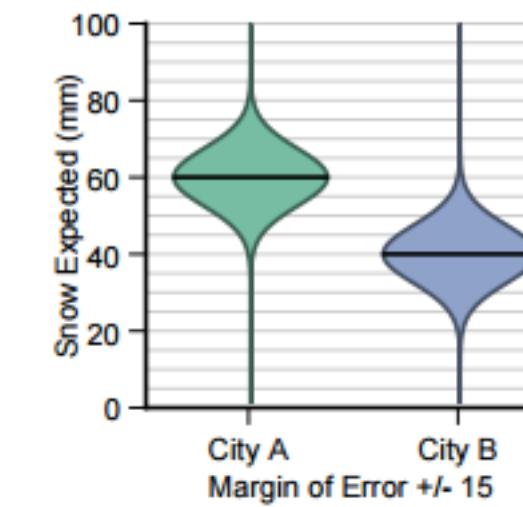
(a) **Bar chart** with error bars: the height of the bars encodes the sample mean, and the whiskers encode a 95% t-confidence interval.



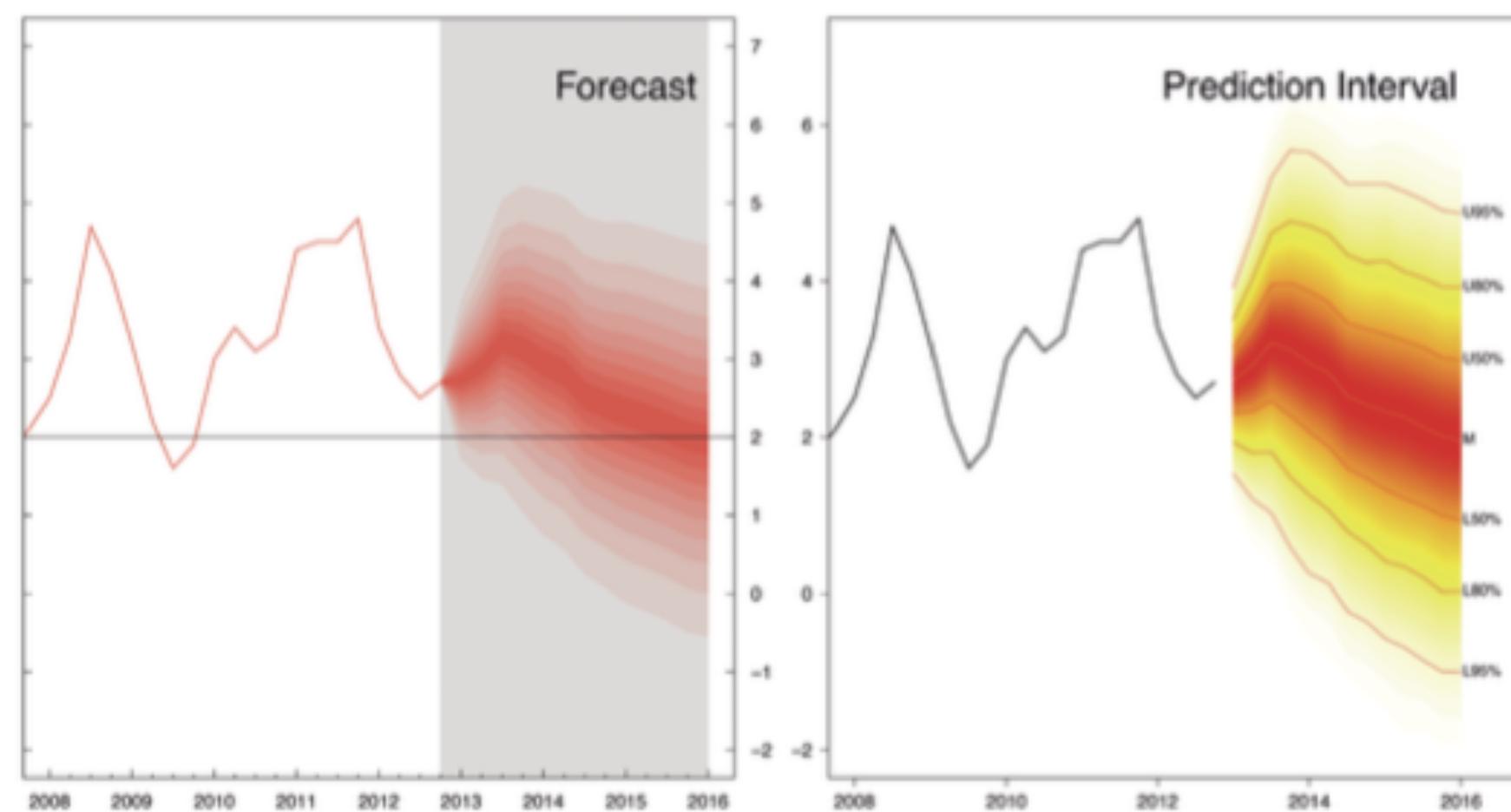
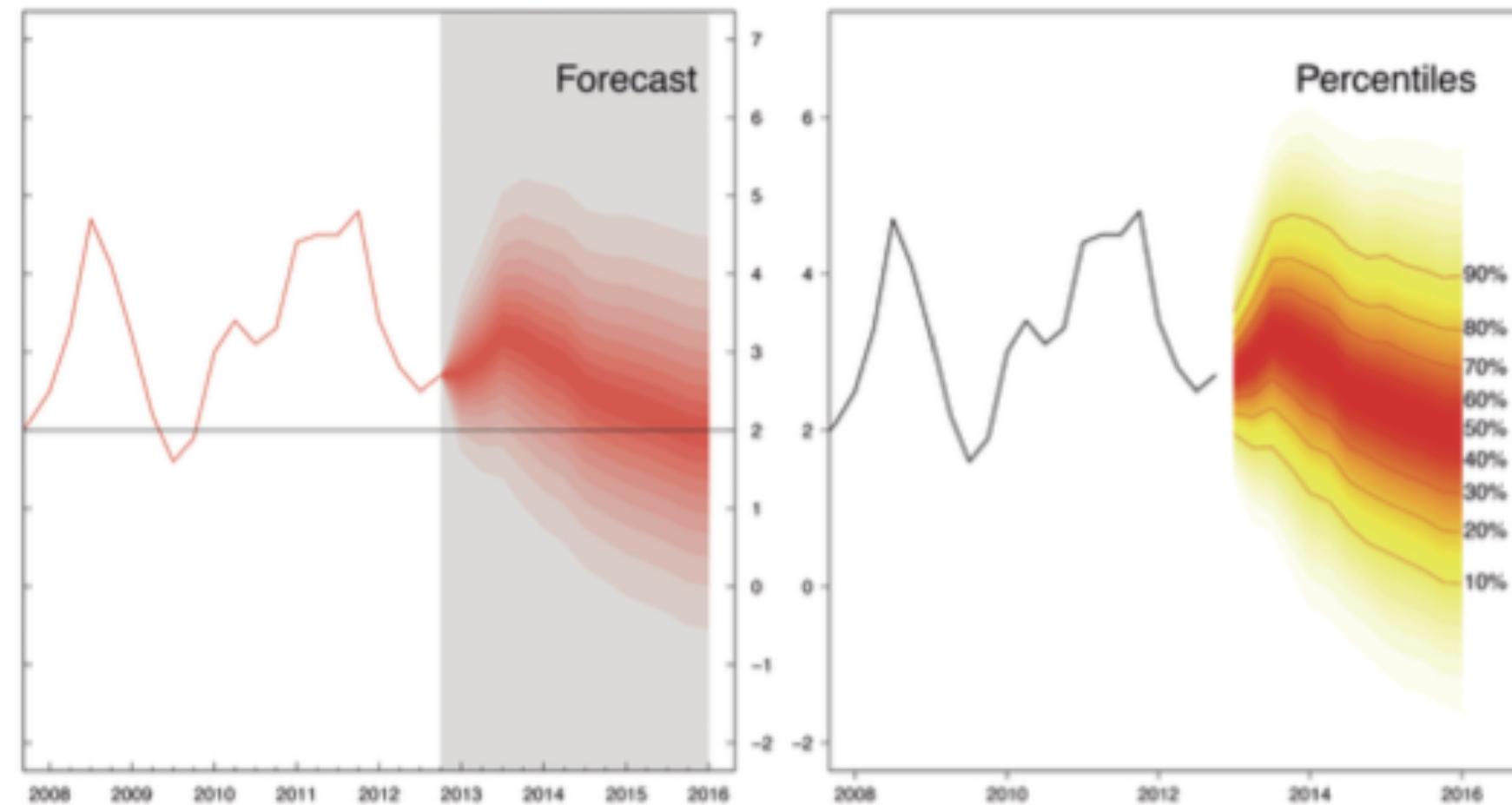
(b) **Modified box plot:** The whiskers are the 95% t-confidence interval, the box is a 50% t-confidence interval.

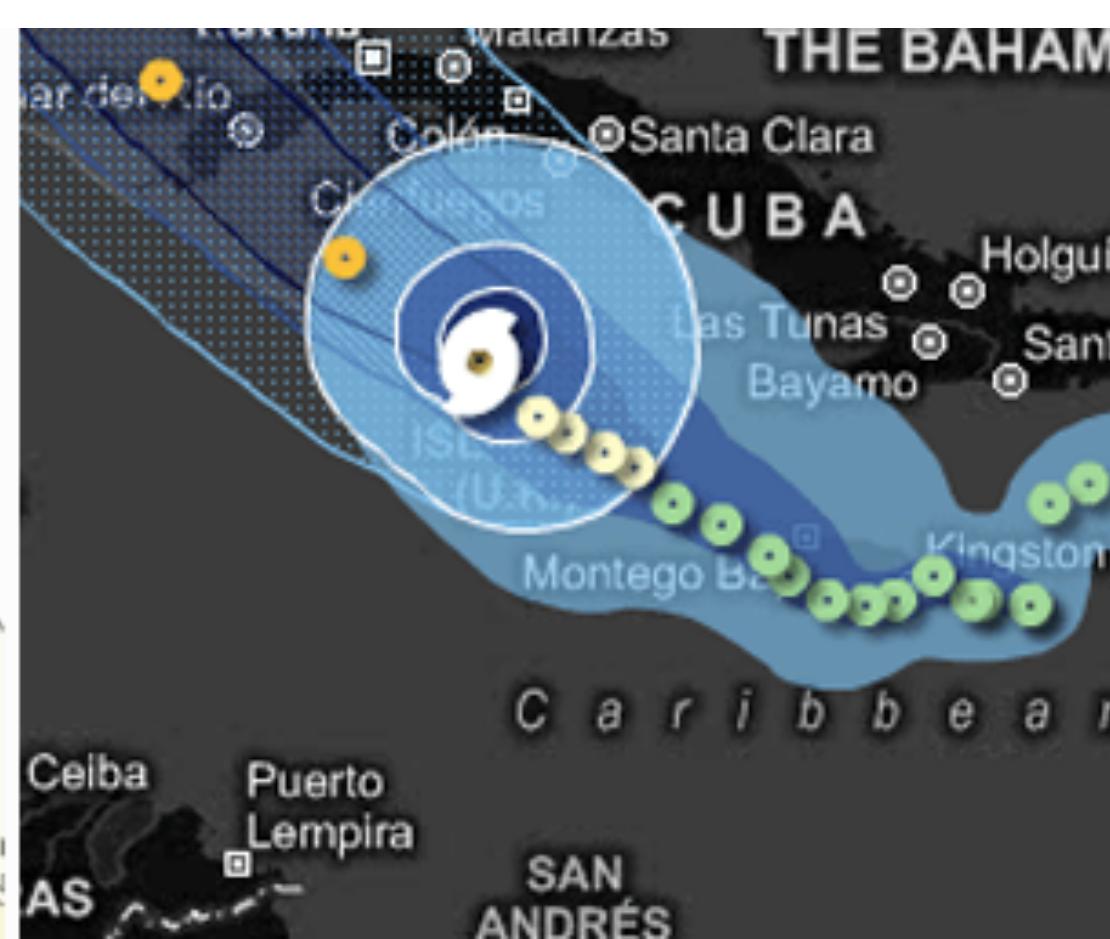
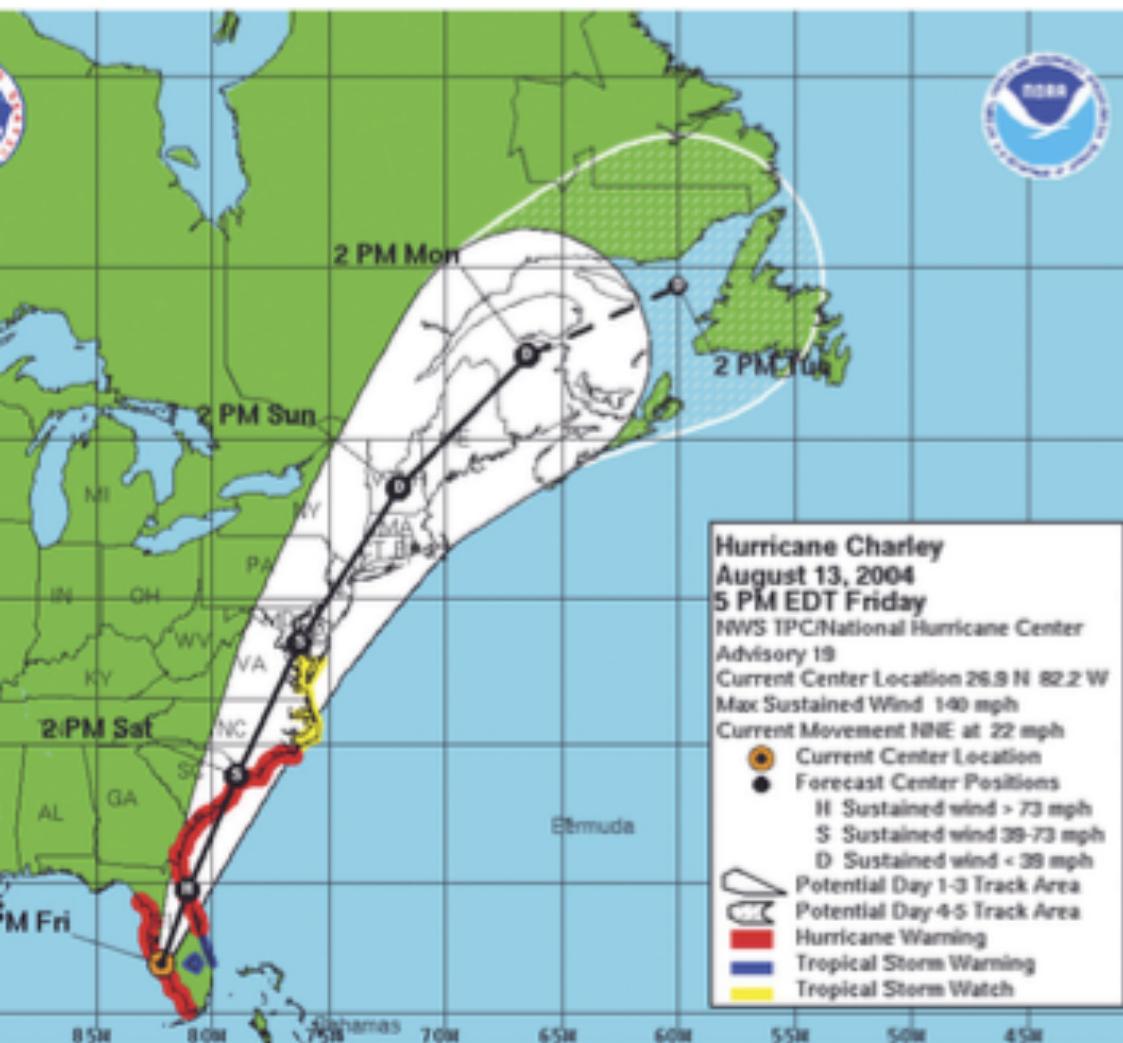


(c) **Gradient plot:** the transparency of the colored region corresponds to the cumulative density function of a t-distribution.



(d) **Violin plot:** the width of the colored region corresponds to the probability density function of a t-distribution.





How to Assess Visual Communication of Uncertainty? A Systematic Review of Geospatial Uncertainty Visualisation User Studies

Christoph Kinkeldey, Alan M. MacEachren & Jochen Schiewe

To cite this article: Christoph Kinkeldey, Alan M. MacEachren & Jochen Schiewe (2014) How to Assess Visual Communication of Uncertainty? A Systematic Review of Geospatial Uncertainty Visualisation User Studies, *The Cartographic Journal*, 51:4, 372-386, DOI: [10.1179/1743277414Y.00000000099](https://doi.org/10.1179/1743277414Y.00000000099)

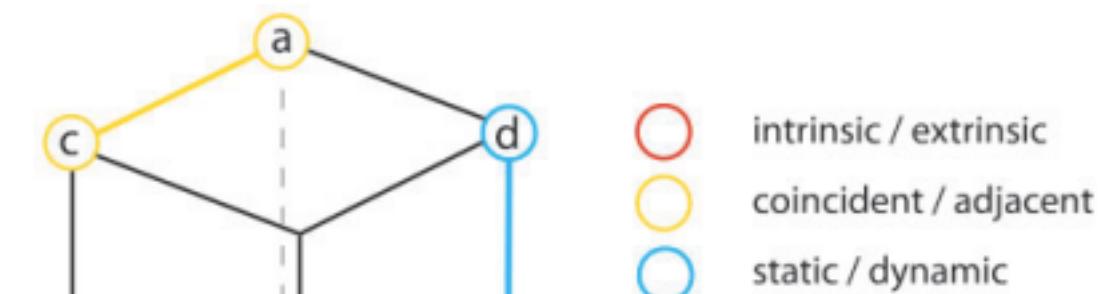
To link to this article: <http://dx.doi.org/10.1179/1743277414Y.00000000099>



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Published online: 01 Sep 2014.



glyphs or error
bars, grid-based
techniques, or
contouring

Colour hue, colour
value, transparency,
or colour
saturation



Figure 5. Three of the recommended intrinsic techniques w.r.t. user performance: colour hue, color value and transparency (from certain=bottom to uncertain=top)

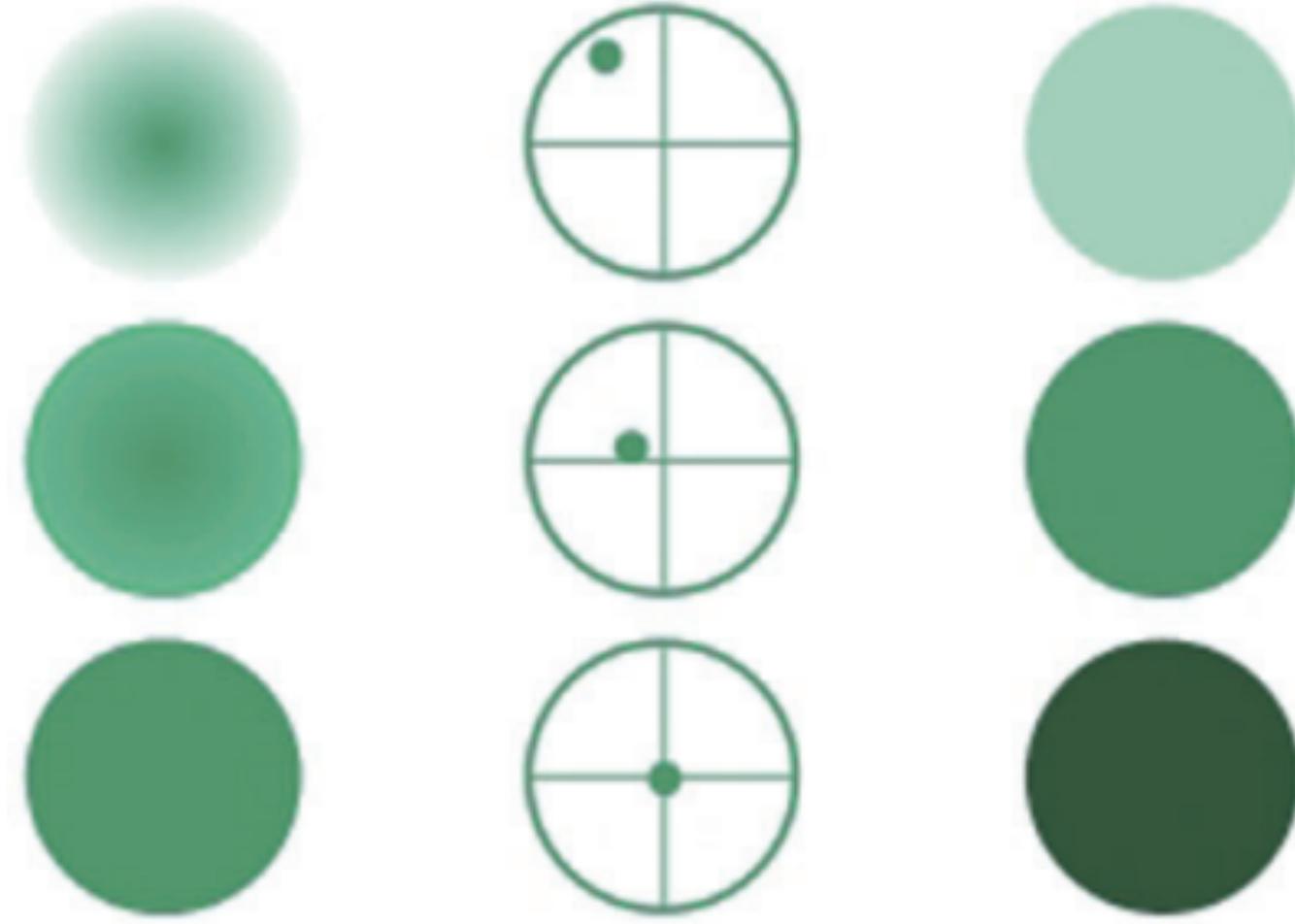


Figure 6. Three best options w.r.t. intuitiveness from MacEachren *et al.* (2012): fuzziness, position and colour value (the top depiction in all cases was interpreted to be most uncertain)

PROJECT

Ukko

3.0.0

SETTINGS / INFO

LEGEND

SKILL



High

Medium

Low

PREDICTED WIND SPEED



High

Medium

Low

PREDICTED CHANGE



Increase

Decrease

INSTALLED WIND POWER

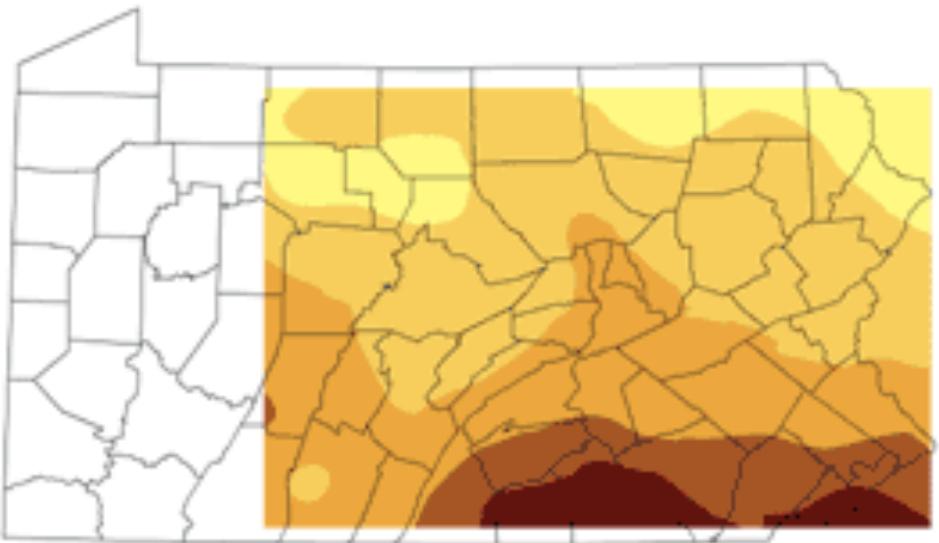


High

Low

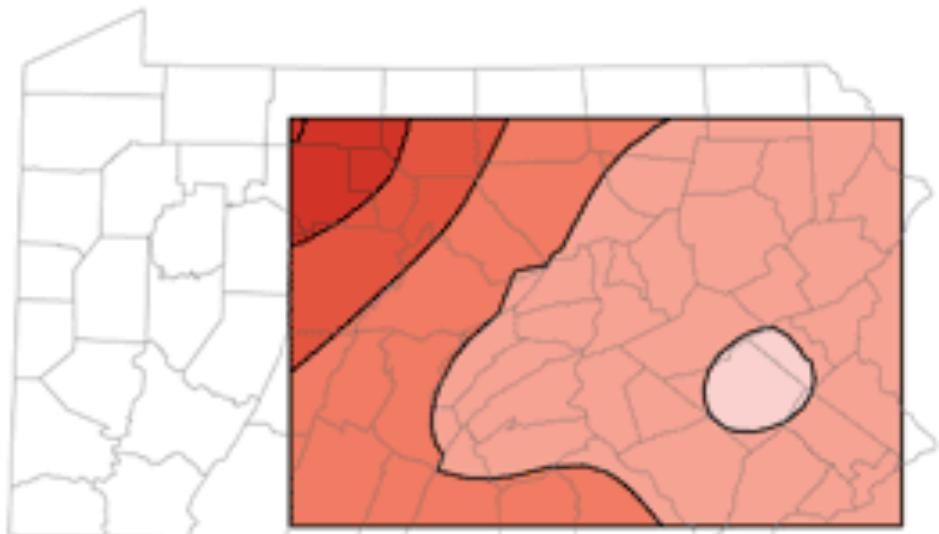


Mapbox



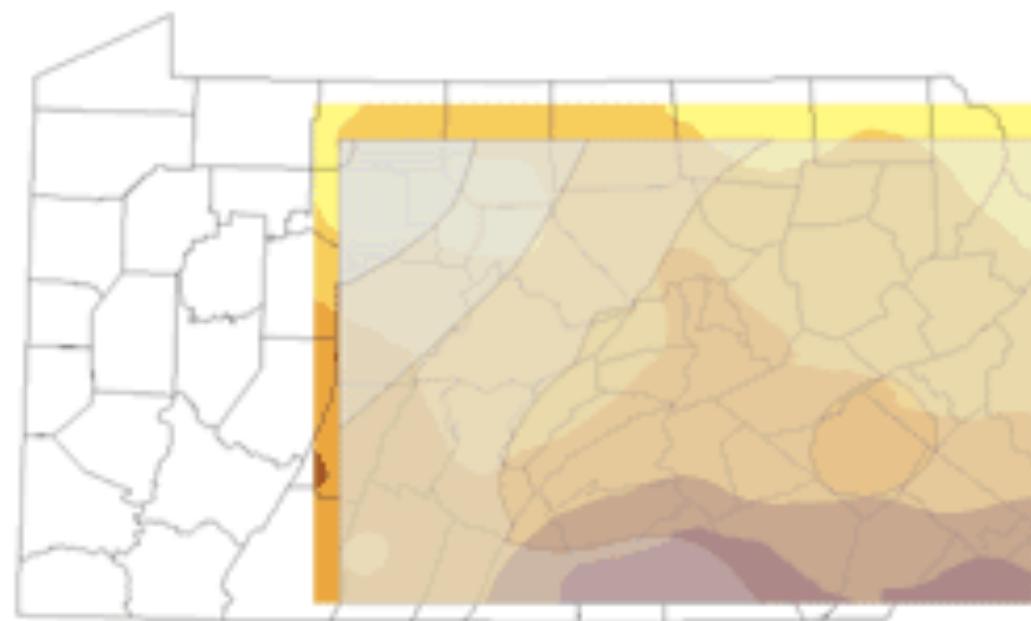
**Minimum temperature
(degrees F)**

- 28 - 35
- 36 - 40
- 41 - 42
- 42 - 43
- 44 - 47



Error (degrees F)

- Less than 1
- 1
- 2
- 3
- 4 or more



**Minimum temperature
(degrees F)**

- 28 - 35
- 36 - 40
- 41 - 42
- 42 - 43
- 44 - 47

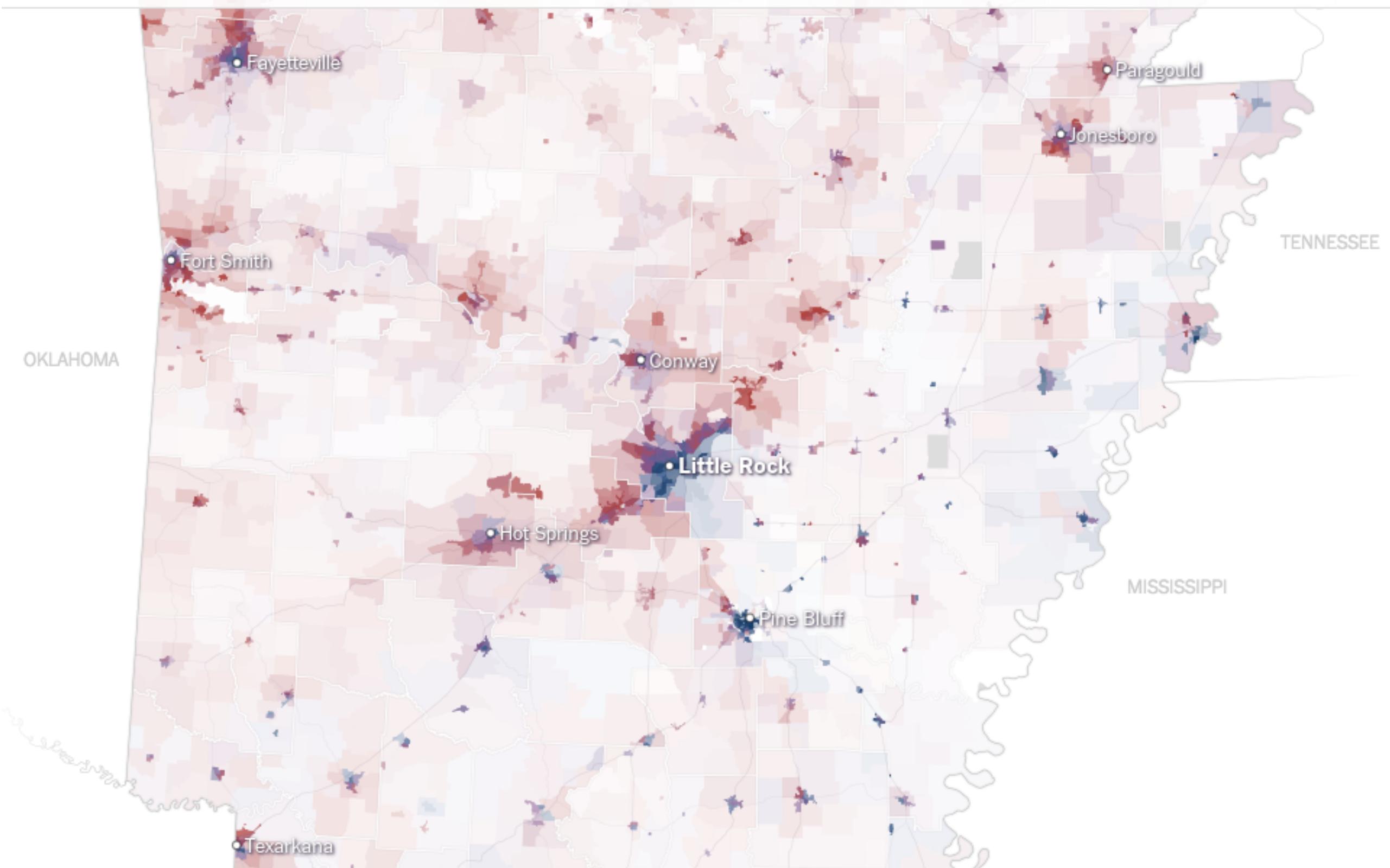
Arkansas

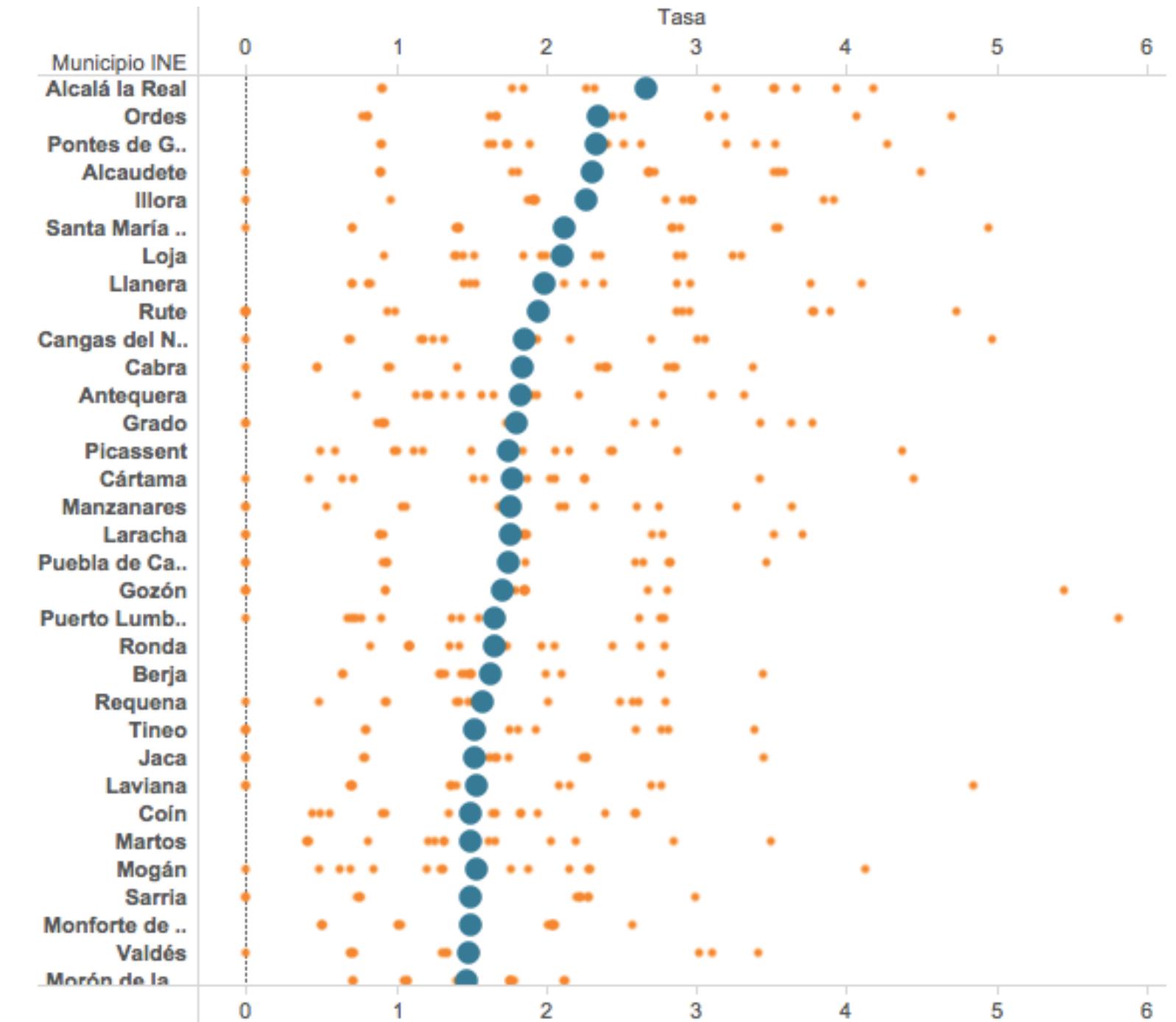
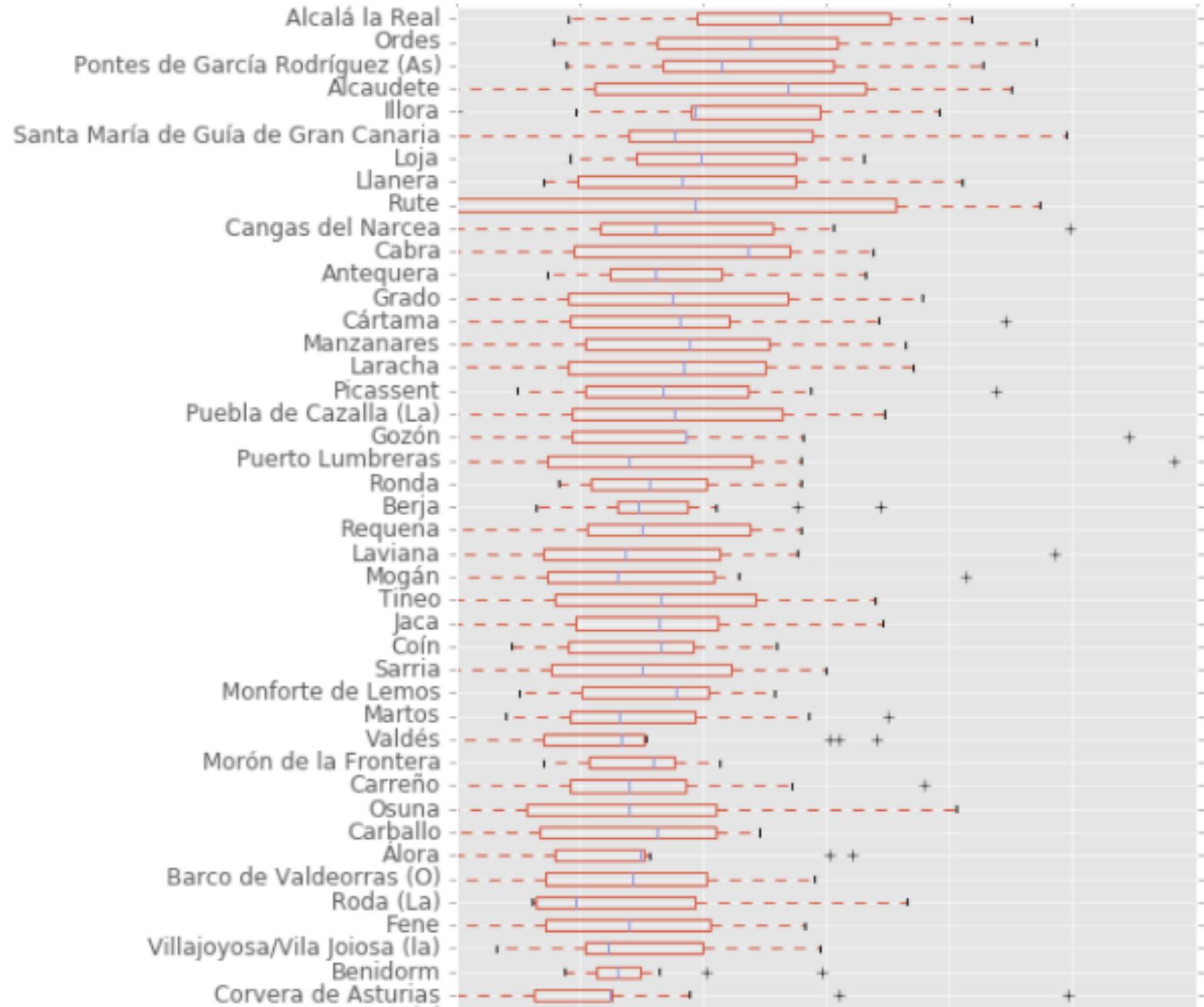
✓ Rep. Tom Cotton

56.5%

■ Dem. Mark Pryor

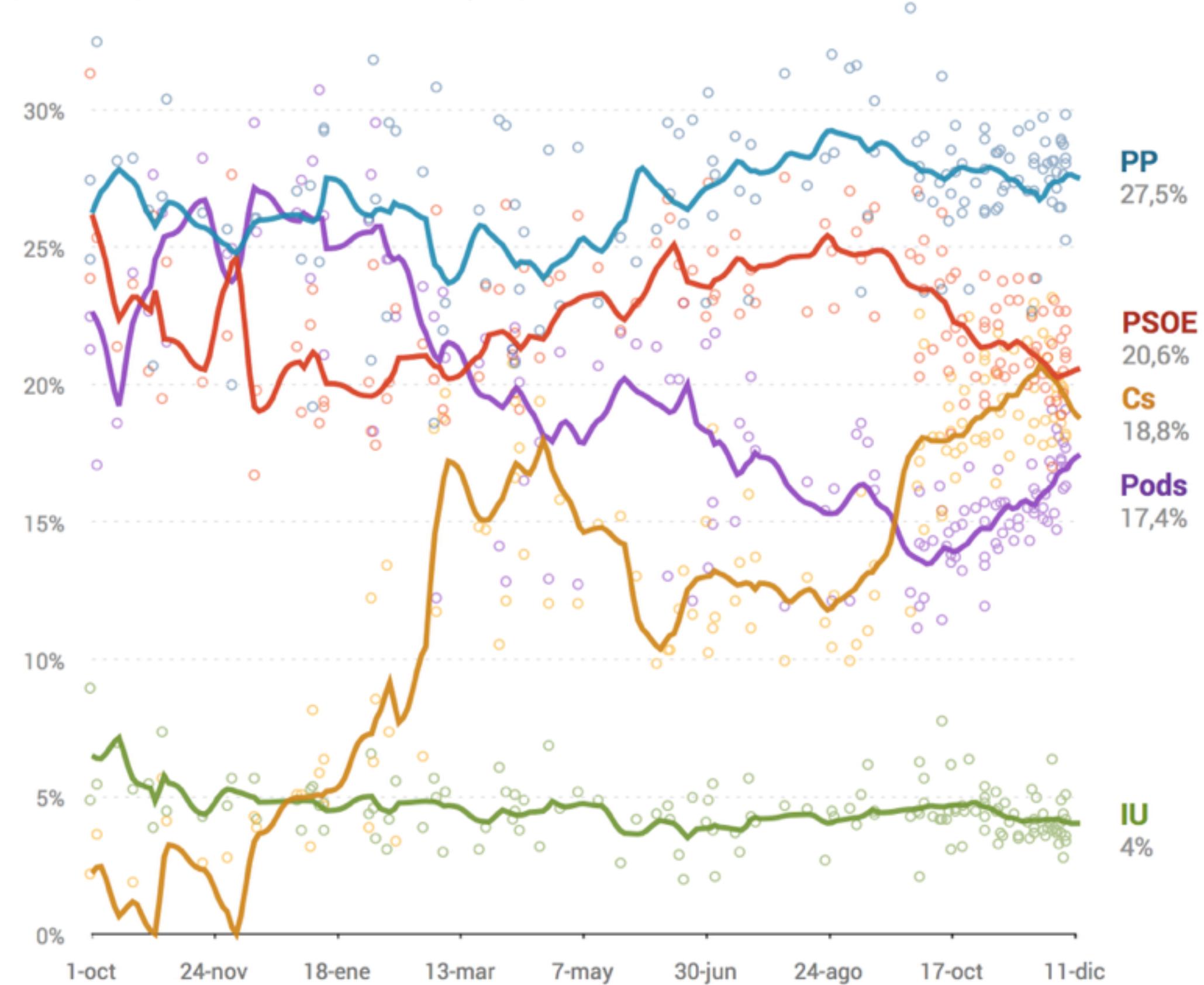
39.5%



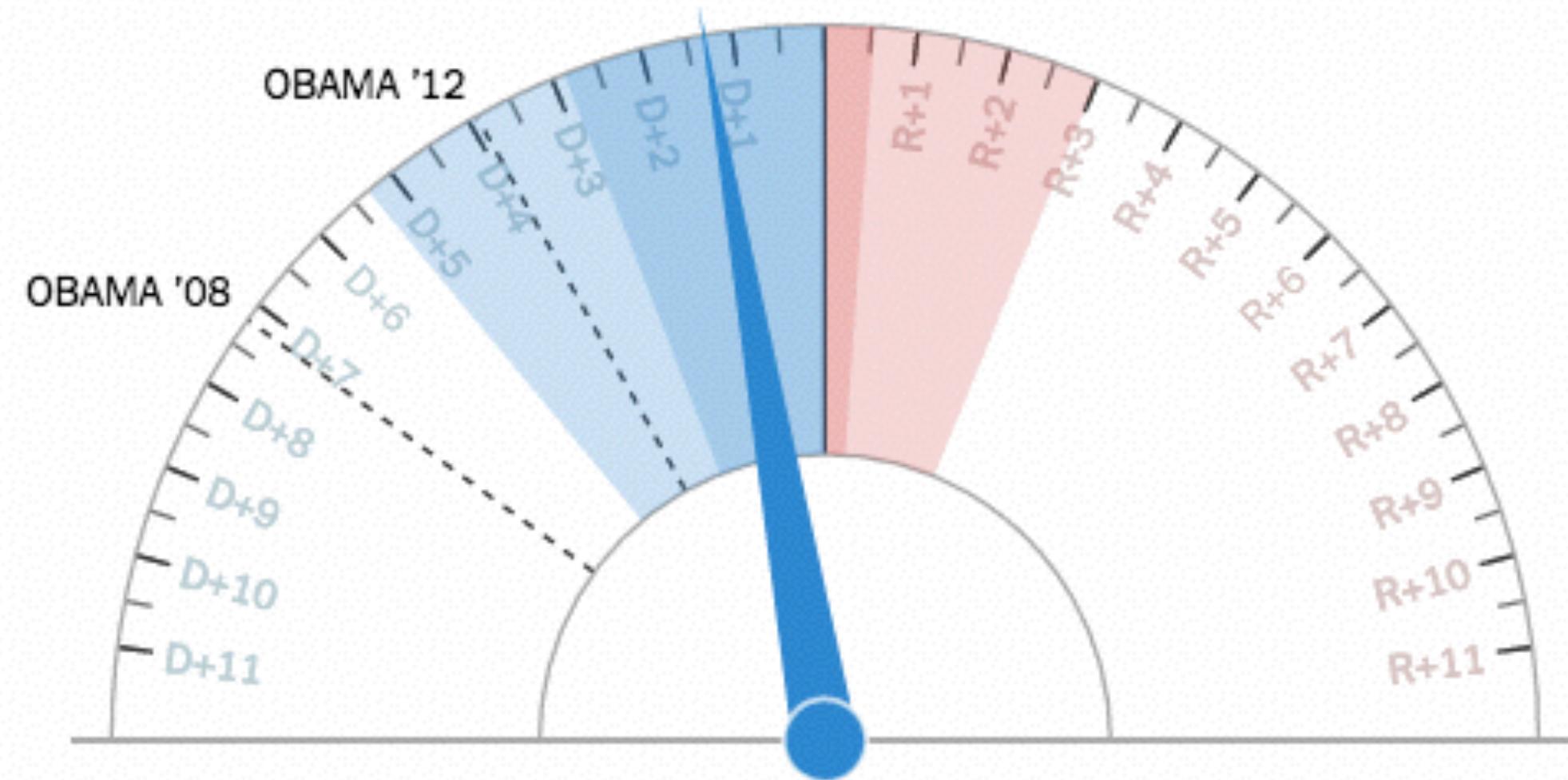


Sometimes it's better to plot the points anyway

Porcentaje de voto según las encuestas. Las líneas representan un promedio ponderado por fecha, tamaño de muestra y empresa encuestadora.



Popular vote margin



Clinton +1.4

FORECAST, in pct. points