Cartography

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Visualization

Cartography
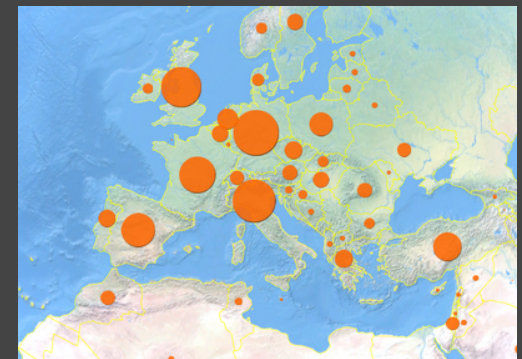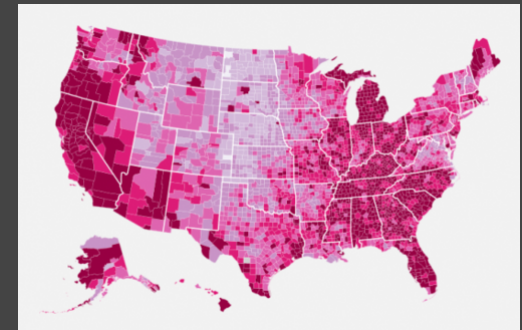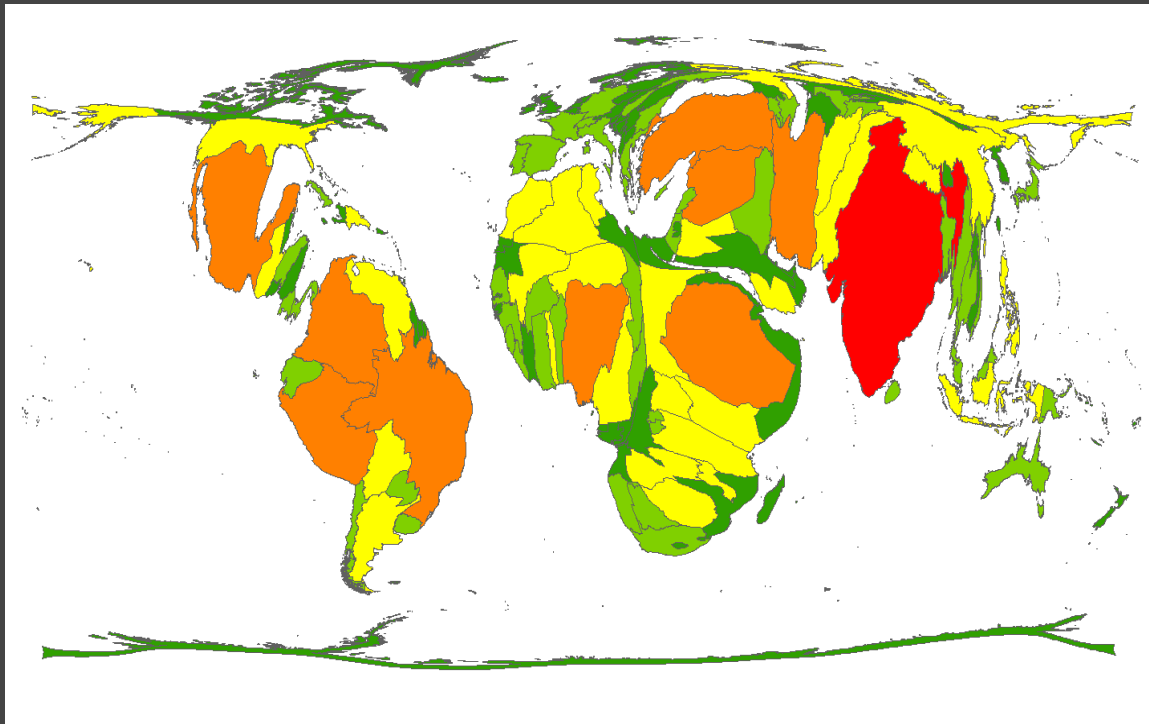
visualization of geographically-referenced data

Thematic maps: popular methods

-choropleths
-cartograms
-proportional symbol maps

Thematic maps

Cartogram (left), choropleth (upper right), proportional symbol map (lower right)

# Challenges

-position channel unavailable
-high level of complexity with multivariate or time-series data
-vulnerable to visual clutter and occlusion
-complications with small regions, especially with big values
-hard to show data at different scales

Three papers

-Necklace maps
-Linked views with parallel coordinates
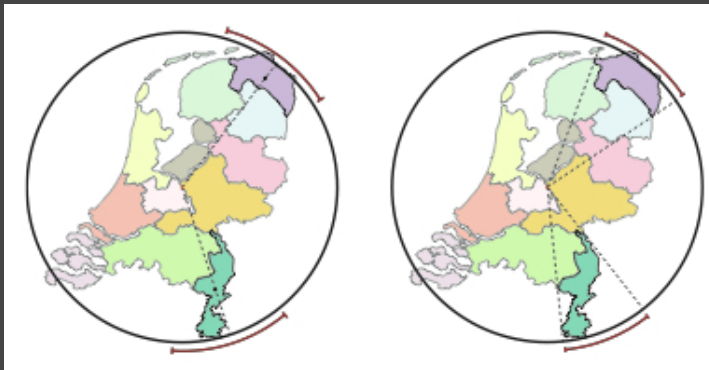*-Geographic weighting for scale-varying*

Necklace Maps
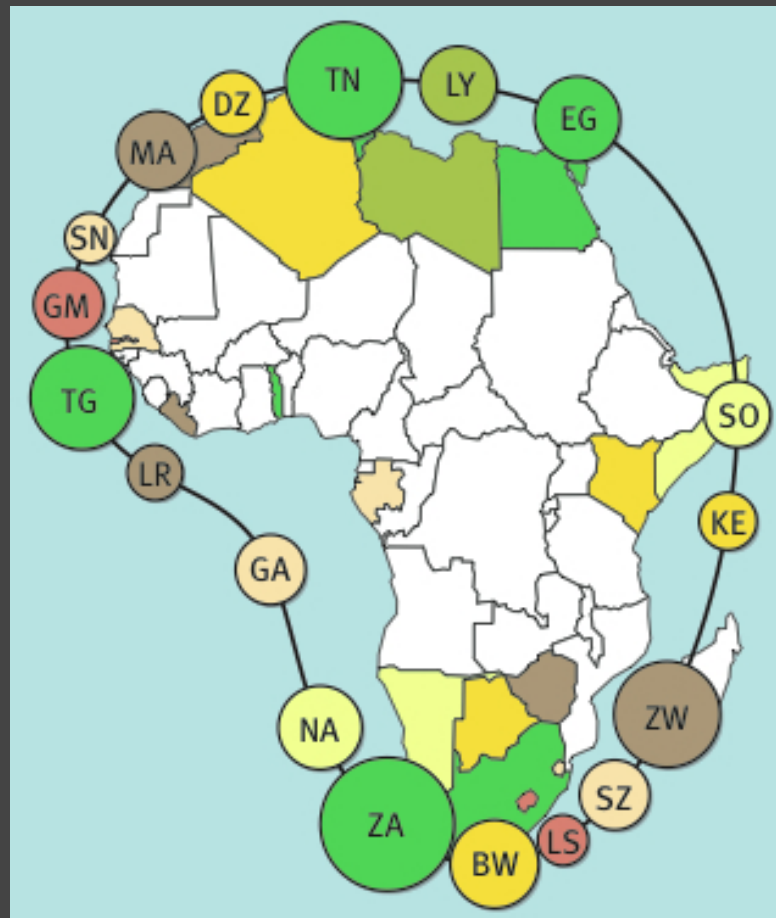
Necklace Maps. Bettina Speckmann, Kevin Verbeek. IEEE TVCG 16(6):881-889 (Proc. InfoVis 2010).
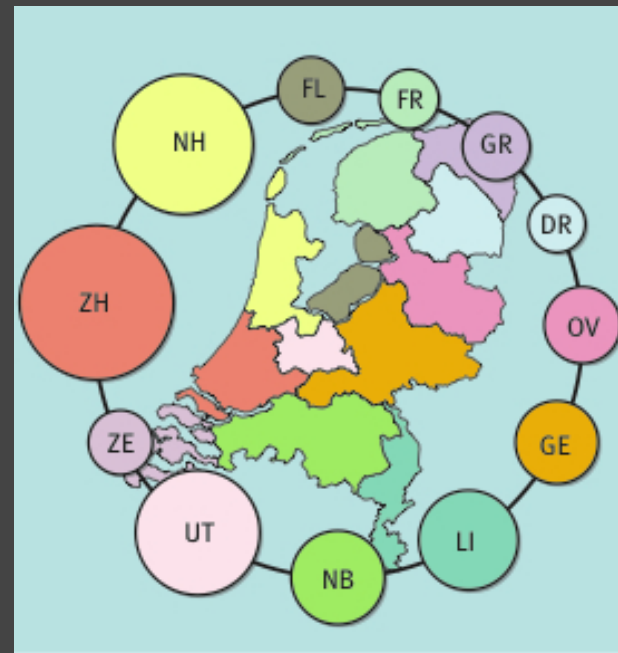
Necklace Maps: algorithm

computing region intervals

optimize placements


optimize symbol sizes

Critique

pros:
- well-motivated and formulated algorithm
- addresses clarity and occlusion
- handles small regions well

cons:
- doesn't really facilitate absolute values
- claims that it overcomes requirement of uniform data within region, not sure it does
- comparison of areas is only relatively better, in absolute terms people don't perceive areas that well

Linked Views: PCP
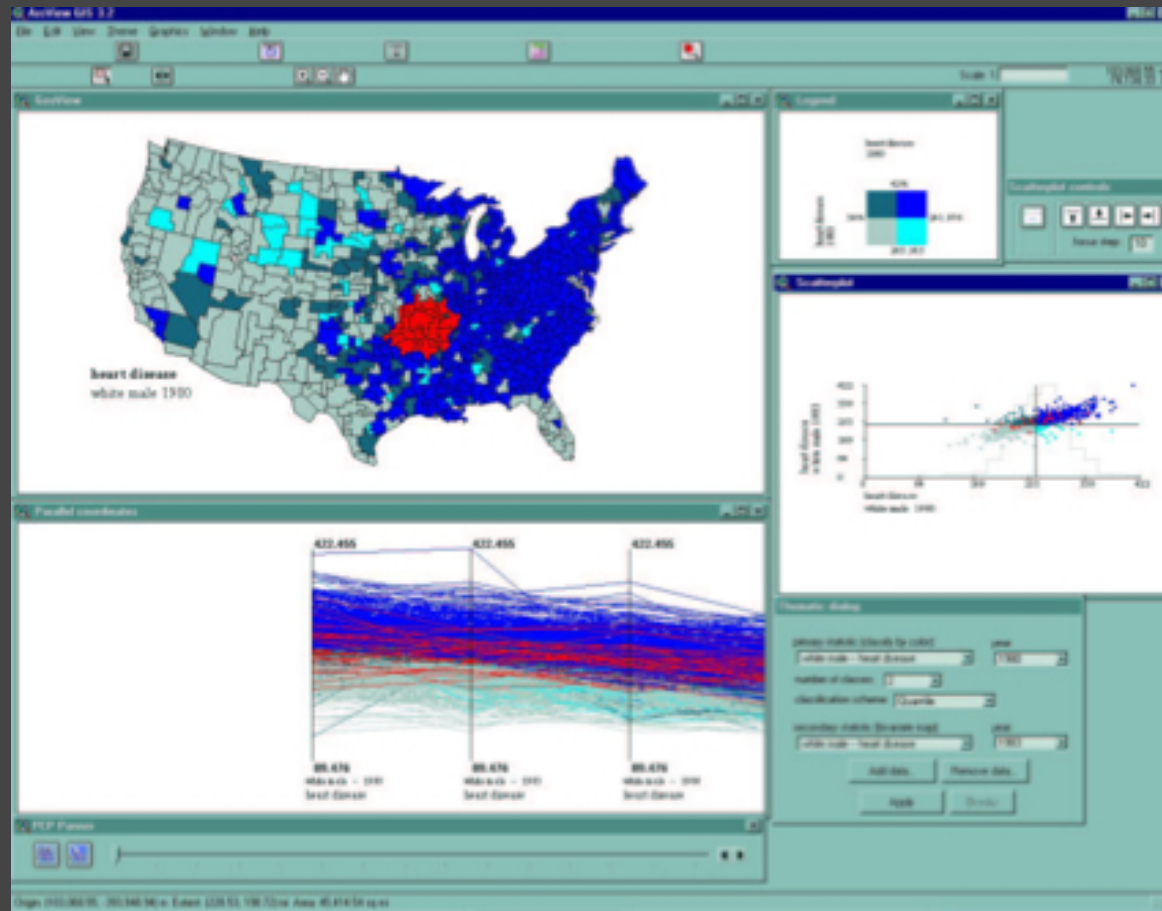
Case Study: Design and Assessment of an Enhanced Geographic Information System for Exploration of Multivariate Health Statistics. Robert M. Edsall, Alan M. MacEachren and Linda Pickle. Proc. InfoVis 2001.

Evaluation

part 1: task-based
-compare performance on simple tasks with scatterplot vs. parallel coordinate views

part 2: exploratory
-ask participants to look for patterns using complete linked-view environment

Evaluation

scatterplot vs parallel coordinates:
-no results, good performance for both
complete environment:
 -observed high accuracy overall
 -identified some successful interaction patterns
exploratory study:
 -choropleth was always used for spatial patterns
 -parallel coordinates were always used for temporal trends

Critique

pros:
- interesting solution to well-motivated problem domain
- evidence for the use of linked views with multivariate spatiotemporal data

cons:
- perhaps too many varying objectives
- in some cases, stated goals not exactly the goals addressed
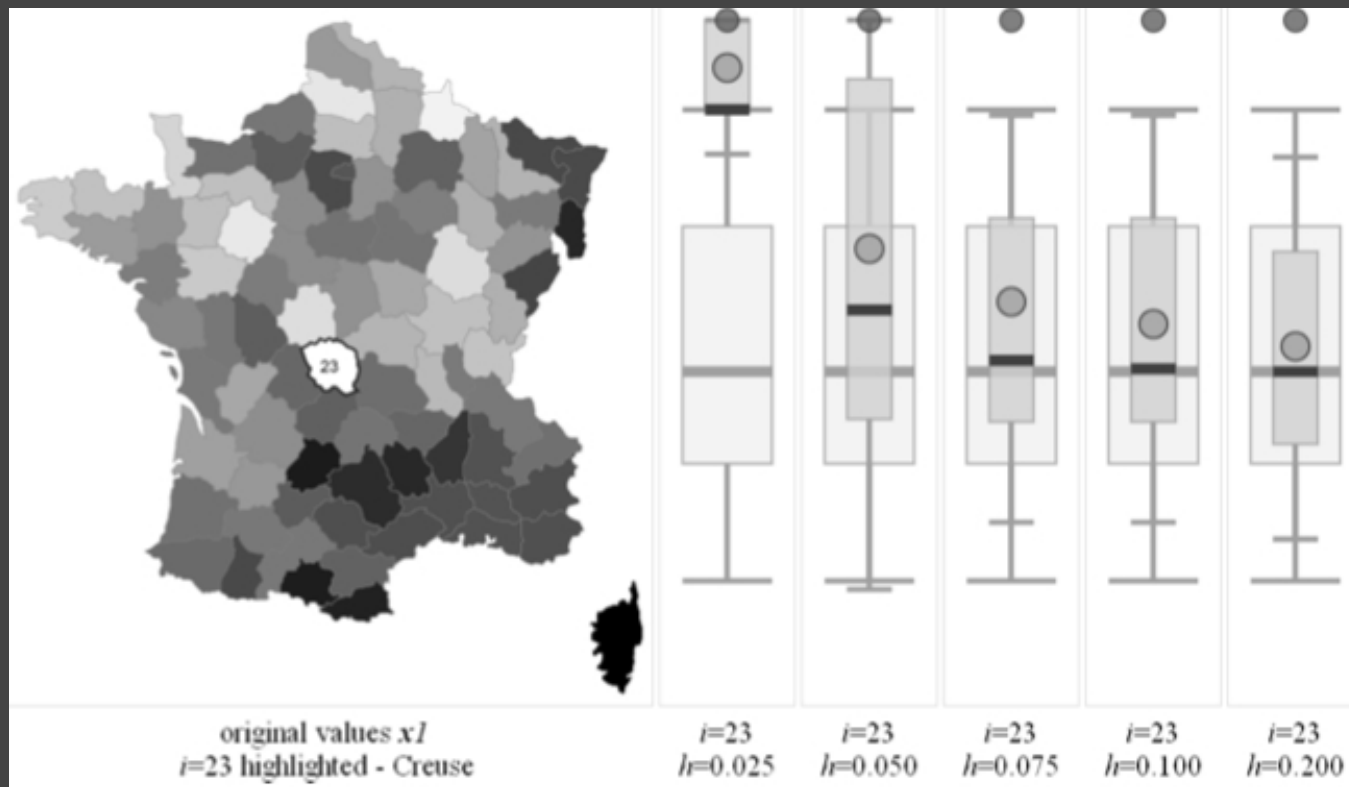- possibly a bit of overstatement of the implications of the accuracy results

Geographically-Weighted Visualization for Scale-Varying Analysis
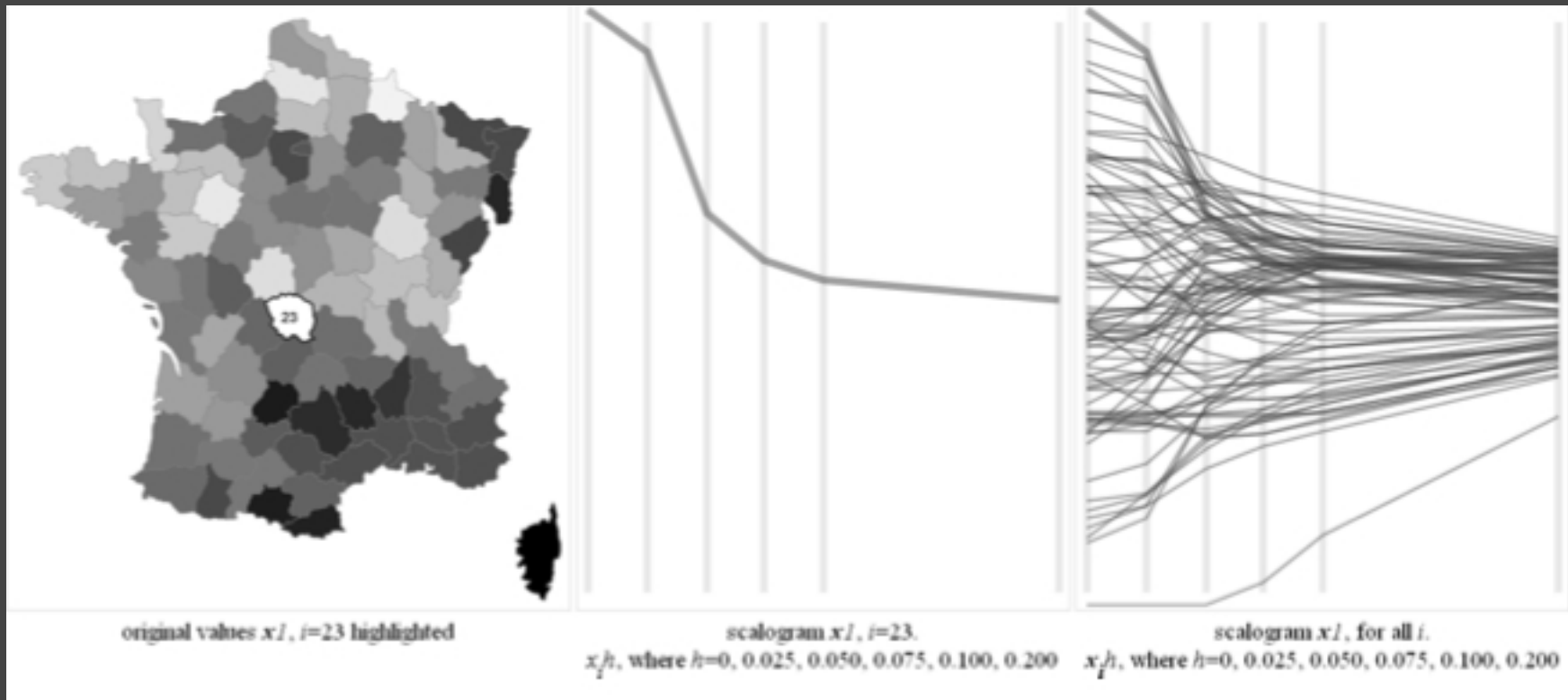
Weighting to show multiple scales
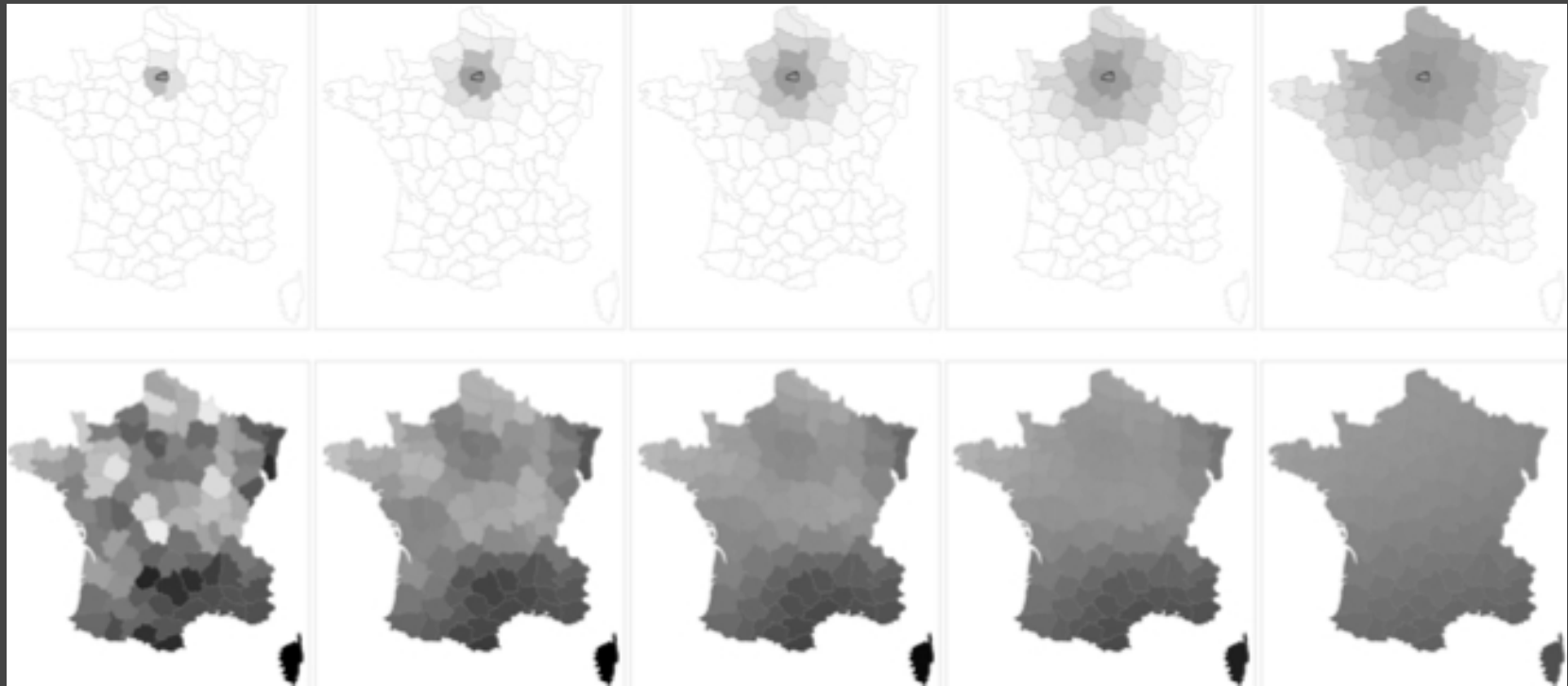
Geographically Weighted Visualization - Interactive Graphics for Scale-Varying Exploratory Analysis. Jason Dykes and Chris Brunsdon, IEEE TVCG 13(6):1161-1168 (Proc. InfoVis 2007).

Boxplots for multiple scales

original values $x1$
$i=23$ highlighted - Creuse

$i=23$
$h=0.025$

$i=23$
$h=0.050$

$i=23$
$h=0.075$

$i=23$
$h=0.100$

$i=23$
$h=0.200$

Scalogram

original values *x1*, *i*=23 highlighted

scalogram *x1*, *i*=23.
xᵢh, where *h*=0, 0.025, 0.050, 0.075, 0.100, 0.200

scalogram *x1*, for all *i*.
xᵢh, where *h*=0, 0.025, 0.050, 0.075, 0.100, 0.200

Critique

pros:

-beautiful solutions to the multi-dimensional scale-varying problem

cons:

?

Discussion

Thank you!

References

[1] Necklace Maps. Bettina Speckmann, Kevin Verbeek. IEEE TVCG 16(6):881-889 (Proc. InfoVis 2010).

[2] Case Study: Design and Assessment of an Enhanced Geographic Information System for Exploration of Multivariate Health Statistics. Robert M. Edsall, Alan M. MacEachren and Linda Pickle. Proc. InfoVis 2001.

[3] Geographically Weighted Visualization - Interactive Graphics for Scale-Varying Exploratory Analysis. Jason Dykes and Chris Brunsdon, IEEE TVCG 13(6):1161-1168 (Proc. InfoVis 2007).