

Ideas in visualization

David Bolin
University of Gothenburg

Banff, July 13, 2017



- ① What is the best way of visualizing estimates of spatial fields and their uncertainties?
- ② How should one do visualization for more complicated scenarios:
 - problems in three spatial dimensions
 - spatio-temporal applications
 - hierarchical models
- ③ Visualization for model validation.
- ④ Visualization for data uncertainty.

- Contours may be mandated by the problem.
- Useful when you care about a specific level.
- Can provide a spatially explicit estimate with (some form of) uncertainty.
- It is often difficult to combine the information from two maps, which is needed when showing mean and standard errors.

Other alternatives

- Posterior samples
 - Provides more details about the variation (and smoothness)
 - Functions of the field may be better represented. (gradient flows)
 - Clear guidance must be provided on how the samples should interpreted/used
- Fog maps: vary opacity or color saturation in some way.
- Interactive visualization: showing meta data on mouse over etc.
- 3D animation / VR - some tools being set up?
- Techniques from other disciplines: neuro science, chaos; CS, arts.

How much/what do we show?

- Do we even show estimates where standard deviation is very high?
- It is often good to show the observations together with estimates.
- Is there a difference between scientists and policy-makers, as recipients of uncertainty information?

Tools and persons mentioned in the discussion

- RColorBrewer, viridis, oce, pals packages.
- psychology resources.
- collaboration with CS/Art departments or offices of computational resources at the university.
- One of the leaders in visualization in the CS community is Gordon Kindlmann at Chicago: <http://people.cs.uchicago.edu/~glk/>
- Compute Canada webinars on visualization.
- betterfigures.org