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Tilemaps for Summarising Multivariate Geographical Variation

Depict multivariate variation over geographical space by placing glyphs on maps

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WHAT FOR?

- Multivariate data
- Different measures
- Statistical distributions

CONTIGUOUS AND NON-CONTIGUOUS LAYOUTS
night time in the last few months of the year
day time in the last few months of the year
flying on a winter's night (low occupancy)
night time in winter, day time all year
night time in winter, day time all year with effect of increasing/decreasing length of day apparent

http://openaccess.city.ac.uk/17398/

Glyphmaps (Wickham, et al)
**Design space**

- **Type of layout**: contiguous or non-contiguous, partial geographic layouts, sq/rect/hex
- **Layouts**: MAUP, density of variation
- **Glyph design**: can be anything... but: shape, ease of comparison, geographic precision and glyph complexity tradeoff

**Type of layout**: partial geographic layouts

**Layout**: Modifiable Areal Unit Problem

- Re-aggregating data in tiles can deal to artefacts
  - The “Modifiable Areal Unit Problem” (MAUP)
- Possible ways to deal with this
  - Interactively move the grid around
  - Allocate data points at edges of cell to all adjacent cells using inverse-distance-weighted function

**Layout**: density of variation
**Glyph design: shape**

- Glyphs that fit inside tiles

**Glyph design: ease of comparison**

- Facilitate comparison in all directions
- Consistent layout
- Symmetrical

**Glyph design: geographic precision and glyph complexity tradeoff**

![Image of geographic precision and glyph complexity tradeoff]

**(Possible) disadvantages**

- Glyphs break up geographical continuity
- Modifiable Areal Unit Problem
- Geographical distortion may vary (for non-contiguous layouts)
- Are they readable?

**(Possible) advantages**

- Depict multivariate data across space
- Associations between variables (at locations)
- Rich summaries possible
  - Multivariate data
  - Different measures
  - Statistical distributions
  - Geographically-weighted statistics

**Also works for non-geographical space**

![Image of also works for non-geographical space]

[http://openaccess.city.ac.uk/15167/](http://openaccess.city.ac.uk/15167/)
More rich geographical summaries of multivariate data please!