

SPATIAL TRANSFORMATION METHODS FOR GEOGRAPHIC DATA

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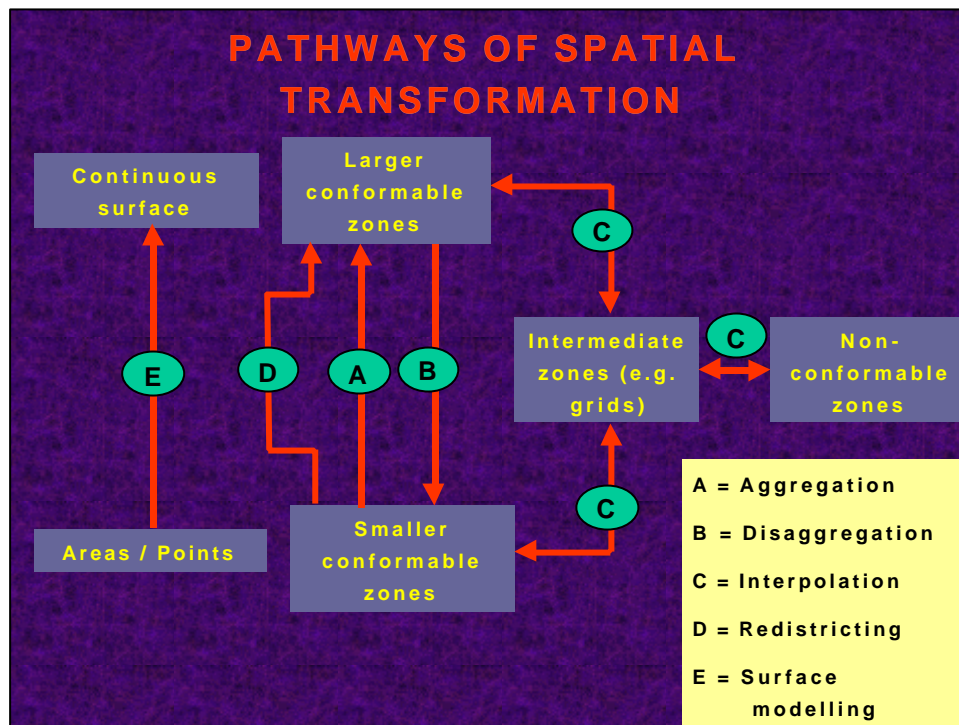
- **Geographer**
- **Scientific-co-ordinator CORINE Programme, mid-late 1980s**
- **Advisor to WHO on environmental health indicators and GIS**
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- **Responsible for GIS in Small Area Health Statistics Unit**
- **Work here based on short study for Eurostat, with Huntings plc**

THE NEED FOR SPATIAL TRANSFORMATION

- Different types of SE data are collected on the basis of different administrative zones
- Environmental data often do not relate to administrative zones
- Zone systems change over time
- Administrative zones are often inconsistent within and between countries
- Mapping on the basis of discrete areas may be misleading

TRANSFORMATION METHODS

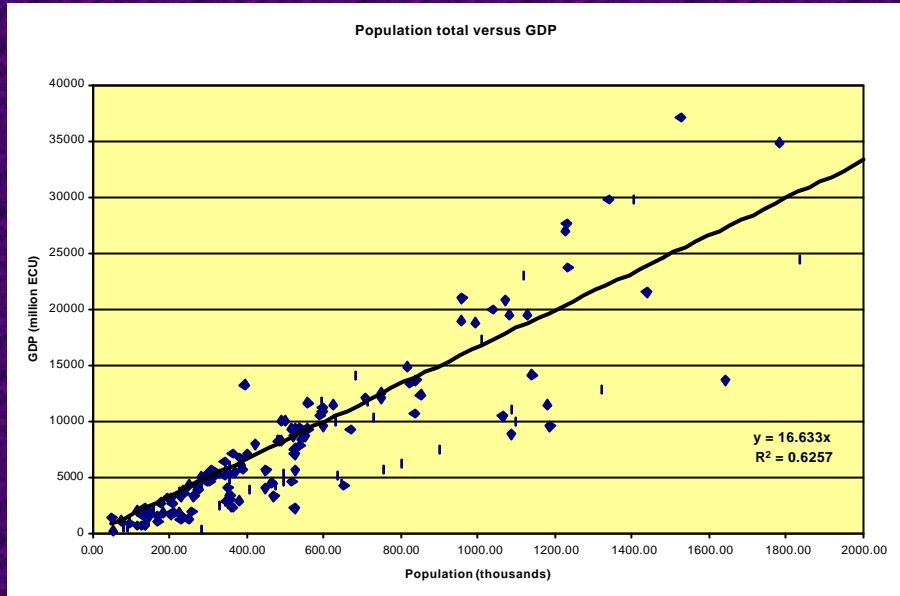
- **Aggregation:** summation/averaging of data into larger, nested units
- **Disaggregation:** subdivision of data into smaller, nested units
- **Interpolation:** estimation of data for unsampled points/areas
- **Redistricting:** growth of new spatial units by merging of existing units
- **Map smoothing:** re-estimation of data for small-areas, taking account of errors in data



CASE STUDIES

Transform-ation	Technique	Data	Source zone	Target zone
Disaggreg-ation	Areal weighting	Population	NUTS 3	NUTS 5
Disaggreg-ation	Regression mapping	GDP (+ population)	NUTS 3	NUTS 5
Area interpolation	Control zones	Setaside (+ tilled land)	NUTS 3	Water-shed
Surface modelling	Focal averaging	Population	NUTS 5	Surface
Surface modelling	Centroid smoothing	Population	NUTS 5	Surface
Map smoothing	Bayesian estimation	Health risk	NUTS 5	NUTS 5

POPULATION v GDP – NUTS 3



Modelled GDP by regression mapping

NUTS 3 unit	Actual GDP (m Euro)	Sum of modelled GDP (m Euro)	Weight (ratio actual/modelled)
R2211	4633	3529	1.31
R2221	9110	6234	1.46
R2301	45486	25649	1.77
R2402	3192	2306	1.38

CONCLUSIONS

- **Observers read stories from maps; maps are not neutral – the zone system influences the stories they read**
- **There is no one reality – each zone system is a story about a different reality**
- **Map producers do not have the right to ignore the effects of the zone systems they use**
- **We need spatial transformation methods to improve (and control) the sense in the maps we produce**
- **Many methods are available – which is best depends on the data involved, and the purpose**
- **Spatial transformation is modelling – and involves error**
- **We cannot ignore the statistical issues involved in spatial transformation – validation and error control are essential**