

Statistical Geography and Geo-enabled Statistics

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Pretoria, St Georges
July 2016

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Introduction

Terminology

- Statistical geography
- Geo-enabled statistics
- Geographical statistics
- Spatial statistics
- Geo-referenced statistics

Statistical Geography

- Reference to the geographical levels on which statistical data is disseminated e.g. census
- Most likely it will be administrative entities
 - Province
 - Districts / Regions
 - Divisions / Counties
 - Municipalities
 - Localities / Places

Standard and non-standard geographies

- Standard
 - Standardised geographic areas agreed upon when dissemination products are developed, i.e. general use
- Non- Standard
 - User specific or other administrative areas such as health districts, school districts, police precincts, electoral wards etc. (SA)

What is geo-enabled-, geographical-, geo-referenced-, or spatial statistics?

- The addition of the extra dimension of **location** to statistics
- Geography reference adds the **where** to the **what** and **quantity**

The beauty of Geographical Information Systems (GIS)

Statistical Data

WMO001304Mansfield city	2937	1303	4001945	20000	15.50659	0.10440
WMO00040Mansfield city	4935	2042	5077900	24025	19.60603	0.10546
WMO00040Mansfield town	723	319	4101305	0	3.51404	0.10000
WMO00702Mansfield town	321	219	1495797	0	1.50470	0.10000
WMO00006Aberdeen city	20619	6984	5302300	24171	20.47926	0.10471
WMO00006Aberdeen city	17447	7090	6722007	20770	25.90204	0.10989
WMO01122Aberdeen city	15008	6853	20553404	42413	30.61659	0.10724
WMO01104Aberdeen CD	3692	1467	2076319	0	11.09519	0.10000
WMO01235Aberdeen city	2507	1062	11645145	0	4.480215	0.10000
WMO01954Allipoli town	629	189	2005821	1461	1.00904	0.10000
WMO01000Allipoli town	864	477	9051074	3911	3.60300	0.10005
WMO01705Aberdeen city	8794	4279	48004032	24287	18.67449	0.10370
WMO01755Aberdeen town	134	174	3345099	0	1.29150	0.10000
WMO01022Aberdeen city	24076	12707	11705130	85700	45.40540	0.10300
WMO02135Aberdeen city	7174	3223	5070427	21143	12.70054	0.10163
WMO02020Aberdeen town	1054	505	5204061	0	2.040107	0.10000
WMO02020Aberdeen town	1760	735	21519227	22290	12.16942	0.10766
WMO04054Aberdeen town	772	315	11029025	0	5.08251	0.10000

Spatial Data

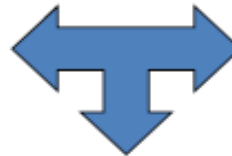
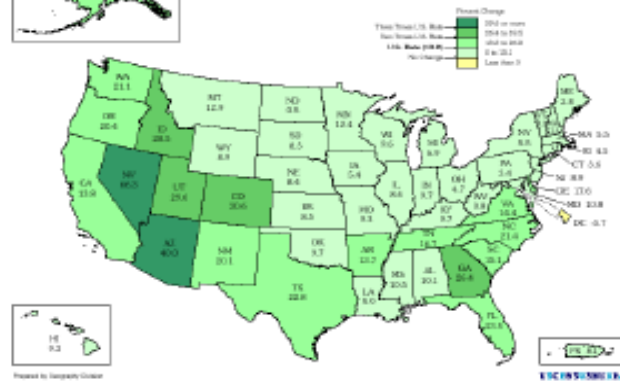


Figure 1. Percent Change in Resident Population for the 50 States, the District of Columbia, and Puerto Rico: 1990 to 2008



Can combine spatial and non-spatial data from different datasets in a spatial analysis operation in order to answer questions such as:

- What is here . . . *Identification*
- Where is . . . *Location*
- What has changed since . . . *Trends*
- What relationships exist between . . . *Patterns*
- What is the best route between . . . *Optimal path*
- What if . . . *Model*

Spatial statistics

It is similar to traditional statistics, but they *integrate spatial relationships* into the calculations.

- Geographic relationships
- Geographic distributions
- Spatial patterns
- Local and global

Spatial statistics

- **Geographic Relationships**
 - Ordinary Least Squares (Global)
 - Geographically Weighted Regression (Local)

- **Geographic Distribution**
 - Finding the Centre of features
 - Measuring Compactness
 - Orientation

- **Spatial Patterns**
 - Average Nearest Neighbour
 - Spatial Clustering (Ripley's K-function)

- **Local and Global**
 - Spatial Autocorrelation (Global)
 - Anselin Local Moran's I (Local)
 - Getis Ord General G (Global)
 - Hot Spot Analysis (Local)

Thank you for your attention

References and useful sites

- Timothy Trainor, US Census Bureau. *Why Geography is Important to Statistical Information.*
- Stats SA: Census 2011 Spatial Metadata V2
- ESRI (Software Help Files)

- <http://gisgeography.com/gis-applications-uses/>
- https://en.wikipedia.org/wiki/List_of_geographic_information_systems_software
- <http://www.esri.com/software/arcgis/arcreader>

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