

Geo-Refer: Geographical Referencing Resources for Social Scientists

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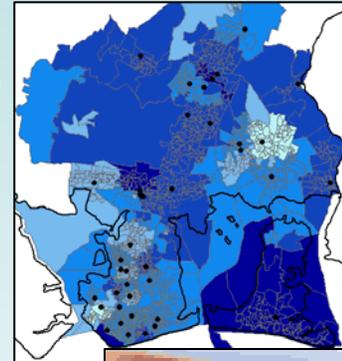
Overview

- Social science and the need for geographical referencing
- Geo-Refer project
- Presenting geographical referencing through adaptive online learning
- Resources available

Social science and the need for geographical referencing

Geographical referencing examples

- Link survey results to census data
- Produce shaded area map of census results
- Associate postcoded patient records to Indices of Deprivation
- Allocate questionnaire responses to urban/rural neighbourhood types
- Link admin records to different geographies



Learning needs

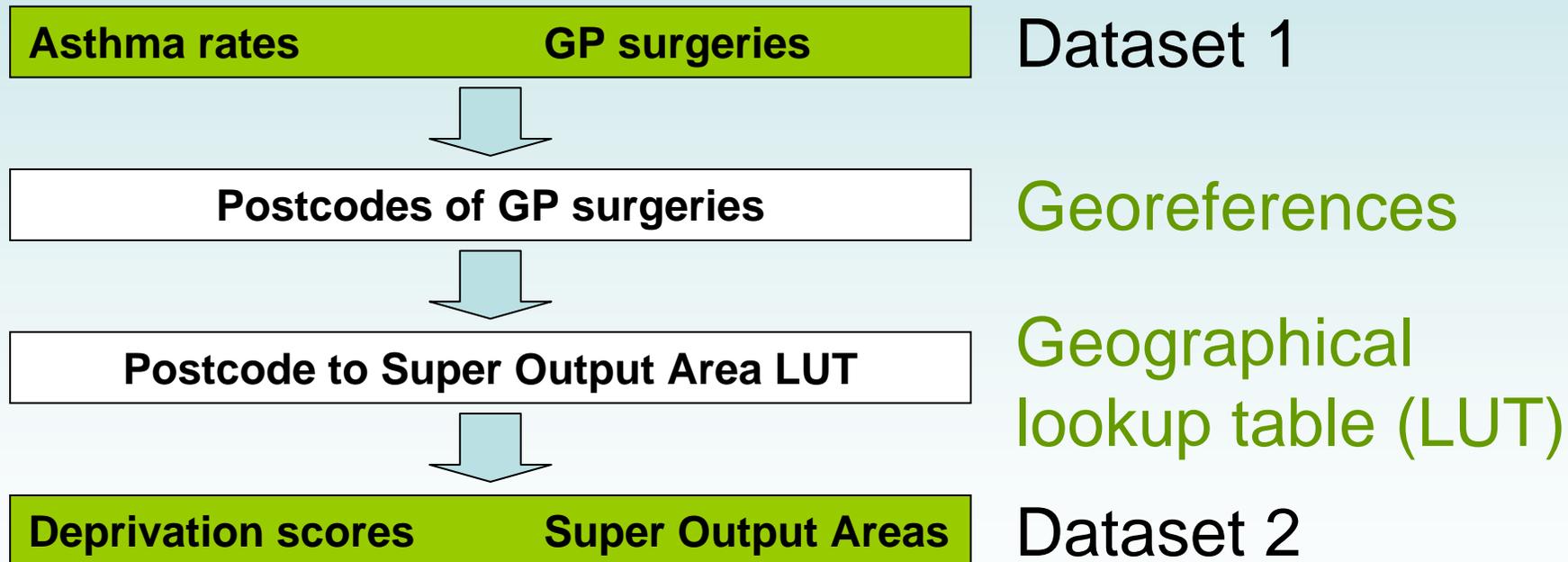
- Methodological vacuum: geographical referencing rarely included in general “research methods” courses
- Frequently needed by non-geographers but no obvious source of guidance (“phone a friend?”)
- Users often not able to articulate enquiries within a standard GIS education framework

Two recurring groups of tasks

- Data linkage (aspatial & spatial)
 - Record matching
 - Using geographical lookup tables
 - GIS operations
- Mapping
 - Point and thematic mapping

Tabular data linkage example

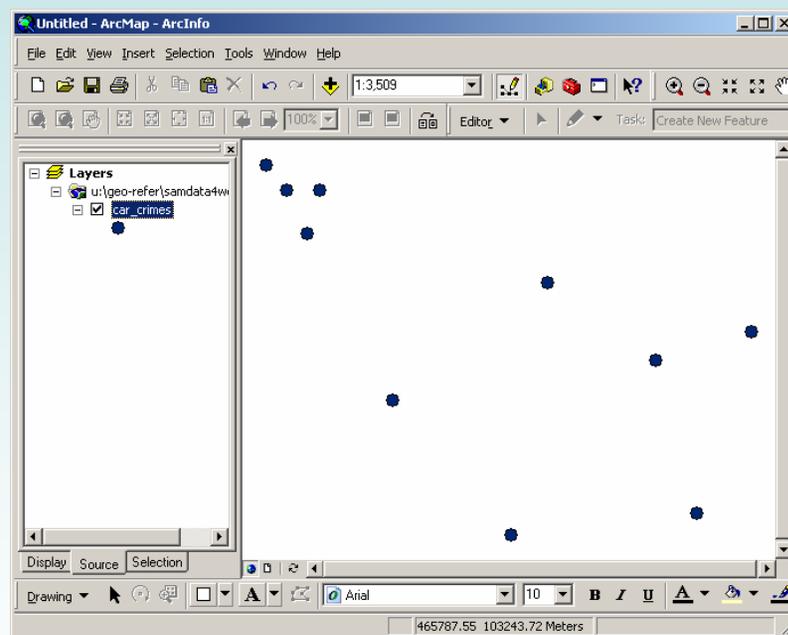
Tabular linkage requires lookup(s) between georeferences on two or more datasets



Mapping a set of points

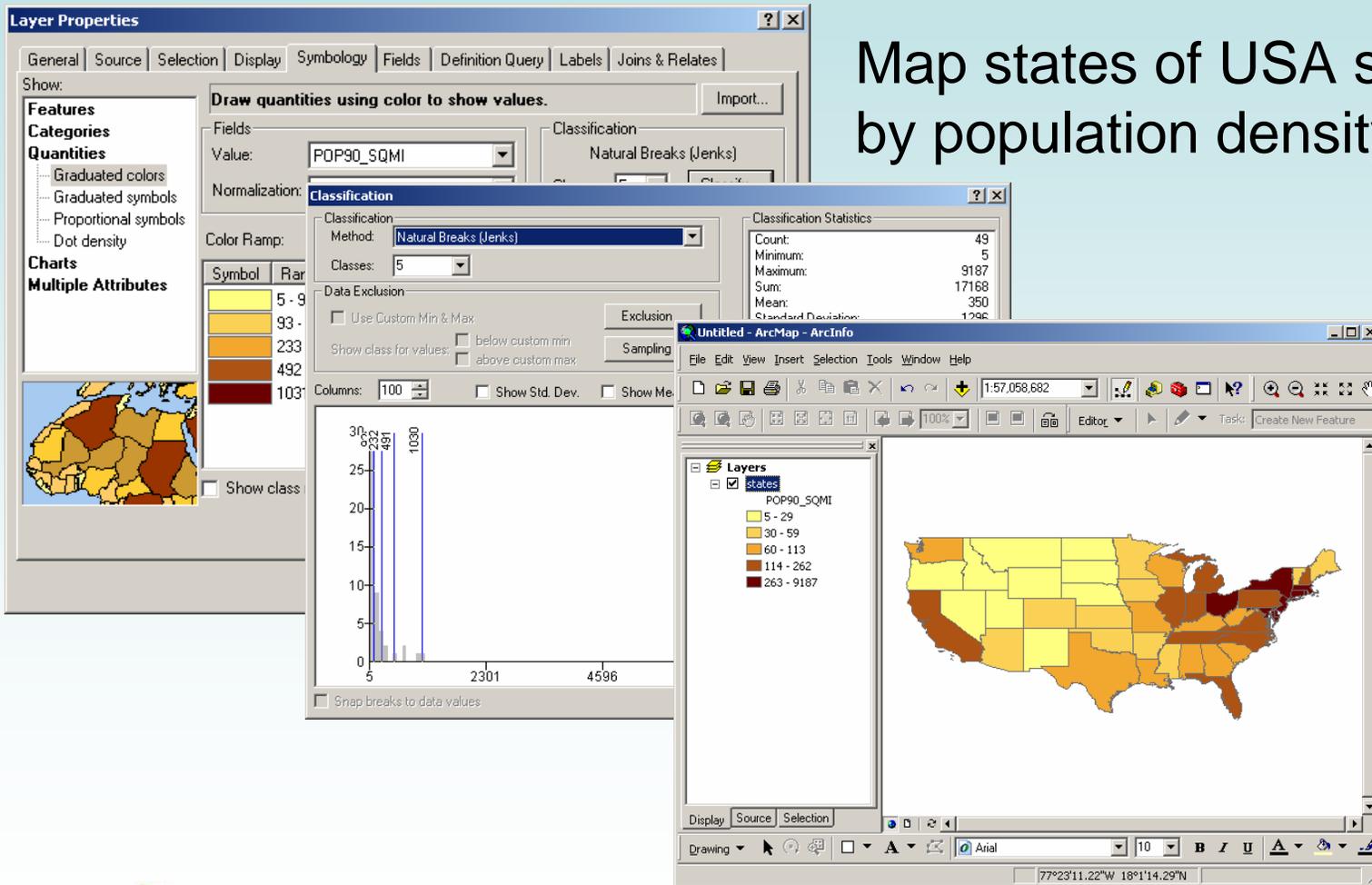
Grid-refs of car crimes

465474,103429
465490,103409
465517,103409
465507,103374
465703,103334
465791,103271
465869,103294
465577,103238
465825,103146
465673,103129



Mapping thematic data

Map states of USA shaded by population density



Geo-Refer project

Geo-Refer project

- On-line learning resources for social scientists who are not geographers but who need to undertake some sort of geographical referencing
- ‘Intelligent’ assembly of materials: customisable to user’s research needs
- Re-usable, updatable, deliverable within multiple environments and portals

Geo-Refer and Geo-Refer2

- Geo-Refer (Feb 06 – Jan 08)
 - Created learning objects
 - Delivered general workshops
 - Gathered case studies & refined materials
 - Developed adaptive learning interface & database
- Geo-Refer2 (Feb 08 – Dec 08)
 - Adapt interfaces and workshops for specific communities (census, health, local government)
 - Explore and demonstrate sustainability of resources

Presenting geographical referencing through adaptive online learning

4-way categorization of content

- Concepts
e.g. the spatial nature of social science data
- Methods
e.g. creating a point map in ArcGIS
- Datasets
e.g. the National Statistics Postcode Directory
- Examples
e.g. linking and mapping out of hours calls to GPs in Devon

Metadata/standards

- Objects coded according to 15 Dublin Core elements including:
 - Title (The National Statistics Postcode Directory)
 - Coverage: region (UK), time period (2005-2006)
 - Keywords (Link, Match, Postcode)
 - Technical requirements: software (GeoConvert)
 - Copyright (Yes; Athens)
 - Contributor: role (Author), organisation (UoS), date (16/06/08)

The tricky bit ...!

Customised delivery specific to users' needs

- How to understand users' needs?
- User profiling ...
 - “Speaking the language”
 - Knowing enough to articulate needs
 - Asking the right questions
 - “Leading by example”?
 - Learning from face-to-face experience, but still very difficult ...

How might this work for an individual user?

I've got postcoded survey responses: how do I match them to the census and map the results?



We need to create a user profile

Tell us about:

Geo-referencing operations?

Data, spatial units?

Dates – range?

Study area?

User's location/affiliation?

Software?

Discipline/domain?

Jenny Bloggs

Linkage, map

Postcode, census

2001-6

England

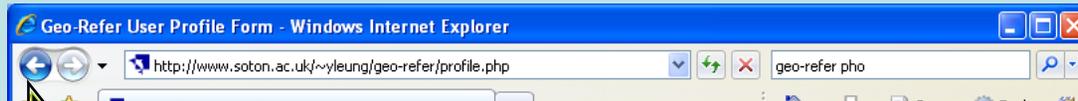
UK Academic

ArcGIS

Health

On-line user profiling

Jenny
Bloggs
User
profile



Please answer the following questions as fully as possible to help us understand your research needs. There are twelve questions in total.

Part 1 - Personal Information

In order to allow us to assign a valid URL to your custom tutorial (using letters, numbers, dot, underscore or space characters) and your email address when the form is completed.

Email Address: @

Your discipline

Below is the list of main disciplines and subjects recognised within the academic sector, please choose the nearest to you for examples relevant to your interests.

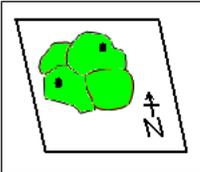
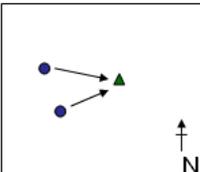
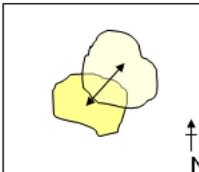
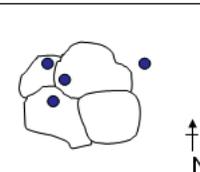
- Area and Development Studies
- Economics
- Education
- Human Geography
- Management and Business Studies
- Psychology
- Social Policy
- Socio-Legal Studies
- Science and Technology Studies
- Arts and Humanities

Part 2 - Your Geographical Referencing Needs

The questions in this part are designed to help us best identify the information and guidance you require. Answer each question as far as possible in relation to your own research. If you are not sure of the answer to any question, select "Don't know".

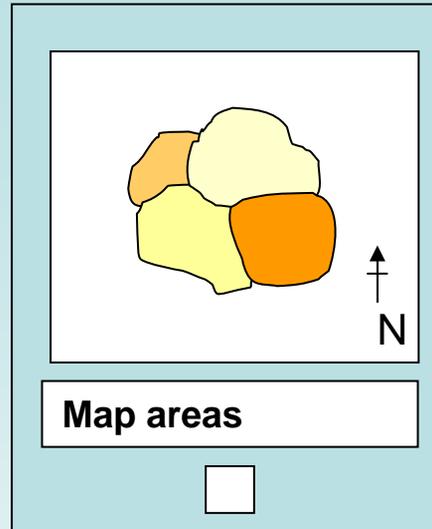
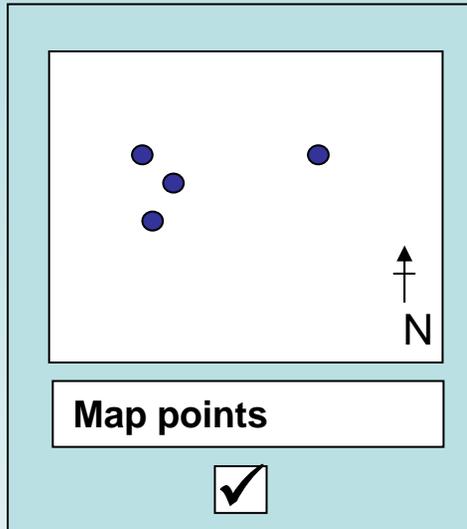
What do you want to do?

This question helps us to understand the types of geographical referencing task(s) you need to undertake. You may check as many boxes from any part of the grid as seem relevant to your project: it is not necessary to include options from every row. If you are not yet sure exactly which options apply to you, use one or more of the "Don't know" boxes. For example, if you know that you need to produce a map, but are not sure what types of data are involved, check the "Don't know" box in the "Mapping" row.

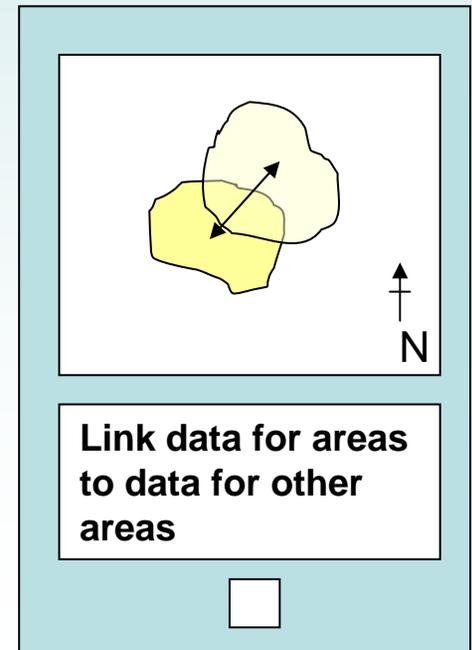
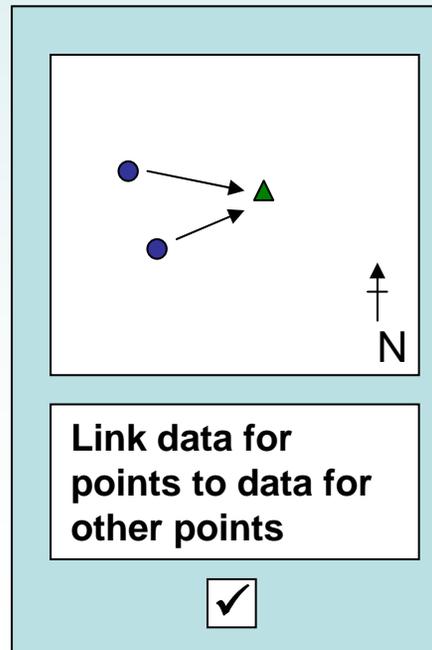
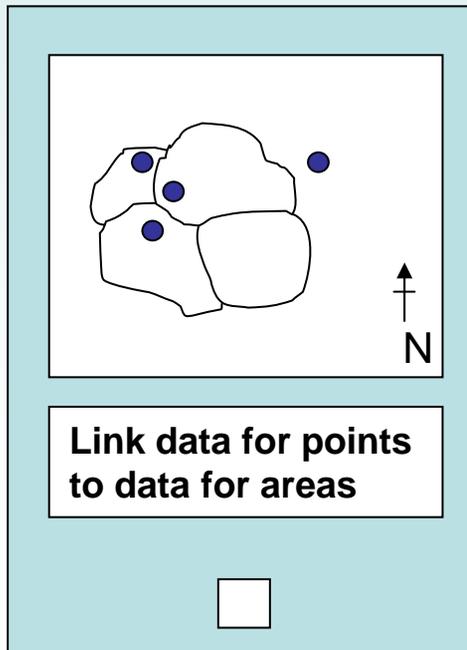
 <p>Think about your geographical data. Are they...</p>	<ul style="list-style-type: none">SO SouthamptonPO PortsmouthTR TruroLE LeicesterWC West CentralCF CardiffSW SwanseaDH DurhamEH Edinburgh		
<input type="checkbox"/> ...already mapped (e.g. paper, image)?	<input type="checkbox"/> ...lists of names or codes?	<input type="checkbox"/> ...yet to be collected by researcher?	<input type="checkbox"/> Don't know about geographical data
 <p>Do you want to link...</p>			
<input type="checkbox"/> ...data for points to other points?	<input type="checkbox"/> ...data for areas to other areas?	<input type="checkbox"/> ...data for points to data for areas (or vice versa)?	<input type="checkbox"/> Don't know about data linkage needs

Visual examples

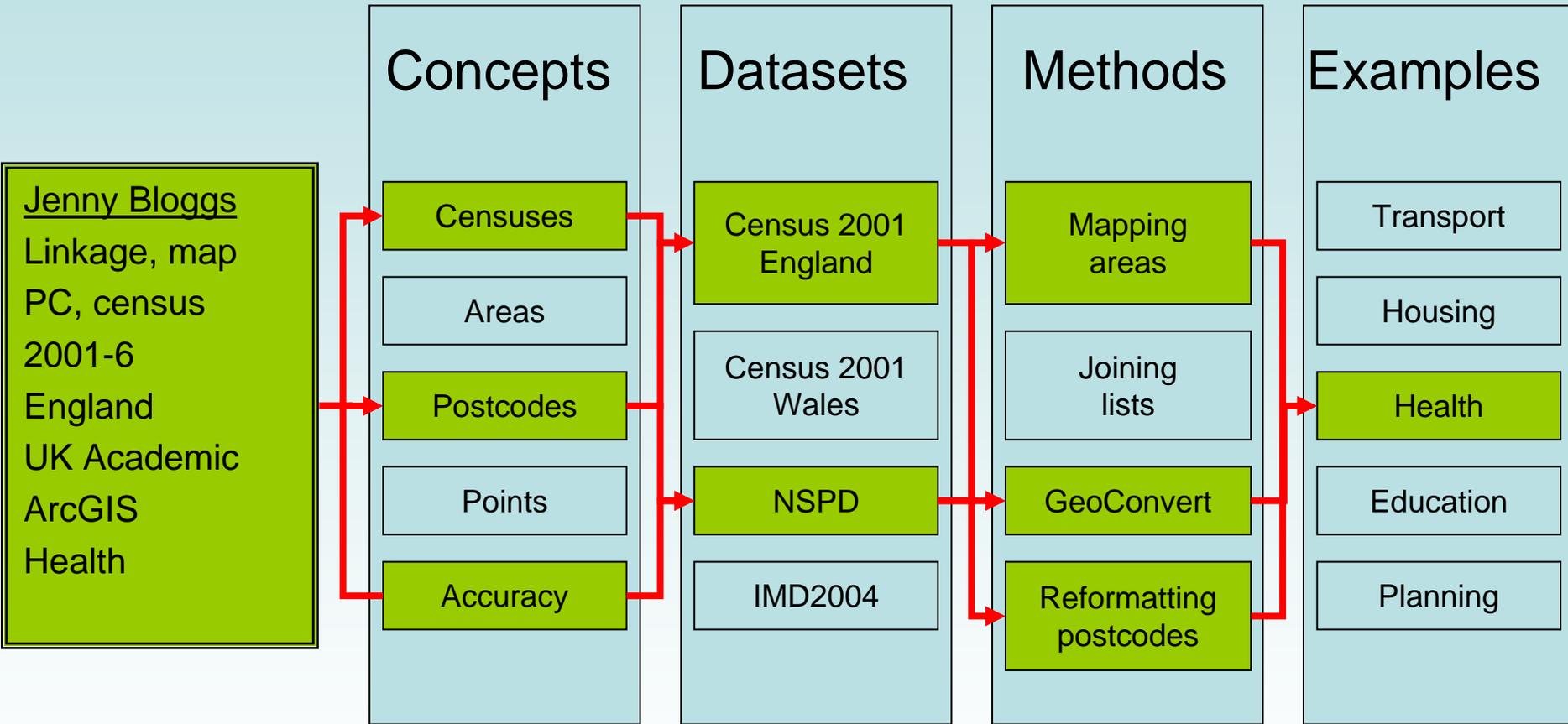
Map?



Link?

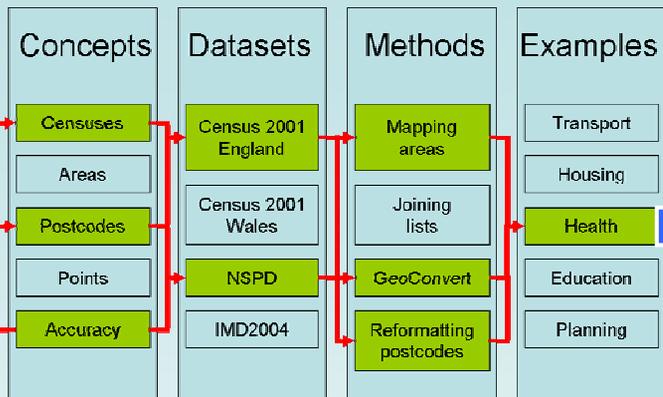


Customised set of learning resources



Customised online tutorial

Jenny Bloggs
Linkage, map
PC, census
2001-6
England
UK Academic
ArcGIS
Health



Customised Geo-Refer Tutorial - Windows Internet Explorer

http://www.soton.ac.uk/~yleung

Google

Customised Geo-Refer Tutorial

Jenny.Bloggs@soton.ac.uk

File created on Wednesday 20th February, 2008 - 11:13:01 pm

Geo-Refer Resources for your work

The URL of this page is now sent to the email address that you used for completing the form

Key georeferencing concepts

- :: [The spatial nature of social science data](#)
- :: [Understanding UK address referencing](#)
- :: [Differentiating between accuracy and precision](#)

Data Access

- :: [Data access for UK academic](#)

Data collection

- :: [How to match two lists together](#)

Area mapping

- :: [Creating a choropleth map](#)
- :: [Joining attribute data to boundary data for mapping purposes](#)
- :: [Example - Deprivation mapping in the Isle of Wight](#)
- :: [Creating a choropleth map in ArcGIS](#)
- :: [Joining attribute data to boundary data for mapping purposes in ArcGIS](#)

Postcode geography

- :: [UK Postcodes](#)
- :: [National Statistics Postcode Directory](#)
- :: [Correctly formatting postcodes](#)
- :: [Correctly formatting postcodes with Excel](#)

Census geography

Census geography

- :: [UK Census Geography](#)
- :: [UK Census Data](#)

You have entered the time period 2001 - 2006. The following are that may be relevant to the geographical extent of your project

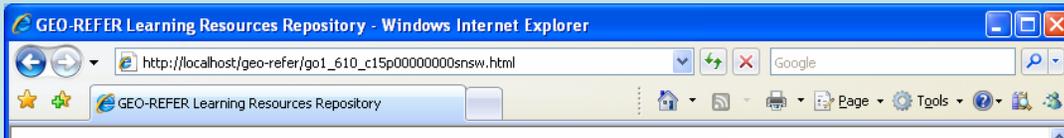
2001 Census

- :: Census Geography - [England 2001](#)

Health geography

- :: [QOF information example](#)
- :: Example - [Linking and mapping out-of-hour calls to GPs in De](#)

e.g. Concepts



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This tutorial contains geo-referencing **Concepts**

Geographical Referencing Learning Resources

Search

UK Census Geography

Decennial population censuses are the most important source of population data in the UK. Although population estimates and projections are generally made for much larger areas, the geography of the census administrative organization of the country at the time of each census is used for many other purposes. In particular, the population and density indicators that can be produced for census areas are frequently used for other purposes.

Modern (since 1971) census geographies are hierarchical subdivisions of various types, down to sub-authority areas such as wards or postcodes, units created specifically for census purposes. Unfortunately, census geographies for successive censuses or between the different countries which make up the UK do not have precise definitions of all the areas below the country level can vary. A 'snapshot' of a continually changing administrative geography (local government boundaries, electoral wards by the Boundary Commission) and must be used to understand population change such as new areas of housing.

Resources

The National Statistics Beginner's Guide to UK Geography
http://www.statistics.gov.uk/geography/beginners_guide.asp

- Project homepage
- Research
- People
- News
- Presentations
- Links & references

Learning Resources

- User profile form
- Resources collection

Past Workshops

- Workshop 1
- Workshop 2
- Workshop 3

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This tutorial contains geo-referencing **Concepts** **Methods** **Datasets** **Examples**

Geographical Referencing Learning Resources

Search

The spatial nature of social science data

The social sciences deal with many objects of study including individuals, families, households, jobs, events, organizations, journeys and networks. It is entirely possible to meaningfully study these phenomena aspatially - for example examining the relationships between individuals within a household - without any regard for their geographical location. However it is important to recognise that each of these phenomena is geographically situated: it has a spatial location. If we are able to record these locations then it becomes possible to undertake explicitly spatial analyses (for example to explore the way in which family structure varies in different neighbourhoods) or to use location as a means of linking otherwise disconnected data (for example to identify the local unemployment rate at the place of residence of each survey respondent). The spatial nature of social science data opens up potential avenues for research which are not possible if these data are treated aspatially, but it is necessary to understand the ways in which social science phenomena may be associated with spatial locations. The social sciences differ in important ways from the physical sciences where the spatial location of the object of study, such as a coastline or landfill site, can be directly surveyed in the form of a spatial coordinate. Georeferencing (short for geographical referencing) in the social sciences is usually indirect, by reference to some intermediate geography such as an address, postcode or administrative area.

Common Geographical Addresses

The first category of geographical references is that which relates to individual addresses. These include the residential or work addresses of survey respondents, the addresses of workplaces or other organizations and the addresses of locations at which events take place - for example shops and hospitals where services are delivered. Postal addresses such as '23 Acacia Avenue, Coketown' are widely used in common language and it is generally possible to assign spatial locations in the form of spatial coordinates either directly or via



© David Martin

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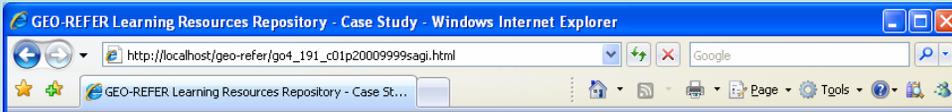
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e.g. Methods and Examples



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Geographical Referencing Learning Resources

Search

Go

Deprivation mapping

Researcher Discipline Outputs

Study area Geographical units Time period Reference datasets

Summary of Tasks

Learning Resources

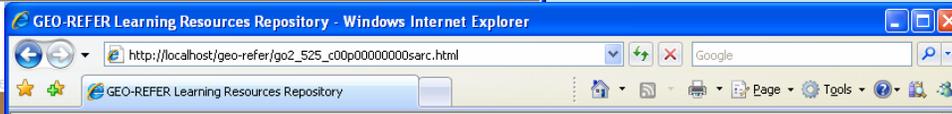
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Geographical Referencing Learning Resources

Search

Go

Creating a choropleth

A polygons shapefile containing the

Start ArcMap.

Creating a choropleth

First, we will create a choropleth map (e.g., Pacific, New England, Mid Atlantic and selecting the relevant file and select "Properties"). This will be

Layer Properties

General Source Selection Display

Show:

Features

Categories

- Unique values
- Unique values, many to one
- Match to symbols in a layer

Quantities

Charts

Multiple Attributes

Draw category

Value Field: SUB_REGION

Symbol: [Symbol]

Value: [Value]

Learning Resources

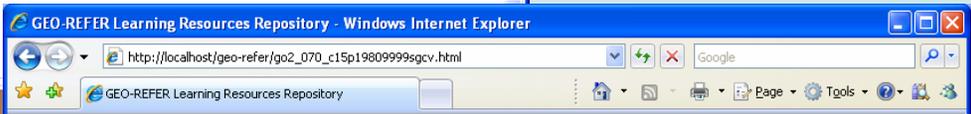
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Geographical Referencing Learning Resources

Resource Category: Concepts **Methods** Datasets Examples

Search

Go

GeoConvert

GeoConvert is an online geography matching and conversion tool hosted by MIMAS at the University of Manchester and currently only available for users in UK academic institutions. GeoConvert allows registered users to obtain and manipulate complex geographical and postcode data in a straightforward way. The tool is based on the information provided in the National Statistics Postcode Directory (NSPD) and contains updated versions of the directory from May 2006.

The main functions of GeoConvert allow users to

- Obtain postcode metadata (deprivation scores, grid reference co-ordinates, urban/rural indicators, area classifications etc.)
- Obtain details of the geographical relationship (intersections/matches) between zones in different geographies
- Re-sample (convert) data from one geography to another

Users who are unable to access GeoConvert will generally be able to achieve the same results by using local copies of the NSPD files loaded in suitable database software such as Microsoft Access but GeoConvert offers the key data linkage and extraction functions without requiring any familiarity with databases. Users are able to upload their own files containing geographical reference codes and download files with extra fields appended to their own data. Users who wish to use versions of the NSPD dating from before May 2006 (also known as the All Fields Postcode Directory, Central Postcode Directory or Postzon file) will need to obtain copies of the directories and load them into a local database.

Further information

Learning Resources

- User profile form
- Resources collection

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Resources available

Using the Geo-Refer resources

- Complete the user profile form
 - Specify own profile and Geo-Refer will best-match learning materials to provide customised tutorial (web-based index page, URL emailed)
- Browse the entire set of resources
 - Extensive list of c.70 objects: concepts, methods, datasets and examples

<http://www.geog.soton.ac.uk/geo-refer/>

Please ...
use, experiment, feedback!

<http://www.geog.soton.ac.uk/geo-refer/>

Email: geo-refer@soton.ac.uk

