

The British Cartographic Society Annual Symposium 2010

Talking with Maps

Presentation Summaries 2: Cartographic Representation

Imaging of geochemical data by interpolation within geological boundaries

Claire McGinn, GIS Scientific Officer, Geological Survey of Northern Ireland, Belfast

J D Appleton, British Geological Survey, Nottingham

S Caven, Geological Survey of Northern Ireland, Belfast

Abstract

Soil geochemistry data are usually presented as percentile-classed coloured maps, with warmer colours indicating higher concentrations of elements. Data are commonly contoured using an inverse-distance weighting or other numerical function to interpolate between the observed points onto a regular square grid or net. However, this method of interpolation ignores the geological reality. Research on datasets from England and Wales has shown that a significant proportion of the spatial variability of chemical elements is controlled by geology (i.e. the parent material of the soil). It is therefore better to restrict the interpolation to data within the polygons that outline the soil parent material.

Soils in Northern Ireland have been comprehensively sampled at an interval of one site per 2 km² during the Tellus Project, 2004-7. Sites were sampled at two depths, 15 cm and 40 cm. Large areas exhibit naturally elevated soil concentrations of potentially harmful elements, including arsenic, chromium and nickel. In places, levels of these elements exceed the proposed Soil Screening Value for assessing ecological risks and/or the Soil Guideline Value, a threshold used in preliminary assessments for land contamination. New maps have been produced of these data using spatial interpolation within geological boundaries. The new and conventionally contoured maps are compared and differences examined in the context of a GIS which facilitates comparison with other data. The differences between the geochemical maps of shallow and deeper soils are also illustrated.

Biography

Claire McGinn graduated from the Queens University Belfast (BSc (Hons), Geography) and the University of Ulster, Coleraine (MSc, GIS). She worked as a field surveyor and GIS Consultant with a Multinational Engineering firm before joining GSNI in June 2009 as GIS Scientific Officer. Claire shares responsibility for capturing much of GSNI's archive material into digital format and has a wide knowledge of existing data sets.

Automated schematization using open standards – challenges and opportunities

Dr Suchith Anand, Research Fellow, Centre for Geospatial Science, University of Nottingham

Jerry Swan, Mike Jackson, Centre for Geospatial Science, University of Nottingham

Abstract

A schematic map is a diagrammatic representation based on linear abstractions of networks. Schematic maps can be used as a visualization tool to help ease the interpretation of information by the process of cartographic abstraction. Web services are collective tools for accessing data and performing operations over the web. This paper details work done by CGS researchers for automated schematization using open standards and looks into the interoperability challenges and opportunities in the implementation of web services technology for map schematization.

Biography

Dr Anand is an Ordnance Survey Research Fellow at the Centre for Geospatial Science, University of Nottingham. His research interests are in automated generalization, Location Based Services, Open Source GIS, Geospatial web services, Geospatial interoperability, Hydroinformatics and Network Modelling. He is the chair of the ICA Working Group on Open Source Geospatial Technologies and also chair of Open Source GIS UK Conference Series.

Smoothing coarse resolution raster for integration with vector data (applied to GeoSure)

Diego Diaz Doce, GIS Programmer/Analyst, British Geological Survey

Abstract

This paper presents a method for smoothing raster datasets of coarse resolution, which allows their subsequent combination with vector data without evidence of grid like appearance. The method is applied as part of the creation process of GeoSure, a collection of 6 separate ground stability datasets, derived from geological data (DigMapGB-50), that provides information about geological hazards intended to address areas with a potential for ground movement in Great Britain.

So far, GeoSure had been produced in vector format, but presenting an unnatural blocky appearance. This is the result of an intermediate stage of the data processing where a 25 m grid is created from the smooth boundaries of DigMapGB-50 to match the cell size of 2 raster datasets of coarse resolution (slope angle and superficial thickness), which are essential for the processing of the final product.

The progression in geoprocessing capabilities of new versions of ArcGIS, along with Python scripting, has allowed overcoming the previous drawback and getting rid of the grid like look. The proposed method tackles the problem by *vectorising* the rasters before they are introduced within the processing of the geohazard layers. The *vectorisation* process described in the paper consists of: (1) reducing the resolution of the rasters, (2) applying a low pass filter several times to smooth raster edges, (3) reclassify the raster according to the appropriate range of values, and (4) convert the raster into vector format; since the raster has now a finer resolution, the vector layer derived from it shows smooth polygons which are ready to be inserted into the creation process of the datasets.

As a consequence, the final output maintains the look of the data it is derived from, depicting geohazard formations closer to those found in the real world and without neglecting reliability.

Biography

Diego holds an MSc in Geographical Information Science from The University of Edinburgh that was taken straight after his degree in Environmental Sciences at the University of Salamanca (Spain). Currently, he works for the British Geological Survey as a GIS Programmer/Analyst, where he is in charge of the creation and maintenance of GIS datasets, GIS support, and development of web map applications.