

DigMap

A digital geological map of the United Kingdom

by Kevin Becken and Chris Green, *Keyworth*

The BGS has been compiling and publishing maps at various scales on the geology of Great Britain since 1835. We will continue to produce paper copies of our maps for the foreseeable future, but additionally new technology provides an opportunity to develop a more flexible approach to map-making. The DigMap project uses Geographical Information Systems (GIS) to produce standardised digital maps which can be tailored to the particular needs of our geologists and external clients.

The power of digital map databases is their ability to deliver exactly the data that are needed for the problem being tackled and integrate those data with other spatial data within GIS. Although the data will be held (and will be available to users) in standard tiles, GIS

techniques are employed to deliver customised data-sets, both in terms of user-defined areas and in selected themes.

Digital geological data are currently available in DigMap at four resolutions. Full national coverage is planned for 1:625 000, 1:250 000 and 1:50 000 scales with selected coverage at 1:10 000 scale. The data were gathered from, and during production of the published paper map series. Manuscript maps at 1:10 000 scale (previously six-inch scale) are the primary product of the field surveying, but the 1:50 000 scale series (previously one-inch scale) is the largest scale series available in litho-printed form for public purchase. These maps usually display Solid geology, Drift geology, and (latterly) Artificial and Mass-movement deposits. There are now almost no areas in Great Britain for which

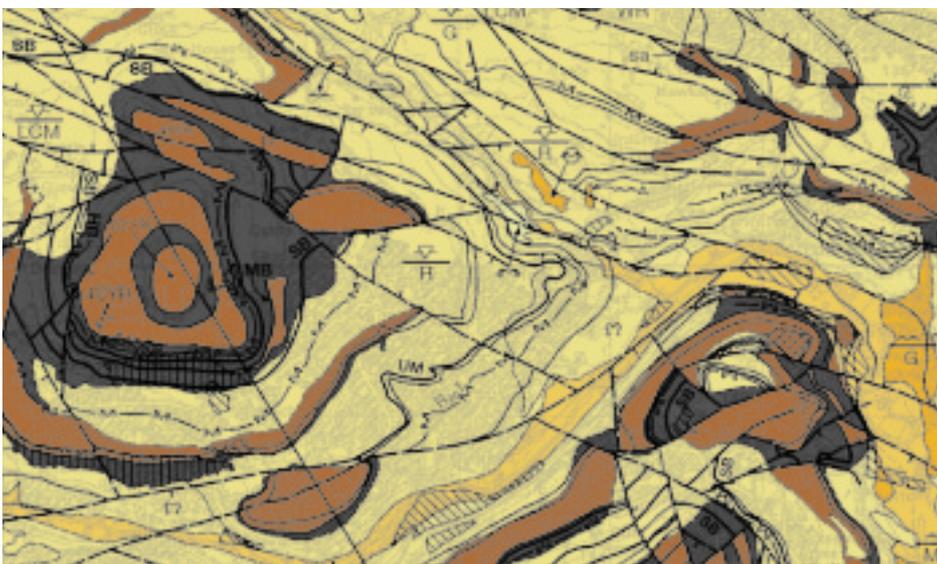
a published 1:50 000 or one-inch map is not available. Production of this series is continuing.

At a smaller scale there is a published national map series at 1:250 000 scale. The work on this series, carried out over some 20 years, was completed in 1993. The onshore maps display solid geology only. This regional scale map database was constructed by digitising the published map series at this scale, updating the linework, reclassifying the attribution (from chronostratigraphy to the DigMap standard, lithostratigraphy and lithology) and retiling. Two very popular maps covering the whole of the UK at 1:625 000 scale are also published. These maps show solid and Quaternary deposits. This national scale map database was constructed by digitising the existing published maps and is currently undergoing conversion to full DigMap standards.

Map production using digital methods commenced in the BGS in the mid-1980s, employing external agencies for final data preparation. Following the introduction of GIS facilities to BGS cartography in 1989, a Digital Map Production System (DMPS) was developed for production of 1:50 000 scale maps. This system was primarily a cartographic database developed to automate some production routines and provide a standard colour table that held the relevant cyan, magenta and yellow printing values. It provided, for the first time in the BGS, a facility to check, 'clean' and digitally encode polygon data. The expertise gained over the following two years enabled a system to be developed for geological attribution, and print-on-demand maps, for the 1:10 000 scale mapping programme. The geological attribution and map production systems evolved into an integrated system in 1997, now the operational system known as DMPS97.

The unification and standardisation of digital mapping methodology and data structures provided the BGS with the framework to embark in 1997 upon the DigMap project. The objective is to create and maintain a national database of digital geological map data at different resolutions in geologically-attributed vector GIS format.

The map data at all scales are structured to common standards using common geological dictionaries, common graphic



Solid geology data of part of Bradford – coloured by its lithology.

Geological information BGS © NERC. Topography based on OS data with the permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office © Crown Copyright. All rights reserved. Unauthorised reproduction infringes Crown copyright and may lead to prosecution and civil proceedings. Licence number GD272191/2000.

structures, and common production techniques.

The data comprise four geological themes: Solid geology; Drift geology; Artificial deposits; and Mass-movement deposits (although not all themes are available at all scales). The linework is feature coded, and the polygons hold attributes including the descriptions for lithostratigraphy and lithology. These attributes are linked to, and governed by, *The BGS Lexicon of Named Rock Units*, which is freely available for public viewing and downloading from the BGS web site at:

www.bgs.ac.uk/free/lexicon/lexicon_intro.html.

The development of the 1:50 000 scale database was accelerated in 1999 when in-house work was supported by line-digitisation of approximately 100 printed maps by an external agency. The attribution of all 1:50 000 scale data to DigMap standards is now well under way in the BGS, as is the process of resolving geological inconsistencies to achieve seamlessness. Although a few areas are subject to new field survey and the data will not be available until 2009, it is planned to have coverage of about 95% of the country at this scale in 2001. It is further planned to turn significant attention to the 1:10 000 scale database from 2001 onwards, concentrating mainly in major urban areas.

The data are updated according to new survey information, and updates will be escalated through all data layers at all resolutions. For example, when new 1:10 000 scale data are available and entered into DigMap, then the updated information will be incorporated and generalised to 1:50 000 and 1:625 000 scale. By this means, DigMap will reflect the most currently available and authorised knowledge of the geology for studies from site-specific local areas, to the national overview.

The DigMap project places the BGS in a strong position to serve all its users and customers with digital geological map data at local, regional and national resolutions. The project enables efficient selection of data for analyses with further attribution to be added as necessary for specific needs. The supporting system allows for more detailed analyses via personal or web-based enquiry. The data will be vitally important 'layers' within the Digital

Geological Spatial Model (DGSM), which is regarded by the BGS and its parent body, the Natural Environment Research Council, as fundamentally important to the future growth of the BGS.

Digital geological map data are now commonly used in the BGS and are available under licence to external users.

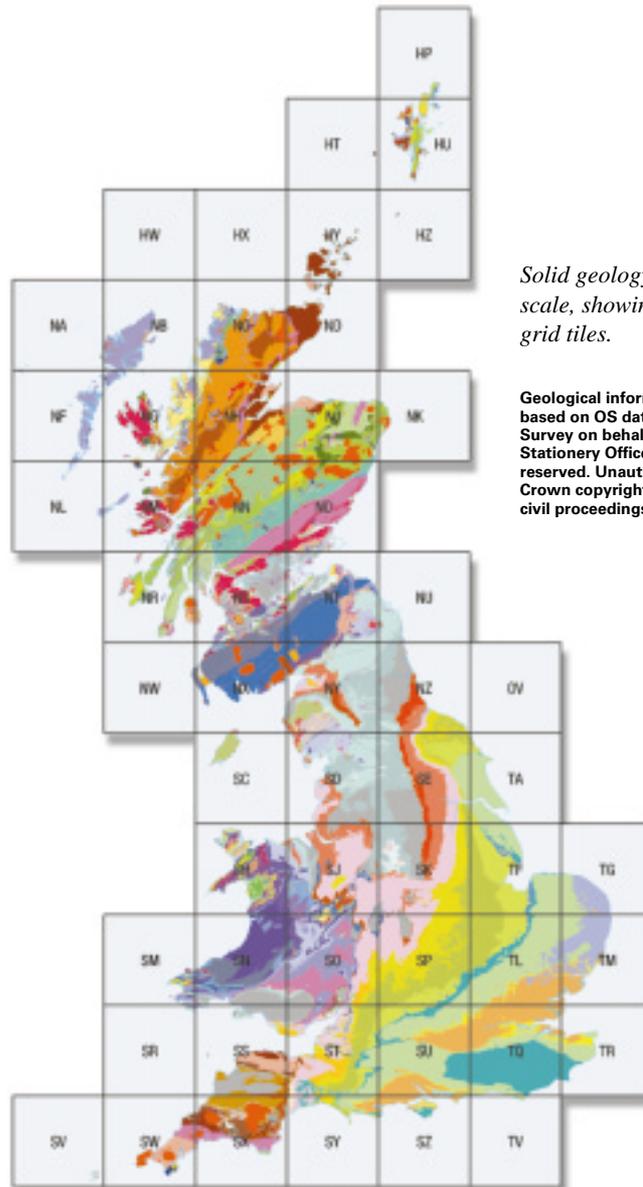
The licence costs will reflect the coverage (area and themes) and the duration of the licence required, with an additional data preparation charge in the first year. This charge may be dependent upon the degree of customisation required. The data are available in common CAD/GIS formats such as ArcView®, MapInfo® and

MicroStation®, plus others subject to discussion.

As the databases evolve, data are released progressively as they become available. The BGS is currently developing a graphical index to DigMap data availability that will be featured on its web site. In the future it is hoped to make licensing (and even delivery for small data-sets) of BGS digital map data available online directly from its Internet Shop (www.thebgs.co.uk).

For further information about DigMap, contact:

Dr Chris Green
Tel: 0115 936 3587
E-mail: cagr@bgs.ac.uk



Solid geology data coverage at 1:250 000 scale, showing the standard 100 x 100 km grid tiles.

Geological information BGS © NERC. Topography based on OS data with the permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office © Crown Copyright. All rights reserved. Unauthorised reproduction infringes Crown copyright and may lead to prosecution and civil proceedings. Licence number GD272191/2000.