British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

DiGMapGB General Information Notes

- for customers of

All scales Digital Geological Map of Great Britain data

Contents

1 Introduction

These notes are intended for licensed users, or potential users, of Digital Geological Map of Great Britain (DiGMapGB) data. They are designed for both geologists and non-geologists, and comprise primarily this set of general notes (applying to all scales of DiGMapGB data) and a set of additional notes on specific scales. They may also be accessed as web pages at: http://www.bgs.ac.uk/products/digitalmaps/expl_notes.html

Geological maps are the foundation for many types of work. They are of potential use to a wide range of customers with economic interests in planning and development, oil and gas reserves, water and mineral resources, waste disposal sites, geohazards and property insurance, as well as more academic aspects such as the Earth's geological history, its fossils, and its landscape development.

The British Geological Survey has established a major project to prepare DiGMapGB data at a range of scales from 1:10 000 to 1:625 000. These datasets are available as vector data in a variety of formats in which they are structured into themes primarily for use in Geographical Information Systems (GIS) where they can be integrated with other types of spatial data to provide powerful aids to problem solving in many earth-science related issues. The source maps (which may now differ from the DiGMapGB data) are also available as raster images if required.

Currently work is concentrated on preparing 1:50 000 scale data for England, Wales and Scotland for which many existing 'paper-only' maps have been digitised, and the nomenclature, particularly of older maps, updated to current usage.

In addition to the many digital geology maps (or tiles) already available, work continues to extend the geographic coverage, the range of scales, and to expand and improve the information embedded in existing tiles.

The data comprises polygons, or areas, and lines. The polygons are attributed with lithostratigraphical and lithological information arranged in up to four themes as available: Bedrock Geology ('Solid'); Superficial Deposits ('Drift' or Quaternary); Mass Movement (mostly landslip); and Artificial Ground (or man-made). The lines or linear features are also attributed and include thin beds mapped as lines (such as coal seams), fossil bands, faults, veins and some landforms.

2 DiGMapGB Datasets

There are four main **onshore** digital geological map datasets at 1:625 000, 1:250 000, 1:50 000 and 1:10 000 scales as tabulated below. In addition there are a few tiles at 1:100 000 and 1:25 000 scales, which supplement or substitute for the 1:50 000 and 1:10 000 data respectively.

Dataset	Scale	Comment
DiGMapGB-625	1:625 000 or 625k	Complete; new dataset planned
DiGMapGB-250	1:250 000 or 250k	Complete; new dataset planned
DiGMapGB-100	1:100 000 or 100k	Partial; Orkneys & Hebrides only, no 50k
DiGMapGB-50	1:50 000 or 50k	Complete except for central Wales; upgrading continues
DiGMapGB-25	1:25 000 or 25k	Partial; selected special sheets only
DiGMapGB-10	1:10 000 or 10k	In progress

Download a sample of DiGMapGB data in ESRI ® Shapefiles, MapInfo® or GML format at: http://www.bgs.ac.uk/products/digitalmaps/data.html

There is one **offshore** dataset

DiGMapGB-250 / (DigSBS250)	1:250 000 or 250k	Complete

In addition there are other related datasets:

Dataset	Scale	Comment
Hydrogeology	1:625 000	Aquifer properties and distribution; distinguishes intergranular and fissure flow, extensive and local aquifers
Mineral resources	1:100 000	County minerals maps; in progress, wide range of minerals, planning permissions and environmental designations
IMAU	1:25 000	Industrial mineral assessment maps; selected areas only, mainly sand and gravel

3 Geological polygon (area) themes

The digital geological maps typically show up to four polygon themes as described below.

Theme	Comment	Age
Artificial Ground	Recent man-made deposits, mineral workings, re-modelled or altered ground	Quaternary age, younger than about 1.8 million years
Mass Movement Deposits	Primarily landslips or foundered ground, moved down slope under gravity	
Superficial (or 'Drift') Deposits	Unconsolidated natural in situ superficial or surficial deposits	
Bedrock (or 'Solid') Geology	Mostly consolidated natural rocks	Pre-Quaternary age, older than about 1.8 million years

A fuller explanation of these themes is given on the BGS web site at:
http://www.bgs.ac.uk/products/digitalmaps/digmapgb.html

Offshore there is a **Sea Bed Sediment** theme instead of a Superficial Deposits theme, details at:
http://www.bgs.ac.uk/products/digitalmaps/seabed.html

4 Availability of polygon (area) themes

The database of each onshore digital map has up to four polygon themes of geology (Artificial, Mass Movement, Superficial and Bedrock), although not all themes are mapped or available on every map sheet. The availability of particular themes varies both from map to map at the same scale and on maps at different scales as indicated below. Most maps record Bedrock and Superficial deposits. Mass Movement deposits are now routinely mapped but they were often not recorded on early geological maps. Similarly Artificial Ground has been recorded on large-scale maps since the 1960s though the methodology has been progressively improved over the years with recent maps distinguishing more categories: Made, Worked, Infilled (or Worked and Made), Landscaped and Disturbed ground. It remains impossible to keep the Artificial Ground theme up-to-date as the ground surface is under continual modification by man and BGS cannot monitor every change. A map that has been recently surveyed will have a better representation of the artificial ground than an older one.

The polygon themes likely to be available for each dataset are shown. Most of these datasets are labelled or attributed with Lex-Rock geological codes which provide the name of each rock unit or deposit and its composition.

Dataset	Artificial Ground	Mass Movement	Superficial (Drift)	Bedrock (Solid)
DiGMapGB-625	–	+	+	SF
DiGMapGB-250	–	–	–	+
DiGMapGB-100	–	–	+	+
DiGMapGB-50	+–	+–	+	+
DiGMapGB-25	+–	+–	+	+
DiGMapGB-10	+–	+–	+	+

+ available; – not available; +– partially available; SF single feature attribution

Offshore, the 1:250 000 scale dataset has two themes:

Dataset	Artificial Ground	Mass Movement	Sea Bed Sediment (Superficial)	Bedrock
DiGMapGB-250	–	–	+	+

The basic themed geological information outlined above may be used with various types of related earth-science information to derive other geology-based maps, for example on mineral resources, applied geology, geohazards, engineering geology, hydrogeology, geochemistry or geophysics.

5 Linear feature themes

All linear features are digitised and geologically attributed. Their availability therefore depends on the detail shown on the printed map. They are organised into a number of themes; some of the main ones are:

- rock segments e.g. coal seam, gypsum or ironstone bed; observed or inferred
- fossil horizon e.g. marine band
- faults e.g. normal, thrust, reverse; observed or inferred
- fold axis e.g. anticline, syncline
- veins; observed or inferred
- landform e.g. buried channel margin, glacial drainage channel margin

6 History of digital geological mapping

The BGS has been publishing geological maps of Great Britain at a variety of scales since 1835. Digital techniques were first used in the mid 1980s and in 1989 the first Digital Map Production System was developed following the introduction of Geographical Information Systems (GIS) to cartography. This DMPS was used primarily for the production of 1: 50 000 scale paper maps in conjunction with a database that permitted the automation of many production routines and the standardisation of printing colours. Notably, it required each polygon to be digitally encoded for the first time and this was linked to a table containing names and descriptions of each geological unit as shown in the printed map key. This is termed single feature geological attribution.

Over the next two years a further system was developed and the digital coding modified allowing the polygons and linework to be geologically attributed, linking each feature to a comprehensive set of tables or dictionaries including the BGS Lexicon. In 1992 this system was used for selected print-on-demand 1:10 000 scale maps. 200 were produced but as the workstations and software were rapidly outpaced by PC development it proved too slow and expensive to implement for routine work.

An amalgamated production system using PCs and a similar data structure was developed and became operational in 1997. This, with further modifications, is the current corporate DiGMapGB format for providing standard digital geological map data. It employs an integrated system of geological attribution and map production in which the same digital information is used across a range of scales to produce both the DiGMapGB datasets for use in GIS and the printed map. It also permits the inclusion of additional geological information which may not be present on the printed map face.

The 1:625 000 scale paper 'poster' maps of Bedrock (Solid) and Superficial (Quaternary or Drift) were amongst the first to be digitised retrospectively, followed in 1998 by completion of the 1:250 000 scale onshore Bedrock geology dataset. The 1:625 000 Superficial and 1:250 000 Bedrock data have subsequently been upgraded to the current format. Offshore the Sea Bed Sediment theme was completed in 2001, and the Bedrock in 2003.

The Digital Geological Map of Great Britain (**DiGMapGB)** project also started in 1998 with the task of producing digital geological map data at a range of scales. Over the next three years all available BGS legacy 1:50 000 'paper-only' maps were digitised, mostly in-house, some by an external agency. These were processed to the same corporate standard as modern digitally prepared maps and incorporated into a single 1:50 000 scale dataset, DiGMapGB-50. The first edition of this was released as Version 1 in 2001 and by January 2002 it contained all available tiles (340 out of a possible 356 in England and Wales, and all 186 in Scotland). New tiles, prepared as a result of map revisions or new surveys, have since been added to the dataset and the information fields supplied with the data have been extended to improve the usability.

In 2003 the traditional BGS 'Solid' and 'Drift' terminology was replaced by 'Bedrock' and 'Superficial Deposits' and the DiGMapGB-50 dataset reissued with this change in the data and the inclusion of linear features. DiGMapGB-50 Version 2 was released in 2004 after refitting the tile margins and further rationalising the nomenclature. Work continues to improve the dataset.

It is planned to create new Bedrock datasets at 1:250 000 and 1:625 000 scales by reduction from the new 1:50 000 scale dataset.

Increasingly customers require more-detailed digital data and the 1:10 000 scale dataset DiGMapGB-10 is now also being prepared, partly driven, by commissions.

Further details on digital maps can be accessed at:

http://www.bgs.ac.uk/products/digitalmaps/home.html

7 Sources of Information

Each digital tile of DiGMapGB data is typically based on the latest geological map at that scale (or its pre-metric equivalent). They are not, however, identical to the original paper maps. Each tile shows the geological units essentially as published, though modifications may have been made to the linework to create the separate themes in full where previously unmapped. Some tiles have required significant **additional geological interpretation**: for example Bedrock geology lines added beneath Superficial Deposits; Artificial Ground added within a quarry; Superficial Deposits added beneath Artificial Ground. Major revisions to the linework have generally been avoided. Open polygons or areas have been are closed, if necessary with arbitrary lines, allowing them to be infilled with colour. These do not appear on the printed map and do not represent real geological lines; rather they show the minimum extent of the areas.

Regardless of the source or vintage of each map, the **geological nomenclature** has been reviewed and revised, as far as reasonably possible, to conform to the most up-to-date accepted

usage. For a recent map, these changes, if any, are minimal. In contrast on an old map some, and possibly many, of the deposits or rock units may have been renamed. Such changes will be reflected in future editions of the printed maps when they are republished. A **Lex-Rock** form is available which shows how the revised terminology relates to that on the existing published map.

The sources of information are available if required.

8 Caution

Geological observations are made according to the prevailing understanding of the subject at the time. The quality of such observations may be affected by subsequent advances in knowledge, improved methods of interpretation, and better access to sampling locations.

Raw data may have been transcribed from analogue to digital format, or may have been acquired by means of automated measuring techniques. Although such processes are subjected to quality control to ensure reliability where possible, some raw data may have been processed without human intervention and may in consequence contain undetected errors.

Detail clearly defined and accurately depicted on large-scale maps may be lost when small-scale maps are derived from them.

Data may be compiled from the disparate sources of information at BGS's disposal, including material donated to BGS by third parties, and may not have been subject to any verification or other quality control process.

Data, information and related records which have been donated to BGS have been produced for a specific purpose, and that may affect the type and completeness of the data recorded and any interpretation. The nature and purpose of data collection, and the age of the resultant material may render it unsuitable for certain applications/uses. You must verify the suitability of the material for your intended usage.

The data, information and related records supplied by BGS should not be taken as a substitute for specialist interpretations, professional advice and/or detailed site investigations. You must seek professional advice before making technical interpretations on the basis of the materials provided.

If a report or other output is produced for you on the basis of data you have provided to BGS, or your own data input into a BGS system, please do not rely on it as a source of information about other areas or geological features, as the report may omit important details.

Digital map data should be used at about the same scale as that of their original compilation. This scale is embedded in the DiGMapGB data attached to every polygon as a ‘nominal scale’ value (NOM_SCALE). The 1:250 000 scale data should not for example be enlarged and used at 1:50 000; 1:50 000 scale data should not be used at 1:10 000 scale, nor 1:10 000 scale data used at 1:1250 scale.

Most geological maps were originally fitted to a particular Ordnance Survey topographic base. An indication of the age of each base is given by a ‘nominal OS year’ value (NOM_OS_YR) which provides the date of the latest revision made to the base. Care must be taken with interpretations linked to topography, particularly when the geological data are draped on to a different topography to that specified by the nominal OS year.

If customers are uncertain about the use of particular data they should seek professional advice.

They may consult the BGS contacts listed at the end of this document on technical matters, licensing arrangements, or geological aspects including the appropriateness and limitations of the data.

9 Geological map-making and generalisation

Most onshore geological surveying is carried out on large-scale maps at 1:10 000 scale (formerly six-inch to one-mile) and for much of the country this is the most detailed geological mapping available. This primary-source geological map is an interpretation based on the geologist's initial observations and other, invariably limited, available information. It involves initial selection; deciding what is significant and in need of depiction and what is trivial and need not be mapped. As the Bedrock geology is often concealed by Superficial Deposits, soil, vegetation or water, its features are commonly interpolated from borehole records or surface exposures elsewhere rather than determined by direct observation. Further, in order to show the geology on the map some simplification or generalisation may be required, for example several small ill-defined patches of peat may be depicted as a single deposit.

This geology is then usually published at later dates in less-detailed form on smaller-scale maps at 1:50 000, 1:250 000 and 1:625 000 scales by a process of successive generalisation. These modifications are determined in part by cartographic considerations; for example a small polygon representing an important igneous intrusion may be 'blown-up' in size on the 1:50 000 scale map in order to retain it at this smaller scale and allow some colour infill.

Geological units with a lithostratigraphic nomenclature are given a rank in a hierarchy which ranges from 'Bed' (the smallest), to 'Member', 'Formation', 'Group' and 'Supergroup' (the largest). Thus, a particular rock unit may be mapped originally to Bed detail at 1:10 000 scale. When published at 1:50 000 it may only be possible to show it to Member level. On later compilation at 1:250 000 and 1:625 000 it may have to be further simplified to Formation then Group or Supergroup level respectively.

Considering the Artificial Ground and Mass Movement themes, these deposits are recorded at 1: 10 000 scale and may be published at 1:50 000 scale with the usual cartographic selection and simplification of small areas; and perhaps exaggeration in size if particularly important. These themes are not normally shown on 1:250 000 and 1:625 000 scale maps.

The 1:250 000 and 1:625 000 scale DiGMapGB data reflect the date of compilation of the paper source maps, 1977-92 and onwards for 1:250 000 scale, and 1979 for 1:625 000 scale. In the intervening years many of the component 1:50 000 maps have been re-surveyed or revised but most of this new information has not yet been incorporated into the small-scale maps.

10 Using geological map data

Different scales are suitable for a range of different uses. For example 1:10 000 scale data can be used for site development (but should not be relied on for site-specific information); 1:50 000 for local planning; 1:250 000 for regional planning; and 1:625 000 for national overviews or strategic planning. Data should be used that are fit for purpose and at an appropriate scale, normally at about the same scale as their original compilation.

Most geological maps were originally fitted to a particular topographic base and care must be taken in interpretation if the geological data are draped on to a different, more recent topography, which it may not fit. The datasets give an indication of the age of the original topographic base.

A separate report has been compiled on the accuracy of digital geological maps which can be downloaded free at http://www.bgs.ac.uk/products/digitalmaps/accuracy####. It explains some of the principles that are followed in geological map-making and describes the many factors that contribute to the overall accuracy of the digital data. A proper understanding of these helps to ensure that the data are used appropriately.

11 Colour on geological maps

Geological units are usually shown coloured on published maps. This colour is an aid to recognition and differentiation and is usually accompanied by a map code, commonly comprising a combination of letters (in various fonts) custom drawn symbols and numbers. These map codes are used together with colour on the map face and marginalia (such as the geological cross section and generalised vertical section) and they are identified and described in the map key.

The earliest geological maps were water-coloured and the later printed maps attempted to copy their appearance. Certain conventions can be traced back to William Smith's 1820 geological map of England and Wales; for example, green for the Chalk, grey for the Coal Measures, and blue for the Carboniferous Limestone. Pastel colours are often associated with the Superficial or Quaternary deposits; for example, pale yellow for Alluvium, and pale blue for Till (or Boulder Clay). Darker colours are generally used for the Bedrock units; red for igneous intrusions or lava flows. Similar conventions, with similar colours, have often been used on maps from geological surveys around the world.

Up to about 1990 BGS used 'eight-colour' printing schemes (6 colours + grey + black). This was then replaced, with the advent of digital map production techniques, by 'four-colour' printing: cyan, magenta, yellow and black (or CMYK) to save on costs. The grey was replaced by 'screened black' with consequent loss of definition for the topography. This scheme is still in use though some of the old colours, such as orange and purple, are impossible to replicate precisely.

DiGMapGB data provides up to 5 different colours for each geological unit:

Colour	Explanation
BGSREF	the BGS reference colour which replicates the printing colour as far as possible, though in some cases new default colours have been established for the purpose of rationalisation countrywide
BGSREF_LEX	an alternative colour used when required to avoid colour clashes; as new units are identified so more colours are needed and it is sometimes impossible to find a suitable one that is unique and can be clearly differentiated from similar colours used for other units
BGSREF_FM	colour at Formation level
BGSREF_GP	colour at Group level
BGSREF_RK	colour for the lithology

The user of the data should treat these colours only as recommendations that were valid at the time the dataset was created. Colours specified are subject to change and users are able to change the colours of the geological units on screen or on plots according to their own requirements.

Each one of the information fields on colour has a three-digit YCM (Yellow, Cyan and Magenta) number, for example 912. Each digit can be separately interpreted using the following:

Digit	0	1	2	3	4	5	6	7	8	9
Percent	0	7	14	21	31	42	54	67	80	100

Thus, if the BGSREF is 912, the relative proportions of the three colour components are 100% yellow (9) + 7% cyan (1) + 14% magenta (2).

These YCM colours can also be converted to RGB (Red, Green and Blue) colours using the following formulae:

Red = 255 – (Cyan% / 100 x 255)
Green = 255 – (Magenta% / 100 x 255)
Blue = 255 – (Yellow% / 100 x 255)

Thus 912 YCM = Red 237, Green 219, Blue 0

12 Data Structure

The data are routinely released in ESRI ArcGIS® / ArcView® file formats. Other formats are available on request. The digital tiles are geologically attributed to the latest version of the BGS Digital Map Production System (DMPS97). This is an integrated system of geological attribution and map production which standardised the methodology of digital mapping and data structure, providing the framework for the DiGMapGB project. Additional attribution may be added if requested.

The standard data supplied to customers has polygons (or areas) of the four themes (Artificial, Mass Movement, Superficial and Bedrock). All the linear features have also been captured and identified geologically by type.

A two-part label, referred to as a 'LEX-ROCK' seed, such as 'MMG-MDST', identifies every polygon on each theme. Here, the first part, MMG, is the Lexicon code abbreviation for the name of the unit, 'MERCIA MUDSTONE GROUP'. This is defined in the BGS Lexicon of Named Rock Units which may be accessed on the BGS Web site at:

http://www.bgs.ac.uk/lexicon/lexicon_intro.html.

In stratified units the name is a lithostratigraphic one usually comprising a geographic prefix, with or without a lithological qualifier, followed by a rank (Bed, Member, Formation, Group or Supergroup) for example, Sherwood Sandstone Group. Intrusive and highly metamorphosed units are usually non tabular and do not generally occur in stratified sequences so their position with respect to neighbouring units does not necessarily reflect their order of formation. These rocks are given lithodemic names with a suffix which indicates the type of rock body, for example: dyke, sill, pluton, intrusion, complex, suite or supersuite.

The second part is the rock code, an abbreviation of the lithology as defined in the BGS database dictionary Dic_Rock_Type. Here MDST is the code for 'MUDSTONE'. The lithology represented by this coding is usually the single predominant lithology present, or the two or three main lithologies. Other minor or trace lithologies, not referred to, may also be present. In the current DiGMapGB version the lithology is also expressed by a RCS code or codes derived from the hierarchical BGS Rock Classification Scheme (RCS).

13 Polygon information fields

DiGMapGB-50 / DiGMapGB-10, Version 1.10, year 2003		
Data Field	**Explanation**	**Comment**
LEX_ROCK	A two-part code, LEX & ROCK, used to label each polygon of DiGMapGB data and for creating map keys or legends.	note 1
LEX	Lexicon (or LEX) Code. First part of the LEX_ROCK label. Up to 5 characters (mostly letters). An abbreviation of the rock unit or deposit as listed in the BGS Lexicon of Named Rock Units: e.g. GOG.	note 2
LEX_D	Description of the Lexicon Code above giving the name of the unit: e.g. GREAT OOLITE GROUP is the full name of the unit coded as GOG.	note 3
ROCK	Rock Code. Second part of the LEX_ROCK label. A code, up to 5 letters, for the type of rock or lithology. These abbreviations are listed in a BGS database or dictionary called Dic_Rock_Type: e.g. LMST.	
ROCK_D	Description of the Rock Code above: e.g. LIMESTONE is the lithology of the rock unit coded as LMST.	

RCS	RCS Code. An alternative code (or a string of such codes joined by + signs), each up to 6 characters for the type of rock or lithology as based on the hierarchical BGS Rock Classification Scheme (RCS). These abbreviations are listed in a BGS database or dictionary called Dic_Rock_Name: e.g. SDST + MDST.	note 4
RCS_D	Description of the RCS Code(s) above giving the lithology of the unit: e.g. SANDSTONE (UNDIFFERENTIATED) + MUDSTONE (UNDIFFERENTIATED) is the description of the rock coded as SDST + MDST.	
RANK	Rank of the unit in the lithostratigraphic or lithodemic hierarchy: e.g. GROUP or SUITE	note 5
BED_EQ	Bed Equivalent. Lexicon Code for the unit at Bed or equivalent level where applicable.	note 6
BED_EQ_D	Description of BED_EQ above; name of unit at Bed level.	
MB_EQ	Member Equivalent. Lexicon Code for the unit at Member or equivalent level where applicable.	
MB_EQ_D	Description of MB_EQ above; name at Member level.	
FM_EQ	Formation Equivalent. Lexicon Code for the unit at Formation or equivalent level where applicable.	
FM_EQ_D	Description of FM_EQ above; name at Formation level.	
SUBGP_EQ	Subgroup Equivalent. Lexicon Code for the unit at Subgroup or equivalent level where applicable.	
SUBGP_EQ_D	Description of SUBGP_EQ above; name at Subgroup level.	
GP_EQ	Group Equivalent. Lexicon Code for the unit at Group or equivalent level where applicable.	
GP_EQ_D	Description of GP_EQ above; name at Group level.	
SUPGP_EQ	Supergroup equivalent. Lexicon Code for the unit at Supergroup or equivalent level where applicable.	
SUPGP_EQ_D	Description of SUPGP_EQ above; name at Supergroup level.	
MAX_AGE_D	Maximum age of the unit, to the most accurate chronostratigraphical division possible: e.g. ASBIAN	Same if unit spans only one age division
MIN_AGE_D	Minimum age of unit, to the most accurate chronostratigraphical division possible: e.g. ALPORTIAN	
MAX_AGE_NO	Maximum Age Number. A number, representing the MAX_AGE field; used for GIS querying, e.g. 1322120.	note 7
MIN_AGE_NO	Minimum Age Number. A number representing the MIN_AGE field; used for GIS querying e.g. 1321340.	
MAX_STAGE	Maximum Stage. Name of the Stage of maximum chronostratigraphical age applicable: e.g. ASBIAN. .	Same if unit spans only one Stage (Age)
MIN_STAGE	Minimum Stage. Name of the Stage of minimum chronostratigraphical age applicable: e.g. ALPORTIAN. .	
MAX_SERIES	Maximum Series. Name of the Series of maximum chronostratigraphical age applicable: e.g. VISEAN. .	Same if unit spans only one Series (Epoch)
MIN_SERIES	Minimum Series. Name of the Series of minimum chronostratigraphical age applicable: e.g. NAMURIAN.	
MAX_SUBSYS	Maximum Sub-System. Name of the Sub-System of maximum chronostratigraphical age applicable: e.g. DINANTIAN.	Same if unit spans only one Sub-system
MIN_SUBSYS	Minimum Sub-System. Name of the Sub-System of minimum chronostratigraphical age applicable: e.g. SILESIAN. .	
MAX_SYSTEM	Maximum System. Name of the System of maximum chronostratigraphical age applicable: e.g. CARBONIFEROUS.	Same if unit spans only one System (Period)
MIN_SYSTEM	Minimum System. Name of the System of minimum chronostratigraphical age applicable: e.g. PERMIAN.	

MAX_ERATH	Maximum Erathem. Name of the Erathem of maximum chronostratigraphical age applicable: e.g. PALAEOZOIC.	Same if unit spans only one Erathem (Era)
MIN_ERATH	Minimum Erathem. Name of the Erathem of minimum chronostratigraphical age applicable: e.g. MESOZOIC.	
MAX_EONOTH	Maximum Eonathem. Name of the Eonathem of maximum chronostratigraphical age applicable: e.g. PROTEROZOIC.	Same if unit spans only one Eonathem (Eon)
MIN_EONOTH	Minimum Eonathem. Name of the Eonathem of minimum chronostratigraphical age applicable: e.g. PHANEROZOIC.	
BGSREF	BGS Reference colour for the polygon based on the LEX_ROCK code pair. The default-printing colour defined as a 3-digit number e.g. 434.(for Claygate Member_mudstone and sandstone).	
BGSREF_LEX	Alternative BGS Reference colour at the Lexicon code level, LEX; as defined above e.g. 434 (no alternative needed as no clashes so same as above).	
BGSREF_FM	Alternative BGS Reference colour at the Formation level, FM_EQ; as defined above e.g 323 (for London Clay Formation which includes Claygate Member.	
BGSREF_GP	Alternative BGS Reference colour at the Group level, GP_EQ; as defined above e.g. 424 (for Thames Group which includes London Clay Formation).	
BGSREF_RK	Alternative BGS Reference colour for the lithology ROCK code; as defined above e.g. 822 (for mudstone and sandstone lithology of Claygate Member).	
SHEET	Geological map sheet (number and name) that the polygon appears on: e.g. EW069_BRADFORD; SC032E_EDINBURGH.	
VERSION	Version number of the digital data: e.g. V1_10. Data with the same number have the same structure; as new fields are added or other major changes made so the version number is changed.	
RELEASED	Date the DiGMapGB data was converted into release format.	
NOM_SCALE	Nominal scale of the published (or compiled) information used to prepare the digital data, e.g. 1:50 000 [including 1:63 360] or 1:10 000 [including 1:10 560].	note 8
NOM_OS_YR	The latest year date of Ordnance Survey information contained in the topographic base used for the original printed geological map (or the base used for DiGMapGB compilations). Fuller details are available if required.	
NOM_BGS_YR	The latest year date of the principal BGS geological information contained in the 1:50 000 digital tile. This is usually the year of publication of the most up-to-date map sheet. Where no published map was available it is the year of compilation for DiGMapGB-50. Fuller details are available if required.	
MSLINK	Used for BGS QA purposes.	
	Additional notes	
note 1	In the preparation of DiGMapGB data each LEX_ROCK pair is given a unique number which is then used to link to other BGS databases and thereby provide the information used to populate the other information fields. See other DiGMapGB explanatory notes at http://www.bgs.ac.uk/products/digitalmaps	
note 2	The Lexicon is a database of named rock units and definitions which can be viewed on the Internet at http://www.bgs.ac.uk/lexicon/lexicon_intro.html. The majority of stratified rock units are given a lithostratigraphical name whilst none-stratified units, such as igneous intrusions and some metamorphic bodies, have a lithodemic name.	
note 3	Direct access to the Lexicon can be obtained via the web by prefixing the LEX code with the BGS web address…. http://www.bgs.ac.uk/scripts/lexicon/lexicon.idc?pub= thus: http://www.bgs.ac.uk/scripts/lexicon/lexicon.idc?pub=GOG	
note 4	The BGS Rock Classification Scheme (RCS) is available in 4 Volumes which can be downloaded free at: http://www.bgs.ac.uk/bgsrcs/home.html	
note 5	Further explanatory notes are available on lithostratigraphic units at: http://www.bgs.ac.uk/products/digitalmaps/lithostrat.html and lithodemic units at: http://www.bgs.ac.uk/products/digitalmaps/lithodemic.html	

note 6	Where possible the parentage of each rock unit is provided in so far as it is applicable. Thus a named unit of Bed rank may be part of a named Member, which is itself part of a Formation. Several Formations may make up a Group and several Groups may form a Supergroup. A Formation is the prime mapping-unit and need not be divided up into named Members or Beds; nor does a Formation have to belong to a Group or Supergroup.	
note 7	The Age Number is a hierarchical 7-digit number, based on the chronostratigraphical age, that allows rock units to be ordered approximately, or selected or queried by their age. It is not an absolute age in years.	
note 8	Digital data should normally only be used at scales similar to the source data; for example 1:50 000 data are not suitable for use at 1:10 000 scale without great caution. http://www.bgs.ac.uk/products/digitalmaps/geninfo8.html	

14 Linear feature information fields

All the linear features are identified by type as summarised in the table below.

Category	Feature
Rock segment	coal, gypsum, ironstone, tonstein, oil shale, cementstone bed or incrop; inferred or observed
Fault segment	normal, thrust, reverse, slide, oblique slip, strike slip, shear zone, scissor, sub-Triassic, inferred or observed; observed underground; undifferentiated; incrop of fault
Vein segment	inferred or observed
Fold axial plane	anticline, syncline, anticline/syncline pair; antiform, synforms, antiform/synform pair; monocline; reclined; recumbent; chevron; concentric; disharmonic; kink; pre-lithification, ptygmatic; similar; unknown
Fossiliferous horizon segment	algal, brachiopod, coral, Eustheria, Lingula, marine, mussel, Planolites bands
Alteration boundary	limit of dolomitisation, reddening, hydrothermal alteration, metamorphic aureole, migmatisation, granite vein, granite pegmatite vein, pegmatite, diorite-granodiotite
Linear landform segment	backfeature of former coast / lake margin / river terrace; buried channel centre / margin; drift filled hollow; drumlin crestline / line at base; dune crestline / line at base; elongate margin crestline; esker crestline / line at base; glacial drainage channel centre / margin; linear feature crestline; marked break in slope

In most of the current DiGMapGB data these linear features are not specifically labelled, for example coal seams, marine bands and faults are not named, but it is planned to do so in future versions of the detailed DiGMapGB-10 datasets.

15 Licences and obtaining data

BGS does not sell digital map data; they are made available under non-exclusive, non-transferable licence agreements, full details of which are supplied. There is a licence fee that entitles the licensee to use the data in-house for an agreed period of between one and five years but does not allow supply to a third party. There are three components to the fee:

1) Data Usage Charge [DUC]; variable fee depending on scale of the data, duration of the licence, area in square kilometers, and the number of licensed seats required.

2) Licence Administration Charge [LAC]; fixed fee of £150 applied each time a licence is issued or renewed.

3) Data Preparation Charge [DPC]; fixed fee, typically of £150 applied to each new licence with supply of data. It may vary for different datasets and for any one dataset there may be more than one fee depending on how many preparations are required.

The total fee = DUC + LAC + DPC

Areas are user-defined and need not conform to BGS sheet boundaries or the National Grid. There is no minimum, but orders for small areas are not cost effective because of the fixed LAC and DPC charges. Discounts are applied for large areas.

Users are the number of people that can access the data at the same time, also referred to as the number of seats, PCs or workstations. Discounts are applied to the Data Usage Charge element for multiple users in price bands, for example:

Band 1 for 1 user: standard 1 x DUC
Band 2 for 2-5 users: 2 x DUC
Band 3 for 6-10 users: 3 x DUC]

Discounts may also be applicable for acceptable academic use, subject to approval by the IPR manager. Some examples of the total licence fee chargeable are tabulated below.

Scale	Unit charge per sq km	Example area in sq km	Example DUC + LAC + DPC	
			1 user for 1 year	1 user for 5 years
1:10 000	£3.75	25 (1 tile):	£394	£769
1:25 000	£0.60	100 (1 tile)	£360	£600
1:50 000	£0.15	560 (1 tile)	£384	£720
1:250 000	£0.006 (per theme)	10 000 (1 tile)	£360	£600
1:625 000	£0.00096	10 000	£310	£348

These fees are exclusive of VAT and fees for either two, three or four year usage can be calculated.

The data should be ordered through the IPR section, by contacting Dr Jean Alexander, the IPR manager, who will deal with any questions about the BGS data licensing or data usage. Data is normally dispatched within 15 working days of the confirmation of an order.

Geological map data are revised periodically, not normally annually. When the dataset is changed there is a new release. When major changes are made to the whole dataset a new Version is created and released. When changes are made to part of a dataset the update is released. Licensees will be provided with new Versions and geologically significant updates such as new or replacement tiles, revised geological linework, renamed geological units, or major changes to the information fields. The licensee will not automatically receive a new dataset each year if no changes have been made to the data.

16 Copyright

NERC accepts no responsibility for maintenance or technical support.

Use by customers of information provided by the BGS is at the customer's own risk. In view of the disparate sources of information at the BGS's disposal, including such material donated to the BGS that the BGS accepts in good faith as being accurate, the Natural Environment Research Council (NERC) gives no warranty, expressed or implied, as to the quality or accuracy of the information supplied, or to the information's suitability for any use. NERC/BGS accepts no liability whatever in respect of loss, damage, injury or other occurrence however caused.

The copyright of any coastline supplied with the dataset, or comprising an integral part of the dataset, or derived from the dataset, is vested in the Crown. The user must obtain Ordnance Survey permission to use OS topographic data.

17 Contacts

For further information on DiGMapGB please contact the following as appropriate:

Availability of DiGMapGB data; **ordering** data; **technical** enquiries:	
Mr Roger Parnaby Map Data Supply British Geological Survey Keyworth Nottingham NG12 5GG	☎ 0115 936 3554 email: DiGMapGBdata
Licensing DiGMapGB data:	
Dr J Alexander Intellectual Property Rights Manager British Geological Survey Keyworth Nottingham NG12 5GG	☎ 0115 936 3331 email: IPR Section
Geological content of DiGMapGB; **feedback** on deficiencies, usage, ways to improve etc	
Mr A Smith DiGMapGB project leader) British Geological Survey Keyworth Nottingham NG12 5GG	☎ 0115 936 3249 email: DiGMapGB

Further information may be accessed through the BGS World Wide Web site:

www.bgs.ac.uk/products/digitalmaps/digmapgb.html -home page for BGS digital map products with links to the different kinds of digital map, their availability and how to obtain them, their use and explanatory notes.

www.bgs.ac.uk -home page for access to all information regarding the BGS and its products and services.

18 Referring to DiGMapGB datasets

References to BGS digital geological map datasets follow the format for paper publications as far as possible and ideally includes the following:-

Primary responsibility	author or body
Date	publication or date of copyright, span of dates, or latest date
Title (+/-theme)*	sufficient to identify the dataset

Type of medium	in square brackets: [CD-ROM], [disc]
Edition	edition, version or update etc
Place of publication	city or town
Publisher	BGS
(+/- Specific tile)*	
Release date	

*optional as required

Within this framework it is possible to refer to the particular geological theme such as 'Bedrock', 'Superficial Deposits' or 'Sea Bed Sediments' where necessary. Also one can refer to particular parts of a dataset by identifying the name/number of specific map 'tiles' of digital data as appropriate.

For example:

British Geological Survey. 2003. Digital Geological Map of Great Britain 1:625 000 scale (DiGMapGB-625) Superficial Deposits data [CD-Rom]. Version 1.10. Keyworth, Nottingham: British Geological Survey. Release date 30-04-2003.

British Geological Survey. 2003. Digital Geological Map of Great Britain 1:625 000 scale (DiGMapGB-625), Bedrock data [CD-Rom]. Version 1.10. Keyworth, Nottingham: British Geological Survey. Release date 28-04-2003.

British Geological Survey. 2003. Digital Geological Map of Great Britain 1:250 000 scale (DiGMapGB-250) data [CD-Rom]. Version 1.10. Keyworth, Nottingham: British Geological Survey. Release date 13-11-2003.

British Geological Survey. 2003. Digital Geological Map of Great Britain 1:250 000 scale (DiGMapGB-250) Offshore Bedrock data [CD-Rom]. Version 1.10. Keyworth, Nottingham: British Geological Survey. Release date 13-11-2003.

British Geological Survey. 2003. Digital Geological Map of Great Britain 1:250 000 scale (DiGMapGB-250) Offshore Sea Bed Sediment data [CD-Rom]. Version 1.10. Keyworth, Nottingham: British Geological Survey. Release date 13-11-2003.

British Geological Survey. 2004. Digital Geological Map of Great Britain 1:50 000 scale (DiGMapGB-50) data [CD-Rom]. Version 2.10. Keyworth, Nottingham: British Geological Survey.

British Geological Survey. 2004. Digital Geological Map of Great Britain 1:50 000 scale (DiGMapGB-50) data [CD-Rom]. Version 2.10. Keyworth, Nottingham: British Geological Survey. Tile EW257_Romford. Release date 30-06-2004.

British Geological Survey. 2003. Digital Geological Map of Great Britain 1:10 000 scale (DiGMapGB-10) data [CD-Rom]. Version 1.10. Keyworth, Nottingham: British Geological Survey.

British Geological Survey. 2003. Digital Geological Map of Great Britain 1:10 000 scale (DiGMapGB-10) data [CD-Rom]. Version 1.10. Keyworth, Nottingham: British Geological Survey. Tile TQ69SW. Release date 23-06-2003.

Compiled by A Smith

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NATURAL ENVIRONMENT RESEARCH COUNCIL

List of additional notes for digital map data

To be read in conjunction with this general note as applicable.

1 DiGMapGB datasets, onshore

1.1 1:10 000 scale (DiGMapGB-10) data

1.2 1:25 000 scale (DiGMapGB-25) data

1.3 1:50 000 scale (DiGMapGB-50) data

1.4 1:100 000 scale (DiGMapGB-100) data

1.5 1:250 000 scale (DiGMapGB-250) data

1.6 1:625 000 scale (DiGMapGB-625) data

2 Offshore datasets

2.1 1:250 000 scale (DiGMapGB-250 / DigSBS250) data

3 Other digital datasets

3.1 1:100 000 scale Mineral Resource Data of England and Wales

3.2 1:625 000 scale Hydrogeology map of Great Britain

3.3 1:100 000 scale County Minerals maps