

# Free at the point of use

The next generation of BGS online resources



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**British  
Geological Survey**  
Expert | Impartial | Innovative

Working with new technology and data to understand and predict the geological processes that matter to people's lives and livelihoods.



UK Research  
and Innovation



**British  
Geological Survey**  
Expert Impartial Innovative



# William Smith's 1815 map

“A Delineation of the Strata of England and Wales with part of Scotland”

This was the ‘map that changed the world’ & helped shape the economic and scientific development of Britain, helping to source raw materials for the industrial revolution.

It came in 15 sections, each with 6 panels, in total 8 feet long and 6 feet wide!

Clive pointing out Durham on the full size replica, BGS Keyworth





# Mapping Since 1815



**Geological Survey of Scotland staff, Inchnadamph, Highlands (sometime in the 1880's)**

Included in the group – far left John Horne & second right Ben Peach – famous for their work on the North West Highlands of Scotland





BGS geologist using field tablet (looking NW to Loch Broom, NW Scotland)



# DiGMapGB

Digital Geological Map of GB -  
1:10 000 to 1:625 000 scale

Themes: bedrock, superficial,  
mass movement, artificial  
ground, linear features

## DiGMapGB-50

1:50,000 / 99% coverage GB

Licenced 20p/km<sup>2</sup>  
(ESRI, MapInfo + others on request)

Free WMS, alternatively  
Geology of Britain viewer





# Where to start...

- **OpenGeoscience** BGS open data portal
- **GeoIndex** [www.bgs.ac.uk/geoindex/](http://www.bgs.ac.uk/geoindex/)  
Map-based index for professionals, onshore and offshore viewers, desktop and mobile
- **Geology of Britain viewer**  
<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>
- **BGS maps portal** – over 6000 high-resolution maps & sections can be viewed online including historic maps
- **Apps** iGeology (iOS & Android) / iGeology 3D (Android)  
*mySoil* (iOS & Android) / *myVolcano* (iOS)



## Browse our free data

### View maps



Data published through map viewers allowing you to reveal more about the ground beneath your feet.

### Apps



Bespoke mobile apps, such as *iGeology* and *mySoil* that allow you to view BGS datasets on a map where ever you are!

### Map data downloads



A number of GIS datasets for download including some of our core, baseline datasets showing geology, gravity and magnetic data, and hydrogeology data.

### Photos and images



Open access to a number of our photo collections, including petrological thins.

### Publications



Free to view publications produced by the survey, and by other bodies whose responsibility was later taken over by the survey.

### Scanned records



Open access to a number of our digital scan collections, including borehole log scans and published maps.

### Data collections



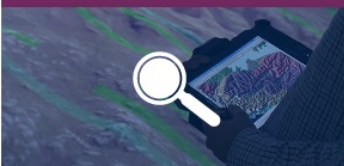
Search, view and download many of BGS's most popular databases and vocabularies.

### Web services



More of our information is accessible through web services and linked data to encourage developers to use and innovate it within their own systems.

### Software



BGS have developed a number of software tools to advance their understanding of scientific systems and help them model geological and hydrogeological processes.

OpenGeoscience is a free service where you can view maps, download data, scans, photos and other information.

Available under the Open Government Licence – acknowledge as follows:

"Contains British Geological Survey materials ©UKRI 2018"

# OGL



Enter location



## Data



Borehole scans



ADD DATA

SHOW LEGEND

Reference: N224SE131

Name: DURHAM UNIV SCIENCE LABS 3

Length (m): 51.450000

Date: 1983

Easting: 427705

Northing: 541188

Record: [Scan](#)

### Durham University Science Laboratories No. 3 Borehole

Drilled - May 1983.

Position - 50 m, S 30°E of the south-east corner of the Psychology Building, University Science Laboratories, Durham. The borehole was sunk on the site of the Mountjoy Research Centre. Grid Reference NZ 27714118.

Height - 95 m AOD.

Direction - Vertical.

Driller - Mr. P. Turner of C.H. Stevenson and Co. (Blasting) Ltd., South Shore Road, Gateshead for Soils Engineering of Middlesbrough.

Rig - Air flush.

Cores examined by Mr. P. Turner (driller).

0 - 46.62 m	Drift clay and sand, unstable sides and casing had to be inserted. Rockhead into sandstone at 46.62 m.
46.62 - 47.11 m	Sandstone.
47.11 - 47.46 m	Shale.
47.46 - 47.90 m	Coal believed to be the Maudlin Seam (H).
47.90 - 50.75 m	Interbedded sandstone and shale.
50.75 - 51.45 m	Sandstone.

Note: This log was supplied by the driller after the hole was completed. No rock samples were seen by G.A.L.J.

### Map Legend

Borehole scans

- Unknown Length
- Confidential
- 0 - 10m
- 10 - 30m
- 30m+





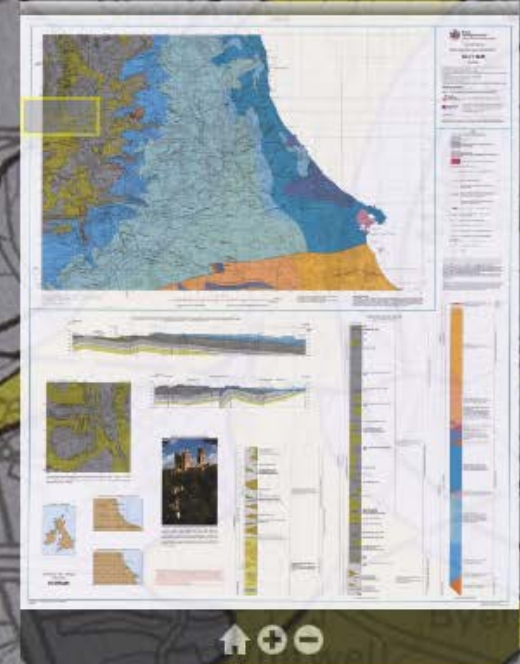
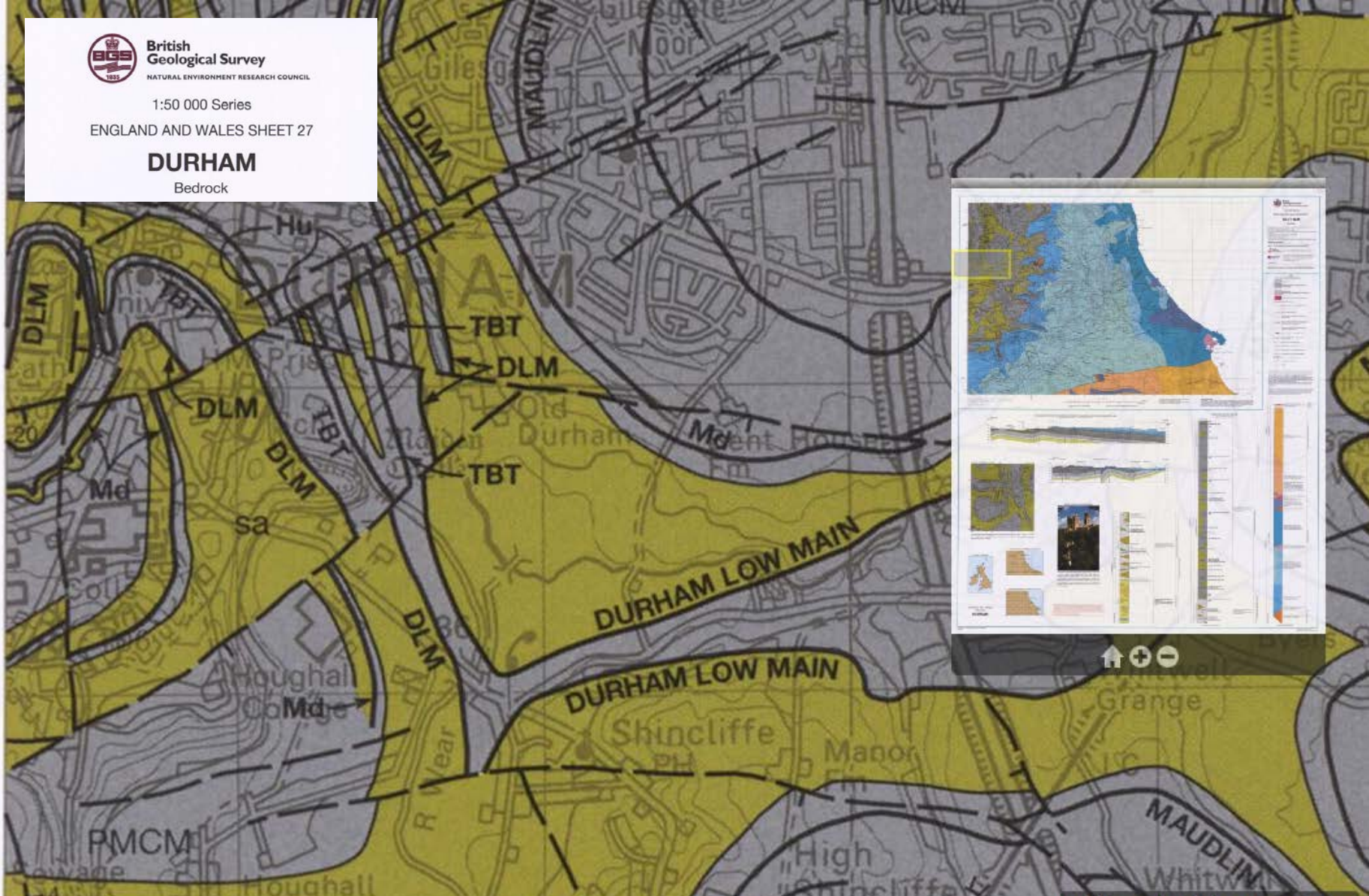
British Geological Survey  
NATURAL ENVIRONMENT RESEARCH COUNCIL

1:50 000 Series

ENGLAND AND WALES SHEET 27

## DURHAM

Bedrock



## BGS Maps Portal

Maximum extent of view of 1:50,000 geological map for Durham



 **Surface Geology**    **3D Models**    **Borehole Scans**    **Earthquake Timeline**


**Surface Geology**


- Superficial only
- Bedrock only
- Bedrock and Superficial


Visible geology:  
1:625 000 scale

**Geology Key**

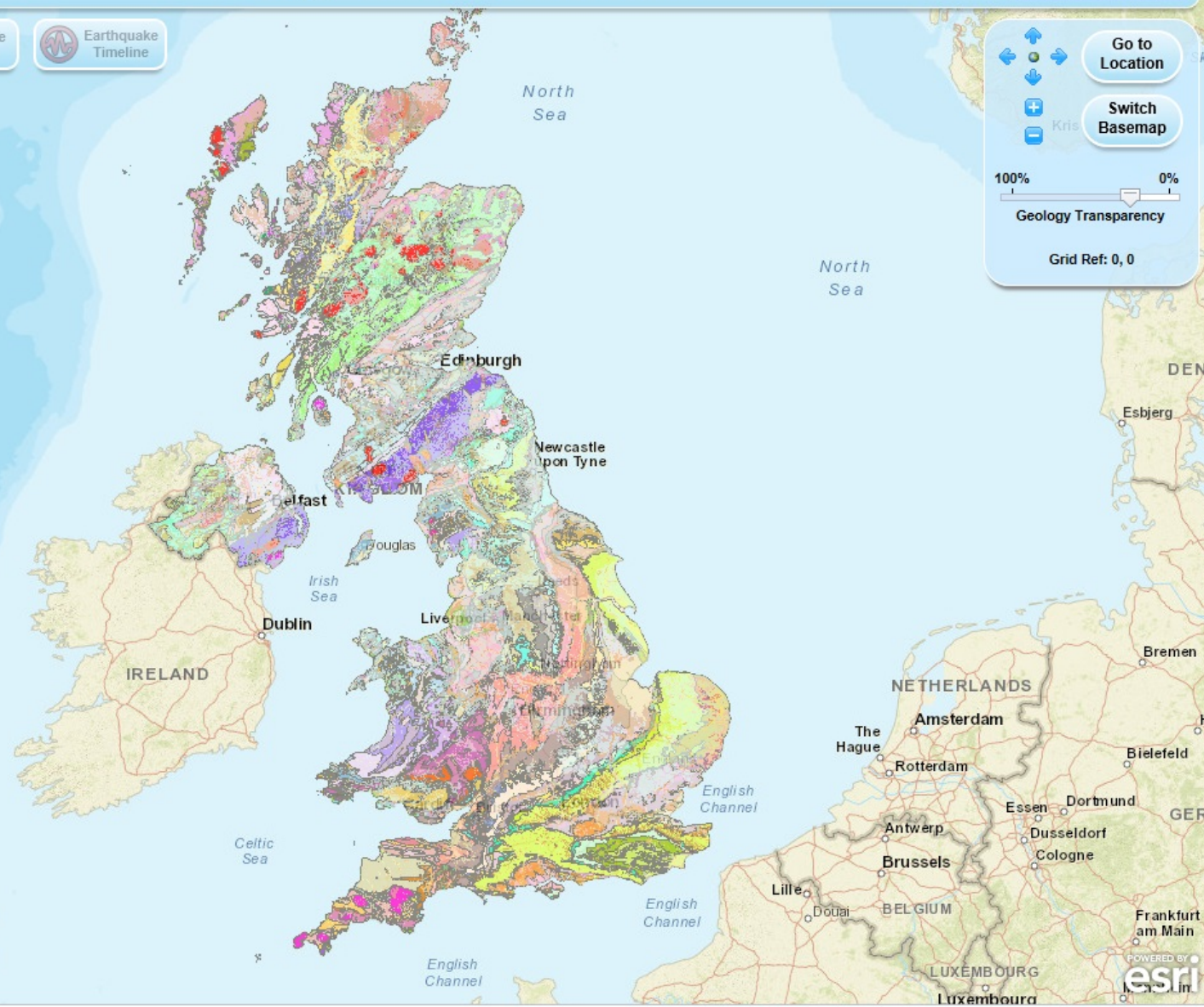
[More on digital geology](#)

 **Go to Location**

 **Switch Basemap**

100%  0%  
**Geology Transparency**

Grid Ref: 0, 0





-  Surface Geology
-  3D Models
-  Borehole Scans
-  Earthquake Timeline


## Surface Geology

- Superficial only
- Bedrock only
- Bedrock and Superficial

Visible geology:  
1:50 000 scale

Geology  
Key

[More on digital geology](#)



100%  0%

Geology Transparency

Grid Ref: 429806, 540608

Bedrock geology  Superficial deposits

### 1:50 000 scale bedrock geology description:

Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone. Sedimentary Bedrock formed approximately 310 to 318 million years ago in the Carboniferous Period. Local environment previously dominated by swamps, estuaries and deltas.

**Setting:** swamps, estuaries and deltas. These sedimentary rocks are fluvial, palustrine and shallow-marine in origin. They are detrital, forming deposits reflecting the channels, floodplains and deltas of a river in a coastal setting (with periodic inundation from the sea).

[Further details](#)

[What is Bedrock Geology?](#)

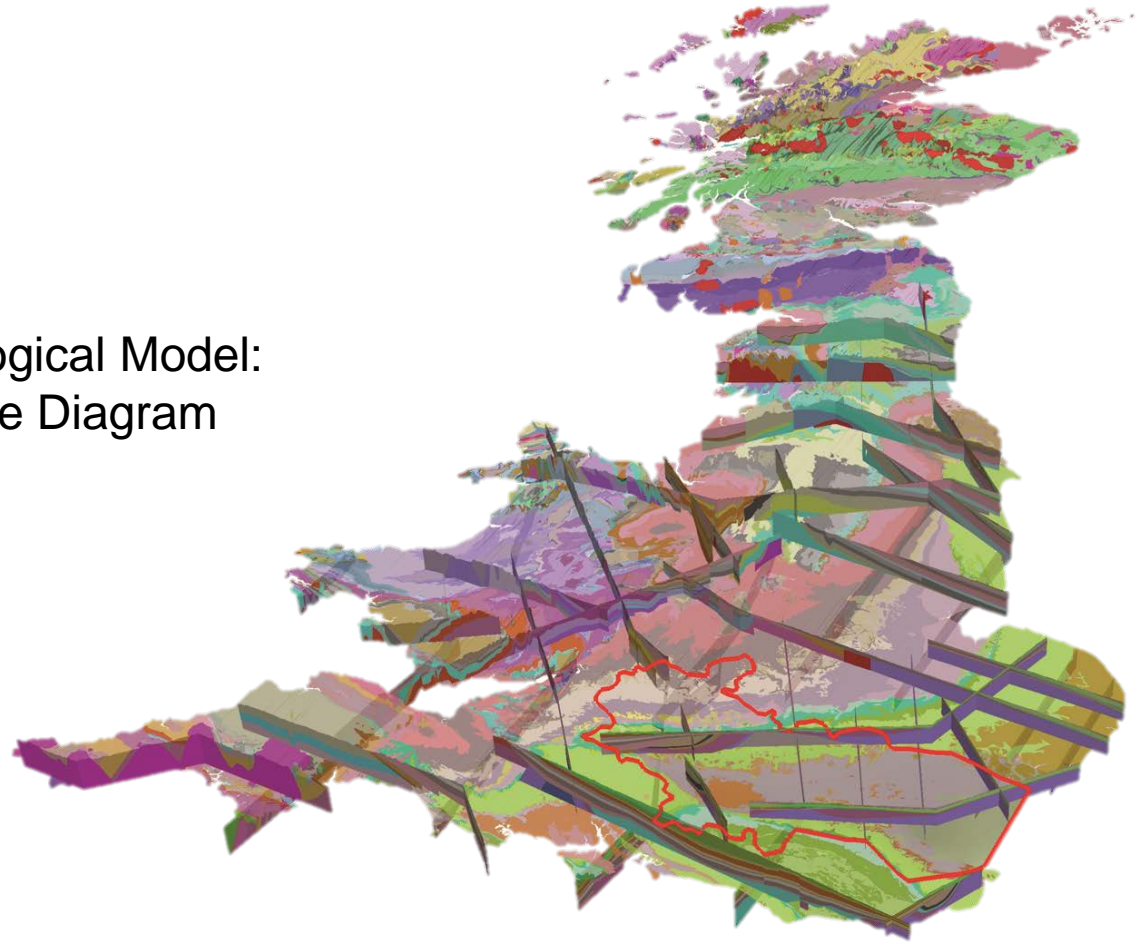
[To purchase detailed geological reports for this area, try our GeoReports service](#)



# Geology of Britain

Welcome to the 3D Geology of Britain viewer. Now you can dive beneath the ground surface and explore the geology beneath!

Integrating the National Geological Model:  
UK3D National Bedrock Fence Diagram







Grid Ref: 427111m, 542746m. Elevation: 51m

DoBH, OS, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA | Source: USGS, NGA, NASA, CGIAR, GEBCO, N Robinson, NCEAS, NLS, OS, NMA, Geodata... Powered by Esri

Geology of Britain viewer <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>



1 of 2

### Cross Section

**Description:** PENNINE LOWER COAL MEASURES FORMATION AND SOUTH WALES LOWER COAL MEASURES FORMATION (UNDIFFERENTIATED) - MUDSTONE, SILTSTONE, SANDSTONE, COAL, IRONSTONE AND FERRICRETE - MUDSTONE, SILTSTONE, SANDSTONE

### Cross Section

**Description:** UNNAMED IGNEOUS INTRUSION, CARBONIFEROUS TO PERMIAN - DOLERITE AND THOLEIITIC BASALT - DOLERITE AND THOLEIITIC BASALT

[More information](#)

1 of 2

### Cross Section

**Description:** ORDOVICIAN ROCKS (UNDIFFERENTIATED) - MUDSTONE, SILTSTONE AND SANDSTONE

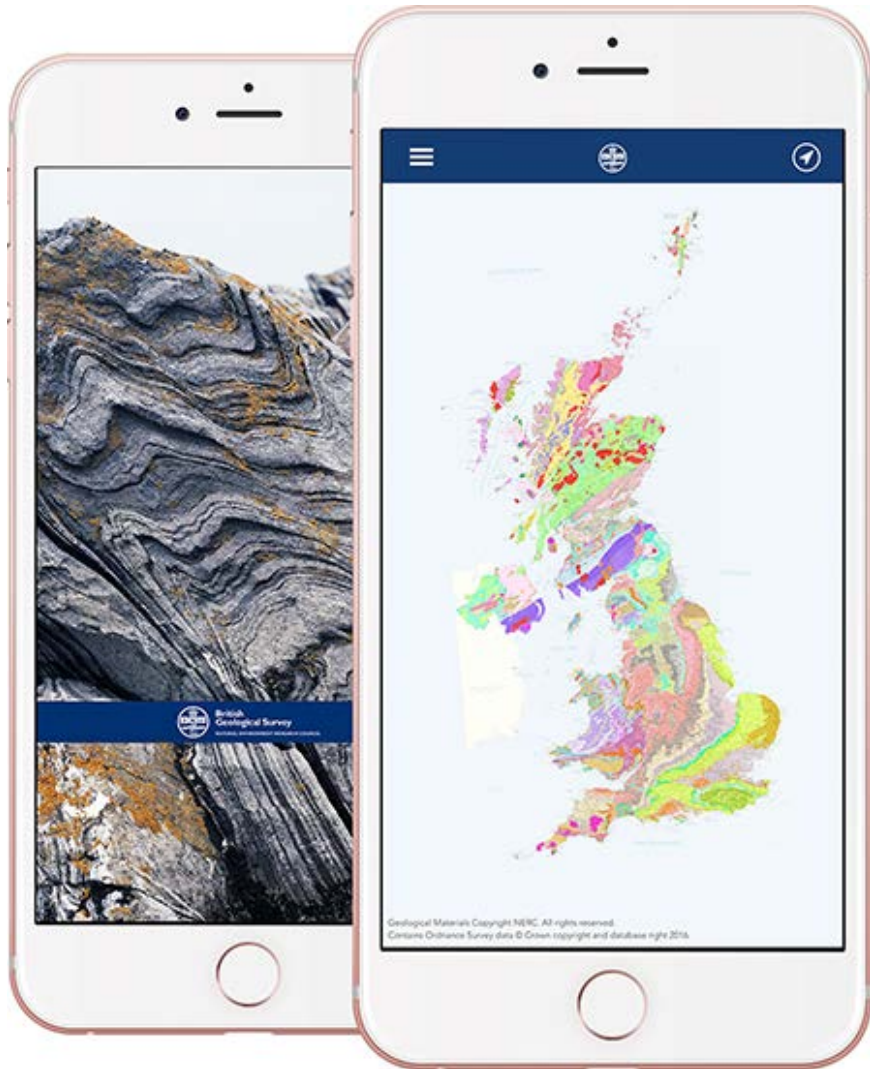
[More information](#)

1 of 2

Grid Ref: 429495m, 542674m. Elevation: 0m



# iGeology



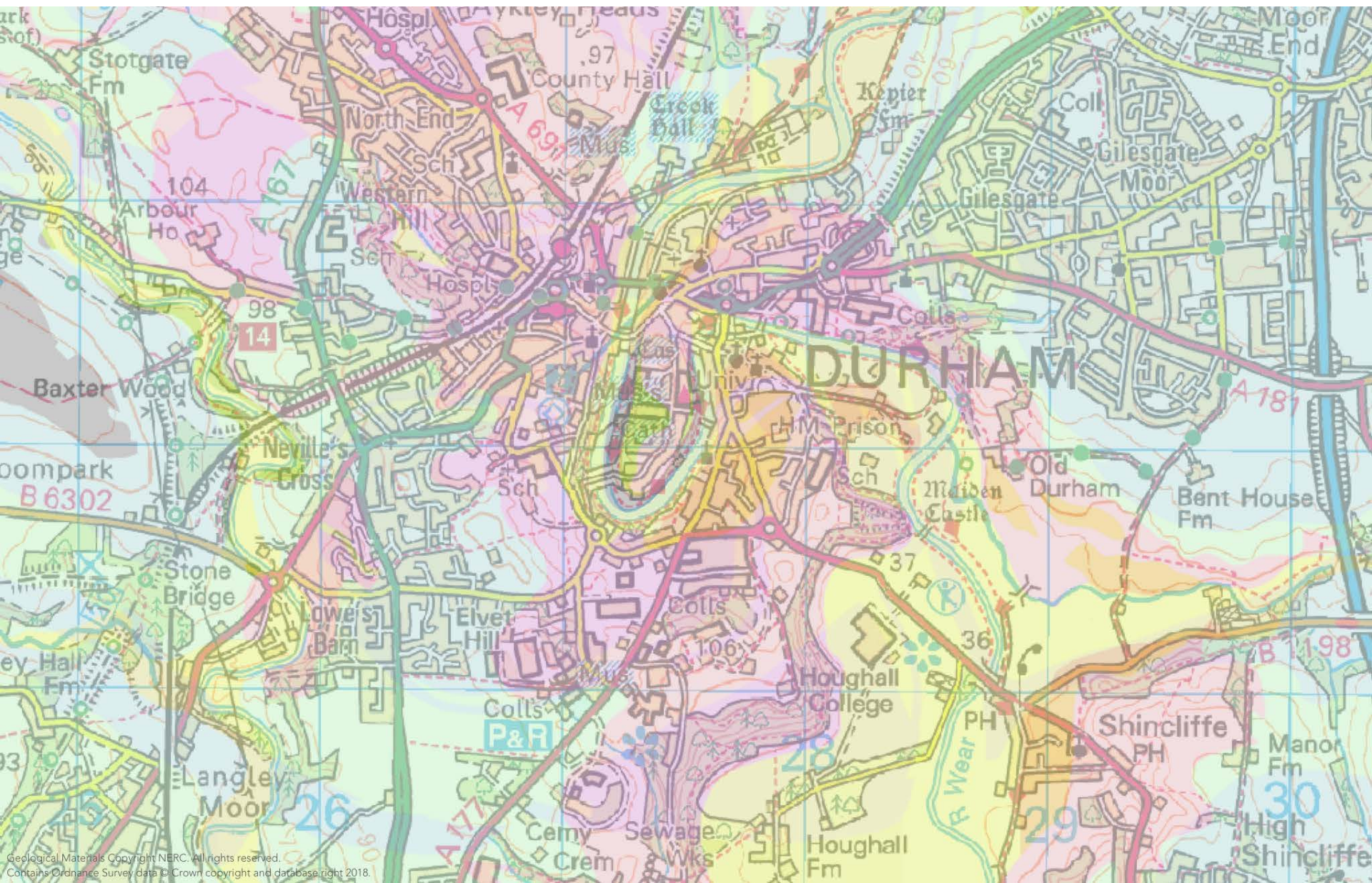
Free iOS/Android App by BGS

Free access to the equivalent of 500 geology maps

Version 5.0.4 additions, citizen geoscience contributions

- outcrop descriptions
- points of interest
- Photos
- Social media-style photofeed





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Contains Ordnance Survey data © Crown copyright and database right 2018.

iGeology map for Durham (combined Superficial & Bedrock surfaces)





## Superficial Geology

### Superficial Lithology

Glaciofluvial Deposits, Devensian - Sand And Gravel. Superficial Deposits.

### Geological Environment

These sedimentary deposits are glaciofluvial in origin. They are detrital, generally coarse-grained, they form beds, channels, plains and fans associated with meltwater.

### Superficial Lexicon Code

GFDUD

## Bedrock Geology

### Bedrock Lithology

Pennine Middle Coal Measures Formation - Sandstone. Sedimentary Bedrock formed approximately 310 to 318 million years ago in the Carboniferous Period.

### Geological Environment

Queried geology for Durham Castle

(from [www.bgs.ac.uk/lexicon](http://www.bgs.ac.uk/lexicon))

## Welcome to MineralsUK

MineralsUK is the British Geological Survey's [Centre for Sustainable Mineral Development](#). This website has a wealth of information on mineral resources, mineral planning, policy and legislation, sustainable development, statistics and exploration.

### Minerals & you

Economic minerals – here you will find out what they are, where they come from and why they are important.

### What's new

- Briefing Note- Battery raw materials
- Mineral profile – Lithium
- United Kingdom Minerals Yearbook 2015

### //Digital maps

A web-based Geographical Information System (GIS) has been produced to provide access to a range of Minerals Information Online.

[more info](#)

### //Downloads

[World Mineral Production 2012-2016](#)  
The latest edition of this long running series is now available.

[more info](#)

### //Video

[Secrets in the Stone](#)  
Paul Everett from the BGS building stones teams describes their work in helping to conserve the built heritage of the UK.

[more info](#)





# MineralsUK.com

- Info on mineral resources, planning, policy & legislation, sustainable development, statistics & exploration
- Free downloads:
  - Directory of Mines & Quarries, 2018 edition imminent!
  - Mineral statistics – UKMY, European, World (data download 1970-2016 for over 100 minerals/ products)
  - MRP, IMAU, County maps, planning factsheets, mineral profiles
  - Risk List - supply risk for elements of economic value
- Digital map viewer of spatial data for mineral resources, planning permissions and environmental designations

# Now and next...

- **Data mining the past** – legacy data given new life  
e.g. IMAU, MRP, County maps, min stats
- **Building Information Modelling (BIM)** – good example of data sharing, public sector driven
- **Crowdsourcing & shared data** – from apps to industry, all data welcome
- **Open data** – free, accessible, updated, who pays?
- **Geospatial Commission** –developing a national geospatial strategy, consultation ends 24<sup>th</sup> October, question themes include data licencing, interoperability & integration of third party data sets



# Digital Twin

- **Models of the subsurface** – from cities, countries to continents and ultimately the whole planet
- **“Google subsurface”** – maybe not Google until it can be monetised, ESRI are leading the way, UK companies are taking up the baton
- **Sensor networks** – real-time subsurface monitoring using low-cost sensors will constantly take the pulse of the planet, with potential for early warning
- **Virtual Earth** – immersive VR technology will enable visualisation of environmental impact prior, during and after development

# Geological Survey 4.0

- **Internet of things** – connection and communication between machines, sensors and people
- **Digital twin** – virtual copy of the planet enriched with digital models and sensor data
- **AI and machine learning** – computers learning to act like humans and improve over time
- **Autonomous decisions** – systems able to make their own decisions and act independently
- **Who needs a geologist?** Sensor-equipped drones telemeter data to the central digital twin hub and provide decisions on subsurface development



# Give us your data!

- **What is the value of keeping data?** Risk of losing it, inaccessible formats & archiving cost
- **Why not give it to BGS?** Save yourself the time/cost, we will archive it, help improve understanding of UK geology and you will be able to access your data via BGS web map portals
- **What do we want?** Borehole records & materials, site investigation reports, preferably digital (e.g. AGS Data Format), not sure, contact us
- **Who do you give it to?** Contact the National Geological Records Centre (NGRC):  
[www.bgs.ac.uk/services/NGDC/records/depositing.html](http://www.bgs.ac.uk/services/NGDC/records/depositing.html)

# Conclusions

- Geological surveys are changing, you would expect that, refocusing strategy is happening as we speak
- BGS will maintain national coverage of geological data, extending into the subsurface, filling in the gaps
- Open data, free and accessible is the future, who pays to manage and maintain is a good question!
- Who will stand here in 30 years time? Or maybe we just tune in to VR [#EIGMars2048](#)



# Thank you for your attention!

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