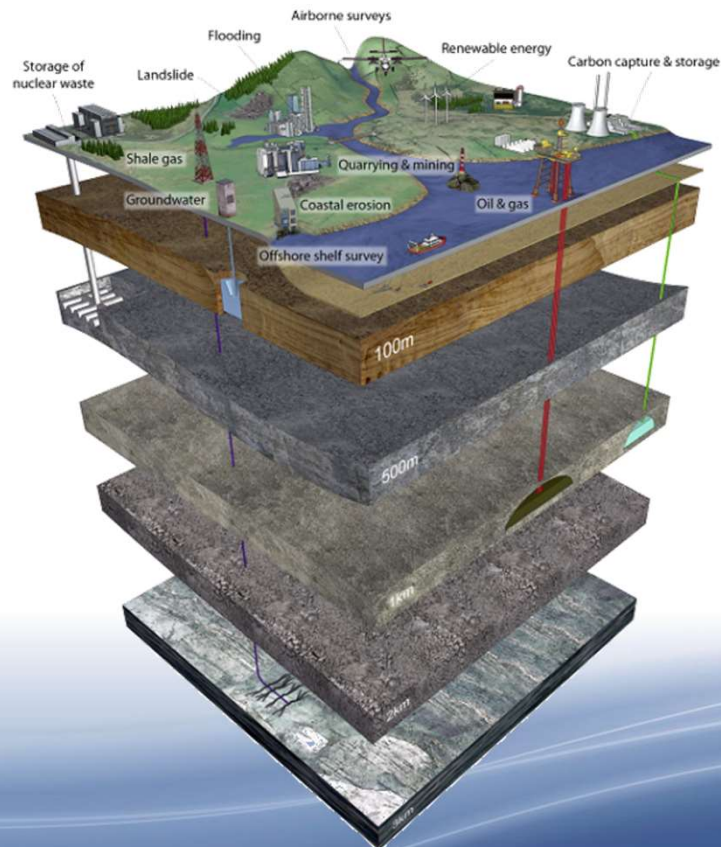




The British Geological Survey

Dr Oliver Wakefield - oliverw@bgs.ac.uk





**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

Dr Oliver Wakefield

Sedimentary Geologist

Nicker Hill, Keyworth, Nottingham. NG12 5GG

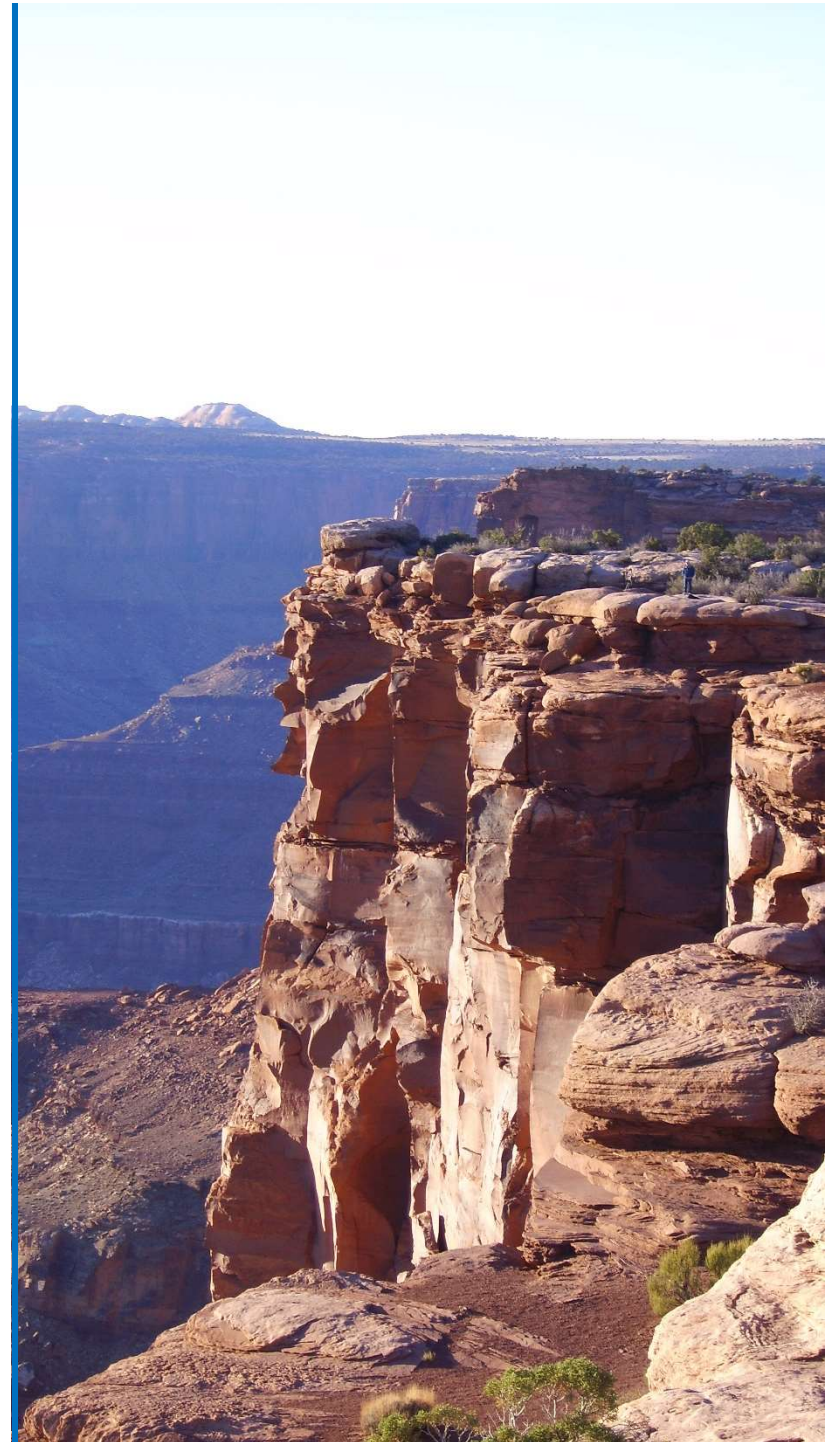
☎ +44 (0)115 9363169 | ✉ oliverw@bgs.ac.uk

Also: enquiries@bgs.ac.uk



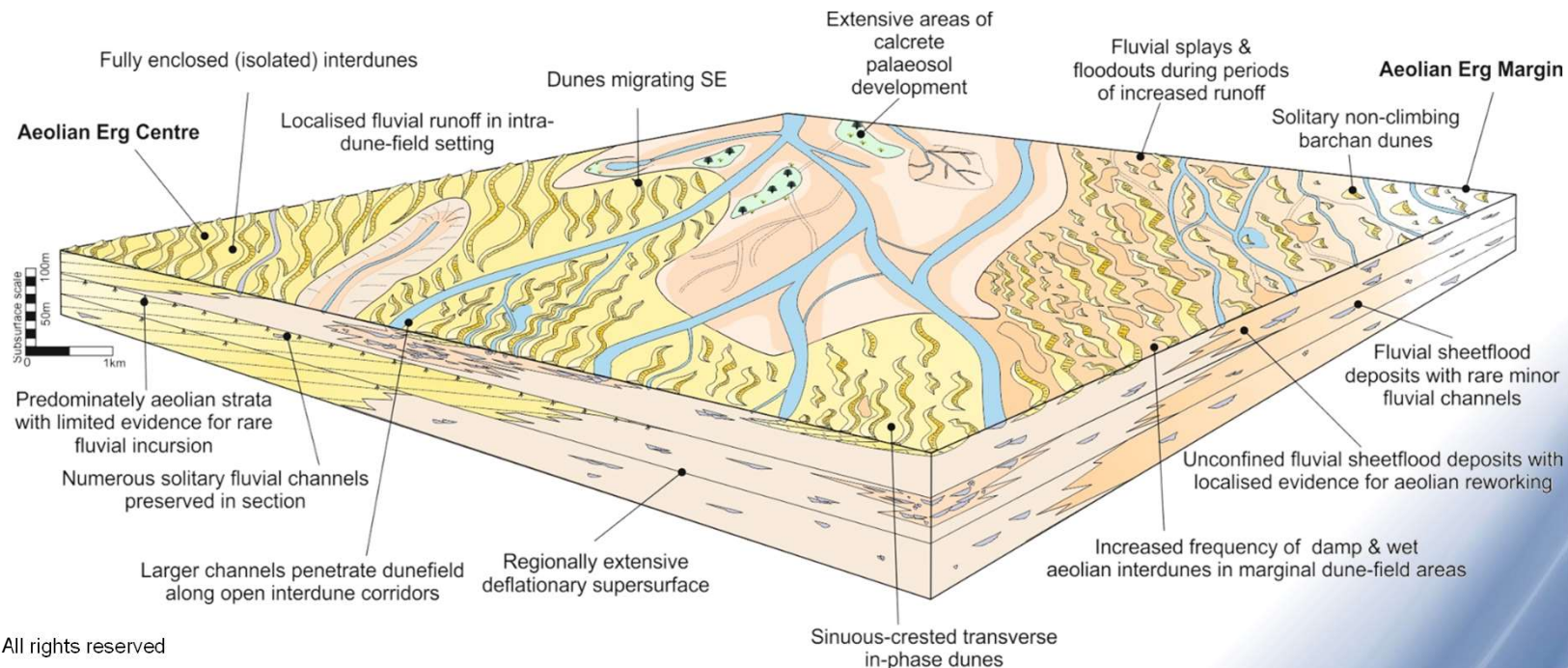
Layout

- **My background**
 - **Skills**
- **BGS**
- **Why have a Geological Survey?**
- **What we do (*past, present, future*)**
 - **Supporting the UK interests**
 - **Commercial work**
 - **Research**
 - **My AOI**
- **Opportunities**
- **Questions**



My Background

- Undergraduate in Geology and Geography
- Completed PhD entitled:
“Aeolian, fluvial and shallow marine sedimentary system interactions in the Permian Cutler Group, southeast Utah, USA”
- Joined BGS (Geology and Landscape England)

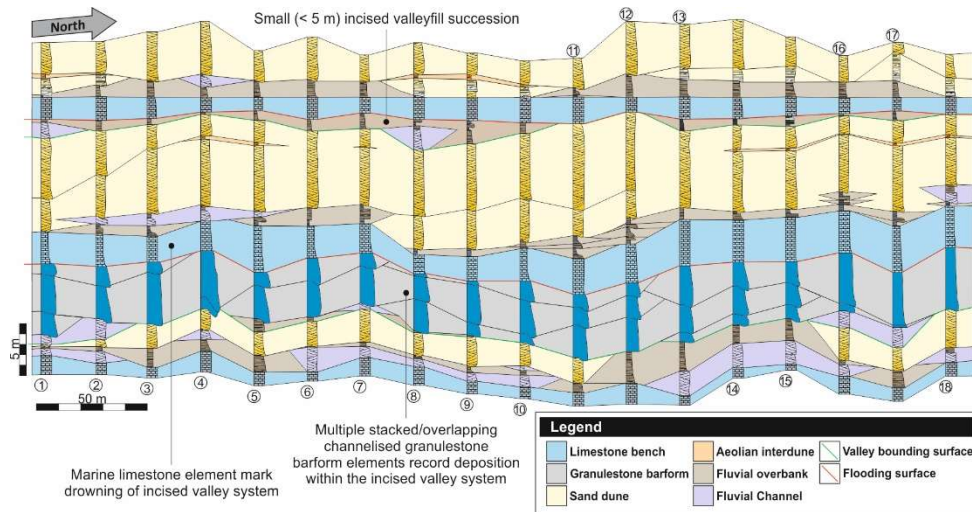




Skills

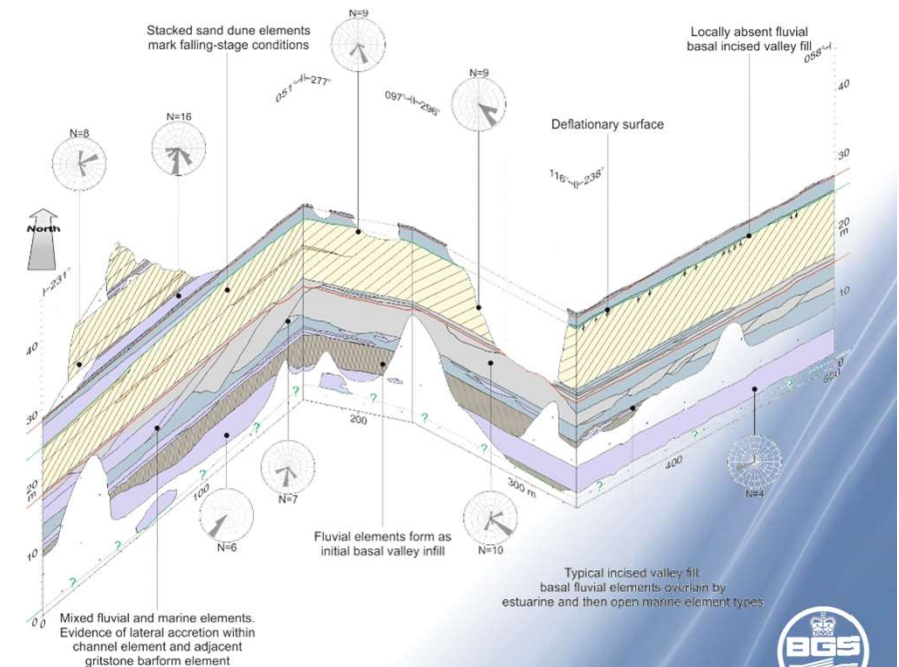
- **Geology...**

- 'Desk' and 'field' skills
 - Sedimentary logging
 - Facies analysis
 - Architectural element analysis
- Computer modelling



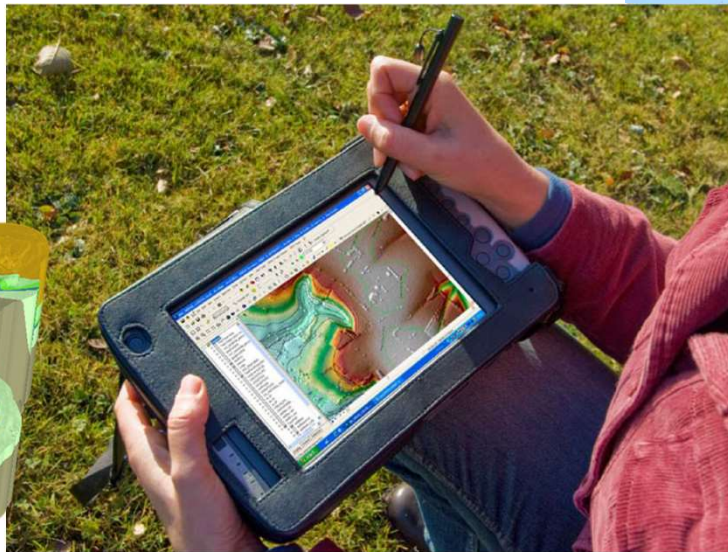
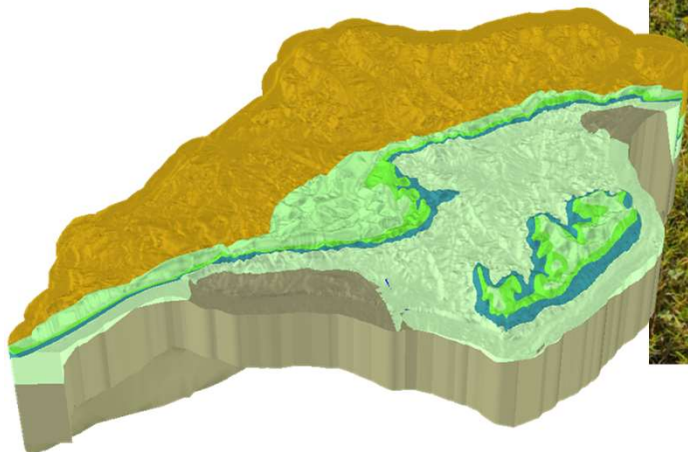
- **Research**

- Creating and conducting
- Grant applications
- Presentations and papers
- Network (groups and people)



BGS

- The British Geological Survey is a part of the Natural Environment Research Council (NERC) and is its principal supplier of national capability in geoscience.
- It advances understanding of the structure, properties and processes of the solid Earth system through interdisciplinary surveys, monitoring and research for the benefit of society.
- We are a world-leading geoscience centre for:
 - survey and monitoring
 - modelling and research
 - data and knowledge



Government (Business, Innovation & Skills)



Research Councils



Arts & Humanities Research Council



British Antarctic Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



Centre for Ecology & Hydrology

NATURAL ENVIRONMENT RESEARCH COUNCIL



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



Some facts

- World's oldest geological survey (*est. 1835*)
- ~£50 m turnover
 - 50% of our income comes from the Natural Environment Research Council (NERC). The rest through commissioned research from the public and private sectors
- Based all over the UK
- Employees 100's staff
- More than just geologists...



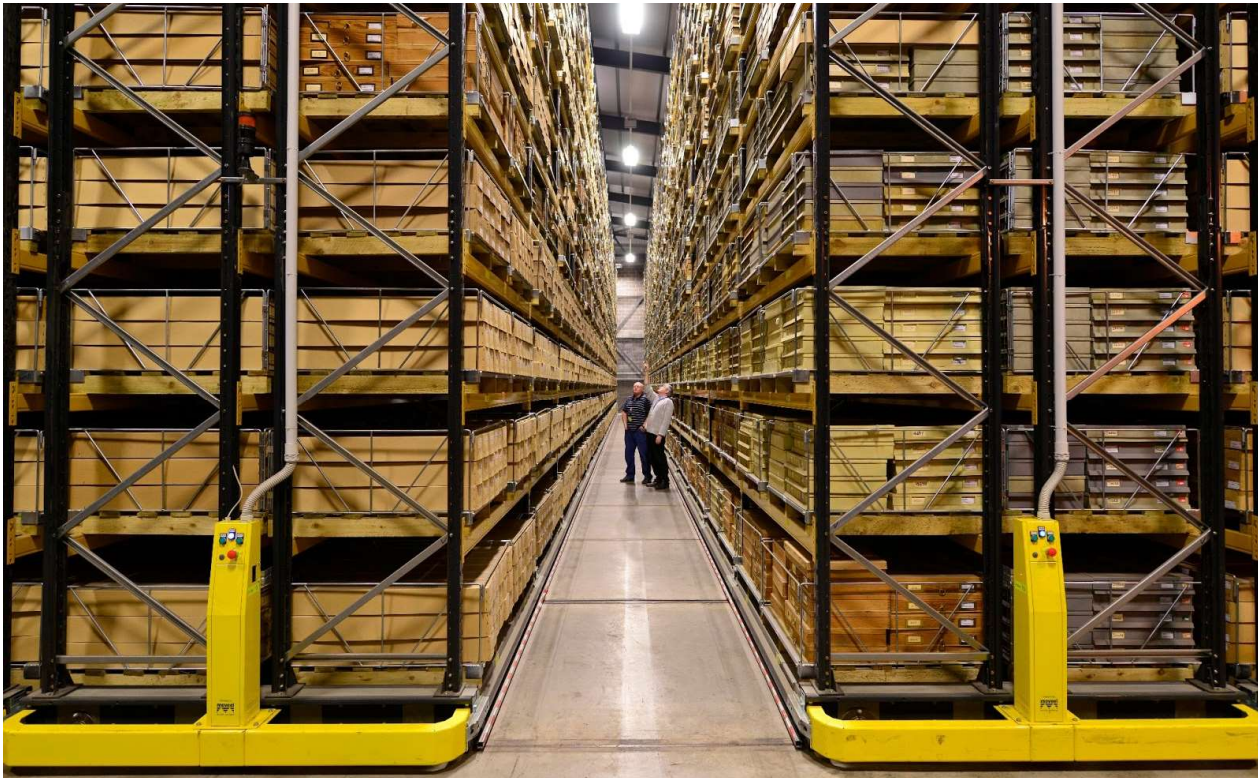
BGS staff roles

- Geologists (sedimentologists, igneous petrologists, metamorphic geologists, survey geologists)
- Stratigraphers
- Engineering geologists
- Mineralogists
- Petrologists
- Palaeontologists
- Hydrologists
- Geophysicists
- Computer modellers
- Mathematicians
- Geochemists
- A huge array of support staff
- *And many more...*







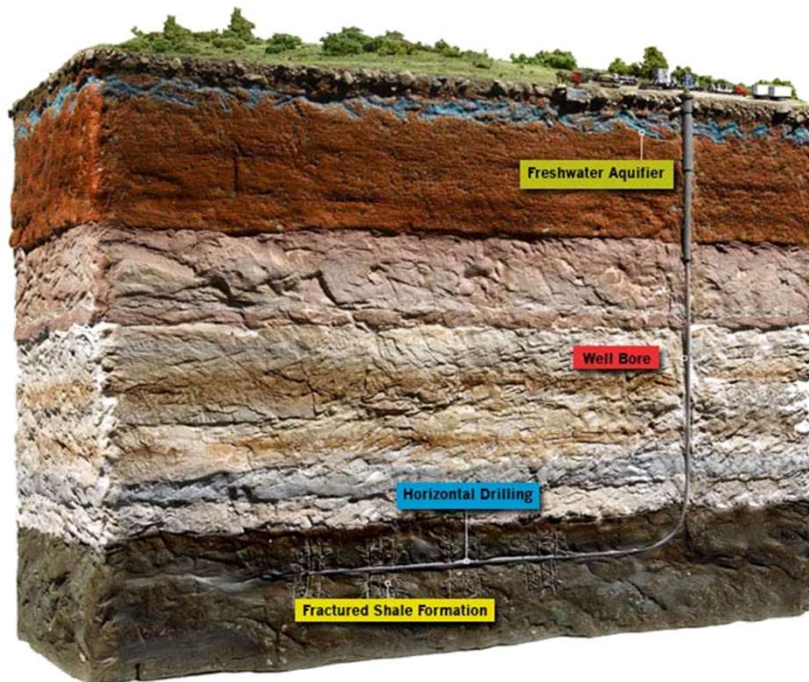


BGS

Question: *Why do we have/need a geological survey?*

Answer: *To provide expert impartial advise (often to government). Some questions only BGS can answer...*

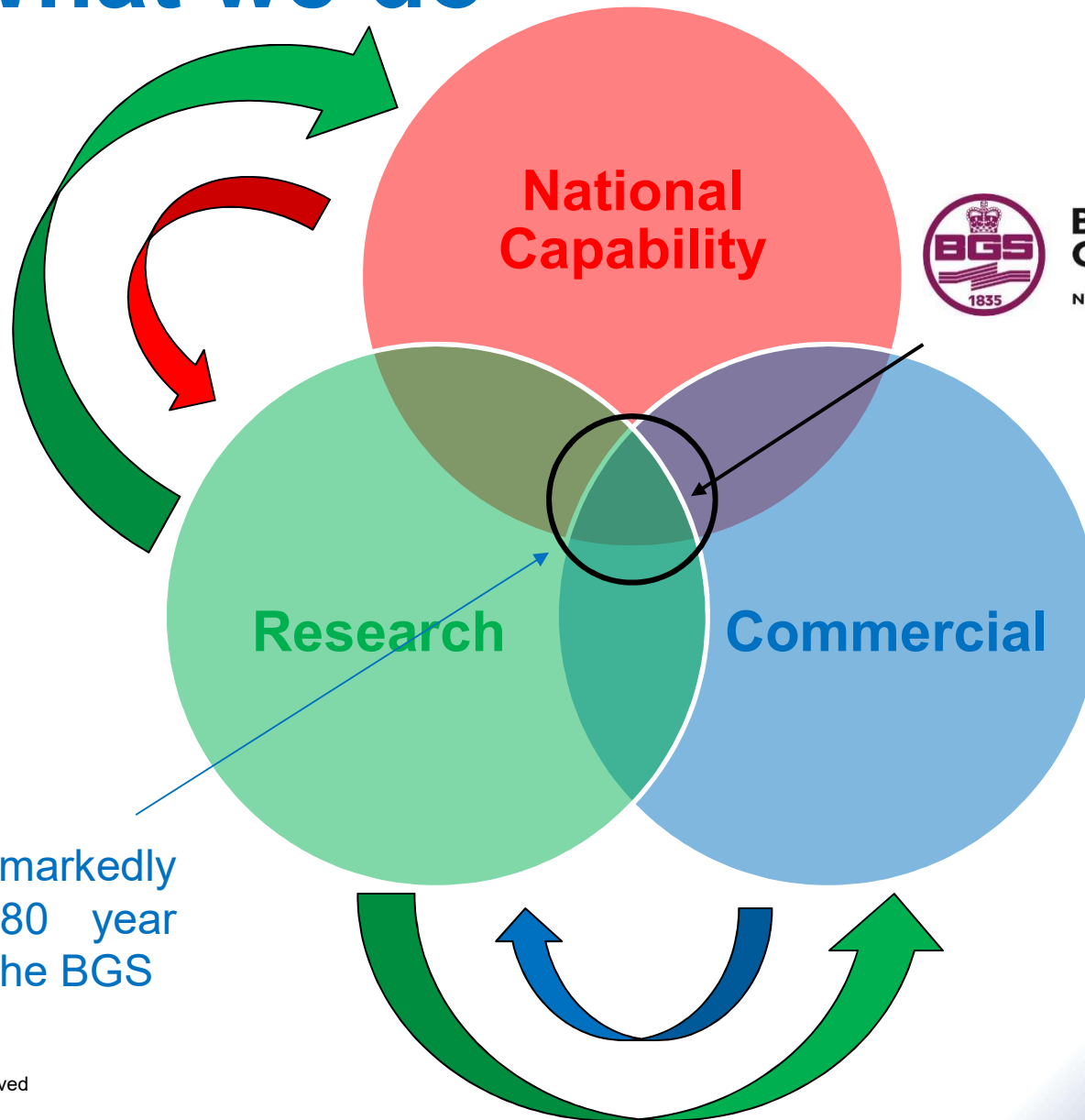
Very important for contentions issues
...like the 'f' word...



Plus the organisation has unique 'rights'.



What we do



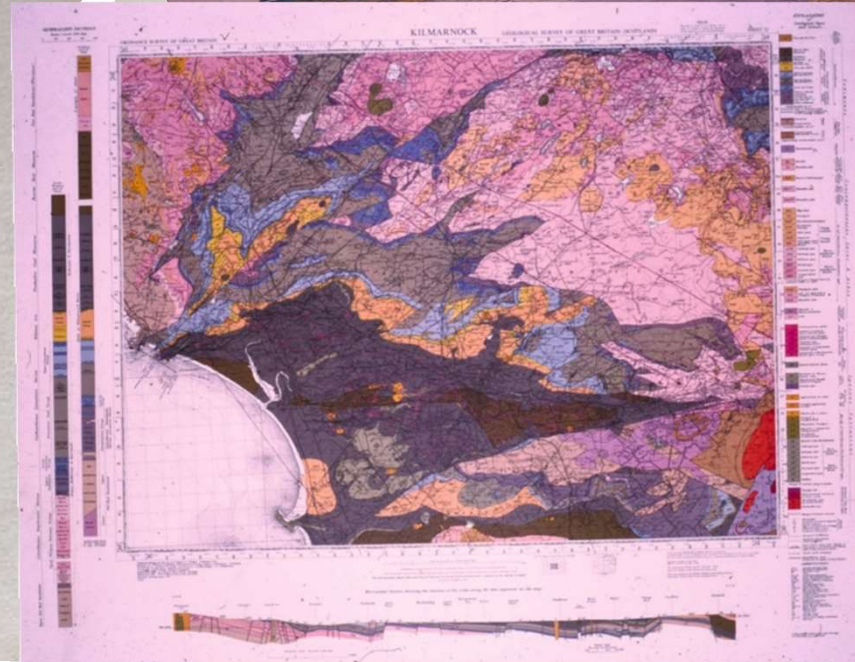
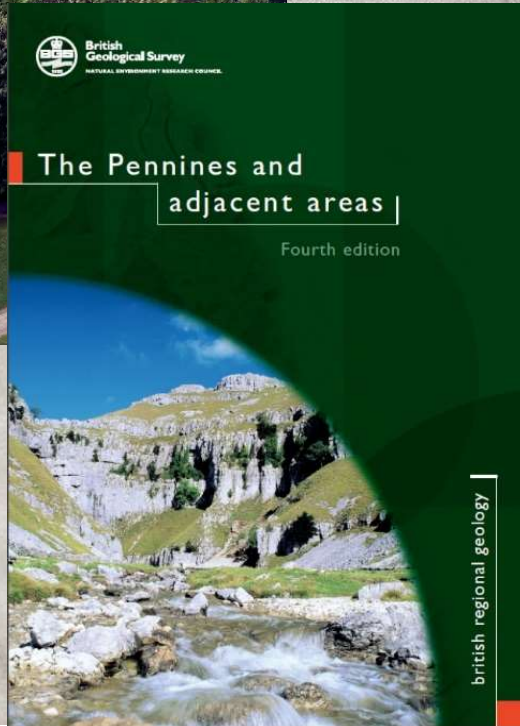
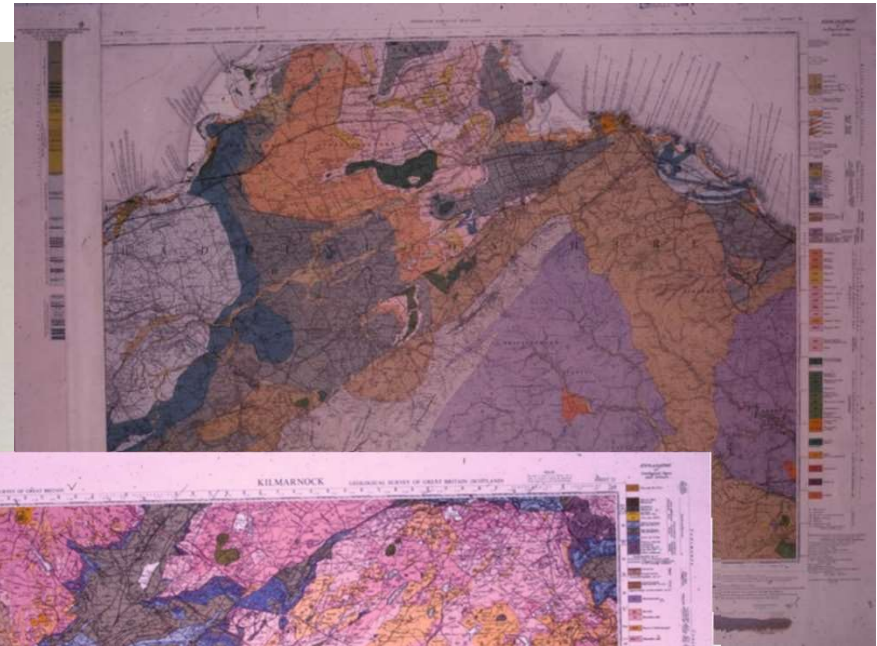
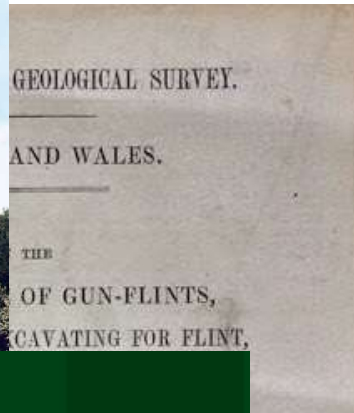
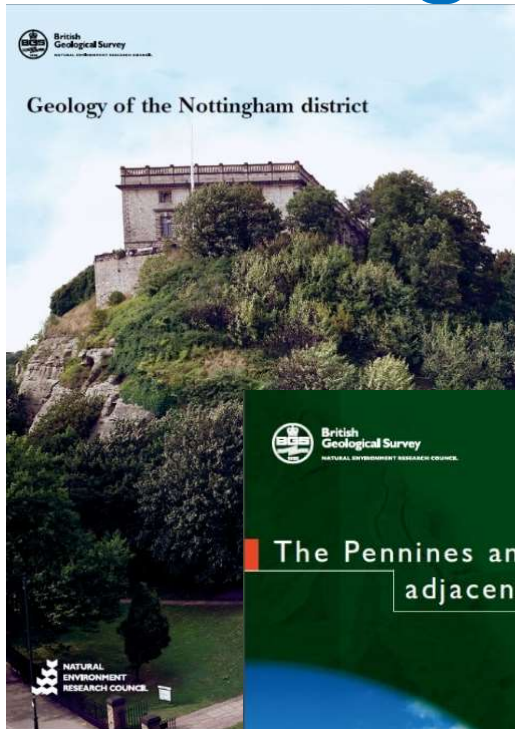
British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

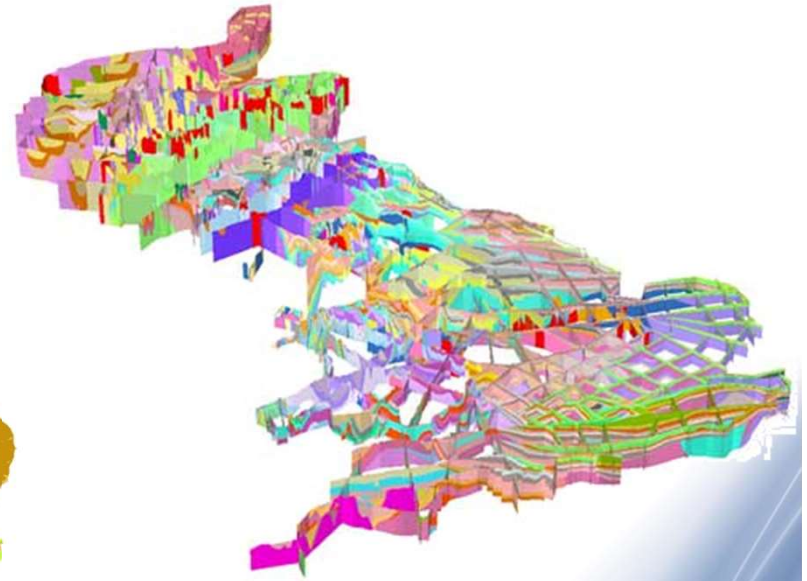
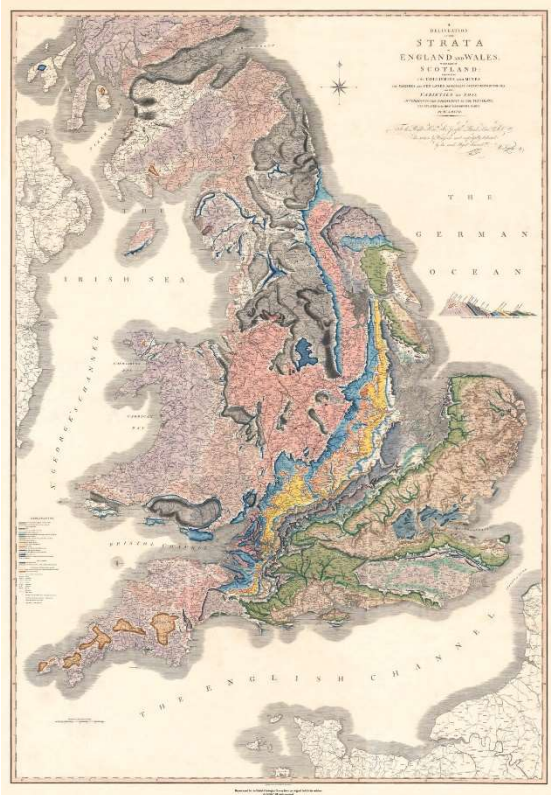
Changed markedly
in the 180 year
history of the BGS

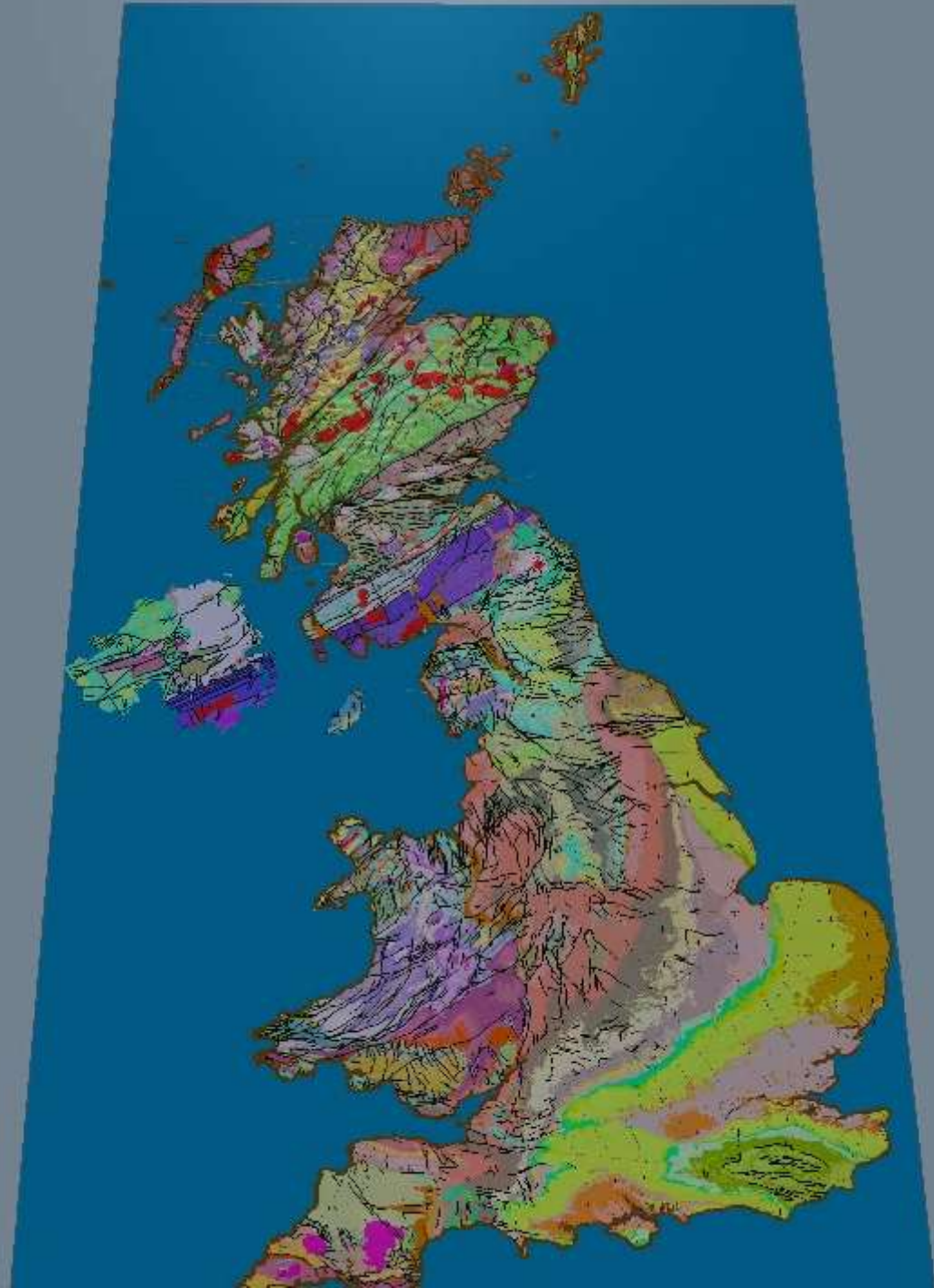


Changing with the times...

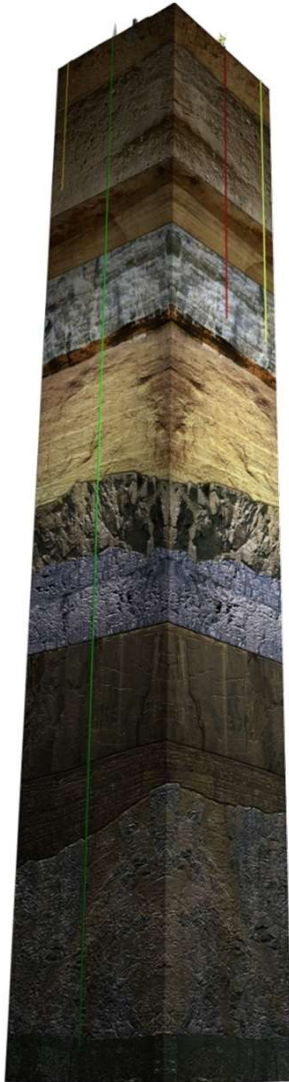


Changing with the times...





National Capability




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‘In the next decade BGS will research the science of subsurface flows and interactions between flows and the solid rock matrix, **at time scales consistent with human usage of the subsurface**’

Gateway to
the Earth

Science for the
next decade

 **British
Geological Survey**
NATURAL ENVIRONMENT RESEARCH COUNCIL

Some key examples....



Urban observatories

- 64 'cities' within the UK that accounts for ~54% of the total population [~34.6m]
- *Predicted to increase by ~9.5m in the next 50 years*

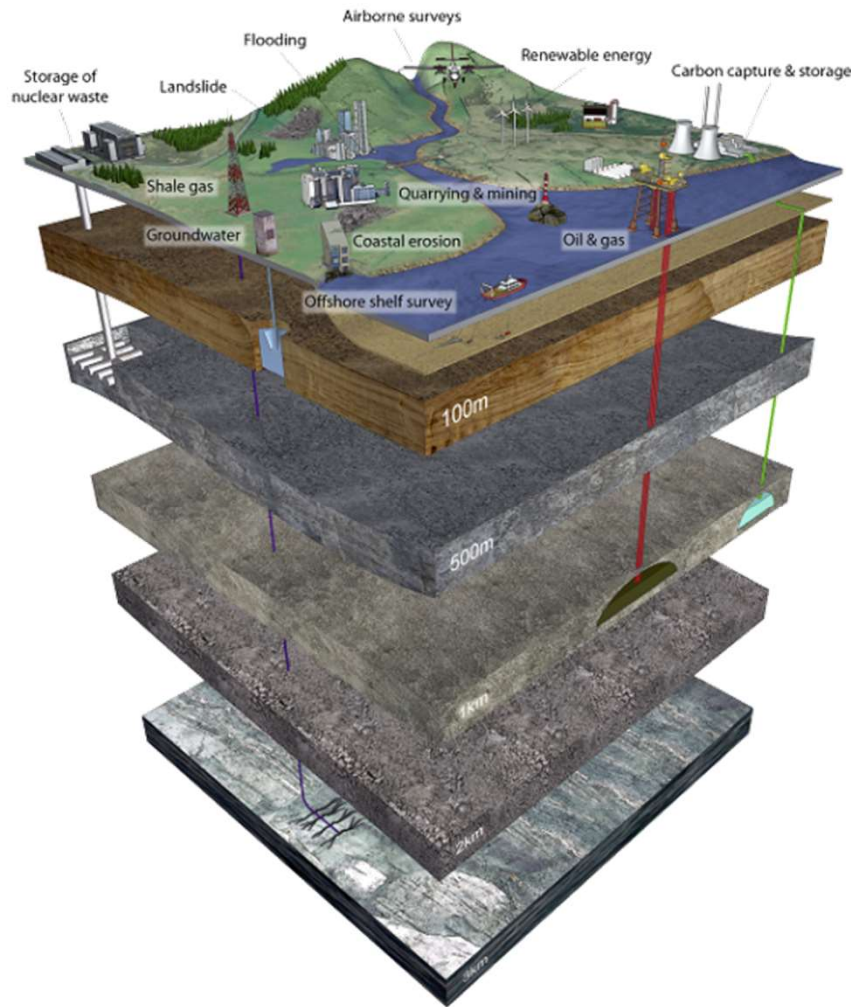
(Champion, 2014)

Creates significant pressure on space within urban areas – increasingly the underground. As such, **understanding the subsurface in our cities is a key focus for the BGS.**



London model

Energy testbed



- Ever increasing demand for energy
- Concern over use of some technologies
- Critical need for regulators, Government, and the public to be informed on, and have the facts about a variety of activities

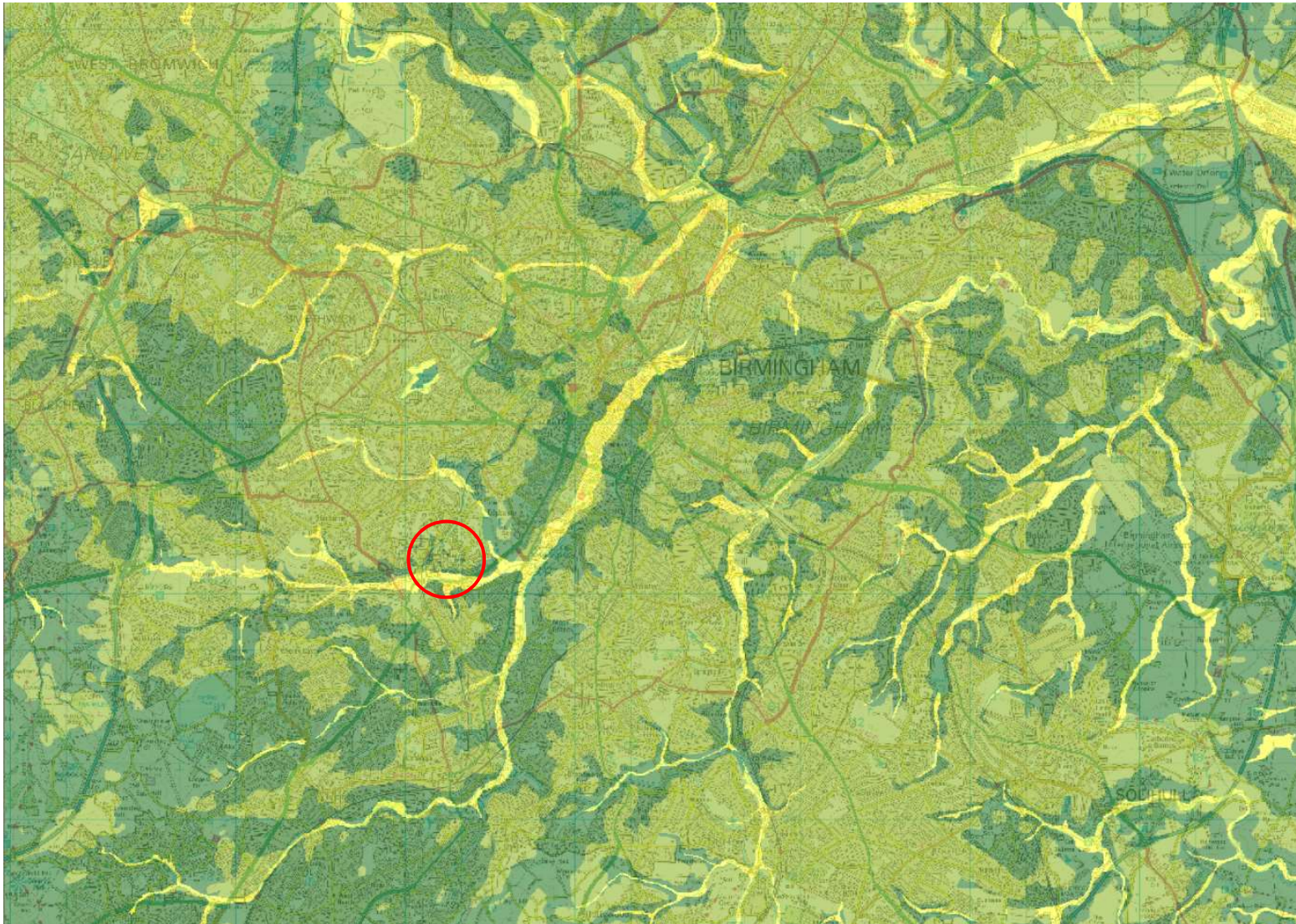
Chancellor of the Exchequer George Osborne allocated £31 million of funding to create world-class subsurface research test centres through the Natural Environment Research Council (NERC).

**Energy Security and Innovation
Observing System - ESIOS**

National Capability

As well as undertaking work at the 'cutting edge' we also work to identify the risk from, and mitigate against, a variety of natural hazards.





Occurs where loosely-packed sandy layers become fluidised by water. Such sands can 'run', removing support from overlying buildings and causing potential damage.

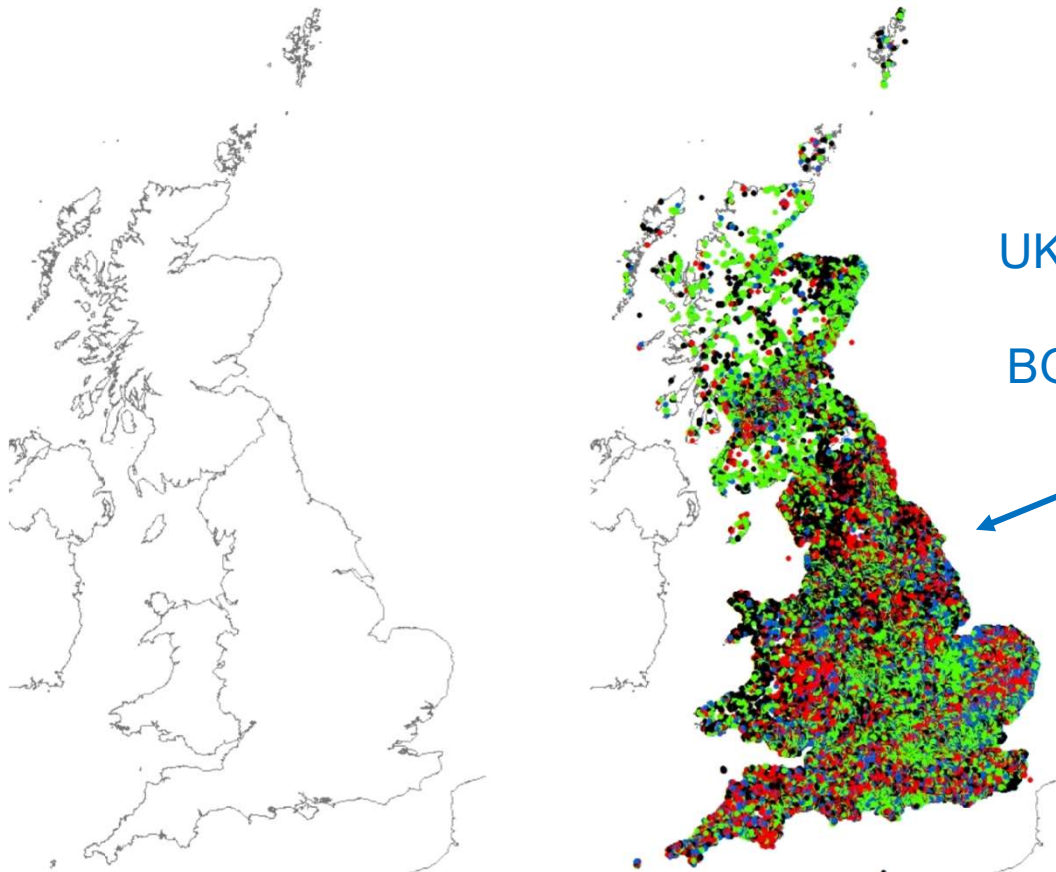


Gateway to the Earth

COMMERICAL WORK

Commercial work

- BGS receives lots of commercial requests from partners when information is required that only BGS holds (*can hold*).



UK map showing onshore
BH records held by
BGS. ~1.5 million records

GEOLOGICAL SURVEY OF GREAT BRITAIN
RECORD OF SHAFT OR BORE FOR MINERALS

(For Survey use only)

6-inch Map Registered No.

SP/085W/18

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner:

Univ. of Alham. Social Science Bldg. BH. 2

Nat. Grid Reference

0497.8374

For whom made

Town or Village Bham

County Warwick/Worce

Exact site

Attach a tracing from a map, or a sketch-map, if possible.

1" N.S. Map No.

168

1" O.S. Map No.

Confidential or not

Purpose for which made trial

Ground Level at ^{shaft} _{bore} relative to O.D. 450'

If not ground level give O.D. of beginning of shaft bore

Made by (14.3m)

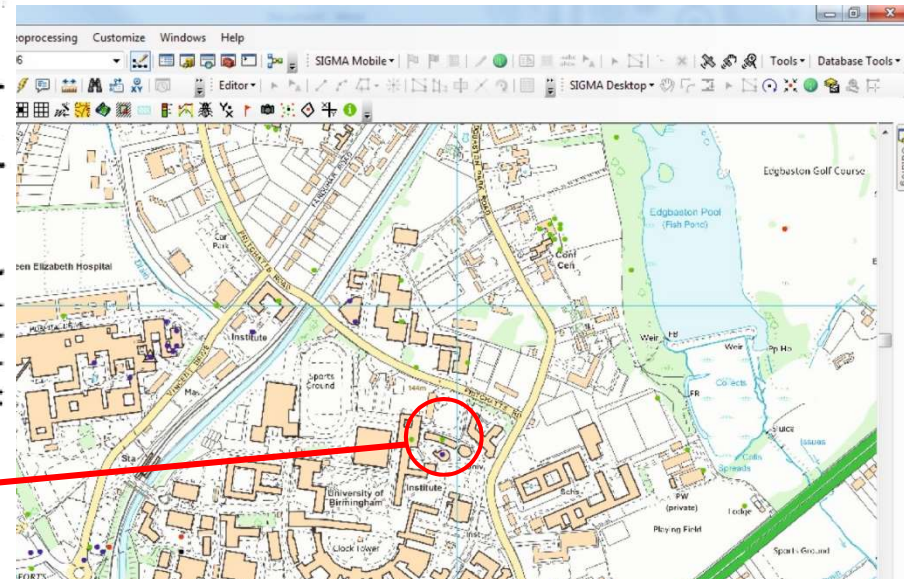
Date of sinking

Information from

Date received

Examined by

SPECIMEN NUMBERS AND ADDITIONAL NOTES



Silty, sandy topsoil containing gravel. (3.2m)
 Stiff, red-brown, sandy clay containing fine-, medium-, coarse gravel and cobbles; some pockets of light brown silt. Dense red-brown fine, medium and a little coarse sand containing fine, medium & coarse gravel. (9.14m)

(For Survey use only)
 GEOLOGICAL CLASSIFICATION

DESCRIPTION OF STRATA

THICKNESS

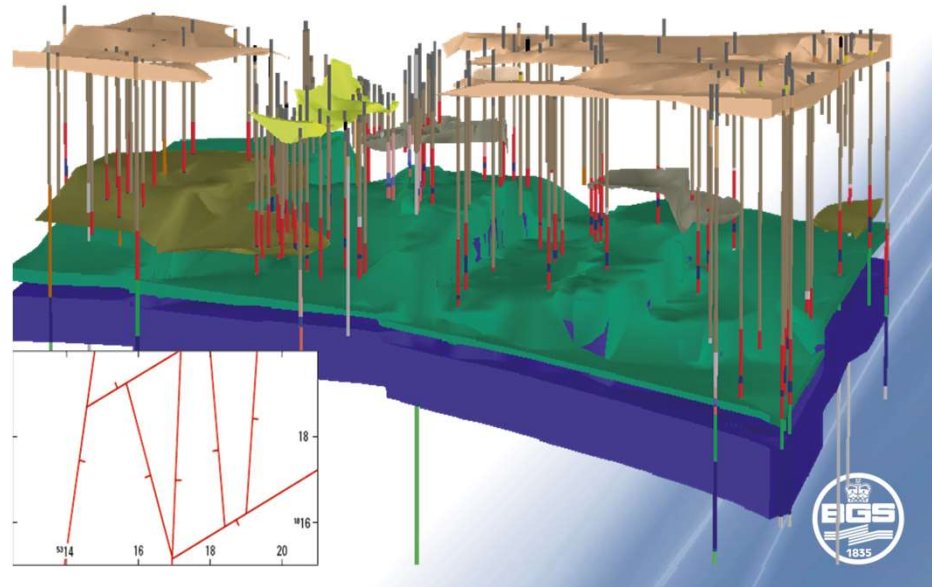
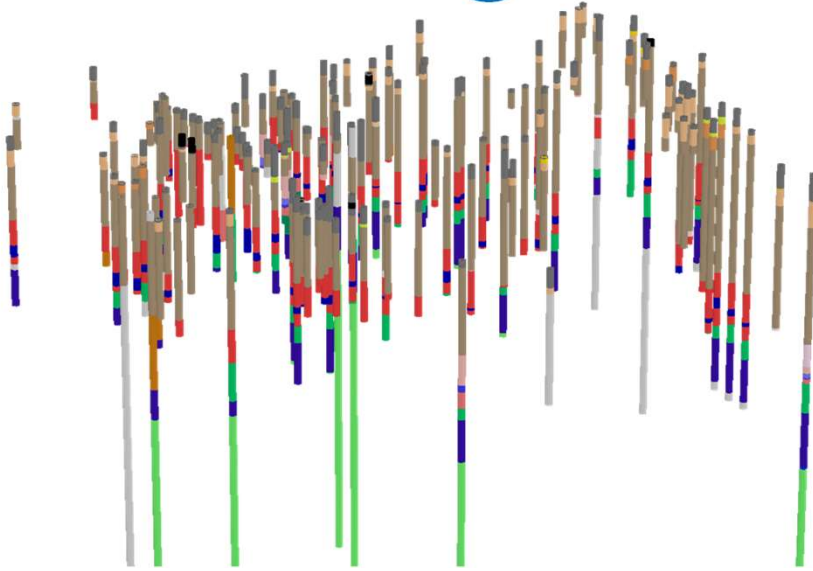
DEPTH

Fr	In.	Fr	In.
0	6	0	6
10	0	10	6
19	6	30	0

Silty sandy loam containing gravel
 Stiff red-brown sandy clay containing fine medium & coarse gravel and cobbles; also pockets of light brown silt.
 Dense red-brown fine, medium and a little coarse sand containing fine, medium & coarse gravel

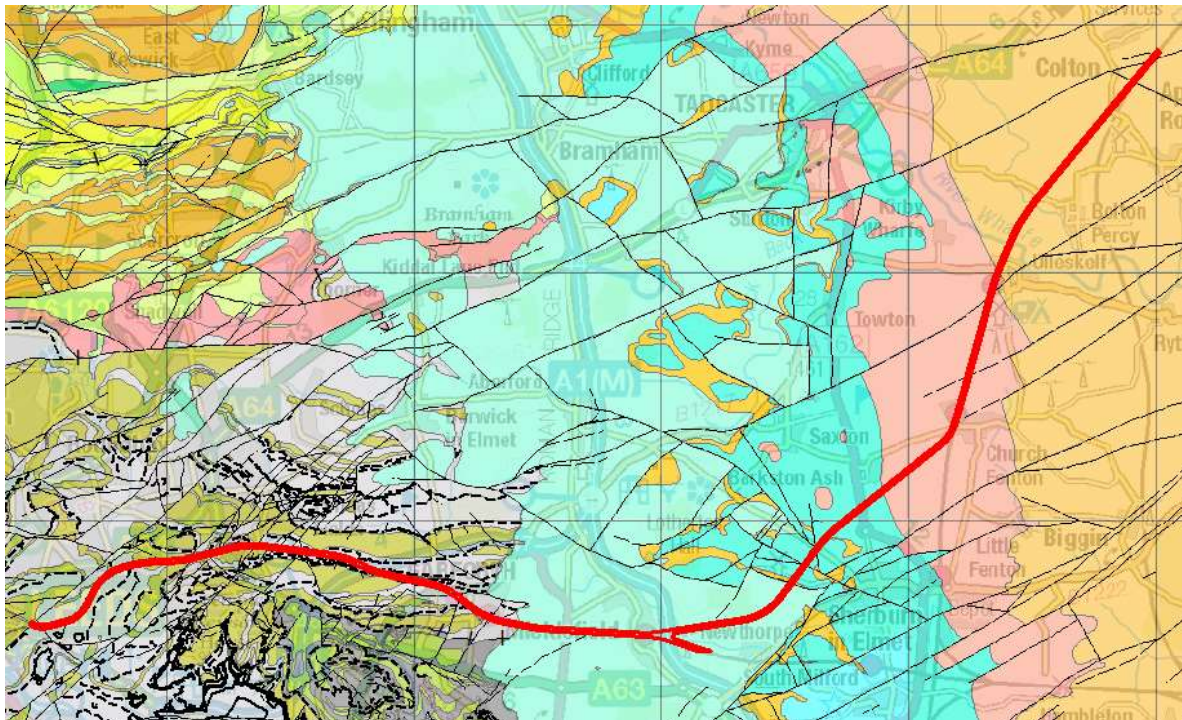
(Ground level = 450 ft)

Farringdon Station 2014



North Trans-Pennine

- Between Leeds and York - electrification (over-track cabling)
- Required some small deviations in the track position
- Engineering work required information on ground conditions – specifically the difference between weathered SSG and glacial deposits.



[link to pdf](#)



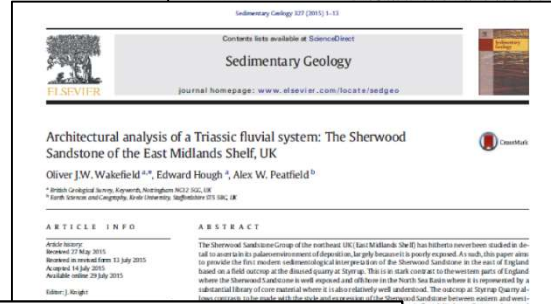


RESEARCH

Research at BGS

- Lots conducted in, and supported by, BGS resources
 - Through grant applications
 - On the back of commercial work
 - BGS funded PhD students (BUFI & CDTs)

Research in all manner of earth, physical and social sciences.



ly, whereas lowlands equate to (Jordan, 2000). Related styles of formation of the Colorado Basin (1933; Dickinson et al., 1994; 1977; Jager, 2005; Mountney et al., 2006); Jordan and Mountney, 1994; Weller, 2000); beds (Tevell, 1972; Mack, 1978); formed the regional paleogeography of the succession, being cycles of sandstone and siltstone (1978). The uppermost 10 to 15 m of the Colorado River basin might have acted as a result but proposed a 413 Myr duration interval and marine sediments account for stacked, depositional change (Riley, 1997). This has further literature present within and Mountney (2010, 2012) rely more off-shore and more

however not necessarily appropriate being in north-eastern England, with Sherwood Sandstone in western England in character between them there are readily identifiable differences, including: i) an absence of the Sherwood Sandstone containing lens of the group in the north east of the eastern parts of England compared. As such, there is a need to better in the Sherwood Sandstone, with such outcrop-dipersed studies will resolution beyond geological best observation is not always possible. An understanding of the internal heterogeneity in a modern sedimentological and used to parameterise models using they will be relevant to a wide user shore Group has been the focus of research the UK and offshore (Warrington, Low and Ruffell, 2006) there are relationships in the East Midlands shelf.



My Research

- Fluvial and aeolian systems
 - Modern
 - Ancient

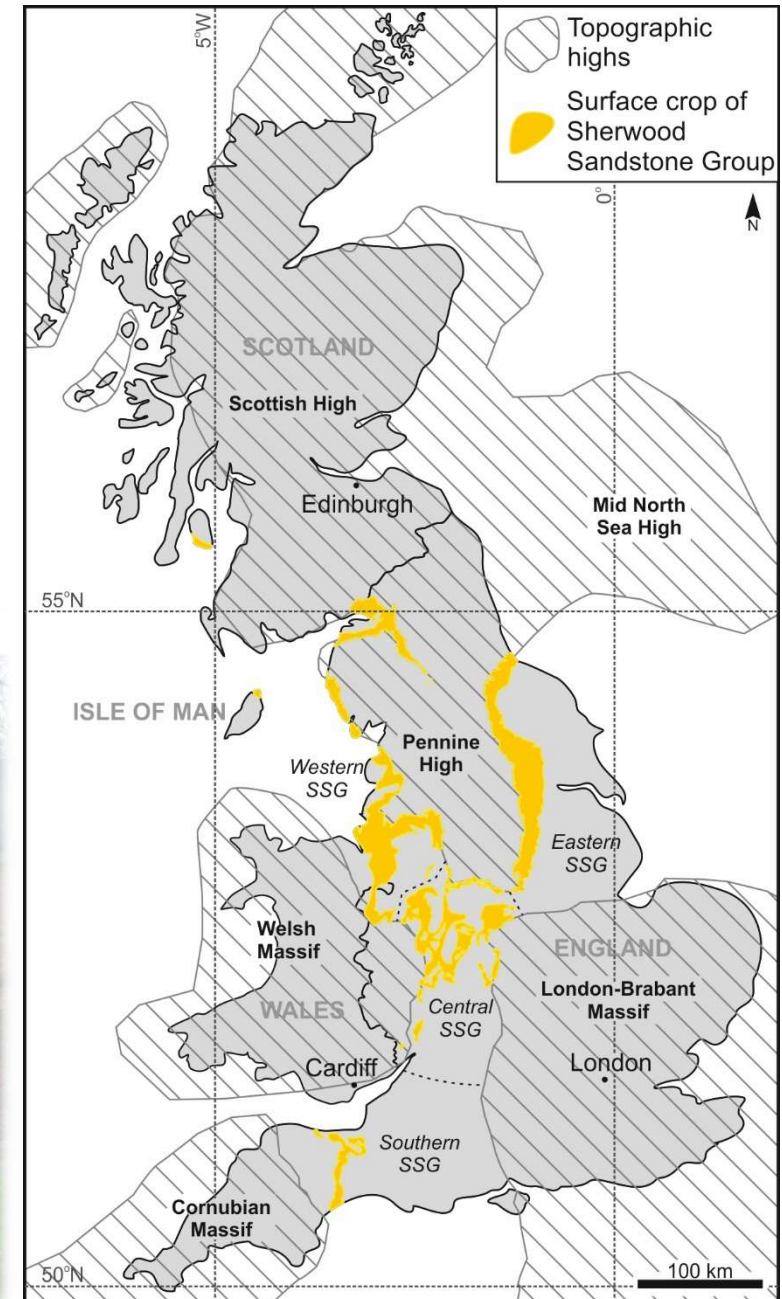
**Largely from an
extractive potential**

Some current examples...

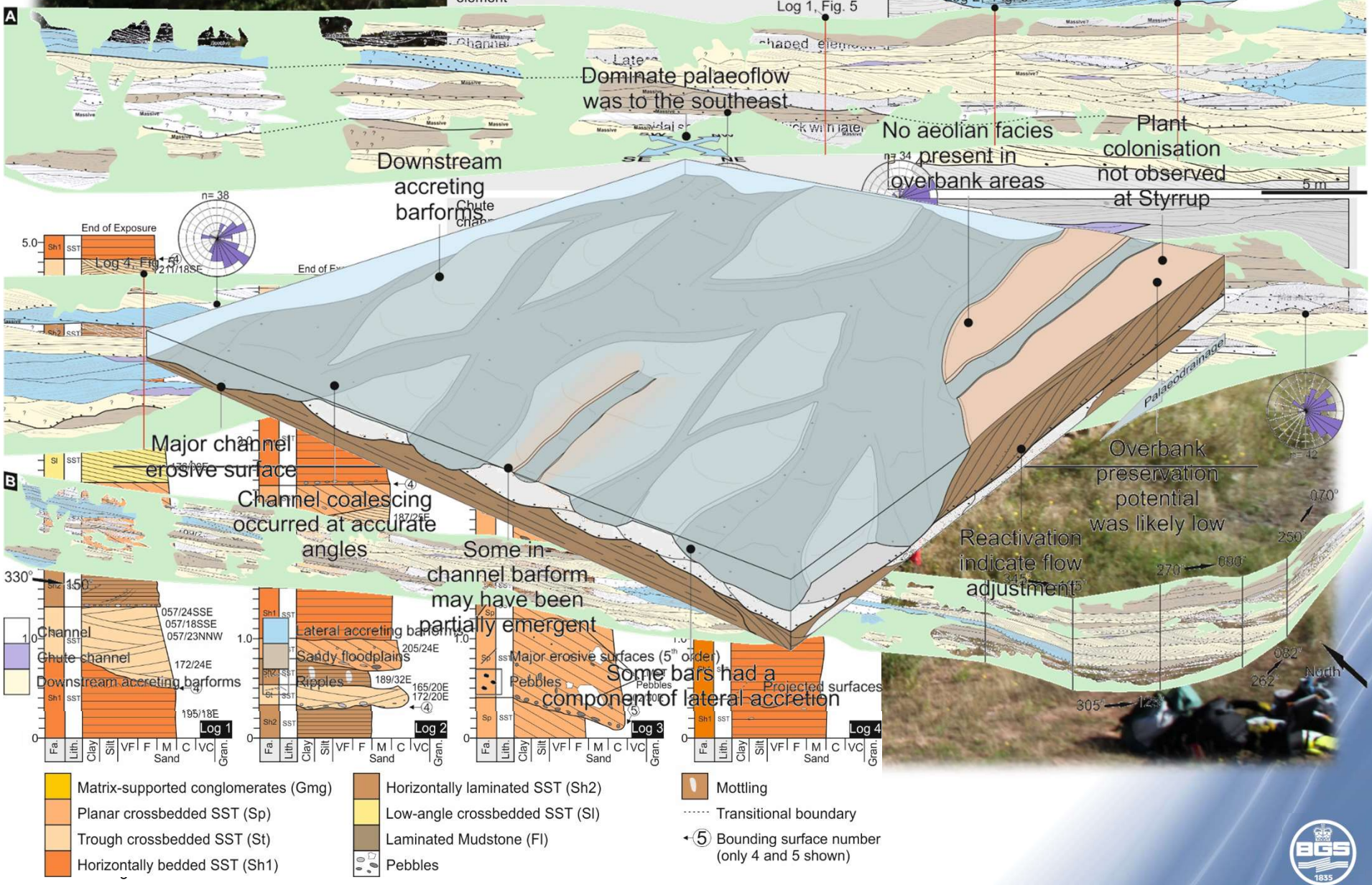


Example 1: SSG

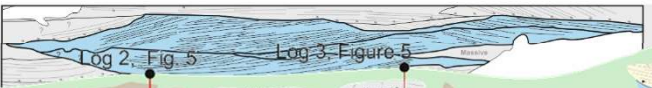
- Terrestrial succession (mixed A-F)
- Huge aquifer in the UK
- Hydrocarbon producing (incl. lateral equivalents)
- Key CCS target
- Underlies number cities – Industrial legacy
- *Relatively little work done on it...*



Name	Element Code	Description
Lateral accretion element	LA	Lensoidal shaped with a lateral extent of 10-18m and thicknesses 1-2 m.



Dominant palaeoflow was to the southeast



Downstream accreting barforms

Dominant palaeoflow was to the southeast

No aeolian facies present in overbank areas

Plant colonisation not observed at Styrrup

Major channel erosive surface

Channel coalescing occurred at accurate angles

Some in-channel barform may have been partially emergent

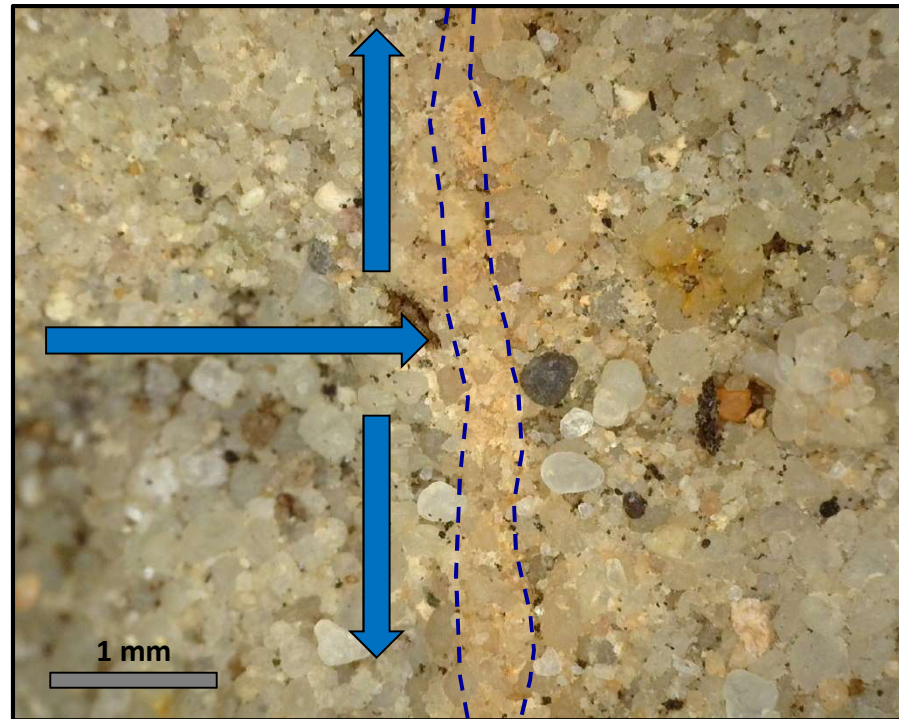
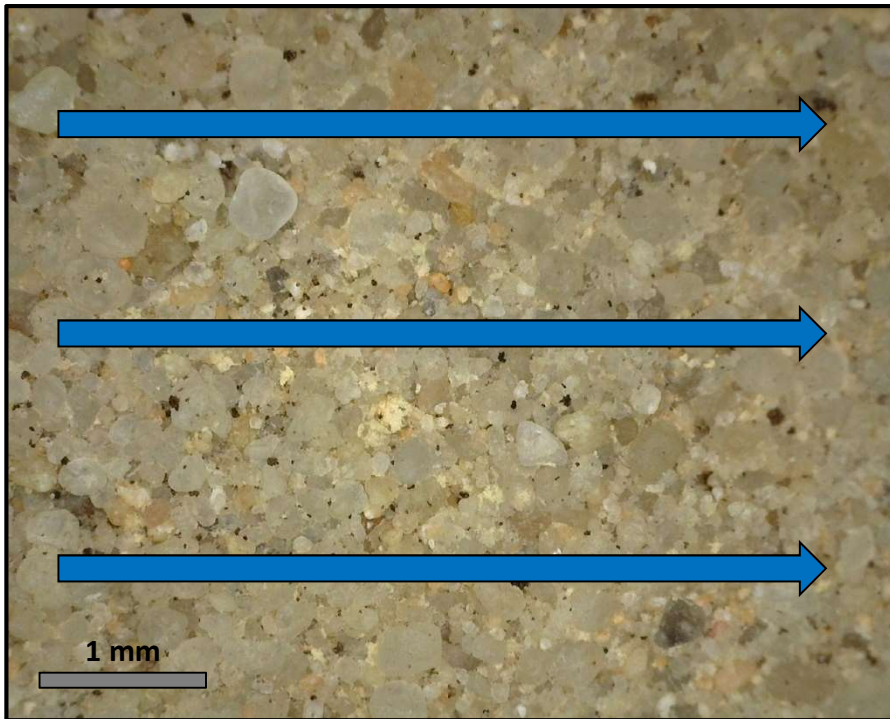
Some bars had a component of lateral accretion

Reactivation indicate flow adjustment

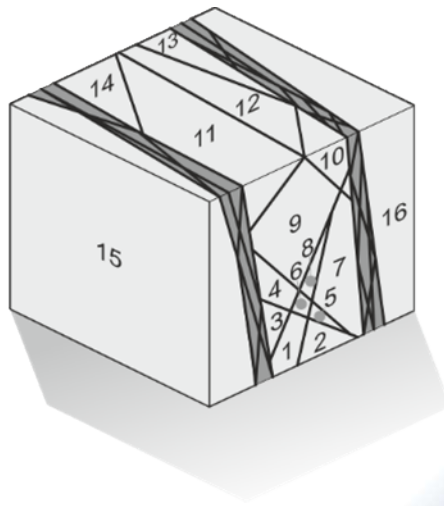
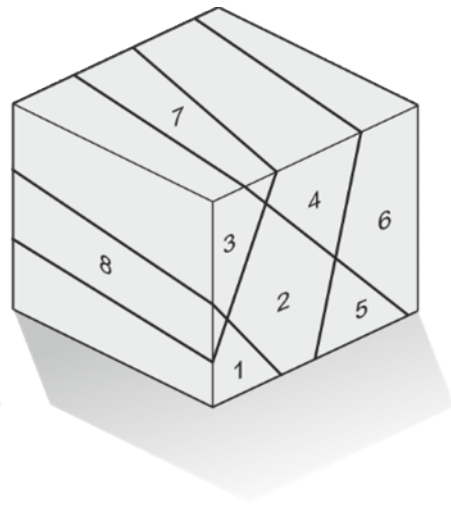
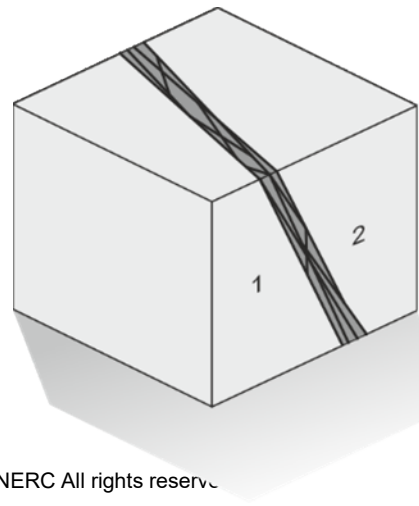
Overbank preservation potential was likely low

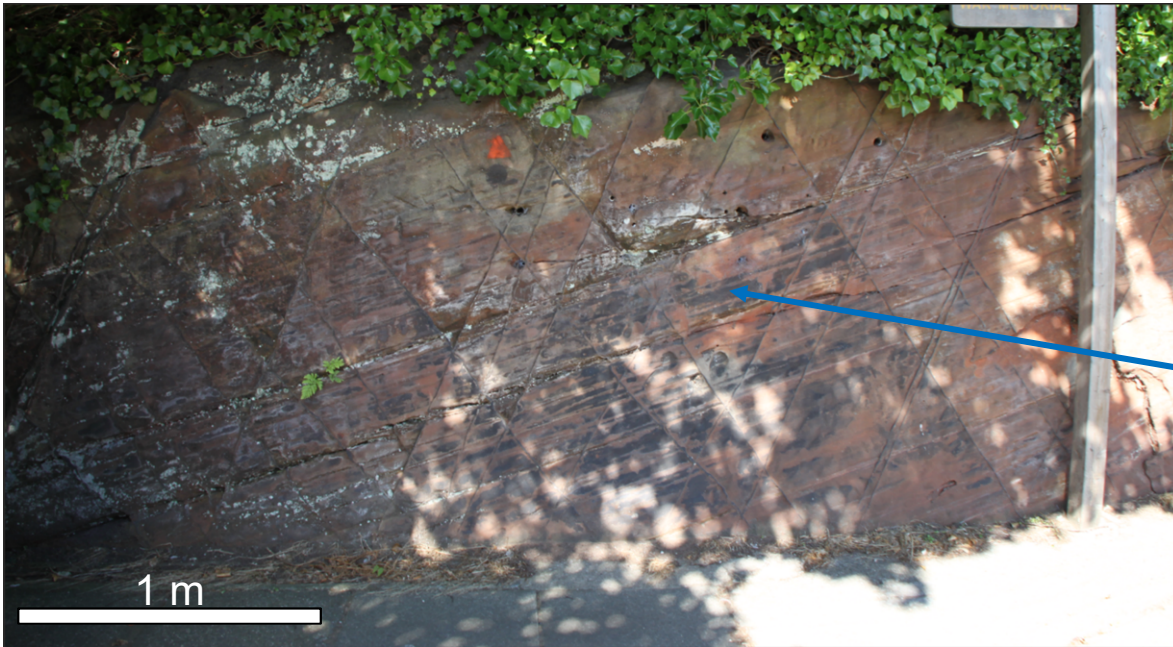


Examples 2: Deformation Bands

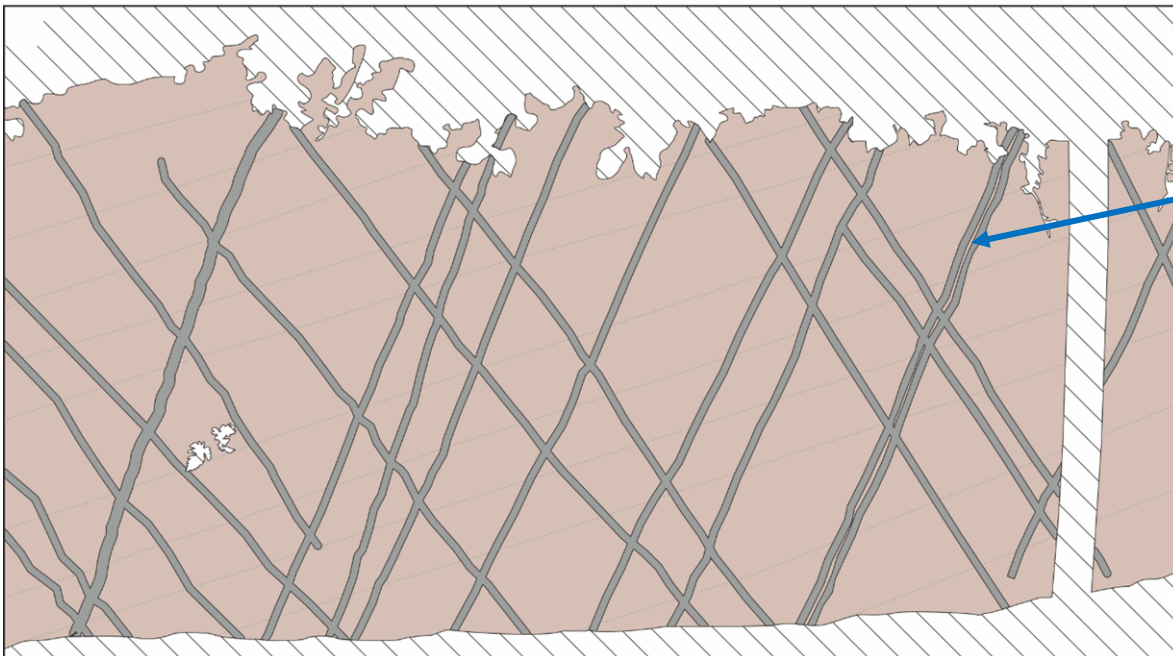


Secondary cementation often occurs along the bands



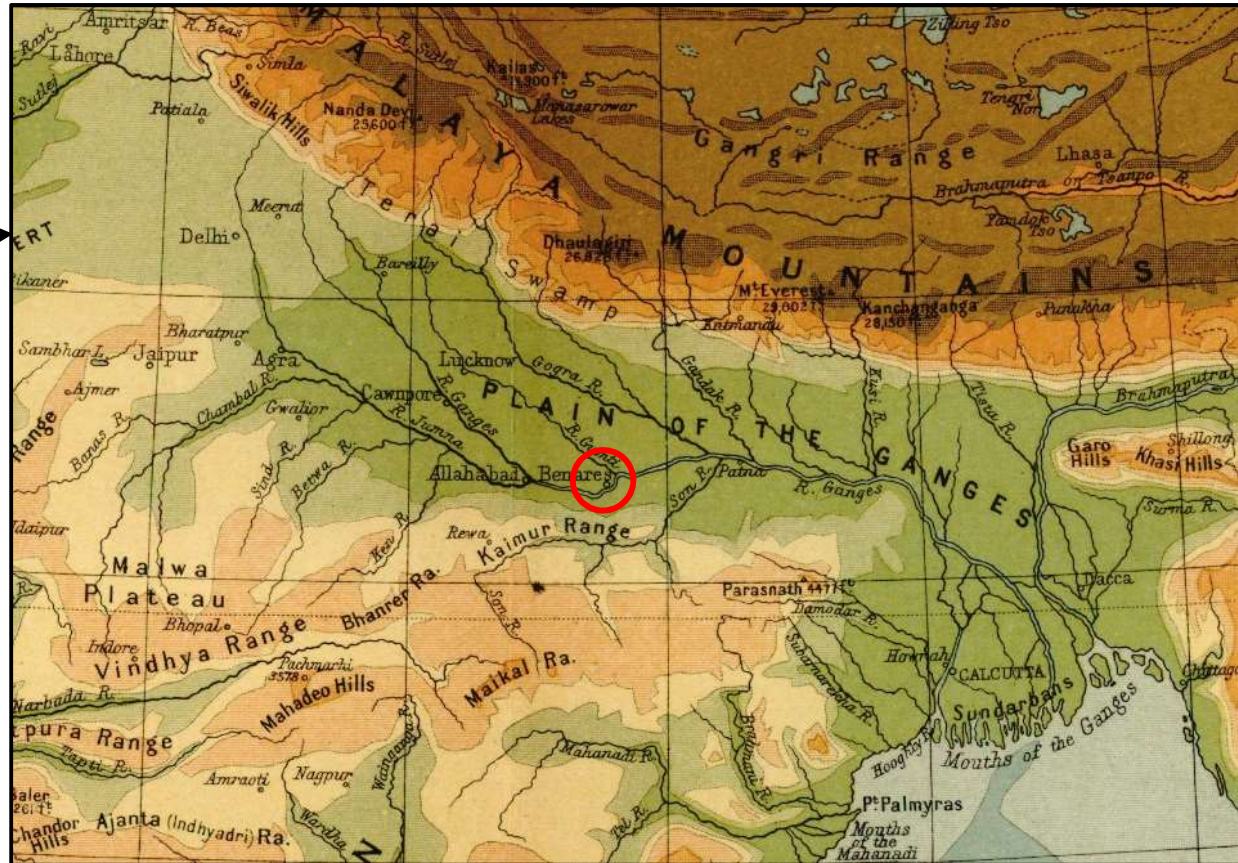
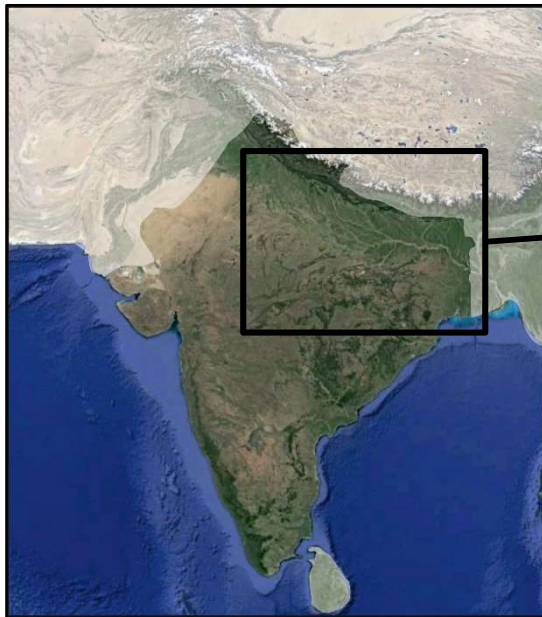


Highly permeable aeolian facies (700 – 3000 mD)



Granulation seams (def. bands) poor permeability (0.4 – 12 mD)

Example 3: Varanasi, India





Opportunities

- If you're interested in working for a unique organisation
- If you want to do a PhD with BGS
- If you want some work experience
- Just have a look around
- If you want to use some BGS data (non-commercial)

Check on
the Website

Contact me
oliverw@bgs.ac.uk

Contact
enquiries@bgs.ac.uk

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News stories about BGS Earth Science Week - Ask a Geol

Latest blog



Combating malnutrition in sub-Saharan Africa...by Grace Manzeke

Our science



Science for the next decade
Download the strategy [pdf 4.5 MB](#)
#BGSmatters

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2. Browse staff by discipline
3. Lexicon of named rock units
4. Geology of Britain viewer
5. Map and map data viewer
6. News (mobile)
7. Search borehole scans
8. Diary (mobile)
9. Search the BGS website
10. Maps and viewers

Can't find something? Let us know
BGS communications dashboard

Sinkholes Monitoring Aquifers BGSmatters Minecraft Poll

Sinkholes



Following the recent sinkhole event in St Albans, you can find out more about BGS research on caves, subsidence and soluble rocks

OpenGeoscience — free data!



OpenGeoscience

Browse our free maps and viewers, apps, data collections, data downloads, scans & photos and web services.

Use the Geology of Britain viewer:
Zoom to

Geology shorts

PLAYLIST Geology Shorts



PLAY ALL

Current activities



A selection of current activities from international and UK projects including links to recent blogs.

Latest news

- British Geological Survey showcase at Dynamic Earth | 18 October 2015
- New UK-led drilling project gets the green light
- Geological maps updates
- East Anglia 3D pdf
- GeoProperties products development
- Unlocking the underground in Wales: launch of new subsurface knowledge exchange network
- Scotland's aquifers and groundwater bodies

Latest events

- Energy Security & Innovation Observing System for the Subsurface project town hall meeting | 22 Oct 2015 | BGS Keyworth
- Keyworth shop and Geological Walk closure | 22nd Oct 2015
- GeoDATA 2015 | 5 November 2015 | Belfast

Tweets

- BGS @BritGeoSurvey
Come work with us: Assistant or Associate Professor in Geoenvironmental Engineering [divr.it/CTww9d](#)
Expand
- BGS @BritGeoSurvey
Come work with us: Associate Professor in Geoenergy (Based at the University of Nottingham, UK) [divr.it/CTww1J](#)
- BGS @BritGeoSurvey
David Boon @BGSWales talking to

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The following are thanked for support in numerous projects:

