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Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

Applied geoscience for our
changing Earth

BGS OpenGeoscience



Dr Keith Westhead, Head of Knowledge Exchange, BGS

Strategic framework for **public sector** information provision

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Power of Information

Digital Britain

Making Public Data Public

Re-use of Public Sector Information

OPSI – Information Fair Trader Scheme

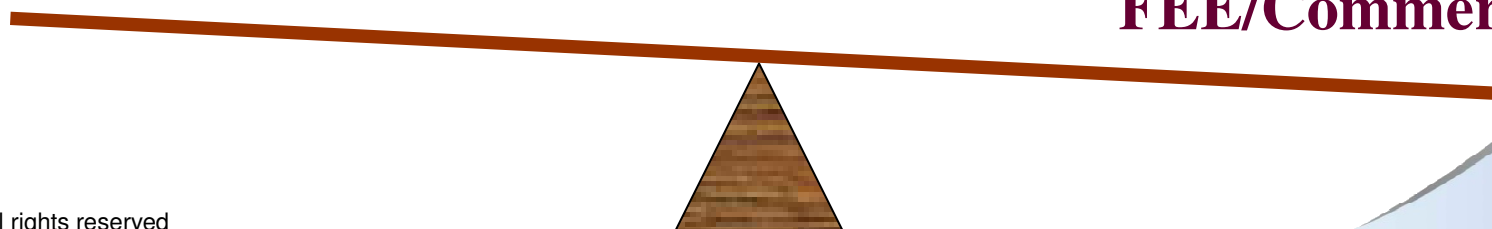
Access
Openness

Innovation

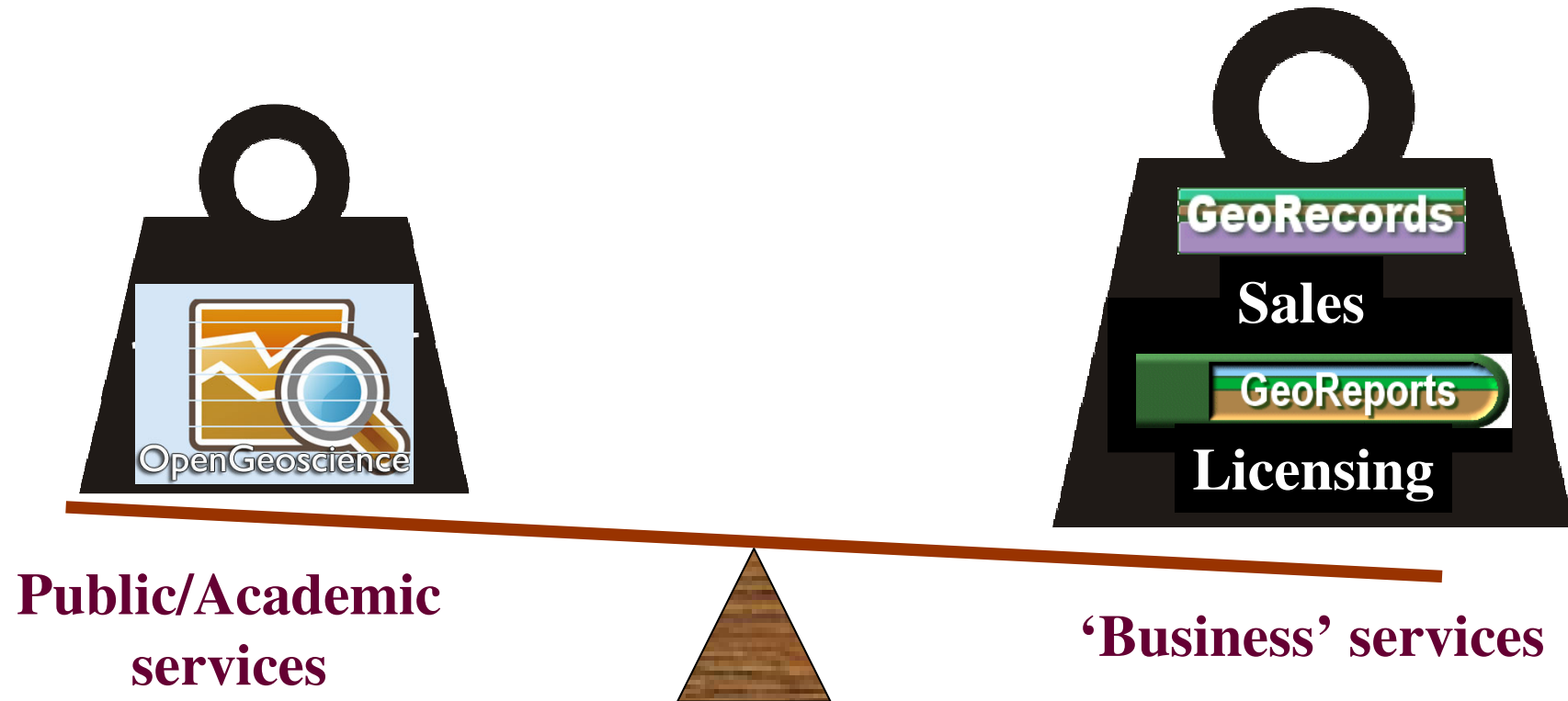
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Maximisation

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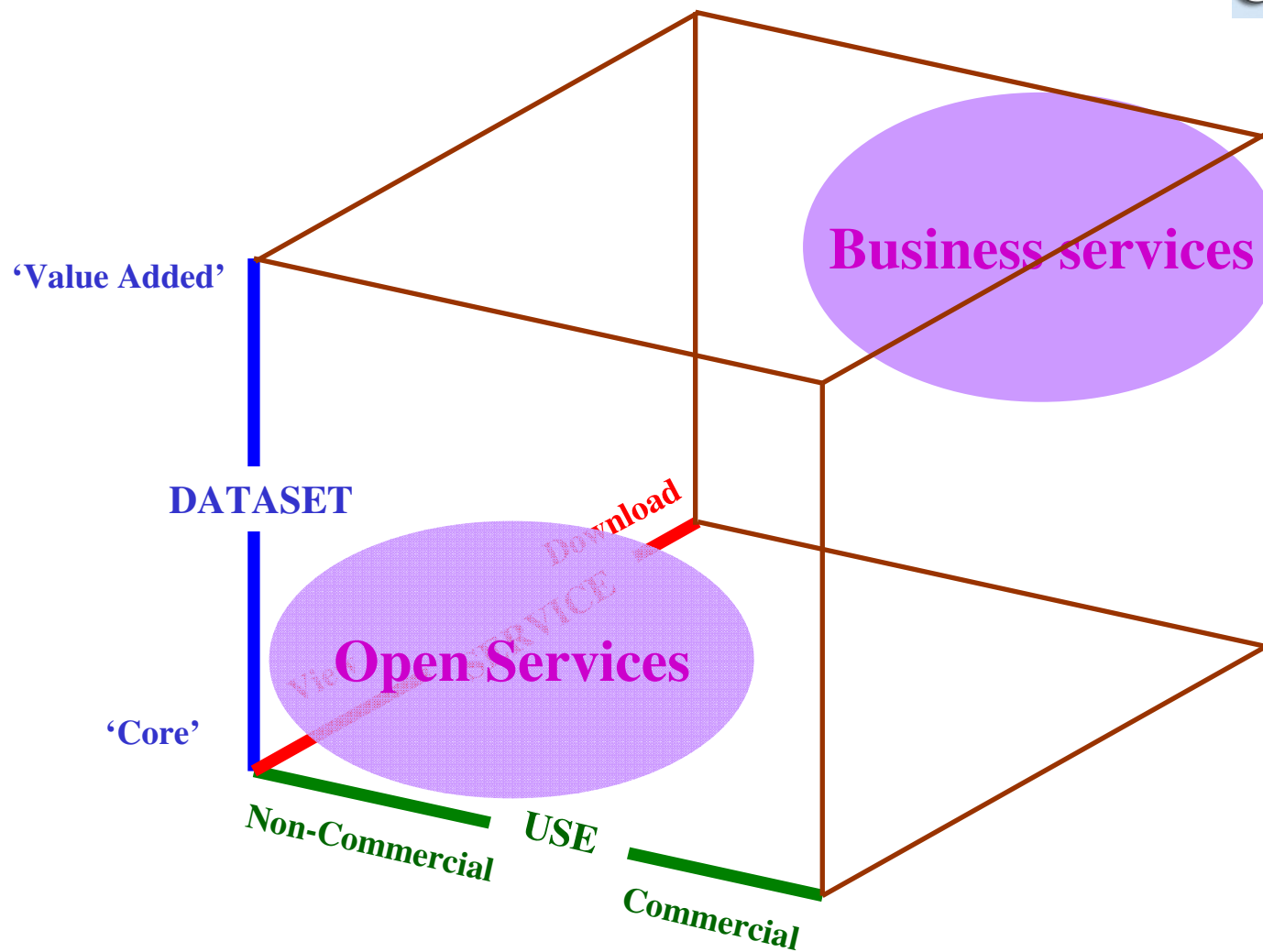
FEE/Commercial



Strategic framework for BGS KE



Strategic framework



BGS business services



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BGS DigMapGB-50

BGS 1:50 000 scale vector mapping made up of artificial ground, superficial deposits, bedrock geology and mass movement



BGS DigMapGB-50 - sample image

Product details

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Author: British Geological Survey
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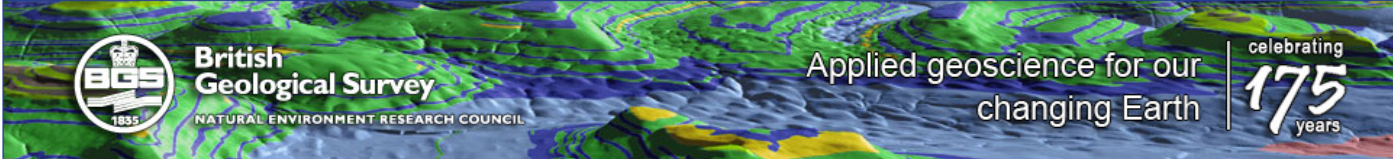
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- And for innovation for the benefit of others



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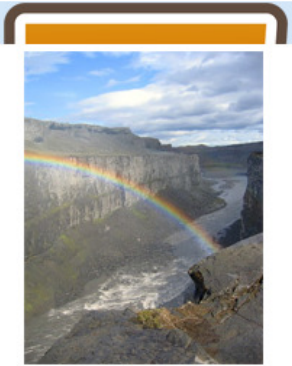
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- Early Pliocene Weddell Sea seasonality determined by bryozoans
- Guide to the geology of Mount St. Bernard, Charnwood Lodge, Warren Hills and Bardon Hill, Charnwood Forest
- Sheet SE30NW (Barnsley) [bedrock & superficial deposits]
- Sheet SE30NE (Monk Bretton) [bedrock & superficial deposits]
- Sheet SE21SE (West Bretton) [bedrock & superficial deposits]
- Sheet SE20SE (Thurgoland) [bedrock & superficial deposits]



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

Geology of Britain viewer

Pan and zoom to an area of interest.

Click on the map to show the **geology** at that location.



Currently viewing: [1:50 000 scale geology](#)

Full Transparency None

Map Satellite Hybrid

Bedrock Superficial

1:50,000 Geology details ✕

[BRANSCOMBE MUDSTONE FORMATION - MUDSTONE](#)

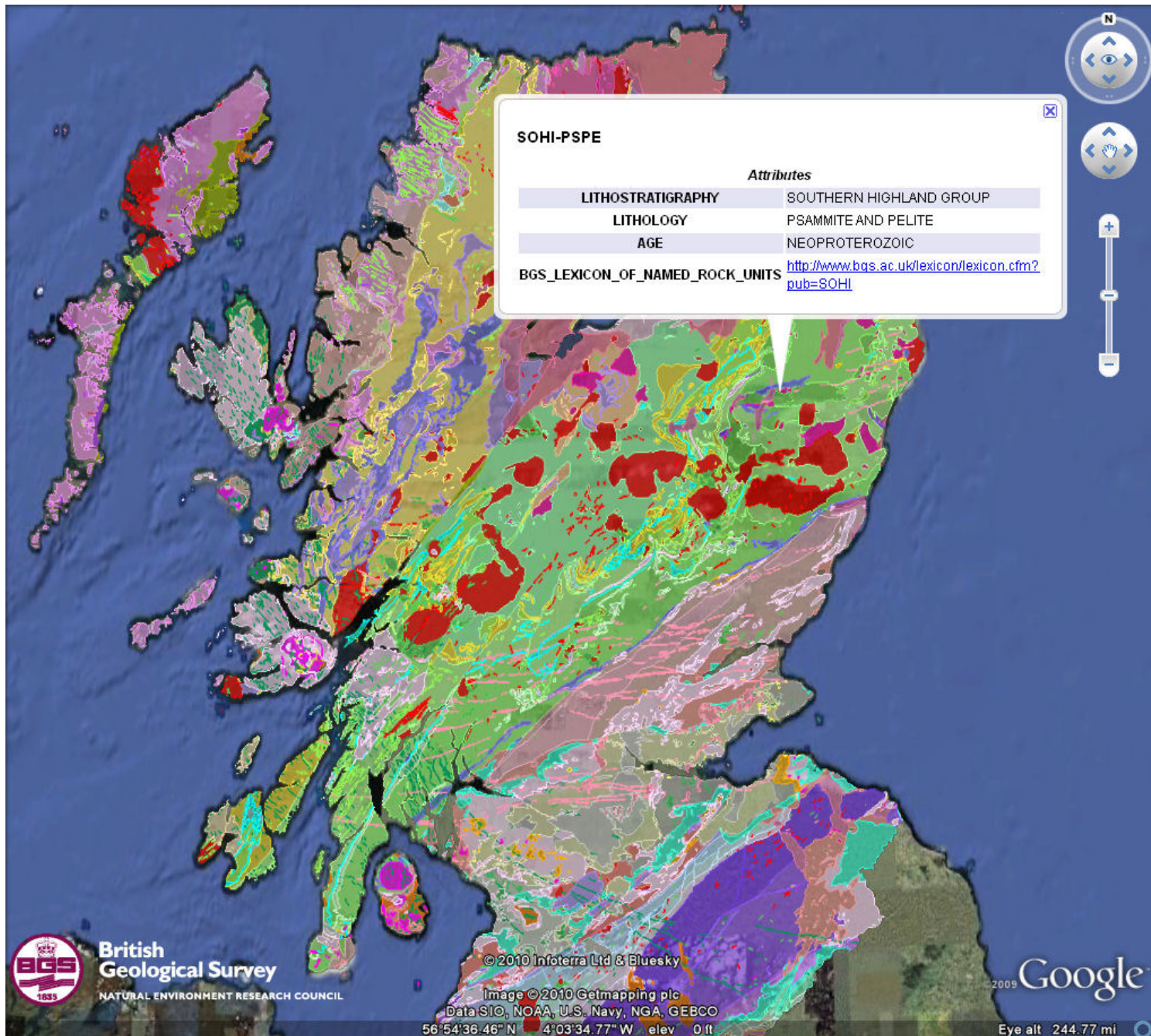
[What is Bedrock Geology?](#)

Stanton-on-the-Wolds Golf Club

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P000742



P number: P000742

Old photograph number: D02128

Caption: Oblique aerial view looking north-east along the Great Glen from Banavie shows a linear fault-determined glen with glacial basins of Loch Lochy, Loch Oich and Loch Ness and U-shaped glacially scoured valley along the fault line.

Description: Oblique aerial view looking north-east along the Great Glen from Banavie shows a linear fault-determined glen with glacial basins of Loch Lochy, Loch Oich and Loch Ness and U-shaped glacially scoured valley along the fault line. The Great Glen Fault Zone is one of the two most important fractures in Scotland (the other is the Highland Boundary Fault). It is a major transcurrent fault with a sinistral displacement of about 100 km. Note also the highly developed meandering river system with prominent gravel bars in the foreground. The fault has had a long and debated history, though the consensus is that the main phase of sinistral transcurrent movement occurred at the end of the Caledonian Orogeny (Silurian) with reactivation, mainly as a normal fault, during and after the deposition of the Old Red Sandstone.

Date taken: 01/01/1976

Photographer: Christie, A.

Copyright statement: NERC

Acknowledgment: This image was digitized with grant-in-aid from SCRAN the Scottish Cultural Resources Access Network

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The BGS Lexicon of Named Rock Units — Result Details

INDEX LIMESTONE (SCOTLAND)

Computer Code:	ILS	Status Code:	FORMAL, LOCAL
Preferred Map Code:	ILS		
Age or Age Range:	[CE]	PENDLEIAN	to []

Lithological Description:

A pale to dark grey bioclastic (crinoidal) marine limestone, with algal nodules. The name is not geographical in origin, but indicates a marker bed for the Limestone Coal Formation coal seams below.

Definition of Lower Boundary:

Generally a conformable change from a marine mudstone almost at the top of the Limestone Coal Formation. The Index Limestone as it is usually called, forms the base of the Upper Limestone Formation.

Definition of Upper Boundary:

Generally a conformable change to a thick marine mudstone, which may also include the Huntershill Limestone, that passes up into deltaic arenaceous deposits of the Upper Limestone Formation.

Thickness:

From 0.6 m to 2.2m in the Airdrie, Falkirk and Glasgow districts, and 3m in the Irvine area of Ayrshire.

Geographical Limits:

Throughout most of the outcrop of the Upper Limestone Formation of the Midland Valley of Scotland, but locally absent in Ayrshire and Strathclyde on highs partly created by the Clyde Plateau Volcanic Formation and poorly developed in central and east Fife because of an on-delta facies change.

Parent Unit:	Parent Unit Code:
UPPER LIMESTONE FORMATION	ULGS
Previous Name(s):	Previous Code(s):
COWGLEN LIMESTONE	
INDEX LIMESTONE	ILS

Alternative Name(s):

INDEX LIMESTONE

Stratotypes:

Reference Section	The Mossneuk Borehole, BGS reg. no. NS88NE/204 south of Alloa, with a base at 770m depth, and 0.93m measured thickness.
-------------------	---

Reference(s):

Hinxman, L W, Anderson, E M and Carruthers, R G. 1920. The economic geology of the Central Coalfield of Scotland, Area IV; Paisley, Barrhead, Renfrew. Memoir of the Geological Survey, Scotland.

Forsyth, I H, Hall, I H S and McMillan, A A. 1996. Geology of the Airdrie district. Memoir for 1:50 000 Geological Sheet 31W (Scotland), pp29-32.

Cameron, I B, Aitken, A M, Browne, M A E and Stephenson, D. 1998. Geology of the Falkirk district. Memoir for 1:50 000 Geological Sheet 31E (Scotland), pp23-27.

See also

- Vocabularies
- Rock classification scheme
- Information and Knowledge Exchange Directorate



Item matches "scotland geology"

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41. **Busby, J.P.; Akhurst, M.C.; Walker, A.S.D.**. 2009 A new high-resolution aeromagnetic dataset over central Ayrshire : insights into the concealed geology. *Scottish Journal of Geology*, 45 (1). 1-12. 10.1144/0036-9276/01-370



42. **Busby, Jon; Lewis, Melinda; Reeves, Helen; Lawley, Russell**. 2009 Initial geological considerations before installing ground source heat pump systems. *Quarterly Journal of Engineering Geology and Hydrogeology*, 42 (3). 295-306. 10.1144/1470-9236/08-092



43. Challands, T.J.; Armstrong, H.A.; Maloney, D.P.; **Davies, J.R.; Wilson, D.**; Owen, A.W.. 2009 Organic-carbon deposition and coastal upwelling at mid-latitude during the Upper Ordovician (Late Katian) : a case study from the Welsh Basin, UK. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 273 (3-4). 359-410. 10.1016/j.palaeo.2008.10.004



44. **Frogbrook, Z.L.**; Bell, J.; Bradley, R.I.; **Evans, C.**; Lark, R.M.; **Reynolds, B.**; Smith, P.; Towers, W.. 2009 Quantifying terrestrial carbon stocks: examining the spatial variation in two upland areas in the UK and a comparison to mapped estimates of soil carbon. *Soil Use and Management*, 25. 320-332.

45. **Golledge, Nicholas R.; Hubbard, Alun L.**; Sugden, David E.. 2009 Mass balance, flow and subglacial processes of a modelled Younger Dryas ice cap in Scotland. *Journal of Glaciology*, 55 (189). 32-42. 10.3189/002214309788608967



Mass balance, flow, and subglacial processes of a modelled Younger Dryas ice cap in Scotland

Nicholas R. GOLLEDGE,^{1,2} Alun L. HUBBARD,³ David E. SUGDEN,²

¹*British Geological Survey, Murchison House, West Mains Road, Edinburgh, EH9 3LA**

Email: n.golledge@bgs.ac.uk

²*Institute of Geography, University of Edinburgh, Drummond Street, Edinburgh, EH8 9XP*

³*Institute of Geography & Earth Sciences, The University of Wales, Aberystwyth, Ceredigion, SY23 3DB*

ABSTRACT. We use an empirically validated high-resolution three-dimensional ice sheet model to investigate the mass balance regime, flow mechanisms, and subglacial characteristics of a simulated Younger Dryas stadial ice cap in Scotland, and compare the resulting model forecasts with geological evidence. Input data for the model are basal topography, a temperature forcing derived from GRIP $\delta^{18}\text{O}$ fluctuations, and a precipitation distribution interpolated from modern data. The model employs a Positive Degree Day scheme to calculate net mass balance within a domain of 112500 km², which under the imposed climate gives rise to an elongate ice cap along the axis of the western Scottish Highlands. At its maximum, the ice cap is dynamically and thermally zoned, reflecting topographic and climatic controls respectively. In order to link these palaeoglaciological conditions to geological interpretations, we calculate the relative balance between sliding and creep within the simulated ice cap; forecast areas of the ice cap with the greatest capacity for basal erosion; and predict the likely pattern of subglacial drainage. We conclude that ice flow in central areas of the ice cap is a largely due to internal deformation, and is associated with geological evidence of landscape preservation. Conversely, the distribution of streamlined landforms is linked to faster-flowing ice whose velocity is predominantly the result of basal sliding. The geometry

Pracis Tool Version 1.0

BGS 1835

UID: K0GL18092008115112 PROJECT: E2016572 Arthur's Seat
 X: 345736.7845 DATE GATHERED: 18/09/2008 11:51:12
 Y: 134756.432125 XY SOURCE: Map
 Z: Z SOURCE:

Structure Basic Log Comments Samples Landform Doline Cavity Building Damage
 Stream Sink Spring Photos Sketches



Rotate Left Rotate Right

General view looking west toward the Lion's Haugh vent

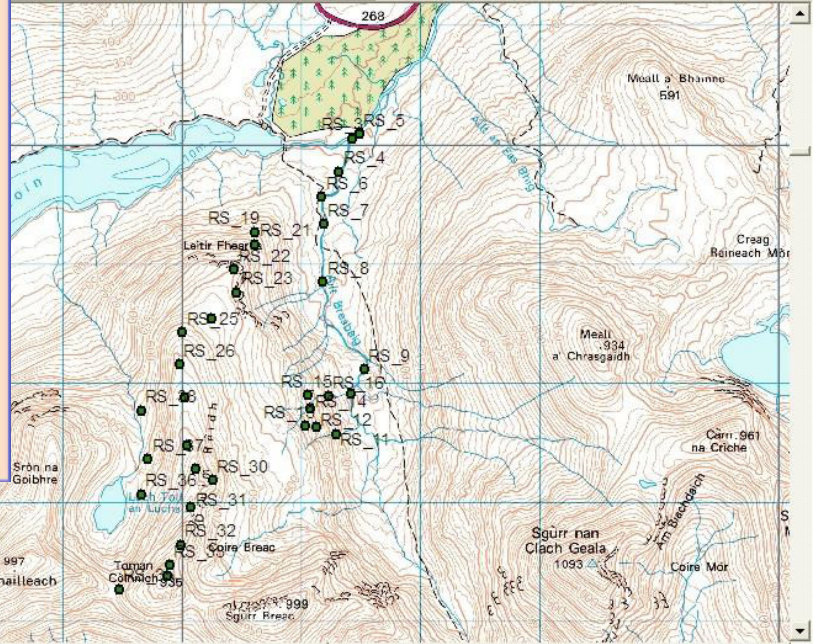


B_B 29/08/08 C.Jordan, E.Bee, N.Smith, K.Lawrie, A. Marchant, G.Wildman)

GPS Tools DFDC Project Details DFDC Tools

Target: Bedrock Inferred Go

Finish Sketch 1:50,438



215724.989 876185.714 Meters

MARLSTONE
ROCK FMN

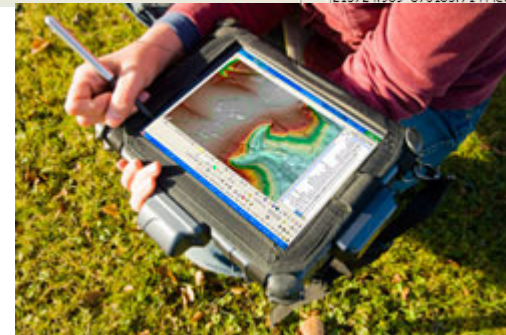
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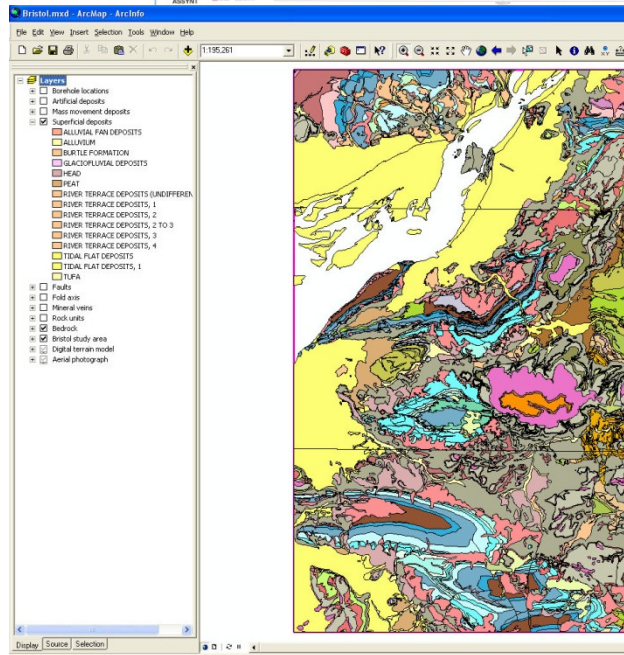
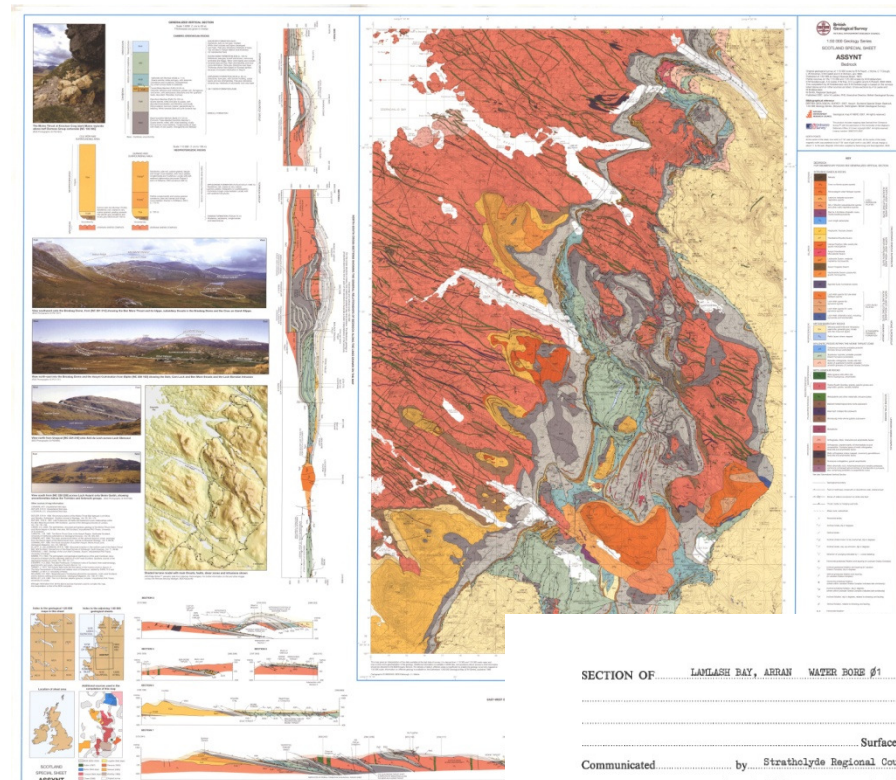




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support teaching and
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SECTION OF LAMLASH BAY, ARRAN WATER BORE #1 1

Surface Level..... O.D.
Communicated by Strathclyde Regional Council, Water Department
Date of boring or sinking August 1979 Borer Pettifer
One-inch Map 21 Six-inch Map N5 #35W

	Thickness		Depth from Surface	
	Metres	Metres	Metres	Metres
No core	4	39	4	39
Boulder clay: chocolate-brown, rather sandy. Few pebbles mostly 1-2 cm but up to 5 cm seen	1	12	5	51
Sandstone boulder	5	42	10	93
Greenish clay angular fragments (1 cm) of greenish mudstone 7 fault gouge or weathered top	0	56	11	49
No core	4	17	15	96
Sandstone: pinkish-brown or purplish brown; coarse (0.5 mm). Coarse, cross-laminated. Finer band, darker, fining upwards and downwards 17.70-18.07. Slip 15° to core length.	2	26	18	22
Passing down into				
Sandstone: off white to grey; coarse (0.5 mm), cross-laminated. Some limonite staining. Elongate clasts of greenish and red mudstone up to 10 cm long. Parallel bedding 10-30 to base. Sharp base 10° to core length	1	08	19	30
Sandstone (Grit): as above. Off white, coarse (1 mm) coarsening down, coarse cross-laminated. Elongate red mudstone clasts and occasional angular pebbles of meta-quartzite up to 1 cm. Limonite stains	1	70	21	00
Passing down into				
Grit: off white with limonite stains (1-2 mm). Many clasts of red mudstone and quartzite. One red, rounded mudstone clast (10 x 4 mm)	0	70	21	70
Sandstone: red/off white; coarse (5 mm). Rounded grains. Well-laminated. Laminations (2-3 mm thick) at 15° to core length	0	50	22	20
Passing down into				
Grit: off white; 1 mm, quartzite and mudstone clasts. Sharp base	0	65	22	85
c/forward	22	85		

EDINA

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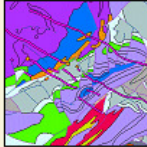

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BGS Data 1:250,000 	Bedrock and Linear Feature layers on 100 x 100 km tiles. More Info.	<input type="radio"/> Shape Files <input type="radio"/> MID/MIF
BGS Data 1:625,000 	Bedrock and Superficial Deposits layers on one tile for the whole of Great Britain. More Info.	<input type="radio"/> Shape Files <input type="radio"/> MID/MIF

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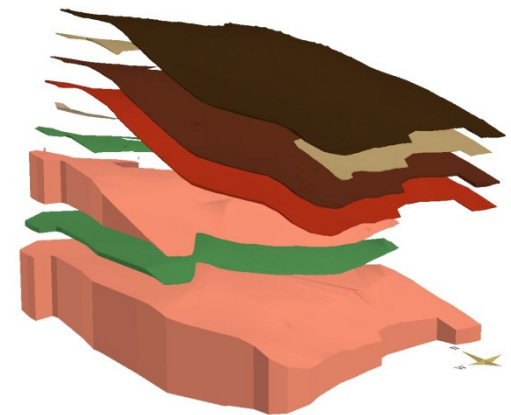
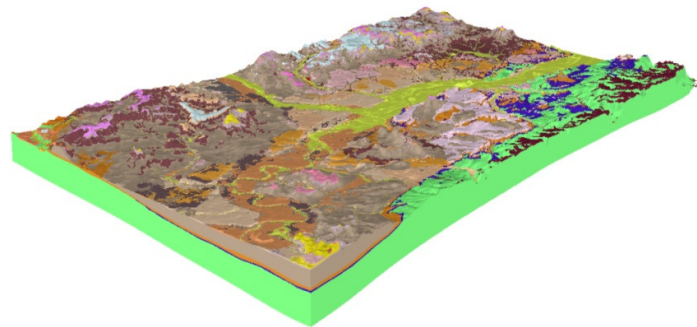
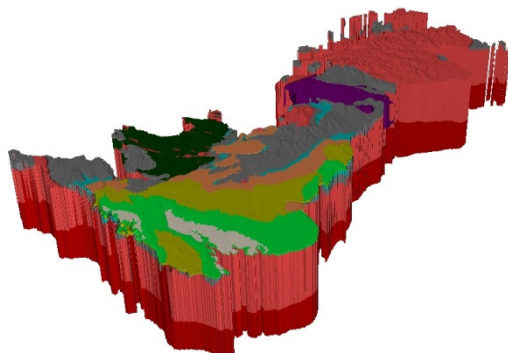
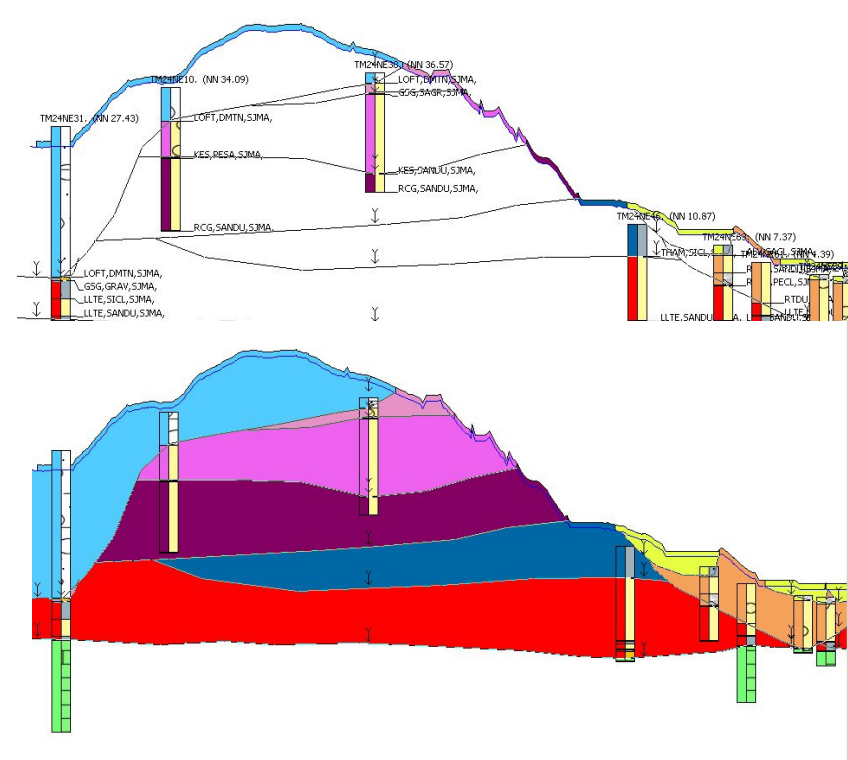
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GSI3D is a software package for modelling and visualising the subsurface in three dimensions.

GSI3D uses digital geoscience data and geological expertise to rapidly produce 3D geological models without the need for highly trained software experts

Joining fees for research consortium :
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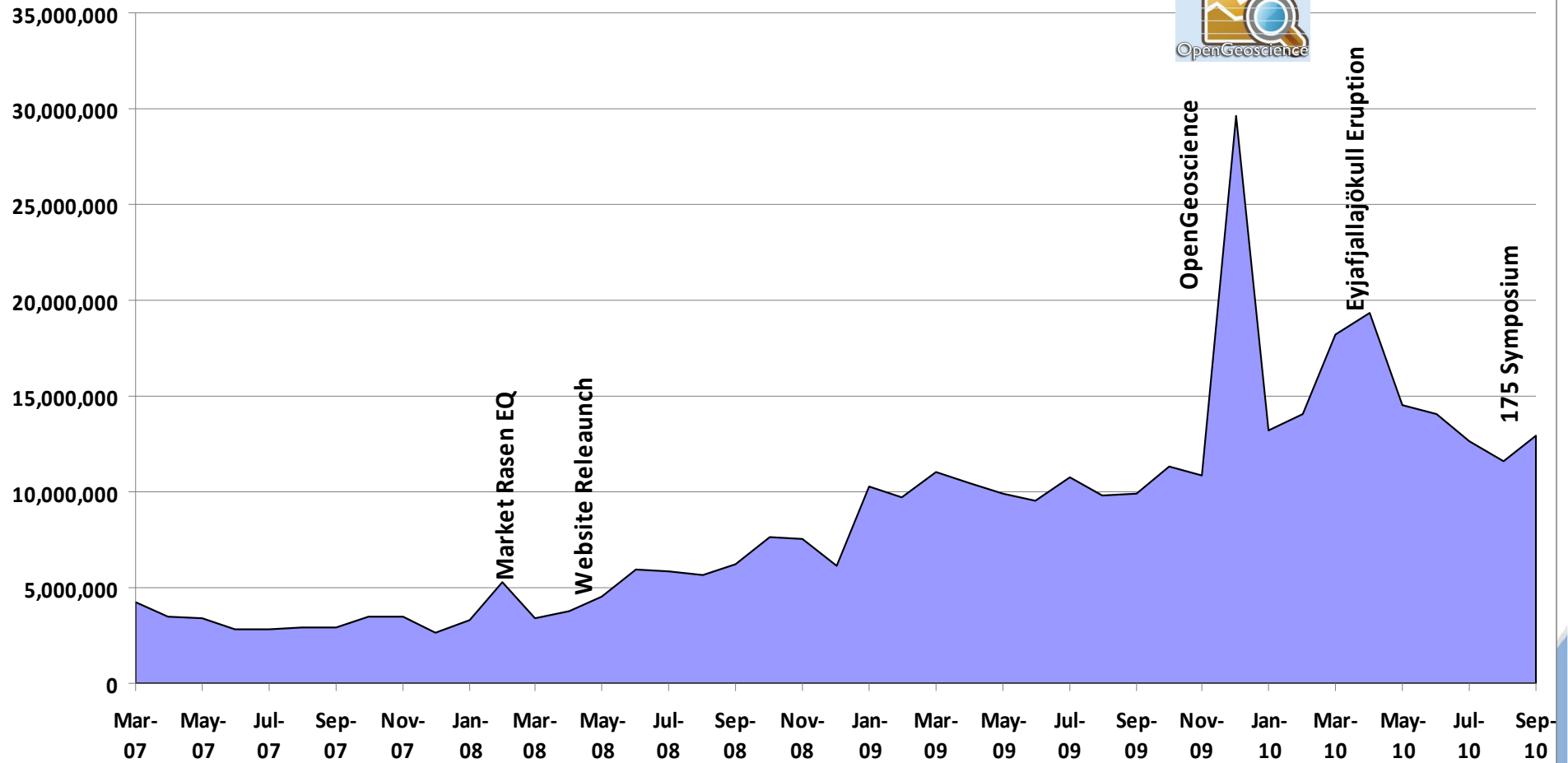
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Eyjafjallajökull Eruption

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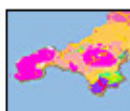
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summit urged

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- Richard Black: Widening divide?
- Q&A: The climate summit
- Where countries stand
- Copenhagen in graphics



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Archaeologists uncover signs of mass cannibalism at a 7,000-year-old human burial site in Germany.

FEATURES, VIEWS, ANALYSIS



The UK rocks

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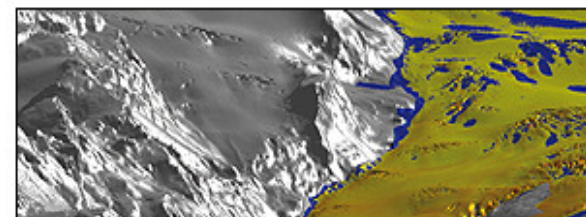


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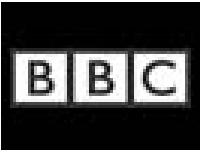



Open Reveal image


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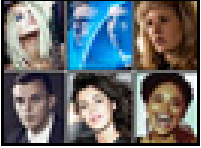
BBC site statistics on Mon 7 Dec

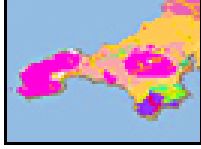
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UK Politics
- 

Flooded town united by new bridge
Page views: 412,586
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Cumbria
- 

BBC Sound of 2010: The longlist
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3.8% of this top 50
Entertainment
- 

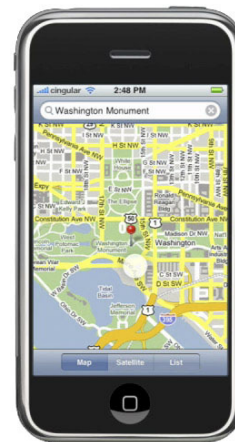
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Sci/Tech
- Act now on climate, summit urged**
Page views: 280,671
3.2% of this top 50
Europe

What did visitors click on?



BBC Feedback on OpenGeoscience

- Jonathan Amos, BBC correspondent said:
- OpenGeoscience was so popular because it actually gave people something “to play with”
- *Demonstrates that there is a world of ‘digital natives’ out there who are hungry for rapid online access to information about their ‘place’*



Feedback from the GI world

- OpenGeoscience was cited by senior GoogleEarth executives in recent presentations
- Jack Dangermond, Global President ESRI inc. (the 'Bill Gates of GIS'), has taken a personal interest in OpenGeoscience and offered to promote it

Feedback from universities

- “Literally putting geosciences 'on the map'. It will become a kind of 'GoogleRock' ” - Open University
- “Capacity to transform the way in which geosciences are taught in universities” - Birmingham University



Feedback in the blogosphere

- Blogs – positive and interested audience
- Twitter 180+ tweets 'British Geology' or OpenGeoscience
- YouTube - 7000 views OG help video
- YouTube contacted us to offer advertising on our site due to high useage!



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- walkscotland Fantastic resource - British Geological Survey - <http://www.bgs.ac.uk/OpenGeoscience>
about 22 hours ago from web
- dtester To all Science and Geography teachers - BGS has opened up **OpenGeoScience** - <http://tinyurl.com/yzzh94p> some great resources!
1 day ago from TweetDeck
- rafeblandford Great stuff from the BGS <http://www.bgs.ac.uk/opengeoscience/> - Explore Britain's Geology
about 23 hours ago from Seismic
- stevie258 RT @jagir: RT @katharnavas: **OpenGeoscience** | Free data | British Geological Survey (BGS) <http://bit.ly/7y3Ddt>
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about 23 hours ago from twitterfeed
- KarenKinnaman via Del.icio.us : **OpenGeoscience** | Free data | British Geological Survey (... <http://bit.ly/4ZV1ua> #social #networking
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about 23 hours ago from API
- delicious_n_hot **OpenGeoscience** | Free data | British Geological Survey (BGS) <http://bit.ly/51JQjw>
about 23 hours ago from web
- HodderHumanity RT @The_GA: Free British Geological Survey data, maps and photos now available free online

OpenGeoscience mashups



- A key aim of OpenGeoscience was to allow people to ‘mash-up’ BGS data with their own information.
- The user community is already taking advantage of the web map services available within OpenGeoscience and a number of “mashups” have already been created.

[Map data mash-ups gallery | OpenGeoscience](#)

[Mash-ups](#) reuse, repurpose and combine existing data, art or content to create something new, or add value in some way.

We encourage non-commercial users to mash-up [OpenGeoscience](#) material with their own data in new and innovative ways by adding new functionality or interfaces.

We can draw inspiration and know-how from mash-ups from the developer community to help us develop robust new products for the benefit of society. Contact us if you create something new and innovative that could benefit others: [using BGS data](#)

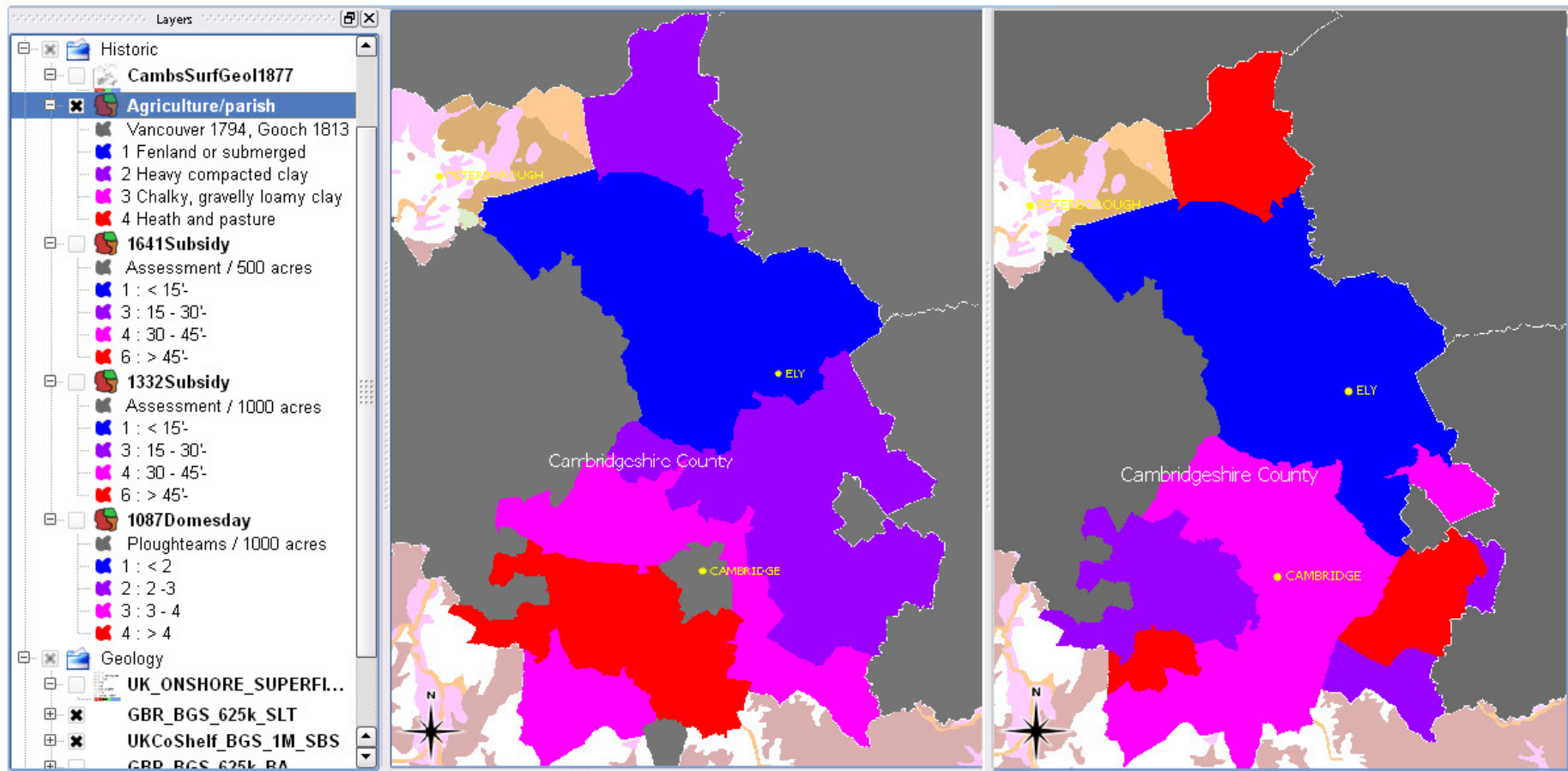


[Example Mash-ups](#)

Gallery below of mash-ups using geological map data at different scales and applications such as: ArcGIS Explorer, ArcGIS Server, ArcWatch, Google Maps, KML, MapInfo and Ordnance Survey OpenSpace.

- [BGS developers](#)
- [our research partners](#)
- [developer community](#)

Land cover and surface geology of East Anglia



**SUBSIDY & LAND COVER CORRELATION, EAST ANGLIA FENLANDS S
AFTER DARBY (1969, 1974) & O.S. OPENDATA**

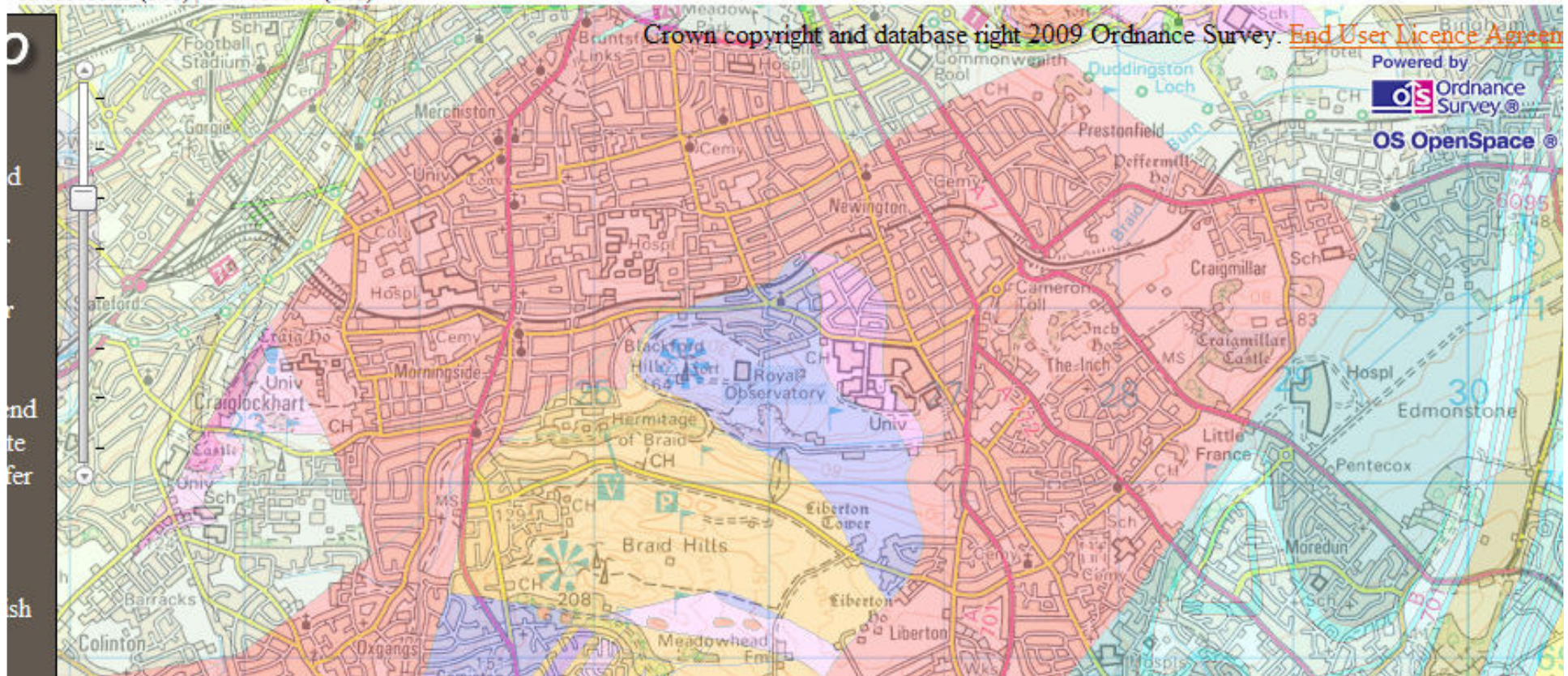
Bracknell Caving Club



Ordnance Survey OpenSpace



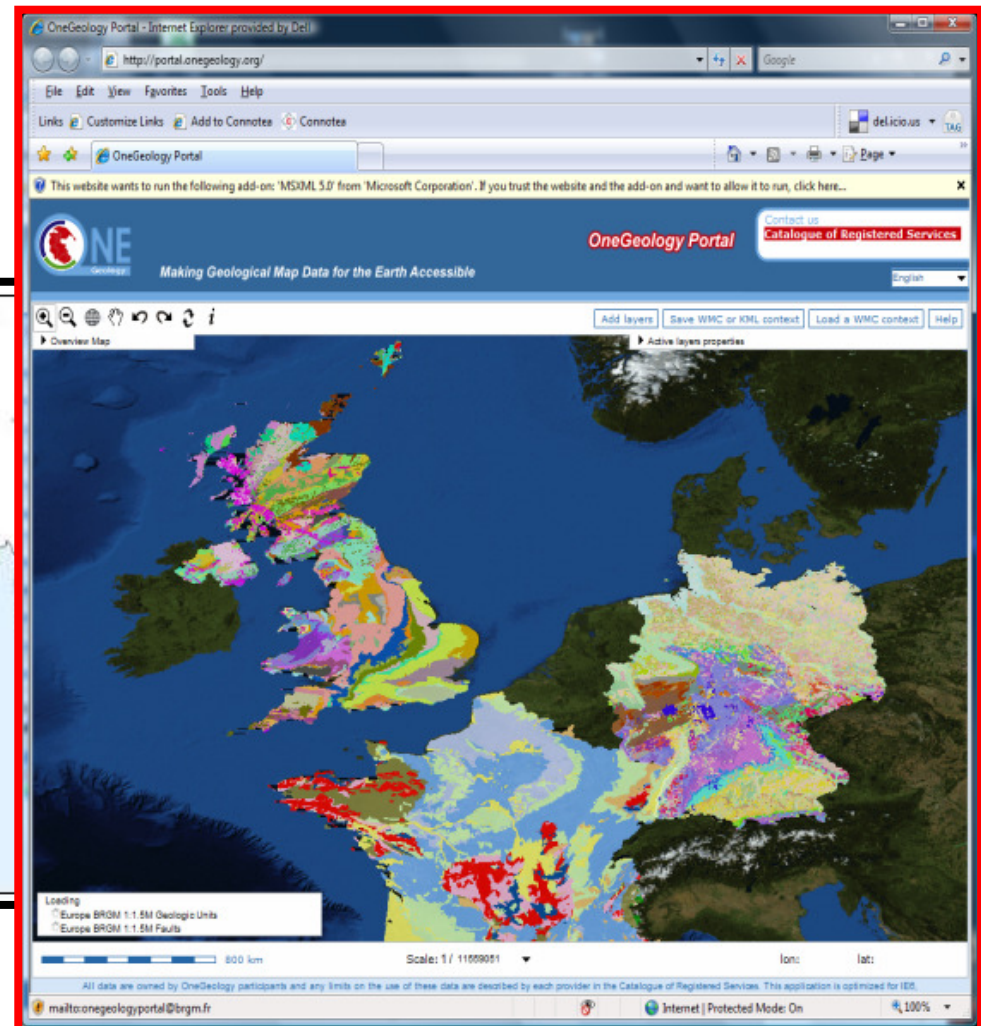
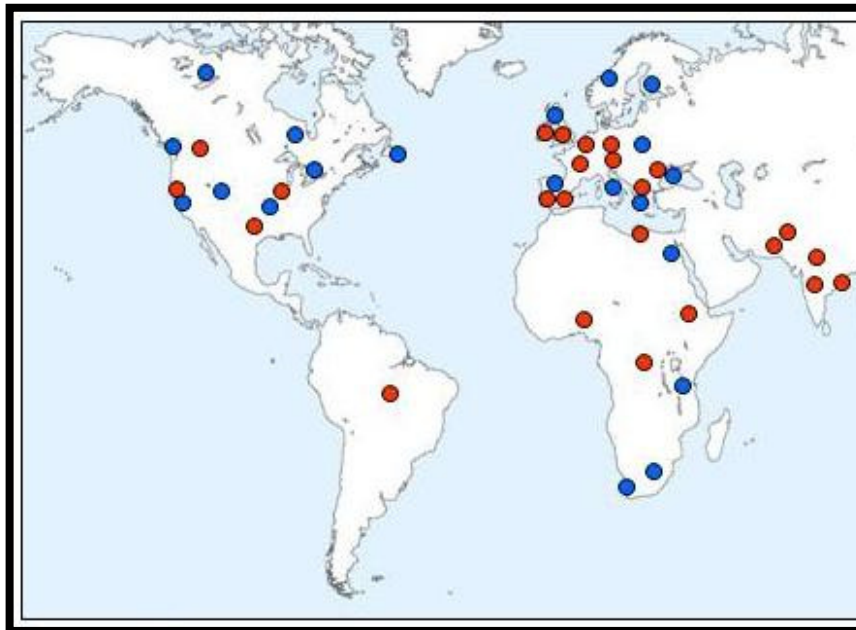
X: 325886.25 (2.93) | Y: 670608.75 (6.01)



Global reach



Sigma • MOBILE
System for integrated Geoscience Mapping



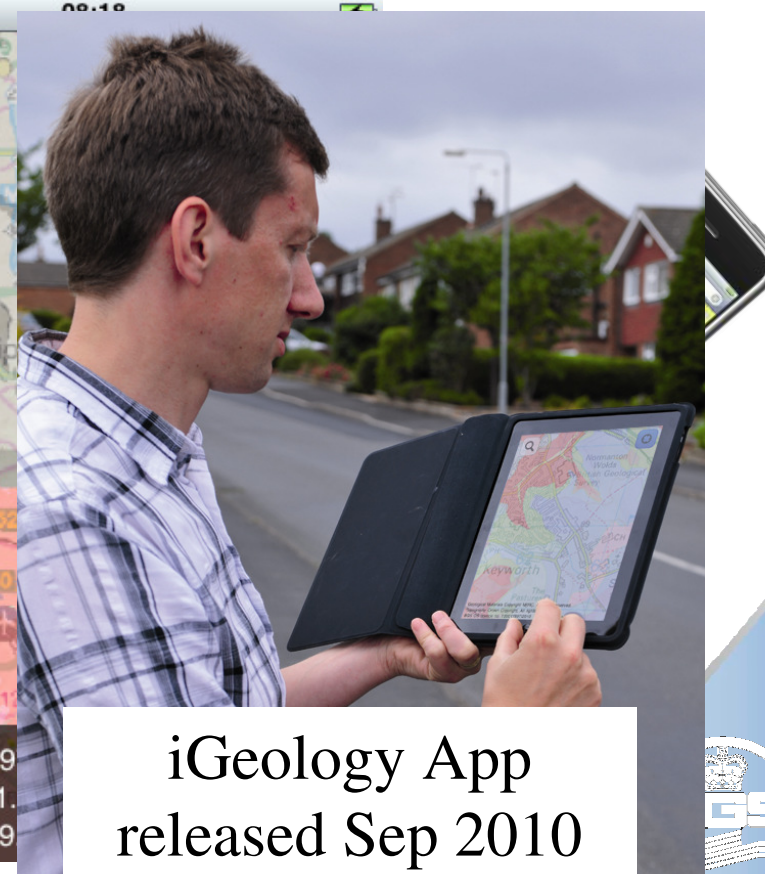
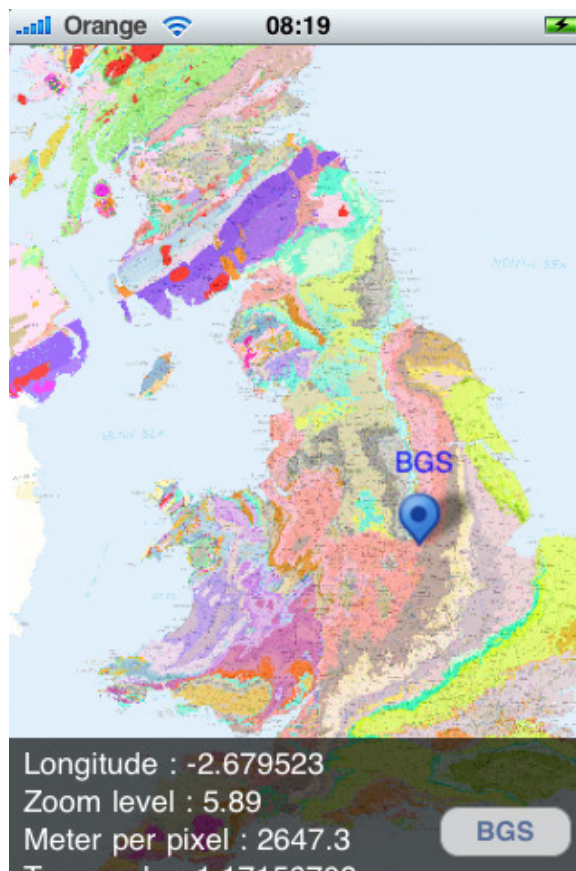
What's next for OpenGeoscience?



Better support for mobile devices



Web Map Service & mobile technologies are converging to allow instant access to datasets wherever you are.



iGeology App
released Sep 2010



Publishing Linked data



- Online data will become increasingly linked and searchable with the Linked Data Web
- BGS is looking to publish a number of its data and digital products as Linked Data.



Borehole scans

GeoRecords

Find boreholes | Terms & conditions | Accessibility | Help & hints | Privacy policy | Contacts

Borehole scans viewer

Show map displaying listed boreholes

	QS	Reference	Bore name	Confidentiality	BNG easting	BNG northing	Driller (m)	
View scan	SK63SE	BJ1.	BELLEVUE (COLSTON BASSETT)	NO CONDITIONS APPLIED (NON-CONFIDENTIAL)	469275	0333893	68	
View scan	SK63SE	British Geological Survey - Borehole 233690 - PDF Logs - Microsoft Inte						
View scan	SK63SE	https://extranet.bgs.ac.uk/bhscans/,DataInfo=bgsintranet.ad.bgs.ac.uk,Port=90+cont						
View scan	SK63SE	Easy Print PDF << < Page 1 of 50 (Size unknown)						
View scan	SK63SE	NO CONDITIONS APPLIED (NON-CONFIDENTIAL)						
View scan	SK63SE	1 / 1 58.6%						
View scan	SK63SE	Find						
View scan	SK63SE	SK 63 SE / 81						
View scan	SK63SE	BELLEVUE B.H.						
View scan	SK63SE	BORINGS DEPT NOTIFICATION SN						
View scan	SK63SE	British Geological Survey						
View scan	SK63SE	© All rights are reserved by the copyright proprietors.						
View scan	SK63SE	INS03SW BJ 1.						
View scan	SK63SE	1935						

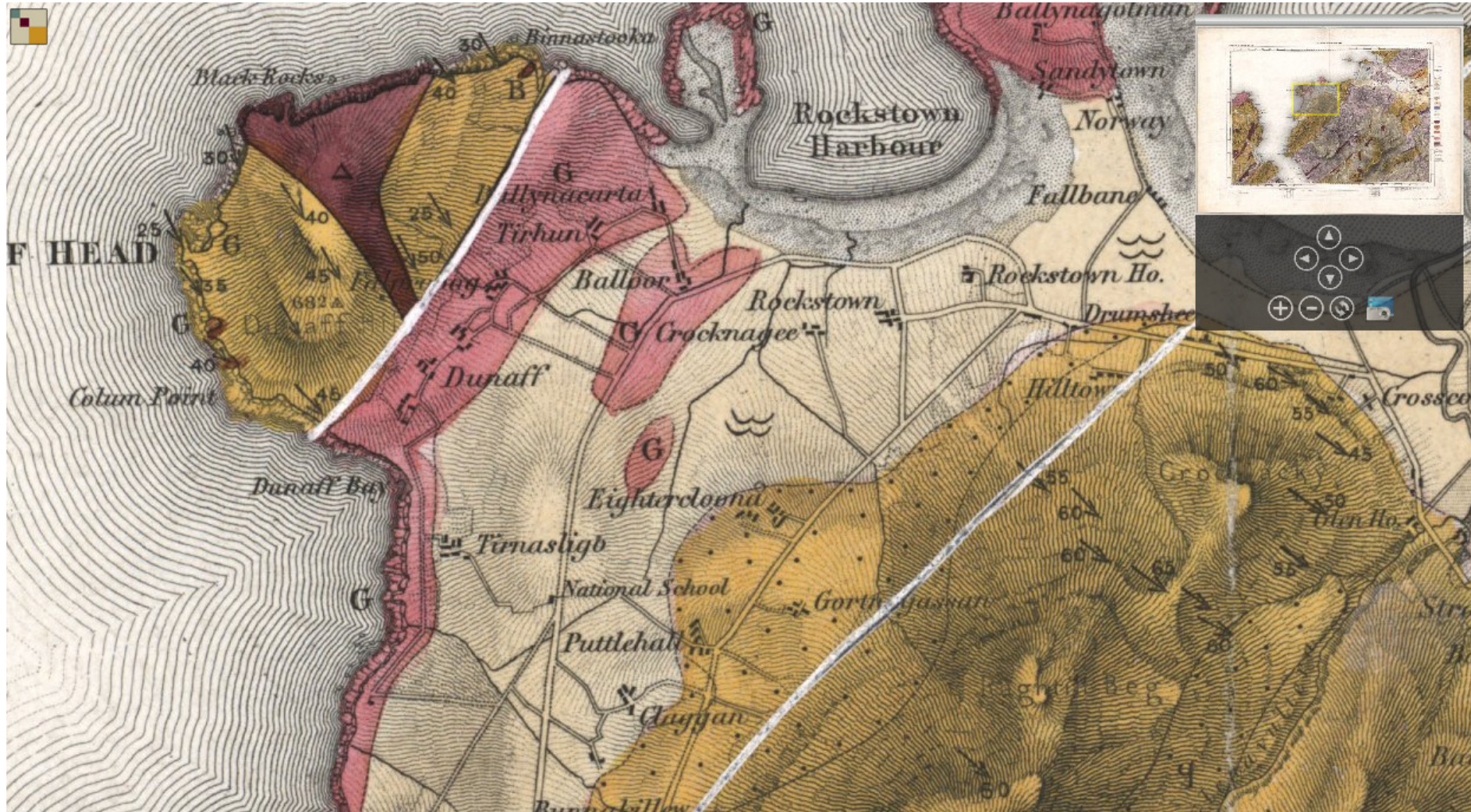
SECTION OF LAMLASH BAY, ARRAN WATER BORE Ø1 1

Surface Level O.D.
 Communicated by Strathclyde Regional Council, Water Department
 Date of boring or sinking August 1979 Borer Pettifer
 One-inch Map 21 Six-inch Map N.S. Ø 3 SW

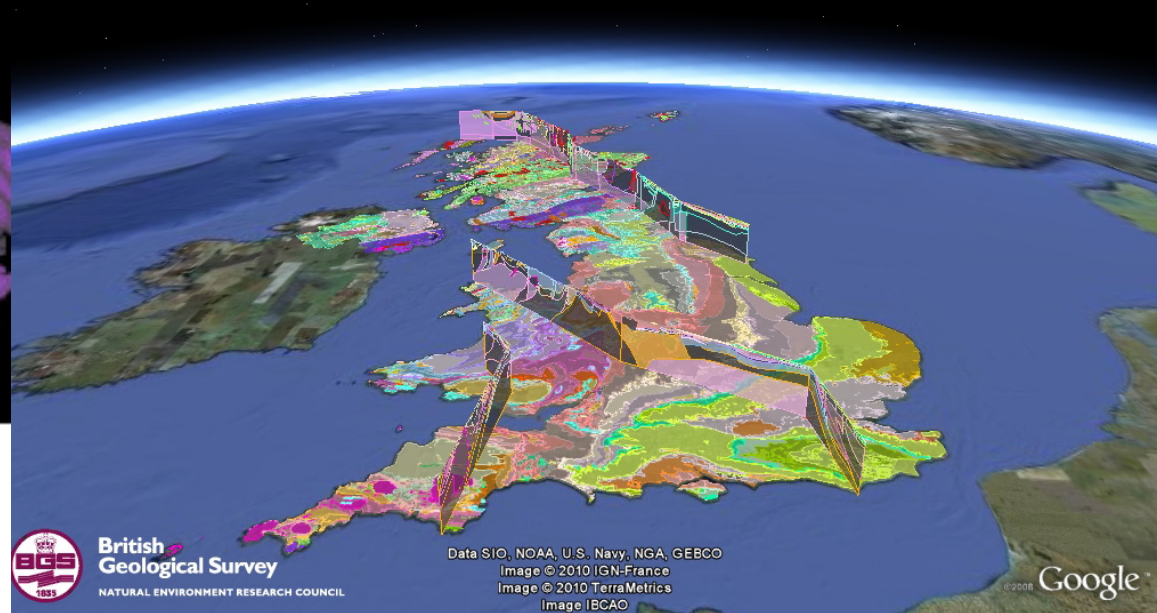
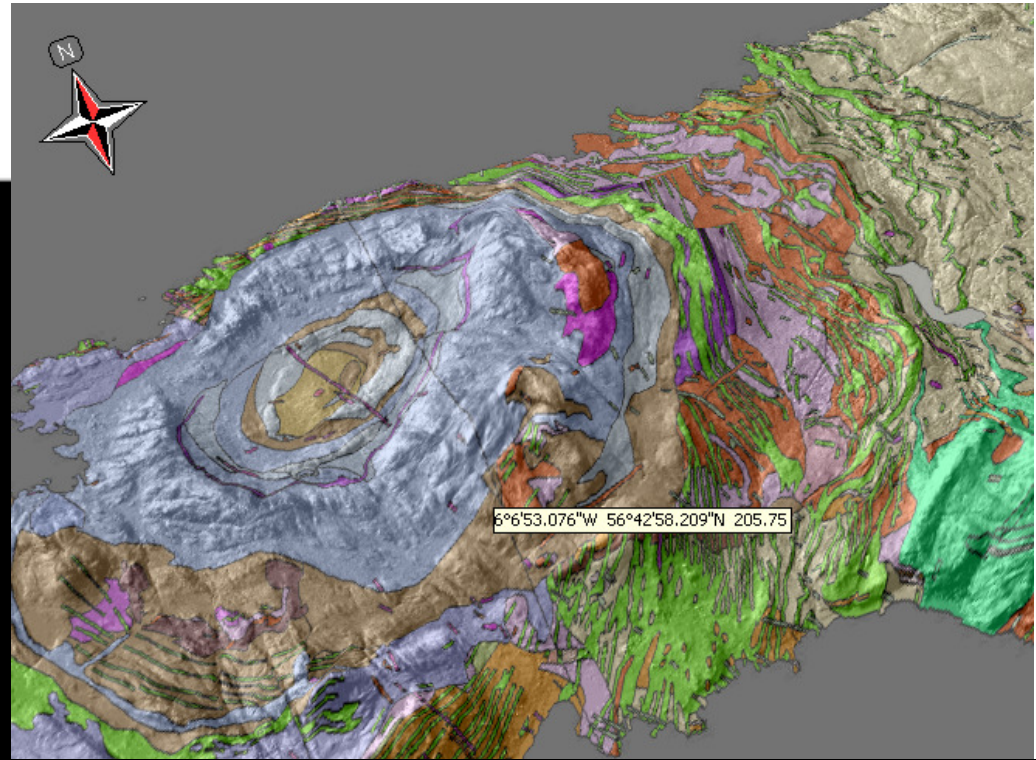
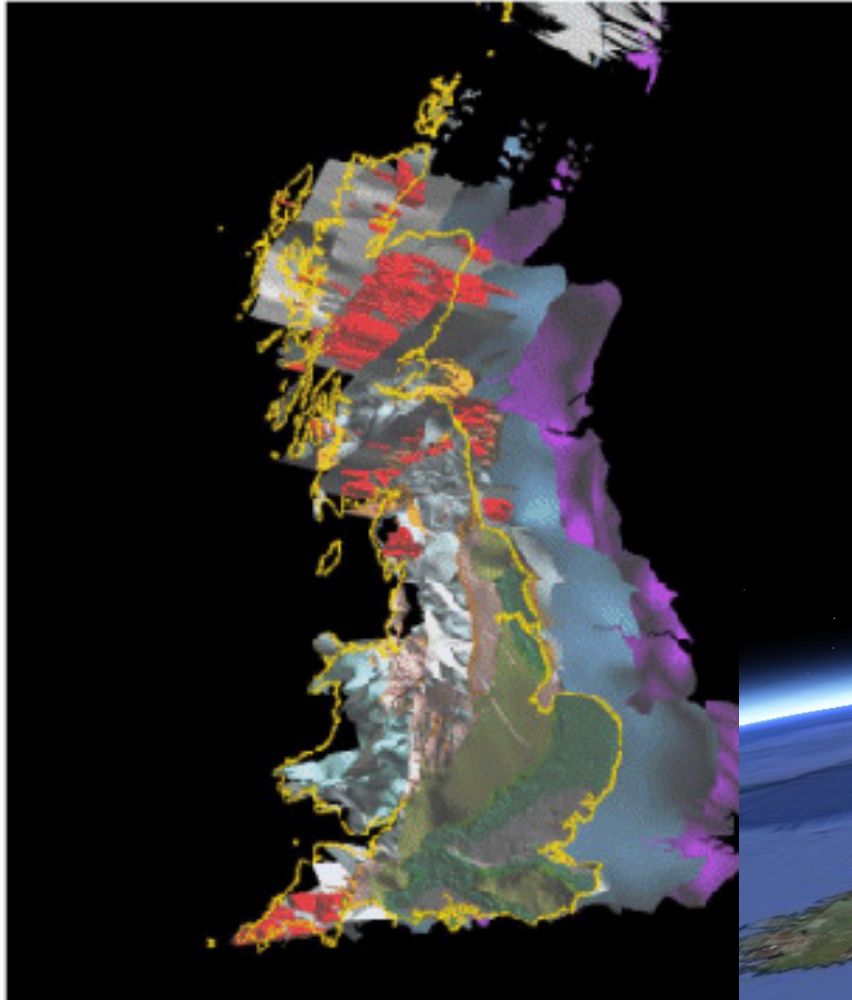
	Thickness	Depth from Surface	Thickness	Depth from Surface
	Metres	Metres	Metres	Metres
No core	4	39	4	39
<u>Boulder clay</u> : chocolate-brown, rather sandy. Few pebbles mostly 1-2 cm but up to 5 cm seen	1	12	5	51
<u>Sandstone boulder</u>	5	42	10	93
<u>Greenish clay</u> angular fragments (1 cm) of greenish mudstone ?fault gouge or weathered top	0	56	11	49
No core	4	47	15	96
<u>Sandstone</u> : pinkish-brown or purplish brown; coarse (0.5 mm). Coarse, cross-laminated. Finer band, darker, fining upwards and downwards 17.70-18.07. Dip 15° to core length	2	26	18	22
Passing down into				
<u>Sandstone</u> : off white to grey; coarse (0.5 mm), cross-laminated. Some limonite staining. Elongate clasts of greenish and red mudstone up to 10 cm long. Parallel bedding 18.90 to base. Sharp base 10° to core length	1	08	19	30
<u>Sandstone/Grit</u> : as above. Off white, coarse (1 mm+) coarsening down, coarse cross-laminated. Elongate red mudstone clasts and occasional angular pebbles of meta-quartzite up to 1 cm. Limonite stains	1	70	21	00
Passing down into				
<u>Grit</u> : off white with limonite stains (1-2 mm). Many clasts of red mudstone and quartzite. One red, rounded mudstone clast (10 x 4 mm)	0	70	21	70
<u>Sandstone</u> : red/off white; coarse (5 mm). Rounded grains. Well-laminated. Laminations (2-3 mm thick) at 15° to core length	0	50	22	20
Passing down into				
<u>Grit</u> : off white; 1 mm, quartzite and mudstone clasts. Sharp base	0	65	22	85
c/forward	22	85		



Map scan delivery



3D



Questions....

- How is the data used?
- Enough and the right data?
- Barriers to take up?
- Building partnerships?
- Integrating with teaching programmes?
- New developments e.g. Mobile, VLEs?



Licensing BGS Data and Information to Universities

BGS policy is that all data/information is free for non-commercial academic teaching and research where research results are made publicly available

A fee may be charged where:-

- It is a large/complex request or where the data is of a sensitive nature
- Research is being carried out for a commercial funder/sponsor
- A university is competing for funding with a private company (IFTS)

In return BGS requires:-

- A simple licence to be signed by the institution
- The institution to ensure any students are (legally) bound by the institution
- There is an academic supervisor's signature included
- BGS/NERC receives acknowledgement

