



**British
Geological Survey**

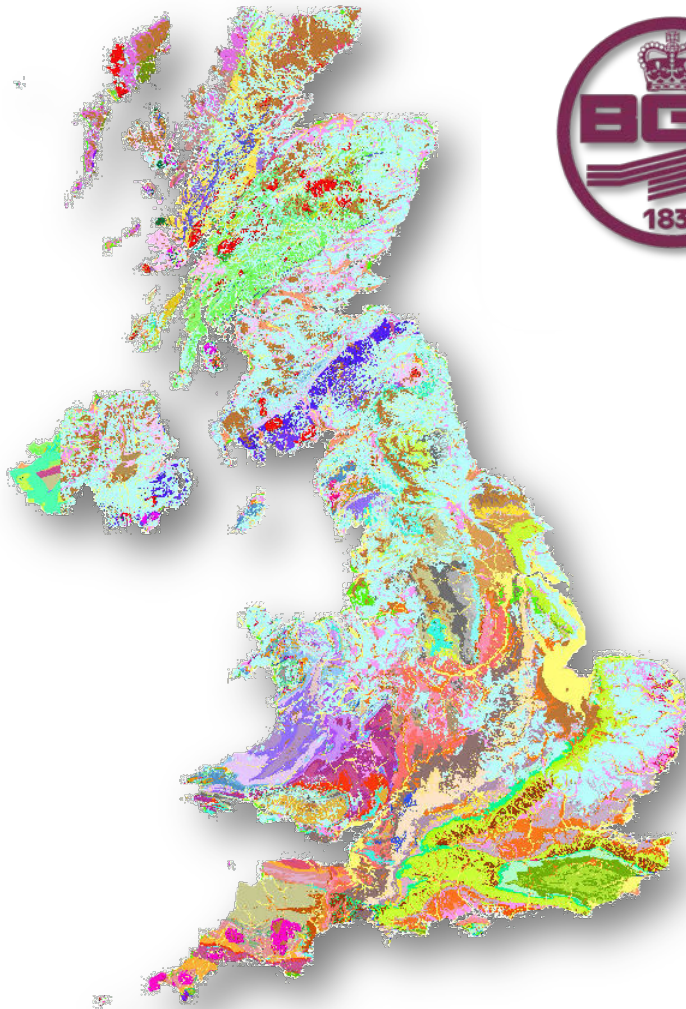
NATURAL ENVIRONMENT RESEARCH COUNCIL

Applied geoscience for our
changing Earth

What Does BGS Survey?

Russell Lawley

An Overview of our Role



- Component body of NERC
- Advise UK government on all aspects of geoscience
- Partly public funded
- HQ in Nottingham
- 650 staff across UK
- We operate globally, generally in a capacity-building role
- Geologically surveying UK since 1835
- We create and provide an extensive range of geoscience information for public good
- www.bgs.ac.uk



Our Core National Datasets

DiGMAPGB

Digital Geological Map of Great Britain

Offshore Marine Geology:

Sea-bed sediments and features

Bedrock and Quaternary

Baseline Geochemistry sampling
of Great Britain

(Soils, sediments, streams, plants)

Baseline geophysical surveys of
UK & continental shelf.

(Gravity, Magnetics,
Radiometrics, Seismics)

Surveyors and Methods



Surveyors and Methods



Surveyors and Methods



Surveyors and Methods



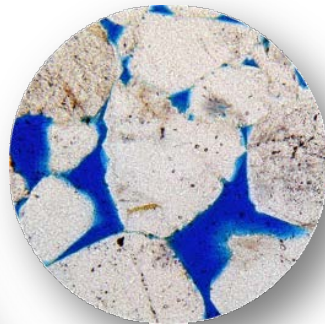
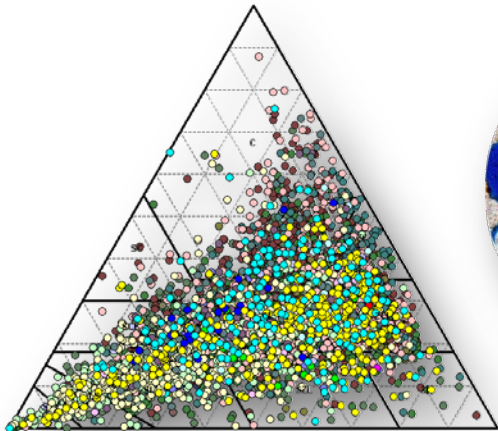
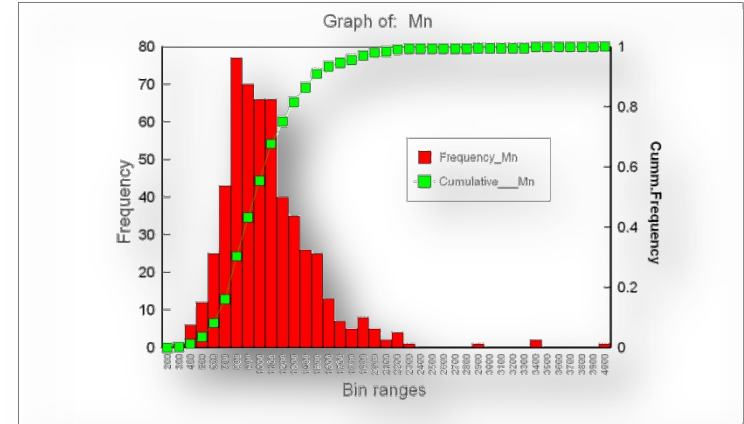
Surveyors and Methods



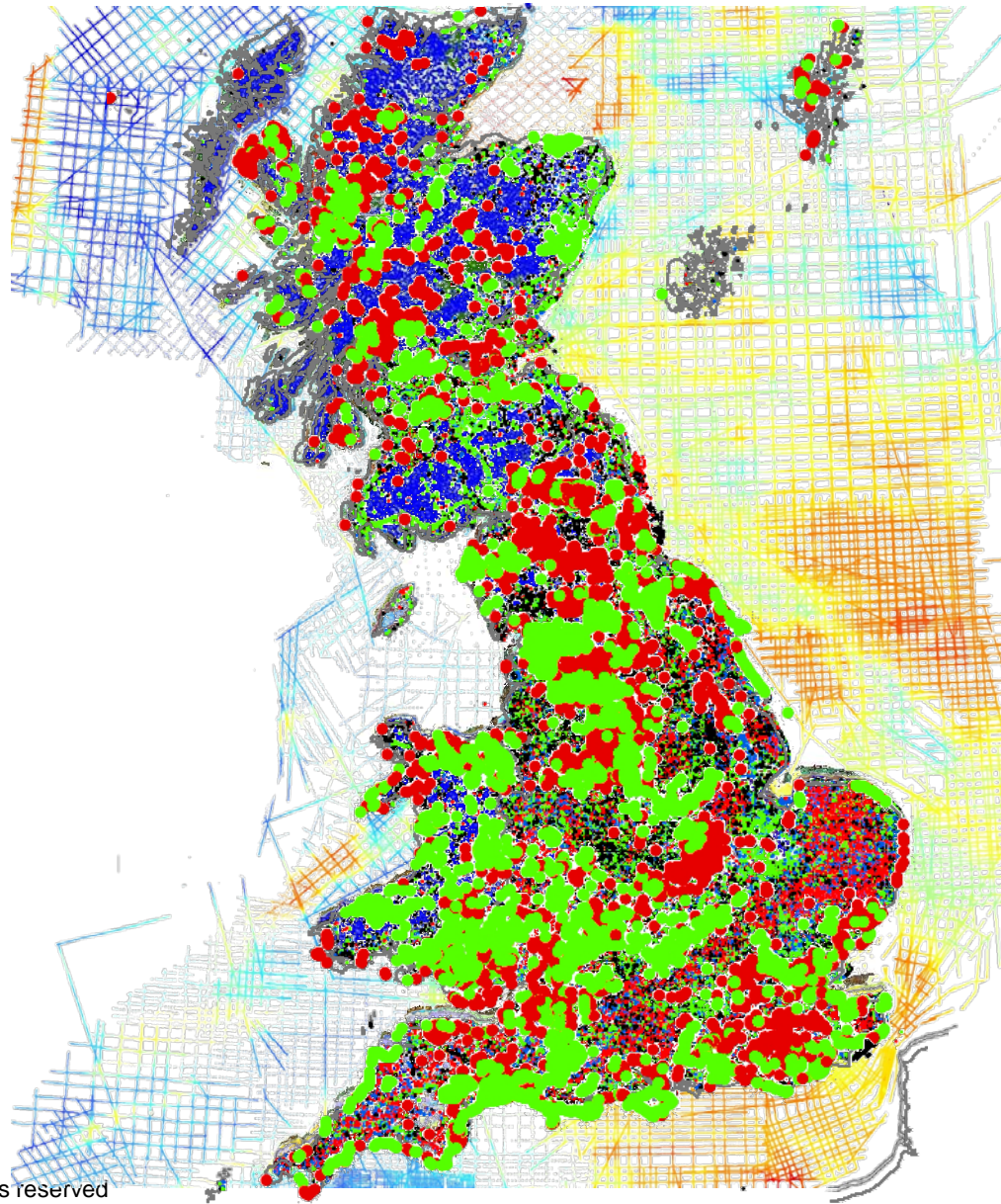
Surveyors and Methods



Surveyors and Methods



Our Sampling Programmes



Terrabytes of satellite, terrain and air photo mapping

Terrabytes of geophysical measurements (air, land, sea)

400,000+ chemical samples (soil, sediment, water, plant, rock)

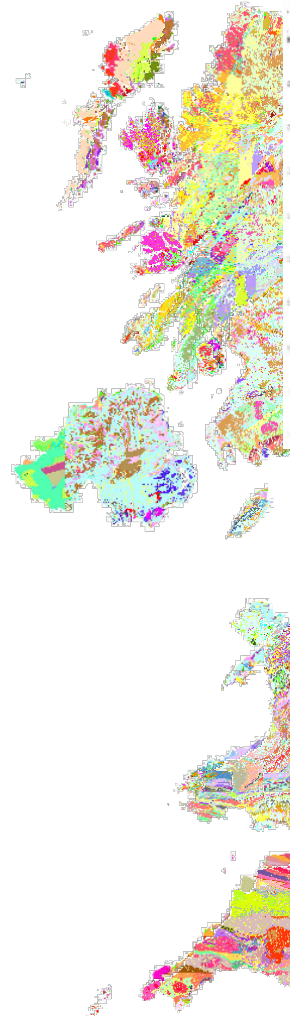
Millions of surveyor observations (e.g. landslides, exposures)

2 million borehole and trial - pit records (Thank you!)



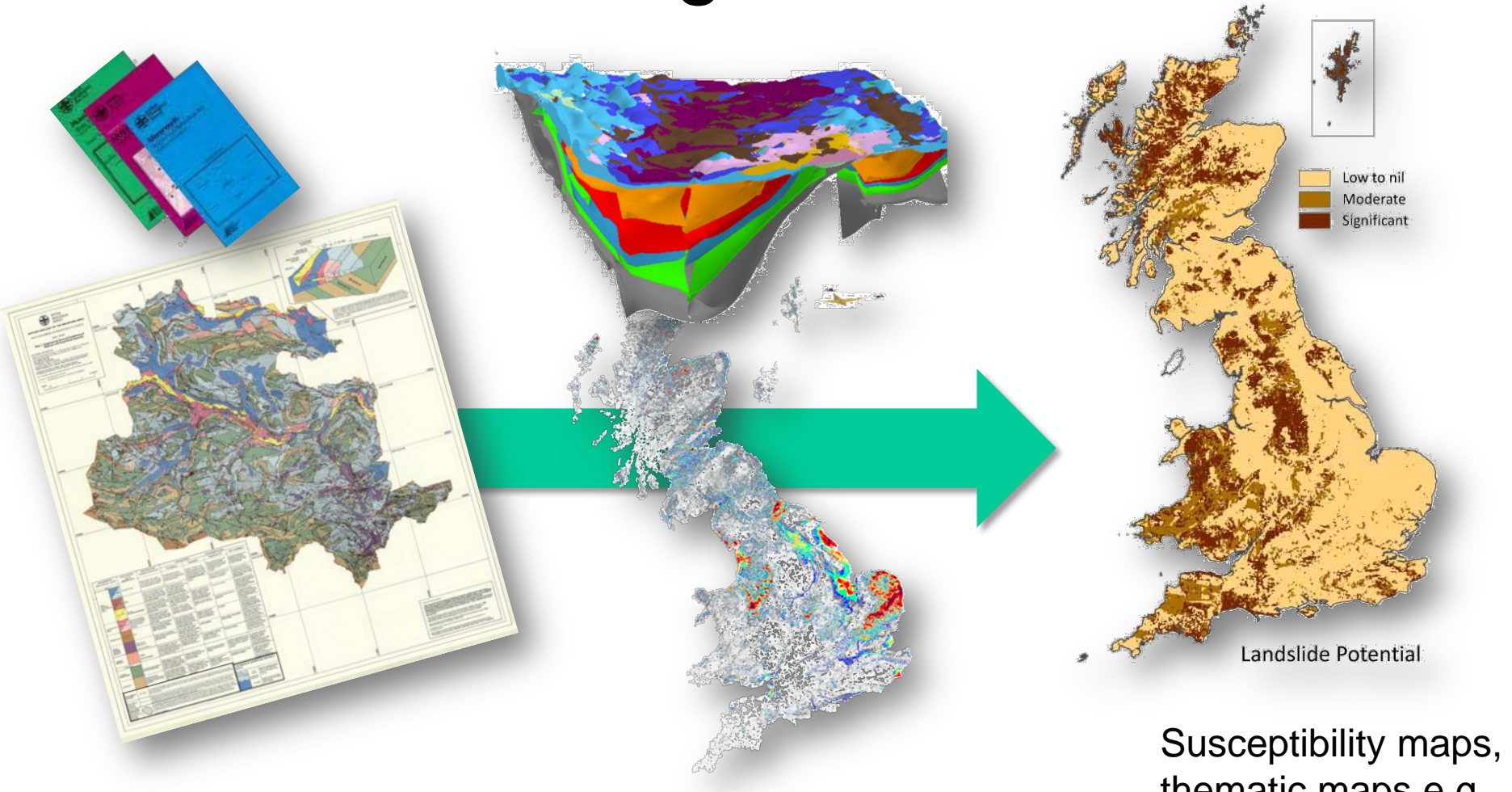
Matching Scope to Scale

National cover - local relevance



Sampling		Properties		Strata		Depth	Level
Depth	Type	Stratum	Unit	Designation	Description	Depth	Level
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0.00-0.05	00				1000	0.0	0.0
0.05-0.10	00				1000	0.0	0.0
0.10-0.15	00				1000	0.0	0.0
0.15-0.20	00				1000	0.0	0.0
0.20-0.25	00				1000	0.0	0.0
0.25-0.30	00				1000	0.0	0.0
0.30-0.35	00				1000	0.0	0.0
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0.45-0.50	00				1000	0.0	0.0
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0.55-0.60	00				1000	0.0	0.0
0.60-0.65	00				1000	0.0	0.0
0.65-0.70	00				1000	0.0	0.0
0.70-0.75	00				1000	0.0	0.0
0.75-0.80	00				1000	0.0	0.0
0.80-0.85	00				1000	0.0	0.0
0.85-0.90	00				1000	0.0	0.0
0.90-0.95	00				1000	0.0	0.0
0.95-1.00	00				1000	0.0	0.0
1.00-1.05	00				1000	0.0	0.0
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1.75-1.80	00				1000	0.0	0.0
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1.85-1.90	00				1000	0.0	0.0
1.90-1.95	00				1000	0.0	0.0
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7.95-8.00	00				1000	0.0	0.0
8.00-8.05	00				1000	0.0	0.0
8.05-8.10	00				1000	0.0	0.0
8.10-8.15	00				1000	0.0	0.0
8.15-8.20	00						

Evolution from Survey, to Maps, to Models, to Solving Problems



Traditional, surveyed, 'interpreted' maps

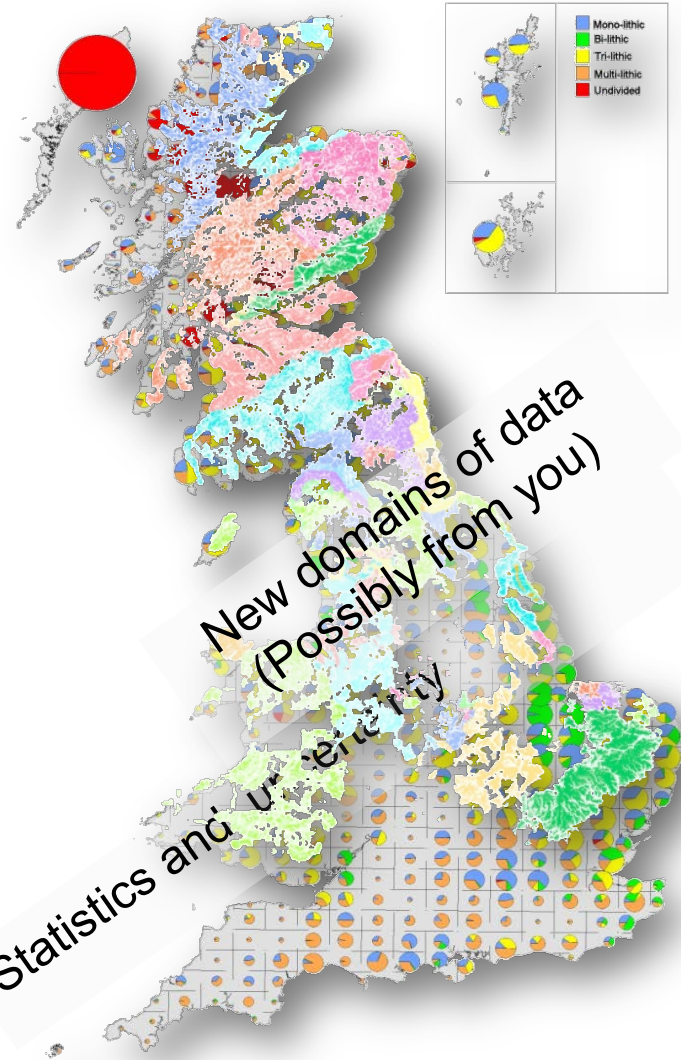
Mathematical and conceptual models (2 > 3D)

Susceptibility maps, thematic maps e.g. GeoSure DiGMAPGB:Plus

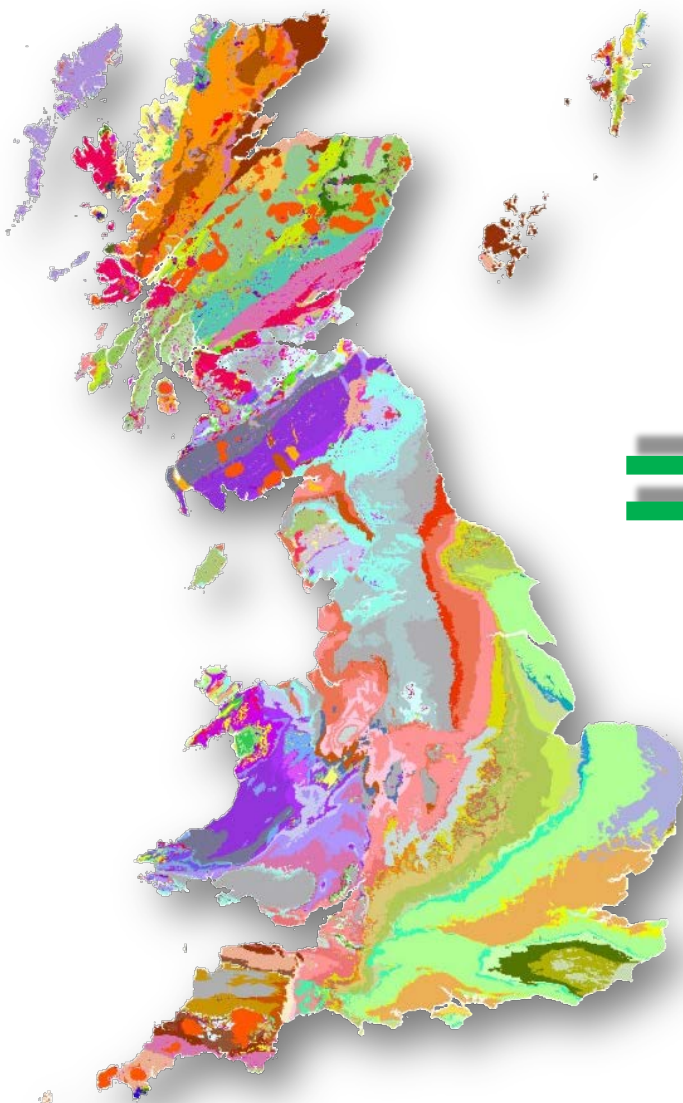
Getting Answers from Geology



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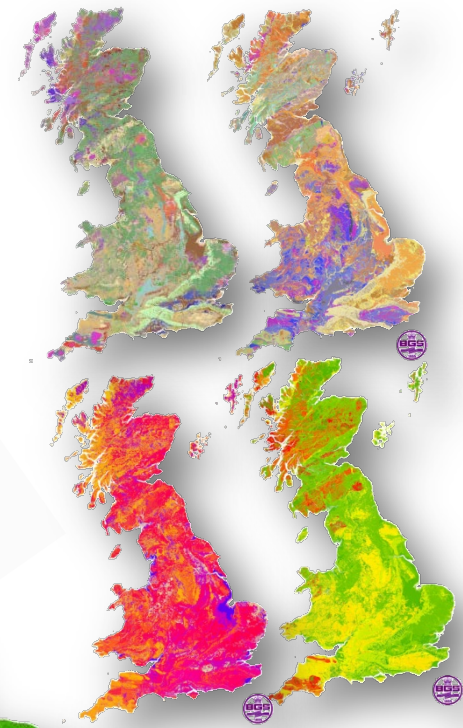
Getting Answers from Geology



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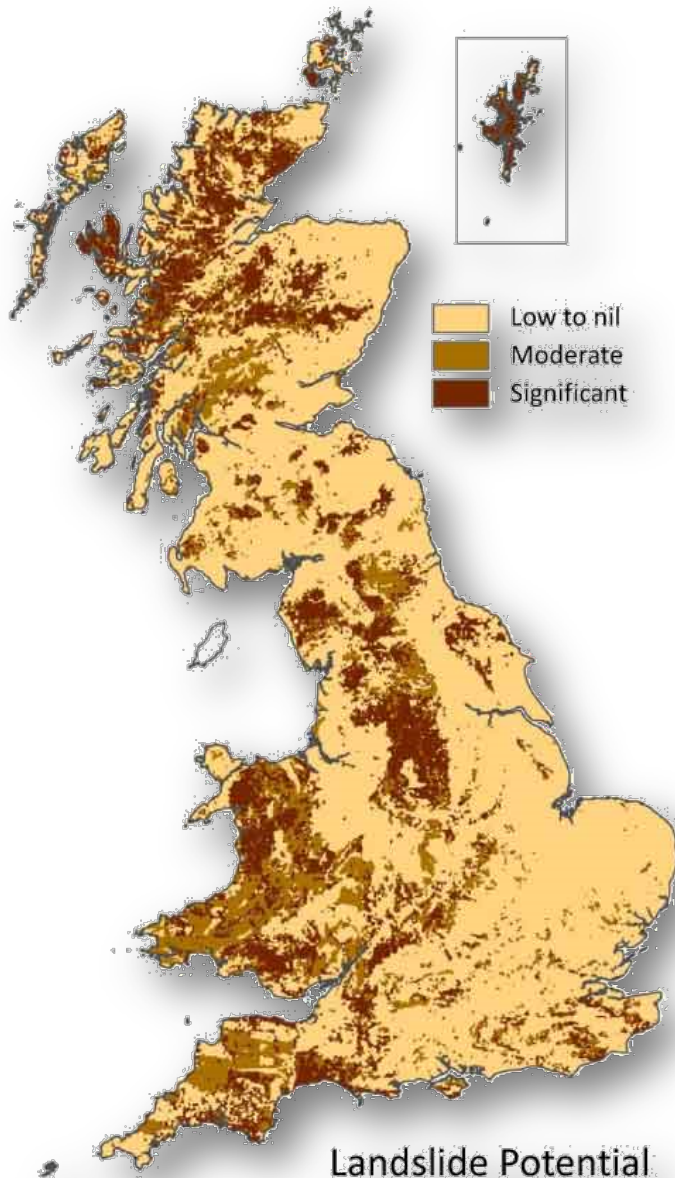
Simplified maps to answer simple questions



- GeoSure
- Radon
- Excavatability
- Swelling clays
- Sulphates
- Corrosion
- etc



Datasets: GeoSure



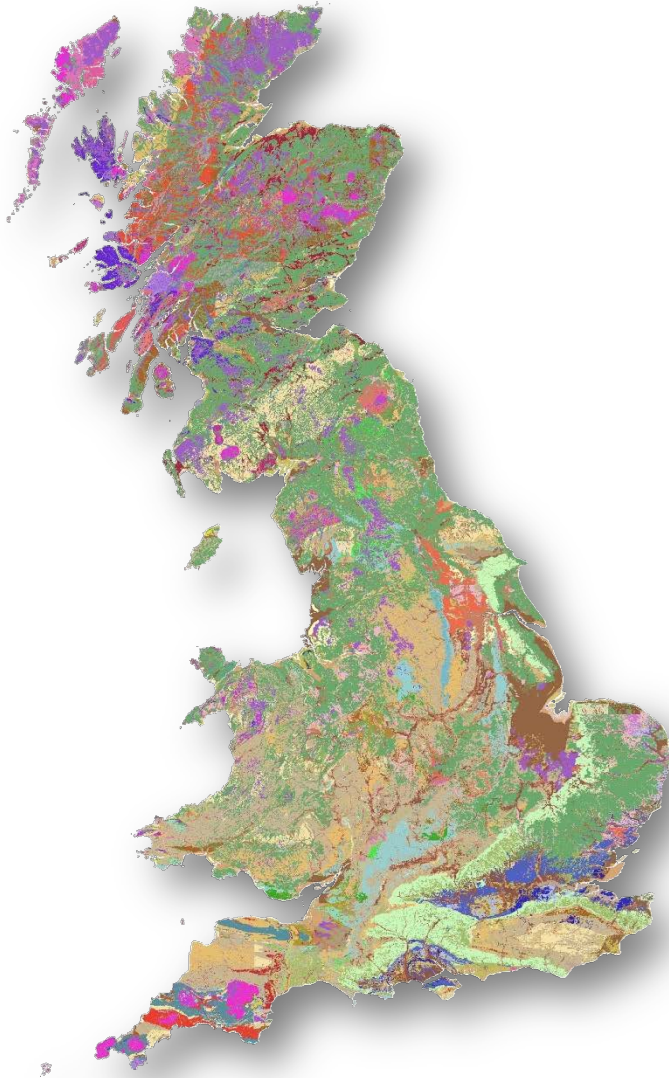
Description of susceptibility of 2 storey dwellings to 6 geohazards:

- collapsible deposits
- compressible ground
- landslides
- running sands
- shrink swell
- soluble rocks

Other hazards include Flooding, Radon, Contamination

- GB Coverage
- 1:50,000 (locally 1:10,000) Scale
- Vector GIS Formats
- Sample data available
- User guides available

Datasets: DiGMapGB-PLUS



Description of basic engineering properties to 2-3m depth

- Strength
 - Excavatability
 - Use as Engineered Fill
 - Foundation conditions
 - Bulking Volume
 - Discontinuities
-
- GB Coverage
 - 1:50,000 (locally 1:10,000) Scale
 - Vector GIS Formats
 - Sample data available
 - User guides available



Corrosivity



Corrosion potential

- Unlikely to cause corrosion
- May cause corrosion
- Likely to cause corrosion

- Classification of corrosivity (ferrous materials) based on DIPRA scoring
- GB Coverage
- 1:50,000 Scale
- Vector GIS Formats
- Sample data download
- Non-ferrous ratings in progress

- Numerical score
- Classification
- Recommendation for protective measures
- Recommendation for use of backfill

- Analysis of pipe-burst data

An Example of Data Evolution

(*From Power to Poirot*)

Aims:

Resolve issues of 'unforeseen' site conditions
Improve security & reliability of earth

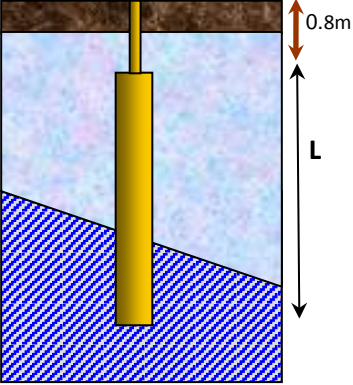
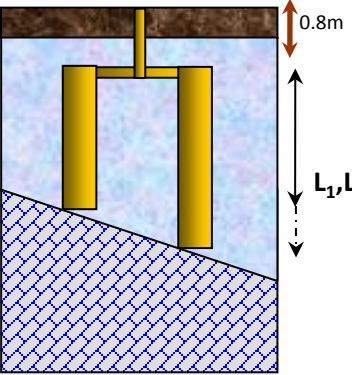
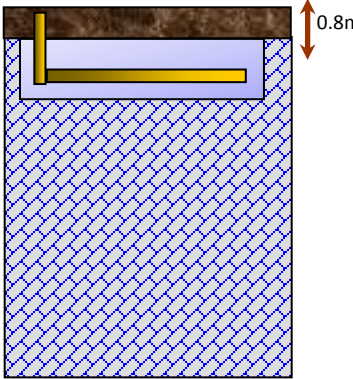
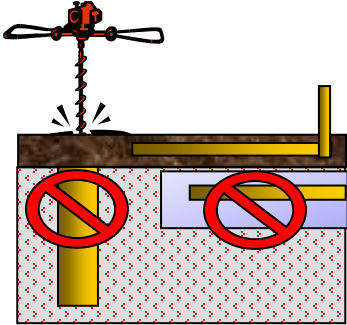
Objectives:

Site characterisation
Pre installation design and costs
Specification for deep driving of earthing rods
Simple 'warning' system for materials & installation type (**no geology-speak!**)



An Example of Data Evolution

(From Power to Poirot)

Scenario 1: Single rod installation	Scenario 2: Multiple rod installation	Scenario 3: Trench installation	Scenario 4: Specialist installation
			
<p>The optimum solution</p>	<p>Occurs when penetrability or resistivity prevents 10 ohm resistance from a single rod</p>	<p>Occurs when there is no vertical rod penetrability or where there would be an excessive number of multiple rods</p>	<p>Neither rods or trenching are possible can only earth via the soil layer or by specialist insertion</p>

An Example of Data Evolution

(From Power to Poirot)

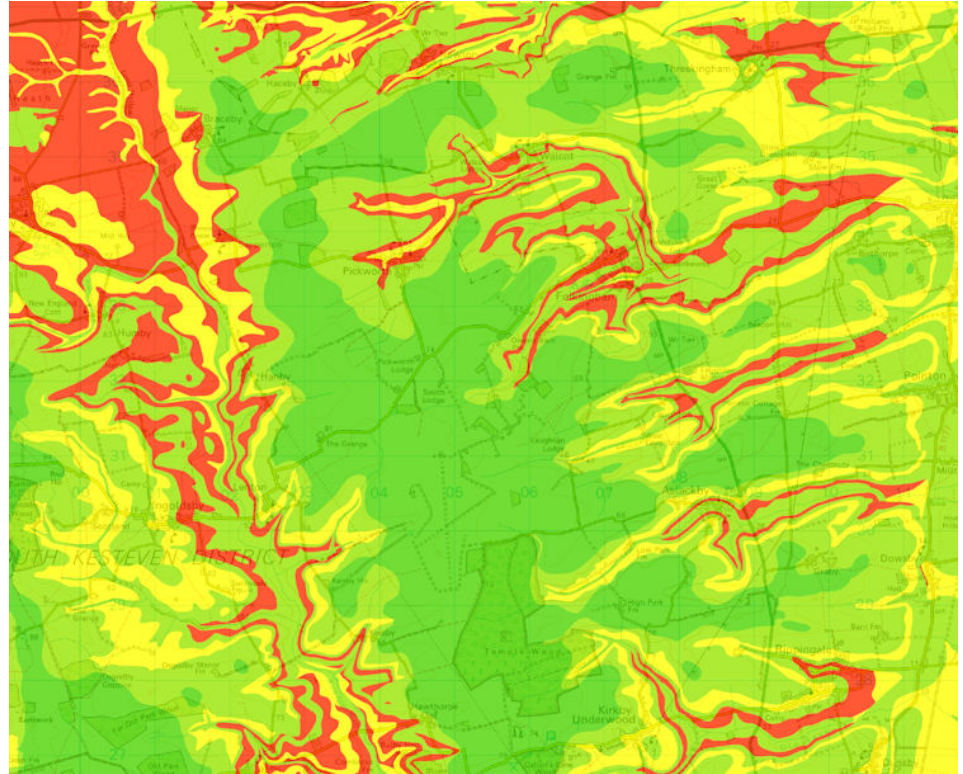
- Earth-rod penetrability
- Trenchability
- Ground resistance
- Other installation factors
 - Trafficability
 - Corrosion
 - Flooding



An Example of Data Evolution

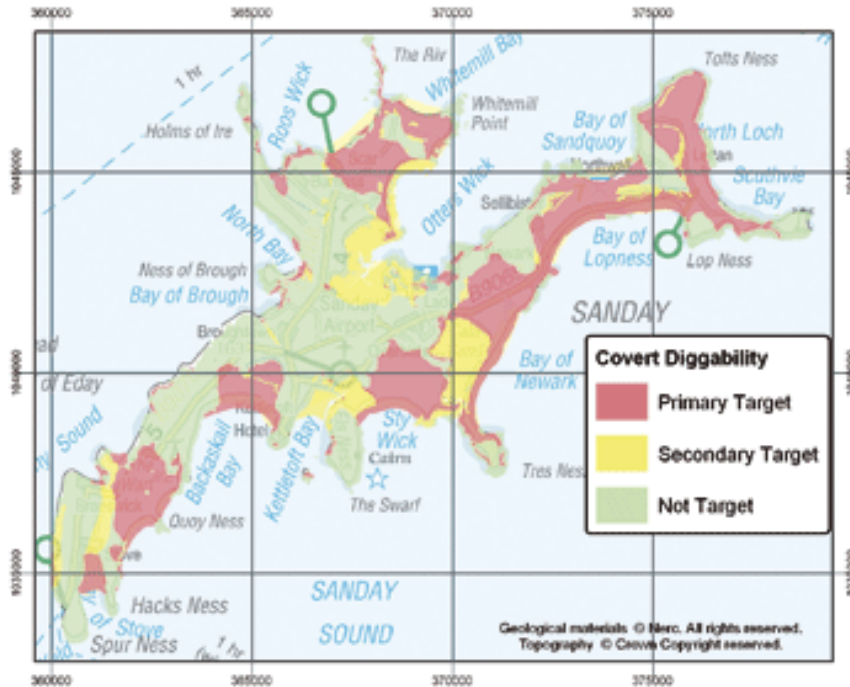
(From Power to Poirot)

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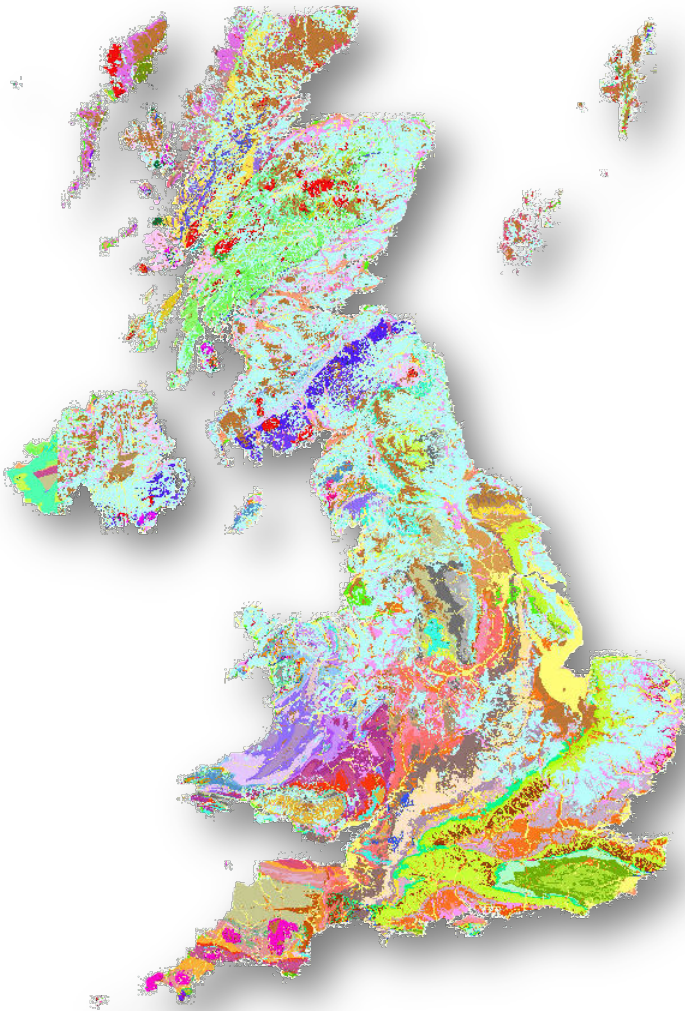
(*From Power to Poirot*)



- Search-probe penetration
- Covert diggability
- Suitability for GPR
- Other burial/search factors
 - Trafficability/access
 - Preservation potential
 - Scour/exhumation

Subtle changes to the way the data is compiled allows us to re-use information from one sector, to help another.

Questions?



.....and thank you.

