



Where not to buy a house in England?



David Giles

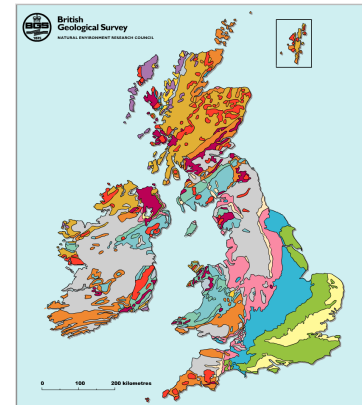
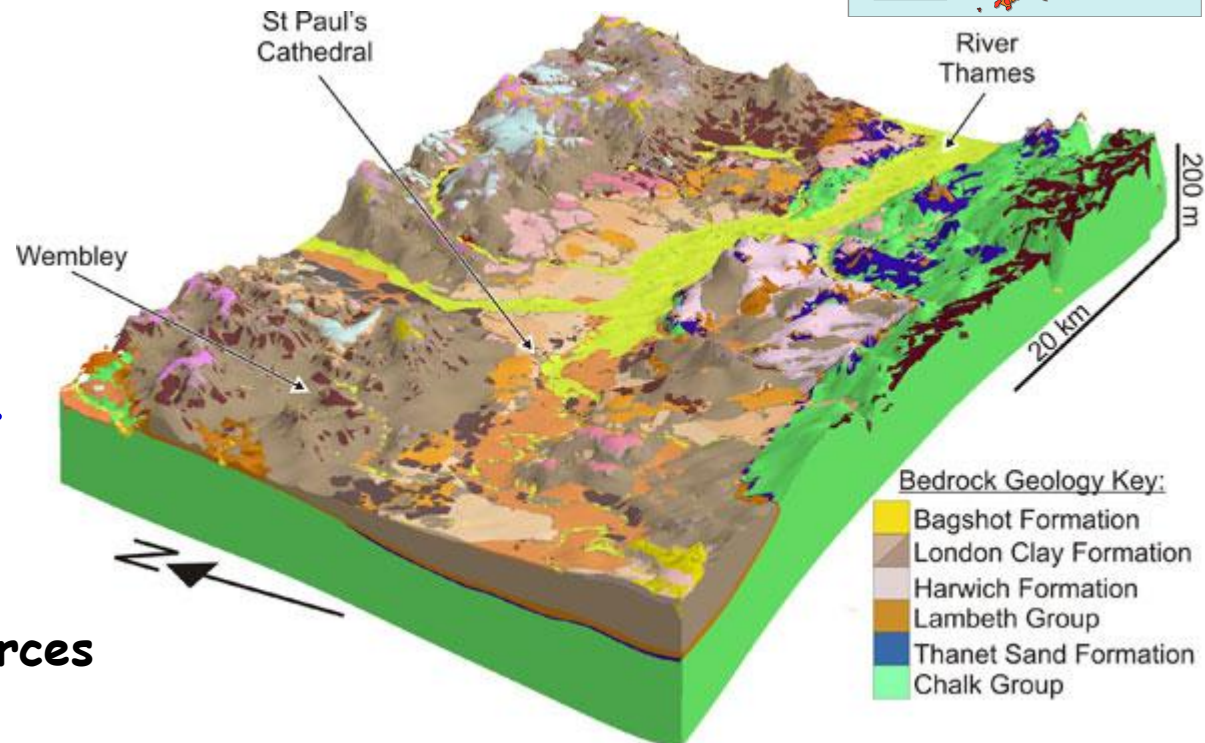
Principal Lecturer in Engineering Geology
School of Earth & Environmental
Sciences
University of Portsmouth

England's Green & Pleasant Land



What do we need to know?

- **Geology**
 - Rocks
 - Soils
- **Geohazards**
 - Local
 - Global
- **Where they exist**
- **What to look for**
 - Information sources



The Lurking Geohazards

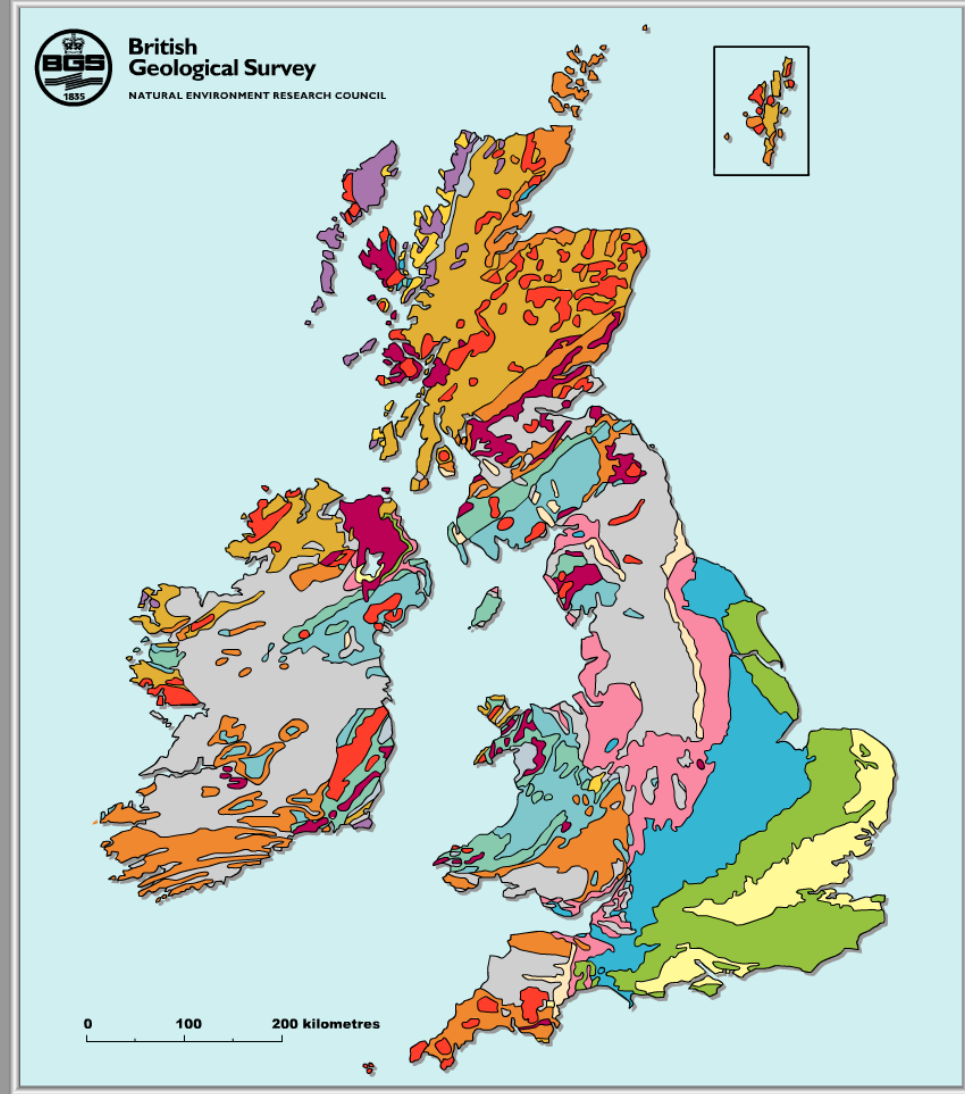
- **Dissolution**
 - Carbonates
 - Evaporites
- **Landslides**
 - Active
 - Relict
- **Mining**
 - Coal
 - Metals
 - Carbonates
- **Gases**
 - Natural
 - Anthropogenic
- **Swelling - Shrinking**
 - Mineralogy
- **Seismic**
 - Faults
- **Other**
 - Tsunami
 - Volcanic

































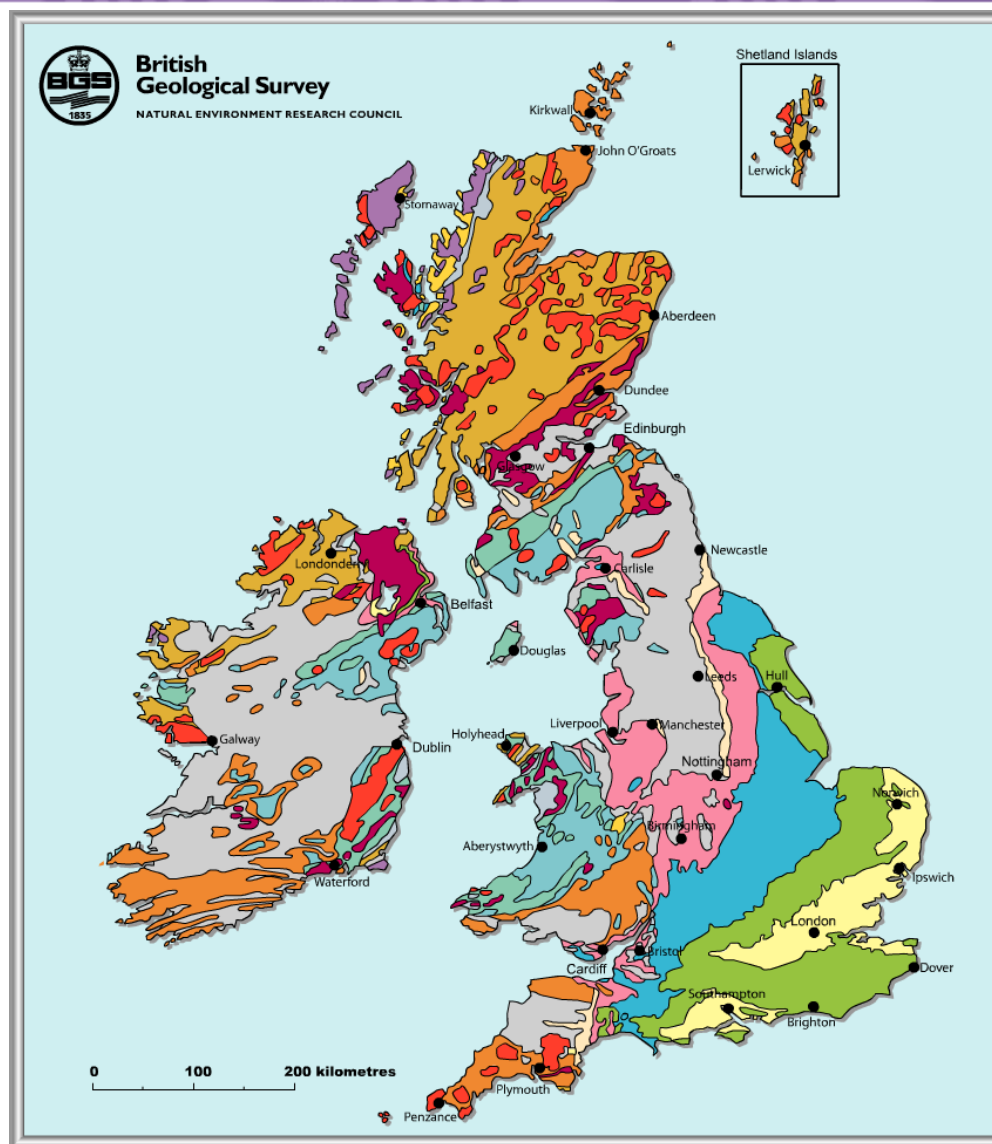
UK Geology

SEDIMENTARY ROCKS	
Cenozoic	
	Palaeogene, Neogene, Pliocene and Quaternary
Mesozoic	
	Cretaceous
	Jurassic
	Triassic
Palaeozoic	
	Permian
	Carboniferous
	Devonian
	Silurian
	Ordovician
	Cambrian
Upper Proterozoic	
	Neoproterozoic
METAMORPHIC ROCKS	
	Lower Palaeozoic and Upper Proterozoic
	Lower Proterozoic and Archaen
IGNEOUS ROCKS	
	Intrusive
	Volcanic

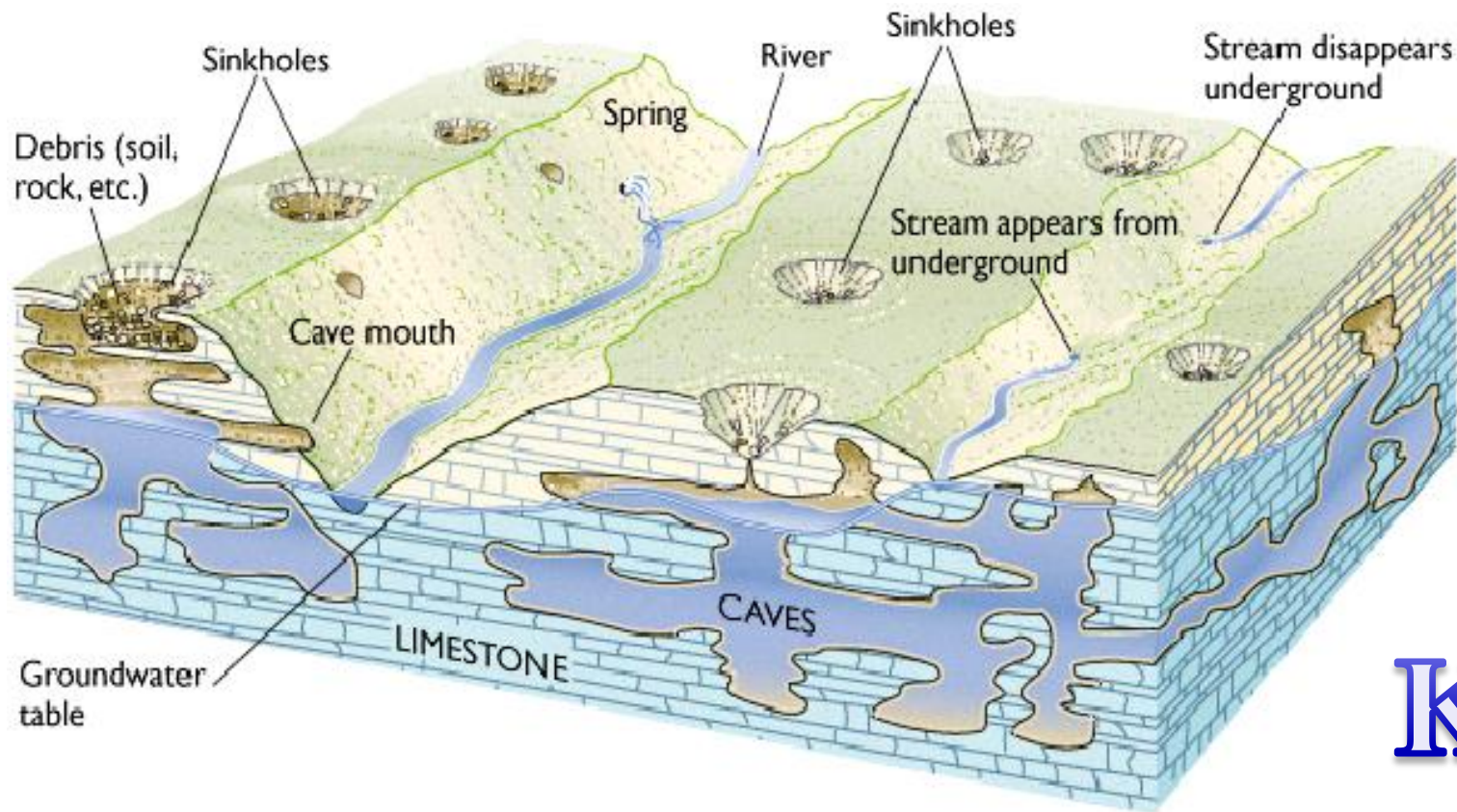
☐ Coast
 ☐ Land\Sea
 ☐ Linework
 ☐ Locations



SEDIMENTARY ROCKS		
Cenozoic		
	Palaeogene, Neogene, Pliocene and Quaternary	
Mesozoic		
	Cretaceous	
	Jurassic	
	Triassic	
Palaeozoic		
	Permian	
	Carboniferous	
	Devonian	
	Silurian	
	Ordovician	
	Cambrian	
Upper Proterozoic		
	Neoproterozoic	
METAMORPHIC ROCKS		
	Lower Palaeozoic and Upper Proterozoic	
	Lower Proterozoic and Archaen	
IGNEOUS ROCKS		
	Intrusive	
	Volcanic	



Soluble Rocks – Dissolution Hazard



Karst

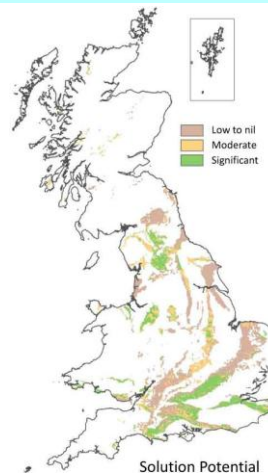
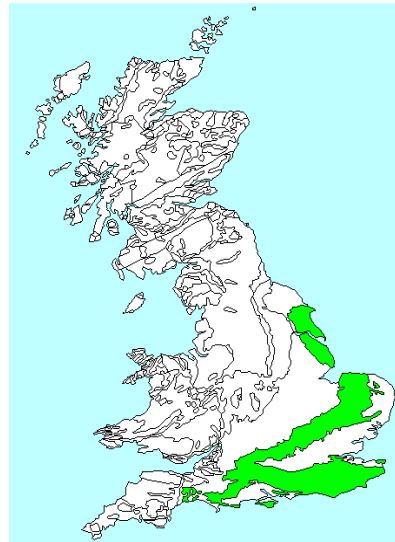
Permian Magnesian Limestones
Cretaceous Chalk

Carboniferous Limestones
Permo-Triassic Evaporites

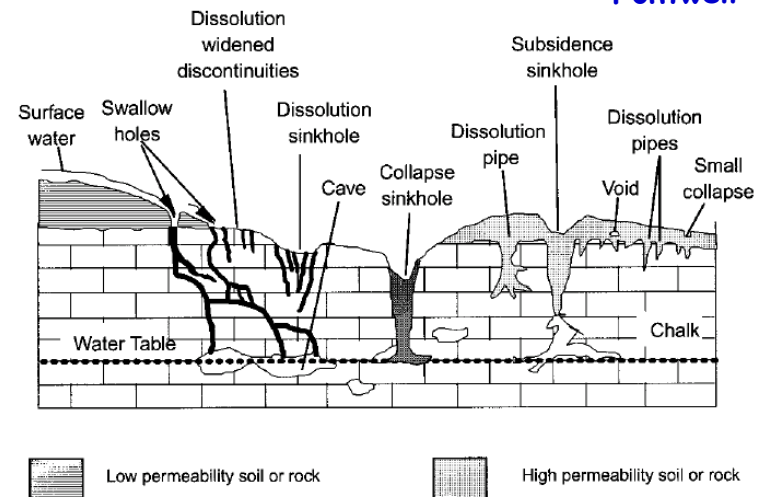
Chalk Dissolution



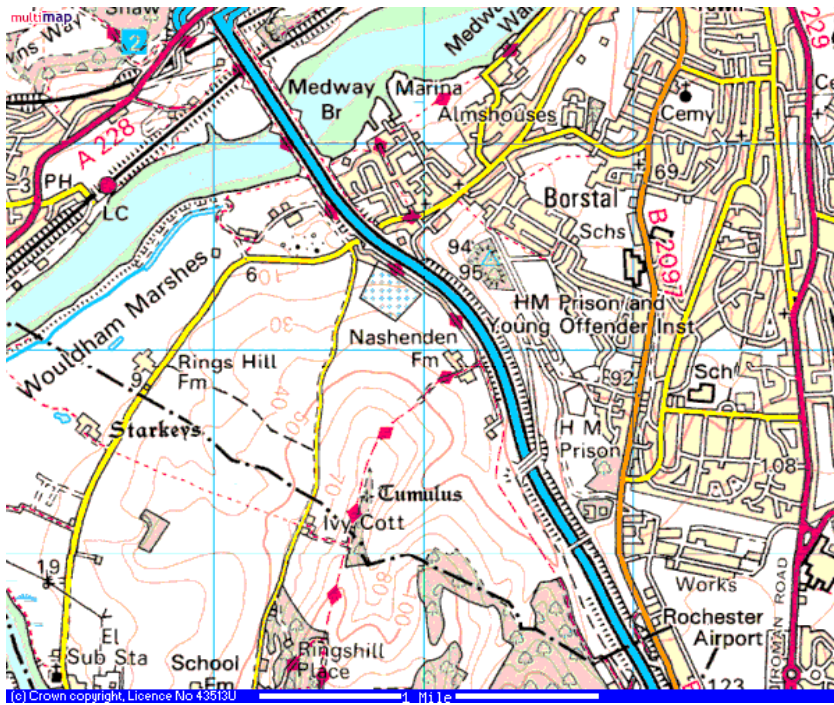
Lulworth Cove



Fontwell

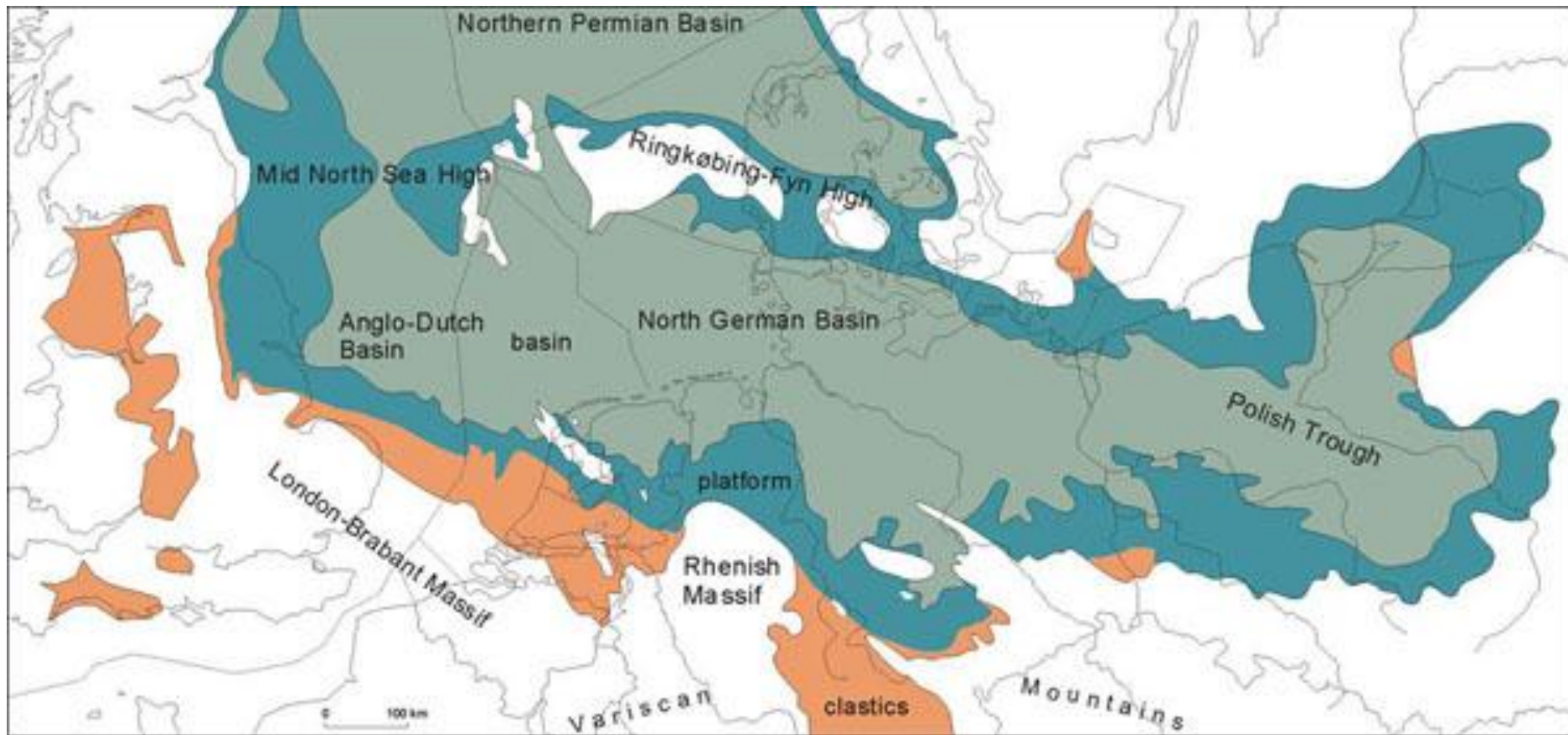


M2 Widening Channel Tunnel Rail Link Kent





Evaporite Dissolution – The Zechstein Sea Legacy





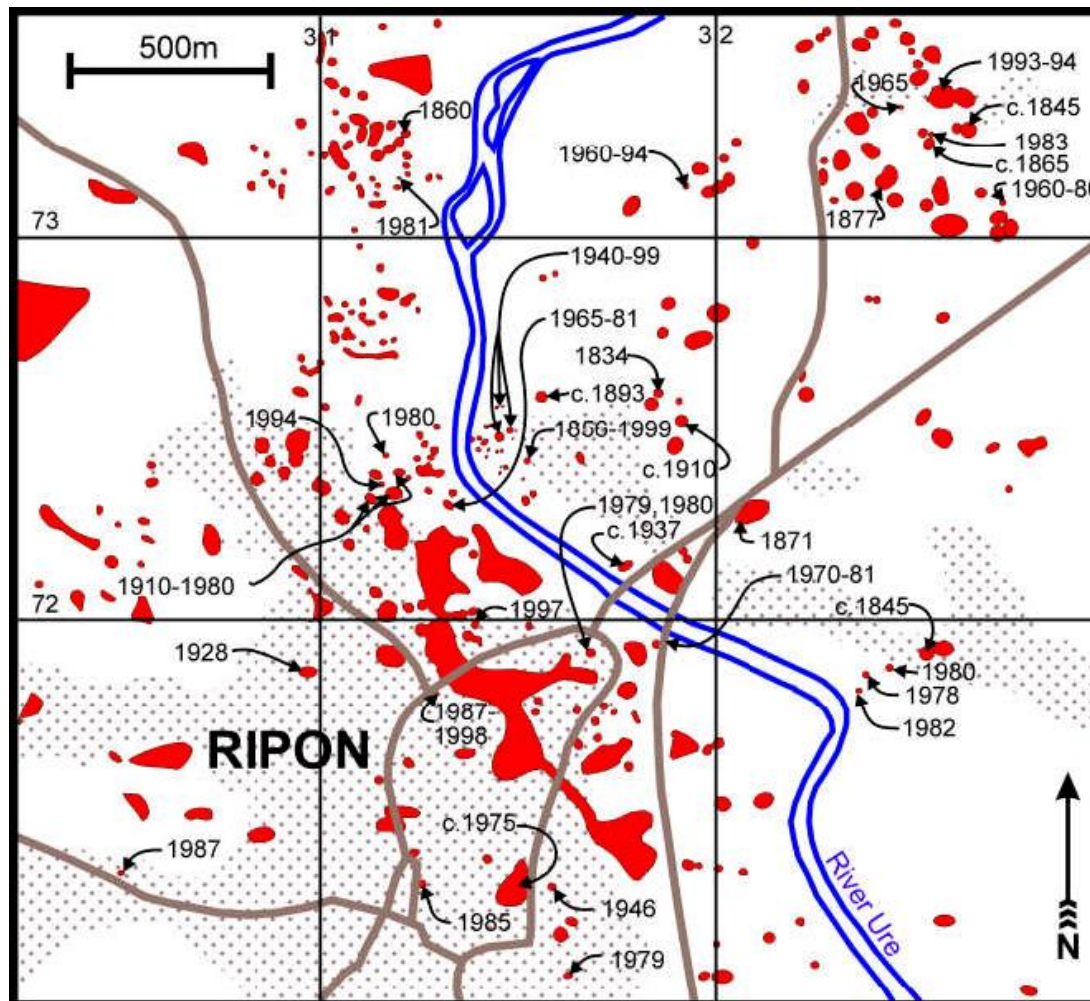
River Ure, Ripon







Evaporite Dissolution



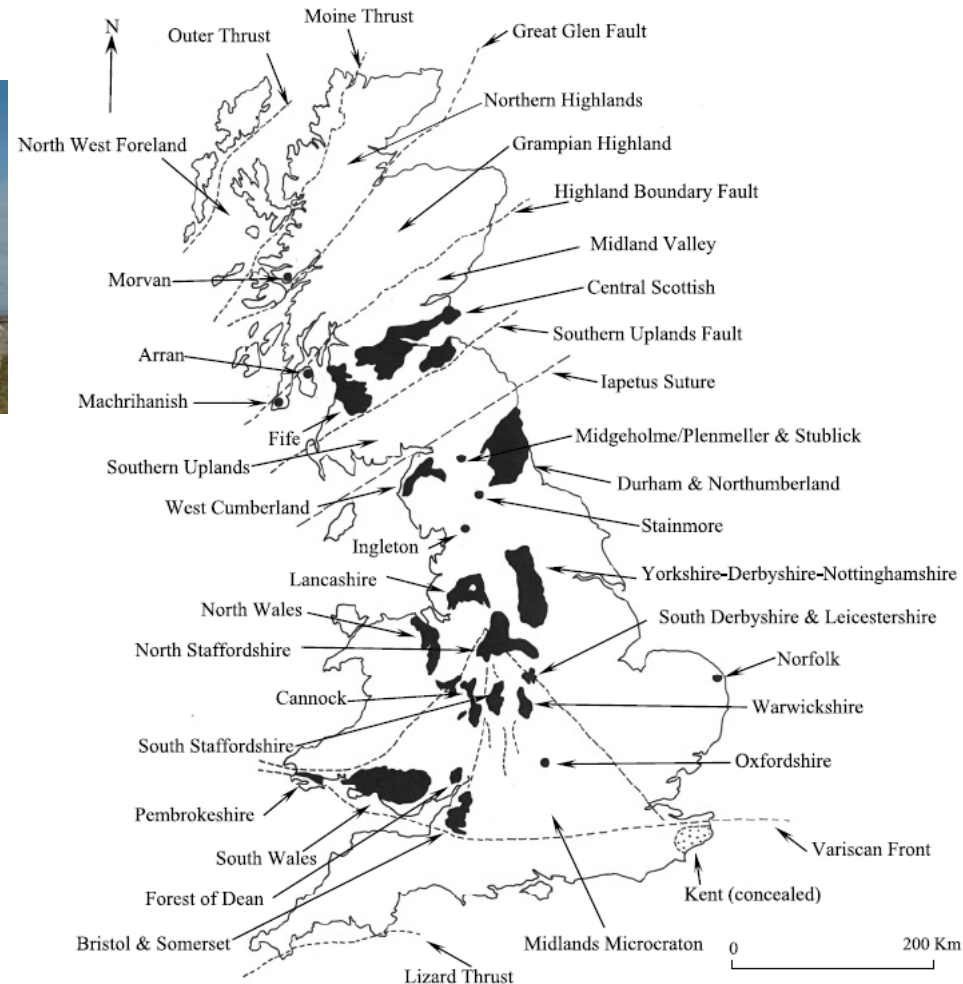
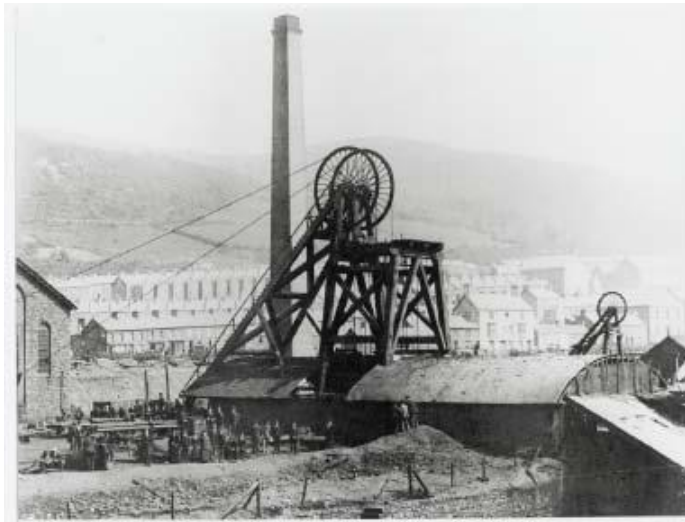
Ripon (UK) Gypsum Dissolution Subsidence Areas

Natural dissolution of gypsum results in a cave system which is continually and rapidly enlarging. Collapse into the caves causes severe catastrophic subsidence at the surface.

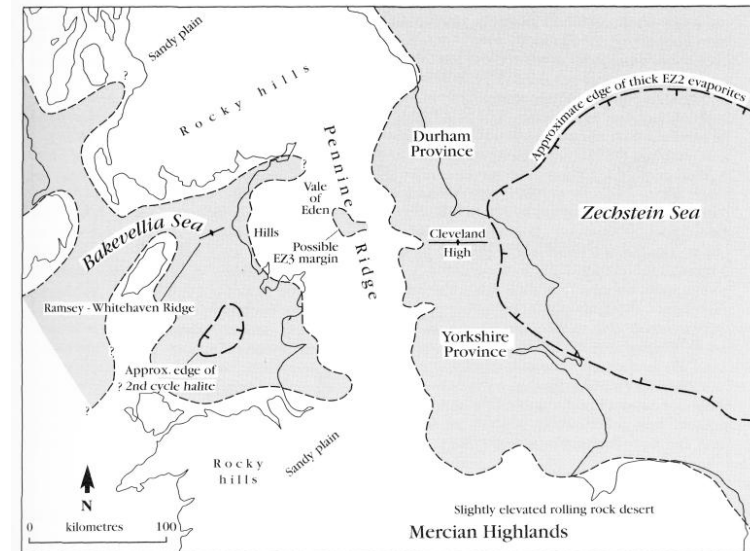
The natural subsidence is a major constraint to development in the area.

Subsidence – Mining Geohazard

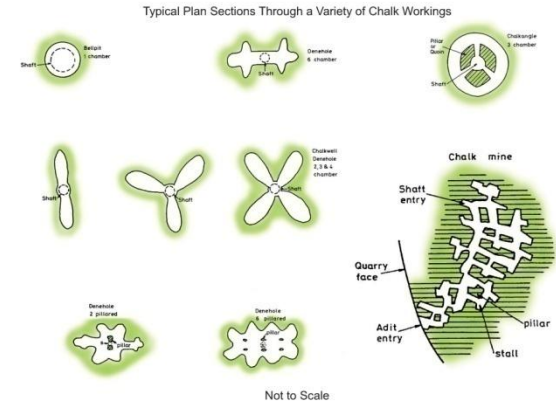
- Coal
- Chalk
- Limestone
- Salt
- Metalliferous



Salt Mining Subsidence



Chalk Mining Subsidence

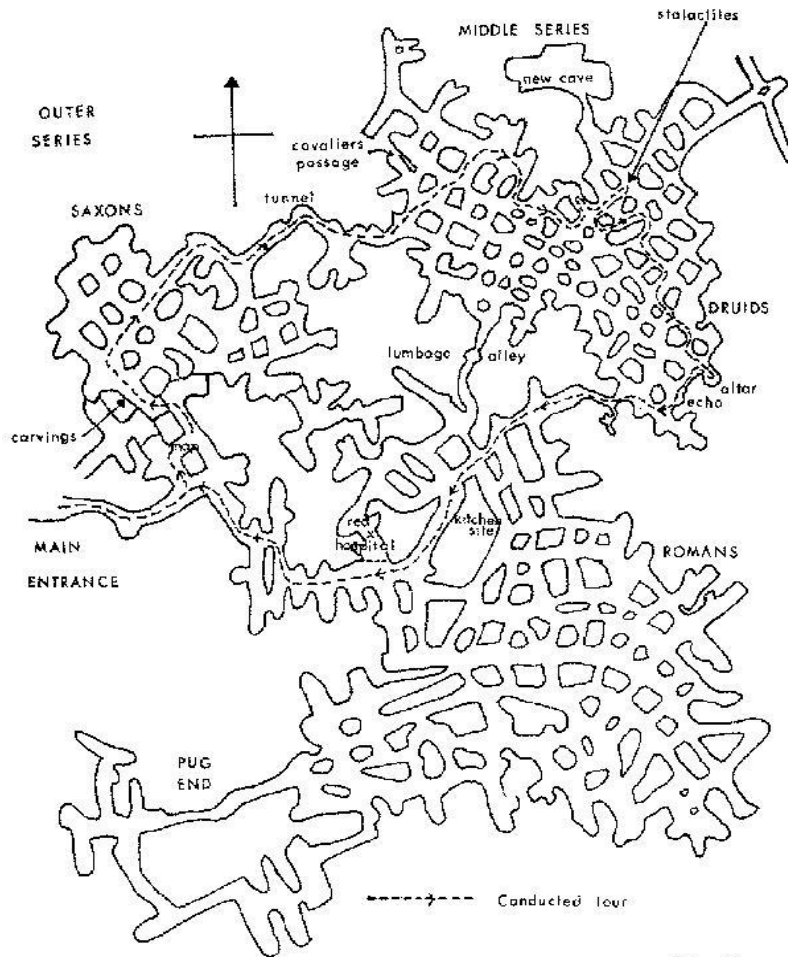


Blackheath Hill , London



Reading

Chalk Mines



AS DISPLAYED ON THE WALL IN THE CAVES

Chislehurst, Kent



Coal Mining Subsidence



South Wales

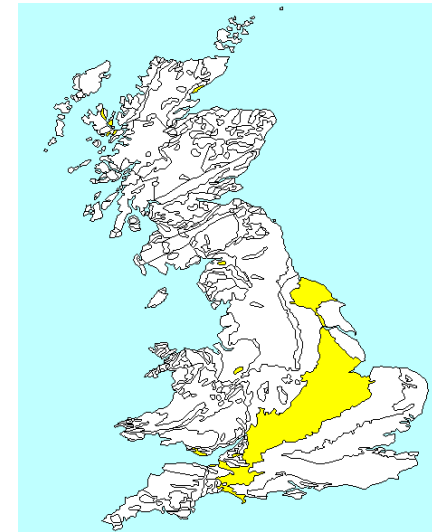
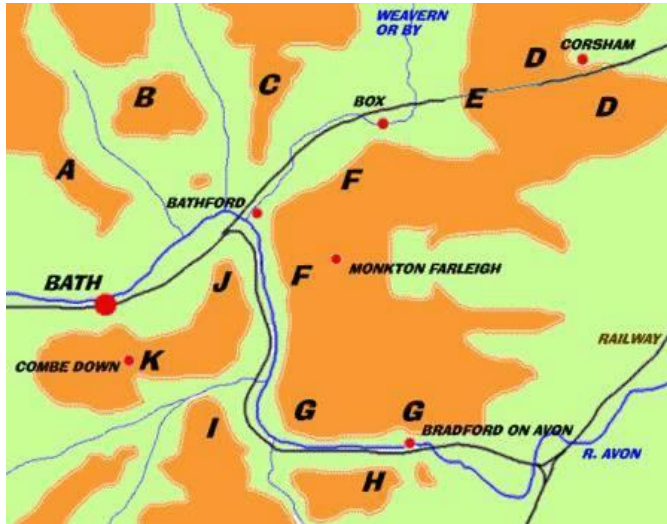
Crooked House Pub, Dudley



Edinburgh



Limestone Mining



Coombe Down,
Bath

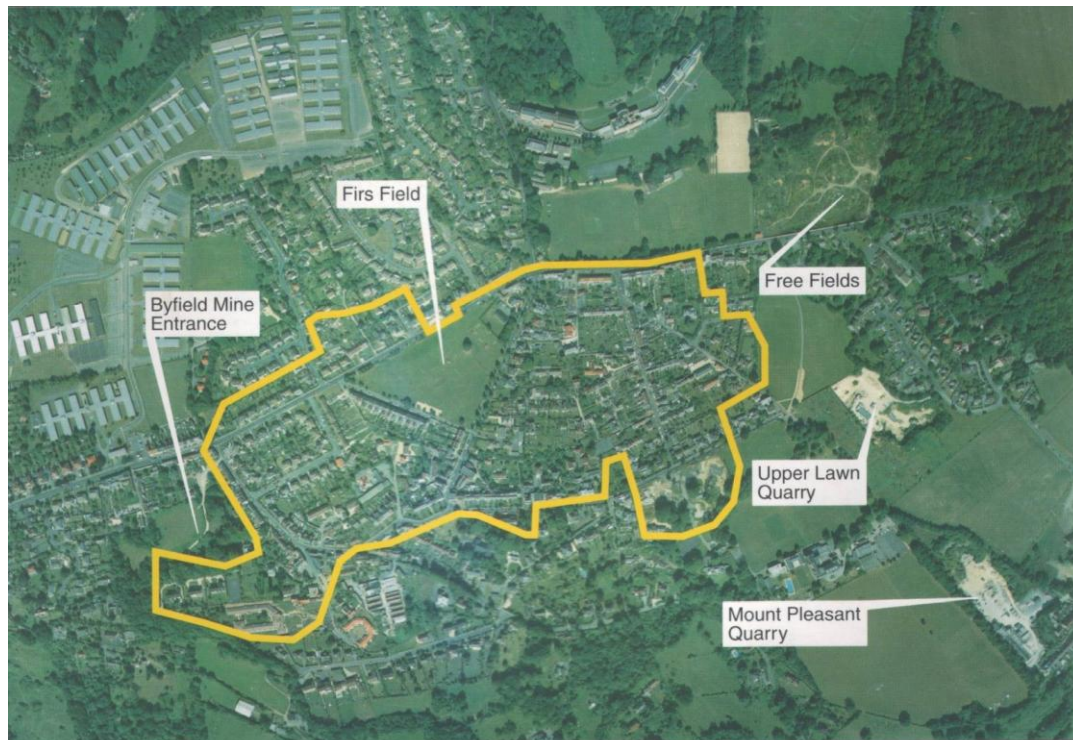




Westwood Mine, Bath

Limestone Mining

Coombe Down, Bath
Firs & Byfield Mine



— Approximate boundary of Firs and Byfield mines

Aerial photograph of Combe Down



Key UK Landslides



Quirang, Storr



Mam Tor



**Lyme Bay,
Black Venn**



**South IOW, Ventnor
et al**



Holbeck Hall



Warden Point



Folkestone Warren

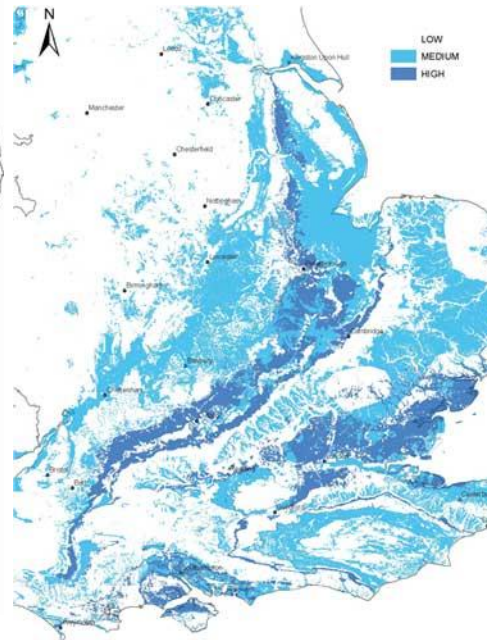
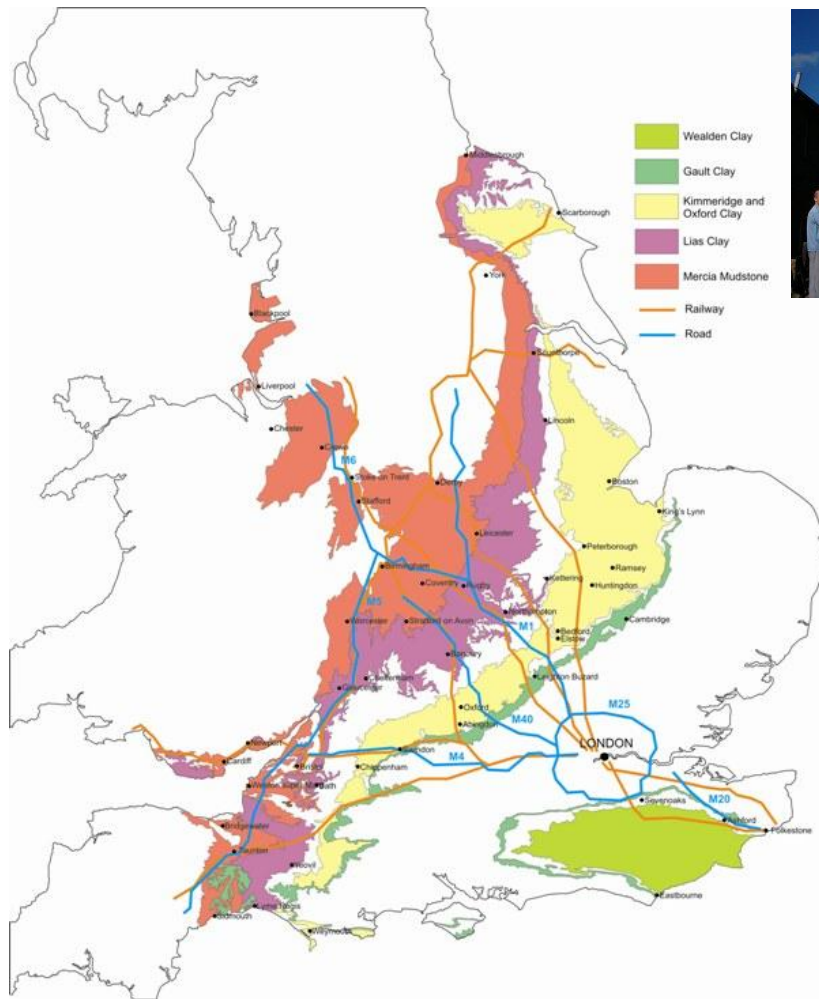
Gulls



Bath University



Swell / Shrink



Gas Hazard

- Loscoe - Gas Explosion

Anthropogenic
Or
Natural

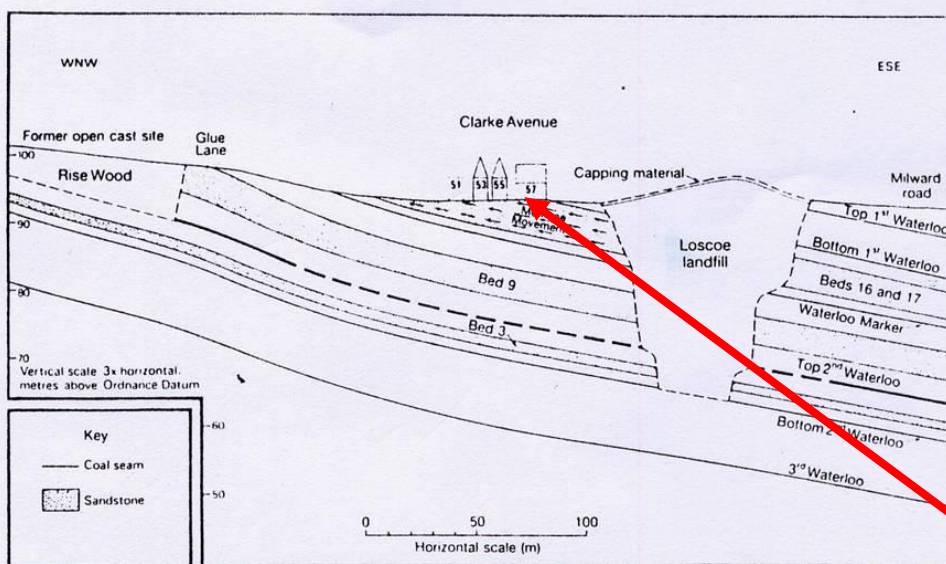
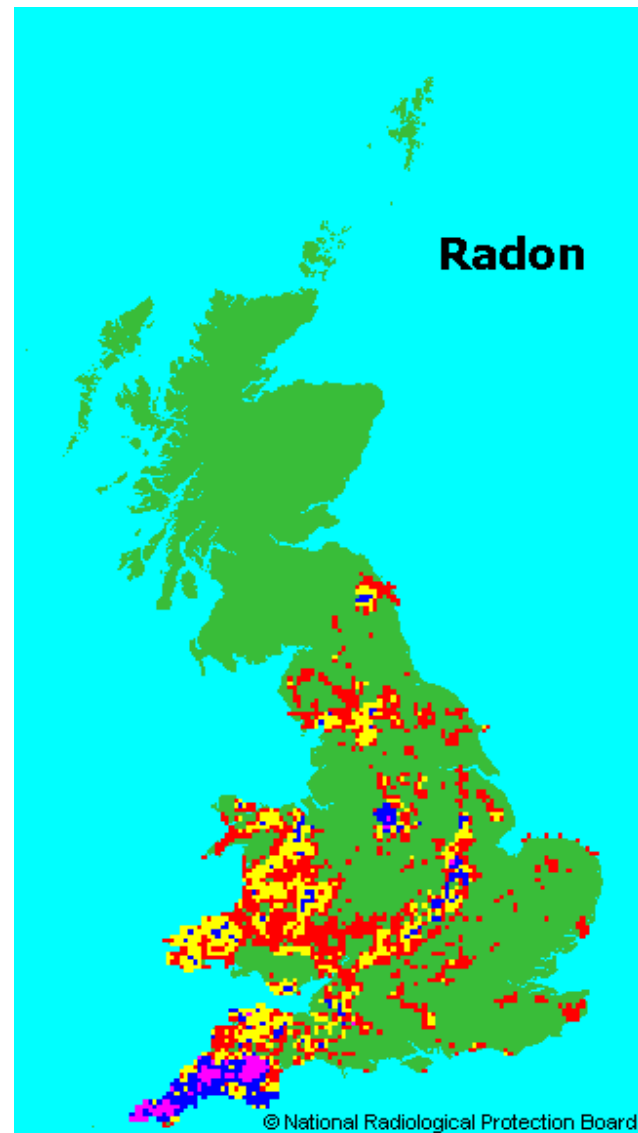
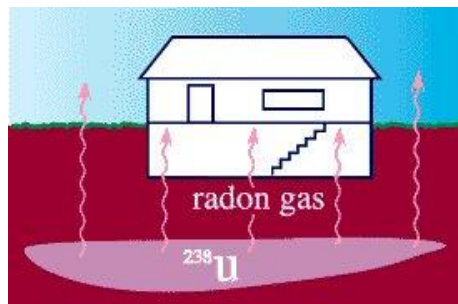


Fig. 8.21. Geological cross section through the Loscoe landfill.

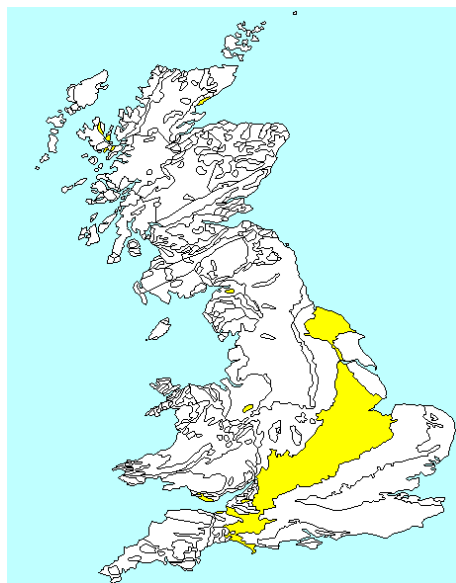
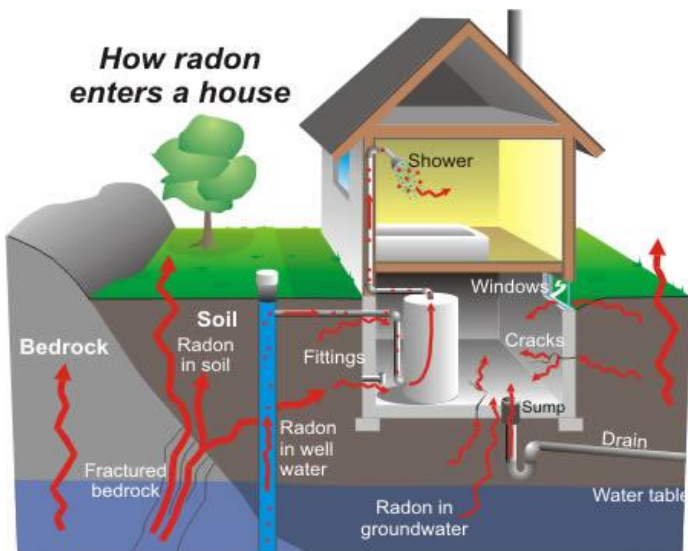
3 inhabitants escaped with their lives



Radon



How radon enters a house



Radon

HPA-RPD-033

Indicative Atlas of Radon in England and Wales

J C H Miles*, J D Appleton†, D M Rees*, B M R Green*, K A M Adlam† and A H Myers†

* HEALTH PROTECTION AGENCY, CHILTON, DIDCOT, OXFORDSHIRE OX11 0RQ, UK

† BRITISH GEOLOGICAL SURVEY, KEYWORTH, NOTTINGHAM NG12 5GG, UK

ABSTRACT

This report presents an overview of the results of detailed mapping in England and Wales of radon potential, defined as the estimated percentage of homes in an area above the radon Action Level. The work was carried out jointly by the Health Protection Agency and the British Geological Survey and was based on the results of measurements of radon in 460,000 homes. The method allows variations in radon potential both between and within geological units to be mapped. The resulting map, which defines radon Affected Areas in England and Wales, includes much more detail than could be shown in an atlas. The full detail is instead published as a dataset which can be licensed for use in geographical information systems. The estimated radon potential for an individual home can be obtained through a website, www.ukradon.org. The atlas presents a simplified version of the map, so is indicative rather than definitive: that is, each 1-km grid square is coloured according to the highest radon potential found within it.

© Health Protection Agency and British Geological Survey

Health Protection Agency
Centre for Radiation, Chemical and Environmental Hazards
Radiation Protection Division
Chilton, Didcot, Oxfordshire OX11 0RQ, UK

Approval: October 2007
Publication: November 2007
£14.00
ISBN 978-0-95951-608-2

This report reflects understanding and evaluation of the current scientific evidence as presented and referenced in this document.

Low graphics | Accessibility help

BBC
NEWS

LIVE BBC NEWS CHANNEL

News services
Your news when you
want it



News Front Page

World

UK

England

Northern Ireland

Scotland

Wales

Business

Politics

Health

Medical notes

Education

Science & Environment

Technology

Entertainment

Also in the news

Video and Audio

Have Your Say

Magazine

In Pictures

Country Profiles

Special Reports

RELATED BBC SITES

SPORT

WEATHER

CBBC NEWSROUND

ON THIS DAY

EDITORS' BLOG

Last Updated: Tuesday, 21 December, 2004, 10:26 GMT

E-mail this to a friend

Printable version

Radon gas linked to cancer deaths

Domestic exposure to radon gas is responsible for a significant number of lung cancer deaths, research has found.



The risk appears to be much higher for smokers.

The researchers conclude radon gas is widespread in the home causes approximately 20,000 lung cancer deaths in the European Union each year - about 1,000 in the UK.

The British Medical Journal study, funded by Cancer Research UK and the European Union, is the largest ever of its type.

Radon is a naturally occurring, colourless, odourless, radioactive gas found at varying levels in all houses in the UK and across Europe.

“ We also found that there is a detectable risk even in homes with levels below 200 Bq/m³, which is the currently recommended 'action level' in the UK. ”

Professor Sarah Darby

This research combines information from 13 smaller studies across Europe, which involved 7,000 people who had developed lung cancer and 14,000 without the disease.

SEE ALSO:

Radon cancer fears dismissed

27 Dec 04 | Health

Natural gas 'a cancer menace'

24 May 00 | Health

RELATED INTERNET LINKS:

National Radiological Protection Board

Cancer Research UK

British Medical Journal

The BBC is not responsible for the content of external internet sites

TOP HEALTH STORIES

Targeting depression early 'key'

'Risky' kidney transplant success

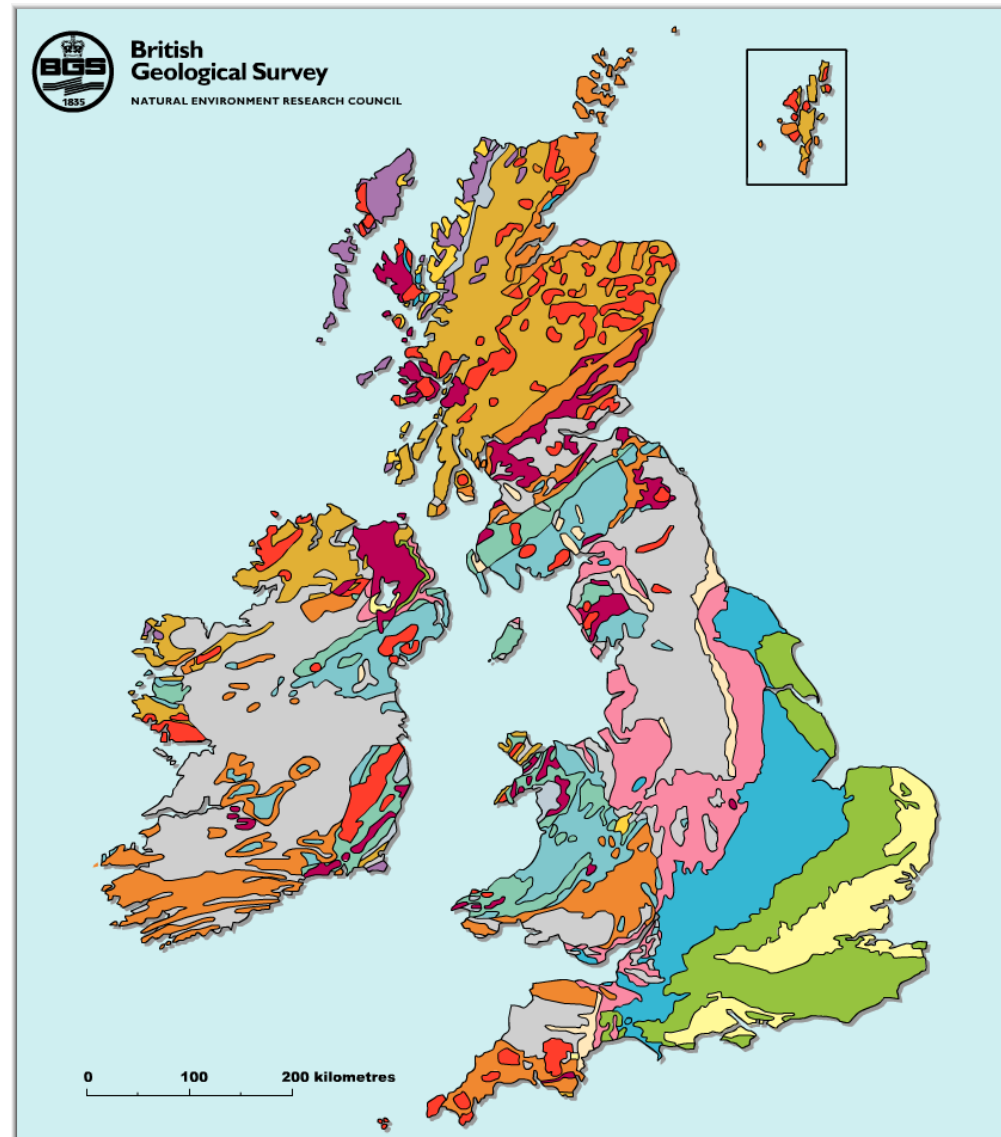
GPs 'ignoring sick-note advice'

News feeds

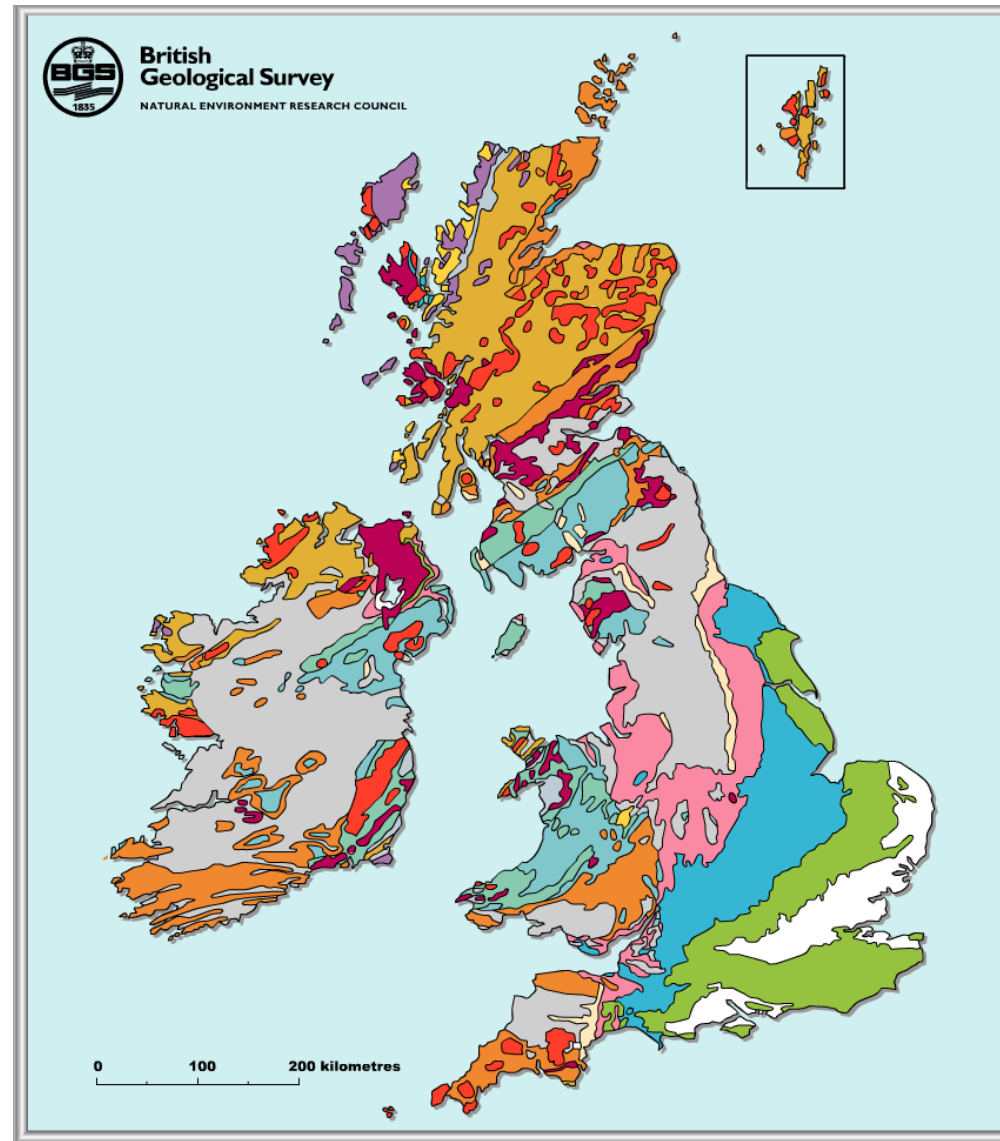
Radon is second only to smoking as a cause of lung cancer.

The EPA (Environmental Protection Agency) has found that radon is responsible for over 20,000 deaths per year in the US. Health Canada estimates that over 1,600 Canadians die each year from exposure to radon in their homes.

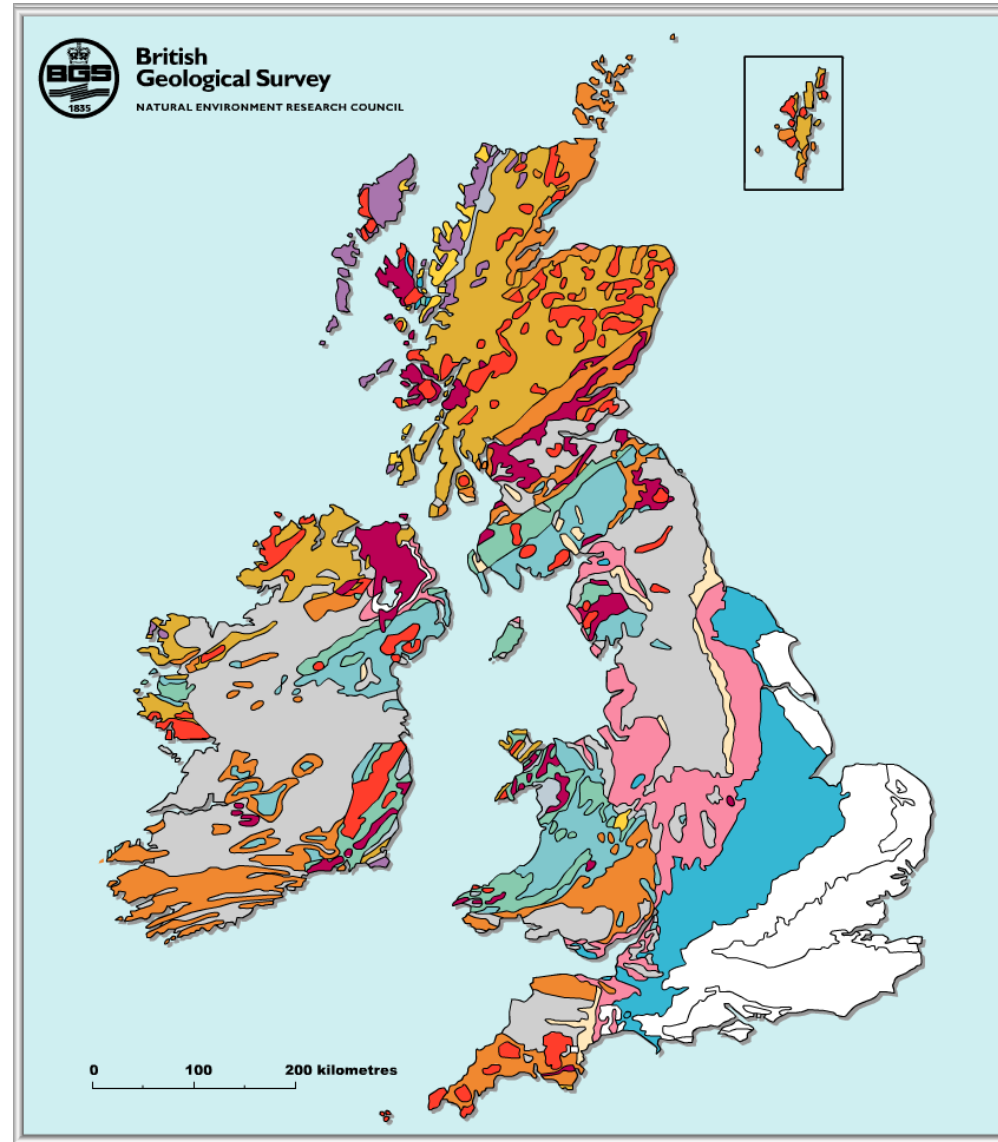
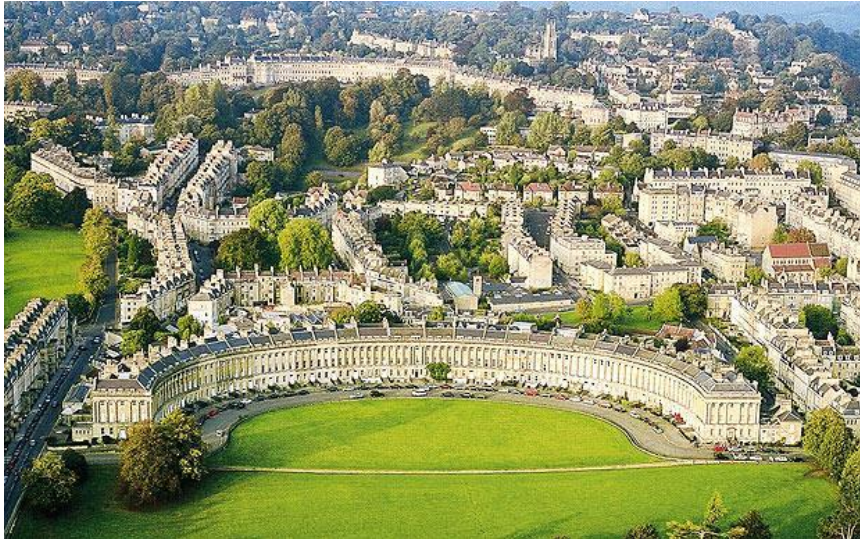
Tertiary Rocks



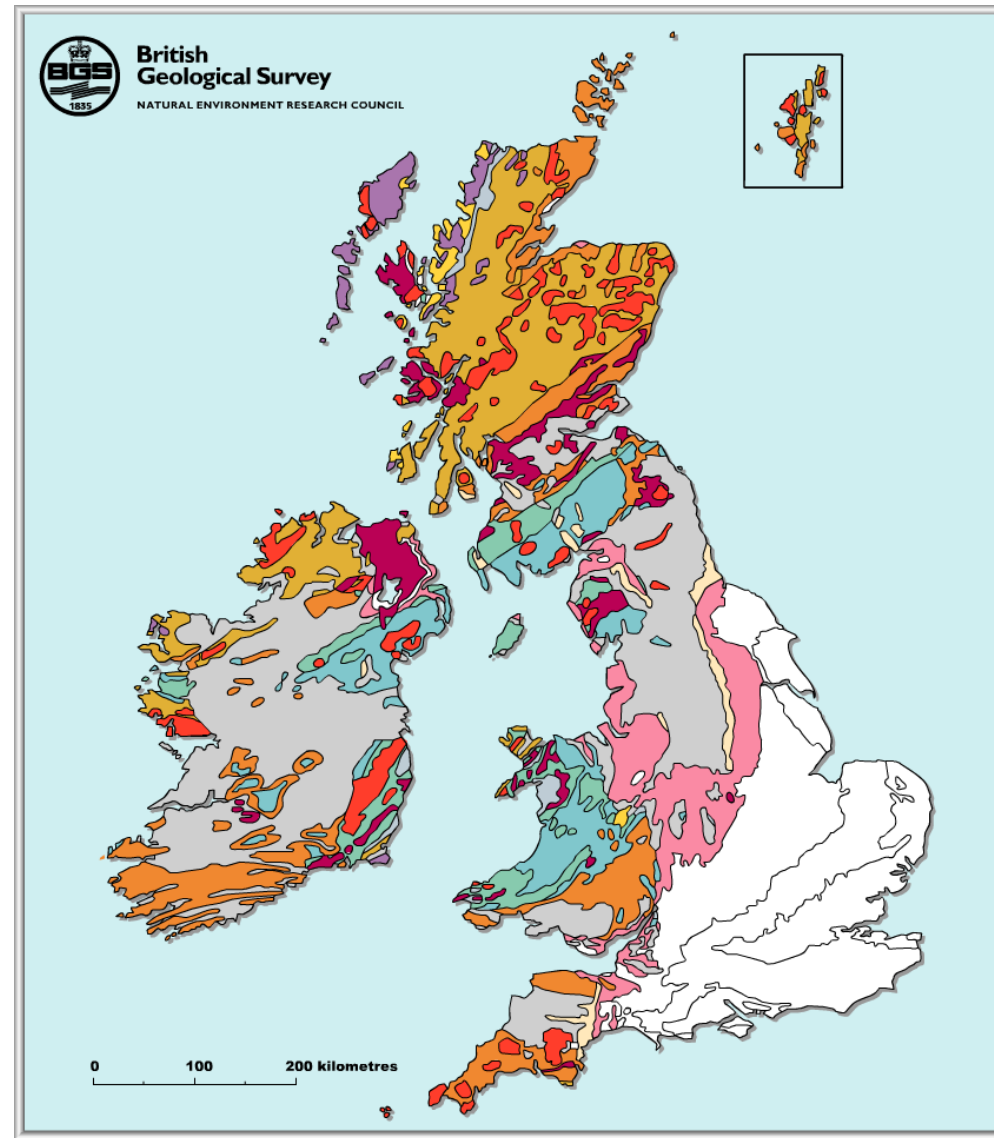
Cretaceous Rocks



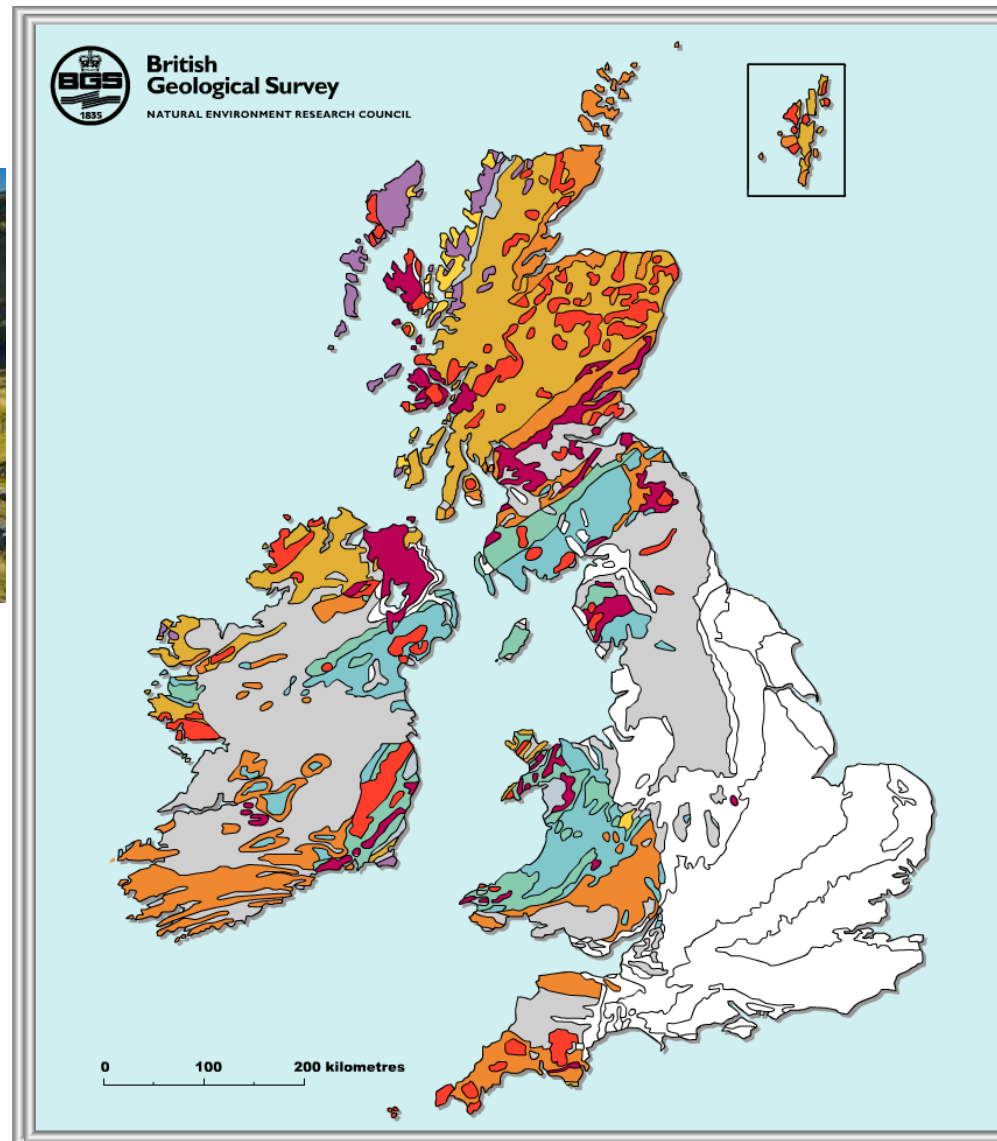
Jurassic Rocks



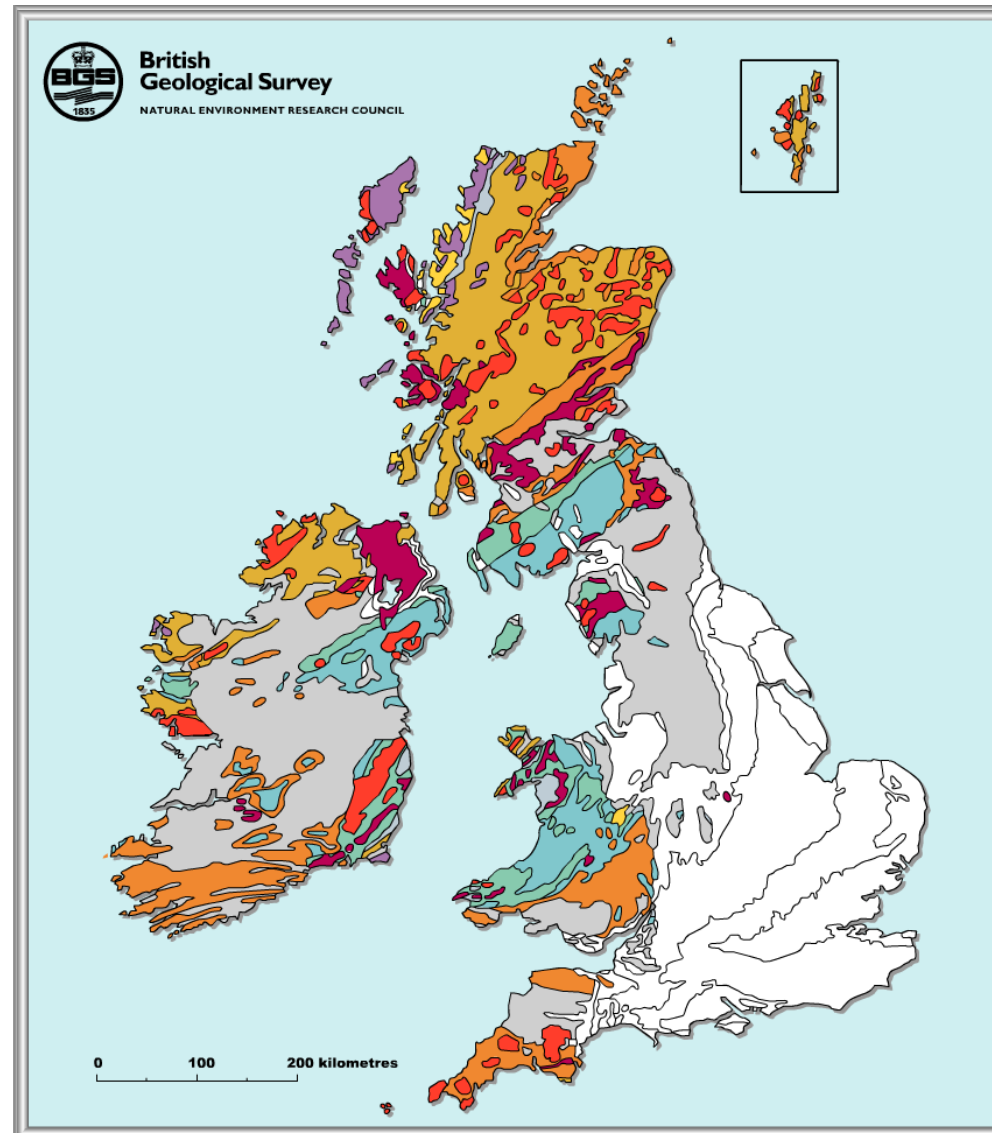
Permo-Triassic Rocks



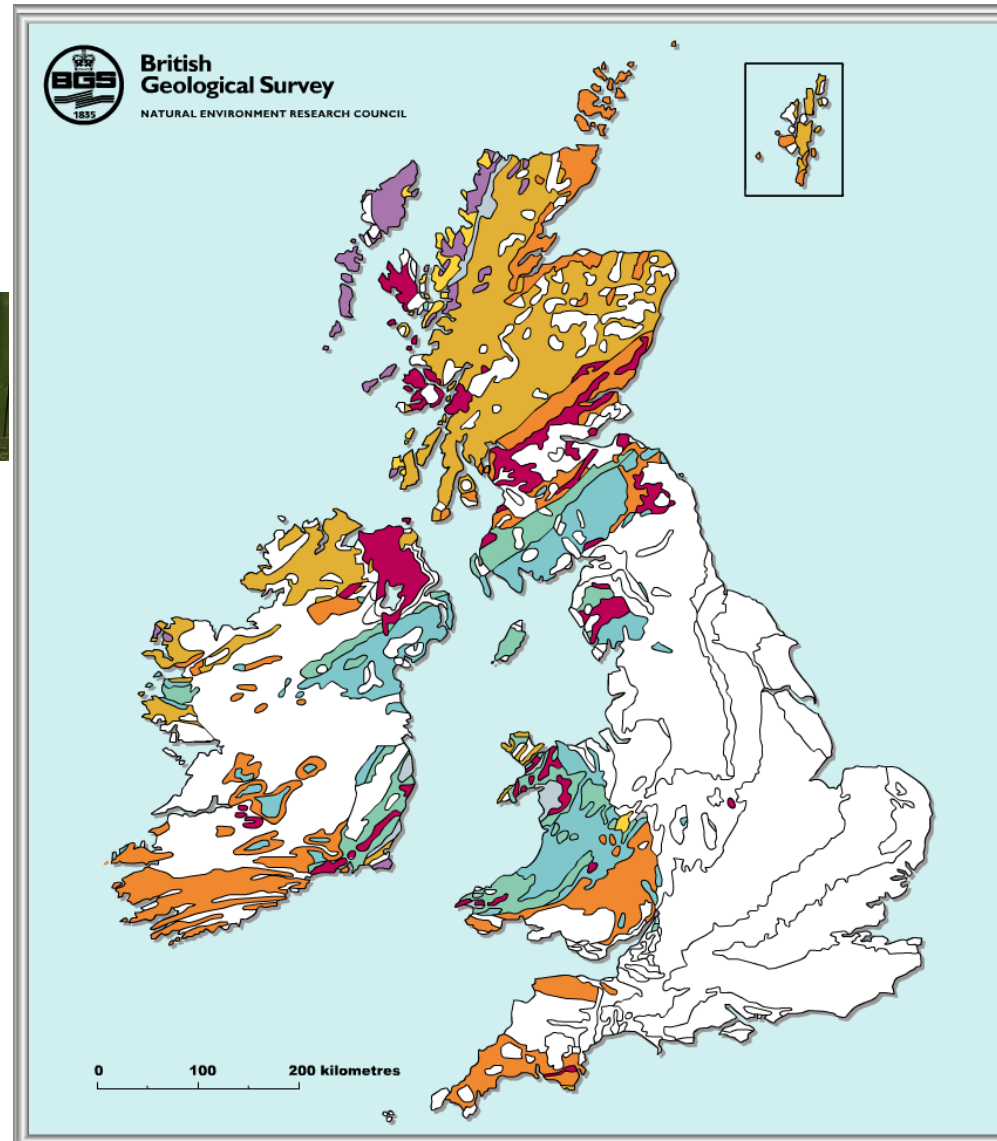
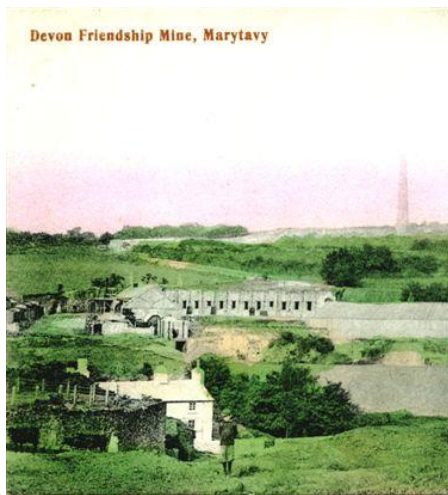
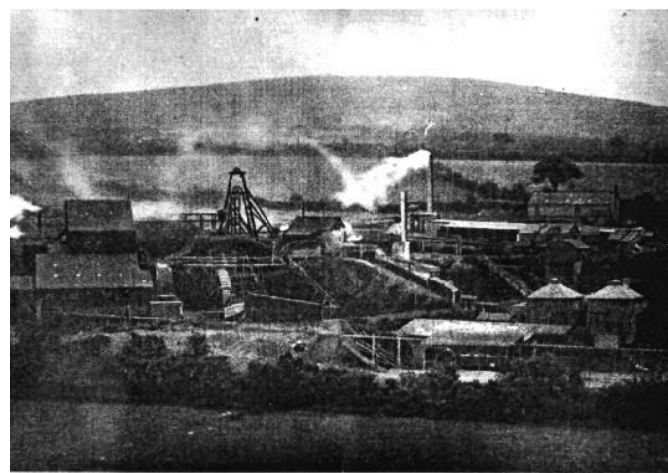
Carboniferous Rocks



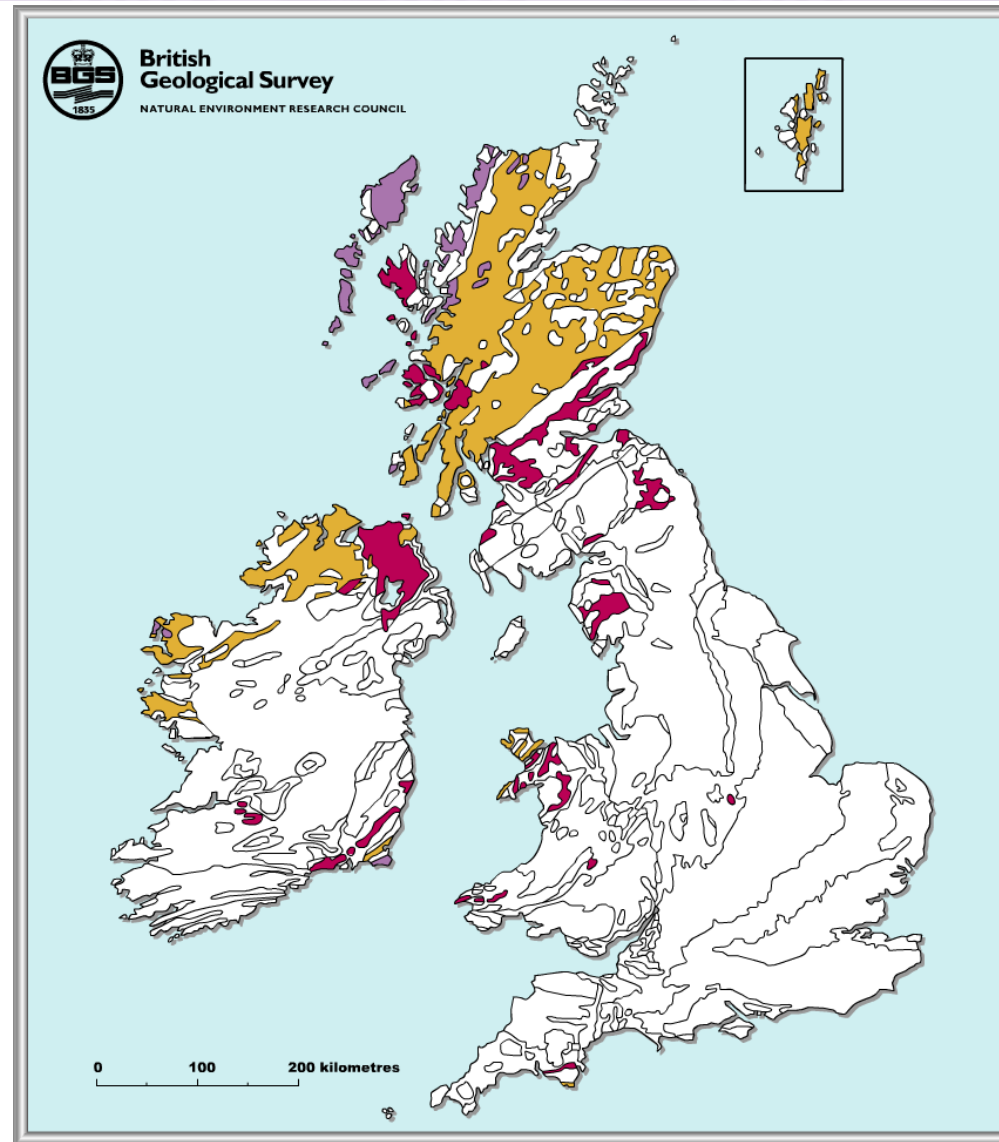
Granites



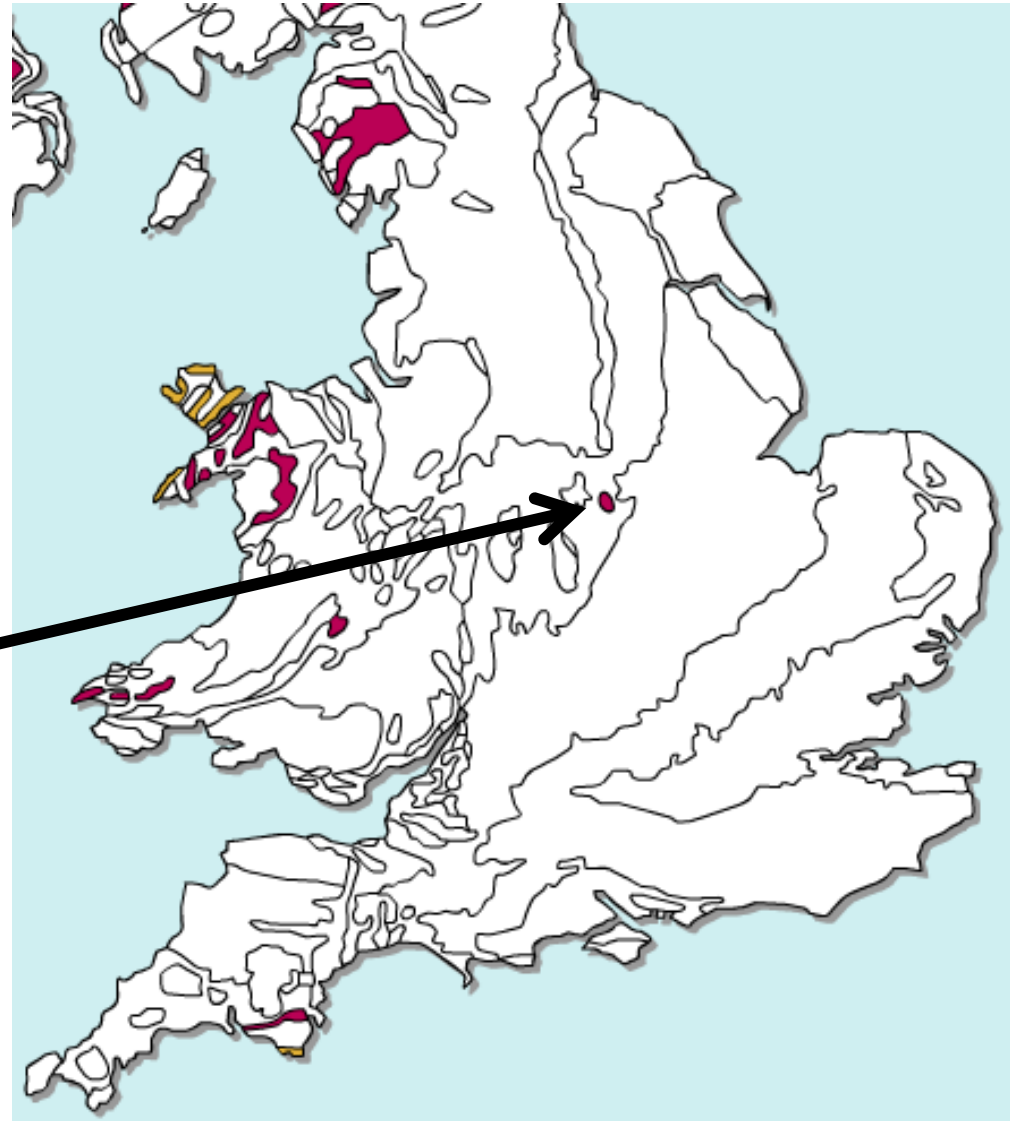
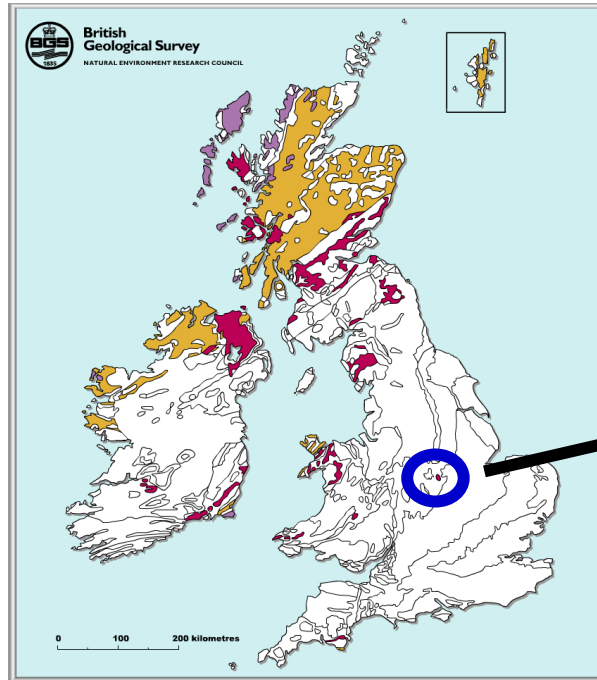
Devonian Rocks



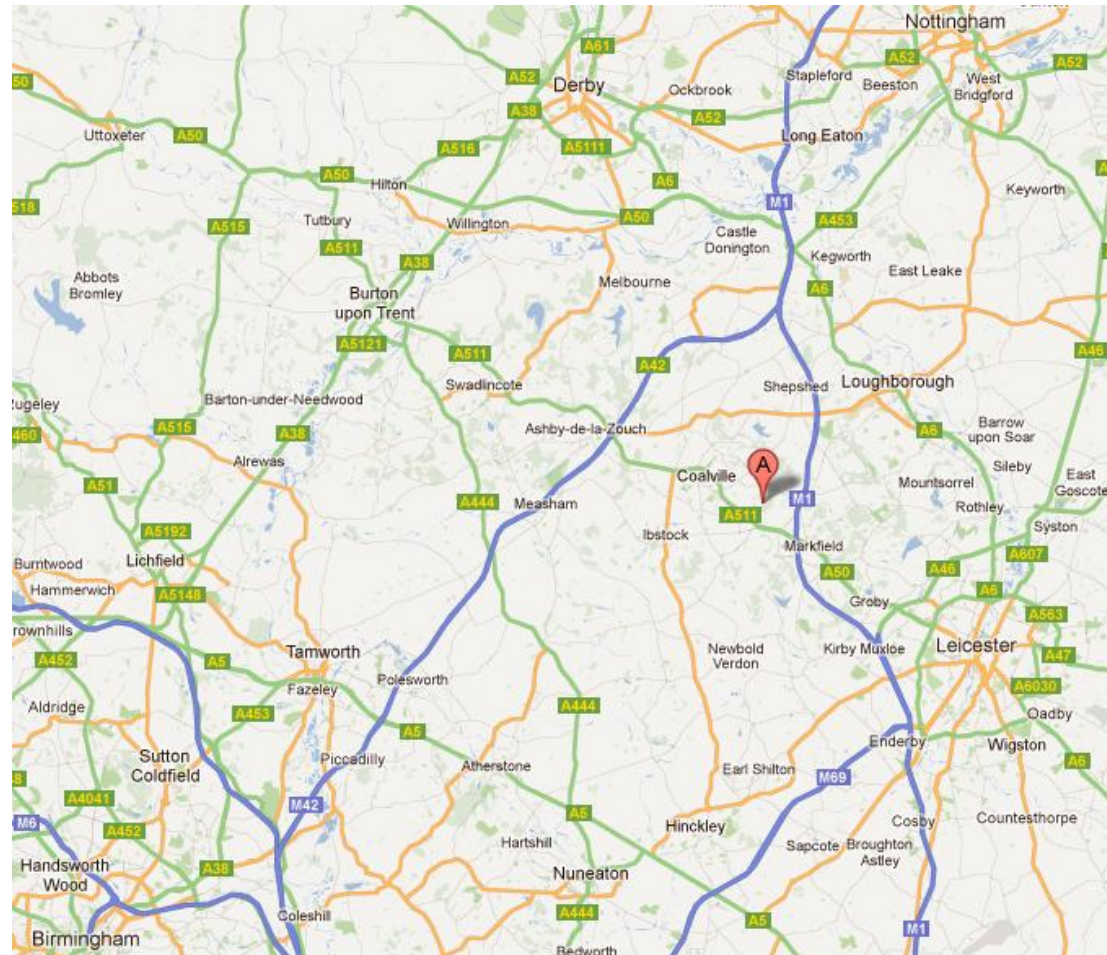
Silurian Ordovician Cambrian



So where then?



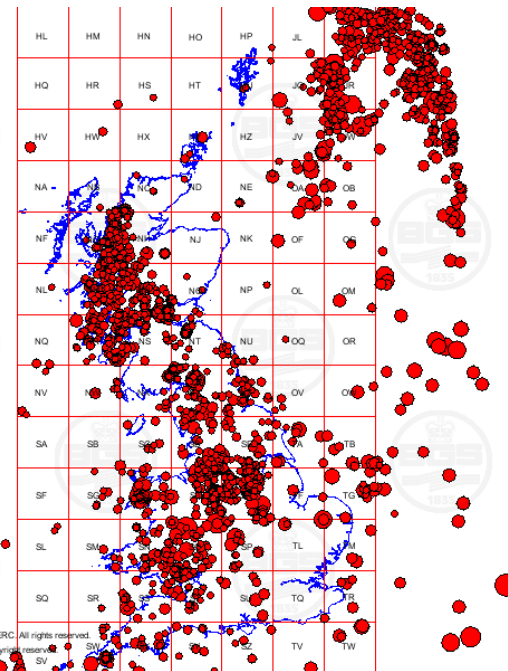
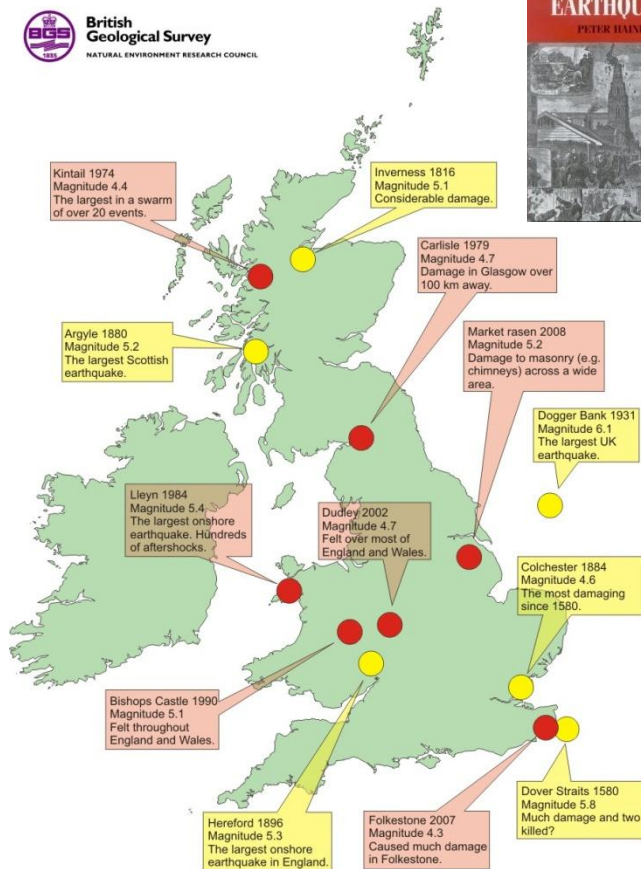
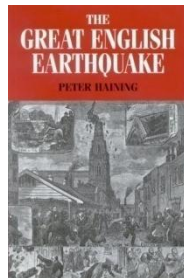
Bardon Hill, Leicestershire



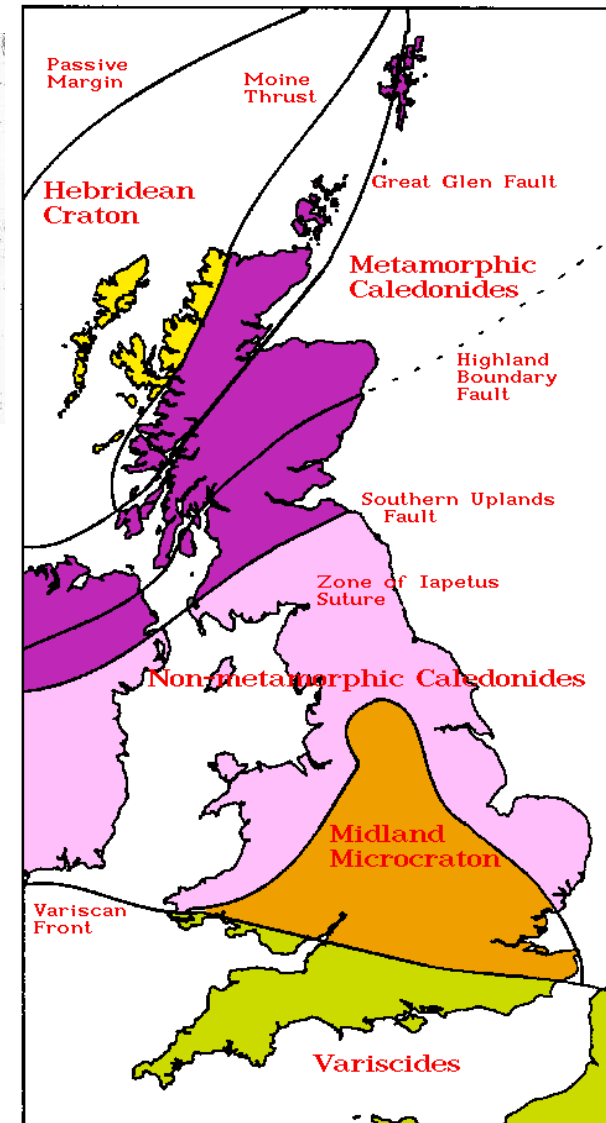
Back to the drawing board...



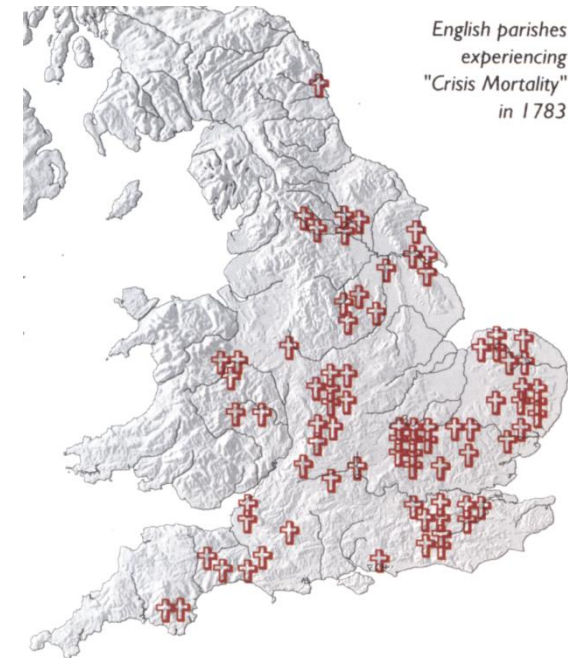
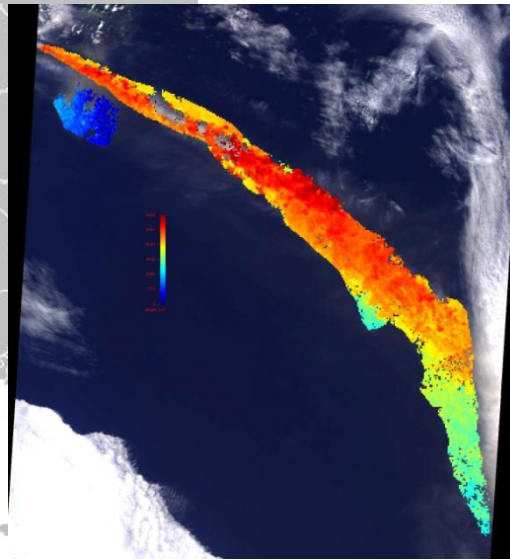
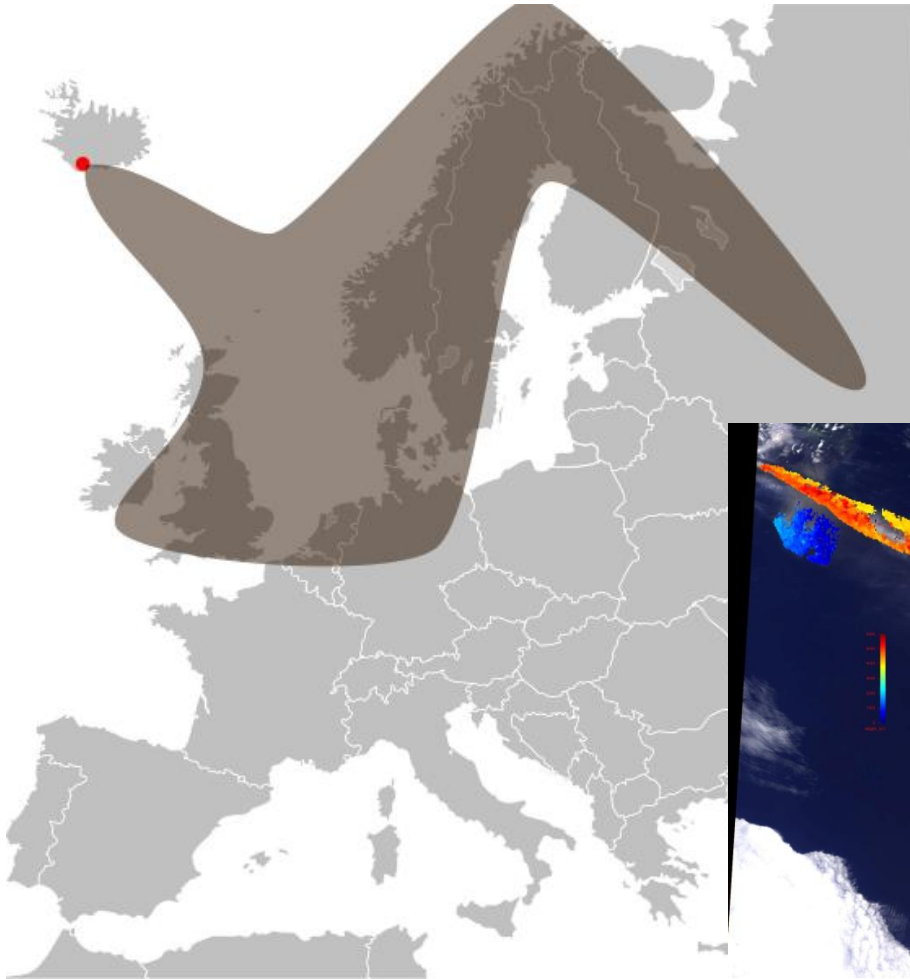
UK Seismicity



Geological materials Copyright NERC. All rights reserved.
Topography Copyright Crown Copyright.
OS licence no. 100017897/2006.



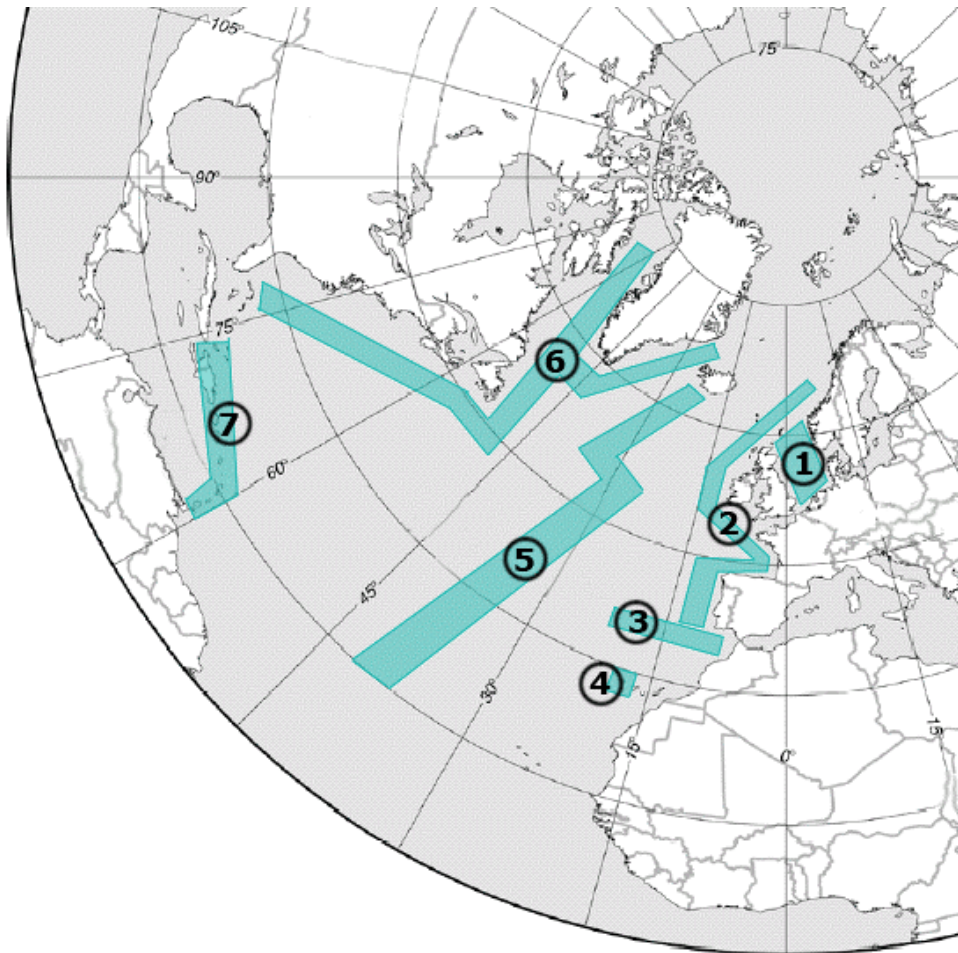
UK Volcanicity



Sea Level Rise



UK Tsunami Hazard



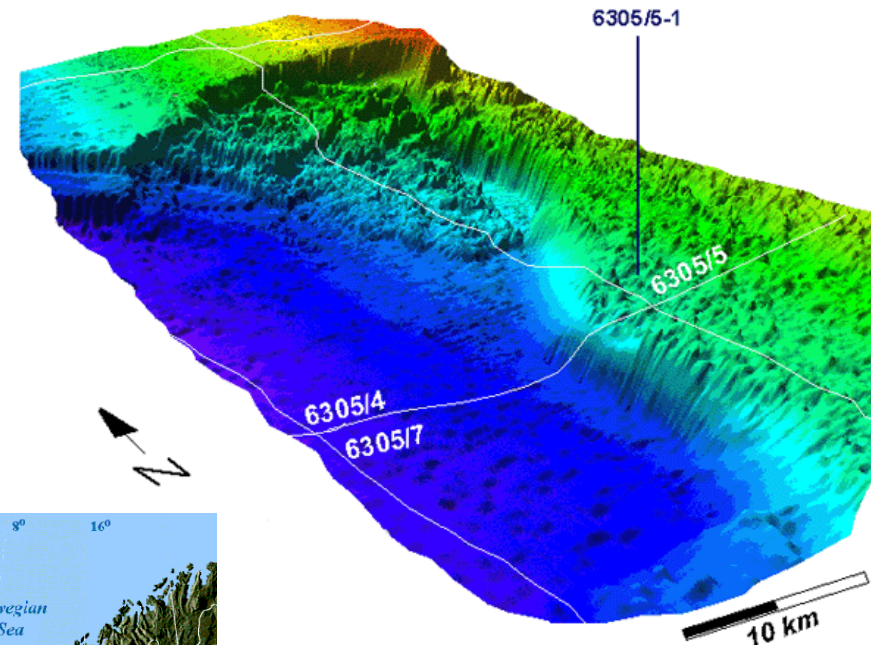
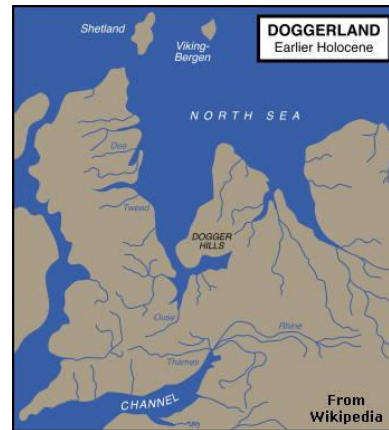
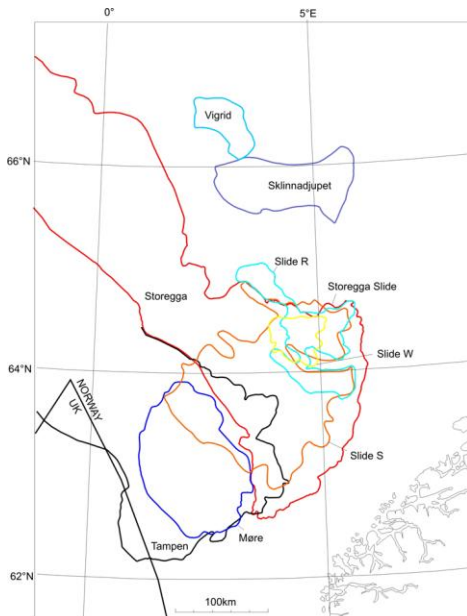
Study commissioned by Defra Flood Management

The threat posed by tsunami to
the UK



June 2005

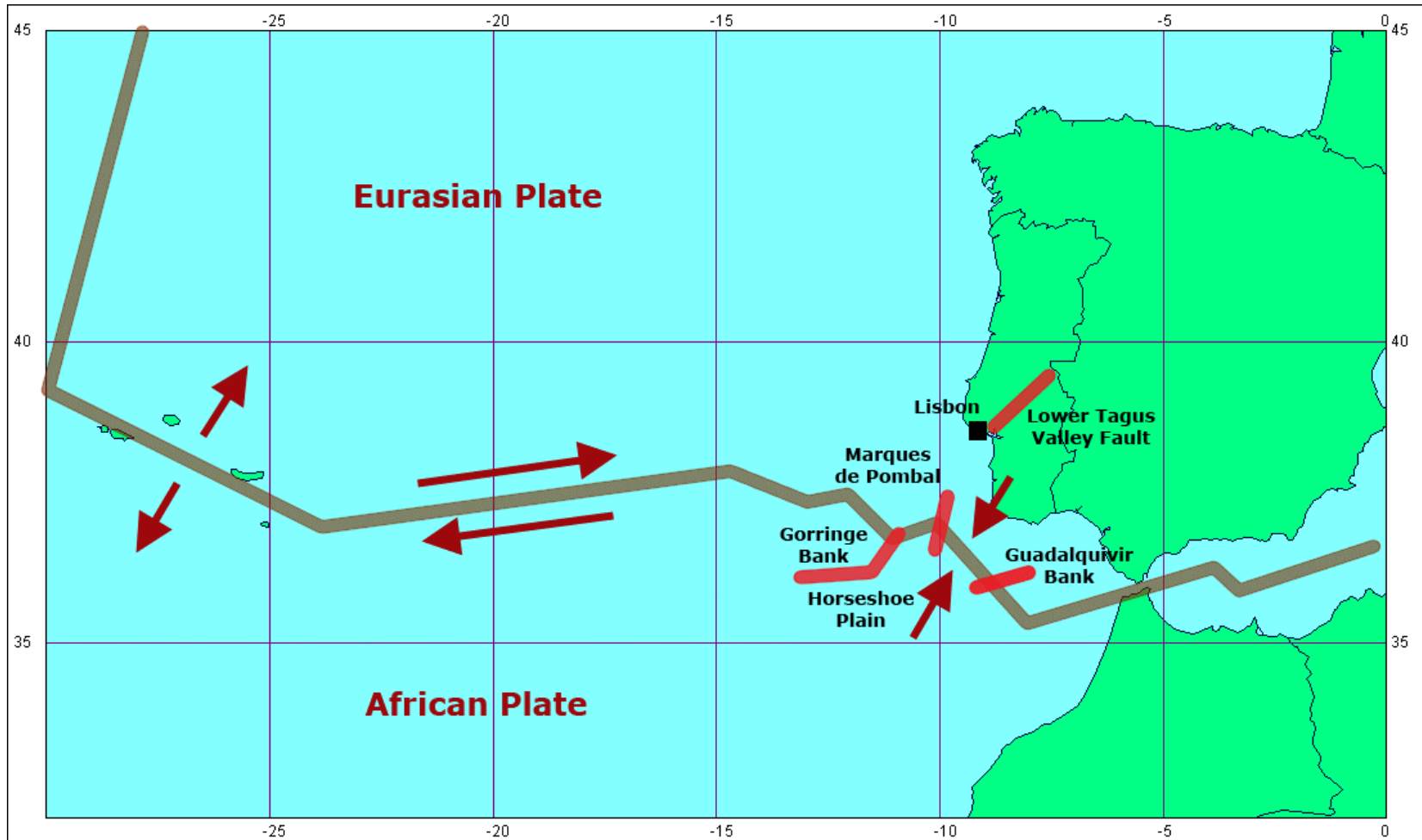
UK Tsunami Hazard



3D image of massive Storegga slide possibly caused by a gas hydrate melt-down -- resulted in a tsunami that drowned Scotland 7,000 years ago.

Image: Deep East 2001, NDWP, NOAA/OER.

UK Tsunami Hazard



Lisbon Earthquake 1755



Erdbeden von Lissabon, 1. Novbr. 1755.

UK Tsunami Hazard

Atlantic Ocean Travel Time Maps
November 1, 1755 Lisbon, Portugal
Modified Mercalli Intensity XI

