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# Potential Geological Settings in the UK

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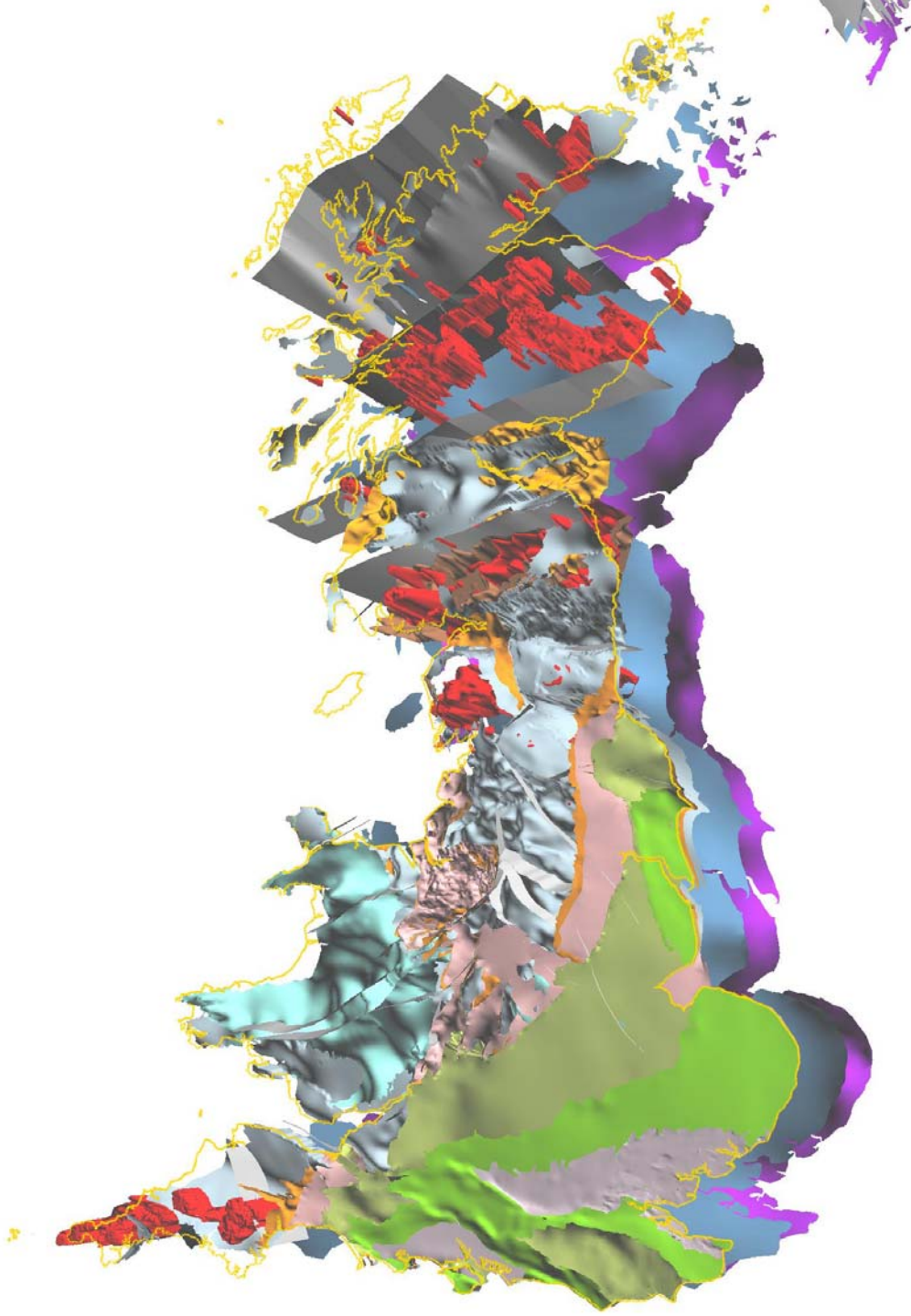
# UK Geology highly varied

## Offers a number of disposal options for the geological disposal of radioactive waste





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# Main Criteria

Geology contributes to long-term isolation of radioactive waste

Ideally need:

Physical stability (constructability/operational safety);

Long groundwater return time;

Relatively simple, predictable groundwater flow regimes;

Slow groundwater movement/low hydraulic gradients;

Long term stability;

and.....



# Some other considerations

.....may also consider:

Resources;

Climate change;

..... and other factors.



# Favourable Geological Situations

Basement under sedimentary cover (BUSC)

Large inland sedimentary basins

Low permeability sedimentary rocks

Low permeability 'basement' rocks

Low relief terrain (inc small islands)

Many of these overlap



# Favourable Geological Situations

## BUSC

Well known model (Sellafield and Dounreay are variants)

Hosted in 'basement' with cover rocks potentially providing long flow paths and dilution.

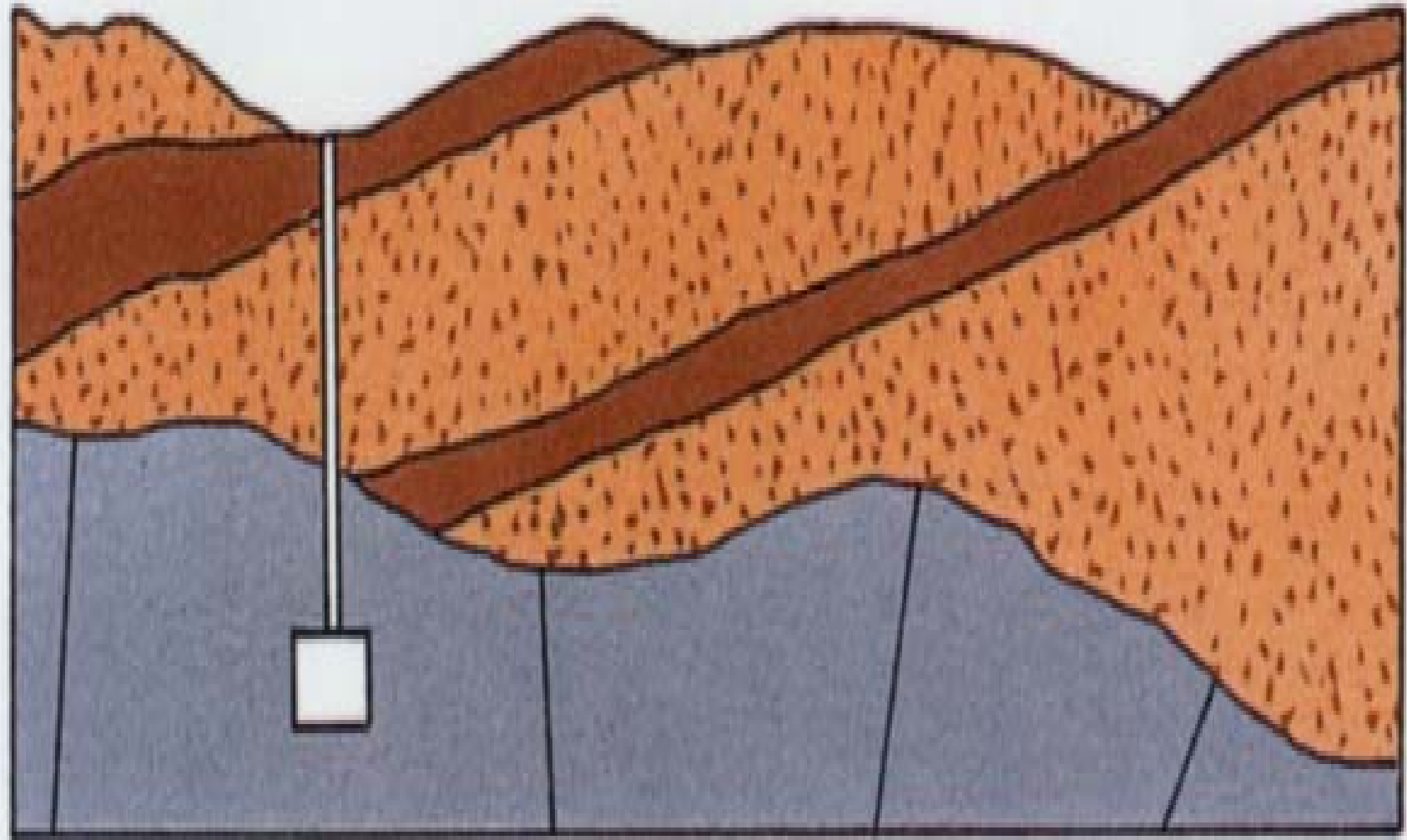


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# Favourable Geological Situations

Large inland sedimentary basins

Likely to have disposal options in:

- Evaporite deposits;
- Thick mudstone sequences;
- Basinal brines that are stagnant.



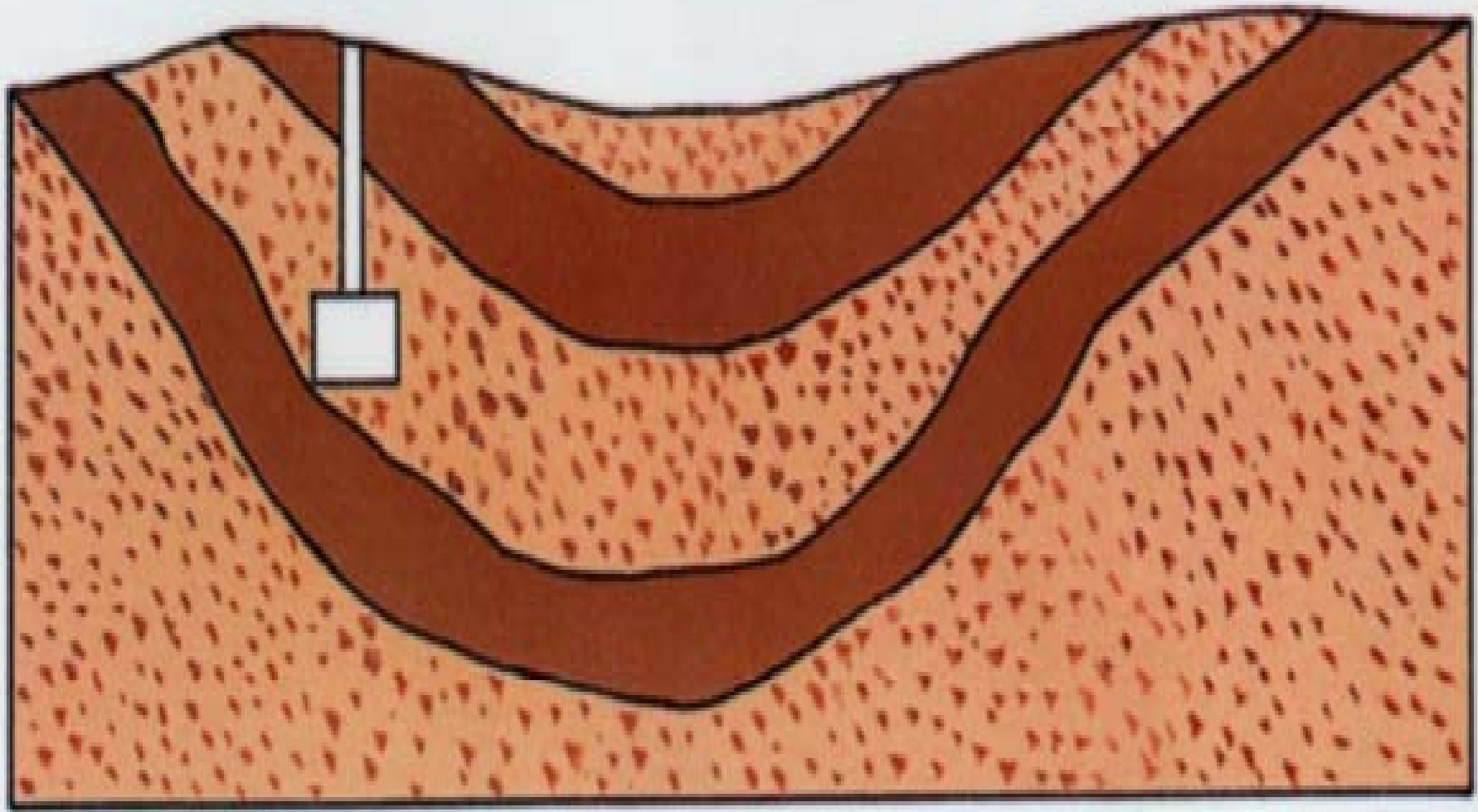


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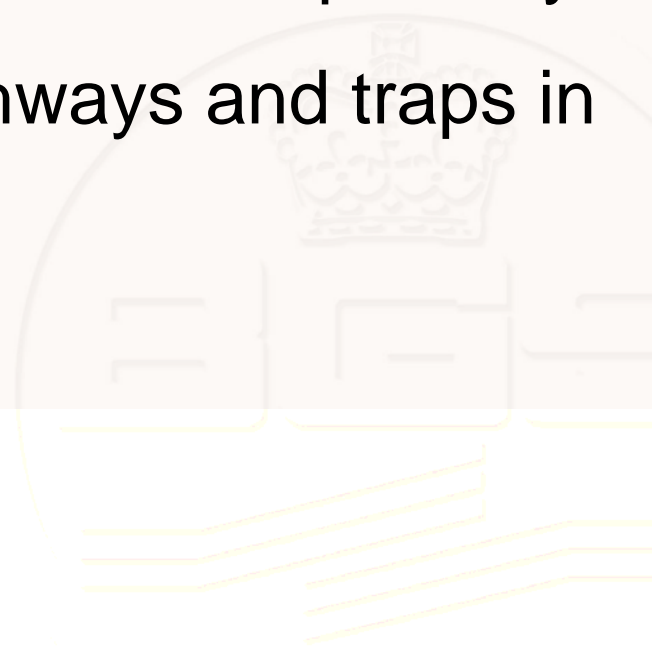


# Favourable Geological Situations

Low permeability sedimentary rocks

Packages of sedimentary rocks with mudstone sections thick enough for construction of a repository

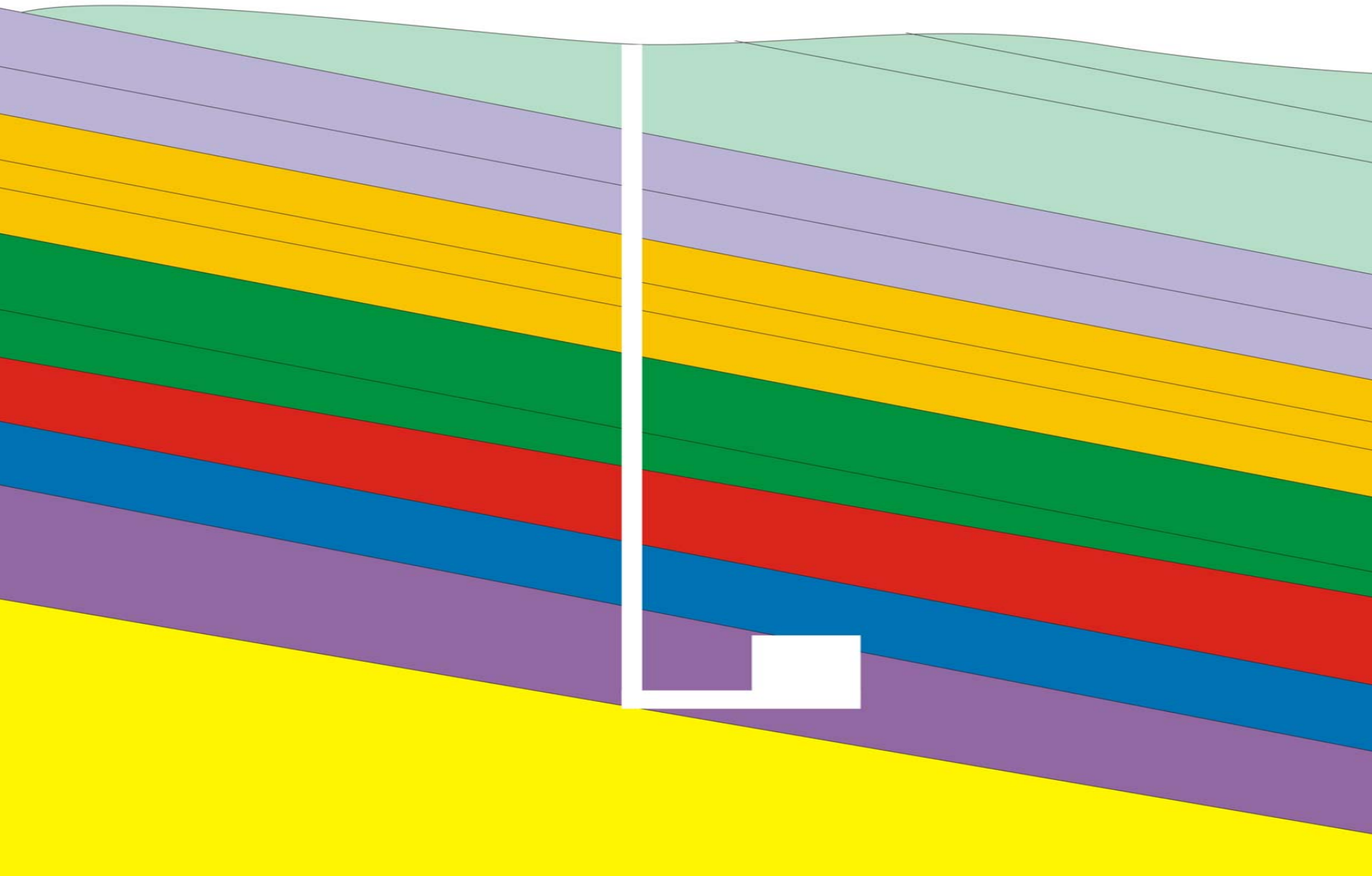
Offer potentially long migration pathways and traps in overlying deposits.





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# Favourable Geological Situations

Low permeability basement ('hard') rocks

Rocks with low bulk rock permeability rocks at surface, regardless of surface relief

Potential problems of complex geology (sometimes) and short return pathways



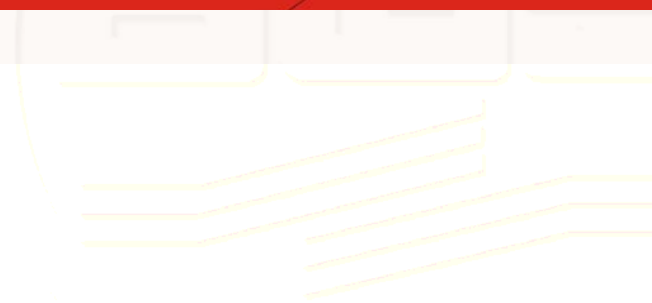
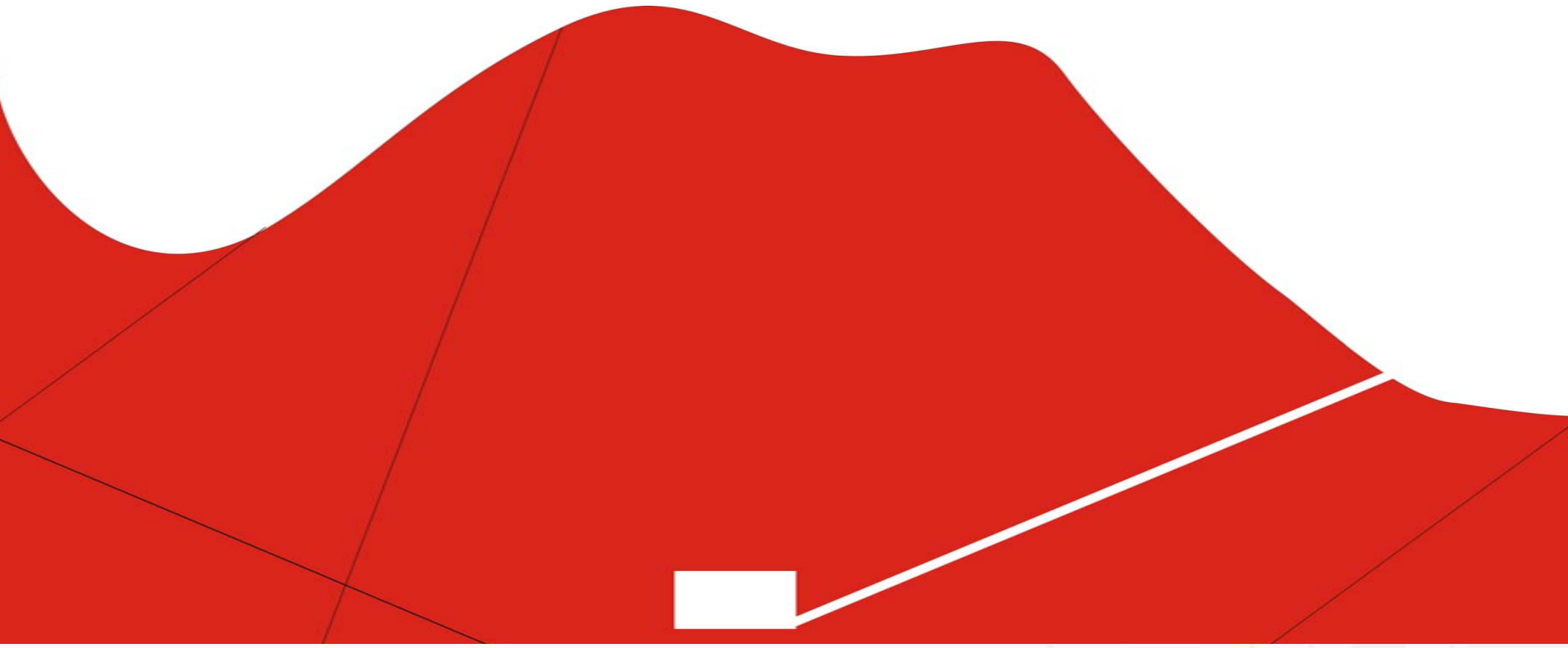


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# Favourable Geological Situations

Low relief terrain (inc small islands)

Includes basement and areas of cover rock.



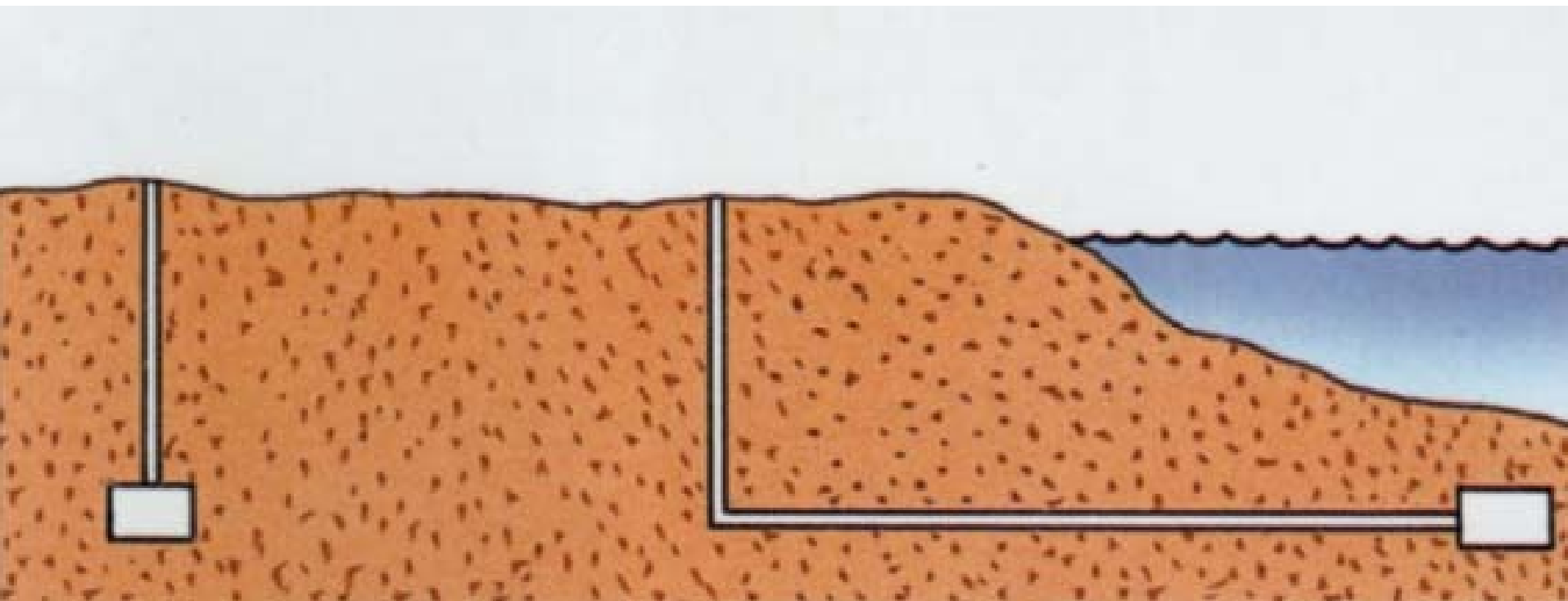


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# Less Suitable Geological Situations

Within an aquifer

High groundwater fluxes

Natural resources (coal etc)

High geological complexity

Not a current issue here but .....

High seismicity

Active volcanism





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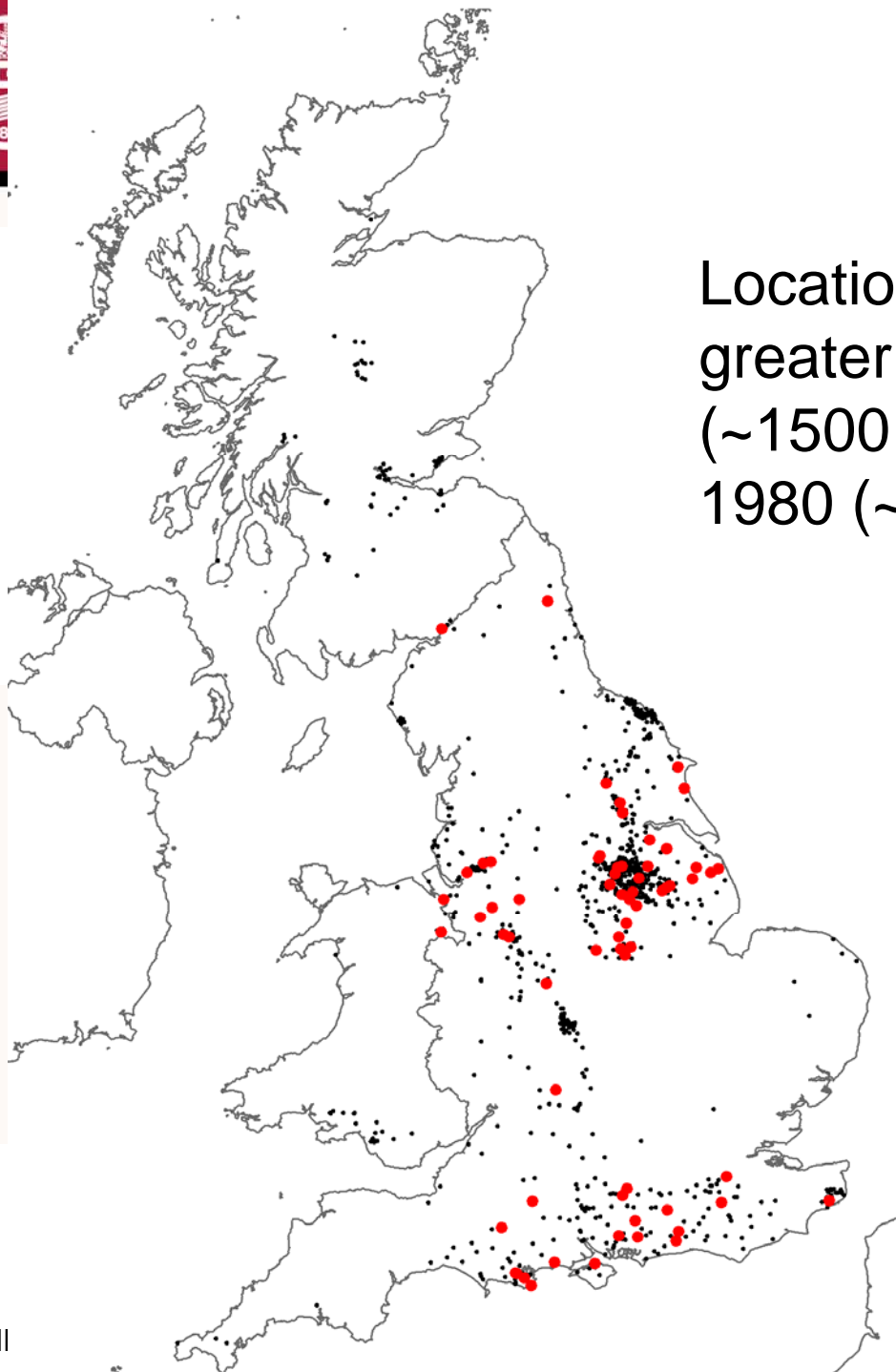
# Deep Geological Information

Information largely restricted to Coal and hydrocarbon exploration activities including  
Boreholes





Location of all registered boreholes greater than 1000m drilled depth (~1500 since 1850), those drilled post 1980 (~180) highlighted in red.





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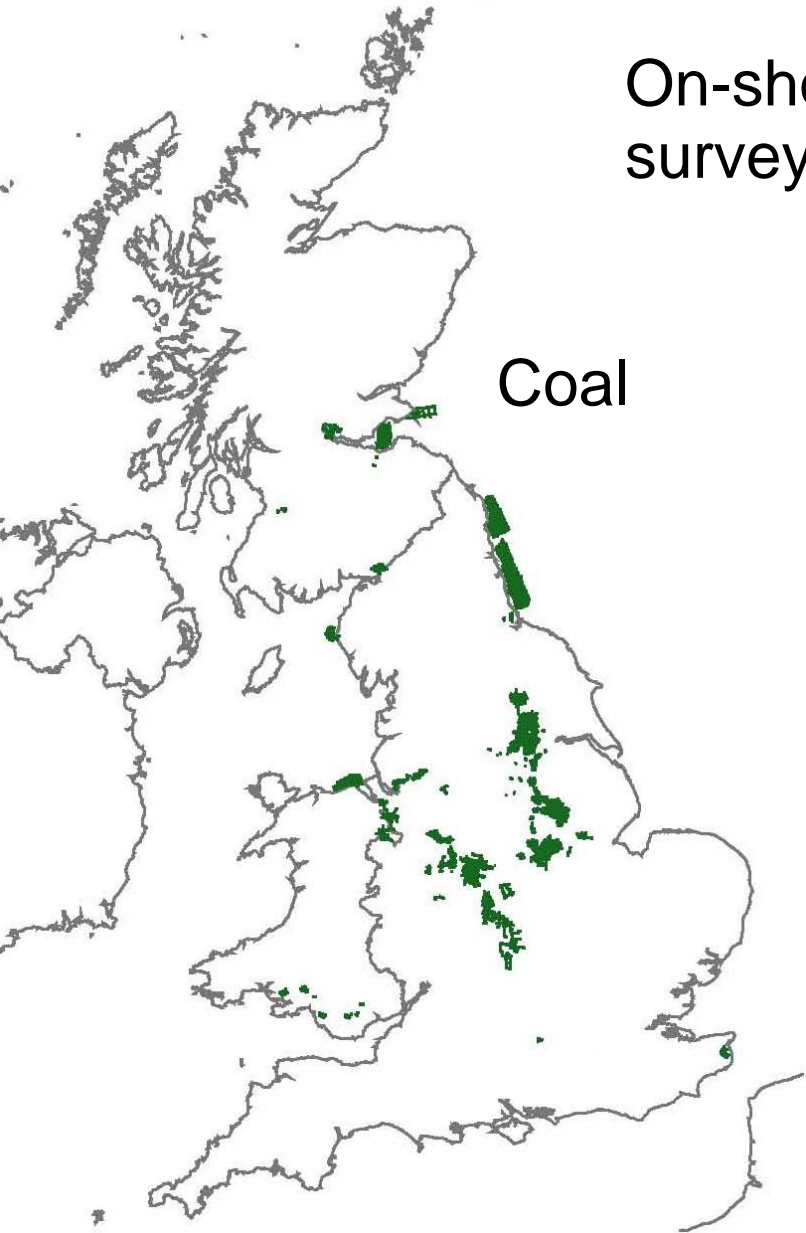
Seismic Surveys



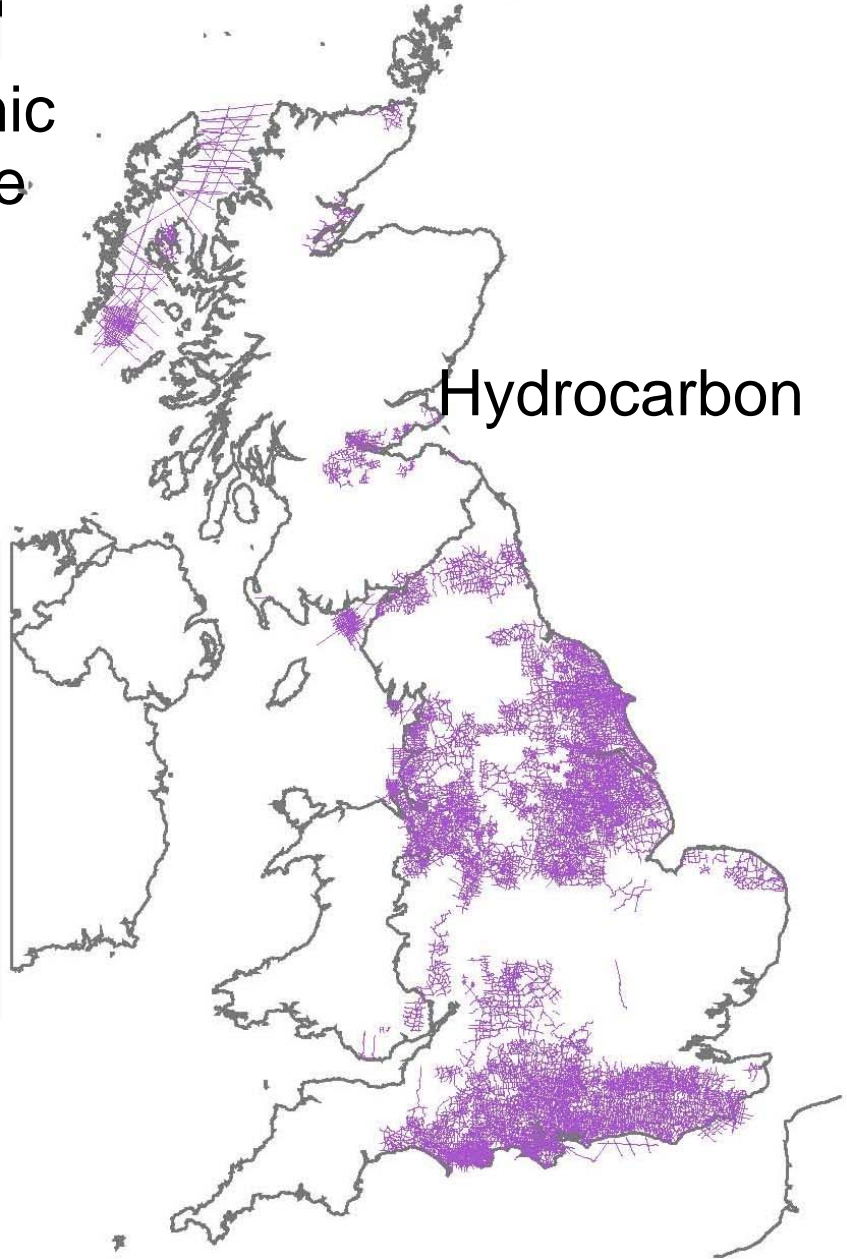


On-shore seismic  
survey coverage

Coal



Hydrocarbon





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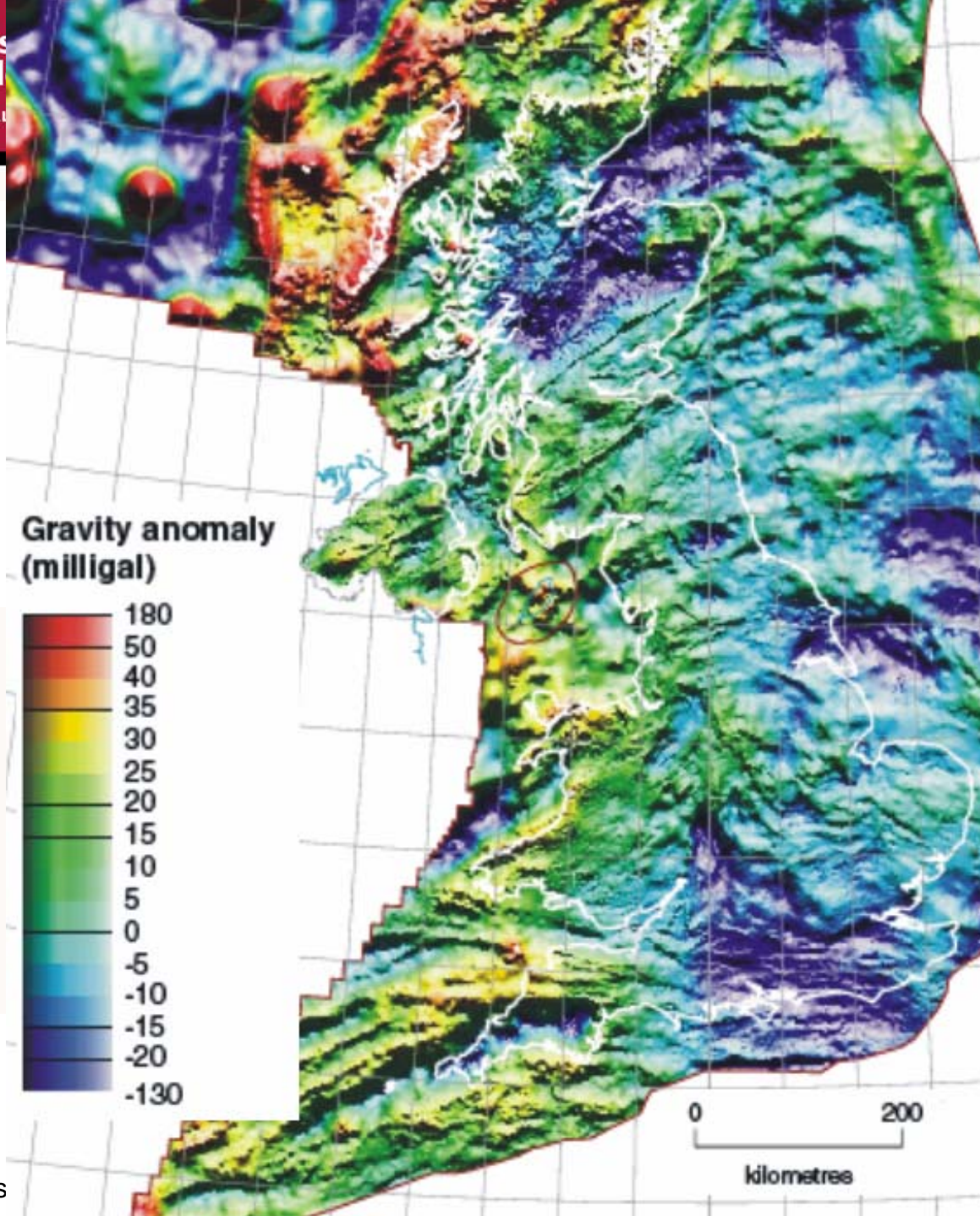
Seismic Surveys

National/Regional geophysical datasets including Gravity, magnetics etc

Site specific data including Sellafield



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Given geological variability and the number of potentially suitable geological environments available in the UK the geological disposal of radioactive waste is a viable option.

