

Future Science – A vision for the next 25 years

An Industry perspective

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Agenda

- Oil and Gas
- Mining
- Engineering
- Hydrogeology
- Contaminated Land
- Other issues
- Q&A

Oil and Gas

- Deep water:
 - Rift basin evolution, dynamic topography, source to sink
 - Magma rich vs magma poor margins, Heta flow
 - Sub salt / basalt imaging, direct HC detection
- Sub thrust plays:
 - Imaging, structural modelling of thrust foldbelts, petroleum systems
- Unconventionals:
 - Kerogen type and kinetics,
 - Prediction of natural fractures, 'frackability', micro-seismicity
- Mature Basins:
 - Enhanced oil recovery, thrust fold 3D seismic acquisition and processing.

Mining

- Understanding the nature of, and requirement for, minerals and metals beneath the land, sea and easily accessible asteroids – and how to extract them – both with regards to mining and metallurgical processing.
- How to mine in a more responsible manner e.g.
 - How to process minerals economically without the use of large volumes of water
 - How to crush, grind and process minerals without the need for large energy requirements
 - How to remove humans from hazardous environments such as underground mines

Engineering Geology

- Offshore geohazards and ground modelling (for civil-structural engineering projects)
- Nuclear waste
- Automation of geoscience
- Building Information Management (BIM) for the sub-surface
- Linking-up and improved interpretation of surface and sub-surface monitoring data
- Updating the UK's engineering ground model

Hydrogeology

- Benchmarking groundwater flood risk maps
- Improved economic assessments of long duration, groundwater dominated flood events
- Emerging contaminants – fate and transport of these, build on BGS work.
- Widening the UKTAG methodology (2017) for determination of additional hazardous substances?
- Maintaining borehole / water well efficiency by early intervention and improved additives.
- Horizontal wells for shallow thin aquifers?
- Wetland ecohydrological guidelines and nitrate threshold values

Contaminated Land

- Asbestos in the ground – insufficient research into the risk of asbestos in the soil.
 - Significant amount of costly remediation because practitioners have to follow a highly 'precautionary principle.'
- More research is required on:
 - Toxicology
 - Fate and transport of contaminants .
 - Potential use of Bioaccessibility Testing in risk assessment.
 - Emerging "contaminants of emerging concern."
 - Nano particles in the environment.
- Move to 4 year degree v 3 year degree plus MScs – lack of specialism.

Other issues

- Long term storage of radioactive waste
- Mining landfills - recovery of plastics, metals, sand and gravel with increased commodity prices.
- Climate change impact on ground water resources affecting population and industry
- Funding challenges
 - Reductions in oil, gas and mining due to reduced prices
 - Reductions elsewhere due to budget constraints, BREXIT uncertainty, etc

Q&A