NERC Strategy

John Ludden, Executive Director,
BGS and NERC Executive

Tellus conference Belfast 2007

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ENVIRONMENT
RESEARCH COUNCIL

Impact of NERC Research

- Stern Review *(2006)*
- Millennium Ecosystem Assessment *(2005)*
- Economic Benefits of Environmental Science *(NERC, 2006)*
- IPCC assessments *(2007)*

Next Generation Science for Planet Earth

NERC Strategy 2007- 2012

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NERC's Strategic Goal

To deliver world-leading environmental research at the frontiers of knowledge:

- Enabling society to respond urgently to the increasing pressures on natural resources and global climate
- Contributing to UK leadership in predicting the regional & local impacts of environmental change from days to decades, and
- Creating and supporting vibrant, integrated research communities

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Themes

- Climate system
- Biodiversity
- Sustainable use of natural resources
- Earth System Science
- Natural hazards
- Environment, pollution and human health
- Technologies
- Knowledge
- People
- Science Infrastructure
- Delivery

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Climate System

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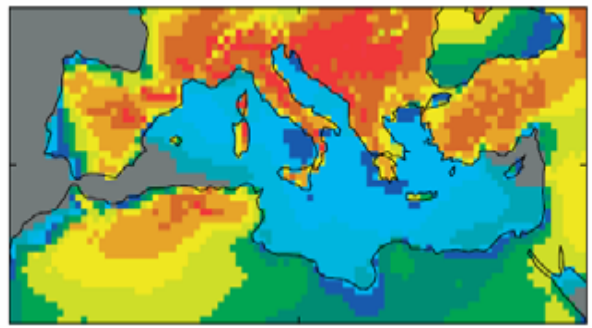
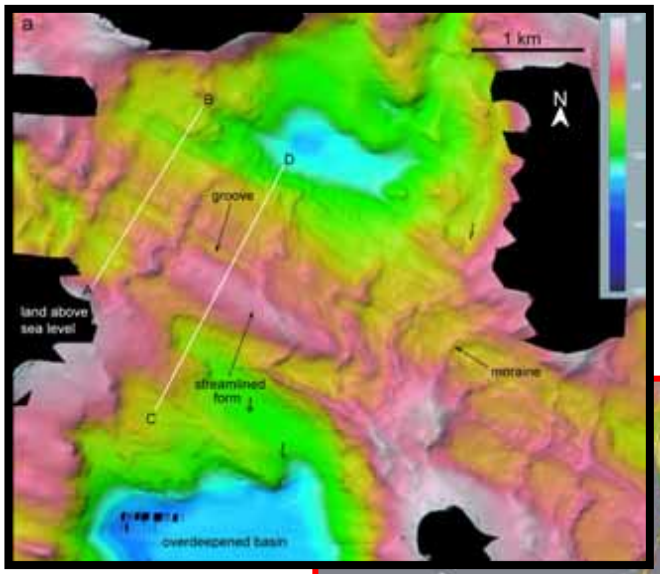
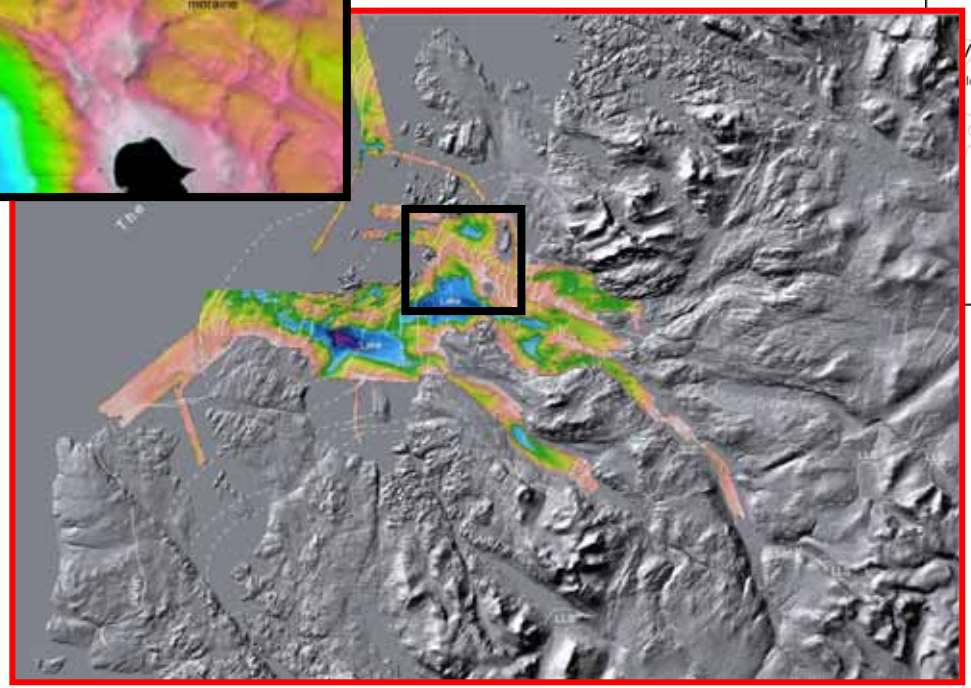
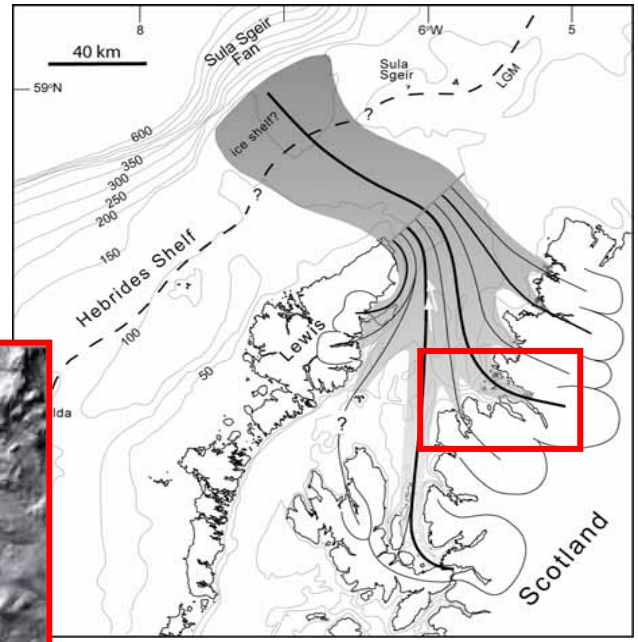
- Highest priority theme for NERC.
- Capability to produce predictions that are required for decision makers: i.e. regional predictions over shorter timescales.
- More focus needed on the polar regions.
- Water is a major source of uncertainty in climate models & major impact for society.



Integrating onshore-offshore knowledge - modelling the last de-glaciation







Integrated topographic and bathymetric model of glacial landforms,

Biodiversity

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- Whole ecosystem approach identified as unifying concept for this theme.
- Contribution of biodiversity to ecosystem services, valuation
- Key high level challenge covering:
  - **Biodiversity functions and resilience** Its role in key ecosystem functions
  - **Influence of environmental change** The impact on genes, populations, species and communities

Sustainable Use of Natural Resources

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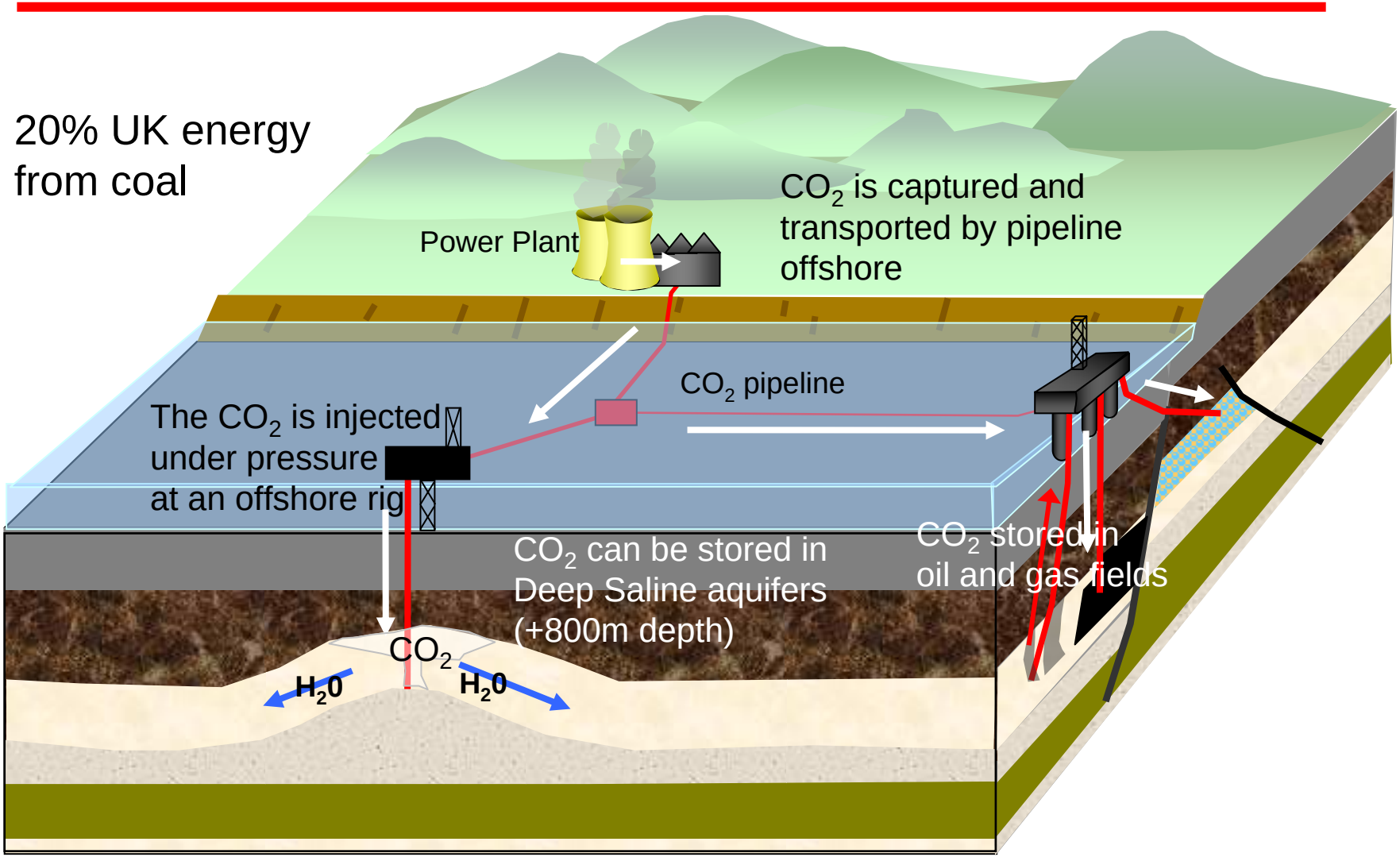
- Energy the most important challenge within the theme.
  - Extend the resource base.
  - Focus on clean energy.
  - Environmental impacts of new technology.
- Sustain and improve water and soil quality
  - Integrated approach needed.

CO_2 Options for Geological Storage




Even beneath cities like Berlin
The major challenges are socio-political not technological
(GASAG)

Earth-system Science

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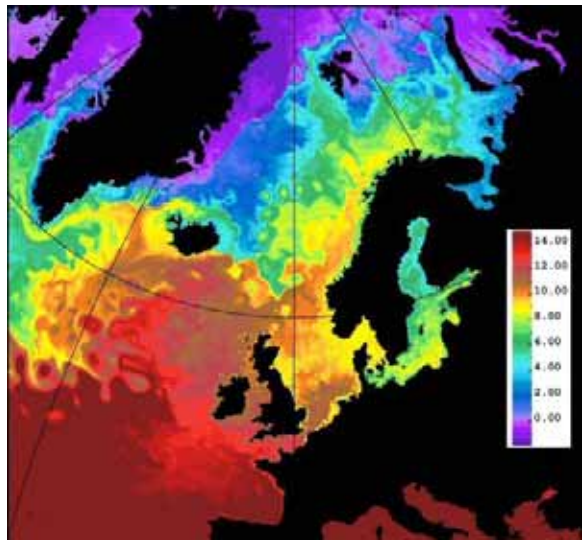
- Larger scale broader aspects of the Earth system.
- Three high level challenges
  - Forewarning of abrupt changes in the Earth System
  - Interaction between evolution of life and the planet
  - Driving forces and feedbacks at the global level.

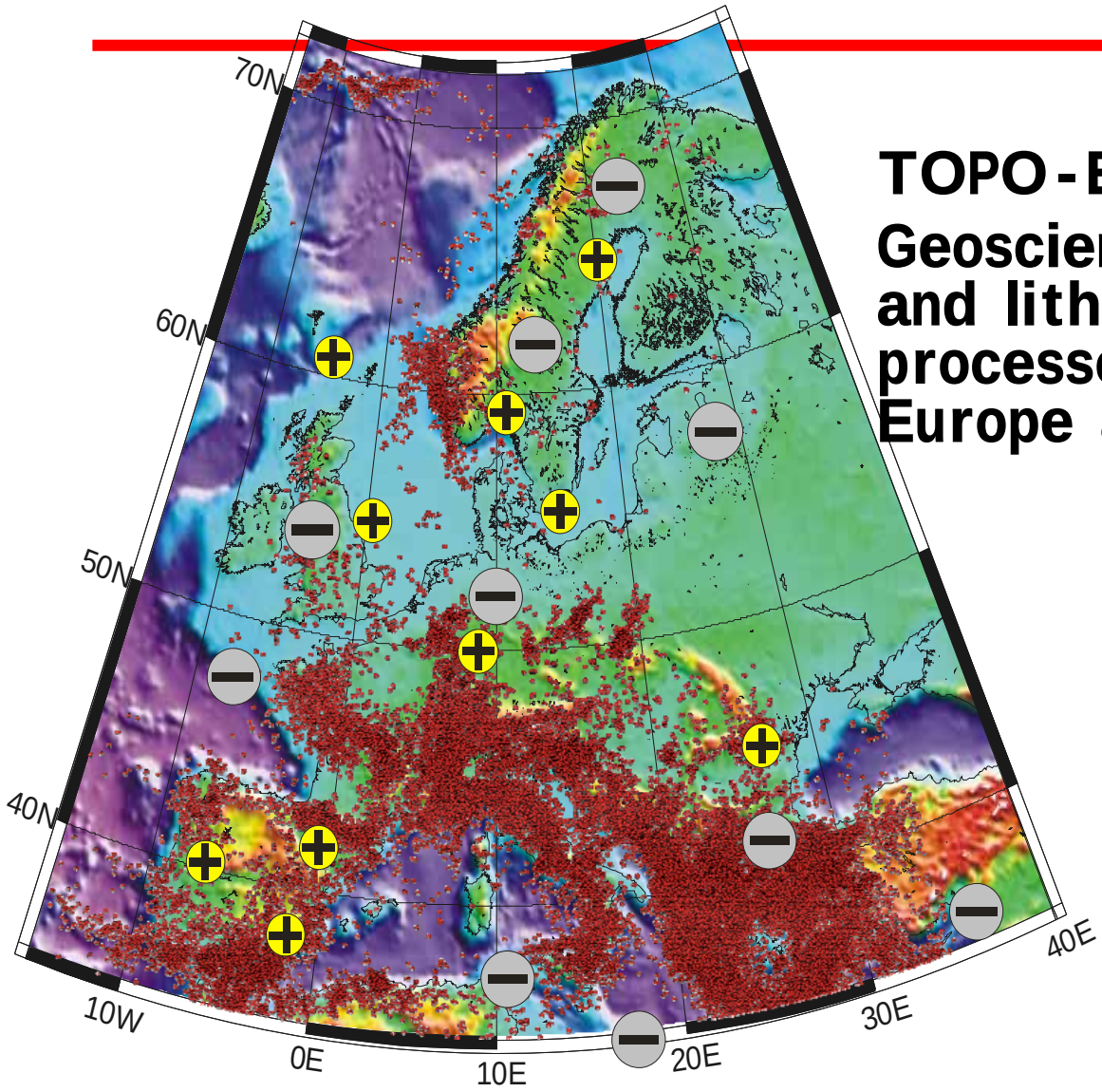


Research into Earth Events

Precambrian Fossils in England

Ediacaran Fauna Charniodiscus

dynamic topography and lithosphere deformation of Europe



TOPO-EUROPE:

Geoscience of coupled surface and lithosphere & mantle processes of continental Europe and its margins

Earthquakes

Areas going up

Areas going down

Natural Hazards

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- Improving predictability of location, timing and consequences
- Key challenges are in the hydro-meteorological area
- Storms are highest priority hazard
- Geophysical hazards

Soufrière Hills Volcano Montserrat – Before and after

7th 8th January 2004

Environment, Pollution and Human Health

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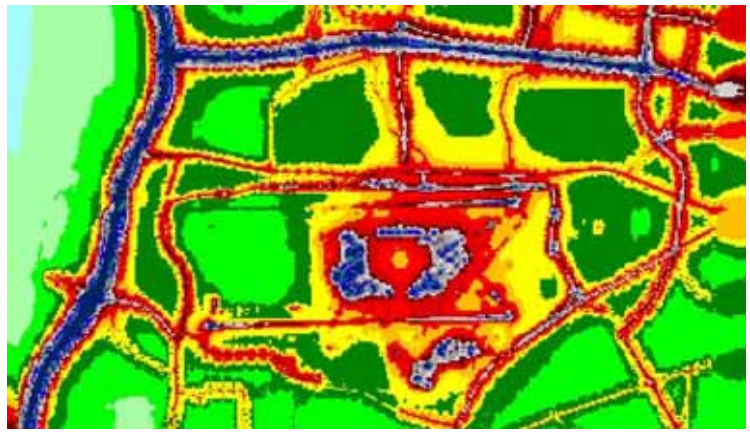
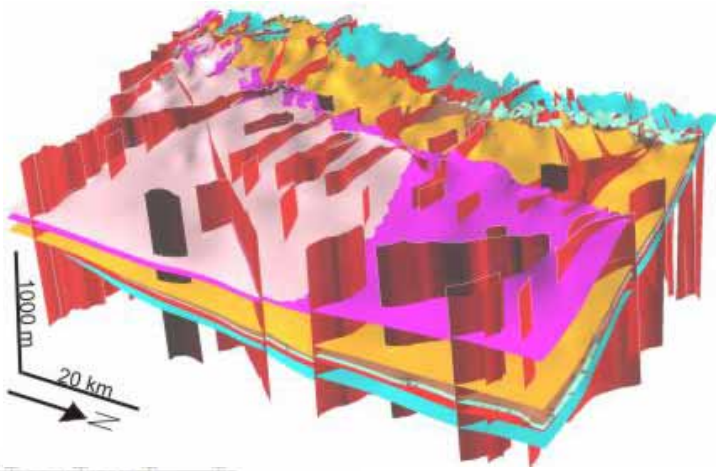
- Measurement and distribution of pollutants and pathogens at all time and space scales.
- Process studies and better modelling of how pollutants and pathogens move through the environment.
- Environmental and health consequences of waste management activities.

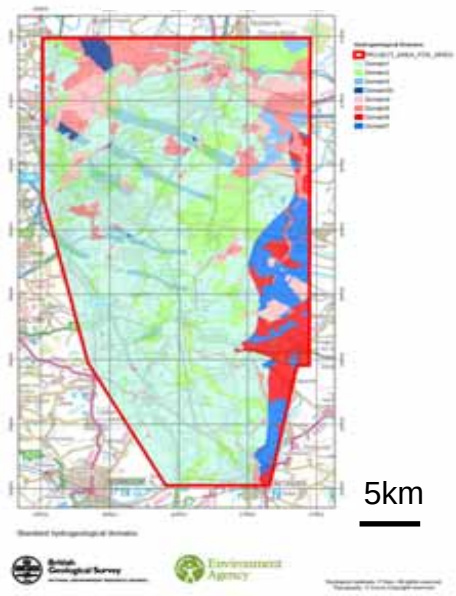


Modelled NO_2 concentrations at LHR, showing the influence of roadside and airside emissions.

Applied 3D environmental geoscience

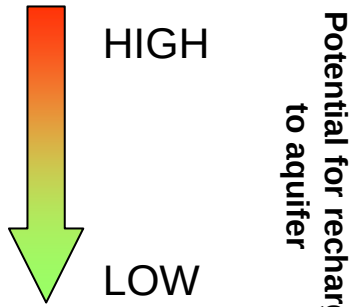
- Geological maps and attributed 3D models provide a powerful tool to aid environmental decision making
- Applications in York range from preservation of archaeological artefacts to predicting aquifer recharge and vulnerability
- Models have been applied on behalf of the Environment Agency to aid groundwater management on a regional scale





Hydrogeological Domains from 3D geological model

Example, Doncaster to Retford



Technologies

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- Important and timely area which needs to be developed.
- There must be two way links between technology and the science themes.
- Key technology areas:
  - Remote sensing
  - Intelligent field sensors
  - Novell laboratory instrumentation
  - Computing power & data repositories.

Delivering the Strategy

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- National capability (predominantly in RCC).
- Research programmes (joining previous streams in RCC with old-style thematic programmes)
- Theme leaders to facilitate advice to NERC on theme priorities
- Theme action plans to be developed
- Research programmes within and across themes

Cross-council Research Programmes

- **Living with Environmental Change**
- **Energy**
- Terrorism & Global Conflict
- Ageing
- Nanotechnology

Living With Environmental Change

- Why?
  - We live in the midst of human-induced environmental changes that challenge our social and economic well-being
- What?
  - Whole system predictions and analysis of environmental change
  - Linking natural science, engineering, social science, economics, policy depts. and business

Knowledge Exchange

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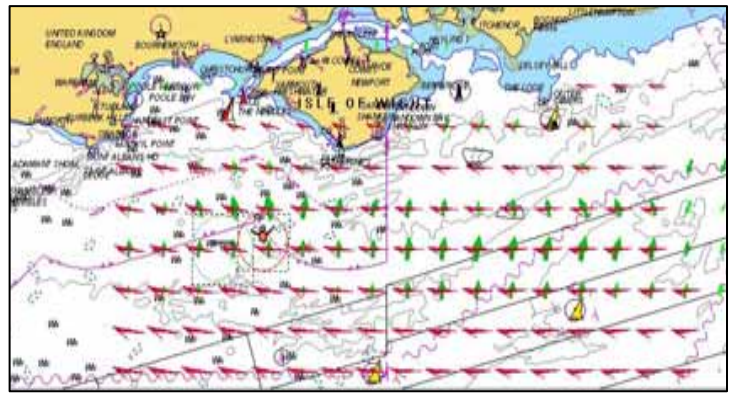
- Stakeholder engagement
  - Strategic partnerships with major users
  - Science into policy, and application of knowledge
- Commercialisation
  - Drive licensing and spin-outs using proof-of-concept funding and expert facilitation
- Training
  - Review of skills requirements
- Science and Society



Ground stability information - economic benefits

- Subsidence costs UK insurance industry c. £ 300M p.a. and rising (ABI)
- Excludes ‘invisible benefits’ *e.g.* subsidence avoided, stress and disruption through loss of property/finance, economic growth, better decision-making
- Science into policy

BGS is involved in developmental projects in 14 countries today

Including:

- **Afghanistan**
- **Palestinian Water Authority**
- **Ethiopian Government**
- **Bangladesh Government**
- **Nigeria Water Aid**
- **Southern African Development Community**
- **Madagascar**

NERC's next Strategy

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Current status

- Approval by Council Jun '07.
- Launch the strategy Nov '07.
- Development of implementation plan.