NERC Strategy

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Tellus conference Belfast 2007
Impact of NERC Research

- Millennium Ecosystem Assessment (2005)
- Economic Benefits of Environmental Science (NERC, 2006)
- IPCC assessments (2007)
Next Generation Science for Planet Earth

NERC Strategy 2007-2012
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
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
Climate System

- 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,
• 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

- 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.
CO₂ Options for Geological Storage

20% UK energy from coal

- CO₂ is captured and transported by pipeline offshore
- The CO₂ is injected under pressure at an offshore rig
- CO₂ can be stored in Deep Saline aquifers (+800m depth)
- CO₂ stored in oil and gas fields
Even beneath cities like Berlin

The major challenges are socio-political not technological

(GASAG)
• 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

• 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
• 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.
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
Technologies

- 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

- 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

• 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

Current status

• Approval by Council Jun ’07.
• Launch the strategy Nov ’07.
• Development of implementation plan.