



RAS Meeting



Solid Earth Geophysics Forum

Burlington House, London

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Topics

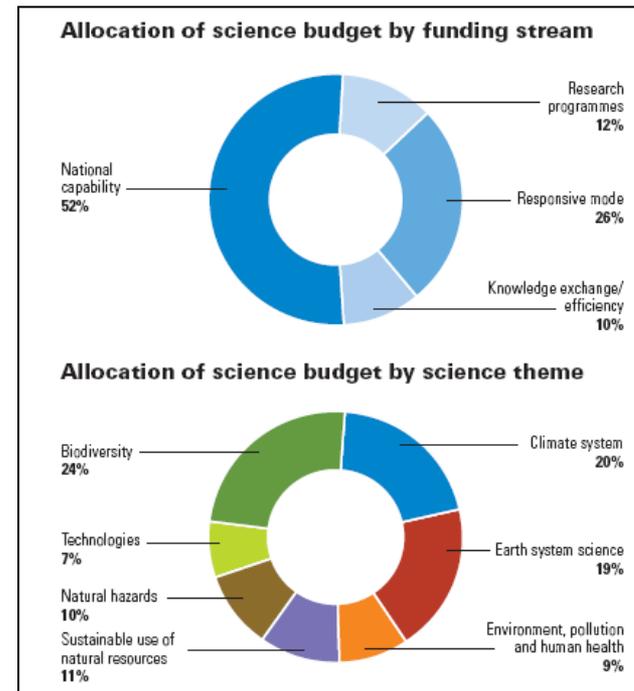
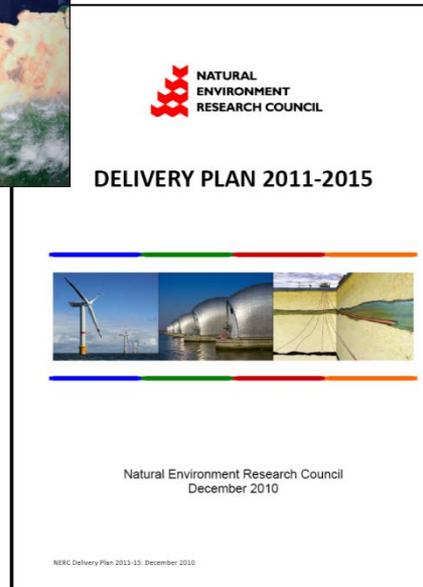
- **NERC Strategy**
- **Research Programmes**
 - Deep Earth (TAP 4)
 - IODP
- **Responsive Mode**
- **Facilities**
- **Constraints**

Funding

- Research Programmes
- Responsive Mode
- National Capability
- Knowledge Exchange



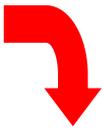
NERC
strategy



Strategic Research



NERC
strategy



to 2012

NERC Strategic Science Themes



Biodiversity

Climate system

Earth-system science

Natural hazards

Technologies

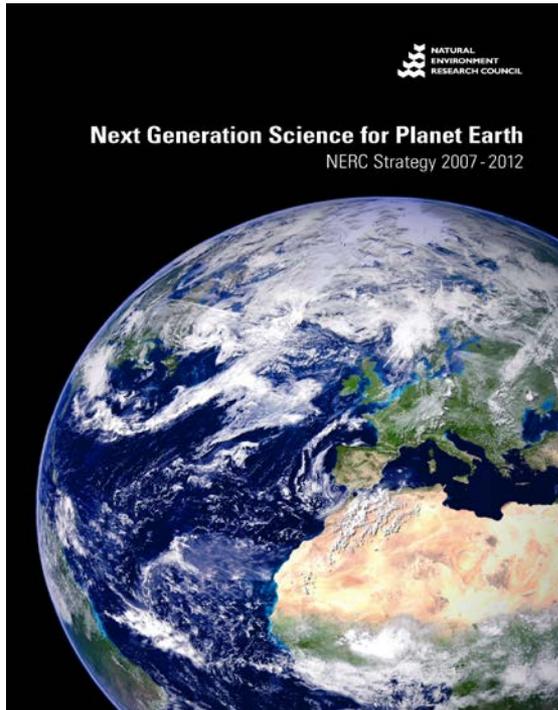
Sustainable use of natural resources

Environment, pollution & human

health



NERC Strategy



Changing context



Economy
Politics
Society
Environment
Science & technology

NERC
Strategy
2013

Audiences and messages



Environmental science delivers for the UK

- Excellence with impact
- Economic growth



Partnership with users and stakeholders

- Our “offer” to business, policy, society
- Working with other sciences and funders



Research to meet society’s needs

- UK and global societal challenges
- NERC strategic research priorities

Strategy building blocks



**Economic
growth**



**Scientific
discovery**

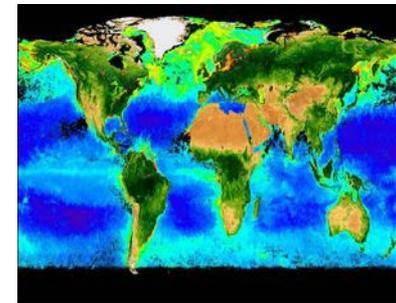
**Resource
security**



**Environmental
hazards**



**Environmental
change**



Meeting society's needs



Economic growth

How to use environmental science for innovation and economic growth in ways that exploit natural capital whilst enhancing the sustainability and resilience of the whole human-Earth system.



Scientific discovery

How to support the excellent environmental science, technology and skills base, including curiosity-driven research, that is needed to meet society's evolving needs into the future.

Societal challenges



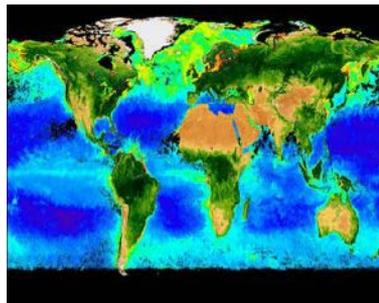
Resource security and supply

How to meet increasing demands on food, water, energy, minerals and other natural resources to support the growing world population and improve living standards, whilst living sustainably within the Earth's limits.



Environmental hazards

How to assess the risk and reduce the vulnerability of people, places and infrastructure to environmental hazards and emergencies such as extreme weather events, floods, droughts, volcanoes, earthquakes, space weather, pollution, novel diseases and invasive species.



Environmental change

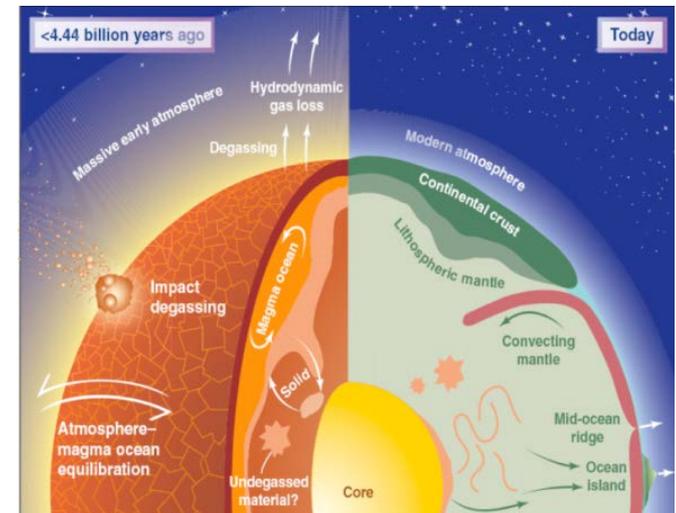
How to improve predictions and make informed choices about the behaviour of the whole human-Earth system and how we respond to environmental changes such as climate change, biodiversity loss, and natural services across land, air, sea and ice.

A transformative advance in understanding the Earth system

- ❖ Mantle convection: How the Earth loses heat
- ❖ Recent paradigm change:
 - Layered → whole mantle convection
- ❖ Fundamental science questions to be answered before new model can emerge.

Volatiles (H_2O , CO_2 , N_2 , S, halogens, noble gases)

- ❖ Control mantle convective style and vigour
- ❖ Critical to surface habitability



ESS Theme Challenge 2:
*Understanding the long term
development of the Earth and
its habitability*

Volatiles, Geodynamics & Solid Earth Controls on the Habitable Planet

Science Questions

❖ Initial Conditions

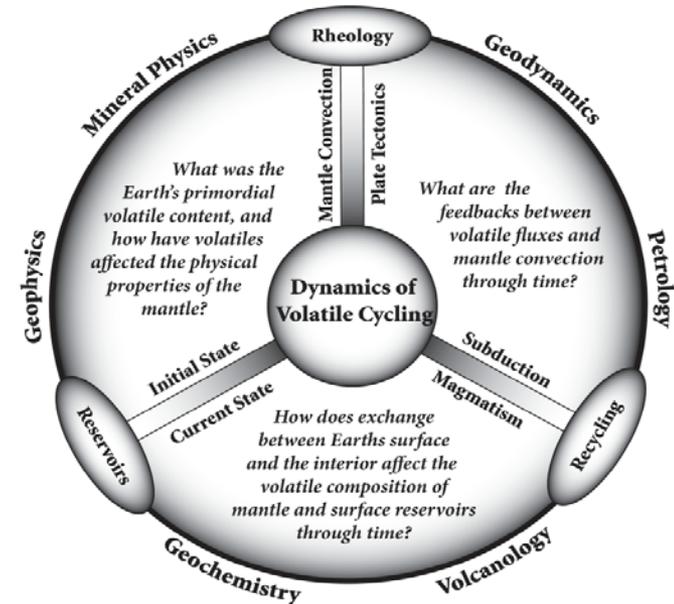
- ❖ Deep Earth's primordial volatile content?
- ❖ Dynamics and fluxes into and out of the early mantle?

❖ Feedback

- ❖ What are the feedbacks between volatile fluxes, and mantle convection?

❖ Reservoir Evolution/Flux

- ❖ Exchange between Earth's surface and the interior through time?



Impact on understanding:

- ❖ Rheology, tectonics and role of volatiles;
- ❖ Origin and evolution of the atmosphere and ocean;
- ❖ Deep carbon cycle;
- ❖ Mantle redox and surface chemistry

Interdisciplinary and coordinated approach involving a number of research disciplines.

Volatiles, Geodynamics & Solid Earth Controls on the Habitable Planet

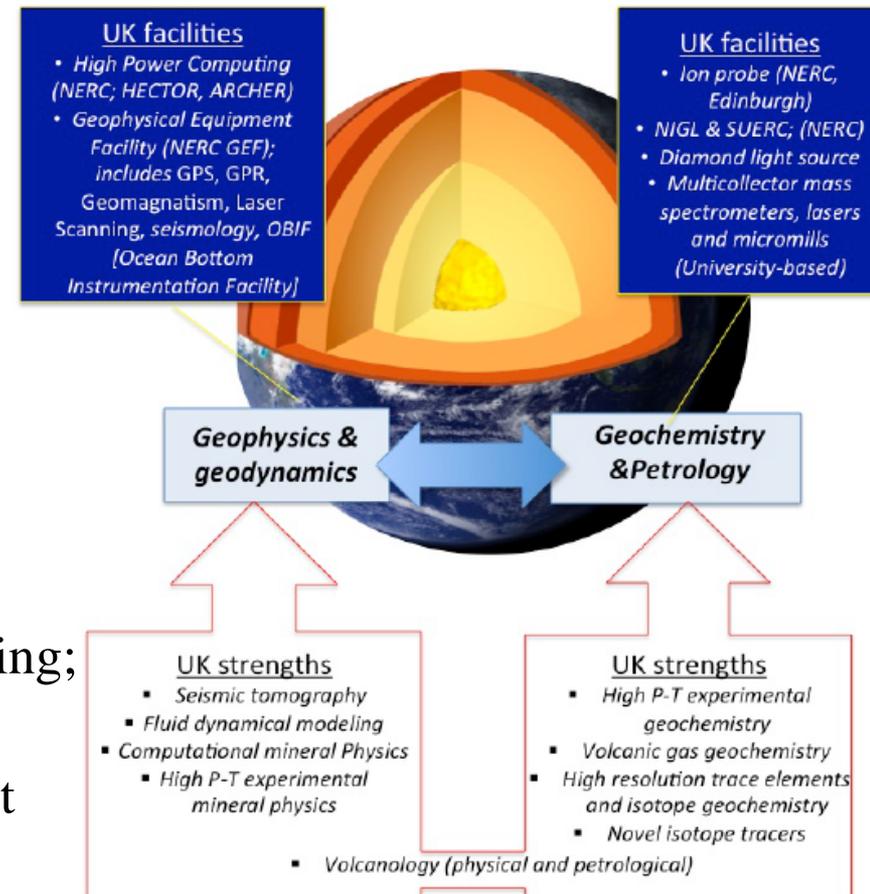
UK = world class community

(NERC responsive mode funded)

- ❖ Geochemistry
- ❖ Mineral Physics
- ❖ Geophysics
- ❖ Modelling

UK = world class facilities

- ❖ NERC responsive mode investments
- ❖ NERC facilities
 - (Diamond Light Source; Computing; NIGL; SUERC)
- ❖ Other UK research council equipment
- ❖ JIF; SRIF; ERC investments



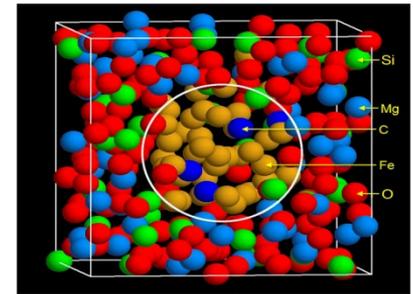
Volatiles, Geodynamics & Solid Earth Controls on the Habitable Planet

Delivery

- ❖ Coordinated network of PI's, NERC Fellows, PDRA's and a graduate student cohort
- ❖ International links: NSF (Geoprisms and CIG); DCO
- ❖ **£8million** over 6 years

Benefits

- ❖ Basic science advances
- ❖ Technology advances
- ❖ Training doctoral and postdoctoral scientists
 - NERC 'most wanted' list
- ❖ **Fundamental Advance in Understanding the Earth System**



UK International Ocean Discovery Programme



IODP is an international programme of scientific ocean drilling for understanding the evolution of the oceans and the Earth system and the global tectonic cycle

NERC is a participant in IODP and has been judged excellent, influential and world leading by **NERC Council National Capability prioritization 2011**



New capabilities to scientific ocean drilling

\$114M refit of the US non-riser drillship, *JOIDES Resolution*,

Deployment of Mission Specific Platforms to tackle shallow water targets and ice covered regions where it is not prudent to operate drillships – support of new rock drilling technology

New \$550M Japanese riser drillship, *Chikyu*, that allows drilling in unstable formations, gas-prone strata, and ultra-deep targets



UK-IODP Research Programme

5 components to the proposed action investments

- Support for site-survey activities
- Support for UK scientific participation in expeditions
- Post cruise short term research support
- Knowledge exchange
- Programme coordination costs

Total investment is £5.5m

Peer Review

To strengthen and streamline the peer review of responsive mode grants and increase community confidence NERC will:

- Involve more established academics and grant holders in peer review
- Set, monitor and support consistently high standards of contributions from all College members
- Ensure all proposals receive a defined and uniform level of review from experts with high or medium expertise

- Remove the 'sift' so that all Standard Grant proposals follow the same review process with the opportunity for applicants to respond to reviewer comments
- Make funding decisions quicker for Standard Grants
- Give moderating panels more consistent membership and more stable scientific remits
- Raise the quality of feedback from panels to applicants

NERC/CSIC Seismic Collaboration

- Collaboration fully operational since 2011
- Builds on a 6M Euro Spanish investment in a MCS system, incl. 6km digital streamer
- Jointly resourced by NERC & CSIC equipment and jointly supported by NERC & CSIC technical staff
- NERC's invested in excess of £1m capital in support of the collaboration in last 3-years
- Step change in science demand – from one NERC MCS cruise every 18-months or so, to around two a year



- **Communicating contributions to the growth agenda**
 - Emphasis in new strategy
 - Preparing for CSR
 - Not about altering proportion of translation research (8%)
- **More agile and responsive for strategic research**
 - Community ideas
 - Aligning with other funders
- **Delivering an effective service whilst reducing administrative effort**
 - 22% cut this CSR
 - 160 staff to deliver £300m budget