



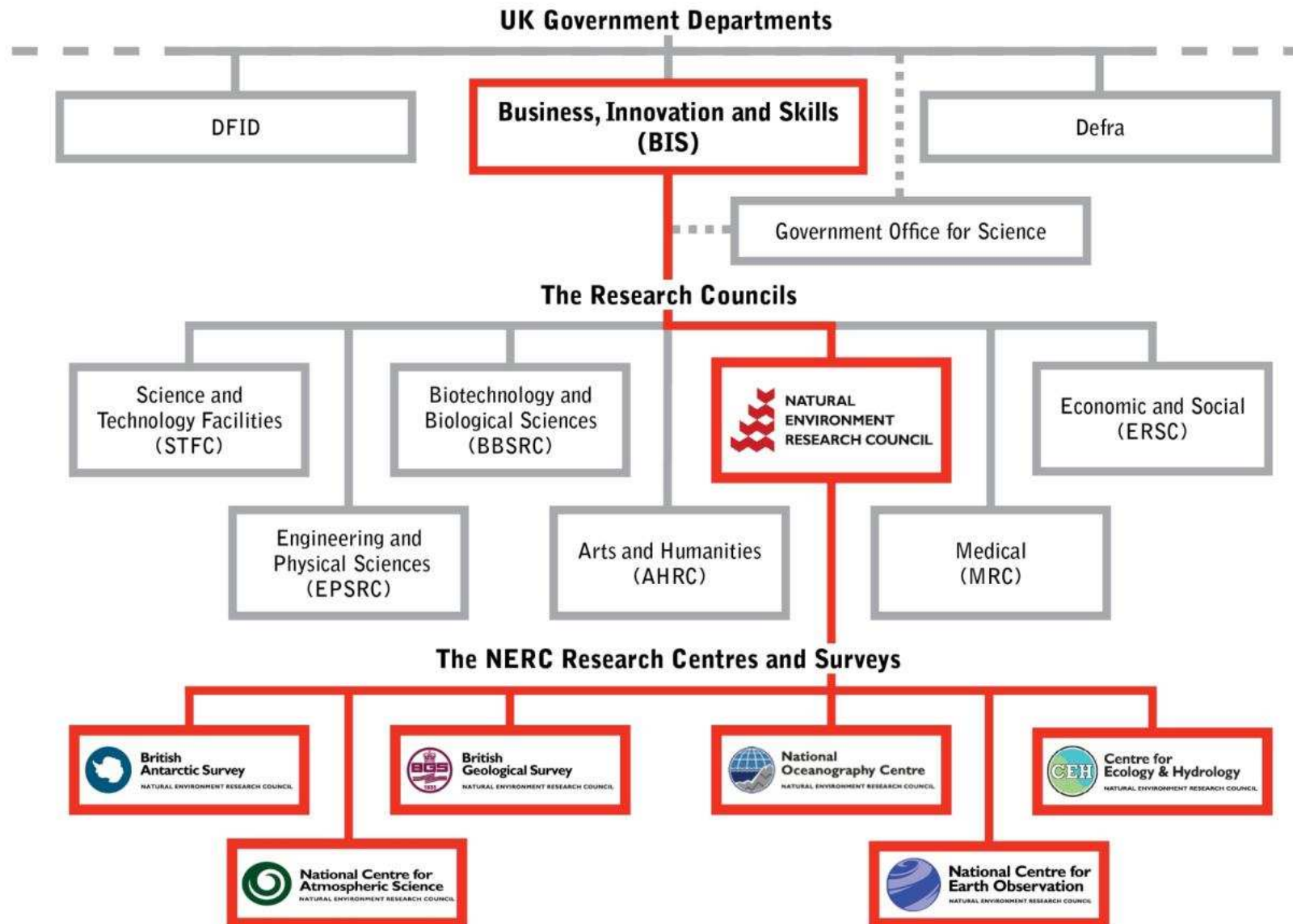
NATURAL  
ENVIRONMENT  
RESEARCH COUNCIL

# Next Generation Science for Planet Earth

Natural Environment  
Research Council



# NERC in a UK Government Setting



# NERC science strategy 2007-2012

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## Strategic science themes

- Climate system
- Biodiversity
- Sustainable use of natural resources
- Natural hazards
- Environment, pollution & human health
- Earth system science
- Technologies

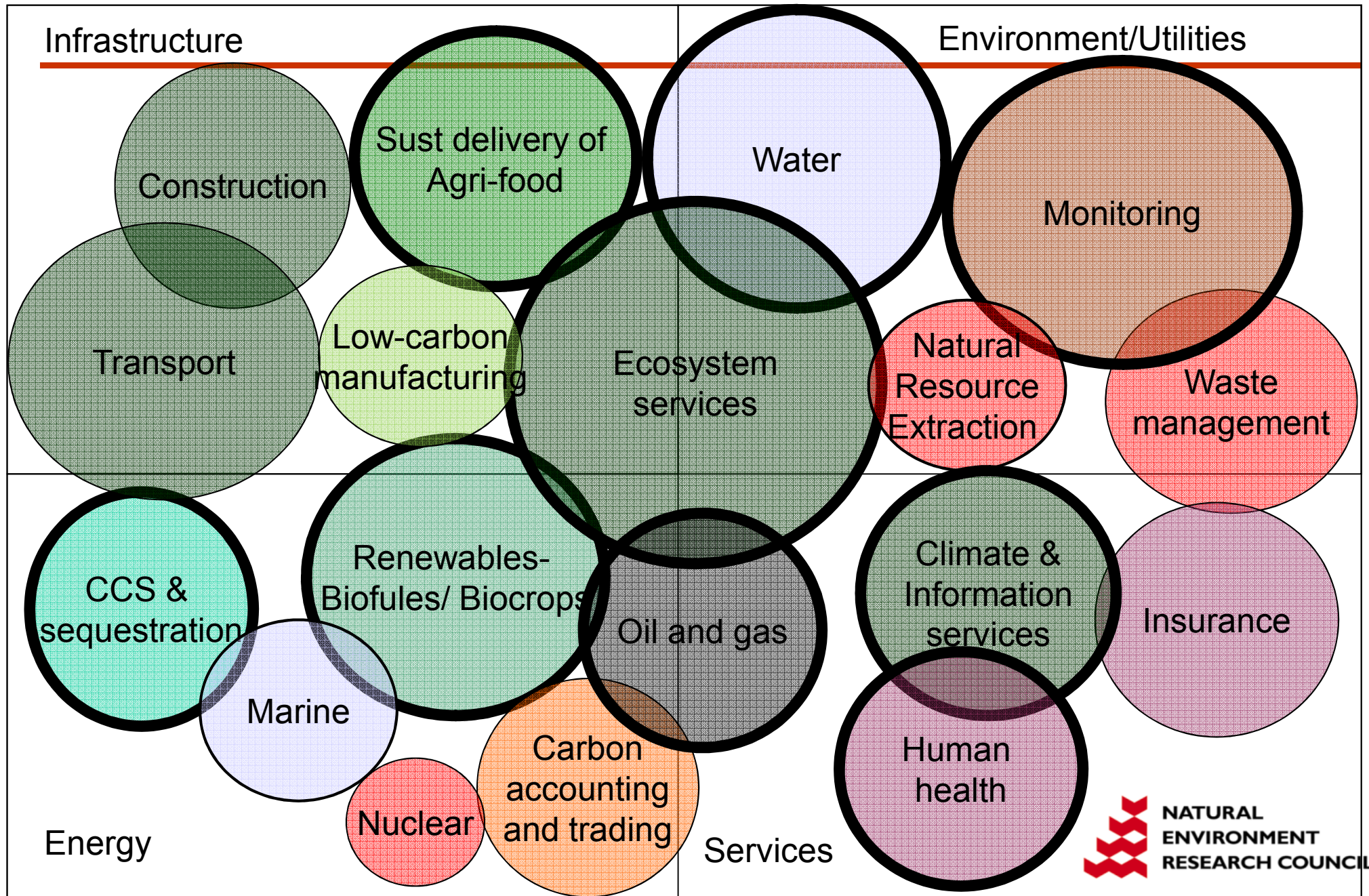
# NERC's main activities

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- National capability (Centres, Infrastructure, Skilled People) ~140M GBP pa
- Research Programme ~ 80M GBP pa
- Responsive mode ~ 80M GBP pa
- Training
- Knowledge exchange for Innovation

All welcome international partnerships

# Excellence with Impact – the Green Economy



# NERC Research Centres

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- British Antarctic Survey
- British Geological Survey
- Centre for Ecology and Hydrology
- National Oceanography Centre
- National Centre for Atmospheric Science
- National Centre for Earth Observation





## British Antarctic Survey

- World-leading interdisciplinary research, observations and logistics at Polar Regions
- Over 450 staff in Cambridge, Antarctica and the Arctic
- Five research stations, two Royal Research Ships and five aircraft in and around Antarctica, one research station in Arctic.

[www.antarctica.ac.uk](http://www.antarctica.ac.uk)



British  
Antarctic Survey

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**British  
Geological Survey**

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Applied geoscience for our  
changing Earth

UK's principle supplier of geological expertise and information  
for government, commercial and individual users

Strategically important research including:

Energy and natural resources,

Vulnerability to environmental change and hazards

Earth System Science

[www.bgs.ac.uk](http://www.bgs.ac.uk)



# The National Oceanography Centre

One of the world's top five institutes devoted to research, education in ocean and earth sciences

Ships, deep diving technology, sustained observations, predictive models, knowledge for policy makers and society

Priorities include the oceans' role in climate change, sea level change, future of the Arctic Ocean, technology development

Over 200 research active scientists - average one publication per month in *Science and Nature*

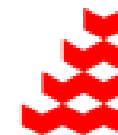
University of Southampton's undergraduate and post graduate Ocean and Earth Science students - largest student community in UK.



**National  
Oceanography Centre**

NATURAL ENVIRONMENT RESEARCH COUNCIL

<http://noc.ac.uk/>



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# National Centre for Atmospheric Science

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190 Scientists, across 20 UK Institutions

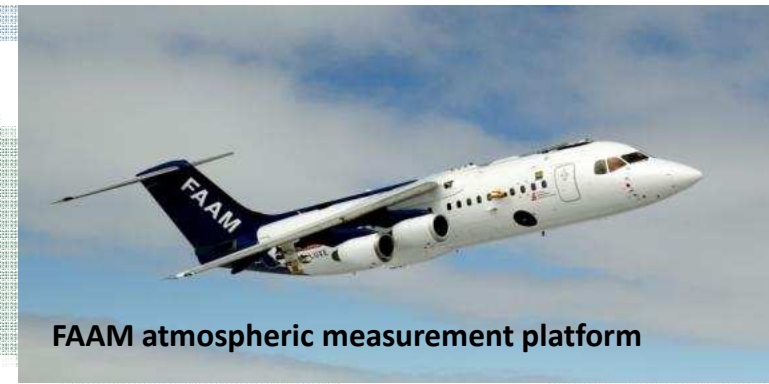
## Priorities:

- Climate Change - modelling and predictions
- Air Quality and atmospheric composition
- Weather, including hazardous and severe weather
- Technologies for observing and modelling the atmosphere

## Facilities:

- FAAM – Facility for Airborne Atmospheric Measurements - aircraft platform for global atmospheric research
- FGAM Facility for Ground-based Atmosphere Measurements - LiDARs, Radars, atmospheric observatories.
- CMS – Computer Modelling Services
- BADC – British Atmospheric Data Centre

[www.ncas.ac.uk](http://www.ncas.ac.uk)



FAAM atmospheric measurement platform



LiDAR deployment in Iceland



Cape Verde Observatory

# Centre for Ecology & Hydrology (CEH)

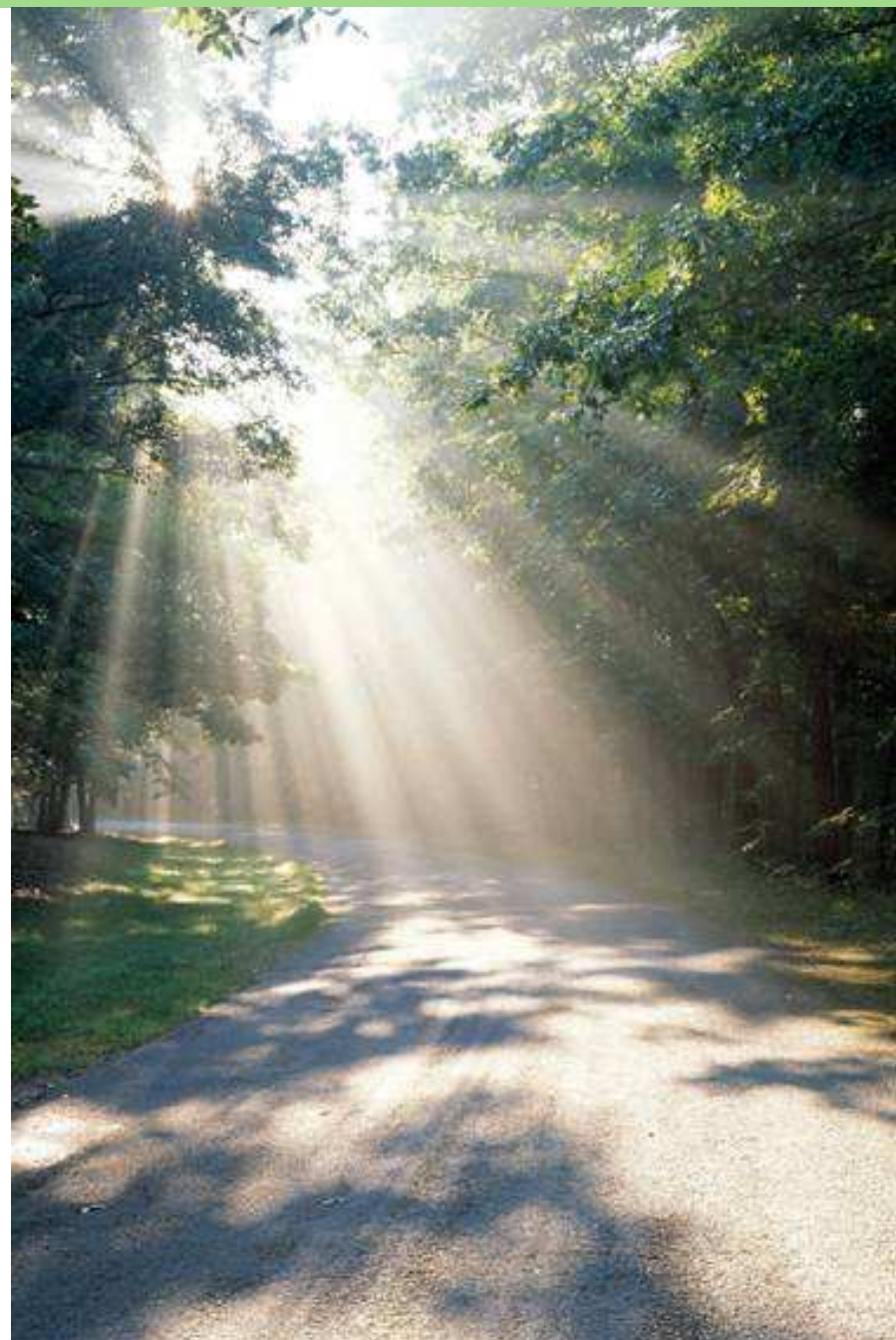
UK's centre of excellence for integrated research in terrestrial and freshwater ecosystems and their interaction with the atmosphere

400 Science Staff & 190 Students & Fellows

4 Research Centres & 300+ Active field sites

800 Peer-reviewed papers per annum

*Ag/food; Human Health; Water; Energy*



# NERC Strategic Research Programmes (RP)

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**Some examples.....**

**EXISTING: Services for Poverty Alleviation (ESPA)**

- Includes regional focus on Amazonia and Andes

**NEW: Biodiversity and Ecosystem Services in Human-Modified Tropical Forests**

**-Exploring opportunities for partnership with FAPESP**

**PROPOSED: Global air pollution, impacts of tropical megacities, mitigation strategies.**

<http://www.nerc.ac.uk/research/programmes/>

# Biodiversity and ecosystem processes in human modified tropical forests

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Tropical forests are hot spots of biodiversity and provide crucial ecosystem services including large scale climate and air quality regulation

High priority for UK policy under UN Convention on Biological Diversity

Biodiversity and biogeochemical cycling are typically studied in isolation. This action adopts an integrated approach.

- Intensive field study. SAFE site (Malaysia)
- Interaction of biodiversity with biogeochem cycles. Upscaling/modelling
- Impact of potential forest management options
- New technology for long term observations
- Application to other tropical forest regions
- Committed use of FAAM146 aircraft



# Biodiversity and ecosystem processes in human modified tropical forests

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- £8 M + aircraft commitment to programme, majority to Sabah experiment in 2014/15.
- £1.5 M approx. for complementary work, e.g Amazonian forests
- Ideally find unique UK contributions to existing international or Brazilian activities which add value and support overarching programme aims.
- Specifically application of new technology for long-term observations in Amazon.
- THIS MEETING to identify practical opportunities for collaboration, available facilities and help for UK researchers preparing funding bids in 2012, for science 2013-2017.

# International Partnerships through Grant Funding Schemes

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## All Grant Funding Schemes (Responsive and Directed Mode)

- Welcome overseas project partners
- Fund overseas researchers (through UK PI) where in-country funding sources are not available

## NERC International Opportunities Fund

2010 and 2011 – run in partnership with FAPESP and funded 3 joint awards

To add value to NERC and overseas capability through international partnership:

- international programmes and networks
- collaborative secondments and exchanges between centres of excellence
- major international workshops, conferences and syntheses

# BELMONT

F O R U M

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- Established 2009 – Founding Co-Chairs US NSF and NERC
- **FAPESP is valued Brazilian partner**
- High level, action-oriented group of the world's major and emerging funders of global environmental change research and international science councils
- To accelerate delivery of knowledge needed for action to avoid and adapt to detrimental environmental change, including extreme hazardous events
- Chinese Partner - National Natural Science Foundation of China (NFSC)
- *2011 - Belmont Challenge White Paper*
- 2012 – will launch two international actions at 'Planet Under Pressure' and 'Rio +20'
  - Coastal Vulnerability action
  - Freshwater Security action

[www.belmontforum.org](http://www.belmontforum.org)





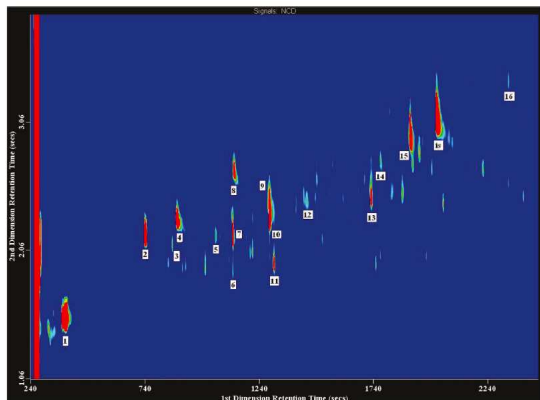
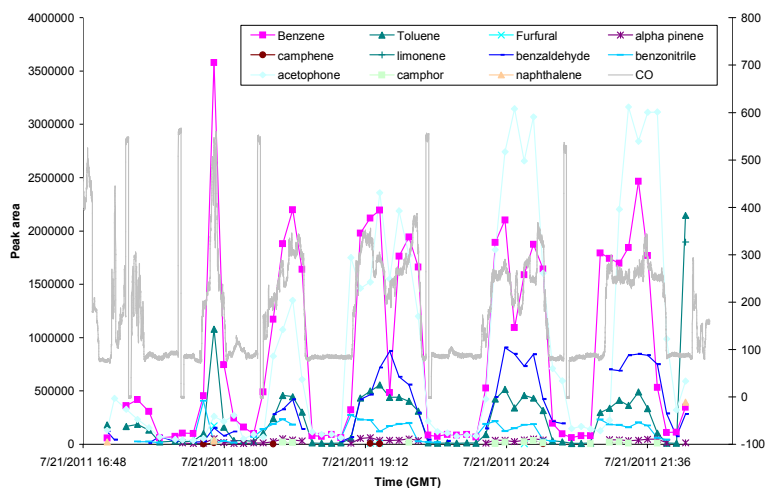
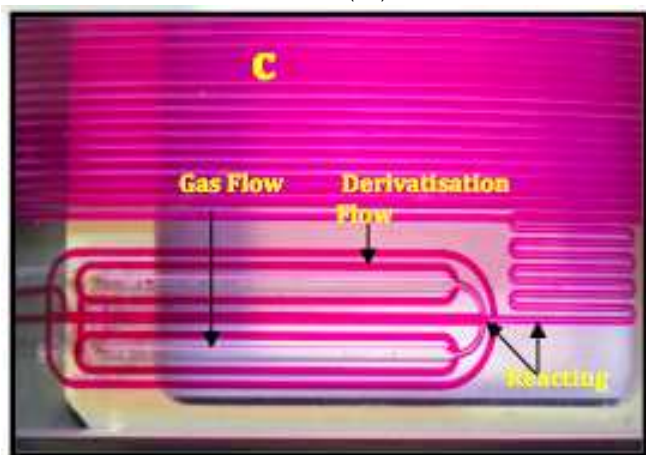


Figure 2. GCxGC-NCD of volatile components from an urban aerosol sample (March 19, 2008) using the new sample preparation technique (1: pyrrole, 2: unknown, 3: nitrobenzene, 4: N-nitrosopiperidine, 5: 1-nitrononane, 6: N-nitrosodibutylamine, 7: 4-methyl-2-nitrophenol, 8: caprolactam, 9: benzamide, 10: undecanenitrile, 11: aminomethanesulfonic acid, 12: 1-nitrododecane, 13: 2,6-dimethyl-4-nitrophenol, 14: tridecanenitrile, 15: N-butyl-benzenesulfonamide, is: internal standard (propanil), 16: 9-nitroanthracene).



Fast response aircraft measurement of monoterpenes and biomass burning emissions – semivolatile and polar compounds by GC-MS  
Partners in SAMBBA.



Low energy long-term monitoring of trace gases, microfabricated and nanoscale devices. Solar powered instruments for VOCs, low consumable autonomous derivitisation methods.