

UK-IPY: UK NATIONAL COMMITTEE FOR IPY 2007-2008

Report to the HAIS Meeting, National Academies of Science, Washington
October 5-6, 2006

UK National Committee

The Committee was formed in 2003 at the request of The Royal Society and its meetings are sponsored by the Society. The Committee currently comprises:

Member

Sir John Houghton (John Ray Initiative, **Chair**)
Prof. Chris Rapley (British Antarctic Survey, **Deputy Chair**)
Prof. Steve Albon (Macauley Institute)
Prof. Jeff Bale (University of Birmingham)
Dr. Michael Bravo (SPRI, University of Cambridge)
Dr. Bob Dickson (CEFAS)
Prof. Julian Dowdeswell (SPRI, University of Cambridge)
Dr. Cynan Ellis-Evans (British Antarctic Survey, **Secretary**)
Prof. Jane Francis (University of Leeds)
Dr Tracey Henshaw (Natural Environment Research Council)
Dr Sue Horne (Particle Physics and Atmosphere Research Council)
Prof. Brian Hoskins (University of Reading)
Prof. Peter Liss (University of East Anglia)
Prof Graham Shimmield (Scottish Association for Marine Science)
Dr Ric Williams (University of Liverpool)
Prof. Duncan Wingham (CPOM, University College London)
Dr. Peili Wu (UK Meteorological Office)
Dr Tim Yeoman (University of Leicester)
Dr Ruth Cooper (Royal Society, Liaison)
Mrs Linda Capper (British Antarctic Survey)

Expertise

Meteorology
Remote Sensing
Arctic Mammals
Terrestrial Ecology
Polar Humanities
Arctic Oceanographer
Glacial Geologist
Polar Limnologist
Palaeobotanist
Microbiologist
Physicist
Meteorologist
Environmental Chemist
Biogeochemist
Physical Oceanographer
Glaciologist
Atmospheric Modelling
Atmospheric Physicist

Outreach, Communication

IPY-UK Contact Details

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Committee Meetings and Early Activities

The Committee first met in December 2003 and most recently in September 2006. From the outset it has supported a bottom-up approach from the UK research community to develop proposals for IPY. It has however provided guidance as to what it regards as high priority areas for IPY research and these are:

- A Generic Observation Theme for IPY, including study of the Global Water Cycle
- West Antarctic Ice Sheet (WAIS) Instability
- Biogeochemistry of the Southern Oceans
- Effects of climate change and anthropogenic perturbation in polar regions on ecosystem processes and risks from invasive species

- Indigenous Social Science Themes:
 - Human Dimension of Climate Impact
 - Viability and Forms of Human Settlement
 - Citizenship, State-Building, and Security
- The Legacy of the Sciences: Humanistic Themes for IPY
 - Science and Governance
 - The History and Philosophy of the (Polar/Field) Sciences
 - The Fine Arts and the Sciences

The Committee has also encouraged the UK science community to become involved in IPY by hosting a Town Meeting at The Royal Society for around 130 leading researchers in October 2004. This outlined the range of science envisaged in the IPY Framework document (published by ICSU, November 2004), the potential for UK research involvement and the polar logistics available. The response to this meeting was reflected in the high numbers of proposals involving UK scientists seen in the first Call for IPY Expressions of Intent (January 2005).

As of September 2006, UK scientists are involved in around half of the 220+ endorsed projects and are nominally fronting 6 science and two outreach projects. In the Antarctic, 28 projects involve UK researchers (mostly BAS personnel), whilst in the Arctic 32 proposals have UK contributions and further 35 bipolar projects involve UK researchers. See attached honeycomb diagram and spreadsheet.

Funding of UK involvement in IPY science – current status

The Natural Environment Research Council (NERC) took an early interest in IPY 2007-2008 and was persuaded to contribute funding for a core of three full-time posts to establish an International Programme Office at British Antarctic Survey from 2004 to 2010. In practice this funding became available in early 2005. The British Antarctic Survey has also donated a half post to allow Dr Ellis-Evans to be a Senior Advisor to the IPO.

ARCTIC RESEARCH - NERC also found £5m (~\$10m) of new science funding to support an Arctic-IPY initiative. Requirements for obtaining this funding was that the scale of project be large (what UK Research Councils term a “consortium bid”) and demonstrably have international collaborations. Around 40 proposals were received and from these three projects have been approved for full funding whilst a fourth will probably get 50% funding and will restructure to fit this funding envelope. One of the projects (ASBO) is entirely dependent on getting access to the capabilities of the largest Canadian icebreaker, Louis St. Laurent, and currently awaiting the outcome of a partner Canadian proposal. If this proposal falls and the icebreaker therefore not available, it has been agreed that ASBO will be dropped and two smaller reserve projects will replace it. The four lead projects for the ARCTIC-IPY Initiative at this time are:

Project Title: Arctic Biosphere-Atmosphere Coupling across Multiple Scales (ABACUS).

Requested Funds: £1.7 million **AWARDED**

Principal Investigator: Dr Mathew Williams (University of Edinburgh)

Research Objectives:

Our objective is to improve understanding of the controls on carbon (C), water and energy exchange between arctic terrestrial ecosystems and the atmosphere. Our proposed research

will resolve critical unknowns related to potential feedbacks between global change and arctic C, energy and water cycles.

Project Title: Dynamics of gas hydrates in polar marine environments

Requested Funds: £600k **AWARDED**

Principal Investigator: Dr Christian Berndt (National Oceanography Centre, Southampton)

Research Objectives:

- 1) Quantification of the present amount and distribution of gas hydrates in the Arctic.
- 2) Quantification of how much methane can be expected to reach the atmosphere if warming of Arctic water at intermediate and shallow depths continues, and to understand if this will accelerate Arctic warming.
- 3) Examination of the geological record for the effect of post-glacial warming on the gas hydrate system off Svalbard to understand whether past climate change has triggered significant gas hydrate dissociation events.

Project Title: Arctic Synoptic Basin-wide Oceanography (ASBO)

Requested Funds: £1.8 million **AWARDED** pending Canadian Funding decision (due Dec 06)

Principal Investigator: Dr Seymour Laxon (University College London)

Research Objectives:

This proposal forms the UK contribution to efforts during the International Polar Year to obtain a synoptic view of the Arctic Ocean freshwater budget in partnership with the Canadian Arctic Margin Experiment (CAME) and the wider international IPY community, notably iAOOS. The specific objectives of our programme are to:

1. Quantify the current fresh water (both solid and liquid) and salt content of the Arctic Ocean.
2. Quantify the heat and freshwater exchanges between the Arctic shelves and deep basins.
3. Quantify freshwater exchange between Arctic sea ice and the surface and halocline layers.
4. Determine the origin of changes in Arctic Ocean and North Atlantic salinity structure.
5. Determine the extent to which the thermohaline structure of the Arctic Ocean and its evolution is properly represented in Global Climate Models.

Project Title: Impact of combined iodine and bromine release on the Arctic atmosphere (COBRA)

Requested Funds: £1.2 million **FIRST RESERVE** - if ASBO falls then this would be fully funded, If ASBO is successful, approximately £510,000 will be available for a reduced scope project

Principal Investigator: Dr Lucy Carpenter (University of York)

Research Objectives:

1. To produce a large high quality data set on the composition, properties and fluxes of gases and aerosols within a "bromine hot spot" of the Arctic boundary layer.
2. To characterise the physical and chemical nature of sea-ice/snowpack surfaces and frost-flowers, and the biological nature of any under-ice diatoms.
3. To determine the relative and/or combined roles of sea-ice, frost flowers, sea-salt enriched snow pack and biological sources in the exchange of halogens, ozone and particles in the field.
4. To conduct laboratory studies with frost flower surrogates and to examine the effect of temperature, pH, and other surface constituents on the exchange of trace gases.
5. To investigate the impact of iodine chemistry and sea-ice/snowpack/atmosphere exchange on ozone and mercury depletion.
6. To quantify the role (if any) of iodine emissions on new particle formation in the Arctic.
7. To determine the extent of halogen activation in autumn, throughout Hudson Bay.
8. To test in detail current parameterisations of bromine emissions from frost flowers within the global 3D model p-TOMCAT against a range of measurements and to examine the combined effects of bromine and iodine on tropospheric ozone on both global and regional scales.

ANTARCTIC RESEARCH - In the Southern Hemisphere, UK has an internationally regarded polar presence through the British Antarctic Survey. Conveniently, the IPY 2007-2008 programme began to develop at around the same time in 2003 that British Antarctic Survey was developing its new five year research strategy (2005-2010) "Global Science in an Antarctic Context". This has resulted in much of the IPY themes and science areas being reflected in the new GSAC programme and many of the IPY Coordinated Projects for the Antarctic include contributions from GSAC. The entire BAS science programme constitutes around 22% of the annual institute budget, excluding logistic support. We estimate that at least half the BAS science programme will be contributing to IPY and with attendant logistic infrastructure this will represent around £10-15M contribution to IPY Antarctic research in each year.

A number of further contributions to IPY will arise from Research Council grants recently awarded or to be announced in the near future. The most recent has been a major consortium bid to study deep ocean chemosynthetic environments in the Southern Ocean during 2008 and 2009 which has been awarded £2M and will contribute to the major IPY projects CAML and ANDEEP-SYSTEKO.

NERC has announced a Call for projects to utilise the NERC research aircraft for IPY related studies on Iceland and Greenland during Summer 2007.

Other Contributions to UK IPY Research Activities

Whilst NERC are the major player in UK Research contributions to the IPY, other Research Councils are also making inputs. The Particle Physics and Atmospheric Research Council (PPARC) oversees instrumentation platforms based in the polar regions that support a number of upper atmosphere experiments, including SUPERDARN. These facilities will have enhanced roles during the IPY in supporting an enhanced observational programme (though regrettably the BAS SUPERDARN at Halley Station, Antarctica will be unavailable due to a revised rebuild schedule for the station).

The Central Laboratory for the Research Councils (CCLRC) oversees the Rutherford-Appleton Laboratory where staff will be contributing to a number of upper atmosphere projects and to the International Heliophysical Year. The Arts and Humanities Research Council is considering support for a number of IPY Humanities projects in the Arctic.

UK IPY Outreach Activities

The development of IPY Outreach projects in UK has been slow but we are involved in 11 endorsed EOC projects and leading two Exhibition projects, namely The IPY History Exhibitions (ID 296) and the Antarctic Touring Exhibition (ID 451).

At our November 2005 meeting we appointed Mrs Linda Capper (head of Media Relations at British Antarctic Survey) as the EOC Coordinator for IPY-UK. She has subsequently formed a committee largely drawn from professional media officers and is holding an IPY-UK Education, Public Engagement and Communications Workshop at the Royal Society on October 25th. From this we expect to develop a draft Communication Strategy for the National Committee to consider in November. This Strategy will provide the framework for the UK EOC contribution to IPY.

A priority for IPY-UK was the development of a new website to emphasise outreach opportunities and we are hopeful that this will be funded in November 2006. The existing website has suffered from poor support and so is outdated in terms of content.

At the most recent IPY-UK Committee meeting a number of ideas for IPY events were considered. These include:

1. March 2007 - a launch event to be held at the Royal Society as a hub event. PI's from UK projects should present projects so there is more content rather than simply re-describing IPY for the media. Opened by the Government Chief Scientist, Sir David King.
2. March 2007 - a simultaneous launch in Edinburgh (using the "Dynamic Earth" exhibition) as a spoke event? Video links.
3. April 2007 - POST (Parliamentary Office of Science and Technology) event at Westminster to get the IPY message across to politicians, following the IPCC report publications
4. May 2007 - Launch of the NHM/BAS "Antarctica" Travelling Exhibition
5. July 2007 - Royal Society Summer Science Exhibition. Significant polar theme
6. September 2007 - British Association Festival of Science – York
7. September 2008 - British Association Festival of Science/ Mersey River Festival, Liverpool
8. 2008 - A Royal Society Discussion Meeting (collaboration with IPF-UK?) on the Polar Regions – internationally regarded meeting series resulting in a book.

Can also contribute to the Frontiers of Science workshop series, which involves a bilateral agreement with another country and around 70 young scientists. It is suggested that this time the bilateral might be with Scandinavia as a whole. The British Council also have a Network of Science series for young scientists that could also be used within IPY.

Other IPY Outreach events will hopefully emerge from the Workshop on October 25.

JCEE
October 2006