



## EXPRESSION OF INTENT FOR ACTIVITIES IN IPY 2007-2008.

**Deadline for Submission - January 14, 2005**

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### 1.0 PROPOSAL INFORMATION

#### 1.1 Title of proposed activity

Air-Ice Chemical Interactions – IPY coordinated studies

#### 1.2 Acronym or short form title of proposed activity

AICI-IPY

#### 1.3 Concise outline of proposed activity

The polar atmosphere is often considered both pristine and simple. However, there is a strong dynamic between the lower atmosphere and ice surfaces. Over the polar plateau, production in the snowpack controls the chemistry of the lower atmosphere. Halogen chemistry over the sea ice zone depletes boundary layer ozone, and causes mercury deposition. Persistent organic compounds undergo a distillation which leads to their deposition in polar regions.

The IGBP projects, IGAC and SOLAS, have jointly endorsed a task, “Air-Ice Chemical Interactions”, to determine the importance of these processes, and assess how they would alter with a warming climate and shrinking cryosphere.

IPY offers a unique opportunity to determine the spatio-temporal pattern of boundary layer chemistry and processes, by linking various field activities carried out in the same year. AICI-IPY will provide an overall framework, arrange supporting laboratory and modelling studies and integration of remote sensing data, and organise synthesis meetings. This work will support and link these more focussed field activities:

Polar plateau intensives: studying the influence of the snowpack, and boundary layer structure, by measuring concentrations, fluxes and processes at sites with different characteristics. Summit, Greenland has a long pedigree in air-snow studies, and this will be extended under AICI-IPY; a separate, related, IPY plan for enhancing the Summit infrastructure is being submitted (lead contact Roger Bales). The ANTCI group at South Pole expect to carry out further campaigns in IPY. AICI-IPY scientists will aim to add activities at Concordia (Antarctica).

OASIS (Ocean-Air-Sea Ice-Snow Interactions) will study processes in the sea ice and coastal zone. OASIS contains ambitions both wider (biogeochemistry) and narrower (Arctic ocean/coast) than AICI, and will submit a separate detailed plan to IPY. OASIS has scheduled an international planning meeting for January. It is likely to consist of studies at coastal stations and an ice station. Counterpart Antarctic coastal studies are already planned.

ITCT-Arctic will fly two multi-aircraft campaigns (winter/spring and summer) to investigate transport in and out of the Arctic. The campaigns will be closely linked with the ground-based studies described above. A separate IPY proposal will give more details (lead contact Andreas Stohl)

To provide an overall context for the intensive campaigns, AICI-IPY will determine the year-round spatial distribution of at least that most important molecule, ozone, in the boundary layer. No picture exists of the scale of ozone production and depletion, and its concentration in the boundary layer is not amenable to satellite observations. This work will link other AICI studies, using sensors deployed on autonomous platforms and buoys. OASIS will organise this action for the Arctic sea ice zone, while AICI will coordinate individual polar operators to fill gaps on the map in the Antarctic and over Arctic land.

1.4 Which IPY 2007-2008 theme(s) will be addressed by the project (see Note 1)

<b>Theme 1 – The current state of the polar environment</b>	Y
<b>Theme 2 - Change in the polar regions</b>	Y
<b>Theme 3 - Polar-global linkages and interaction</b>	Y
<b>Theme 4 - Investigating new frontiers</b>	N
<b>Theme 5 -The polar regions as vantage points</b>	N
<b>Theme 6 - Human societies in polar regions</b>	Y

1.5 What is the major target of the proposed activity (specify one – see Note 1)

<b>Natural or social science research</b>	Y
<b>Education/Outreach and Communication</b>	N
<b>Data Management</b>	N
<b>Legacy</b>	N
<b>Other Targets</b>	N

1.6 What significant advance(s) in relation to the IPY themes and targets can be anticipated from this project?

AICI-IPY will provide a first year-round spatial pattern of chemistry (especially ozone) in the polar regions (theme 1). Through the linked process study intensives, this will lead to an understanding of the extent of processes determining boundary layer chemistry, and to models to determine how that chemistry will change (theme 2). These processes probably spill out of the polar regions, and certainly affect air and water quality, so this work will also contribute to themes 3 and 6. The increased activity in atmospheric chemistry will lead to an improved infrastructure, with chemistry studies carried out routinely at more stations (legacy).

1.7 What international collaboration is involved in this project? (see Note 2)

AICI is endorsed by IGAC, and has a Steering Committee from 8 nations. Of the component parts, Summit activities have traditionally been US-led but with European involvement; the OASIS executive committee contains 6 nationalities; ITCT-Arctic builds on previous multinational initiatives (e.g. ITCT-2K4); the ozone network will seek participation from every Antarctic operator and Arctic nation.

## **2.0 FIELD ACTIVITY DETAILS**

2.1 Outline the geographical location(s) for the proposed field work (see Note 3)

Plateau studies: Summit, South Pole, Concordia  
 OASIS: Probably Alert, Barrow, Ny Alesund and Arctic Ocean. Counterparts at Halley and probably other coastal Antarctic stations.  
 ITCT-Arctic: Arctic transects  
 Ozone network: all manned stations, unmanned platforms and buoys throughout the

polar regions, land and sea.

2.2 Define the approximate timeframe(s) for proposed field activities?

Arctic Fieldwork time frame(s)	Antarctic Fieldwork time frame(s)
04/07-08/08	10/07 – 02/09
mm/yy – mm/yy	mm/yy – mm/yy
mm/yy – mm/yy	mm/yy – mm/yy

2.3 What significant logistic support/facilities will be required for this project?  
Can these resources be usefully shared with other projects? (see Note 4)

<p>Access to plateau stations (Summit, S. Pole, Concordia);          Access to coastal sites (Arctic and Antarctic);          Ship for access to Arctic sea ice in springtime (sharable)          Airborne platforms over sea ice (blimps essential, aircraft desirable)          Aircraft for ITCT-Arctic          Autonomous powered platforms on land and on buoys (sharable with other projects e.g. meteorology, geophysics, oceanography).</p>
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2.4 Will the project leave a legacy of infrastructure? (see Note 1)

<p>Parts of the project will involve nations and sites not previously active in tropospheric chemistry; it is anticipated that this will lead to a legacy of increased research, monitoring capacity, and infrastructure in both polar regions. The data collected will act as a baseline against which future change can be assessed.</p>
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2.5 How is it envisaged that the required logistics will be secured? (one or more options can be identified)

Consortium of national polar operators	Y
Own national polar operator	Y
Another national polar operator	N
National agency	Y
Military support	Y
Commercial operator	Y
Own support	N
Other sources of support	N
<p>Several aspects of the work (for example, individual ozone sensor sites) can be carried out as individual components hosted by single national operators. However, it is anticipated that OASIS at least will require components supplied by different members of a consortium of operators. Operations at Summit use military and commercial support, while airborne measurements will be supported by other agencies.</p>	

2.6 Has the project been "endorsed" at national or international level (see Note 5)

Y	AICI is endorsed by IGBP-IGAC and SOLAS. IGAC specifically supports the IPY proposal presented here. Individual components have support from international groups: for example OASIS is itself an international grouping with SOLAS endorsement. Various national IPY committees have had sight, and approved of this plan and specific elements of it.
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### 3.0 PROJECT MANAGEMENT AND STRUCTURE

3.1 Is the project a component (established over the IPY 2007-2008 timeframe) of an existing plan, programme or initiative or is it a new autonomous proposal?

Component of an existing or planned activity ?
As explained above, AICI-IPY is part of AICI, which is an activity of IGAC and SOLAS. The need for an integrated one-year intensive phase was recognised at the start. Several specific elements are entirely new.

3.2 How will the project be organised and managed? (see Note 6)

AICI-IPY will be managed and coordinated by the AICI SSC, which exists, has been approved by IGAC, and which has support from the IGAC offices. The AICI SSC will delegate responsibility for individual components such as OASIS and Summit activities to the executive groups already existing or planned for those components. The AICI SC will form a small task group to promote and coordinate the ozone network.
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3.3 What are the initial plans of the project for addressing the education, outreach and communication issues outlined in the Framework document? (see Note 7)

Scientists involved in existing related activities such as Summit, ANTCI (South Pole) and Alert2000 have a strong record of outreach activities including educational web sites, web chat Q and A sessions with schools, and teachers joining field parties. We anticipate making a strong plan to continue such activities.
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3.4 What are the initial plans of the project to address data management issues (as outlined in the Framework document)? (see Note 8)

Most data will be submitted to national data centres. AICI plans to use its emerging web site as a central metadata point for all AICI datasets, linking to the individual data.
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3.5 How is it proposed to fund the project? (see Note 9)

Parts of the project already have funding in national plans, while some parts (such as ozone sensor deployments) will mainly be subsumed in existing logistic activities. For OASIS, plateau studies, and ITCT activities, individual national funds will be sought based on international science plans.

3.6 Is there additional information you wish to provide?

#### 4.0 PROPOSER DETAILS

4.1 Lead Contact for the Expression of Intent

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 Surname Wolff  
 Organisation British Antarctic Survey  
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4.2 List up to six other project members and their affiliation.

Name 1 Paul Shepson  
 Organisation Purdue University, USA  
 Name 2 Jack Dibb  
 Organisation University of New Hampshire  
 Name 3 Stephen Wood  
 Organisation National Institute of Water and Atmospheric Research Ltd, Lauder,  
 New Zealand  
 Name 4 Kathy Law  
 Organisation Service d'Aeronomie/IPSL, Paris, France  
 Name 5 Gabriele Capodaglio  
 Organisation University of Venice, Italy  
 Name 6 Jack McConnell  
 Organisation York University, Toronto, Canada

## Accompanying Notes for submission of IPY 2007-2008 Expressions of Intent

**Note 1** – IPY projects can take a number of forms.

a) 1.4 - They may address one or more of the IPY 2007-2008 themes and if so will be expected to have component activities addressing education, outreach, data management and possibly legacy.

b) 1.5 - The main focus can be on science or on one or more aspects of education, outreach and communicating the Polar Year, an activity that addresses data management or that explicitly leaves a legacy (such as building a new polar facility or establishing new systems).

**Note 2** - An important characteristic of IPY 2007-2008 projects will be their international structure in order to facilitate research impractical for a single nation to undertake. Whilst project components are likely to be primarily funded at a national level, the projects are expected to be established and coordinated internationally. The Joint Committee will be looking for evidence of international collaborations developing in the Expressions of Intent and established by the June 2005 full proposal deadline.

**Note 3** – The geographic locations need not be precise but logistic operators will want to broadly know where activities will occur, e.g. West Antarctic Ice Sheet, Weddell Sea, Svalbard, Greenland, etc. If you have more detail please supply. An IPY project can also be one that involves no field activities.

**Note 4** - This refers to major facilities and infrastructure and some examples (not comprehensive) are given below.

Ice-breaker	Multi-instrumented platforms	Snow terrain vehicles
Ice strengthened research ship	Helicopters	Existing field stations
Ship-based drilling capability	Fixed wing geophysical aircraft	New field station
Ship recovery of buoys etc	Fixed wing transport aircraft	Observatories
Submarines	Rockets	Fuel depots
Autonomous Underwater Vehicle	Satellites	Ice drilling capability
Remotely Operated Vehicle	Radars	Rock-drilling capability

Please note if your project will share facilities with other IPY activities, or if there is capacity to support other projects as part of your activity (e.g. a marine biodiversity cruise could feasibly offer to deploy or recover buoys, moorings, etc., for an ocean/climate project)

**Note 5** - All IPY projects will ultimately be subject to assessment by National (and/or International) funding agencies. However it will be important to establish coordination of IPY 2007-2008 at the national and international level. Both National IPY Committees and International bodies supporting IPY 2007-2008 will have an important role in this. Contact with these bodies may occur before January 14 2005 but should certainly take place before the June 2005 deadline for full proposals.

**Note 6** – The Joint Committee for IPY 2007-2008 will be overseeing Polar Year activities but will not be managing the individual projects. It is anticipated that IPY projects will be self-managed, free-standing activities or be part of a planned or existing programme that has an established management structure. The JC will need to be satisfied that all proposals have realistic plans for structuring and managing activities. For the larger proposals the JC anticipates that a Project Steering Committee will be established.

**Note 7** – It will be a requirement of IPY proposals that there is a clear plan for Education, Outreach and Communication (EOC) activities in the full proposal for the June 2005 deadline. If initial ideas for EOC have been established these can be outlined in the Expression of Intent.

**Note 8** – It will be a requirement of IPY proposals that there is a clear plan for the management of project data, including its early availability to the community, presented in the full proposal for the June 2005 deadline. Initial ideas for data management should be outlined in the Expression of Intent, including which data organisations are likely to be involved, e.g. ICSU World Data Centres, Joint Committee for Antarctic Data Management, WCRP, etc.

**Note 9** – It is anticipated that funding for IPY 2007-2008 will be primarily obtained through national funding agencies but in some cases will involve international funding agencies (e.g. European Union) and in some cases will come from private sources. Certain projects will be part of programmes already funded and if so these can be identified here.