



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

Deadline for Submission - January 14, 2005  
Email to [jcel@bas.ac.uk](mailto:jcel@bas.ac.uk) or Fax to +44-1223-221270

## 1.0 PROPOSAL INFORMATION

### 1.1 Title of proposed activity

**Present day processes, past changes and spatiotemporal variability of tree distribution at the ARCTIC BORDER: implications and feedbacks to the arctic and global environment**

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

**ARCTIC BORDER**

### 1.3 Concise outline of proposed activity

#### **Background**

The position and dynamics of the forest-tundra boundary delimiting the Arctic are major determinants for land atmosphere interactions at the circumpolar scale and for ecological and socioeconomic functions at the local to regional scale. Considering that terrestrial areas, including this boundary, are covering vast parts of the circumpolar north any change of position or structure will cause massive changes of the feedback system between the abiotic and biotic environments. High latitude forests and tundra areas provide essential feedbacks to the arctic and global climate through for example their capacity to store large amount of carbon and their ability to transform solar radiation to sensible heat. A change in growth rate and area covered by trees would change the CO<sub>2</sub> uptake capacity of the regions, and replacement of tundra by forest (in particular evergreen) would decrease regional albedo and thus enhance warming. Further, changes in tree cover interact with the occurrence and distribution of continuous and discontinuous permafrost. Consequently, a change in range position would involve series of large ecosystem consequences with repercussion on occurrence and vitality of forests and trees in the transition zone towards the Arctic and thus further affecting the arctic environment. However, our understanding of the location, dynamics and environmental drivers (natural and human factors) at regional and circumpolar level is poor, and more knowledge about these processes is therefore needed.

**Rationale**

The recently published Arctic Climate Impact Assessment (ACIA) presents detailed information of the global change responses, interactions and feedback mechanisms. ARCTIC BORDER is a related multidisciplinary research project, planned as an IASC initiative, seeking to explore changes in the circumpolar tundra-taiga boundary under the umbrella of the International Polar Year (IPY 2007-2008), by coordinating existing and new physical and biological measurements of key variables and processes at multiple observational sites around the Arctic. The project addresses these issues to reveal present and ongoing processes; identify and quantify past changes; and to improve the ability to predict future changes in response to environmental changes. Geographical regions and topics in focus will be the furthest pole ward positions of the tundra-taiga interface in a set of locations with contrasting climate pattern (continental vs. oceanic) around the circumpolar Arctic (see 2.1 below). At each selected location the primary focus are on regeneration pattern, history (abiotic and biotic disturbance, land use) and recent changes. These topics are addressed by the use of dendroecological, remote sensing, and socioecological techniques.

## 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>	Yes
<b>Theme 2 – Change in the polar regions</b>	Yes
<b>Theme 3 - Polar-global linkages and interaction</b>	Yes
<b>Theme 4 – Investigating new frontiers</b>	No
<b>Theme 5 -The polar regions as vantage points</b>	No
<b>Theme 6 - Human societies in polar regions</b>	Yes

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

<b>Natural or social science research</b>	Yes
<b>Education/Outreach and Communication</b>	No
<b>Data Management</b>	No
<b>Legacy</b>	No
<b>Other Targets</b>	No

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

Main advances will be enhanced insight into present environmental status and change of the sensitive and environmentally highly significant Arctic border, and its role (feedbacks) in Arctic and global climate systems. Models predict that up to 35% of the present Eurasian tundra could be displaced by advancing boreal forest, with drastic consequences for the Arctic tundra biota, and for human societies depending on the sustained use of Arctic ecosystems. However, the models need to be elaborated with spatially and climatically diverse data reflecting the circumpolar diversity. The project will be a significant contributor in this respect which meets the requests by indicated IPY themes.

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

Partners from all countries in the circumpolar north where polar treelines are an important local or regional environmental factor or a topic of strong scientific and environmental interest. In addition the intention is to include partners from the southern Hemisphere. The project is already including the following partners (see 4.0 below):

Norwegian Institute of Nature Research (NINA), Norway  
University of Oulu, Finland  
University of Helsinki, Finland  
Abisko Research Station, Sweden  
Russian Academy of Sciences, Russia  
University of Laval, Quebec, Canada  
University of Alaska, US  
Scott Polar Research Institute, UK  
University of St. Andrews, UK

## 2.0 FIELD ACTIVITY DETAILS

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

Primary locations: Alaska, North-western Canada, Quebec, Scandinavia, North-western and North-eastern Russia

Additional locations: Chile/Argentina, Southern New Zealand

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

<b>Arctic Fieldwork time frame(s)</b>	<b>Antarctic Fieldwork time frame(s)</b>
09/06 – 03/07 preparation	09/06 – 03/07 preparation
03/07 – 09/08 collection of data	03/07 – 09/08 collection of data
09/08 – 03/09 data processing	09/08 – 03/09 data processing

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)

The project will use existing field stations and local transportation

2.4 Will the project leave a legacy of infrastructure? (see Note 1)

No, the project will build on already existing research infrastructure. Observations and field experiments will conform to the IPY data and documentation policies.

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	No
Own national polar operator	No
Another national polar operator	No
National agency	Yes
Military support	No
Commercial operator	No
Own support	No
Other sources of support	Yes
Further details	
The TTI group will use existing networks at national and international levels, as well as local knowledge to secure the required logistics.	

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

Y or N?	Yes, ARCTIC BORDER has been endorsed by the Finnish IPY committee, and we also expect endorsement from other national IPY committees in countries represented by the project consortium. The closely linked FATALITY project will be endorsed by the Canadian IPY committee.
---------	--

### **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?

New Project Yes	Component of an existing or planned activity Yes
The activity is a new project within the frames of the IASC project Tundra-Taiga Interface (see <a href="http://www.iasc.no">www.iasc.no</a> )	
The project will include and coordinate multidisciplinary working groups and work packages, adopting common observation protocols, but will also have the sufficient flexibility to adopt to the funding structure for IPY projects.	

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

The project will be organised through the international Tundra-Taiga Interface group and coordinated by B. Sveinbjørnsson and A. Hofgaard (see details below)

The ARCTIC BORDER proposed time plan for project/proposal implementation will, apart from the campaign periods (2007-08) given under point 2.2, include

- Science plan to be presented for the IASC executive committee, and to the ICARP II meeting in Copenhagen Nov 2005.
- 2005/06: Full proposal submission to ICSU/WMO.
- 2006: Individual and joint funding proposals
- 2009-2010: Publication and dissemination of results

The management of ARCTIC BORDER will involve the following elements:

- The already established TTI group will function as a Project Steering Committee (PSC), taking into account the recommendations given by the EoI-reviews from ICSU/WMO-JC. It will be responsible for working out the final proposal and for the management of the IPY-project, meeting regularly with the project coordinator.
- The Program Coordinator/Secretariat will be responsible for coordination, data and information exchange, website, workshop organisation and the reporting process.

- 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)

The project will include

- PhD-student programs crosscutting the addressed IPY themes 1-3, and 6.
- Association and joint workshops with local/regional stakeholders
- Result presentations designed both for topic specific and integrated publications
- Presentation schedules designed for political and public interest groups
- A central website for public information and dissemination of scientific results will be established.

- 3.4 What are the initial plans of the project to address data management issues (as outlined in the Framework document)? (see Note 8)

ICSU World Data Centre will be provided with meta data information as soon as the project is finalised and full data information will be provided after publication of results, but at the latest three years after completion of the project.

The metadata will be documented and published on a website, and the data management procedures will conform to the ICSU/WMO-JC data policy structures.

### 3.5 How is it proposed to fund the project? (see Note 9)

Funding will be sought at many different levels, from each individual participant (home institutions), from national research councils as well as from possible international sources (e.g. EU, Nordic sources), established with the aid of the IPY and other circumpolar networks. The project management plan will incorporate flexibility with respect to the uncertain funding structure of the research activities, since all participants/groups will eventually have to seek independent funding for their work packages through national and international councils as well as from their home institutions.

### 3.6 Is there additional information you wish to provide?

The TTI group will also submit the project to Working Group 8 of the ICARP II Meeting in order to get their support.

Two other projects (EoI's) submitted to the ICSU/WMO-JC are relevant and have significant complementary value for Arctic Border, i.e.

FATALITY (Dr. Serge Payette, Universite Laval, Quebec, Canada)

ARCLIDIV (Dr. Jon Børre Ørbech, Norwegian Polar Institute, Tromsø, Norway)

The TTI group will seek close collaboration with these projects, in particular with the FATALITY project, which is coordinated with and closely linked with ARCTIC BORDER.

## **4.0 PROPOSER DETAILS**

### **4.1 Lead Contact for the Expression of Intent**

Title Senior Research Ecologist  
First Name Annika  
Surname Hofgaard  
Organisation Norwegian Institute for Nature Research  
Address 1 Polar environmental Centre  
Postcode/ZIP N-9296 Tromsø  
Country Norway  
Telephone +47 7775 0413  
Mobile +47 9245 2740  
Fax +47 7775 0401  
Email annika.hofgaard@nina.no

Title Professor  
First Name Bjartmar  
Surname Sveinbjörnsson  
Organisation University of Alaska  
Address 1 Dept. of Biological Sciences  
Address 2 Univ. of Alaska Anchorage  
Address 3 3211 Providence Drive  
Postcode/ZIP Alaska 99508  
Country US  
Telephone +1-907 786 1366  
Mobile  
Fax +1-907 786 4607  
Email afbs@ua.alaska.edu

### **4.2 List up to six other project members and their affiliation.**

Name 1 Serge Payette  
Organisation Univ. of Laval, Quebec, Canada  
Name 2 Gareth Rees  
Organisation Scott Polar Research Institute, UK  
Name 3 Oddvar Skre  
Organisation Skogforsk Bergen, Norway & University of Oulu, Finland  
Name 4 Tatiana Vlassova  
Organisation Russian Academy of Science, Russia  
Name 5 Robert Crawford  
Organisation Univ. of St Andrews, UK  
Name 6 Terry Callaghan  
Organisation Abisko Research Station, Sweden & University of Sheffield, UK  
Name 7 Matti Eronen  
Organisation University of Helsinki, Finland

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

**Note 1** – Expression of Intent activities can take a number of forms.

**a)** 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. If ticking one or more themes it will not therefore be necessary to tick Education, Outreach & Communication, Data Management or Legacy in Question 1.5.

**b)** Equally the focus could be on one or more aspects of education, outreach and communicating the Polar Year, propose 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** – 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.

**Note 3** - This refers to major facilities and infrastructure and some examples (not comprehensive) are given below.

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

**Note 4** - 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.

**Note 5** – 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 need to be established.

**Note 6** – 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 7** – 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 8** – 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.