**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

The State and Fate of the Polar Cryosphere

1.2 Acronym or short form title of proposed activity

CliC - State of the Cryosphere

1.3 Concise outline of proposed activity

The cryosphere is arguably the most visible feature of the Earth’s polar regions. The cryosphere – sea-, lake-, and river-ice, snow cover and solid precipitation, glaciers, icebergs, ice sheets, ice caps, and frozen ground – plays an integral role in not only the polar climate system, but also in the global climate system. It is inseparable from the polar freshwater system, both on land, ice and in the sea. Understanding the state of the cryosphere, and its associated past, present and future variability and change in time and space, is essential to understanding the polar environment in terms of its physical and biogeochemical interactions with the ocean, atmosphere and terrestrial systems, and the impacts on and interactions with social, cultural and economic systems.

This project, proposed by World Climate Research Programme (WCRP) Climate and Cryosphere (CliC) project, provides a framework for assessing the polar cryospheric system and the related physical and chemical processes, interactions and impacts within the Earth system. The IPY provides the opportunity for a coordinated circumpolar assessment of both polar regions by nations and their organisations, scientists and residents that likely would not be otherwise undertaken. Traditional knowledge will be incorporated in this assessment.

We are interested in a sustained long-term cryospheric polar observing system, which would be implemented in the future through GCOS, GOOS, GTOS, CEOS for the sake of countries and future systems like GEOSS, The observing system will include relevant research observations and should be based on innovative technology. The IPY presents an opportunity to put some components of such a system in place. CliC is capable of, and eager to, provide the framework for coordination of this cryospheric observational system.
In the process of enhancing our ability to measure and monitor the cryosphere, we propose to coordinate activities that will create a “snapshot” of the cryosphere and evaluate its current (IPY) state in the context of past states. We will

1. assess the current state of the cryospheric parameters in the polar regions,
2. formulate the observational requirements of cryospheric variables for weather and climate monitoring and prediction,
3. strengthen international cooperation in the development of cryospheric observing systems.

CliC will provide overarching coordination of smaller-scale IPY projects and national activities, both within and outside of the IPY scope (as appropriate), linking them together in a way that increases the benefit to the IPY effort. The project will not only be a key element within IPY but will also support the new Integrated Global Observing Strategy (IGOS) Cryosphere Theme, which is being developed by CliC and SCAR (Scientific Committee on Antarctic Research).

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

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

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

| Natural or social science research | Y |
| Education/Outreach and Communication | N |
| Data Management | N |
| Legacy | N |
| Other Targets | N |
1.6 What significant advance(s) in relation to the IPY themes and targets can be anticipated from this project?

This project will evaluate the current state of the polar environment (Theme 1) by coordinating the development of a synoptic set of multidisciplinary observations to establish the status of the polar environment in 2007-2008. It will address change in the polar regions (Theme 2) through the acquisition of key datasets and multidisciplinary observational networks necessary to understand factors controlling changes in the cryosphere. These datasets and observational networks will be integrated with global datasets and networks to help us understand polar-global linkages and interaction (Theme 3).

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

As part of WCRP, CliC is inherently international in structure. This project is even broader than CliC, however, and will be relevant to the same groups involved in the IGOS Cryosphere Theme development: ICSU, IOC, WMO, several space agencies, GOOS, GCOS and GTOS, IGBP, WCRP, SCAR and other appropriate organisations. Many national agencies are involved, including the Meteorological Service of Canada, ESA, the Geological Survey of Canada, the International Permafrost Association, the Finnish Institute of Marine Research, the British Antarctic Survey, the Australian Department of the Environment and Heritage, the Nansen Environmental and Remote Sensing Center of Norway, the National Meteorological Services of Norway and Denmark, the U.S. National Oceanic and Atmospheric Administration, and NASA.

2.0 FIELD ACTIVITY DETAILS

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

No fieldwork is proposed here. Instead, we will work with data collected by others, both in situ, remotely sensed, and modelled.

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

<table>
<thead>
<tr>
<th>Arctic Fieldwork time frame(s)</th>
<th>Antarctic Fieldwork time frame(s)</th>
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</thead>
<tbody>
<tr>
<td>mm/yy – mm/yy</td>
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<td>mm/yy – mm/yy</td>
<td>mm/yy – mm/yy</td>
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</tbody>
</table>
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)

No new facilities or logistic support are being proposed. The project will require data from existing and newly established IPY networks and observatories and those collected by other IPY investigators, as described above.

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

The project would leave a legacy of
• a comprehensive, international cryospheric observing system,
• established international collaboration and co-operation in polar regions research and monitoring,
• a broad-ranging set of samples, data and information regarding the state and behaviour of the polar regions to provide a reference for comparison with the future and the past, and
• observing sites, facilities and systems to support ongoing polar research and monitoring.

2.5 How is it envisaged that the required logistics will be secured? (one or more options can be identified)

<table>
<thead>
<tr>
<th>Option</th>
<th>Y/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consortium of national polar operators</td>
<td>Y</td>
</tr>
<tr>
<td>Own national polar operator</td>
<td>Y</td>
</tr>
<tr>
<td>Another national polar operator</td>
<td>Y</td>
</tr>
<tr>
<td>National agency</td>
<td>Y</td>
</tr>
<tr>
<td>Military support</td>
<td>N</td>
</tr>
<tr>
<td>Commercial operator</td>
<td>N</td>
</tr>
<tr>
<td>Own support</td>
<td>N</td>
</tr>
<tr>
<td>Other sources of support</td>
<td>N</td>
</tr>
</tbody>
</table>

An international effort such as this would most benefit from individual national contributions combined with international funding that would bring together an international team of researchers to address these issues.

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

The conceptual framework and detailed plans proposed here have been endorsed by the IGOS Partners as a new IGOS Cryosphere Theme and by WCRP/CliC.
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?

<table>
<thead>
<tr>
<th>New Project</th>
<th>Component of an existing or planned activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

This is a new proposal, but one which is intentionally aligned with the goals and objectives of the IGOS Cryosphere Theme.

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

The programme will be managed by the CliC Science Steering Group (SSG). The CliC Science and Implementation Plans provide the overall pan-polar structure.

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)

Much of the activity will take place in academic institutions and will therefore involve students at the undergraduate and graduate levels. Web-based data visualization and distribution tools will be used for disseminating results to the broad community.

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

Datasets will be managed according to the IOOS and GOOS standards for data management. They will be archived in the World Data Centers and national data centers, as appropriate. Datasets will be freely available after “privilege period” for the principal investigators (to be determined). Datasets that need to be archived include, but are not limited to:

- the WMO GTS data stream (from polar nations),
- specialized cryospheric and related data sets (e.g., NSIDC, Global Precipitation Climate Centre),
- national network data from participating polar nations (buoys, ships, regional surface arrays),
- operational satellite products, including radar, SAF data, and OSI-SAF sea ice...
products,
  o numerical weather prediction data (initialization data, reanalysis products, regional climate outputs, etc.),
  o data from research projects (SEARCH, AOSF, OASIS, RIME, SBI),
  o specialized observations of the cryosphere,
  o historical data and results.

The CliC Data Management and Information Panel will provide oversight to our data management needs.

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

It is proposed that individual national research sponsors provide funding for their participation in the programme.

3.6 Is there additional information you wish to provide?

We ask that the IPY Joint Committee acknowledge the IGOS-P Theme on Cryosphere as a useful coordinating mechanism for cryospheric observations in the future, particularly with respect to the legacy that it leaves after the IPY.
4.0 PROPOSER DETAILS

4.1 Lead Contact for the Expression of Intent

Title: Dr.
First Name: Jeffrey
Surname: Key
Organisation: U.S. National Oceanic and Atmospheric Administration (NOAA), National Environmental Satellite, Data, and Information Service (NESDIS)
Address 1: 1225 West Dayton Street
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Mobile: N/A
Fax: (608) 262-5974
Email: Jeff.Key@noaa.gov
Repeat Email: Jeff.Key@noaa.gov

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

Name 1: Dr. Barry Goodison (CliC SSG Chair)
Organisation: Meteorological Service of Canada
Name 2: Dr. Vladimir Ryabinin
Organisation: WCRP
Name 5: Dr. Mark Drinkwater
Organisation: European Space Agency
Name 4: Dr. Tatiana Khromova
Organisation: Russian Academy of Sciences
Name 5: Dr. Konrad Steffen
Organisation: University of Colorado, USA
Name 6: Ian Allison
Organisation: Australian Antarctic Division, Australia
Name 7: John Turner
Organisation: British Antarctic Survey, UK
Name 8: Dr. Cecilie Mauritzen
Organisation: Meteorological Institute, Oslo, Norway
Name 9: Dr. Bruno Rudolf (GPCC Director)
Organisation: Deutscher Wetterdienst
Name 10: Dr. Stephanie Meakin
Organisation: Inuit Circumpolar Conference
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.

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

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.