



## **IPY Legacies - Initial Ideas and Options**

### **Introduction**

This document from the IPY International Programme Office (IPO) responds to the January 2008 proposal by Norway entitled 'Maximizing the IPY Legacy'. While responding positively to the content and intent of the Norway proposal, this document expands the definitions of the IPY legacy to include a broad array of facets and issues. In view of the long list of IPY legacy aspects, a proposal such as Norway makes for a scoping study and stakeholder workshop seems necessary and timely. For each of these legacy aspects, a scoping study should assess prospects for success, potential partners, degree of Arctic Council involvement, and urgency. The IPO and obvious partners including IASC, SCAR, the University of the Arctic, and the Arctic Portal look forward to contributing to and participating in these legacy discussions.

### **The Overall IPY Legacy**

In addition to tangible and practical aspects of IPY legacy listed below, IPY has encouraged an integrating focus, a sense of urgency, and substantial cooperation. In addition to its investigations, IPY has served as the occasion and stimulus for novel ideas and fresh enthusiasm, leading to a hope and a goal that we achieve the possible and exceed the probable. With very rapid changes underway in the Arctic, one wonders whether the 25-year interval to the next IPY, as suggested by young polar researchers and others, might prove too long? The suggestion by Icelandic President Ólafur Ragnar Grímsson that the next IPY occur in 10 years represents a fresh idea from this IPY and a possible means to sustain focus, cooperation and enthusiasm.

### **IPY Legacy: Science and Science Funding**

The IPY scientific legacy, measured by quantity, will follow funding - the pulse in IPY funding will produce a pulse in polar research publications. The IPY scientific legacy measured by quality depends on the quality of the investigators involved and on the extent to which they use international collaboration to extend and enhance the quality of their research. IPY has excellent investigators engaged in international collaborations on crucial scientific issues. The need for excellent Arctic science will continue for many decades.



IPY will demonstrate the value of circum-Arctic studies and the necessity of multinational scientific cooperation. The experiences gained from the IPY Project development and funding processes may have value as examples for improved long-term research coordination and funding. New trans-national funding opportunities will arise after IPY but additional discussion and action may prove necessary to achieve durable circum-Arctic research funding cooperation.

### **IPY Legacy: Science Infrastructure**

The breadth of IPY science exceeds the breadth of existing international science organizations. This breadth represents a potential success for IPY. It portends a truly comprehensive approach to the polar regions, and perhaps sets a fine example for future international science. However, the IPY breadth exposes fissures and weaknesses in current science infrastructure. IPY participants from various disciplines have different traditions of data sharing, different funding sources and strategies, different career options, different vernaculars, even different geographic coordinate systems. No existing international organization encompasses all the geophysical, sociological and ecological sciences of IPY. The leading polar science organizations, IASC and SCAR, have shown innovation and flexibility and will play key roles as IPY plans and conducts its own conferences and in planning and implementing post-IPY research programmes.

### **IPY Legacy: Observations**

This IPY requires and implements a uniquely broad and advanced array of tools and techniques. These include airborne remote sensing systems, underwater and under-ice fixed and mobile systems, genomic and proteomic probes and assays, and a host of analytical improvements. This unprecedented array of new and expanded observational capabilities provokes two questions. Which elements of this evolving suite of existing and new observational tools represent the most effective and most efficient post-IPY Arctic observing systems? Second, how can the Arctic research community sustain the necessary observational capabilities? Substantial community efforts, organized under the label SAON (Sustained Arctic Observing Networks), begin to define the needs and explore the solutions for sustained polar observational capabilities. Other major infrastructure developments, such as for ice breakers and for polar research stations, occur independent of the SAON process.

Observational systems must evolve in order to monitor a rapidly changing Arctic system. All systems need careful evaluation from an integrated and pan-Arctic perspective. Satellite platforms and sensors that today provide essential observations have very long lead times and an uncertain future. Finally,



predictive capability for the Arctic will require enhanced interaction between observational systems and research and operational modeling communities.

### **IPY Legacy: Environmental Impact of Polar Research**

A rigorous and encompassing environmental impact assessment of the ensemble of IPY Arctic activities would document the activities of all funded IPY projects 'as delivered', the equipment used, the duration and location of all deployments and operations, the transport (in and out) of people, equipment and supplies, and so on, to quantify the physical infrastructure (buildings, runways), emissions and disposals into air and water, and the energy expenditures that contribute to the cumulative environmental footprint of Arctic research. Although an assessment at this point would not change IPY's environmental footprint, a thorough and honest assessment of the environmental impacts of polar research during IPY could establish an important baseline for long-term observations in polar regions and offer positive examples for other large-scale international research efforts.

### **IPY Legacy: Data**

IPY has an enlightened and advanced data policy, clearly stated and agreed to by IPY participants. IPY has component information systems, within nations, disciplines or existing programmes, that provide access capabilities and that push across disciplinary boundaries. IPY occurs in a time of unprecedented real-time data communications and of rapid advances in geobrowser technologies.

Nevertheless, IPY faces substantial data challenges: inconsistent understanding of its policy, minimal support from national funding agencies, weak compliance, no means of enforcement, and little prospect for a modern friendly integrated IPY data and information system that would enhance access and encourage compliance. IPY tries to advance the frontiers of international data management at a time when national bodies work to define their own data visions and while legacy international data centres struggle to modernize. The SAON process will assign a very high priority to data access and exchange, but will face the same challenge to obtain the resources necessary for international data coordination.

### **IPY Legacy: Future Researchers**

IPY has attracted a bright talented energetic group of early career researchers who have crossed national and disciplinary boundaries to form a network, APECS - Association of Polar Early Career Scientists. They have quickly grasped the essence of IPY, they recognize the need to extend their community across more disciplines and to more countries, and they value and balance



research and outreach. They have growing national and international networks, and very likely represent the views and needs of many future researchers. They seek to play a very positive role in the future of polar research.

### **IPY Legacy: Political Systems**

IPY has gained attention in international settings and at governmental and non-governmental levels. That attention and exposure might result in sustained increases in funding for polar research, in improved abilities to observe the polar regions, and in continued or extended protection of polar environments for peaceful and scientific purposes. In the Arctic, IPY receives strong support and attention from the Arctic Council and from Council members, observers, and permanent participants. International discussion, originating in the Arctic Council, has led, at least momentarily, to improved international research access to Arctic Ocean regions. Efforts toward sustained Arctic Observing Networks (SAON) also benefit from Arctic Council involvement and support. Through its partnerships with northern communities and institutions, IPY should enable greater knowledge and stronger voices for the cultural and political well-being of northern residents.

IPY data, shared widely and freely, will have a 'second life' as the basis for discussion, management and possible exploitation of polar ecological and geochemical resources. IPY terrestrial and marine biodiversity studies might indicate the need and desired location for protected areas. Or, prediction of future ice-free regions or routes and identification of surface and subsurface features might accelerate resource exploitation. The timing and attention of IPY will provoke renewed discussion of existing and future treaties and conventions for Arctic environmental protection.

### **IPY Legacy: An Informed Public**

IPY occurs during a time of increasing public attention to climate and environment issues in many countries. Often, IPY information about sea ice, sea level, or polar ecosystems receives immediate broad international mainstream press coverage and reverberating comment in the blogosphere. The fact that IPY gets quoted broadly in many locations and formats emphasizes its substantial and still-growing potential to represent science to the public as an accessible, non-magic, non-elite activity. The IPY networks of young researchers, teachers, artists and journalists, and the polar information systems developed centrally, nationally and institutionally, can provide an enduring public resource for polar science and information. This public impact, more than the quantity or quality of research, will influence future perceptions of science and future decisions about polar research funding.



Most IPY research projects include active education and outreach programmes, focused on change in polar regions. Given the breadth of IPY science, this pulse of fresh attractive information could improve interest and understanding of science in a public already fascinated by polar images. IPY educational materials could persist in national and international education networks and lead to improved public awareness of how policies and lifestyle choices in non-polar regions impact polar environments. A small fraction of IPY projects take a more explicit environmental focus, addressing contaminant impacts on ecosystems and humans, impacts of visitor activities, and ways to increase use of renewable energy and improve processing of wastes in polar research and in polar communities. These particular messages have relevance within polar regions and within the polar research community, but also address globally-important themes. Many IPY participants share the view and hope that IPY might lead to a greater environmental awareness inside and outside the polar regions, and to individual and collective change of views and behaviours.

### **IPY Legacy - Supporting Activities**

IPY supporting activities include many informal networks and practical activities, including the IPY web site and other activities coordinated by the IPO, by Coordinators of various IPY Projects, or by IPY National Committees. Many supporting activities may prove useful or essential to the on-going success of the larger legacies listed above. For these, IPO should identify willing partners to accept responsibility for their continuation. Other supporting or coordinating activities should end as the IPO and IPY Projects end, but may need recording or archiving. In either case, IPO advocates a timely, deliberate and active identification and decision process to develop optimal partnerships and to prevent unintended loss of any parts or records.

We anticipate many partnerships rather than a single 'home' for these activities, and recognise the need for different strategies for websites than for people networks or databases. Ideally, transfer of activities deemed worthy of continuation should happen soon, during this second year of IPY. The IPY IPO anticipates an on-going need for a central information function, some system or process by which partner organisations continue to inform and interact, perhaps through the IPYDIS. A list at <http://www.ipy.org/images/uploads/IPYlegacies.pdf> attempts to gather information on all IPY supporting activities, on their probability to continue after IPY, and on potential partners. That list presents current IPY activities in the areas of formal networks and committees, informal networks and working groups, and information systems and services. An overall strategy for IPY legacies, and any workshop activities focussed on IPY legacies, will want to consider these supporting activities.