A Vision for International Polar Year 2007-2008

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Abstract
Planning for International Polar Year (IPY) 2007-2008 is well underway. IPY 2007-2008 will be an intense, internationally coordinated campaign of polar observations, research and analysis that will further our understanding of physical and social processes in Polar Regions, examine their globally-connected role in the climate system, and establish research infrastructure for the future. It will galvanize new and innovative observations and research while building on and enhancing existing relevant initiatives. It will seek to excite the public and help develop the next generation of polar scientists. It will run for two years, from 1 March 2007 until 1 March 2009, to allow two field seasons of research and activities in each Polar Region. This IPY, unlike previous international science years in 1882-83, 1932-33, and 1957-58, includes a strong human dimension and thus health-related activities are being planned. The Arctic Human Health Initiative (AHHI), in particular, includes many potentially important elements.

Key words: International Polar Year, Arctic, Antarctic, Arctic human health

INTRODUCTION:
The Scope and Objectives of IPY 2007-2008
Environmental change and variability are part of the natural pattern on Earth. But environmental changes currently witnessed in the Polar Regions are in many cases more pronounced than changes observed in the mid-latitudes or tropics. The Arctic sea ice cover is decreasing; some ice shelves in Antarctica are retreating and thinning; glaciers are shrinking; and ecosystems are changing, for instance, with plants flowering at earlier times. These changes are having human impacts: some Alaskan villages have been moved to higher ground in response to rising sea levels, and thawing of permafrost is undermining roads and buildings in northern communities around the world. Why should the vast majority of us, who live in the warmer regions of the Earth, care? The Polar Regions, while physically distant, are critical links in the global climate system. The polar oceans play a critical role in maintaining ocean currents that keep coastal Europe much warmer than it would be otherwise, and the sea ice cover modifies Earth’s surface temperature by reflecting solar energy. These are just a few of many global connections. The Polar Regions also hold unique information on Earth’s past climate history, and they are growing in economic and geopolitical importance. They are a unique vantage point for studies that will help scientists understand environmental changes in the context of past changes, which in turn will help us make informed choices for our future. The exploration of new scientific frontiers in the Polar Regions also will lead to new discoveries, insights, and theories potentially important to all people. To better understand these and other questions, nations around the world are making plans to participate in International Polar Year (IPY) 2007-2008.

At its most fundamental level, IPY 2007-2008 is envisioned to be an intense, coordinated field campaign of polar observations, research, and analysis that will be multidisciplinary in scope and international in participation. IPY 2007-2008 will provide a framework and impetus to undertake projects that normally could not be achieved by any single nation. It allows us to think beyond traditional borders—whether national borders or disciplinary constraints—toward a new level of integrated, cooperative science. A coordinated international approach maximizes both impact and cost effectiveness, and the international collaborations started today will build relationships and understanding that will bring long-term benefits. Within this context, IPY will seek to galvanize new and innovative observations and research while at the same time building on and enhancing existing relevant initiatives. IPY will serve as a mechanism to attract and develop a new generation of scientists and engineers with the versatility to tackle complex global issues. In addition, IPY is clearly an opportunity to organize an exciting range of educational and outreach activities designed to excite and engage the public, with a presence in classrooms around the world and in the media in varied and innovative formats. The IPY will use today’s powerful research tools to better understand the key roles of the Polar Regions in global processes. Automatic observatories, satellite-based remote sensing, autonomous vehicles, the Internet, and genomics are just a few of the innovative approaches for studying previously inaccessible realms. IPY 2007-2008 will be fundamentally broader than past international years because it will explicitly incorporate multidisciplinary and interdisciplinary studies, including biological, ecological, and social science elements. It will run from March 1, 2007 until March 1, 2009, to allow two field seasons of research in both the Arctic and the Antarctic.

Previous International Years
IPY 2007-2008 is an ambitious program following in the footsteps of some past campaigns. There have been three similar programs over the last 125 years. During the first IPY in 1882-1883, 12 countries launched 15 expeditions (13 in the Arctic and two in the Antarctic). As part of its contribution, the United States established our northernmost scientific station at Point Barrow, Alaska. The second IPY in 1932-1933, even in the midst of the Great Depression, included participants from 40 nations and brought advances in meteorology, atmospheric sciences, geomagnetism, and the “mapping” of...
fenomena that advanced radioscience and technology. The United States established the first year-round research station inland from the Antarctic coast. The International Geophysical Year (IGY) in 1957-1958, in which 67 nations participated, was conceived as an effort to use technology developed during World War II, such as rockets and radar, for scientific research. IGY brought many "firsts," such as the launch of the world's first satellites. IGY had a strong polar component, especially in the Antarctic: research such as the launch of the world's first satellites. IGY had a strong polar component, especially in the Antarctic: research stations were established and the experience in international collaboration, even in tense political times, led to ratification of the Antarctic Treaty in 1961. Each of these campaigns produced unprecedented exploration of Earth and space and led to discoveries in many fields of science. IPY 2007-2008 is expected to leave a similar legacy of accomplishments.

WHAT WILL HAPPEN DURING IPY?

During the window of IPY 2007-2008, scientists from many nations (more than 35 as of mid-2006) will join together in expeditions and research projects designed to meet the IPY objectives, coordinated at both the national and international levels. They will work both in the Arctic and the Antarctic, and in universities, laboratories, and observatories around the world. The specific research projects have not yet been selected, but we envision teams of researchers collecting coordinated measurements to compile a snapshot of environmental conditions, which can serve as a baseline for understanding future environmental change. There might be an effort to coordinate satellites to gather consistent data on ice extent. Ecologists might mount a massive effort to conduct a census of marine life so that we better understand population trends for important fisheries. Other groups might dive into the ocean floor in search of sediment cores with evidence of past environments. Multidisciplinary teams might document ecosystem changes in far northern communities where traditional subsistence foods are important to the local lifestyle and try to understand how changes are affecting the people of those communities.

SCIENTIFIC CHALLENGES

IPY 2007-2008 is an opportunity to deepen our understanding of the physical, biological, and chemical processes in the Polar Regions and their global linkages and impacts, and to communicate these insights to the public. Five broad scientific challenges provide a framework for organizing IPY activities:

1. Assessing large-scale environmental change in the Polar Regions, with questions looking at both the physical and human dimensions of change and its impacts.
2. Conducting scientific exploration of "new" frontiers, whether these are once inaccessible places such as the seafloor, or areas of inquiry that are now open because of advances in technology, such as how the tools of genomics now allow exploration of previously unanswerable questions about biological adaptation.
3. Observing the Polar Regions in-depth, with adequate coverage of the vast and challenging landscape, to provide a description of current conditions and allow for better future understanding of variability and change.
4. Understanding human-environmental dynamics in a region where the connections are intimate and where the impacts of change are clear.
5. Creating new connections between science and the public, using these regions that are inherently intriguing.

WHO'S INVOLVED IN THE IPY?

Enthusiasm for IPY 2007-2008 is strong and growing. More than 35 nations have formally declared the intent to participate and many more have discussions in progress. In the United States, over the past few years of initial planning, scientists have been presenting talks and holding open forums at professional meetings and using an interactive website to brainstorm ideas where U.S. leadership might ensure significant contributions. A call to the science community for ideas about what science themes to pursue brought forward hundreds of ideas, and this input has been crucial in the IPY planning. The U.S. Committee for the International Polar Year 2007-2008 was formed by the Polar Research Board of the National Academies to articulate a vision for U.S. participation in IPY 2007-2008 in coordination with, and on behalf of, our nation's scientific communities. The committee worked closely with the U.S. science community using a variety of mechanisms. It also worked with our international colleagues, especially the International Council for Science's IPY 2007-2008 Planning Group, to identify the important science themes and develop the detailed information needed to implement its many contributing activities. When IPY 2007-2008 gets underway, it will involve far more than scientists. The hope is that many people—scout leaders, teachers, museum directors, filmmakers, journalists, parents, and students of all ages—will be involved. Some of the participation will be hands-on; other involvement will take full advantage of the tremendous opportunities for instant communication offered by modern technologies.

At the international level, the original planning group and the current joint committee, run under the auspices of the International Council for Science (ICSU) and the World Meteorological Organization (WMO), have developed guidelines for IPY activities. Based on the framework for IPY and other documents, all activities must meet the 12 criteria outlined by the planning committee:

1. Makes significant advances within one or more IPY themes
2. Involves at least one pole and takes place in timeframe
3. Contributes to international collaboration
4. A viable management plan and organisational structure
5. A viable approach for securing funding
6. A viable plan for securing appropriate logistical support
7. Agrees to principles of IPY data management and proposes a viable data management plan
8. A viable plan or approach for education, outreach and communication activities.
9. Foster the next generation of polar researchers
10. Provides opportunities for lasting legacies
11. Builds on existing plans and initiatives (or doesn’t conflict!)
12. Has interdisciplinary elements

WILL IPY INCLUDE STUDY OF HUMAN ISSUES?
This IPY includes an explicit focus on, and involvement of, the people that live in the North. Examples of studies that might occur, if funded, include:

- Social dynamics of material culture, Netherlands
- Northern indigenous peoples and globalized world, Germany
- Impacts of climate change on economies of the North, Norway
- Decision support/adaptive capacity to climate change and variability in Alaska and the Arctic, USA
- Reindeer herding and oil industry symbiosis or competition, Russia
- Elders of the Northern Ice: sea ice, knowledge, change in the Arctic, USA
- Vulnerability of human communities to environmental change, Canada
- Survey of living conditions in the Arctic, Greenland
- Revealing the economic and social value of Polar Regions, United Kingdom

The expressions of interest include ideas to study traditional medicine of peoples of Siberia, Central and Inner Asia, Canada; assessing status of food-borne zoonotic diseases in Arctic communities, Canada; crisis and welfare in the Arctic, Denmark; Inuit health in transition, Denmark; Siberian human health project, Russia; pressures and impacts on health and well-being of indigenous people of the Arctic, Canada; and a major Arctic human health initiative that is endorsed by the Arctic Council.

The AHHI is serving as the overarching framework for many health activities from many countries. Information about this activity can be found at the Arctic Health website: www.arctichealth.org. The AHHI aims to increase the visibility and awareness of health concerns of Arctic peoples, foster human health research, and promote health strategies that will improve the health and well-being of all Arctic residents. It hopes to help develop new and expanded networks for health surveillance, monitoring and research; seeks to understand disease prevalence over time, risk factors, disease prevention, and control strategies; and seeks partnerships between communities and research through community-based monitoring activities.

Priority research areas under AHHI include:
- Regional and inter-continentially transported anthropogenic pollution in the Arctic
- Oil, gas and other development activities
- Contaminants and zoonotic infectious diseases of traditional food supply
- Climate variability on human health and traditional food supply
- Infectious diseases including TB, HIV/AIDS, hepatitis, vaccine preventable diseases, and emerging infectious diseases (SARS)
- Effects of changing environment on zoonotic disease
- Chronic diseases (cancer, cardiovascular, obesity, diabetes)
- Behavioral health issues (suicide, violence, substance abuse)

There are many ways for people to become involved in IPY. Each of you can work with colleagues in science, agencies, communities, media and education to plan activities, increase awareness and move toward implementation. You can join or form international partnerships and help nurture national and international funding sources and logistics coordination. Be sure to check the key international website managed by the IPY Programme Office & ICSU-WMO Joint Committee at www.ipy.org. You can also check your nation’s own IPY website (such as the US sites www.us-ipy.org or www.us­­-ipy.gov). IPY will be a success if many of us commit to making something happen!

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