

IPY and the Antarctic Environment

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(slide 1)

Thank you to the Committee Chair and to the Committee members for affording me this opportunity to present IPY. IPY develops and evolves quickly. I use this occasion to bring you fresh information about IPY, and to address the very appropriate topic of IPY and the Antarctic Environment.

I know that IPY has many friends on the CEP and in this room. I hope to remember to thank all of you during the course of this talk for all the energy and assistance you provide to IPY.

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IPY has an official title: “International Polar Year 2007 – 2008”. IPY has received full endorsement from the International Council for Science (ICSU) and the World Meteorological Organisation (WMO).

The IPY period of operations extends from March 2007 through February 2009. During this time period, researchers can conduct a full 12 months of study in a polar region, starting and ending in daylight. With a logistics lead time prior to the onset of research, and removal and recovery time afterward, 12 months of research will often involve 18 months of activity. With an offset of six months between northern and southern operations, IPY will extend over 24 months to meet its research goals.

Leadership and guidance for IPY comes from an ICSU – WMO Joint Committee consisting of 14 international scientists and 5 ex-officio members from major international science organisations. Two members of the Joint Committee join us for today’s discussion.

Management and coordination for IPY comes from the International Programme Office.

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The IPY Framework Document specifies six themes under the general goal of drawing scientific and public attention to polar regions. All IPY Endorsed Projects respond to one or more of these themes. The themes consist of:

- a) Understanding the current environmental status of polar regions;
- b) Understanding past changes and predicting future changes in polar regions;
- c) Understanding linkages between polar processes and global processes;

- d) Bringing frontiers of science to polar regions. I say that for a few years science and technology will propagate from the poles to lower latitudes.
- e) Using polar regions as vantage points to earth history and to space, particularly, as many of you know, in Antarctica where a dry stable atmosphere favours many measurements of space.
- f) And, unique to IPY in contrast to other and earlier geophysical years, a focus on the social and cultural dynamics and adaptability of polar people.

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As IPY Projects conduct research consistent with these six themes, we must also care for the polar environment. I did not insert this statement for this audience. Those of you who have heard me make these presentations over the past year have seen me use this statement in every presentation. I often say "We need to leave polar regions cleaner than we found them." The IPY Framework document reinforces this responsibility.

We must also remember our social and cultural responsibilities. We need to engage residents of the north as full partners in the conduct of IPY research and in the analysis and assessment phases. We should embrace traditional and indigenous understanding of Arctic systems as a way to develop better overall understanding of polar regions.

Finally, we need to care for the IPY legacy. IPY will certainly leave an enormous legacy of data and information. IPY will also leave a legacy of systems and infrastructure: observing systems, new information networks, new health systems, new university networks. And, IPY can, and should, have an enormous impact on education at all levels. I think IPY can also leave a legacy in the form of a new and expanded scientific community – I will return to that topic at the end of this presentation.

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IPY builds its programme from the ideas and energy of teams of researchers gathered in coordinated Projects. Each IPY Project presents plans for urgent and significant scientific research, research that requires new partnerships and new resources. Each IPY Project involves international partnerships, always among three nations and often among 10 or more nations. Each IPY Project builds connections to other IPY Projects. Each IPY Project must develop explicit plans for sharing and storing its data, and must comply with IPY's policy of free and open data access.

Each IPY Project develops outreach programmes, generally in the form of web sites and opportunities for graduate students but occasionally with very exciting possibilities for public engagement. Finally, each IPY Project takes responsibility to expand the polar research community, through partnerships with nations outside the traditional polar research community and through recruitment of new students and scientists.

The IPY process has proceeded from Expressions of Interest through Coordination Proposals to Endorsed Projects. As of this date, IPY has received more than 1000 Expressions of Interest and slightly more than 400 Coordination Proposals. The Joint Committee has endorsed approximately 220 Projects, all of which involve many Expressions of Interest and some of which involve partnership among two or more Coordination Proposals.

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We developed a map to show the arrangement and connection of these 200 Endorsed Projects: the well-known IPY 'honeycomb' chart. Here you see the 200 IPY Projects on one page. If you consider that many of these Projects involve several hundred people and, just for operations, 10's of millions of dollars or euros or pounds, you begin to get a sense of the scale and magnitude of IPY.

We divide the chart horizontally into three regions: Antarctic, Arctic, and a region we call 'Both'. Projects in the 'Both' region involve processes that connect polar regions, such as global ocean circulation systems or global transport of pollutants from lower latitudes to polar regions. Or, Projects in the 'Both' region will focus on topics or processes that occur at both poles, such as permafrost processes. Viewing the chart at this large scale allows us to see that IPY has abundant Projects in Antarctica and the Arctic, and many in the 'Both' category.

Next we look vertically at areas of specialty. We do not intend these specialties to divide IPY, but only to show clusters of related activities. IPY includes Projects focused on Earth – those involving geology and geophysics. IPY includes a group of Projects related to Land – these include physical geography and hydrology but also terrestrial organisms and ecosystems. IPY includes a large cluster of Projects focused on People. These occur primarily in the North and cover many aspects of human study: physiology, health, food security, anthropology, sociology, economics, linguistics, etc. IPY includes clusters of Projects focused on the Oceans: circulation systems, chemical properties, and marine ecosystems in both polar oceans, also global

ocean circulation systems anchored at the poles. IPY Projects focus on all aspects of Ice: sea ice, ice bergs, polar and mountain glaciers, ice sheets. Other IPY Projects focus on the Atmosphere, on global atmospheric circulation systems that influence polar weather and on atmospheric transport of materials from lower latitudes to polar regions. Finally, a group of IPY Projects focus on Space. Some of these look outward to space from polar observatories. Other Space Projects use satellites to make observations of polar regions.

We include on the IPY chart an Integrated Data and Information Service. I would need another full talk to describe the complexity of this data and information challenge. Let me point out that we envision an integrated system that accommodates everything from genomic sequences to gravitational variations. I know of no precedent for the challenges we face with the IPY Data and Information Service.

We include on the IPY chart, in the same form and on the same page with IPY science Projects, IPY Education and Outreach Projects. Here you will find an amazing array of activities, from new high-definition movies to television series to blockbuster museum exhibits that will travel internationally to new teacher networks to student expeditions to new university courses to art exhibits, books, maps, workshops, etc. Again we face an unprecedented opportunity and challenge to coordinate these many activities into an integrated public outreach programme. We hope to have an opportunity to show you some ideas from these Education and Outreach Projects on the IPY day.

Using the Projects on the IPY chart, we can make preliminary estimates of the size of IPY. We estimate approximately 50,000 participants coming from more than 60 nations. With this many excellent researchers addressing this many topics, IPY will clearly produce dazzling science.

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In many presentations I would have the pleasure of sharing examples of dazzling science from various areas across the chart. For today's talk, however, I choose to focus on the Antarctic. To facilitate our discussion, I focus on a portion of the chart that covers most of the Antarctic Projects.

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I start our discussion with a look at the large-scale features of the Antarctic environment. I call your attention to the cluster of Projects focused on Antarctic ice. IPY will represent the most comprehensive assessment ever undertaken of this

singular feature of the Antarctic environment. I call your attention to the large cluster of IPY Projects focused on the Southern Ocean. Again, IPY will represent an unprecedented effort to develop an integrated understanding of this globally important Antarctic system. Look also at the cluster of IPY Projects in the 'Both' Atmosphere – this represents a comprehensive assessment of the transport of pollutants from global sources to the Antarctic environment. Finally, please notice the cluster of IPY Projects focussed on Antarctic permafrost and terrestrial ecosystems. On these large scales, we can anticipate that IPY will produce the most up-to-date and comprehensive environmental assessment of the land, atmosphere, ocean and ice features of Antarctica and of global impacts on those major components of the Antarctic environment.

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I turn next to specific features of the Antarctic environment. I call your attention to the Project 'Bird Health'. To the Project 'Polar Ecosystems and Contaminants'. To the Project 'Aliens in Antarctica', looking at invasive species. In the Ocean cluster, please notice the Projects 'Antarctic Marine Ecosystems', 'Polar Microbial Ecology', and 'Indigenous Fish' – each of these Projects assesses specific components of Antarctic marine ecosystems. Please also note the Project 'Ocean Acoustic Observatories'. From this Project we will learn more about the noise environment of Antarctica, one of CEP's focus issues. Please notice in the Atmosphere the Projects 'Polar Region Contaminants', 'Pollution Monitoring Network', and 'Ozone Layer and UV Radiation'. Each of these Atmosphere Projects addresses specific factors that influence Antarctic ecosystems.

Please notice many additional Projects, too numerous to list.

These individual IPY Projects, more than 20 of them, will provide scientific information essential to CEP as it addresses its full array of environmental issues and concerns. CEP could not ask for a more comprehensive, more extensive study of the environmental status of Antarctic systems.

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Of course the array of IPY Projects in the Antarctic region will require infrastructure – ships and field bases and aircraft, etc. Of course those systems will require and use fuel and various forms of logistical support. And, many of those systems will require periodic refurbishment and replacement. With its intense array of systems and observations, IPY should provide, as part of its legacy, the scientific

basis for an assessment of infrastructure necessary for future research and monitoring in Antarctica. With its vast array of modern technology, IPY should also provide impetus for improved effectiveness and efficiency of future Antarctic systems.

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Please let me return to the full IPY chart for a moment. I show here a version of the IPY chart that indicates involvement of northern indigenous people in IPY Projects. In pink, you see Projects led by indigenous researchers and indigenous organisations. In yellow, you see Projects that have indigenous researchers as major partners. I hope some day to have the opportunity to show you some of these remarkable science and education and outreach programmes. For today, I make a separate point. These indigenous researchers and the institutions and communities they represent serve as active and energetic voices for the Arctic. Not a unanimous voice, of course, but a prominent and effective voice for environmental and social issues in the north. Who speaks for the Antarctic environment?

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Here I show, graphically, the gap I see in the South, the missing voice for the long-term Antarctic environment. I call this apparent gap to the attention of this Committee, in the hope that you, with your signatory nations and your governmental and non-governmental partners, with your history of international cooperation and of attention to Antarctic environmental issues, will see IPY as an opportunity to affirm and extend your important roles for Antarctica.

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I return to this graphic representation of the IPY time period for a short summary of the IPY legacy. In addition to the time line, I show a sequence of seasonal events – equinox, solstice, equinox, etc. IPY extends across four such cycles. Although in the short term we focus on launch events, we should equally focus on what we want to have in place at the finish, as part of IPY's legacy.

We will certainly want to leave an IPY legacy of polar regions as a place of study. We understand that the intense period of IPY research will end, but we intend that polar research sustains new activity, new attention, new support, and new cooperation as a heritage of IPY.

We will certainly want to leave an IPY legacy of polar regions as a place of cooperation. We might hope that cooperation will increase as a consequence of IPY, perhaps especially in the north and between north and south.

And, we will certainly want to leave an IPY legacy of polar regions as a place of wonder, and to understand that IPY has helped more people around the world share that sense of wonder.

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I finish as I often do with this beautiful image from Antarctica, and with a quote from Bob Bindshadler. Why do we see so much international interest and enthusiasm for IPY? I think most IPY participants agree with Bob: IPY addresses crucial issues at a critical time. IPY represents science done right: working across disciplines and across national borders, addressing an important global topic, and engaging the public with the full creative, adventurous and complicated aspects of the scientific process. We do have a chance to build a very special programme, among a new and expanded community of physical, ecological, and social scientists that have never worked together on this scale or with this urgency. And we have opportunity, and indeed responsibility, to make IPY a very positive step forward for understanding and protecting the Antarctic environment.

Thank you for your attention this morning, and thank you very much to the many of you in this room who devote time and energy to IPY. IPY's success depends on your efforts and your partnerships.