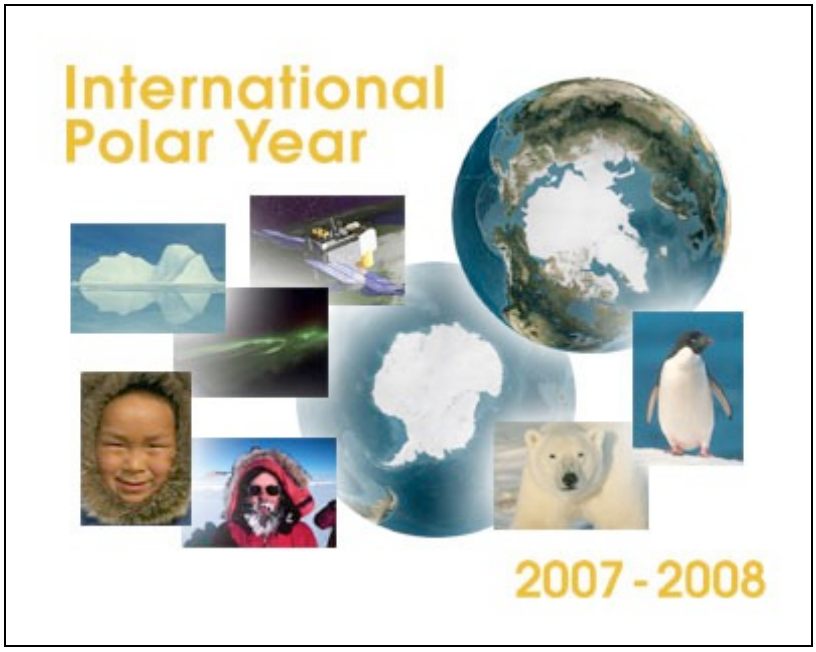

INTERNATIONAL POLAR YEAR 2007-2008

INITIAL OUTLINE SCIENCE PLAN
20TH APRIL 2004

The ICSU IPY 2007-2008 Planning Group
www.ipy.org

EXECUTIVE SUMMARY

This document summarises the current state of progress of the ICSU Planning Group (PG) for the International Polar Year 2007-2008 (IPY). The PG is an international, multidisciplinary group of polar scientists, which was established by the International Council of Science (ICSU) in June 2003 following a proposal from the US Polar Research Board (US-PRB), the European Polar Board (EPB), and the Scientific Committee on Antarctic Research (SCAR).

The concept of the International Polar Year 2007-2008 is of an international programme of coordinated, interdisciplinary scientific research and observations in the Earth's polar regions to explore new scientific frontiers, to deepen our understanding of polar processes and their global linkages, to increase our ability to detect changes, to attract and develop the next generation of polar scientists, engineers and logistics experts, and to capture the interest of schoolchildren, the public and decision-makers.

The official period of the IPY will be from 1st March 2007 until 1st March 2009 to allow observations during all seasons, and the possibility two summer field seasons, in each polar region. The geographic focus will extend over latitudes from approximately 60 deg to the pole, both north and south.

The IPY will include a broad range of activities organized around a select number of scientific themes. On the basis of a substantial input of ideas regarding the content of the IPY submitted by scientists and organisations from around the world, the Planning Group has defined the following five main themes:

(1) To determine the present environmental status of the polar regions by quantifying their spatial and temporal variability.

(2) To quantify, and understand, past and present environmental and human change in the polar regions in order to improve predictions

(3) To advance our understanding of polar - global teleconnections on all scales, and of the processes controlling these interactions.

(4) To investigate the unknowns at the frontiers of science in the polar regions.

(5) To use the unique vantage point of the polar regions to develop and enhance observatories studying the Earth's inner core, the Earth's magnetic field, geospace, the Sun and beyond.

Five emerging observational initiatives serve the scientific themes:

(1) A synoptic set of multidisciplinary observations to establish the status of the polar environment in 2007-2008

(2) The acquisition of key data sets necessary to understand factors controlling change in the polar environment

(3) The establishment of a legacy of multidisciplinary observational networks

(4) The launch of internationally coordinated, multidisciplinary expeditions into new scientific frontiers

(5) The implementation of polar observatories to study important facets of Planet Earth and beyond

This document is the ICSU International Polar Year Planning Group's synthesis of input from the polar community to identify the overarching research themes and possible implementation activities. This Initial Outline Science Plan and the process that led to it will be presented at a variety of international science venues beginning with the Arctic Science Summit Week in Iceland April 2004. The plan is available on the Web at www.ipy.org. Through the course of the next five months this Initial Outline Science Plan will be presented at a wide range of venues. The goal of these presentations will be to elicit feedback from major polar stakeholders such as national committees, funding agencies, operational groups, scientific coordination bodies and satellite agencies and to encourage these stakeholders to begin to develop truly international, multidisciplinary plans to address the themes identified. The ICSU International Polar Year 2007-2008 Planning Group will use the various discussions, and the written feedback to formulate a final version of the Outline Science Plan to be delivered to the ICSU Executive Board with its final report in October 2004.

The ICSU IPY 2007-2008 Planning Group
20th April 2004

INTERNATIONAL POLAR YEAR 2007 2008

INITIAL OUTLINE SCIENCE PLAN
AN INTERIM REPORT OF THE ICSU PLANNING GROUP FOR THE INTERNATIONAL POLAR YEAR 2007-2008

1. PURPOSE OF THE DOCUMENT

This document summarises the current state of progress of the ICSU Planning Group (PG) for the International Polar Year 2007-2008 (IPY). The PG is an international, multidisciplinary group of polar scientists, which was established by the International Council of Science (ICSU) in June 2003 following a proposal from the US Polar Research Board (US-PRB), the European Polar Board (EPB), and the Scientific Committee on Antarctic Research (SCAR). The PG was tasked to begin the process of planning the IPY. In December 2003 ICSU invited a representative of the World Meteorological Organisation (WMO) to become an *ex officio* member of the group.

This summary describes ICSU's charge to the PG and subsequent deliberations and actions of the Planning Group to generate wide international discussion and involvement of the science community in the formulation of the IPY. From this foundation, the document defines a set of objectives for the IPY and outlines a science plan that provides the starting point for the next phase of IPY planning and implementation. During this stage of planning, the broad vision will be widely discussed, debated, and refined for incorporation in the PG's report to ICSU due in October 2004. In November 2004, the PG will be superseded by a new, joint ICSU-WMO Committee, responsible for the oversight and coordination of the IPY implementation.

2. INTRODUCTION

The concept of the International Polar Year 2007-2008 is of an international programme of coordinated, interdisciplinary scientific research and observations in the Earth's polar regions to explore new scientific frontiers, to deepen our understanding of polar processes and their global linkages, to increase our ability to detect changes, to attract and develop the next generation of polar scientists, engineers and logistics experts, and to capture the interest of schoolchildren, the public and decision-makers.

The IPY will include a broad range of activities organized around a select number of scientific themes. On the basis of a substantial input of ideas regarding the content of the IPY submitted by scientists and organisations from around the world, the Planning Group has defined the following five main themes:

(1) To determine the present environmental status of the polar regions by quantifying their spatial and temporal variability.

(2) To quantify, and understand, past and present environmental and human change in the polar regions in order to improve predictions

(3) To advance our understanding of polar - global teleconnections on all scales, and of the processes controlling these interactions.

(4) To investigate the unknowns at the frontiers of science in the polar regions.

(5) To use the unique vantage point of the polar regions to develop and enhance observatories studying the Earth's inner core, the Earth's magnetic field, geospace, the Sun and beyond.

These themes, plus related science questions and associated measurements, are discussed in detail later in this document.

Overall, the IPY seeks to foster new observations and research exploiting innovative, modern technology, whilst building on and enhancing polar initiatives already planned or underway.

The official period of the IPY will be from 1st March 2007 until 1st March 2009 to allow observations during all seasons, and the possibility two summer field seasons, in each polar region. The geographic focus will extend over latitudes from approximately 60 ° to the pole, both north and south. The aim is to establish a manageable and feasible number of core activities, within a much broader set of associated initiatives.

3. RATIONALE FOR IPY 2007-2008 (IPY CONCEPT)

The Planning Group has considered carefully the motivation for organizing an International Polar Year. The history of significant contributions from past coordinated international science campaigns (see Box 1) demonstrates that there is considerable benefit to be gained.

Box 1: History of Past International Polar Years

The idea of nations organizing to conduct a coordinated effort to study the polar regions originated some 125 years ago. The scientific goals of the first International Polar Year (1882-1883), sponsored by the International Meteorological Organisation (a predecessor of the World Meteorological Organization), were to explore geophysical phenomena that could not be surveyed by any one nation alone. There were 15 expeditions (13 to the Arctic and 2 to the Antarctic) and 12 nations participated. In addition to important science activities and exploration of new terrain, this first IPY set a precedent for international cooperation in the realm of science.

The second International Polar Year was held in 1932-1933. This effort was also proposed by the International Meteorological Organization and it accomplished significant advances in meteorology, magnetism, atmospheric science, and the understanding of ionospheric phenomena. About 40 nations participated in related activities, although the overall effort was somewhat diminished by the financial constraints of the Great Depression.

Fifty years after the second International Polar Year, the world came together again but this time to focus on geophysical processes world-wide. The International Geophysical Year of 1957-1958, sponsored by ICSU and WMO, celebrated the 75th and 125th anniversaries of the first and second international polar years, and brought together 67 nations around the idea that the many technologies developed during World War II could be focused to the benefit of science. The accomplishments of IGY are too numerous to list but include discovery of the Van Allen Radiation Belt encircling the Earth, the first estimates of the size of Antarctica's ice mass, and confirmation of the theory of continental drift. There were geopolitical benefits as well, including development of, and ultimately the ratification of, the Antarctic Treaty. It continued the legacy that scientists from around the world can work together, even in tense political and economic times, for the betterment of humankind.

Indeed, the justification for an intense focus on the polar regions is many faceted. The polar regions have great scientific importance: they are integral components of the Earth system, intimately linked to the global climate system, sea level, biogeochemical cycles, marine, freshwater and terrestrial ecosystems, and human activities, both regional and global. Given these connections, the polar regions respond to, amplify, and drive changes elsewhere in the Earth system. The interplay of the ocean, atmosphere, cryosphere, biosphere, geosphere and human activities in the polar regions makes these zones especially influential in the behaviour of climate on decadal and human time scales. So although the polar regions may seem distant from the lives of the majority of the world's people, they are in practice relevant in tangible ways. Given our existing knowledge and understanding about the Earth as a system, the potential of new technologies especially in the areas of electronic communications and information dissemination and processing, and the potential to marshal the expertise and capabilities of the world's polar research community, IPY 2007-2008 offers a unique opportunity to catalyse internationally coordinated, interdisciplinary research activities and to explore the human dimensions of these scientific questions to an unprecedented degree.

The rational for the IPY can be summarised as follows:

Why International?

- Polar processes extend across national boundaries
- The science challenge exceeds the capabilities of any one nation
- A coordinated approach maximizes outcomes and cost effectiveness
- International collaboration shares benefits and builds relationships

Why Polar?

- Polar regions are active, highly connected components of the planet
- Significant changes are occurring in the polar regions
- Polar regions hold unique information on the past behaviour of the Earth system
- Polar regions having growing economic and geopolitical importance, especially the Arctic
- The harsh conditions and remoteness of the polar regions have hampered scientific inquiry compared to mid- and low-latitudes

- There is a need to re-establish and enhance operational observing systems in the polar regions
- The polar regions offer a unique vantage point for a variety of terrestrial and cosmic phenomena

Why a "Year"?

- An intensive, coordinated burst of effort will accelerate advances in knowledge and understanding
- A defined period polar "snapshot" will provide a crucial benchmark for detecting and understanding change in comparison with past and future data sets
- It provides an opportunity for observations in both polar regions throughout all seasons
- The legacy of enhanced observing systems generated by IPY will provide an improved foundation for ongoing monitoring

Why 2007-2008?

- The anniversaries of past IPY and the IGY set a firm deadline
- There is a pressing need to capture contemporary information on change
- A 3-4 year planning horizon is challenging but feasible
- The timescale allows advances in technology and logistics to be exploited to address new issues and access new areas

4. SHORT DESCRIPTION OF THE PLANNING PROCESS

Although numerous discussions about possible ways to celebrate the IPY and IGY anniversaries have taken place in a variety of nations and venues over the past few years, focused planning began in early 2003 when the International Council for Science appointed a small group of scientists to serve as a central planning group. The Terms of Reference and membership of the ICSU IPY Planning Group (PG) are given in Appendices I and II.

To date the PG's efforts have focused mainly on

- gathering, summarising and making widely available information on existing ideas for an IPY
- serving as a clearinghouse for ideas
- stimulating, encouraging and organising debate amongst a wide range of interested parties on the objectives and possible content of an IPY
- formulating a set of objectives for an IPY, and
- developing an initial high level science plan.

This has included close cooperation with the International Union of Geodesy and Geophysics (IUGG) concerning their IGY+50 initiative and in particular their electronic Geophysical Year (eGY), the International Union of Geological Sciences (IUGS) concerning their International Year of Planet Earth initiative (IYPE) and the proposed International Heliophysical Year (IHY).
In a little more than a year, the science community has progressed from its earliest discussions of why such a campaign should be held to serious planning of what IPY might accomplish and what resources are needed. Scientists from twenty-four nations

have provided input. Nineteen nations have established either IPY National Committees or National Points of contact (Appendix III). In addition more than thirty ICSU and non-ICSU science coordinating bodies with an interest in polar research have provided strong endorsements of the IPY and often detailed scientific input to the PG (Appendix IV).

From the beginning, the goal of the ICSU Planning Group was to develop a planning process that was both driven by cutting edge science and by the view of global science community. Thus through ICSU the PG invited the science community to contribute ideas on the pressing scientific issues which should form the content of the IPY. The objective was twofold; (i) to measure the level of interest in the community in an IPY, and (ii) to map out the range and scope of the scientific domain within which an IPY might operate.

The response to the call was very strong, with more than 350 ideas received to date, and with the list continuing to grow (Summary given in Appendices V(a) – V(c)). Some have been provided by individuals, some by National Committees, some by other science coordinating bodies, and some by groups of scientists who organized themselves around common questions. Members of the PG, especially the Chair and Vice-chair, have promoted and discussed the IPY at a variety of high profile scientific meetings. In addition the PG arranged an IPY Discussion Forum held in Paris in April 2004, to present the IPY concept and gather feedback on how best to proceed. These inputs have been critical to the IPY planning.

As of April 2004, the PG had met three times. These meetings provided a forum for the free flow of ideas, for consideration of the input submitted by the science community, and for the development of various documents to advance IPY 2007-2008, including a May 2003 initial proposal to ICSU, a September 2003 letter to ICSU nations and unions calling for input, a January 2004 further letter to ICSU nations and unions reporting on the initial response and requesting further input, a February 2004 Progress Report to ICSU, and this Outline Science Plan. In spite of the short timescale, the Planning Group has made significant progress in defining the rational for, scope of, and ambitions for IPY 2007-2008.

5. OBJECTIVES OF THE INTERNATIONAL POLAR YEAR 2007-2008 AND CHARACTERISTICS OF THE CORE ACTIVIES

On the basis of its own considerations and various inputs received as part of the IPY consultation process, the PG has set the following objectives for an IPY:

- Utilise the vantage point of the polar regions to carry out an intensive and internationally coordinated burst of high quality, important research activities and observations that would not otherwise be undertaken
- Lay the foundation for major scientific advances in knowledge and understanding of the nature and behaviour of the polar regions and their role in the functioning of the planet
- Leave a legacy of observing sites, facilities and systems to support ongoing polar research and monitoring

- Strengthen and enhance international collaboration and co-operation in polar regions research and monitoring
- Address both polar regions and their global interactions
- Link researchers across different fields to address questions and issues lying beyond the scope of individual disciplines
- Collect 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
- Ensure data collected under the IPY are made available in an open and timely manner
- Intensify the recovery of relevant historical data and ensure that these also are made openly available
- Attract, engage and develop a new generation of polar researchers, engineers and logistics experts
- Optimise exploitation of available polar observing systems, logistical assets and infrastructure, and develop and embrace new technological and logistical capabilities
- Build on existing and potential new funding sources
- Engage the awareness, interest and understanding of schoolchildren, the general public and decision-makers worldwide in the purpose and value of polar research and monitoring

Given practical limitations on available assets, effort, infrastructure and funds, the PG adopted the following view regarding priorities, based on the position taken by the IGY Steering Group 50 years previously:

"During the IPY the regular scientific facilities of the world must be supplemented by additional observations suitably distributed in space and time as needed for the solution of the selected problems.

- Highest priority should be given to problems requiring concurrent synoptic observations at many points involving co-operative observations by many nations
- The extraordinary efforts that could be generated during the IPY in these relatively inaccessible regions of the Earth mean that the observations there should preferably cover all major geophysical phenomena, in order to augment our basic knowledge of the Earth and solar and other influences acting upon it

IPY should also include epochal observations of slowly varying terrestrial phenomena to establish basic information for subsequent comparison at later epochs"

The characteristics of the core activities of the IPY beginning in 2007 have been defined as follows:

- High scientific quality, addressing an important question or issue
- Capable of resulting in major progress
- Address one or both polar regions
- Contribute to international collaboration / coordination
- Logistically and technically feasible and achievable within IPY timeframe
- Avoid duplication or disruption of established initiatives and plans
- Provide open and timely access to data
- Maximise effective utilisation of available logistical assets

- Explicitly address roles and tasks for young scientists, technical and logistics experts
- Include explicitly addressed outreach activities.

Additional desirable characteristics are :

- Build on existing activities – adding value
- Interdisciplinary or with potential for interdisciplinary linkage and synthesis within the IPY programme overall
- Provide international access to field sites to support additional science and monitoring activities
- Address training / capacity building including opportunities for individuals to convert to polar science and monitoring
- Provide opportunities for regional scholarship within broader international activities
- Readily communicable to public.

6. THEMES FOR THE INTERNATIONAL POLAR YEAR 2007-2008

The five scientific themes have been developed from extensive input from the polar science community and are intended to provide a framework for the specific activities comprising the International Polar Year 2007-2008. (see section II).

Each theme is presented below along with several key related questions that the IPY 2007-2008 activities will make significant contributions towards answering, along with some possible activities proposed by the community. Following a discussion of each of the five major themes, we present an emerging vision describing a preliminary integration of possible IPY activities.

Theme #1 *To determine the present environmental status of the polar regions by quantifying their spatial and temporal variability.*

Previous International Polar Years and the International Geophysical Year brought the international scientific community together to obtain an integrated assessment of the polar regions and polar processes. Today, rapid environmental change underway in the polar regions has increasingly significant global ramifications. As our planet changes, well planned synoptic observations of the environmental status of the polar regions will be serve as a necessary benchmark for scientists and decision-makers globally. Consequently a key output of the IPY 2007-2008 will be to document the contemporary environmental status of the polar regions, quantifying their spatial and temporal variability and characterizing present day processes.

Determining the spatial and short-term temporal variability of the climate and environment in the polar regions will address questions such as:

a. What is the status of the high latitude ocean circulation and composition?

b. How do polar ecosystem structure and function vary through space and time and how much of this variation can be attributed to anthropogenic change?

c. What are the contemporary factors of social cohesion and values for polar societies?

The activities proposed to capture the modern environmental status of the poles and to document the modern spatial variability include physical, biological and social programs. Achieving such synoptic and multidisciplinary observations will involve transects of ice sheet, land and ocean; an enhanced observational network for annual time series measurements; new technologies such as robotic and autonomous observational systems; and enhanced use of satellite observations. Physical processes targeted should include the sea ice thickness distribution and its development, snow cover, ice sheet and glacier mass balance, the polar hydrological cycle, key ocean atmospheric exchanges, and ice shelf – ocean interaction. Questions concerned with polar biodiversity require biodiversity surveys including modern genomic techniques; attribution of functional diversity; spatial and temporal sampling at a variety of scales. The programs emphasizing the status of the polar inhabitants require a network of social observatories, comparative case studies and databanks of social realities.

In addressing this theme it will be critical to develop an integrated, interdisciplinary plan for synoptic observations. The planning process must serve to integrate these activities building a truly multidisciplinary programme and optimizing limited logistical capability. We envision the acquisition of a synoptic set of multidisciplinary observations as a key component of the IPY 2007-2008.

Theme #2 *To quantify, and understand, past and present environmental and human change in the polar regions in order to improve predictions*

Physical, chemical, biological and social processes in the polar regions act together to produce a dynamically changing environment: an environment which has seen major environmental shifts in the past. To provide a framework for interpreting the synoptic observations made during the International Polar Year 2007-2008 it is imperative that significant advances are made in our understanding of the factors which drive environmental change in the polar regions. It is also imperative that the abilities to both monitor and predict changes in the environment are developed and implemented during the International Polar Year 2007-2008. The target must be to quantify past changes, understand the ongoing changes and improve out ability to monitor and predict future changes. Major questions that will be addressed under this theme include:

a. How are climate, environment, and ecosystems in the polar regions (including high latitude oceans) changing?
b. How has polar diversity responded to long-term changes in climate?
c. What are the inter-hemispheric connections in these changes?
d. How has the planet responded to multiple glacial cycles?
e. What critical factors triggered the cooling of the polar regions?

The activities proposed to quantify, monitor, understand, and predict environmental change were represented by four distinct methodologies. These are the recovery of key paleoclimatic records; documenting the physical factors which controlled past

climate change; enhancing modeling capability through reanalysis and improved parameterization; and the development of a long-term observation system.

Recovery of key paleo-climatic records was advocated as an activity necessary to quantify the magnitude and to understand mechanisms controlling past environmental changes, and to identify inter-hemispheric connections. The proposed activities cover time scales ranging from tens of million of years (sediment cores in the Arctic Ocean) through hundreds of thousands of years (planning for deep ice cores) and thousands of years (lake cores and circum polar shallow ice cores) to hundreds of years (borehole temperatures and permafrost studies). The recovery of strategic circum polar paleoclimatic records will enable a comprehensive analysis of the polar environment.

A number of proponents advocated the geophysical mapping of key ocean gateways in both the polar regions as well as East Antarctic subglacial features. These features each played important controlling roles in the cooling of the polar regions and represent fundamental boundary conditions for the polar environment today. To understand recent change, proposed activities include meteorological and sea-ice reanalyses, establishment of a comprehensive database of polar climate data, intensification of polar climate studies addressing the role of cryospheric processes and feedbacks, and parameterization of the hydrological cycle of cold regions. This is especially important in the light of recent evidence that the hydrological cycle may be accelerating. Finally, to monitor and predict future change, a combined effort of monitoring and modeling was widely advocated.

Concepts advocated include improvement and further development of the World Weather Watch Global Observing System in the polar regions, including space-based component, enhanced monitoring of the ozone layer and transport of greenhouse gases and aerosols, and the establishment of the Arctic Ocean and the Southern Ocean Observing Systems as well as the Arctic hydrologic cycle observing system**.**

Theme #3 *To advance our understanding of polar - global teleconnections on all scales, and of the processes controlling these interactions.*

Although the polar regions are frequently omitted from political maps of the world, their global influence is profound and far reaching. The polar regions remain the largest source of water capable of causing significant global sea level rise, represent the largest sinks in the global carbon cycle and are home to some of the world's major fisheries. Just as the polar regions influence global processes the global processes are impacting the poles. Examples include the formation of the ozone hole, the accumulation of pollutants in Arctic Sea ice, and the influence of global satellite communication connectivity on polar residents. The questions which must be addressed in the IPY 2007-2008 teleconnection theme include:

a. What role do the polar regions play in the global carbon cycle?
b. What is the stability of the Earth's major ice masses and what will be their impact on global mean sea level?
c. What are the linkages between the physical chemical and biological systems in the polar regions?

d. What are the interactions between the polar regions and lower latitudes including linkages through climatic, social, ecologic, and hydrologic processes?

e. How do actors, institutions, relations explain changes at a variety of levels both globally and within the polar regions?

The programs proposed to enhance our understanding of the polar/global connections include physical, biological and social ones. Activities proposed to address these issues include measurements of carbon fluxes in both marine and terrestrial polar ecosystems, improvement of polar meteorological networks and the establishment of an enhanced ocean observing system, analysis of climate indices and data sets, modeling, social surveys**,** and comparative case studies and investigations of living conditions

Although the activities proposed to the ICSU IPY Planning group were focused on the polar regions, it is clear that coordination with global programs will be necessary to achieve an advanced understanding of the polar - global teleconnections. As the planning progresses increased coordination with WCRP, IGBP and IHDP will be required to achieve this target.

Theme #4 *To investigate the unknowns at the frontiers of science in the polar regions.*

Humans have probed the polar regions, investigating the frontiers of the planet since the people began fishing and hunting in the Arctic as the ice sheets retreated thousands of years ago. Although few geographic frontiers remain on the earth's surface, scientific frontiers remain to be investigated beneath the polar ice sheets and under the ice-covered oceans. Today the new scientific frontiers in the polar regions rest at the intersection of disciplines and are ideally suited as an IPY 2007-2008 theme. Many major questions on the interactions between the icy polar domains and sub-ice ecosystems and the underlying solid earth were raised. The questions which must be addressed by IPY investigations at the scientific frontiers are:

a. What are the character of the sub-ice and deep ocean polar ecosystems?

b. What is the pattern and structure of polar marine and terrestrial biodiversity, at all trophic levels?

c. What effect does the solid earth have on ice sheet dynamics?

d. What are the nature, composition and morphology of the sea floor and earths crust beneath the polar ice cover?

e. How does phylogenetic and functional diversity vary across extreme environments, and what are the evolutionary responses underpinning this variation?

A diverse range of activities was proposed to address these questions such as the study of sub-glacial lakes and other unknown terrain beneath the Antarctic ice sheet using airborne geophysics, and marine geophysical and biological exploration of the Gakkel Ridge. Tools to support these activities will include seismic and hydrophone

networks, rapid access drilling, remotely operated vehicles, sample recovery and genomic studies.

Theme #5 *To use the unique vantage point of the polar regions to develop and enhance observatories studying the Earth's inner core, the Earth's magnetic field, geospace, the Sun and beyond.*

The unique position of the poles on the planet makes them an ideal site for observation of diverse processes. Improved understanding of many processes, such as the rotation of the inner core, the strength of the earth's magnetic dipole, geospace, cosmic ray detection and astronomy, is uniquely benefited by polar observations. A number of well formed proposals were received from disciplinary based groups aiming to use the polar regions as observing platforms. These were complemented by interest in developing broader science agendas for new polar research stations proposed by several National Committees. Questions that can be addressed by polar observations include:

a. How does the neutral atmosphere interact with geospace at the polar regions and what are the consequences?

b. What is the influence of solar processes at the polar regions on earth's climate?

c. What is the state of the earth's magnetic dipole?

d. Is the inner core rotating differentially?

Resolution of some of these issues will require extended (up to 6-month) uninterrupted time-series observations in solar, planetary and stellar astronomy. The proposed activities for the polar observatories were generally mono-disciplinary but reflected well-developed concepts. They included the concept of the International Heliophysical Year, presently supported by an international steering group.

Box 2 WMO Co-sponsorship of IPY 2007-2008

At Fourteenth World Meteorological Congress in May 2003, the WMO approved the concept of an International Polar Year as a means to achieve a broad set of research objectives. This activity was independent of the initial ICSU effort to plan an IPY, but communication was quickly established and at the second Planning Group meeting of the ICSU committee, a suggestion was made by WMO to merge interests in an IPY. The Planning Group recommended this arrangement to the ICSU Executive Board which agreed in February 2004 and a joint ICSU-WMO IPY Organising Committee will be convened following the submission of the Science Plan to the ICSU Executive Board in October 2004.

There are many advantages to this co-sponsorship besides the historical fact that both bodies spawned the IGY. WMO is a leading international scientific organization in many countries and its endorsement of IPY greatly facilitates the involvement of the National Meteorological and Hydrological Services and scientists from those nations in IPY. WMO's political structures connect to the governments of many countries, increasing the possible pool of resources to support IPY. WMO and ICSU already

share in bridging organizations, such as WCRP that have expressed a broad set of programs suitable for IPY.

In their planning, WMO had already set forth many activities intended for IPY (listed in Appendix VI). These activities are particularly relevant to Themes #1, #2 and #3 set out in Section VI of this document. It is expected that these will change as WMO takes advantage of the heightened potential for expanded observations and for establishing new observational networks throughout the polar regions. Such enhancements to their programs serves as an excellent example to other existing or planned programs to view IPY as a means to improve what already exists, to recover what has been lost, and to expand what has been planned. It is the intent of IPY to neither degrade nor diminish any of the excellent programs addressing issues of the polar regions, but to be an enabling and enhancing activity enriching them all and to accelerate research initiatives that would otherwise be slow to emerge.

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7. NEW OBSERVATIONAL SYSTEMS

Like the previous IPY's and the IGY, the International Polar Year 2007-2008 will be limited in time. This fact encourages activities that focus on data collection and that utilize the potential of increased coordination of logistic assets. Many submitted ideas recognized this and incorporated it in their inputs in various ways. Often similar activities, sampling strategies and field programs were proposed by different discipline based groups. At the same time, similar activities were advocated by a several national or even different multinational groups. Observational systems or observational programs emerged to address each scientific theme. We hope our view of observations that serve multiple disciplines will prompt groups with a more disciplinary focus to consider and discuss how to make their observational needs more interdisciplinary and thus increase the overall value of their possible IPY contribution. Similarly, we hope the overlapping national and multinational groups will be able to build an effective interdisciplinary, international program achievable within the IPY timeframe.

Below we present the emerging observational systems that serve the scientific themes. We hope this synthesis stimulates the next level of discussion, debate and planning.

A synoptic set of multidisciplinary observations to establish the status of the polar environment in 2007-2008

This synoptic set of multidisciplinary observations is targeted at establishing the status of the polar environment during the International Polar Year 2007-2008, providing future generations with a benchmark for future change and furthering our understanding of the recent changes. These activities may include coordinated polar transects, deployment of instrumentation in inaccessible regions, collection of satellite data and collection of records of changing polar environments.

The internationally coordinated field transects supported by ships, aircraft and traverse vehicles were proposed by a broad range of disciplinary based scientists from biologists interested in the Census of Marine life and genetic diversity of polar organisms to oceanographers interested in the state of polar sea ice and water masses

to geodetic scientists interested in the form of post-glacial rebound at the poles. Transects of the atmospheric and oceanic conditions were proposed by several groups. These marine programs were complemented by the concept of installing instrumentation along the ice divides of the Antarctic continent by traverse and the expansion of the WMO meteorological network. A number of groups advocated establishing baseline observation of polar ecosystems which we have reflected with the concept of mapping polar biodiversity along transects.

Complementing the programs of underway observation along set transects were a series of proposals to deploy permanent or semi-permanent instruments in inaccessible regions. In general, these proposed deployments were very discipline based. Some efforts clearly would benefit by bringing together the discipline-based proposals. For example, there were proposals to install polar oceanographic moorings and a polar seismometer network. Merging these efforts would optimize logistics and enhance interdisciplinary work. Similarly meteorological instrumentation could be merged with geodetic instrumentation.

The third prime measurement strategy that will be a critical facet of the International Polar Year 2007-2008 is a coordinated imaging of the polar regions with the satellites. Existing satellites obtain information across much of the electromagnetic spectrum and provide high spatial and temporal resolution data over the polar regions**.** A number of additional missions under development, such as ESA's Cryostat, have a specific polar mission. Coordination of satellite observations from this international suite of sensors, and additional focus by higher-data rate sensors that do not collect data continuously would secure valuable benchmark data sets and advance the effort to assess the environmental status of the polar regions.

The fourth measurement strategy that was highlighted in the presentation of polar year ideas was the collection of key proxies for changes in climate. These proxies include circumpolar ice cores in high accumulation regions to track the spatial variability in recent change in climate, systematic measurement of borehole temperatures in the polar regions and study of permafrost boreholes.

The acquisition of key data sets necessary to understand factors controlling change in the polar environment

A number of concepts were advanced for internationally coordinated mapping of key marine and continental sites that have played important roles in controlling the nature of polar environments including marine studies of the Drake Passage, Taming Sea and Arctic Gateways. On the continental side, a wide range of aerogeophysical surveys were proposed both to support the acquisition of a long palaeoclimate record as advocated by the International Ice Core Working Group and to determine the controlling topography of the onset of Antarctic Glaciations as proposed by a diverse suite of national and international investigator teams. These surveying efforts were complemented by proposals for internationally collection of targeted paleoclimatic data sets such as drilling in the Arctic Ocean.

The establishment of a legacy of multidisciplinary observational networks

The intensive activity of the IPY 2007-2008 will extend measurements to include observations of linked physical, biological, and chemical observations of the atmosphere, oceans, ice, and land, and will improve spatial and temporal coverage to provide a critical benchmark data set for assessing the state of the polar environment. The infrastructure developed during the IPY 2007-2008 will provide for long-term, spatially distributed interdisciplinary observing networks to understand the polar regions in the coming years and decades. The development and installation of international, long-term, multi-disciplinary observing networks could be a particularly significant legacy of the IPY. These observing systems would provide scientists and decision-makers with real time information on the evolving state of the poles for decades to come. Stations that remain relatively fixed in place, such as on land or on stable ice sheets, as well as stations moving with the ice and the seas, should be developed to integrate physical, biological, and chemical measurements.

Many of the measurements begun in the 1950's during the International Geophysical Year now form the basis for out understanding of how the Earth is changing presently. The past polar years targeted intensive observational periods. The widely articulated vision for the IPY 2007-2008 is for the intensive observation period to be followed by the establishment of both Arctic and Antarctic multidisciplinary observing networks. These observation networks range from the meteorological stations in the Arctic to the installation of seismometers in a pinwheel array in Antarctica. Our vision is that the jointly sponsored ICSU-WMO International Polar Year 2007-2008 will leave a legacy observation network which will leverage the critical communication and power infrastructure which form the backbone of any permanent observation site to underpin a wide variety of observation from a broad range of disciplines. The net results will be collocated observation measuring such diverse features as the earth's atmospheric, oceanographic, magnetosphere, seismic structure of the lithosphere and mantle and isocratic rebound. These permanent stations will enable future scientists to isolate short-term variability from long-term change from climate to the earth's magnetic dipole.

The launch of internationally-coordinated, multidisciplinary expeditions into new scientific frontiers

Many proposals for the IPY 2007-2008 addressed new scientific frontiers. In earlier IPY and IGY research programs, science-driven exploration of new geographical regions was a major activity. In the IPY 2007-2008, only limited regions of the earth's surface, such as parts of East Antarctica, remain unexplored in the traditional geographic sense. Yet new scientific frontiers and challenges have emerged taking advantage of new disciplines and technologies unknown in the previous IPYs and the IGY.

Several major expeditions to new frontiers were proposed by the international community. These include an expedition mapping the biodiversity of the Gakkel Ridge, an interdisciplinary study of the Gamburtsev Mountains, and exploring the extremophiles of the Antarctic subglacial environments.

The implementation of polar observatories to study important facets of Planet Earth and beyond

Many of the proposals highlighted facets of the earth, the geospace, the Sun, the solar system and beyond which can be best studied from the polar regions. Simultaneously several groups indicated the development of new polar stations. The establishment of new stations and enhanced activity at existing stations presents a unique opportunity for the International Polar Year to establish a new suite of observatories at polar stations. Ideally the implementation of these observatories would be coordinated to optimize the use of logistics and encourage the sharing of data. The proposed observatories ranged in focus from the inner core to atmospheric physics to the heliosphere and studies of neutrinos. This effort would embrace the developing initiative to have an International Heliosphere Year during 2007.

8. AN EMERGING VISION: THE POTENTIAL IMPACT OF IPY ON POLAR SCIENCE

The IPY 2007-2008 concept has tapped a powerful vein of enthusiasm and excitement within the scientific community. We believe that this in part derives from the universal awareness that IGY was a seminal event in geophysics. The IGY, and past IPYs, are an inspiring heritage. The IGY, in particular, fundamentally changed how earth and space science is conducted and resonated far beyond the initial years of exploration and research**.**

The IPY aspires to the same goals of improving our knowledge of earth, space and culture, advancing technology and international science, and engendering a new awareness of our planet. The IPY aims to provide scientists with the opportunity to go where they could not go before, to collect data in ways they have not done before, and to establish monitoring systems where none existed before. Breakthroughs and insights will follow.

Logistic capabilities and funding have limits, but the innovation and imagination of the polar science community do not. It is through the creativity of the individuals who are stimulated by the IPY concept that the potential impact of IPY will be determined. The stage is now set to make significant and enduring advances in polar science. It is the intent of IPY to foster new research ideas and methods including accelerating initiatives that would otherwise be slow to emerge.

Many of the hindrances to cooperation, understanding and knowledge are of our own making. IGY succeeded at the height of Cold War tensions and in an era when international bodies to coordinate science were few and far between. IPY 2007-2008 will be implemented in the age when the world is confronting new and different tensions, and with need to work with a dizzying number of international organizations, both scientific and political, each with a mandate to foster and guide internationally coordinated polar science. Shared involvement in the design, development and placement of innovative observing systems can provide a basis to establish key roles for these organizations to realize the extraordinary promise of IPY.

While we encourage the increase of interdisciplinary research, we explicitly seek to lower the boundary between social science and natural science. The polar regions are home to residents many of whom live in very close contact with their environment. Environmental change impacts them directly and rapid change can be destructive. Our aim is to engage those peoples and high latitude peoples more generally in the purpose and execution of the Polar Year from an early stage.

Polar regions are less remote to the rest of the planet than is commonly assumed. Humans, both polar residents and others, impact the polar regions leading to both environmental and climatic consequences, some understood, some not. For everyone's sake, we must accelerate our understanding of these linkages and consequences.

By focusing our collective attention on IPY, we have begun to focus the attention of the world on the polar regions. This opportunity has abundant potential to impress upon people in all walks of life the multitude of ways that the polar regions are important to every person on Earth. Youth that are inspired to scientific or technical careers or that come to appreciate the importance of the polar regions and its stewardship as part of a closely linked climate and cultural system will give the IPY enduring impact.

We can plan for what we determine is most essential to accomplish during the relatively brief 24-month formal period of IPY, but it is expected that IPY will leave a scientific legacy that will extend well beyond the lifetime of the project itself. Among these will be detailed, comprehensive multidisciplinary data sets for the IPY period that will provide both a base-line against which to assess future change and a resource for validation of a hierarchy of developing models.

IPY activities will also contribute to future operational earth observation and ongoing monitoring in polar regions through enhancement of the long-term monitoring network, definition of an optimal and most cost effective data collection strategy, and improved calibration and interpretation of satellite data.

There are also likely to be benefits that are entirely unplanned and that become clear only after the formal IPY period has ended. We foresee that polar science in the post-IPY era will be vastly improved. Well-thought out and coordinated investments in time, technology, money, and logistics will create a research environment where fresh ideas seeded by existing, recovered and new data drive newly enlightened researchers to new discoveries about the polar regions and our world. It is this final legacy - the next generation of polar scientists, trained and enthused during IPY 2007-08 – that will be one of the most important.

9. NEXT STEPS

This document is the ICSU International Polar Year Planning Group's synthesis of input from the polar community to identify the overarching research themes and possible implementation activities. This Outline Science Plan and the process that led to it will be presented at a variety of international science venues beginning with the Arctic Science Summit Week in Iceland April 2004. It is available on the Web at www.ipy.org.

Through the course of the spring and summer this Outline Science Plan will be presented at the European Geosciences Union, the Arctic Council Meeting, the American Geophysical Union, International Arctic Social Sciences Assembly (IASSA), the Antarctic Treaty Consultative Meeting, the WMO Executive Council session, the SCAR Open Science Meeting and the SCAR/COMNAP meeting. The goal of these presentations will be to elicit feedback from major polar stakeholders such as national committees, funding agencies, operational groups, scientific coordination bodies and satellite agencies on the Initial Outline Science Plan, and to encourage these stakeholders to begin to develop truly international, multidisciplinary plans to address the specific themes identified.

A Second IPY Discussion Forum for additional feedback will be held in Paris September 13-14, 2004, immediately prior to the final meeting of the ICSU International Polar Year Planning Group. To be most effective, feedback should be written and submitted by August 15, 2004 to provide ample time to distribute the feedback to the planning group.

The ICSU International Polar Year Planning Group will use the various discussions, and the written feedback to formulate the final Science Plan to be delivered to the ICSU Executive Board and to WMO in October 2004.

In addition to developing this Science Plan, the Planning Groups is also in the process of developing draft plans for IPY data policies, access and archiving, education and outreach and implementation strategies. These plans will be included in the final report to ICSU and WMO. Draft versions of these documents will be posted on the IPY website for feedback over the next few months, and the content will be discussed as available at the venues indicated above.

APPENDIX I - ICSU Planning Group Terms of Reference

The role of the IPY-PG should be to formulate a concept for an IPY 2007-8 and to design the means of ICSU leading such a programme.

Specifically the Group's tasks are:

(i) To gather, summarise and make widely available information on existing ideas for an IPY, serving as a clearinghouse for ideas,

(ii) To stimulate, encourage and organise debate amongst a wide range of interested parties on the objectives and possible content of an IPY,

(iii) To formulate a set of objectives for an IPY,

(iv) To develop an initial high level Science Plan for an IPY which engages younger scientists throughout the planning process,

(v) To develop a specific set of objectives targeted at formal and informal education as well as the general public in the next IPY,

(vi) To develop a proposed mechanism for the design, development, guidance, and oversight of an IPY,

(vii) To present a draft plan to the ICSU Executive Board at their February 2004 meeting; and

(vii) To report to the ICSU 28th General Assembly in 2005 a plan for an IPY in 2007-2008 for final endorsement.

APPENDIX II - ICSU Planning Group Membership and Contact Details

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APPENDIX III - List of IPY National Committees and Points of Contact

IPY National Committees

BELGIUM
National Committee formed by The Royal Academies for Science and the Arts of Belgium.
Prof. Hugo Decleir (Chairman) - hdecleir@vub.ac.be.
Dr. Annick Wilmotte (Vice-Chair) - awilmotte@ulg.ac.be.
Reinout Van Vaerenbergh (Secretary) - Reinout.vanvaerenbergh@kvab.be

CHILE
National Committee chaired by **Dr. Jose Valencia Diaz** - jvalenci@inach.cl

CHINA
National Committee chaired by **Prof. Dr. Zhanhai Zhang** - zhangzhanhai@263.net.cn

DENMARK
The National Committee is chaired by **Prof. Preben Gudmandsen** - pg@oersted.dtu.dk

Greenland Committee **(Green-IPY)** has representation on the Danish Committee and is chaired by **Claus Andreasen** - claus.andreasen@natmus.gl

FRANCE
The National Committee is chaired by **Prof. Gerard Jugie** - Gerard.Jugie@ifremer.fr
The Committee has three subject-specific Points of Contact
Prof **Yves Frenot** (Science Coordination) - Yves.Frenot@ifremer.fr
Prof. **Michel Fily** (Glaciology) - fily@glaciog.ujf-grenoble.fr
Prof. **Paul Treguer** (Marine Research) - Paul.Treguer@univ-brest.fr

GERMANY
The Committee is chaired by **Prof. Reinhard Dietrich** - dietrich@ipg.geo.tu-dresden.de. The Committee Secretary is **Dr. Karsten Gohl** - kgohl@awi-bremerhaven.de

ITALY
The National Committee is chaired by **Prof. Carlo Alberto Ricci** - riccica@unisi.it

JAPAN
A Committee is to be formed and chaired by **Prof. Hideki Shimamura**
- shima@eos.hokudai.ac.jp. The NIPR Point of Contact is **Prof. Okitsugu Watanabe**
- shochou@nipr.ac.jp

NORWAY
The National Committee is chaired by **Prof. Olav Eldholm** - olav.eldholm@geo.uib.no
A second Point of Contact is Dr. Christian Roscher-Nielsen - Christian@dnva.no

RUSSIA
The National Committee is chaired by **Prof. Vladimir Kotlyakov** - igras@igras.geonet.ru

UNITED KINGDOM
The National Committee is chaired by **Sir John Houghton** - john.houghton@jri.org.uk
The Committee Secretary is **Dr. Cynan Ellis-Evans** - jcel@bas.ac.uk

UNITED STATES OF AMERICA
The Chair of the National Committee is **Dr. Mary Albert** - malbert@crrel.usace.army.mil
A second Point of Contact is **Dr Chris Elfring** - CElfring@nas.edu

Points of Contact or Committees yet to be formed

AUSTRALIA
The Chair of the National Committee on Antarctic Research, **Professor Michael Stoddart** - michael.stoddart@aad.gov.au is the nominated Point of Contact

CANADA
The Chairperson of the Canadian Polar Commission, **Dr. Peter G. Johnson** - peterj@uottawa.ca and Steve Bigras - bigrass@polarcom.gc.ca are nominated Contacts.

INDIA
The Point of Contact is **Dr. Prem Chand Pandey** - pcpandey@ncaor.org

FINLAND
The Point of Contact is the Secretary of the National Board on Scientific Research, **Dr. Riitta Mansukoski** - riitta.mansukoski@ktm.fi

NEW ZEALAND
The Point of Contact will be **Dr Clive Howard-Williams** - c.howard-williams@niwa.co.nz

SPAIN
A committee is being formed but at present the Point of Contact is **Prof. Jerónimo López-Martínez** - jeronimo.lopez@uam.es

SWEDEN
The Swedish Polar Research Committee has appointed **Dr Anders Karlqvist** - anders@polar.se as IPY Point of Contact

APPENDIX IV – List of Science Coordination Bodies Endorsing IPY

- Antarctic Treaty Consultative Meeting (ATCM)
- Arctic Climate Impact Assessment (ACIA)
- Arctic Council
- Arctic Ocean Science Board (AOSB)
- Arctic-SubArctic Ocean Flux Study (ASOF)
- Committee of Managers of National Antarctic Programmes (COMNAP)
- European Polar Board (EPB)
- European Space Agency (ESA)
- Forum of Arctic Research Operators (FARO)
- International Arctic Science Council (IASC)
- Intergovernmental Oceanographic Commission (IOC)
- National Aeronautics and Space Administration (NASA)
- Scientific Committee for Antarctic Research (SCAR)
- United States Polar Research Board
- World Meteorological Organisation (WMO)

List of Bodies Contributing Input to the Planning Process

- Air-Ice Chemical Interfaces Programme (AICI)
- Arctic Ocean Science Board (AOSB)
- Arctic-SubArctic Ocean Flux Study (ASOF)
- Census of Marine Life (CoML)
- Climate and Weather of the Sun-Earth System (CAWSES)
- Climate of the Arctic and its Role for Europe (CARE)
- European Polar Board (EPB)
- Global Ocean Observing System (GOOS)
- International Arctic Science Council (IASC)
- International Heliophysical Year (IHY)
- International Oceanographic Commission (IOC)
- International Permafrost Association (IPA)
- International Science Initiative in the Russian Arctic (ISIRA)
- International Society for Photogrammetry and Remote Sensing (ISPRS)
- International Union for Radio Science (URSI) Commission G
- International Union of Geodesy and Geophysics (IUGG)
- International Union of Geological Sciences (IUGS) – The Year
- Scientific Committee for Antarctic Research (SCAR)
- Scientific Committee on Solar Terrestrial Physics (SCOSTEP-STPP)
- WCRP Climate and Cryosphere programme (CLiC)
- WCRP International Programme for Antarctic Buoys (IPAB)
- WCRP Southern Ocean Climate Variability Programme (SO CLIVAR)
- World Climate Research Programme (WCRP)
- World Meteorological Organisation (WMO)

APPENDIX V – Lists of Ideas Submitted by (a) National Committees, (b) Science Coordination Bodies, (c) Individual Scientists

(a) LIST OF IDEAS SUBMITTED BY NATIONAL COMMITTEES OR POINTS OF CONTACT (SORTED BY COUNTRY)

ID	Source	Theme	Proposal or Theme Submitted by a National Committee or National Point of Contact
	Australia		
4	Malcolm Stoddart	4	CircAntCML - undertaken under the umbrella of the Census of Marine Life (CoML)
	Belgium		
124	J.P. Henriet	1	Antarctic shelf/margin habitats -cryosphere/geosphere/hydrosphere/biosphere interactions
126	C. Lancelot	1	Sea ice sampling to quantify Fe availability, functional diversity and sea ice assemblage viability
117	Annick Wilmotte	2	Polar microbial diversity: exploration, function and exploitation
119	Ann Vanreusel	2	Decoding processes structuring biogeography and biodiversity of the Antarctic benthic fauna
122	Louis Beyens	2	Global change and biodiversity of terrestrial arctic ecosystems
123	Wim Vyverman	2	Paleolimnology in East and Maritime Antarctica – a multi-proxy approach
297	Thierry Camelbeeck	2	Establish Geophysical Investigations at the Belgian Station in Antarctica
300	Antoon Kuijpers	2	Paleo-oceanographic development and dynamic changes in the Arctic Ocean
296	D. Fonteyn	3	Polar Stratospheric Ozone and its precursors
118	Hugo Decleir	4	Dynamic interaction between the polar ice sheet and the subglacial environment (AMICS)
120	Georges Feller	4	Genomics and proteomics of polar microorganisms: cellular basis of life at low temperatures
116	Hugues Goosse	5	UCL-ASTR astronomical studies during the International Polar Year 2007-2008
121	Jean. L. Rasson	5	Correlation of Seismic, Ionispheric and Geomagnetic Activity in Arctic/Antarctic regions
125	C. De Clercq	5	AMANDA – ICE CUBE studies (neutrino telescope at South Pole)
299	Michael Roth	5	Electrodynamic Coupling of the Auroral Ionosphere and Magnetosphere
235	M. Arnould	5	1. Astrophysics (helio- and asteroseismology; infrared and sub-millimeter astronomy, particularly at Dome C)
235b	M. Arnould	5	2. Particle Astrophysics - AMANDA/ICECUBE detector development and modelling cosmic object sources
127a	Int. Polar Foundation	E	1. Activities around the “Polaris Climate Change Observatory
127b	Int. Polar Foundation	E	2. Promotion of the IPY 2007/08
127c	Int. Polar Foundation	E	3. Web-based activities and the educational program
127d	Int. Polar Foundation	E	4. Networking of Belgian and European Polar Research
127e	Int. Polar Foundation	U	5. Building of the Belgian Antarctic Station

ID	Source	Theme	Proposal or Theme Submitted by a National Committee or National Point of Contact
	Canada		
336	Theme	1	Potential impacts on culture and economy of changes in exchanges of water through the Canadian Archipelago
336b	Theme	1	Contaminant dynamics in polar systems. Stresses on human activity and environment.
336c	Theme	1	Polar genomics, baselines for resource management and assessment of environmental change.
336d	Theme	1	Earth observation technology for monitoring applications to all projects
336e	Theme	2	Atmosphere, earth and ocean interactions stressing climate change and its impacts at different spatial scales
336f	Theme	U	The merging of indigenous knowledge traditions and western science traditions in polar scholarship
	China		
185	Zhaoqian Dong	1	The process of the Amery Ice Shelf and its interaction with the ocean
186	Zhaoqian Dong	1	The Variability of the Southern Ocean
188	Li Yuansheng	1	Chinese “ITASE” project from Zhongshan Station to Dome A - To set up observing systems on the ice sheet.
190	Li Yuansheng	1	Observation of Lambert Glacier and the Amery Ice Shelf system
192	Chen Bo	1	Changing processes of Arctic Ocean circulation and sea ice
189	Li Yuansheng	2	Monitoring of cryospheric change at Zhongshan Station
191	Yang Huigen	5	Conjugate Studies on Upper Atmospheric Phenomena in IPY 2007/8
187	Li Yuansheng	U	Establishment of an in-land Chinese scientific research station at East Antarctic Plateau
	Denmark/Greenland		
337	NC theme	1	Greenland’s Ice Sheet - major question is its mass balance
337b	NC theme	1	The Arctic Climate
337c	NC theme	1	Man, Nature and Arctic Societies
97	Preben Gudmandsen	1	Air-Sea-Land Interaction with reference to the Coastal North Greenland/adjacent Arctic Ocean.
104	T B G Berg	1	Ecosystem processes across climatic gradients,
105	T B G. Berg	1	The determinants of multi-trophic interactions in a High Arctic landscape
108	Eigil Kaas	1	Observations and data assimilation for sea-ice, Arctic ocean transport and water mass transformations
109	Eigil Kaas	1	Stratospheric water vapour and Polar Stratospheric Clouds,
112	Eigil Kaas	1	The Arctic/North Atlantic Oscillation
113	Mikkel P. Tamstorf	1	Proposal for Polar Year activities related to carbon stocks and fluxes in the High-Arctic.,
267	Claus Andreasen	1	ECOSYSTEM WEST GREENLAND (ECOGREEN)
280	Claus Andreasen	1	Fishing Industry, Construction and Housing Sector Productivity Studies in Greenland
281	Claus Andreasen	1	Socio-economic effects of variations in the availability of living resources for Greenlandic hunters
282	Claus Andreasen	1	Survey of Living Conditions in the Arctic – SliCA

ID	Source	Theme	Proposal or Theme Submitted by a National Committee or National Point of Contact
98	Niels Reeh	2	Long-term mass change of the Greenland ice sheet,
100	P.W. Uitterdijk Appel	2	Puzzle of the Minturn circles - how was surface of high arctic regions formed during Ice Age.
101	Martin Appelt	2	Decoding Polar Processes: Nailing it to the Ground – Man, Culture, Environment in Greenland
102	Kim Aaris-Sørensen	2	Long-term changes in the distribution of the muskox (Ovibos moschatus) in the Eastern Arctic
106	Eigil Kaas	2	Climate / Earth System Modelling,
107	Eigil Kaas	2	The Arctic Ocean and its relation to inter-decadal climate variations,
268	Claus Andreasen	2	ARCTIC SETTLEMENT PATTERNS FROM THE PAST TO THE PRESENT (PRE-WWII)
269	Claus Andreasen	2	Role plyed by media for Youth life in Upernavik - Media Culture of children and youth in Upernavik
270	Claus Andreasen	2	THE UPERNAVIK DIALECT
271	Claus Andreasen	2	The Language situation and the Language Policy in Greenland - seen from Upernavik.
273	Claus Andreasen	2	SILA-INUK: Global Warming - Local Change: Impact of Climate Change on the daily life of Inuit
274	Claus Andreasen	2	ADJUSTING EDUCATION TO GLOBAL AND LOCAL NEEDS
275	Claus Andreasen	2	REGIONALIZATION - RESOURCES, ECONOMY, AND ADMINISTRATION
276	Claus Andreasen	2	FISHERIES DEPENDENT COMMUNITIES UNDER CHANGING ENVIRONMENTS
277	Claus Andreasen	2	TIME SERIES STUDIES ON SOCIO-ECONOMIC CHANGES IN GREENLAND
290	Claus Andreasen	2	TRANSFORMATIONS OF THE SPIRITUAL EXPERIENCE IN THE ARCTIC: PAST AND PRESENT
301	S A Pedersen	2	Climate and Northern Shrimp
303	Svend Funder	2	Melt water events and changing fresh water supply to the Arctic Ocean during ice ages and interglacials
306	Susanne Juul Lassen	2	Paleo-oceanography of Nares Strait – Davis Strait Arctic gateway with special reference to iceberg drift patterns
307	J H Christensen	2	Climate Signals in Terrestrial and Freshwater Ecosystems in the Arctic
308	Jesper Christensen	2	Fate of Mercury in Arctic (FOMA)
310	Peter Japsen	2	Ice sheet stability and mountain building in Greenland
311	Ole Bennike	2	Quaternary environmental and climatic history of Peary Land, N. Greenland
318	Danish Nat. Comm. for Climate Research	2	The changing ice in the Arctic and its coupling to weather, climate and carbon cycling
319	Niels Reeh	2	Establishing a Danish Centre for Cryosphere Changes
321	Naja Mikkelsen	2	Scientific drilling in the Arctic Ocean: Tectonic, paleo-oceanographic and climatic evolution of the polar basin
322	Ulla Odgaard	2	Focus on the world of the Palaeo-Eskimos. The Stone Age people of the High Arctic of Eastern Canada/Greenland
323	Frank Sejersen	2	The perception of and attitude towards risks, threats and crises in Arctic societies
304	Nina Skaarup	3	Structure and economic potential of the NW Greenland continental margin (Baffin Bay area)
305	D.A.T. Harper	3	Early metazoan evolution: Neoproterozoic Snowball Earth, Cambrian Explosion, Great Ordovician Biodiversification
312	Peter Stougaard	4	Characterization of Ikaite tufa columns in the Ikka Fjord, SW Greenland
110	Eigil Kaas	5	Space Weather

ID	Source	Theme	Proposal or Theme Submitted by a National Committee or National Point of Contact
111	Eigil Kaas	5	High-energy radiation and the geomagnetic field,
309	P K Rasmussen	5	The Greenland ice cap as an astronomical site
313	Anna B.O. Jensen	5	Mitigation of Polar Ionospheric Effects for GNSS Applications
314	Trine Dahl-Jensen	5	Large scale tectonics and deep structure of the Greenland shield
317	Niels Larsen	5	Polar stratospheric clouds (PSCs), stratospheric temperatures, denitrification and ozone depletion
272	Claus Andreasen	H	Historical Aspects of the First Polar Year
316	Ingela Dahllöf	O	Is risk assessment for contaminants used in temperate areas valid in Arctic areas? - an outreach opportunity
99	Per Molgaard	U	Bioactive Compounds from Arctic Plants,
103	T. I. Hauge Andersson	U	North Greenland as an area of special interest in the IPY,
278	Claus Andreasen	U	The Role of ICT in Business Development
279	Claus Andreasen	U	Comparative Study of Domestic Violrence among Inuit in Alaska, Canada and Greenland
302	Peter Stougaard	U	Bioactive Compounds from Arctic Microorganisms
315	Uffe Wilken	U	European Polar Outreach (EPO)
320	Space Design Group	U	From the Igloo to the Space Station
	France		
338	NC Proposal	1	Use of the Franco-Italian inland station Concordia as a unique science site on the Antarctic plateau
338b	NC Proposal	1	A ground traverse project on the Eastern Antarctic side involving several nations such as Italy and Australia.
338c	NC Proposal	4	A Southern Ocean CoML project in close collaboration with Australia, New-Zealand and Germany
338d	NC Proposal	1	Implementation of a clean station on Svalbard within the general framework of a joint German-French station
338e	NC Proposal	1	A social science project devoted to the Arctic
	Germany		
68	Hans-Jürgen Hirche	1	Seasonal and long-term observations in the Arctic using existing and abandoned Arctic bases
72	Dorte Janussen	1	Taxonomical, phylogenetic and biochemical investigations of Arctic and Antarctic deep-sea sponges (Porifera)
73	Jens Meincke	1	A study of the fresh water fluxes in the East Greenland Current
74	Gritta Veit-Köhler	1	GAP - Gene flow along the Antarctic Peninsula
76	Heinz Miller	1	IDEA - Ice Divide of East Antarctica., A multinational scientific surface traverse
79	Reinhard Dietrich	1	PONAP – Polar Network of Autonomous Observation Platforms
80	Volker Strass	1	Synoptic Circum-Antarctic Climate-Processes and Ecosystem study (SCACE)
82	Ursula Schauer	1	SPACE - Synoptic Pan-Arctic Climate and Environment Study with the ice breaker Polarstern to the central Arctic
83	Jan L. Lieser	1	TDS@IPY - Transpolar Drift Station during International Polar Year 2007/08,
84	Detlef Quadfasel	1	A study of the water mass transformation north of Svalbard

ID	Source	Theme	Proposal or Theme Submitted by a National Committee or National Point of Contact
173	Detlef Stammer	1	Helicopter-based scatterometer (HELISCAT) measurements of snow and sea-ice
174	Detlef Stammer	1	Sea ice volume and freshwater and salt budget changes in the Greenland-Iceland-Norwegian (GIN) Sea.
69	Rainer Gersonde	2	Bipolar Climate Machinery (BIPOMAC) - northern and southern polar processes in global climate variability
71	Thomas Leya	2	Cryophilic freshwater algae: a bio-resource for climate studies and cell metabolites
77	Julian Gutt	2	Marine life in extreme polar regions under climate change (MALEP)
78	Rob Larter	2	Polar Ocean Gateway Evolution (POGE) - determine history of development of these gateways and significance
81	Eberhard Fahrbach	2	Southern Ocean Freshwater Interactions (SOFI) - Role of SO freshwater in global water cycle and THC
248	Dietmar Muller	2	Constructing a Circum-Antarctic Framework for Palaeo-Bathymetry & Ocean-Climate Models
249	Lothar Viereck-Goette	2	Geodynamics of the West Antarctic Rift System (WARS) and implications for the stability of the WAIS
250	Martin Gude	2	Land use impact on polar and sub-polar geosystems: extent, significance, perspectives LUPOG
70	J. Wolfgang Wägele	4	CASBE - Circum-Antarctic Survey of Benthic Communities
75	Martin Meschede	4	Geodynamics of the Remote Hinge Zone between East and West Antarctica
94	M. Klages	4	HOT RIDGE - sampling of potential hydrothermal vent fields along the Arctic Gakkel Ridge
	Italy		
132	M. Frezzotti	1	5Oth anniversary Scientific traverses in Antarctica from Talos Dome to Dome A
133	G. di Prisco	1	ICEFISH Cruises: Internat. Collaborative Expeditions to Collect/Study Fish Indigenous to Sub-Antarctic Habitats
135	Toni Meloni	1	Temporary Antarctic Network of Geophysical Observatories (TANGO)
214	Guido di Prisco	1	Evolution and Adaptation of Antarctic Fish (in association with “Evolution in the Antarctic” (EVOLANTA)
215	Gabriele Capodaglio	1	Environmental monitoring in polar regions - Micropollutants and Microchemicals in Polar Environments
216	Vito Vitale	1	POLAR-AOD, a network for aerosol measurements in polar regions
217	Harry J. Beine	1	Atmospheric Nitrogen Photo-Chemistry in and above Snow Surfaces - “Photo-Snow” -
218	Silvia Ceramicola	2	PATHWAYS - Palaeoceanographic Pathways in the North Atlantic-Arctic Ocean
220	Emanuele Lodolo	2	Linking climate & tectonics: development of deep-water Antarctic Circumpolar Current & effects on glaciation
251	Gianluca Frinchillucci	2	Map of Arctic Peoples - to study the culture and lifestyles of the peoples of the Arctic and subarctic regions
219	G. Böhm	4	Seismic exploration of Antarctic subglacial lakes
131	M. Candidi	5	Complete coverage of the Antarctic ionosphere by the new southern SuperDARN radar array,
212	S. Cortiglioni	5	Observations of the microwave polarized component of the sky with the BaR-SPOrt experiment
222	Silvia Masi	5	80 years after the NORGE: top science from Polar Long Duration Balloons
134	G. De Rossi	U	Antarctic air network - To interconnect the existing networks and accomplish an Antarctic Domestic Network,
213	Donatella de Pascale	U	Antarctic psychrophilic bacteria: biodiversity analysis for identifying novel compounds of biotechnological interest

ID	Source	Theme	Proposal or Theme Submitted by a National Committee or National Point of Contact
221	Benjamin Pushparaj	U	Exploitation of valuable products from photo-synthetic microorganisms from polar regions
	India		
5	Harsh Gupta	2	Ozone hole
5b	Harsh Gupta	2	Depletion/accretion of polar area
5c	Harsh Gupta	1	The health of polar regions
5d	Harsh Gupta	1	The dynamics of polar regions
	Japan		
339	NC Proposal	1	Scientific Traverse in Dronning Maud Land, Antarctica
339b	NC Proposal	1	Airborne Geophysical Surveys
339c	NC Proposal	2	Shallow marine drilling project for high-resolution reconstruction of East Antarctic and Southern Ocean history
339d	NC Proposal	2	Response of ecosystem and carbon cycle on the climate change in the Arctic tundra
339e	NC Proposal	4	A census of Antarctic Marine Life focusing on meso-pelagic zone
339f	NC Proposal	5	Coordinated radar studies of the Arctic and Antarctic middle and upper atmosphere during IPY (CRSAAMU)
339g	NC Proposal	5	Airborne Atmospheric Observation in the East Antarctic (ANTSYO)
	Norway		
340	NC Theme	3	Understanding the dynamic processes of the polar oceans, land and atmosphere including fluxes between spheres
340b	NC Theme	2	Exploring the evolution of the Arctic Ocean from a warm to a cold state
340c	NC Theme	2	Climate change and polar ecosystems
	New Zealand		
341	Proposal	4	Circum-Antarctic Census of Marine Life - with Australia, France and Japan
	Russia		
6	Vladimir Kotlyakov	2	Cryosphere and climate
342	NC Proposal	1	Renewal of meteorological and aerological observations at representative Russian meteorological stations
342b	NC Proposal	1	Study of global changes of different components in the environment of the Arctic
342c	NC Proposal	1	Bipolar study of seasonal cycle and inter-annual changes of CO2 concentrations
342d	NC Proposal	1	Input of toxic pollutants to Arctic and Antarctic regions and their impact
342e	NC Proposal	1	Study of dynamics of number and distribution of animal and plants in polar regions under global change

ID	Source	Theme	Proposal or Theme Submitted by a National Committee or National Point of Contact
342f	NC Proposal	1	Present state of glaciation in the Arctic: compilation of electronic inventory
342g	NC Proposal	1	To update the BEDMAP database and grids using new data
342h	NC Proposal	1	Changes in natural environment and renewable resources of catchments and river mouths of Russian Arctic
342i	NC Proposal	1	Formation of a complex data base of marine and surface observations in the Arctic and Antarctica
342j	NC Proposal	1	Study of the geothermal field of passive transitional zones of the Arctic and Antarctica
342k	NC Proposal	2	Anthropogenic transformation of the polar biota in connection with the economic development of Arctic
342l	NC Proposal	2	Study of bipolar “climate machine” and oceanic gates of the Arctic Basin and the South Ocean
342m	NC Proposal	2	Estimation the changes in discharge of Antarctic ice sheet over the past 50 years
342n	NC Proposal	2	Reconstruction of environment in the region of land and shelf of Arctic Basin in Late Pleistocene/Holocene
342o	NC Proposal	2	Formation of Amerasian oceanic basin by study of the Arctic Shelf in key region of New Siberian Islands
342p	NC Proposal	2	Study of Mezo-Cainozoic tectonic and magma events of the Arctic continental slope
342q	NC Proposal	3	Modelling of global climate and its natural and anthropogenic changes with the help of numerical models
342r	NC Proposal	3	Mass-energy exchange of the atmosphere and underlying surface in subpolar regions
342s	NC Proposal	3	Inter-ocean exchange in the Southern polar region of the World Ocean
342t	NC Proposal	3	Comprehensive geological studies of the Kara Sea'interactions with surrounding land masses
342u	NC Proposal	4	Study of structure, origin and presence of organic life in subglacial lakes of Antarctica
342v	NC Proposal	5	Geomagnetic, geoelectric fields, magnetic storms and sub-storms, magnetosphere – ionosphere interactions
342w	NC Proposal	U	Study of prospects of development of non-renewable natural resources in Arctic
			☐
	Sweden		☐
86	Per Holmlund	1	A Japanese Swedish Antarctic glaciological traverse between Syowa and Wasa stations
87	Michael Tjernström	1	An Arctic-Ocean Atmospheric Mission By ODEN to study ice-ocean-atmosphere climate processes,
88	Leif G Anderson	1	A study of the land-shelf-basin interactions along the Siberian Shelf Seas,
	UK		☐
343	NC Theme	1	A generic Observation Theme to provide a temporal baseline - a snapshot - of slow polar processes
343b	NC Theme	1	Effects of climate/anthropogenic perturbation in polar regions on ecosystem processes, risks from invasive species
343c	NC Theme	1	Biogeochemistry of the Southern Oceans
343d	NC Theme	1	The social consequences of climate and anthropogenic impacts in the Arctic
343e	NC Theme	2	Stability of the West Antarctic Ice Shelf
343f	NC Theme	3	Bipolar research on the significance of polar regions to the Global Water Cycle
			☐

ID	Source	Theme	Proposal or Theme Submitted by a National Committee or National Point of Contact
	United States		
13	Arnold Gordon	1	Polar Climate Transects are proposed
36	Frank Carsey	1	An International Fleet Of Polar Rovers to address Climate Science During International Polar Year 2007-2008
38	James Maslanik	1	The New Polar Explorers of the 21st. Century: Autonomous Vehicles
41	Sydney Levitus	1	Structure of High Northern Latitude Climate Variability In Space And Time
44	Donald K. Perovich	1	Assessing, understanding, and conveying the state of Arctic sea ice cover
47	Tony Hansen	1	Advanced instrumentation to facilitate research in the Arctic and Antarctic,
48	Paul Shepson	1	OASIS ("Ocean-Atmosphere-Sea Ice-Snowpack Interactions") as an IPY Core Activity
150	Matt Nolan	1	Towards an Arctic Topographic Mapping Mission during the IPY
151	Ola Persson	1	Arctic Ocean Field Program in the central Arctic Ocean to methodologies and explore physical processes
163	Mark Dyurgerov	1	The Ice-Water Budgets of Glacierized Basins in Arctic Archipelago(s)
164	Mahlon C. Kennicutt II	1	Bi-Polar Census of Persistent Global Contaminants
198	Dan Lubin	1	The Antarctic Ozone Hole: Toward Closure on Ecological Impacts
238	Breck Owens	1	Physical profiling of the Arctic Ocean - High-latitude areas lack systematic obs. continuous in time & space
239	John Toole	1	An Arctic Array of Ice-Tethered Profilers as Arctic is poorly sampled in comparison to the temperate seas.
240	Don Cline	1	Pan-Arctic Snow Observation & Modeling: leap-ahead in understanding Arctic terrestrial snowpack dynamics
262	Victoria Gofman	1	International Network of Arctic Indigenous Community-Based Environmental Monitoring & Information Stations
264	Jason E. Box	1	Enhancing Existing Observational Sites to Uphold the IPY-1957 Legacy.
284	Larry Hothem	1	Comprehensive observations in support of Geodetic Infrastructure in Antarctica (GIANT) program
14	Jackie Grebmeier	2	International Arctic Shelf-Basin exchange observations: An Arctic "Snapshot" Proposal for IPY 2007-08
32	Michael Ritzwoller	2	Aspects of Antarctic Array and Some Mantle Imaging Efforts in Antarctica and over the Arctic
33	Jesse Johnson	2	IPY Community Ice Sheet Model Initiative
37	Ginny Catania	2	How will Ice Sheets Contribute to Global Sea Level Rise?
42	Sydney Levitus	2	Historical Oceanographic, Meteorological, Hydrological & other Geophysical Databases
51	Ted A. Scambos	2	Has the Antarctic warmed in the past 50 years? A resurvey of shallow borehole temperatures at IGY sites
52	David Ainley	2	The Ross Sea as a Research Base for IPY – the last pristine marine ecosystem
55	Brad Barr	2	Impacts of Change in the Arctic
56	David H. Bromwich	2	The Polar Atmospheric Initiative
142	Peter Wilkniss	2	The Arctic Grand Challenge: Abrupt Climate Change
152	Adrienne Redd	2	Effects of Indigenous Yup'ik Language Revitalization on Participants and on the Community
170	Vicki Childers	2	Capturing Large-Scale Change in the Arctic Ocean and Cryosphere

ID	Source	Theme	Proposal or Theme Submitted by a National Committee or National Point of Contact
171	David L. Clark	2	Coring of Arctic Ocean sediments to date both Arctic Ocean formation and sea-ice cover formation
196	James Overland	2	Rigorous comparison of Arctic data from IPY 2007-2008 with IPY-1
202	Roger C Bales	2	Long-term measurements of arctic atmosphere at an expanded Summit Environmental Observatory
231	Ken Jezek	2	An international campaign to map the interior and base of the polar ice sheets
254	T. Scambos	2	Larsen Ice Shelf Retreat and Glacier Acceleration on the Antarctic Peninsula
257	Stefan W. Vogel	2	The underbelly of ice sheets - studying the basal zone of ice sheets
259	Andrey Proshutinsky	2	Simulated IPYs: International Collaboration in , Arctic Change Studies Based on Numerical Modeling
325	Ron Weaver	2	Electronic Data Year "unfreeze polar data"
326	Seth Stein	2	Observation of Glacial Isostatic Adjustment in the Arctic with GPS
35	Dr. S. Tulaczyk	4	IPY-FASTDRILL: Interdisciplinary Polar Science & Fast Ice-Sheet Drilling Along a W. Antarctic transect
54	Carol Finn	4	IPY Airborne Geophysical Surveys
223	D.D. Blankenship	4	Investigating the Crustal Elements of the Central Antarctic Plate (ICECAP)
252	Peter Michael	4	Interdisciplinary studies of the slowest spreading mid-ocean ridge on earth: The eastern Gakkel Ridge
39	Robyn M. Millan	5	Polar Balloon Experiments to transport instrumentation across polar regions.
40	Marc Lessard	5	Sounding Rockets for Studies in ionospheric and magnetospheric Physics
143	Edgar A. Bering, III	5	A coordinated study of the Global Electric Circuit linking weather and solar activity
232	Alfred Y. Wong	5	Studying Geospace during IPY
285	Bob Hutt	5	Amundsen-Scott South Pole Station ultra-high resolution seismology
286	Jeffrey Love	5	IPY Geomagnetism programme to monitor the magnetic field under the auroral oval encircling the Arctic
291	G Leonard Johnson	5	An Integrated Heliospheric and Oceanographic Programme
43	Claire L. Parkinson	E	Odyssey of the Mind: A Polar Problem
159	Paulo Afonso	E	An International Space University (ISU) in Antarctica.
165	Anupma Prakash	E	Observing the Arctic from space: Scientific and Educational opportunities for an International Polar Year.
195	Orson P. Smith	E	International Polar Year Workshop Jan 2007 - "Research for Northern Society in a Warming World",
243	Richard A. Caulfield	E	UArctic and the IPY - education opportunities in the Polar Year through the UArctic network
31	P.J. Capelotti,	H	Social construction of polar science: archaeological examinations of international polar research sites
244	Paul Arthur Berkman	H	International Workshop at Amundsen-Scott South Pole Station on International Scientific Cooperation
256	Florence Fetterer	H	Preserving and promoting data collections and reports from early N American arctic research
288	Anne M. Jensen	H	In the Footsteps of Murdoch & Ray-following up John Murdoch's study of Ethnological Results of Point Barrow
199	Laurence C. Smith	U	Trans-Siberia expeditions in the International Polar Year - using the Trans-Siberian Railroad as a platform

(b) LIST OF IDEAS SUBMITTED BY SCIENCE ORGANISATIONS (SORTED BY ORGANISATION)

ID	Source	Theme	Titles of Ideas Submitted by Science Organisations
92	AOSB/AOSF	1	A multi-platform Intensive Observing Period to focus on the Arctic Ocean itself and the climatic drivers of its variability
92b	AOSB/AOSF	1	An integrative circum-arctic assessment of the physical, ecological and socio-economic importance of the Arctic shelves
92c	AOSB/AOSF	3	A study of the role of the High Latitude Oceans in the Global Water Cycle
237	Arctic Council	1	The Arctic Human Development Report and the Survey of Living Conditions in the Arctic could provide platforms for IPY
237b	Arctic Council	2	Activities building on ACIA would be a useful way to develop this activity
237c	Arctic Council	1	Arctic pollution monitoring - IPY, AMAP & CAFF could set up comprehensive network of circumpolar monitoring stations
57	ASPeCT	1	Antarctic Sea Ice Thickness in The International Polar Year
90	CAWSES	5	CAWSES (Climate And Weather of the Sun-Earth System) - understanding physical processes in the Sun-Earth system
129	CLIVAR/CLiC	3	The role of the high latitude oceans in the global water cycle
130	e-GY	5	eGY- An Electronic Geophysical Year initiative coinciding with 50-year anniversary of the highly successful IGY 1957-58.
25	EPB	U	INTERNATIONAL POLAR YEAR 2007- EPB European Involvement and Vision
19	Euro-IPY	2	EURO-IPY – a coordinated contribution by Europe to climate change impacts in the Arctic
23	IASC	1	ICARP II -Possible theme -Understanding the Arctic System: Regional Sustainable Development & Global Connections
50	IGAC	2	Air-Ice Chemical Interactions (AICI) and the IPY
9	IGBP	U	IGBP regional study of polar regions matches well with IPY
89	IHY	5	INTERNATIONAL HELIOPHYSICAL YEAR (IHY) - study the solar-generated events that affect life and climate on Earth
333	IOC	3	IOC intentions for IPY
58	IPA	1	The Thermal State of Permafrost: A Contribution to the International Polar Year
18	ISIRA	U	International Science Initiative in the Russian Arctic (ISIRA) to assist science/sustainable development in Russian Arctic
24	ISPRC	1	Earth Observation workshop in 2007 to link with IPY.
28	IUGG	3	IGY+50 - An opportunity to celebrate the achievements of IGY using new technology and fuller uderstanding of systems
27	IUGS	3	UNESCO International Year of Planet Earth 2004-07 - Earth Sciences for Society
334	JCOMM	2	JCOMM Intentions for IPY
60	PAG	1	The Pacific Arctic Group (PAG) proposes coordinated regional studies in the Canada Basin and Arctic marginal seas
335	SCAR	2	SCAR intentions for IPY
59	SCAR	2	SCAR-RiSCC Terrestrial/Limnetic Ecosystem Science in Antarctica: An Opportunity for The International Polar Year,
15	SCAR	4	SCAR-SALE Exploration of subglacial environments, particularly subglacial lakes of Antarctica.
20	SCOR-SCAR	2	IAnZone - Exchanges Across Antarctic & Arctic Circumpolar Shelf Break Fronts: Similarities, Differences & Impacts.
29b	URSI G	5	Solar variability coupling to middle atmosphere,

ID	Source	Theme	Titles of Ideas Submitted by Science Organisations
29c	URSI G	5	Relations of upper atmosphere phenomena with climate, ecosystems and environments
29	URSI.G	5	Space weather
3	WCRP	3	Snow and ice/albedo feedback, and the related negative feedbacks (eg. cloud) that regulate polar and global climate
3b	WCRP	1	The high latitude radiation budget and the role of polar clouds
3c	WCRP	1	Physical & chemical processes in the polar stratosphere - their interactions with tropospheric circulation & processes
3d	WCRP	3	Teleconnections between atmospheric conditions and circulation in the polar regions and at lower latitudes
3e	WCRP	3	Ocean circulation and water mass modification in polar regions and their interaction with the global THC
3f	WCRP	3	Changes to the global hydrological cycle, their manifestation at polar latitudes and their relation to global climate.
3g	WCRP	3	Polar feedbacks on atmospheric greenhouse gas concentrations, eg, through thawing permafrost or sea ice removal
3h	WCRP	2	Changes to ice sheets and other polar land ice, regarding sea-level change and possible role in rapid climate change
3i	WCRP	1	The processes responsible for high latitude climatic variability on the decadal time scale.
16	WMO	1	WMO proposals for IPY

(c) LIST OF IDEAS INDEPENDENTLY SUBMITTED (SORTED BY THEME)

ID	Contact	Independently Submitted Ideas
Theme 1		
146c	Graham Shimmield	Ecological and biogeochemical role of microbes in polar marine environments
148b	Graham Shimmield	Impact of sea-ice transport of contaminants from the Siberian Arctic
149b	Dr. Nikolai Yakovlev	Numerical modelling of coupled sea ice - deep ocean circulation
149c	Dr. Nikolai Yakovlev	The role of the Arctic Ocean in climate variability
246b	H.G. Jones	Climate and the mass balance of glaciers in polar regions
17	Philip Woodworth	Physical Oceanography in IPY. Network of tide gauges in both polar oceans, Freshening of oceans.
46	Jason E. Box	Expanding Monitoring and Remote Sensing in the Polar Regions
61	Tatsuo Sweda	CACA GRANDE - Assessment of Carbon Allocation by Ground Ranging/Echoing of Arctic/Boreal Regions
85	Chad Dick	A Polar Climate Grid Observation from the top of atmosphere to bottom of ocean or into the ground
96	Enrico Zambianchi	An enhanced network of Antarctic sea ice zone data buoys
114	E.J. Murphy	Integrated Analyses of Circumpolar Climate Interactions & S.b Ocean Ecosystem Dynamics (ICCED)
115	J C Ellis-Evans	The Southern Ocean CIRCLE Initiative - the role of the Southern Ocean in the Earth System.
136	Alexander Braun	Greenland: A Geophysical Target for the IPY: Solid Earth - Cryosphere Interactions

ID	Contact	Independently Submitted Ideas
139	Richard Hall,	An integrated database system for monitoring sea ice in the Polar regions
146	Graham Shimmield	Ecosystem dynamics of Arctic fjords and coastal ecosystems in a changing climate
147	Graham Shimmield	Establishment of baseline data and monitoring platforms in the Arctic and Antarctic environments
148	Graham Shimmield	Long range pollutant transport to the Arctic
149	Dr. Nikolai Yakovlev	Oscillations and estimation of the role of the Arctic in Global Climate Change
154	Mike Meredith	Satellite gravity data to better determine characteristics/dynamics of high-latitude ocean circulation.
155	Mike Meredith	Freshwater input to the ocean (& extraction as sea ice); influence of a changing hydrological cycle
157	Karen Heywood	The potential influence of Arctic freshwater fluxes on rapid climate change in the North Atlantic,
167	Stephen J. Jones	Arctic Sea-Ice and Climate
176	Peter K. Taylor	Arctic Gateway cruise to calculate absolute transports and evaluation of exchanges with the Arctic
177	Peter K. Taylor	South Atlantic Box cruise - two-ship operation to form a synoptic box of three sections
180	Katrine Borgå	Rapid transport of pollutants in drift ice to melting fronts
183	Dominic Hodgson	Monitoring deep water fluxes in the Southern Ocean - an active role in Global Thermohaline Circulation?
184	Chad Dick	Trans-polar Drift Station - Russian/Norwegian collaborative project
193	Alex Rogers	Genomics and evolution of Polar Organisms (GENEPOL)
206	Matt King	Polar Autonomous Network of Geophysical Stations (PANGS)
211	Jan Eiof Jonson	Fate of pollutants in the Arctic
295	Ingrid Hebel	Colonization of polar mosses and lichens, in relation to global climatic change, conservation & human effects
225	Christopher B. Cogan	Arctic Coastal Biodiversity Assessment in the face of unprecedented levels of human impact
233	Wim Vyverman	Biodiversity of eukaryotic micro-organisms in polar ecosystems: exploration, function and exploitation
246	H.G. Jones	Surface snow processes and the physics and chemistry of ice sheets
261	Francisco Navarro	Analysis of glaciological transition zones based on field observations and numerical modelling
283	Tatiana Vlassova	Arctic Residents' Network of Socio-EnvironmentAssessment and Education for Sustainable Development.
324	R. Jaña	Benchmark glaciers network for mass balance monitoring and remote sensing validation - Antarctic Peninsula
327	Luis J. Alvarinho	Sea-Ice Motion and Stratification of Polar Oceans
Theme 2		
175b	Jeff Bale	Quantifying the risks associated with alien invasion under climate change
34	Igor Smolyar	Fisheries in the Arctic
49	Vladimir Sevostianov	Commander Islands as the significant point for monitoring changes in the North Pacific Ecosystem
128	Ola M. Johannessen	CARE – Climate of the Arctic and its role for Europe.
140	Robie Macdonald	Connectivity and change in Arctic Basins as recorded by boundary sediments collected along transects
141	Igor A. Melnikov	Sea ice-associated biology in recent environmental changes in the Arctic

ID	Contact	Independently Submitted Ideas
153	Frank J. Sowa	Indigenous Peoples of the North & Globalised World: Local Perspectives on Nature, Risks & Landscapes
156	Mike Meredith	Long-term obs. of evolving high-latitude water mass properties & fluxes of relevance to THC/climate.
158	Dennis A. Darby	Establishing a Pan-Arctic Pleistocene Stratigraphy & Detail Paleoclimate Record for the Arctic Ocean
160	Mike Bentley	Getting the timing right: a co-ordinated approach to radiocarbon dating in the Antarctic.
169	David Vaughan	West Antarctic Ice Sheet – Glacial / Inter-Glacial Stability (WAIS – GIGS)
172	Michael Janouch	Monitoring the effects of the Montreal Protocol on ozone and UV radiation levels in polar regions
175	Jeff Bale	The evolution of current patterns of polar terrestrial biodiversity
182	German Leitchenkov	Geodynamic, depositional and environmental history of the region off the Amery Ice Shelf, Antarctica
197	Flores, J.A	Rapid and abrupt oceanic changes during the last climatic cycles in Antarctic and Subantarctic regions
204	Jesus Galindo-Zaldivar	Recent tectonic deformations & implications in a global perspective: integrated studies of the Scotia Arc
207	Viv Jones	Circum-Arctic perspectives on climate change from Arctic Lakes
208	Antonio Quesada	Polar Freshwater Ecosystems as sensors of climate change
209	Paula Kankaanpää	Climate change and human impacts in High Arctic desert area, Nordaustland, Svalbard.
210	Veijo Pohjola	Coordinated activities on Nordaustlandet, Svalbard,for Polar Exploration and Climate Change studies
224	Jerónimo López-Martínez	Evidence of present and Holocene environmental changes in ice-free areas of the polar regions
227	Doris Abele	Case study on the impact of climate induced glacial melting on Antarctic coastal communities
228	L. Schirrmeister	The Lena Delta and its catchment area - a highly sensitive Arctic Geo-Eco-system
234	Anne-Pascale Targé	Knowledge transfer within Inuit communities
241	Daniel Praeg	TRANSAT -Testing Tectonic Controls on Cenozoic Evolution of Climate: Latitudinal TRANSect of the ATlantic.
242	Daniel Praeg	GLAMAR - GLacial Meltwater and the Sedimentary ARchitecture of High-Latitude Continental Margins
245	Dessislav Sabev	THE HERD'S CALENDAR: Following the annual trek-route of a reindeer herd in the Kola Peninsula
255	Allice Legat	Global Warming: a threat to Dogrib Burial Sites
260	Carlota Escutia	Climatic inferences on development of the Antarctic sedimentary record
265	Warwick F. Vincent	Northern RiSCC - Northern Regional impacts and Sensitivity to Climate Change
266	Pascale Visart de Bocarmé	Anthropological Study of the Canadian Arctic Inuit through their artistic production.
289	Eric Wolff	International Partnerships in Ice Core Sciences - (IPICS)
328	Rahul Mohan	Is Antarctica Climatically Stable? A search into the marine paleoclimatic record
331	Neloy Khare	Paleoclimatic study in the lake sediments of Antarctica
332	Thamban Meloth	Palaeoenvironmental change studies based on ice core drilling in Antarctica.

ID	Contact	Independently Submitted Ideas
Theme 3		
1	Ian Allison	Global interactions in the Earth's polar regions
22	Andrea Jackson	Large scale atmospheric chemistry / air-ice interaction programme to study pollutants
26	Bob Dickson	Global theme on the role of the (bi)polar oceans in the Global Water Cycle,
45	Kendrick Taylor	Understanding the Role of the Polar Regions in Climate Change
166	R.E. Benestad	The implications of polar conditions for subsequent weather statistics over Northern Europe
181	Paul Twitchell	Atmospheric circulation in the polar regions and its interaction with lower latitudes
226	M. Rutgers van der Loeff	Geotraces in the Arctic
229	Dirk Radies	Climatic, Eustatic and Tectonic Controls on Permo-Triassic Sequence Development in the Arctic
287	Jane Francis	Polar Regions, Climate Change and Global Catastrophes
329	Dhananjai Pandey	Crustal Structure determination using geophysical techniques in polar regions
336	Jeffrey K. Weissel	AIRSAR: Pole-to-Pole
Theme 4		
21c	Jane Francis	Searching for extra terrestrial life – polar regions as analogues for outer space
145b	Graham Shimmield	A survey of biodiversity and biogeochemistry of the Gakkel Ridge using ROV “ISIS” contributing to CoML
146b	Graham Shimmield	Biodiversity and biotechnology of microbes from extreme polar environments
246c	H.G. Jones	Microbiological communities and productivity of cryospheric ecosystems.
10	Chris Wilson	GigaGAP - Geoscientific Insights of Greater Antarctica from Gamburtsev Mountains to Prydz Bay
12	Mario Zuchelli	Exploring subglacial lakes
21	Jane Francis	Science in the footsteps of explorers
137	Martin J. Siegert	The in-situ exploration of a West Antarctic subglacial lake,
145	Graham Shimmield	Probing the Arctic Ocean by Autosub for oceanography, ice thickness surveys and satellite validation
168	Michele Rebesco	COMBINE (COllaborative MultiBeam InterNational Effort) - bathymetric mapping off Antarctic Peninsula
194	Alex Rogers	EXPOSE: Exploration of polar seamounts - an unusual variety of rare habitats
203	German Leitchenkov	Airborne Geophysical Surveys over the East Antarctica Highlands
230	V. Schlindwein	Seismic arrays on drifting sea-ice and icebergs to research the origin of seismicity of the polar oceans
247	Robert Reves-Sohn	Investigation of Hydrothermal Processes on the ultra-slow spreading Gakkel Ridge
292	Ana Ramos	Study of the benthic ecosystem of the Arctic Ocean and comparison with Antarctic Ocean.
293	Charles Cockell	Polar Planetary Biology

ID	Contact	Independently Submitted Ideas
Theme 5		
21d	Jane Francis	The Cretaceous-Tertiary catastrophe in the polar regions
21e	Jane Francis	The changing magnetosphere
11	Dr.Alexander Zaitzev	IHY/CAWSES
30	David J. Kerridge	Space weather and the solar minimum
95	Pierre J Cilliers	Multi-instrument observation of the high latitude ionosphere
179	Sheila Kirkwood	Arctic Atmospheric Processes : from the troposphere to the magnetosphere
205	Eleri Pryse	Radio tomographic imaging of the Arctic ionised atmosphere by the IITC
258	Evgeni Timofeev	Experimental researches on the ionospheric and low atmospheric phenomena related to super power aurora
Education (E)		
91	Veit Andreas	The University of South Georgia - Summer School of Earth Sciences
162	Vivian Darroch-Lozowski,	Northern Light Paths - Arctic environmental and socio-ecological enquiries, educational programs, and art
253	Tatiana Bulgakova	The Institute of Northern Peoples (INP) suggests scientific help to indigenous northern schools
253b	Tatiana Bulgakova	Bringing achievements of foreign research into indigenous northern cultures to Russian University education
History (H)		
93	Cornelia Luedecke	Changing trends in polar research as reflected in the history of the International Polar Years
161	Stuart Elden	Documenting International Cooperation in the Arctic
Unclassified (U)		
144	Victor Dimetriev	“BIPYRAMID" (Data Base for IPY: RAtional Manner of, Its Developing)
294	Charles Cockell	The design of a Martian north polar base
330	A.K. Tiwari	Engineered Bioremediation for cleanup of Oil Spill in Arctic and Antarctica Regions

APPENDIX VI - Initial WMO Activities For IPY

This list comprises WMO's input to the Planning Group describing their ideas for IPY activities. It originated from WMO's intent to conduct their own IPY. Given the groundswell of interest expressed by the scientific community and the upcoming formation of a co-sponsored IPY planning committee, modifications to this list are likely.

- Improvement and further development of the WWW GOS in the polar regions, including re-activation of existing and establishing new surface and upper-air synoptic stations, increasing the number of drifting buoys, VOS, and ASAP, particularly in the Southern Ocean, extending the AMDAR programme over the polar regions, and the use of existing components of the space-based subsystem, as well as new operational polar-orbiting satellite series flying with new observational capabilities for polar regions;

- Enhancement of monitoring of the ozone layer, with an increased spatial and temporal coverage, using ground-based optical remote sensing instrumentation and ozone sondes. Stratospheric aircraft campaigns should be made at both poles with a full complement of measurements necessary to study the chemical and physical properties throughout one to two years period;

- Intensification of long-term integrated measurement/modelling of the transport of greenhouse gases and aerosols, particularly to the Arctic, and carrying out a study of processes of atmosphere-surface ocean interactions in order to minimize the impact of chemicals on the polar ecology;

- Assessment of global-to-regional influences on initiation, evolution and predictability of high impact weather events of polar circulation within the framework of the WWRP component programme THORPEX: a Global Atmospheric Research Programme;

- Establishment of a comprehensive database of polar climate data to carry out specialized studies of current, and assessment and projection of future, climate change in polar regions, as well as investigation of teleconnections between polar regions and the lower latitudes, in an effort to improve implementation of climate prediction, through CLIPS, for more populated areas;

- Intensification of polar climate studies addressing the role of stratosphere-troposphere coupling, cryospheric processes and feedbacks through which the cryosphere interacts with other components of the climate system; assessment of the impacts of past and future climatic variability and change on components of the cryosphere and their consequences, particularly for global energy and water budgets, frozen ground conditions, sea level change, and the maintenance of polar sea-ice covers in the framework of the WCRP Projects CliC, CLIVAR and SPARC;

- Investigation of physical processes in polar oceans, such as the formation of deep water, sea ice formation and melting, iceberg discharge, atmosphere-

ocean interaction as well as the role of polar oceans in climate change. Establishment of the Arctic Ocean and the Southern Ocean Observing Systems, including the reactivation of existing and the establishment new sea level measurements stations as part of GLOSS, strengthening of the IABP and IPAB ice drifter networks, deployment of ocean moorings, Upward Looking Sonars for ice drift, and Argo floats in Southern Ocean, establishing of research stations on drifting ice and conducting marine expeditions on board ships, icebreakers, submarines, national airborne visual and radar patrols, supplemented by satellites with active and passive microwave sensors, optical scanners and sounding instruments;

- Further development of capabilities to observe and model or parameterise the hydrological cycle of regions with cold climate, and to achieve quantitative understanding of fresh water input to the Arctic Basin and Southern Ocean. The implementation of an ARCTIC-HYCOS project should provide data on river input to the Arctic basin over the entire Arctic drainage area.