

International Polar Year



2007 - 2008

Robin Bell - Vice-Chair ICSU Planning Group
IPY Discussion Forum - SCAR Open Science Conference, Bremen
July 28, 2004

www.ipy.org



Goal of Talk

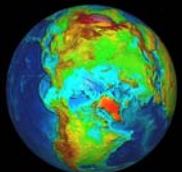
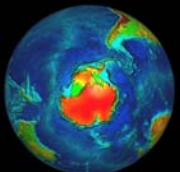
- Motivation for IPY
- Present Concept, Themes and Emerging Initiative from ICSU Outline Science Plan
- Stimulate Discussion and Planning by Highlighting Ideas Emerging in Open Science Conference Corridors



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Motivation for an IPY

- Our Planet is Changing - Global Issue
- Frontiers of Planet Remain Beyond Individual Nation's Reach
- Working Internationally Produce Significant Advances in Understanding
- Understanding with Global Ramifications
- Working Cooperatively International Science Community Can Push Back the Frontiers

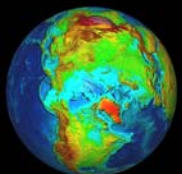
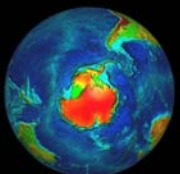




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IPY Concept

- 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
 - to capture the interest of the public and decision-makers



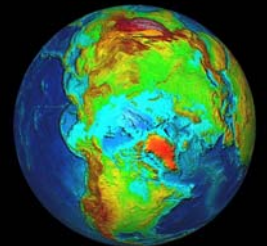
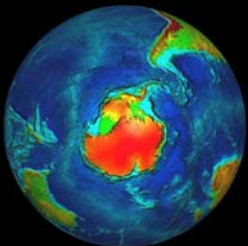


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IPY - 2007/8 Main Characteristics

- When
 - 1st March 2007 to 1st March 2009
- Where
 - Latitudes ~60 to 90, North and South
- What
 - 5 Major Themes
 - 5 Emerging Observational Initiatives



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Science Outline Result of Synthesis of International Community's Brainstorming

- Scientists from 25 countries
- ~30 ICSU and non-ICSU bodies
- 12 National Committees
- 7 National Points of Contact
- 350 "Ideas"



Theme #1 The Pulse of the Polar Regions

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

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

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

How are climate, environment, and ecosystems in the polar regions (including high latitude oceans) changing?



Theme #2

Understanding Change

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

- How has polar diversity responded to long-term changes in climate?
- How has the planet responded to multiple glacial cycles?
- What critical factors triggered the cooling of the polar regions?



Theme #3 Global Teleconnections

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

- What role do the polar regions play in the global carbon cycle?
- What is the stability of the Earth's major ice masses and what will be their impact on global mean sea level?
- What are the inter-hemispheric connections in these changes?

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Theme #4 Investigate the Unknown

To investigate the unknowns at the frontiers of science in the polar regions

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

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

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

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

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



Theme #5 A Unique Vantage Point

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

- How does the neutral atmosphere interact with geospace at the polar regions and what are the consequences?
- What is the influence of solar processes at the polar regions on earth's climate?
- What is the state of the Earth's magnetic dipole?
- Is the inner core rotating differentially?



Five IPY Themes

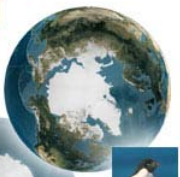
1. **The Pulse of the Polar Regions:** To determine the present environmental status of the polar regions by quantifying their spatial and temporal variability
2. **Change:** To quantify and understand past and present environmental and human change in the polar regions in order to improve predictions
3. **Global Teleconnections:** To advance our understanding of polar-global teleconnections on all scales, and of the processes controlling these interactions
4. **Investigate the Unknowns:** To investigate the unknowns at the frontiers of science in the polar regions
5. **Unique Vantage Point:** 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 IPY Emerging Observational Initiatives

1. **The Pulse of the Polar Regions**==> A synoptic set of multidisciplinary observations to establish the status of the polar environment in 2007-2009
2. **Change**==> The acquisition of key data sets necessary to understand factors controlling change in the polar environment
3. **Global Teleconnections**==> The establishment of a legacy of multidisciplinary observational networks
4. **Investigate the Unknowns**==> The launch of internationally coordinated, multidisciplinary expeditions into new scientific frontiers
5. **Unique Vantage Point**==> The implementation of polar observatories to study important facets of Planet Earth and beyond

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The Growing Grass.... Emerging Self Organized Groups

Proposed Theme

The Pulse of the Polar Regions

Emerging Initiative:

A synoptic set of multidisciplinary observations to establish the status of the polar environment in 2007-2009

Ideas in the Corridors.....

1. Census of Marine Life
2. IDEA Traverses

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The Growing Grass.... Emerging Self Organized Groups

Proposed Theme

Understanding Change

Emerging Initiative:

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

Ideas in the Corridors.....

- Ocean Gateways
- Neo-tectonics - ANTEC
- Defining the Geologic Template for East Antarctic Ice Sheet

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The Growing Grass.... Emerging Self Organized Groups

Proposed Theme

Global Teleconnections

Emerging Initiative:

The establishment of a legacy of multidisciplinary
observational networks

Ideas in the Corridors.....

- ANTEC (Remote Observatories)

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The Growing Grass.... Emerging Self Organized Groups

Proposed Theme

Investigate the Unknowns

Emerging Initiative:

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

Ideas in the Corridors.....

- Collaborative Sequencing of Polar Biota (Ice Fish or Cryptopygus)
- Genetic Mapping of Biodiveristy of Antarctica
- Sub-glacial Lakes

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The Growing Grass.... Emerging Self Organized Groups

Proposed Theme

Unique Vantage Point

Emerging Initiative:

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

Ideas in the Corridors.....

- ANTEC



The Growing Grass.... Emerging Self Organized Groups

- The Pulse of the Polar Regions**==> A synoptic set of multidisciplinary observations to establish the status of the polar environment in 2007-2009
 - Census of Marine Life
 - IDEA Traverses
- Change**==> The acquisition of key data sets necessary to understand factors controlling change in the polar environment
 - Ocean Gateways
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 - Defining the Geologic Template for Glaciation in East Antarctica
- Global Teleconnections**==> The establishment of a legacy of multidisciplinary observational networks
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- Investigate the Unknowns**==> The launch of internationally coordinated, multidisciplinary expeditions into new scientific frontiers
 - Collaborative Sequencing of Polar Biota (Ice Fish or Cryptopygus)
 - Genetic Mapping of Antarctica
 - Subglacial Lakes
- Unique Vantage Point**==> The implementation of polar observatories to study important facets of Planet Earth and beyond
 - ANTEC



What is Happening Now???

- Comment Period on the Science Plan - August 14 Deadline
- Identifying Weaknesses / Omissions in Science Plan
 - Specifically Social Sciences and Polar Medicine
- Grass Roots Organization of International Community
- Initial Discussion of Logistical Planning by Polar Operators Based on National Committees Ideas
 - COMNAP IPY Discussions Bremen
- Development of ICSU/WMO Structure for Identifying Major Projects