



IP3, A Canadian Contribution to Global Science through IPY

IP3

November April 13th, 2007

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This Presentation

- What is IPY?
 - Where did it come from
 - Contributions of past IPY's!
- Overview of IPY # 4
- The Contribution IP3 is making to IPY and linkages
- The IPY Legacy
- Contact Information

The IPY Vision

Karl Weyprecht - after reflection on his own Arctic Expeditions

- Thousands of Observations "furnish us with a picture of the extreme effects of the forces of Nature in the Arctic regions, but leave us completely in the dark with respect to their causes"
- Proposed an "International year of concentrated research activity, organized through national efforts but coordinated at the international level, to methodically map Arctic geography and observe seasonal processes". (*48th Meeting of German Scientists and Physicians in Graz*)



Karl Weyprecht's Principles

Previously Arctic Science was incidental to planting the flag

- **Arctic Science is Planetary Science**
- **Standard Protocols**
- **Standard Instrumentation**
- **Synchronized Readings**
- **Shared and Open Access to Data**



• Yukon connection- **Mt. Weyprecht** – Kluane National Park

IPY1 1882-83

11 Nations- 13 Polar expeditions driven by scientific research



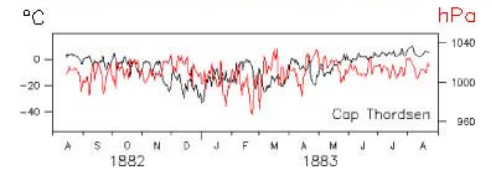
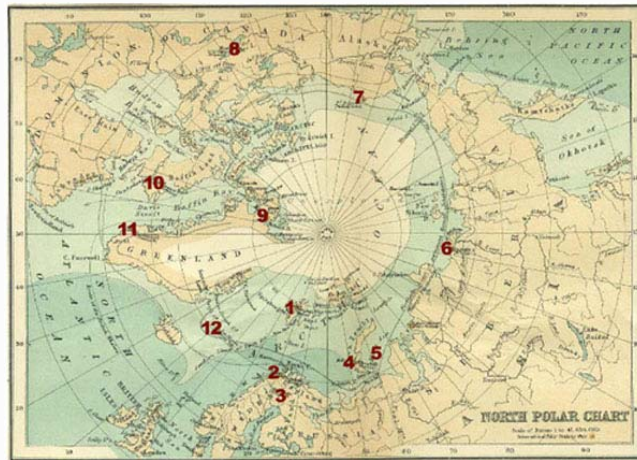
Tymonius equus. — Schöner's Expedition.



SHARPEY'S 4 Jan. 1883. Les navires dans le port de la baie de la glace.



Ordnung polare Expedition in einem Cap Horn. Ansicht des Lagers der Expedition von der Höhe der Expedition.



Handwritten manuscript text in two columns, likely a journal entry or scientific report.



Recognition of Global Benefits

“The object is to obtain a **better knowledge of the atmospheric laws and magnetic forces which are supposed to affect the state of the weather.**

It is supposed that this will **enable observers at Toronto and elsewhere to better prognosticate the weather** and we shall gain largely in that respect.”

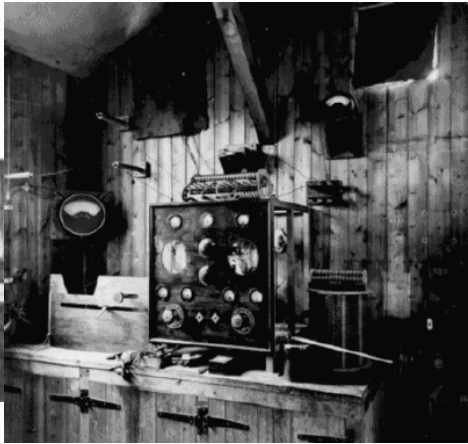
The Canadian Minister responsible when queried why Canada is contributing \$4000 to support the British expedition to Old Fort Rae

- Led to the Discovery of Air Masses and Upper Atmospheric Air Movement (and a better understanding of Tsunamis)



IPY #2: 1932-1933; 40 nations

Breakthroughs in aurora and upper atmospheric science related to radio communications, navigation, and weather forecasting



University of Saskatchewan became a Future Leader in Space Science

- Why? *“This increased knowledge will be of practical application to problems connected with terrestrial magnetism, marine and aerial navigation, wireless telegraphy and weather forecasting.”* Balfour Currie
- Dr. Balfour Currie became a Canadian Lead for Magnetism, Ionosphere and Aurora during the IGY 25 years later
- Saskatoon has become a Canadian Space Research centre.
- Middle of the Depression and subsequent Science disrupted by World War II

IPY 3 (International Geophysical Year): 1957-1958; 67 nations

Occurred during the “Cold War”- most activities were planned but were often interpreted as part of the East West competition.

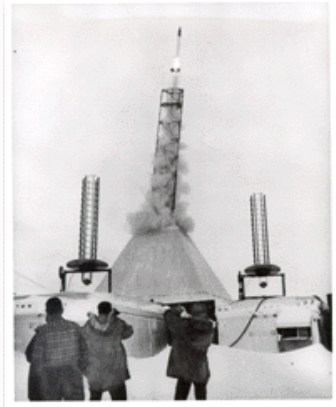
Unprecedented exploration and discoveries

- Launch of the space age (10 first satellites)> Van Allen Radiation Belts
- Mapping ocean floors and discovery of mid oceanic ridges > Tuzo Wilson, U. of Toronto and others – process driving plate tectonics
- Ocean bathymetry & estimate of total mass of the cryosphere

Laid foundations for next decades of polar research

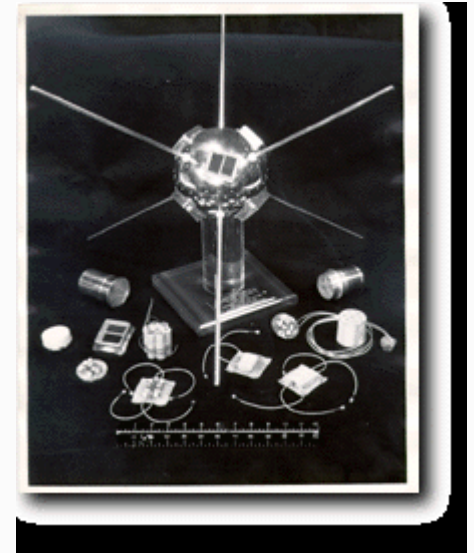
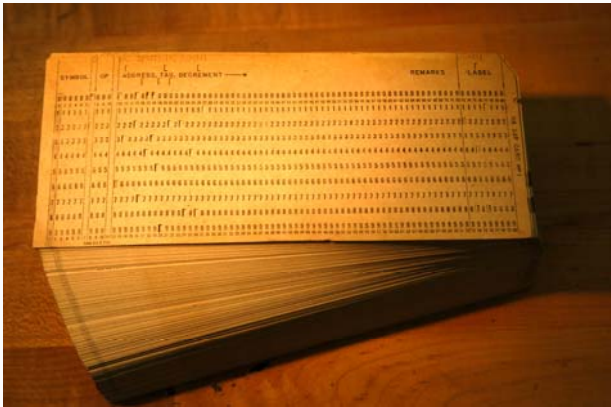
- Signing of Antarctic Treaty
- Establishment of Antarctic Permanent Bases

IGY generated Global Activity



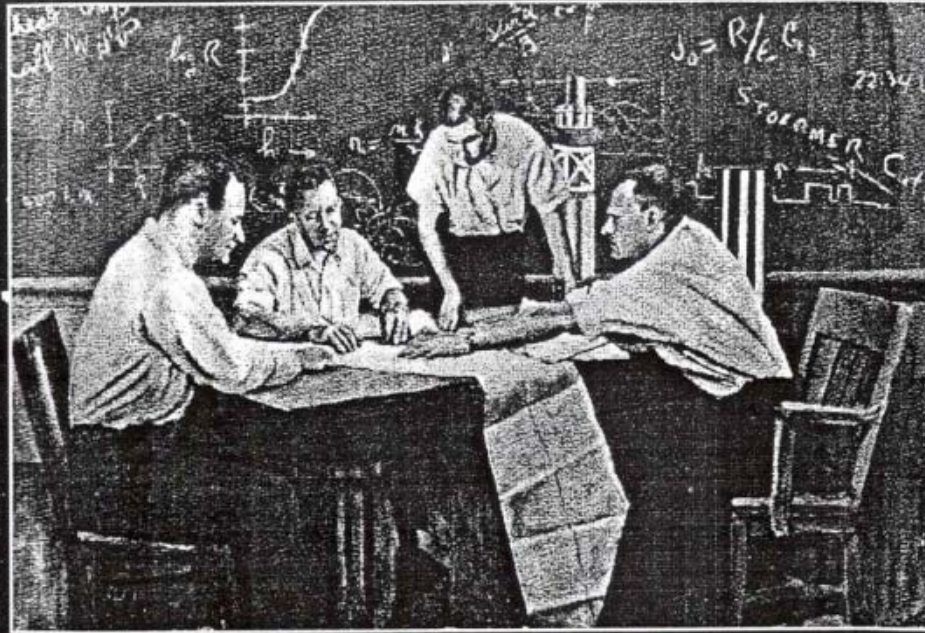
Sno-cat & Crevasse

Debuted New Technologies



Spectacular New Knowledge!

Discovery of the Van Allen Radiation by Explorer 1, January 1958

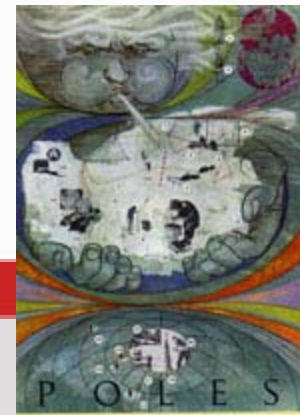
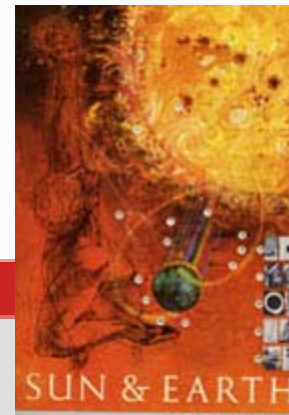
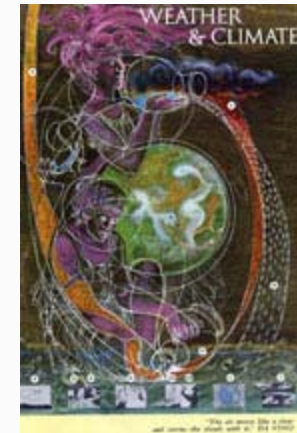
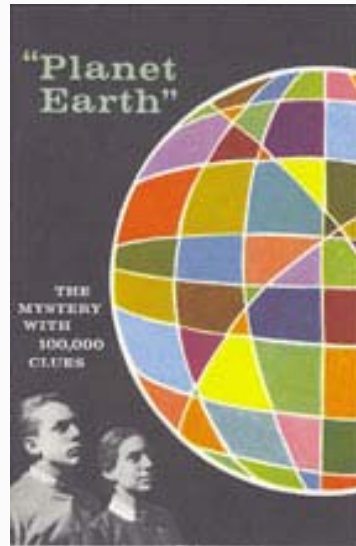


"My God, space is
radioactive!"

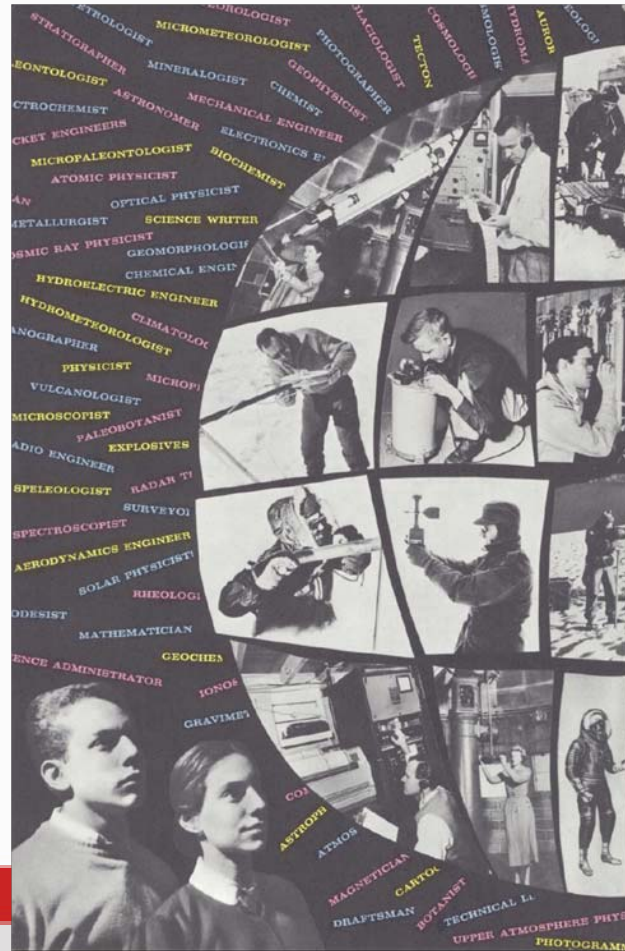
Dr. Ernest C. Ray
March 28, 1958

Education- Engaging Youth

The National Academies



IGY Inspired The Next Generation of Scientists



Energized Canada's Earth & Arctic Science Programs

- The Year Before the IGY Canada graduated 1 PhD geographer
- During and Following the IGY
 - Established the **Polar Continental Shelf Project**
 - **Churchill Launch Centre**
 - Major expansion of Canada's University research capacity
 - Establishment of the **Kluane Lake Research Centre**



IGY Spawned 4 Legacy Years



Year of the Planet Earth



International Heliospherical Year



International Polar Year

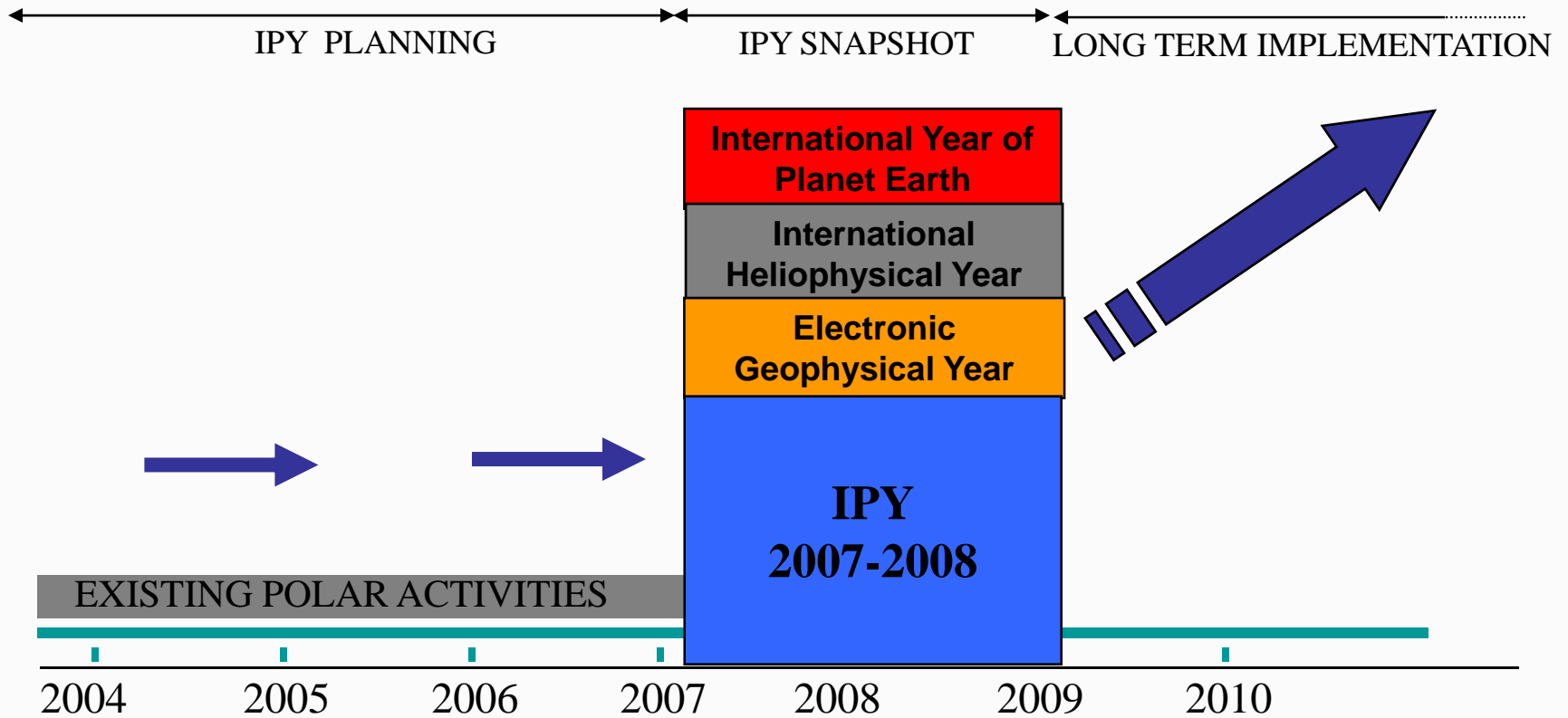


International Electronic Geophysical Year

Strategic Context of IPY 4

- Antarctic Treaty- SCAR
- IASC- 2nd 10 Year Strategic Plan
 - ICARP 2
 - Plan 7: Terrestrial Cryospheric & Hydrologic Processes & Systems
 - Plan : Terrestrial& Freshwater Biosphere & Biodiversity
 - Plan 9: Modeling & Predicting Arctic Weather, Climate & Ecosystems
 - Plan 10: Rapid Change: Resilience & Vulnerability in Social-Ecological Systems
- *www.icarp.dk*

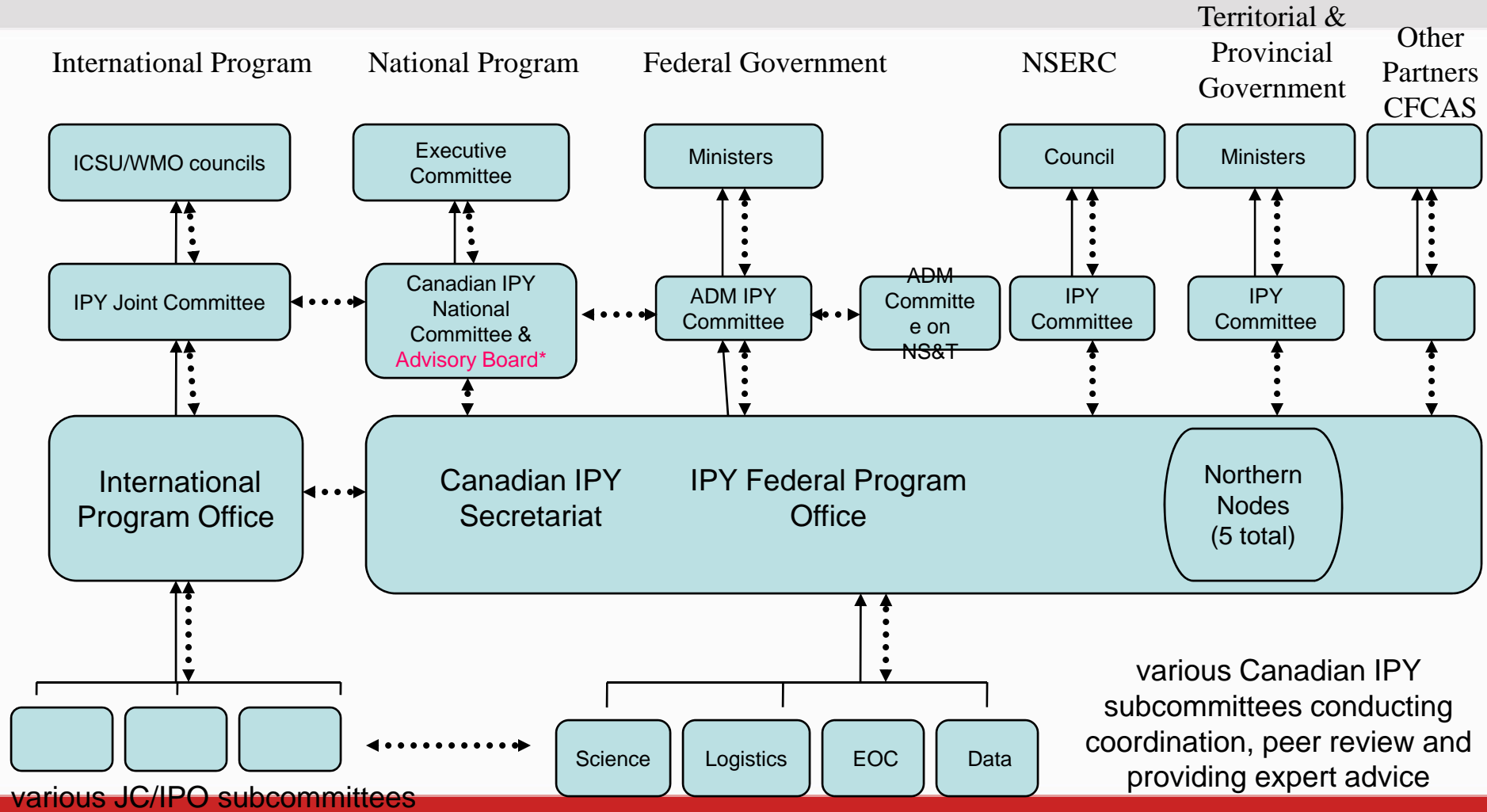
IPY 4 Science will be a 'Snapshot' - - - An "Accelerant" and a Legacy



Who is IPY?

- Co-Sponsors: International Council for Science (ICSU) & UN's World Meteorological Organization (WMO)
 - Internationally coordination: Joint Committee & International Program Office. Canadian Michel Beland is a co-chair
 - International Working Groups: Observations, Logistics, Data, Outreach and Education, Youth etc.
 - International Endorsing Organizations- 50+
 - National Committees delegated responsibility to lead national contributions
-
- Bottom Up versus Top Down organization of the IPY Agenda

Partial Canadian IPY Organization - Scary!

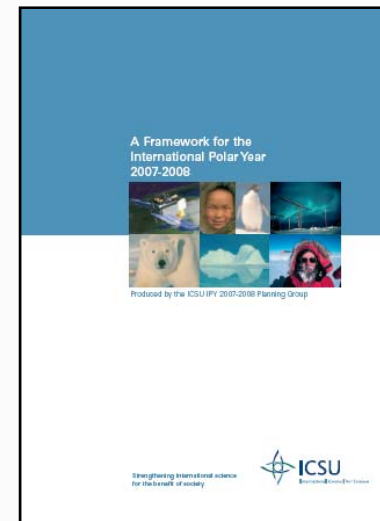


Internationally IPY is Focused on 6 Themes

1. Status
2. Change
3. Global Linkages
4. New Frontiers
5. Vantage Points
6. The Human Dimension (TK Contribution)

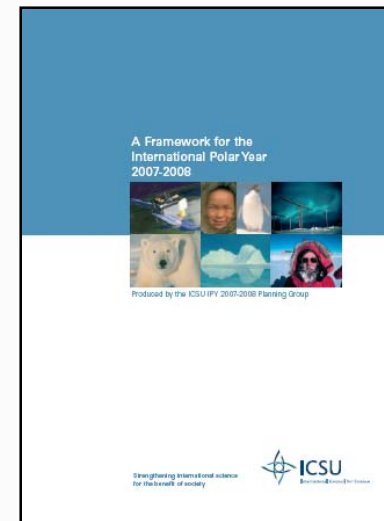
(Human Dimension runs through ALL Themes. Previous IPYs focused on Physical Sciences)

Climate has become a unifying focus



International IPY Objectives

1. **Internationally Coordinated Interdisciplinary Science**
2. Open and coordinated **Data Management**
3. Education, **Outreach** and Communications
4. **Future Generation** of Polar Scientists
5. Demonstrate and utilize **New Technologies**
6. A **Legacy** to include:
 - Observing sites, Facilities and Systems to support ongoing polar science and monitoring
 - **Participation** and leadership the peoples of the polar regions



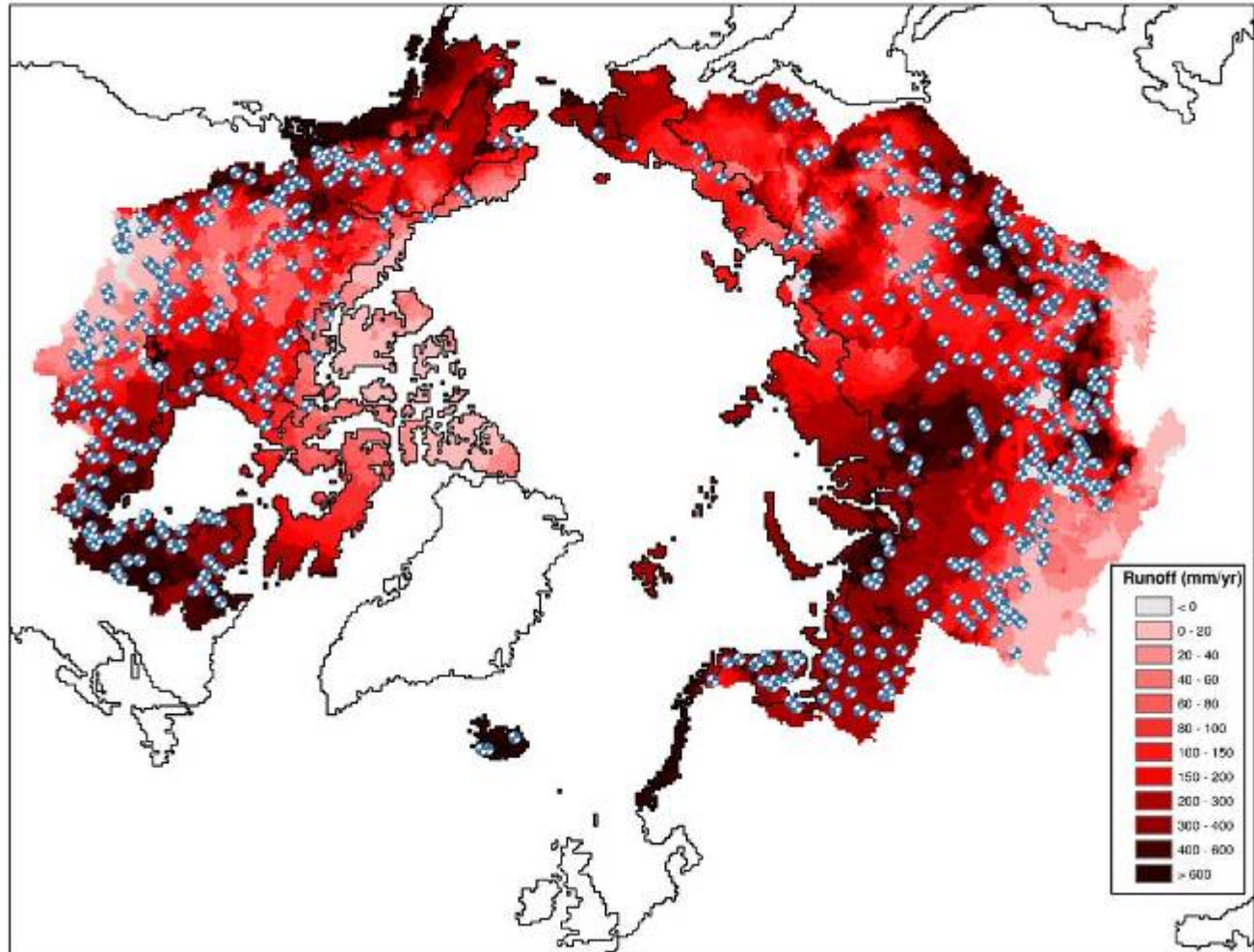
IPY Programs- “Fully Endorsed” and “Nationally Endorsed”- Meaning?

- International collaborations of researchers, communicators, educators, communities and others endorsed by the Joint Committee
 - Consistent with Framework
 - “Almost” all potential science themes covered by “Fully Endorsed” Programs
 - Each “Fully Endorsed” Programs may consist of many projects with multiple funding sources- Interdisciplinary & International in scope
 - Each “Fully Endorsed” Programs under the leadership and coordination of a **Program Lead**
 - New Projects are encouraged to join existing Fully Endorsed Programs
 - A total of **228 Fully Endorsed Programs**
 - **57 Focused on Education and Outreach**
- “National Endorsement” comes from National Committees

Where does IP3 Fit?

- Fully Endorsed IPY Program #104: The Arctic Hydrological Cycle Monitoring, Modelling and Assessment Program (**Arctic-HYDRA**)
 - 10 Individual proposals that were submitted were enveloped into 104
 - Lead Organization is the UN's WMO
 - Program lead -Arni Snorrason, Iceland
 - Multiple Projects
 - Other Projects can request being attached and can help inform Arctic- Hydra

Arctic Hydra will Providing Comprehensive modelling of the Arctic and Northern Region



Arctic Hydra will connect IP3 through to Global System

- Freshwater changes in the Arctic affect the system of Ocean currents in and from the Arctic Ocean
- Freshwater fluxes or salinity anomalies affect the regional ocean and atmospheric conditions
- Freshwater fluxes and salinity anomalies affect the Deep Water formation in the North Atlantic

From Snorrason

The Arctic Ocean Currents

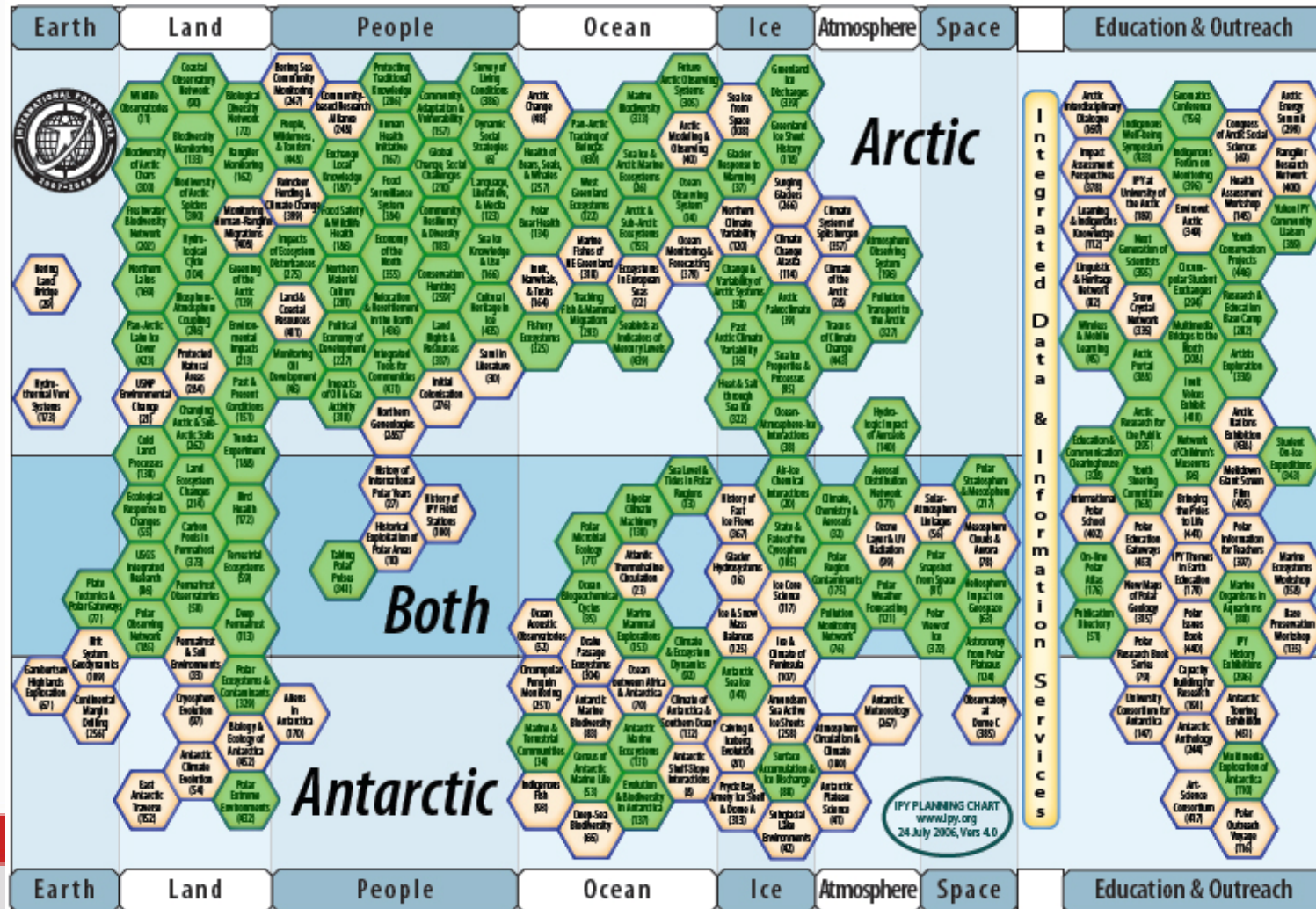


Source: Oceanus 2007, WHOI

IPY and Arctic - Hydra are About other Linkages – Not Just Water

- Freshwater Biodiversity Network #202- Fred is next
- Northern Lakes # 169
- Biosphere – Atmospheric Coupling #246
- State and Fate of the Cryosphere #105
- Polar Weather Forecasting #121
- **Sustainable Arctic Observing Network (SAON)**
- And Programs linking back to people (example Environmental Change & Traditional Use in the Old Crow Flats- Brent Wolfe)

"Genius" of the Planning Chart



IPY Participation not Contingent on Federal IPY \$'s

- Federal Government expects the \$150 Million will serve as a catalyst resulting in a 5-7X Multiplier in Canadian Polar Science-International & Canadian contributions
 - CFCAS has levered an extra \$140 for their \$110 Million)
- Success of IPY has already influenced future federal polar investment- Mini Budget announcements

IPY Official Observation Period will end in March 2009

- A key role of IPY is to leave a legacy
 - Knowledge
 - Infrastructure
 - Monitoring Networks
 - Next Generation
 - Northern Capacity
 - A Better Informed Public
- Results Conferences:
 - Science & Policy 2012- Canada hosting
 - Science informing Policy: Will we be able to match the Antarctic Treaty System?

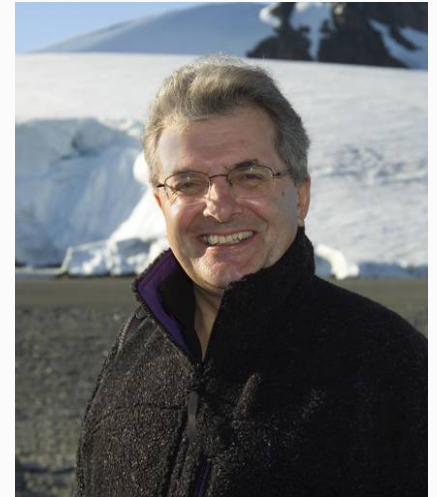
IPY Days

- December 13th 2007 (Thurs): Ice Sheets, traverses, expeditions, adventure
- March 13th 2008 (Wed): Changing Earth, **Past & Present ice, climate**, oceans, paleoclimate, Earth history
- June 18th 2008 (Wed): Land and Life **permafrost**, terrestrial biodiversity, hydrology, snow
- **Can IP3 Contribute?**

Will the IPY Succeed?

“It Already Has!” Dr. Chris Rapley

- Enhanced international collaboration- 63 Nations, December 2006- over 50,000 participants
- Breadth of disciplines and topics
- “Bottom up” approach
- Catalyst for new linkages between disciplines, nations, institutions, programs and projects
- Community involvement building new capacity in the circumpolar north.
- Integration of Traditional and Community Knowledge with “*Western Science*”
- Youth & the next generation of polar scientists are demonstrating leadership.
- New Funding for Polar Science.
- Media and the Arts are active participants
- **Participation exceeded all expectations**



People are Beginning To Look to the Poles



Yukon News, March 5th 2007

The IPY Legacy will out live Yesterday's Story!

Web Sites

- **International**

- International Office – British Antarctic Survey, Cambridge, UK
 - www.ipy.org
 - Access to all National IPY Committees and the International Youth Steering Committee
 - Most data bases now in <http://classic.ipy.org>

- **Canada**

- Canadian IPY Portal (maintained by Secretariat)
 - www.ipycanada.ca
 - Also provides access to the Canadian Youth Steering Committee
 - The plan is it will become a portal for all Canadian IPY activities including research programs

Contacts

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