

WCRP

World Climate Research Programme

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International Polar Year 2007/2008 (IPY), role of WCRP and GEWEX

Vladimir Ryabinin, JPS for WCRP

RISKS
SYSTEMS

LETTER]

09-13.10.2006, ESRIN, Frascati, 1st Pan-GEWEX meeting



WCRP

World Climate Research Programme

IPY 2007-2008

An intensive burst of internationally coordinated, interdisciplinary,
scientific research and observations focussed on the
Earth's Polar regions

Time frame: 1 March 2007 to 1 March 2009

Legacy Workshop spring 2008

Large final conference in Norway, September 2010

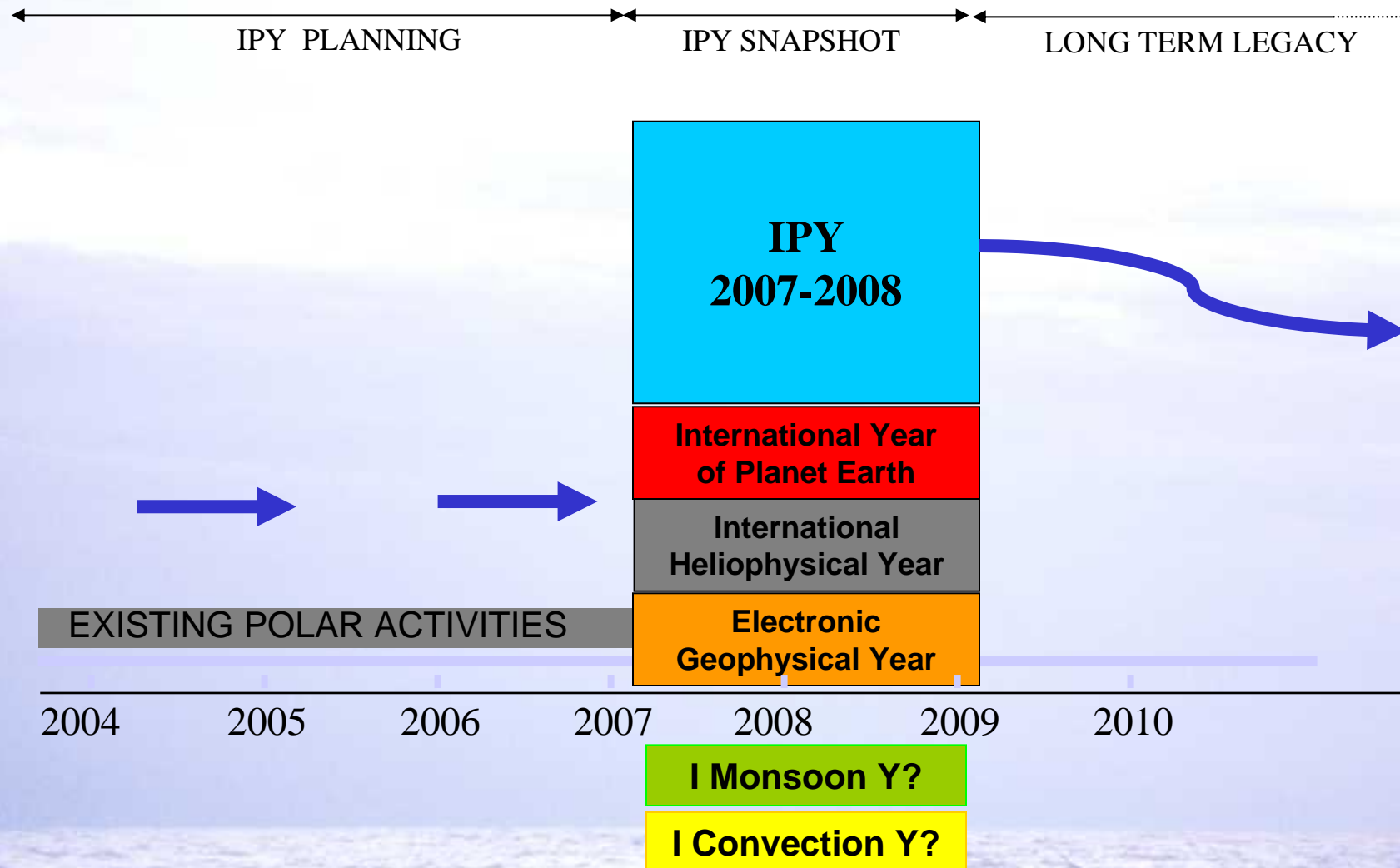
Co-sponsored by ICSU and WMO



www.ipy.org



IPY Snapshot and Legacy



09-13.10.2006, ESRIN, Frascati, 1st Pan-GEWEX meeting

IPY Themes

1. Current Status of Polar Regions
2. Change in the Polar Regions
3. Global Linkages
4. New Frontiers
5. Polar Regions as Vantage Points
6. The Human Dimension
(Human Dimension also runs through first 5 Themes)

Observational Initiatives

Data Management

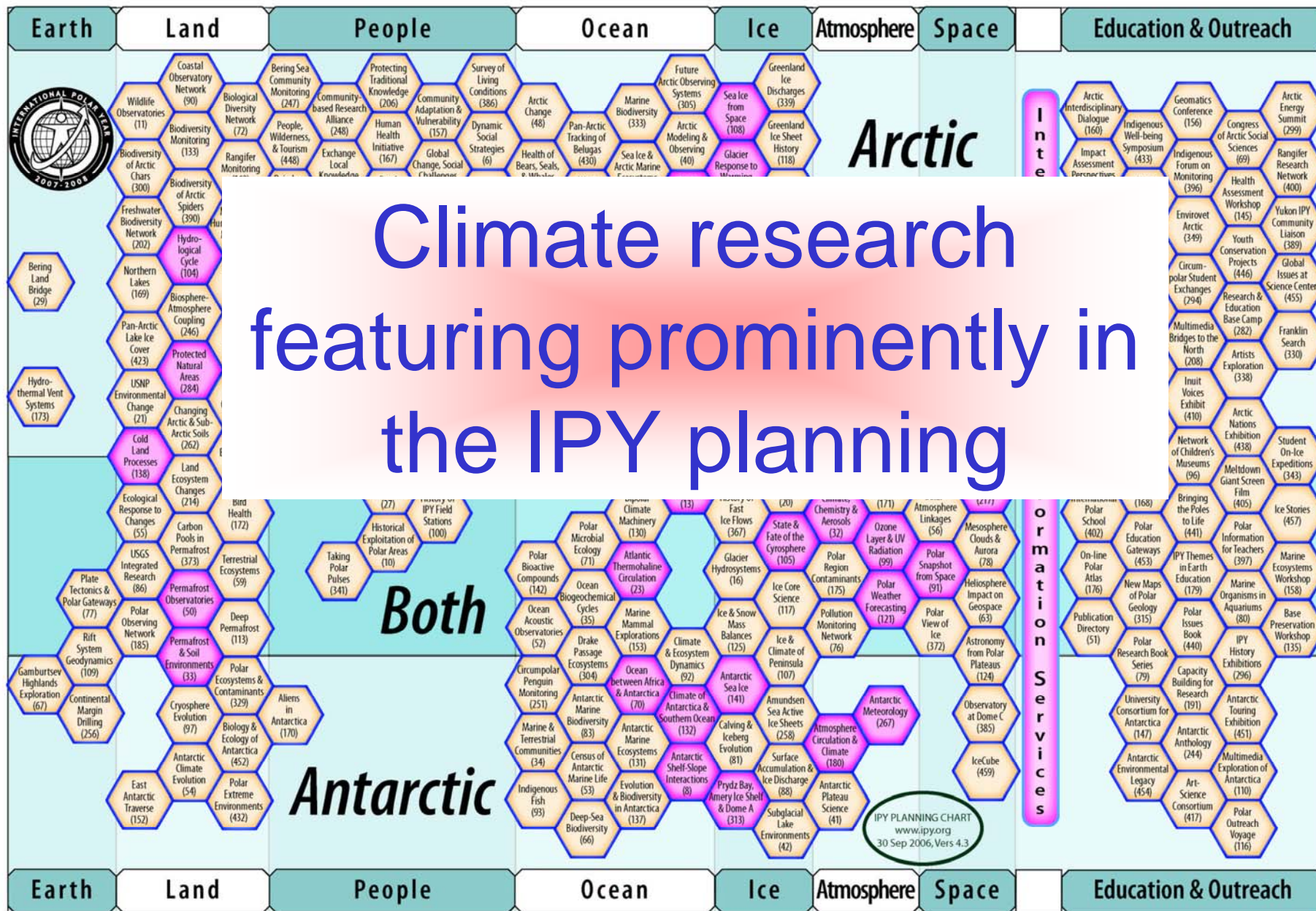
Education, Outreach & Communication



Proposals for IPY activities (“clusters”)

- Planning stage: ~ 1000 ideas (Eols), active role of WCRP
- Approximately 450 full proposals reviewed by JC from 3 Calls for Proposal for:
 - Adherence to IPY goals
 - Level of integration/coordination with related activities
- 225 proposals given full endorsement
 - 172 scientific;
 - 1 data management;
 - others (~ 53?) social, outreach and education.
- ~ US\$220M of new funding already in the pot
- ~ US\$110M being considered by US
- More funding possible
- ~ 50% of proposed projects count on getting some funding





09-13.10.2006, ESRIN, Frascati, 1st Pan-GEWEX meeting

GEWEX-related IPY projects:

91 – IPY Data and Information Service

104 – Arctic Hydrological Cycle

140 – Hydrological Impact of Arctic Aerosols

138 – Cold Land Processes (NEESPI)

418 – Polar CEOP

Overarching:

105 - The State and Fate of the Cryosphere

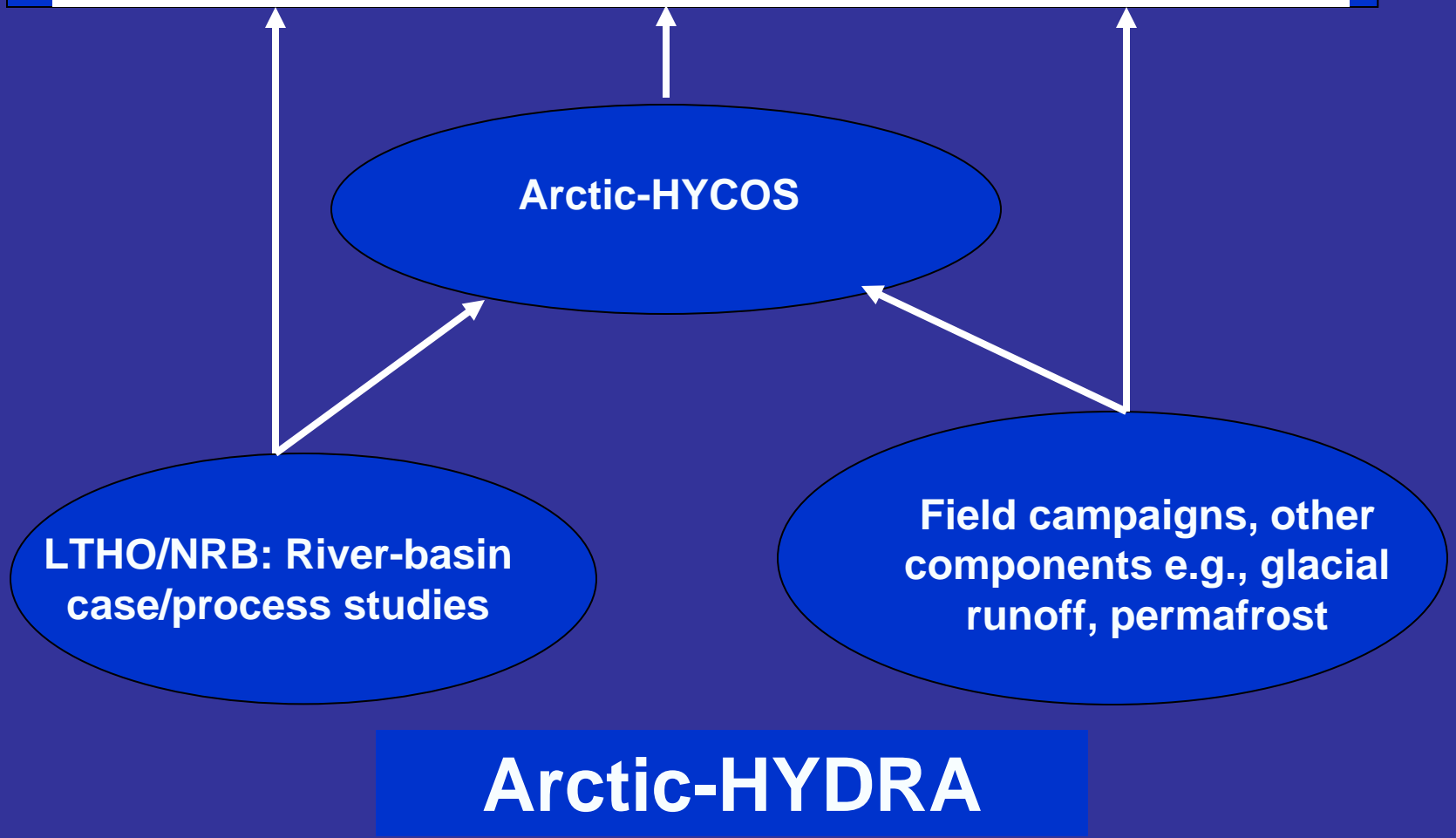
91 - Global Interagency IPY Snapshot Year

CliC IPY Proposal: The State and Fate of the Cryosphere ("Cryos")

Goals

1. **assess the current state** of the cryospheric parameters in the polar regions,
2. **formulate the observational requirements** of cryospheric variables for weather and climate monitoring and prediction,
3. **strengthen international cooperation** in the development of cryospheric observing systems.

IPY and beyond: ICARP plans for 2007-2020



Hydrological Impact of Arctic Aerosols

Interactions among aerosols, clouds
and precipitation in the Arctic

Impact of variations and changes in
aerosol characteristics on
precipitation, snow cover, river flow,
permafrost and surface temperature

HIAA



Science and Observational Requirements on Spaceborne Systems During the IPY

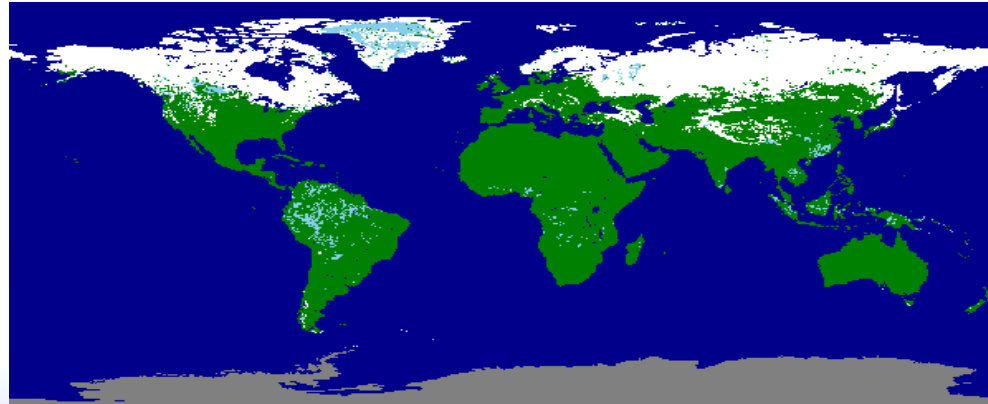
Global Inter-agency IPY Polar Snapshot Year (GIIPSY)

The following IPY observational requirements can be best met, and perhaps only met, through a coordinated effort by the space-faring nations.

*Developed by Ken Jezek et al.
for the IGOS-Cryosphere Theme*

High Latitude Seasonal Snow Cover

how much water is stored as seasonal snow and its variability.

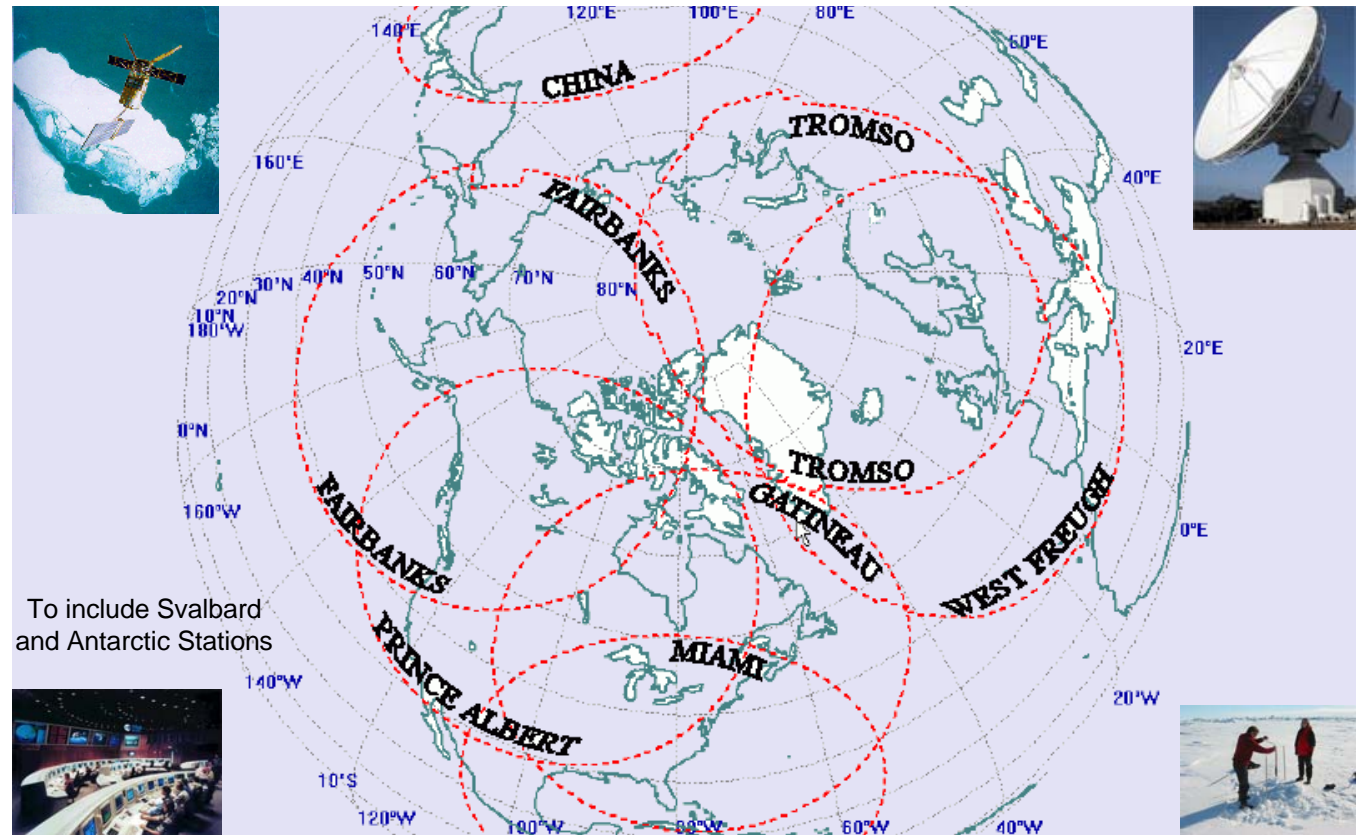


Geophysical Variable	Intermediate Product	Observation Interval	Spatial Scale	Instrument Type	Wavelength	Special requirement	Potential System
Snow Extent Snow Thickness SWE	Microwave and optical radiance	Daily	Arctic Wide	Microwave Radiometer, Visible & IR Imager			MODIS AMSR-E SSM/I SMOS
Surface Temperature	IR Radiance	Daily	Arctic Wide	IR Radiometer	Thermal IR		MODIS A-ATSR
Snow Thickness	Range	Seasonal	Arctic Wide	Laser Altimeter	Visible		ICESat
Surface Albedo	Optical reflectance	Seasonal	Arctic Wide	Visible imager	Visible and IR	Cloud masking	MERIS A-ATSR MODIS SPOT VGT

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The End to End System



IPY science goals can be realized through collaboration on the end-to-end system of:

- Sensors and Spacecraft
- Acquisition Planning
- Receiving Ground Stations
- Processing Facilities
- Calibration and Validation

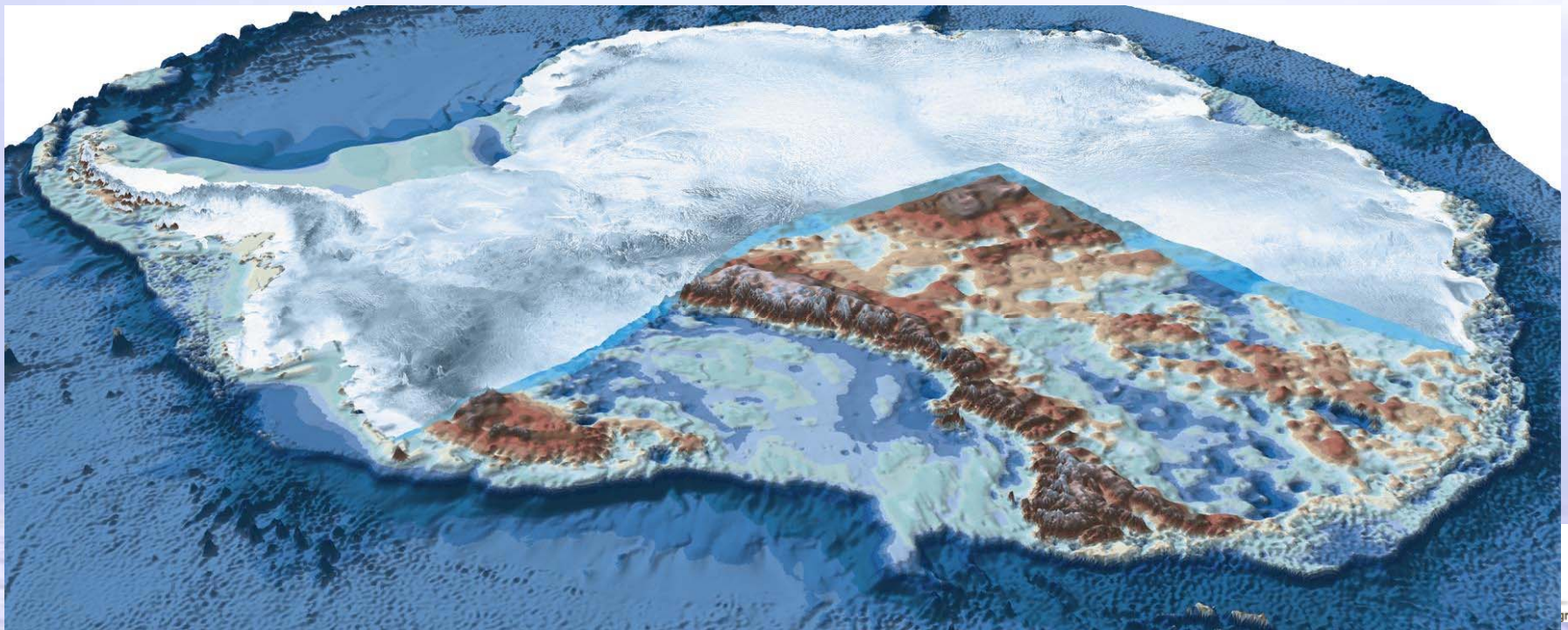
Additionally, plans should include suborbital campaigns where there may be a need to tie interrupted space observations (e.g. ERS-2 to IceSAT to Envisat RA2) that bracket the IPY period.





Technical Innovation

The IPY is a scientific endeavour. It is likely that the IPY investigations will also identify new technical requirements and approaches. A recommendation to the flight agencies is to *seed the most promising ideas so as to prepare for next generation observations.*



Anticipated Requirements on Future Systems Some Examples

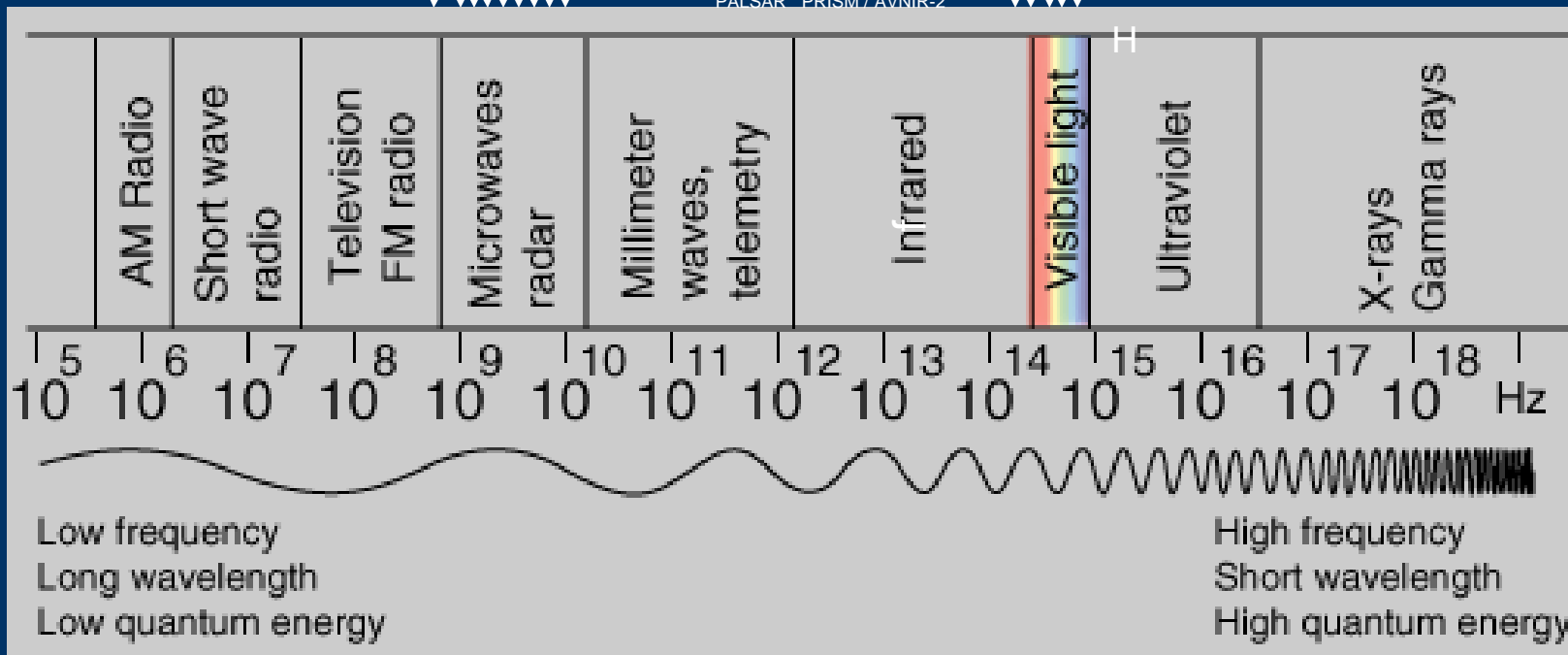
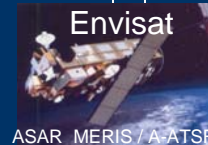
Geophysical Variable	Intermediate Product	Observation Interval	Spatial Scale	Possible Instrument Type	Possible Wavelength	Special requirement	Potential System
Ice Sheet Thickness	Signal travel time	5 years	Ice Sheet	Radar	P-band	20 m accuracy	TBD
Glacier Thickness	Signal travel time	5 years	Arctic Glaciers	Radar	P-band	20 m accuracy	TBD
Sea ice snow cover thickness	Signal travel time	Weekly	Ice covered waters	Radar	Ultrawide band	5 cm accuracy	TBD
Englacial Layers	Signal travel time	5 Years	Glaciers and Ice Sheets	Radar	Ultrawide band	Few meters	TBD
Permafrost type and extent	TBD	Seasonal	Arctic Wide	TBD	TBD	TBD	TBD
Ice Motion	SAR SLC	Annual to 5 year	Polar wide	SAR	C (L,X)	8 day repeat or shorter, 200 m baselines or less, L/R look	TBD

Anticipated New Applications of Existing Systems

Geophysical Variable	Intermediate Product	Observation Interval	Spatial Scale	Possible Instrument Type	Possible Wavelength	Special requirement	Potential System
Ice Sheet internal temperature	Microwave radiance	Annual	Ice sheet wide	Radiometer as sounder	L-band	10 m accuracy	SMOS

Accomplishing the IPY Snapshot

Aircraft and in-situ
Sounders and GPR
Systems



Gravity

IPY Legacy

IPY Sub-Committee on Observations is trying to project what will be the legacy of IPY in terms of data & observing systems

Planning of satellite polar snapshot and its legacy:

ESTEC, 19 October 2006, after the IGOS-Cryosphere workshop, WCRP/CliC & IGOS Cryosphere active and in the lead

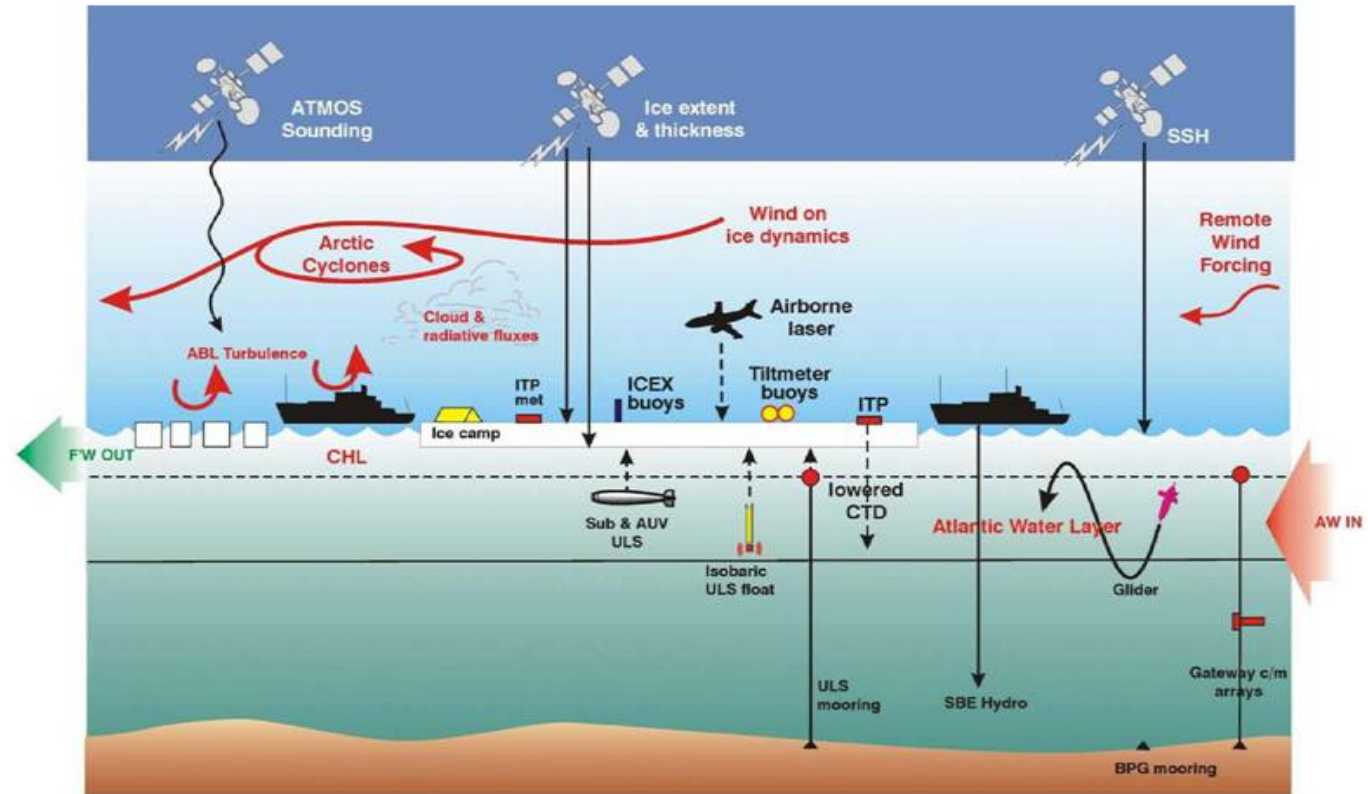
IPY overall data and observations legacy:

Meeting in Beijing, 25-27 October 2006

AOSB/CliC: Integrated Arctic Ocean Observing System (iAOOS)

8 nations: 54 Eols

Observing the Arctic Ocean from satellites to sea bed



Vertical transect through the Arctic Ocean: iAOOS from satellites to seabed



WCRP/GEWEX goal in IPY could be: seeding a Future Polar Hydrometeorological Observing System

- CEOP-like
- Bipolar
- Sustained
- Focus on cryosphere affected hydrology
- Collaboration of IGOS-Cryo, IGWCO, CliC and GEWEX, WMO, Arctic entities
- Complement to Arctic Ocean studies
- Climate research interests central
but with NWP/THORPEX

