



Climate and Cryosphere (CliC) Project

**Report to WGCM Meeting
Victoria, Canada
September 25-26, 2006**

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CliC History

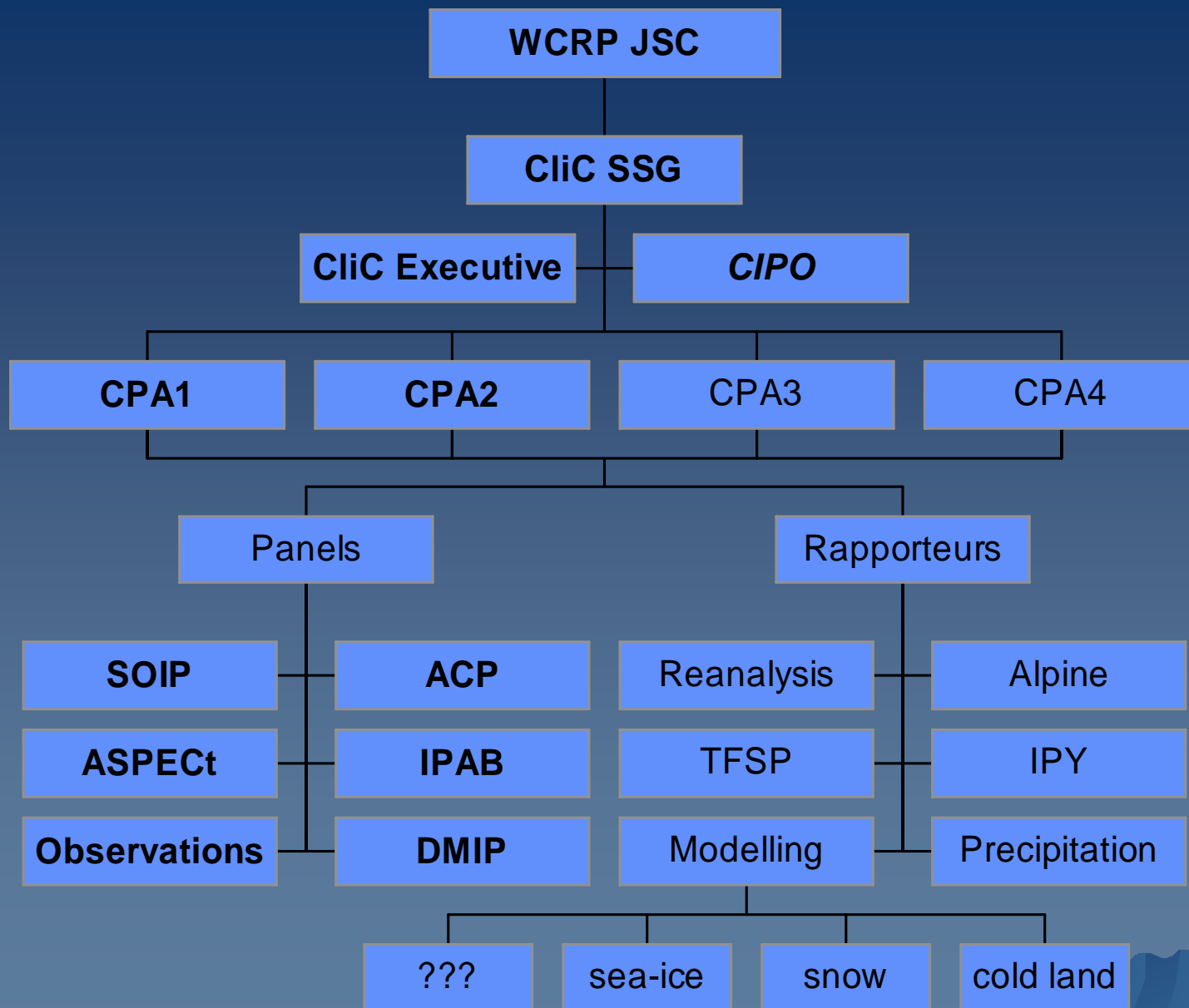
- ◆ Founded in 2000 under the auspices of JSC
- ◆ Successor to ACSYS, 1994-2003
- ◆ Broader, global study, to run to end of 2015
- ◆ Aims to stimulate, support and co-ordinate research on climate and cryosphere
- ◆ Implementation strategy document released in 2005
- ◆ First CliC Science Conference held in Beijing, 2006
- ◆ CliC International Office at Norwegian Polar Institute
- ◆ Cryosphere includes snow, ground ice, glaciers and ice caps, lake and river ice, sea ice
- ◆ Cryosphere is a sensitive component of the climate system.

CliC Goal and Objectives

Principal Goal: To assess and quantify the impacts that climate variability and change have on components of the cryosphere and its overall stability, and the consequences of these impacts for the climate system.

Supporting Objectives:

- ◆ Enhance the observation and monitoring of the cryosphere
- ◆ Improve understanding of the physical processes through which the cryosphere interacts with the climate system
- ◆ Improve the representation of cryospheric processes in models
- ◆ Use observed changes in the cryosphere as indicators of climate change



CPA1 – The terrestrial cryosphere and hydrometeorology of cold regions

- ◆ IPA (International Permafrost Association) coordinating research activities
- ◆ GCP (Global Carbon Project) initiative on carbon stocks in permafrost
- ◆ NEESPI (North Eurasia Earth Science Partnership Initiative)
- ◆ Arctic-HYCOS (Hydrological Cycle Observing System)
- ◆ CEPOP (Coordinated Enhanced Polar Observing Period) being investigated with CEOP
- ◆ Cold climate precipitation with GPCP
- ◆ SnowMIP2 – intercomparison of snow models
- ◆ MRI (Mountain Research Initiative) – high-altitude research stations



SnowMIP2 - focus on forest snow processes

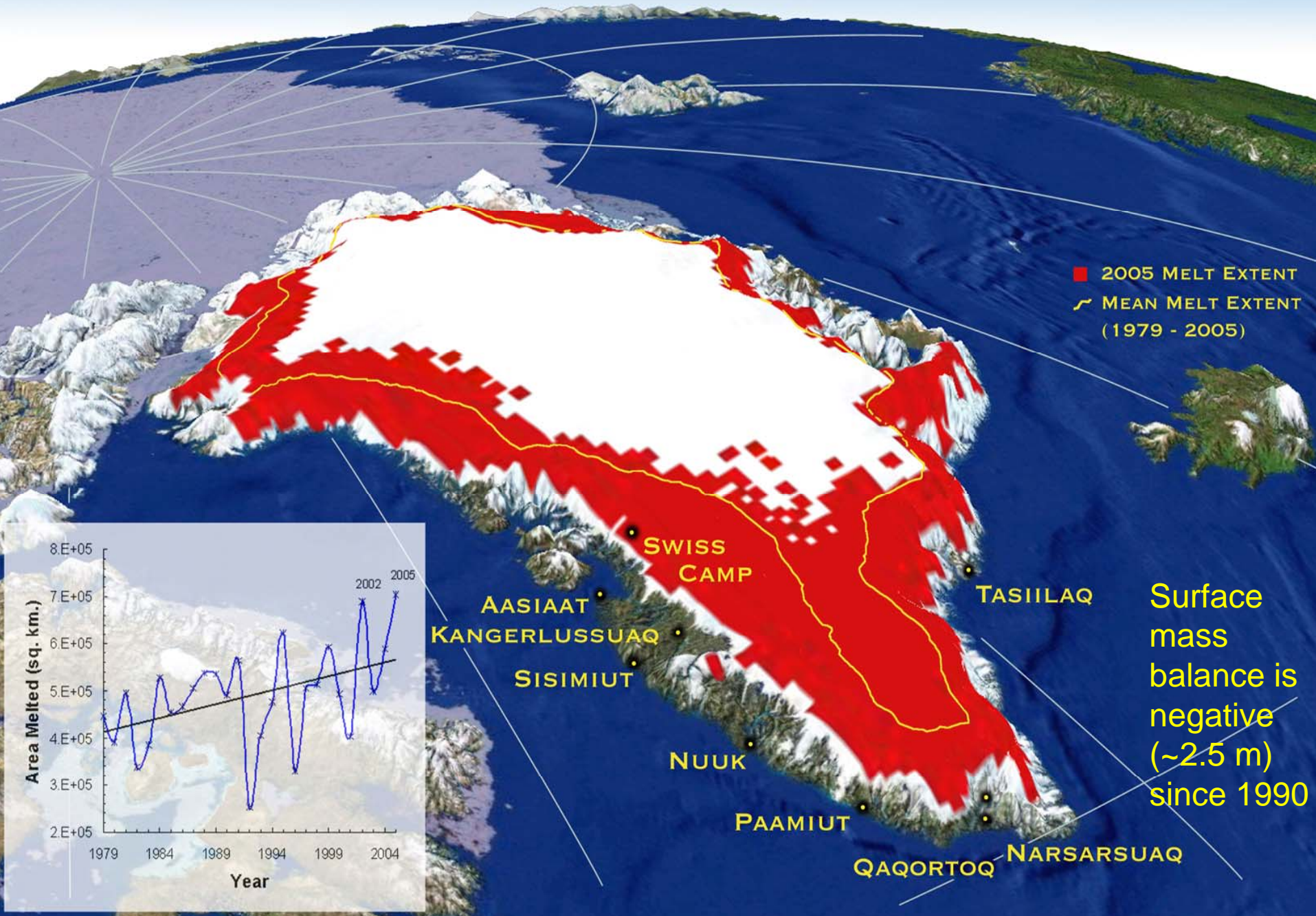


- Begun in 2004
- Data from four study sites in Switzerland, Canada, the U.S. and Japan
- SnowMIP looked at open sites; SnowMIP2 focuses on coniferous forest sites
- Model runs and analysis underway

CPA2 – Glaciers, ice caps and ice sheets, and their relation to sea level

- ◆ Questions of ice sheet and glacier mass balance, iceberg calving, basal melt, downscaling of climate model data, post-glacial rebound, subglacial hydrology
- ◆ Various targetted workshops being organized
- ◆ ASTER (Assessment of modelling uncertainties in long-term climate and sea level change projections)

GREENLAND 2005 MELT EXTENT



CPA3 – The marine cryosphere and its interactions with high-latitude ocean and atmosphere

- ◆ IABP (International Arctic Buoy Programme)
- ◆ ASPeCt (Antarctic Sea Ice Processes and Climate)
- ◆ DAMOCLES (Developing Arctic Modelling and Observing Capabilities for Long-term Environmental Studies)
- ◆ Globice – high-resolution sea ice mapping
- ◆ IceSat-2 mission under consideration by NASA
- ◆ Antarctic sea-ice thickness workshop held July 2006 in Hobart
- ◆ SIOMIP

*Southern Ice ocean model
intercomparison project
SIOMIP*

Slides provided by Siobhan
O'Farrell Interim Co-Chair



Cryospheric component

- ◆ Impetus coming from the Antarctic sea ice community
- ◆ Due to increase in quantity and quality of ice thickness observations this decade (and with additional data to be collected during IPY)
- ◆ Need to verify how well current generation ice models (particularly those included in IPCC models) perform against observations
- ◆ Potential to focus on ice formation in polynyas, snow ice formation, FW flux from ice shelf/glaciers

Project plans also cover Southern Ocean process

- ◆ Water mass formation and transformation
- ◆ Thermohaline circulation
- ◆ ACC dynamics and variability
- ◆ Ocean parameterizations, convection, eddy mixing, downslope flows

Model configuration and collaboration

- ◆ Covers regional, circumpolar and global ice-ocean models
- ◆ Build on WGOMD CORE approach
- ◆ Large and Yeager forcing, ? Over salinity relaxation and open boundary conditions
- ◆ Collaboration with CliC, ASPeCT, CliVAR
Southern ocean implementation panel,
WGOMD, AOMIP, SCAR AGCS, IPY
CASO+SASSI, ISOMIP

CPA4 – Links between the cryosphere and global climate

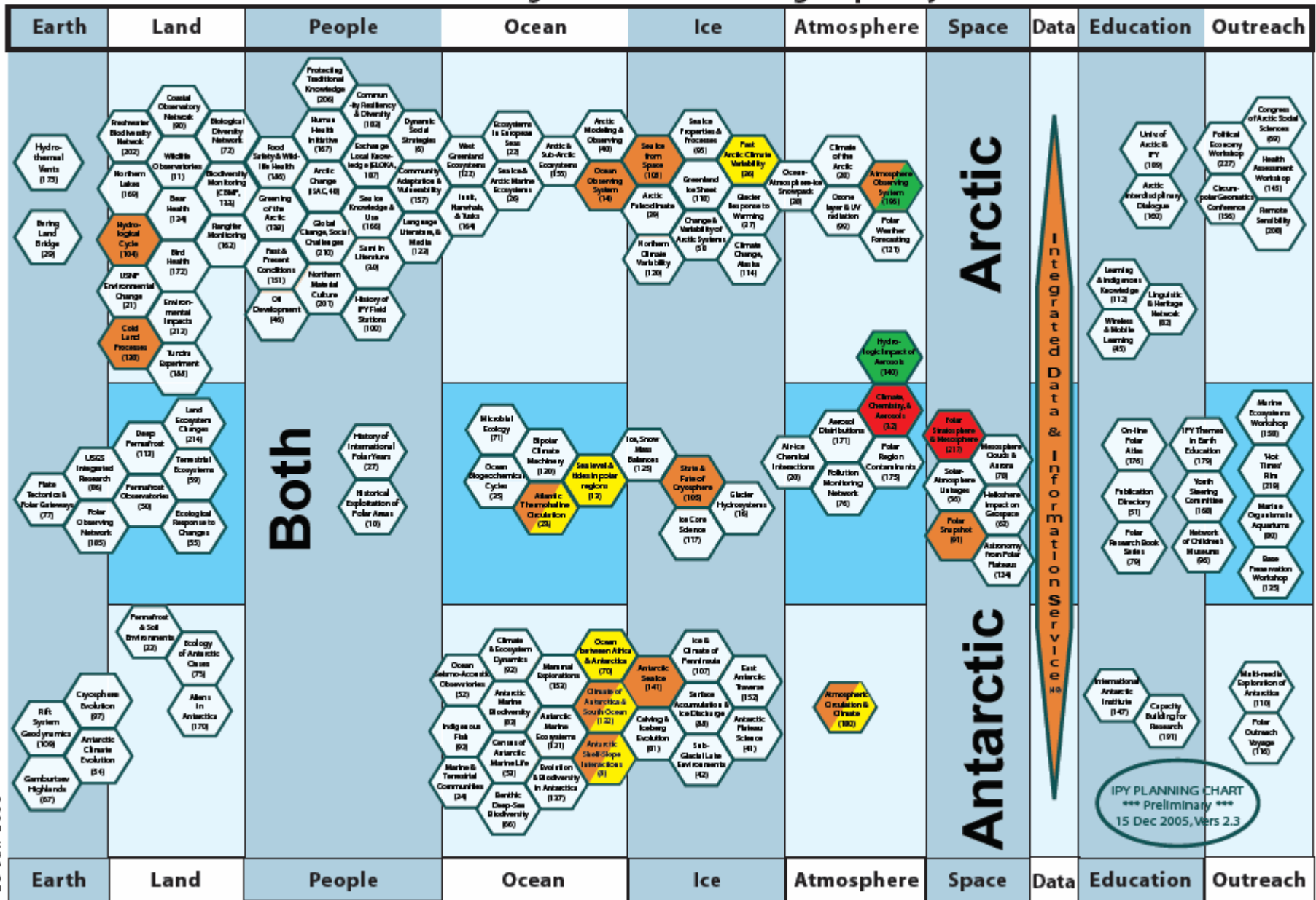
CliC Arctic Climate Panel – collaborations with:

- ◆ ISAC (International Study of Arctic Change)
- ◆ SEARCH (U.S. Study of Environmental Arctic Change)
- ◆ ASOF (Arctic-Subarctic Ocean Fluxes)
- ◆ SCAR
- ◆ AGCS (Antarctica and the Global Climate System)
- ◆ ACE (Antarctic Climate Evolution)

Research initiatives developing within the International Polar Year 2007-2008.



IPY Planning Chart - WCRP Flagship Projects



23 Jan 2006

● CLIC-affiliated projects (13)
 ● Clivar (3)
 ● GEWEX (1)
 ● SPARC (2)

IPY PLANNING CHART
 *** Preliminary ***
 15 Dec 2005, Vers 2.3

