



Cooperative Institute for Research
in Environmental Sciences



National Snow and Ice Data Center
Supporting Cryospheric Research Since 1976



CliC Data Activities

Walt Meier
National Snow and Ice Data Center

WDAC Workshop

Beijing, China

16 July 2012

CliC Goals

- **Assess and quantify the impacts that climatic variability and change have on components of the cryosphere and the consequences of these impacts for the climate system.**
- **Determine the stability of the global cryosphere.**
- **Provide inputs and expertise to enable the prediction of the climate system with cryospheric parameters.**

CliC Project Themes

- **Ice Masses and Sea Level (IMSL)**
 - contribution of glaciers, ice caps and ice sheets to sea level rise
 - how will ice shelves respond to changes in ocean and atmosphere
- **The Marine Cryosphere and Climate (MarC)**
 - impacts and feedbacks of a reduction in sea ice cover
 - nature of hemispheric differences between the two polar regions
- **Terrestrial Cryosphere and Hydroclimatology of Cold Regions (TCHM)**
 - role of terrestrial processes in water, energy, carbon cycles of cold regions
 - interactions and feedbacks between terrestrial and other elements of cryosphere/climate
- **Global Predictions and the Cryosphere (GPC)**
 - impacts of changes on ocean and atmosphere circulation
 - likelihood of abrupt climate changes

CliC Initiatives

1. Improved understanding of ice sheet and shelf dynamics, and impacts on SLR
2. Cryospheric Inputs to Arctic and Southern Ocean Fresh Water Balance
3. Regional Climate Modeling
4. Carbon and Permafrost

Several ongoing activities (e.g., workshops, etc.) supporting these initiatives

CliC Activities

- Review of passive microwave sea ice products and endorsements of a community sea ice concentrations and ice extent product
- Extension of permafrost studies in continental shelf areas
- Improvement of sea-ice parameterization for Arctic- and Southern Oceans
- Support for a new Arctic System Reanalysis
- Focus on the explanation of causes and prediction of the Arctic sea-ice loss involving a CMIP5 diagnostic subproject, including the ARctic Climate Hindcasting, Modelling and PrEDiction ExperimentS (ARCHIMEDES)
- Continuing for the Southern Ocean Observing System development and reinvigoration of the Southern Ocean Physical Oceanography and Cryosphere Linkages (SOPHOCLES) initiative

Some recent CliC-supported Data Workshops

- Sea Ice Products Community Workshop, NASA/GSFC, 15-16 March 2011
- USA-Chile Glacier Mass Balance Workshop , 23-25 Aug 2011, Valdivia, Chile
- 10th Meeting Latin American Snow and Ice Working Group UNESCO IHP 14-18 Nov 2011, Mérida, Venezuela
- Arctic CliC Sea Ice Working Group Meeting, 31 Oct –1 Nov2011, National Snow and Ice Data Center, Boulder, Colorado, USA
- Sea Ice Boundary Layer Workshop, 25-27 June 2012, NOAA, Boulder
- Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAIC), 27-29 June, NOAA, Boulder

Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAiC)



- Long-term (1 year or more) drifting station in the Arctic Ocean
- Focus on first-year ice cover
- Comprehensive observations of ice, ocean, atmosphere, biology
- Plan for 2016-2017
- Science planning workshop, Jun 2012, Boulder co-hosted by IASC and CliC
- <http://www.esrl.noaa.gov/psd/events/2012/mosaic/>

Upcoming conferences

- **ESA/CliC Conference on Earth Observation and Cryosphere Science**

- Assess state of cryospheric observation
- Share recent research
- Discuss future challenges and opportunities
- Outline priorities for future products and techniques
- 13 – 16 November 2012, Frascati, Italy



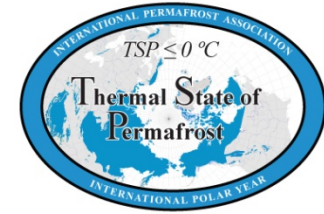
- **Third International Symposium on Arctic Research (ISAR-3)**

- Hosted by Japan Consortium on Arctic Environmental Research
- Mechanisms of warming amplification in Arctic
- Role of Arctic in global climate change
- Effects of Arctic change on Japan's weather and climate
- 14 – 17 January 2013, Tokyo



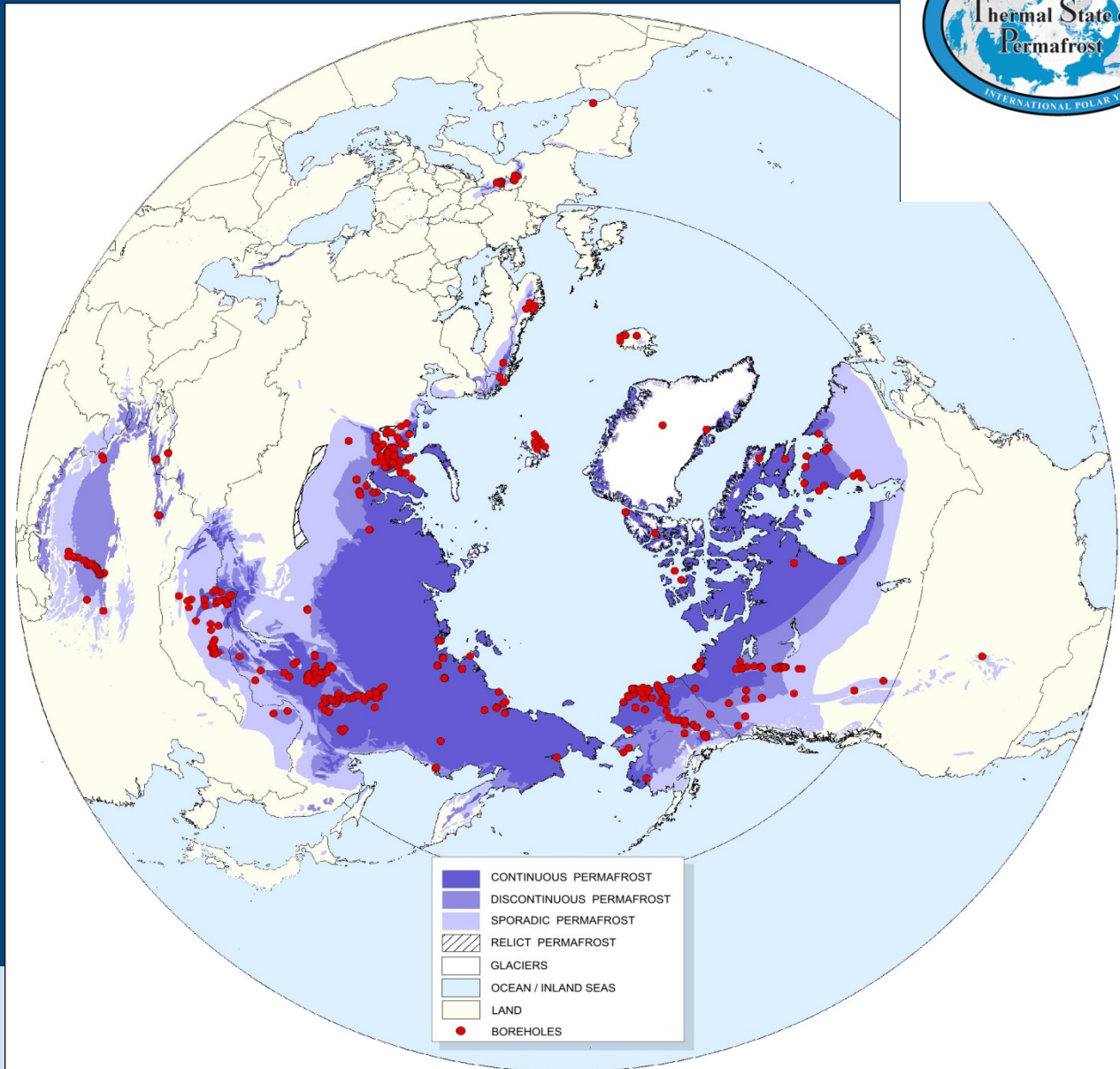
Global Terrestrial Network-Permafrost (GTN-P): Thermal State of Permafrost (TSP)

Total ~ 850 stations



TSP Countries

- Canada
 - China
 - Denmark (Greenland)
 - Germany (Russia)
 - Iceland
 - Italy
 - Kazakhstan
 - Mongolia
 - Norway (NORPERM)
 - Poland
 - Russia
 - Sweden
 - Switzerland (PERMOS)
 - USA
- ~ 760 stations
-
- Southern Hemisphere
 - Italy
 - New Zealand
 - Portugal-Spain
 - Russia
 - USA
- ~ 90 stations

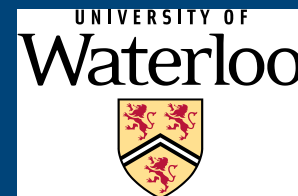


North Hydrology Project

Claude Duguay, University of Waterloo



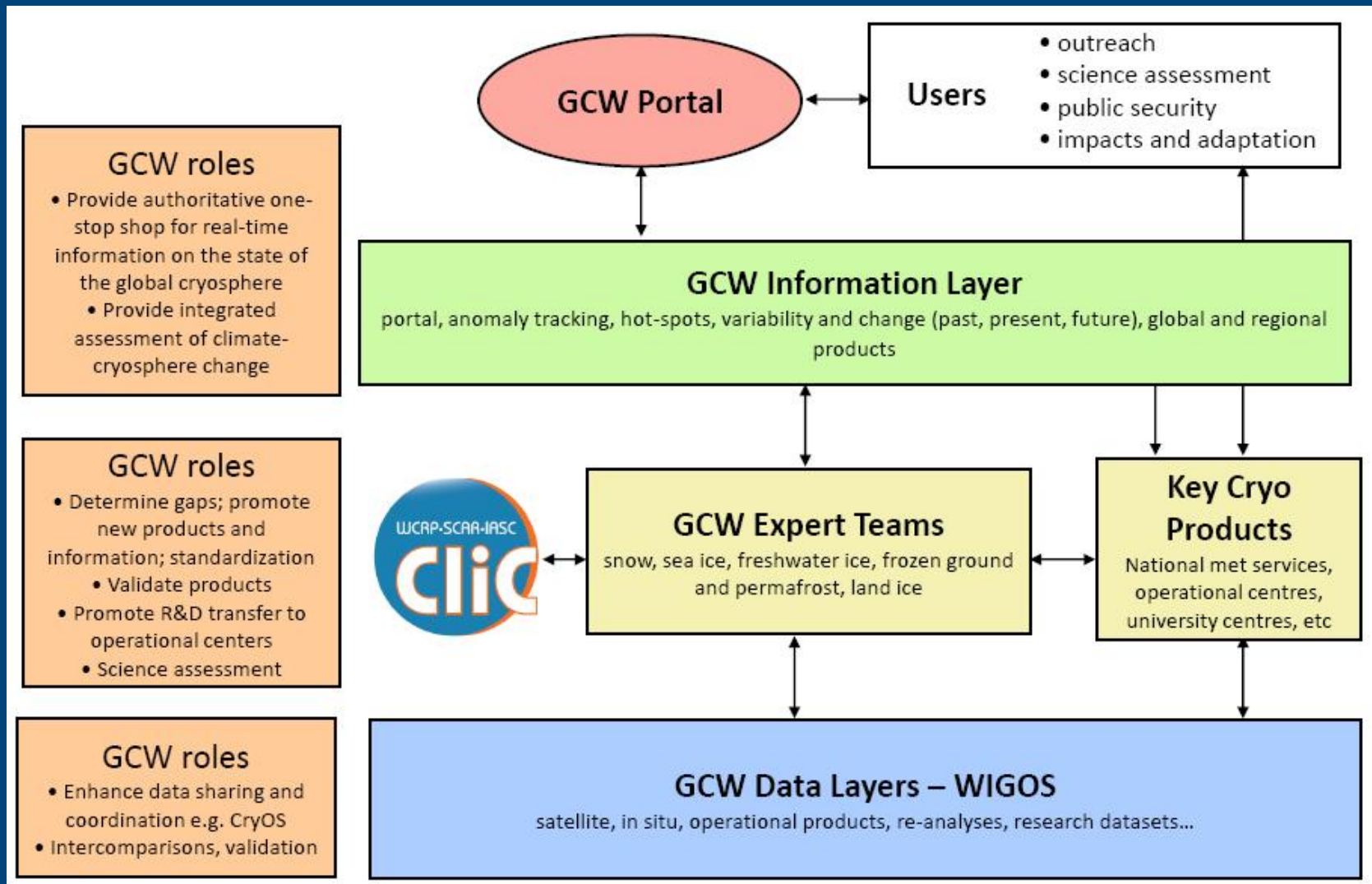
- The overall goal of North Hydrology is to support the international efforts coordinated by the CliC project of the WCRP to **exploit the use of EO technology**, models and in situ data to improve the characterization of river and lake ice processes and their contribution to the Northern Hydrology system.
- North Hydrology aims to develop a Portfolio of novel multi-mission **geo-information products** (maximizing the use of ESA data), improving the current characterization of **river and lake ice dynamics** to enhance NWP and modeling of key hydrological processes at northern latitudes.



Global Cryosphere Watch (GCW)

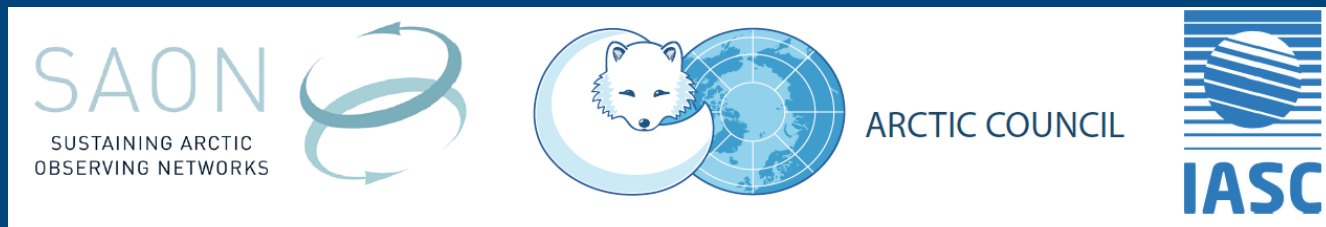
- WMO initiative, legacy project of the Int'l Polar Year (IPY)
- International mechanism for supporting all key cryospheric *in situ* and space-based observations
- Provide authoritative, clear, understandable and useable information on the past, current and future state of the cryosphere for use by the media, public, and decision of policy makers
- Provide an authoritative data portal and information services resource – meet user needs
- Guide development of cryosphere observation “supersites”
- Implementation meeting, Nov 2011, Geneva
- Various implementation groups starting activities

Global Cryosphere Watch

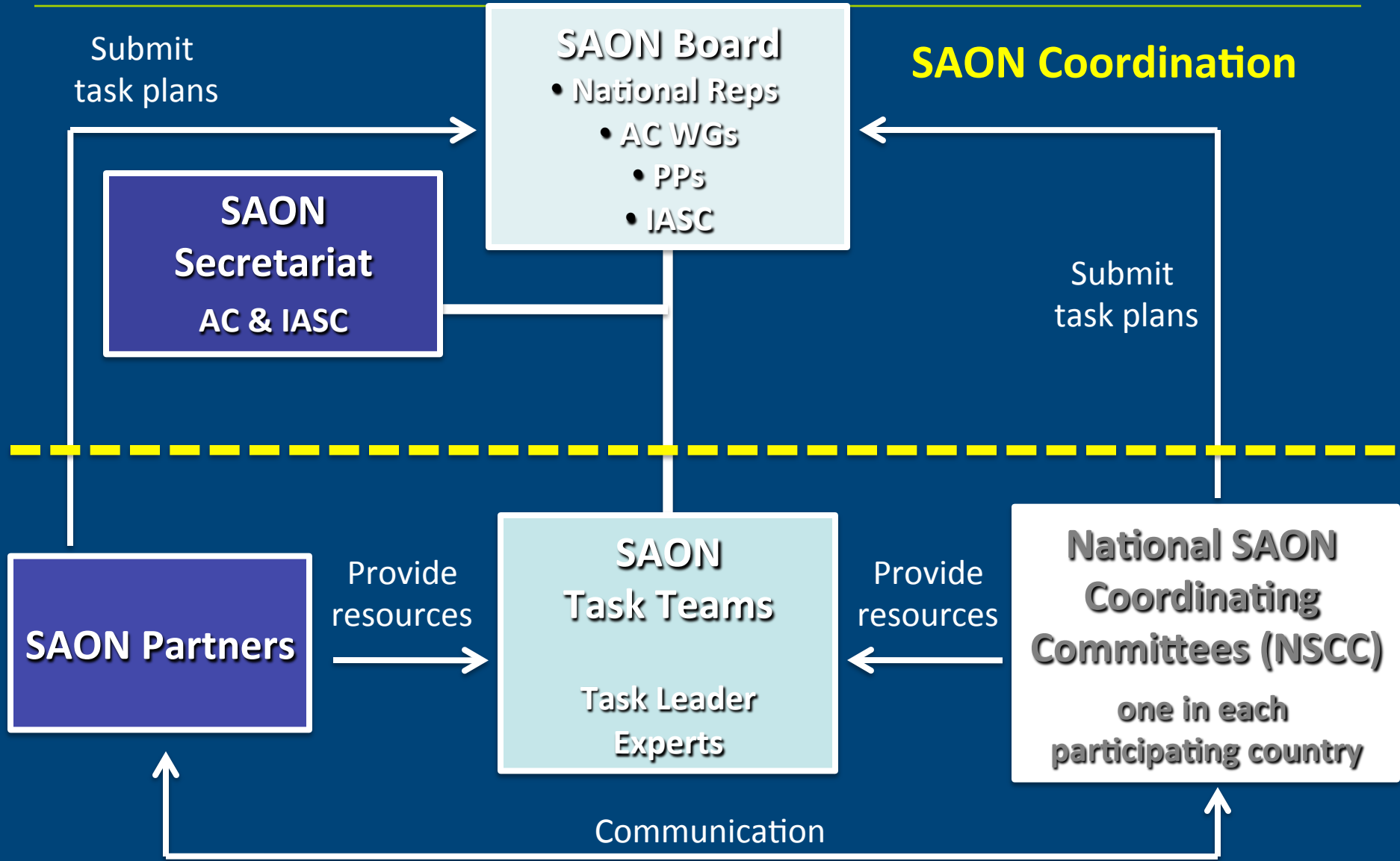


Sustained Arctic Observing Network (SAON)

- IPY legacy project
- Enhance Arctic-wide observing activities
- Facilitate partnerships and synergies among existing observing and data networks
- Promote sharing and synthesis of data and information



SAON Implementation



International Polar Initiative (IPI)

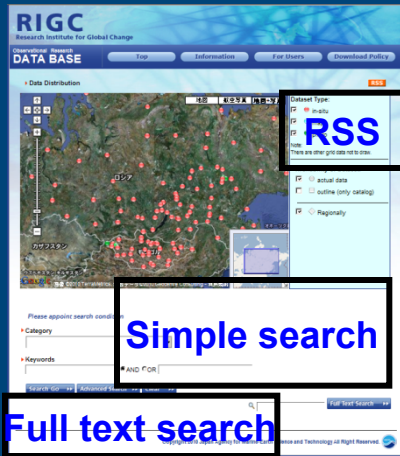
- Proposed framework for long-term, international cooperation
- Build on IPY
- Design a common implementation plan for development of observing systems, research, service, related education and outreach
- Optimize existing resources and identify gaps that need filling

International Ice Mass Balance Inter-comparison Exercise (IMBIE)

- One-year (Aug. 2011 – Aug. 2012) project
- Goal is to understand and resolve discrepancies between various mass balance techniques of the Greenland and Antarctic Ice Sheets
 - Altimetry, gravimetry, mass flux
- Provide reconciled mass balance estimate

Cryosphere Data Archive Partnership (CrDAP) Web Site

Japanese initiative to archive Asian cryosphere products



Simple search

Full text search

Main

show all registration data



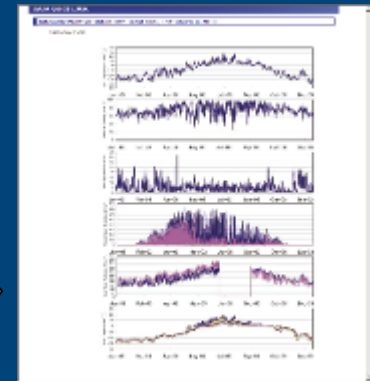
Detail search



Result



Matadata info



Quick look



Photo image QL



Data download

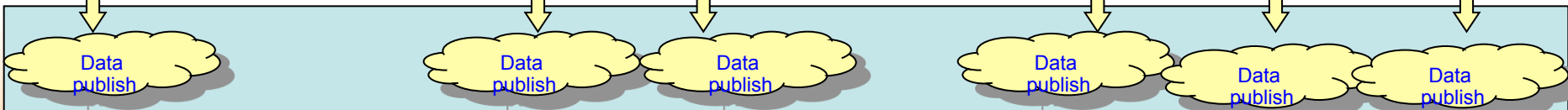


Present condition

Univ.1 Univ.2 Univ.3

Institute1 Institute2 Institute3

Operational Agency1 Operational Agency2 Operational Agency3



Different Metadata Format and Data Format

Future (Arctic country)

Univ.1 Univ.2 Univ.3

Institute1 Institute2 Institute3

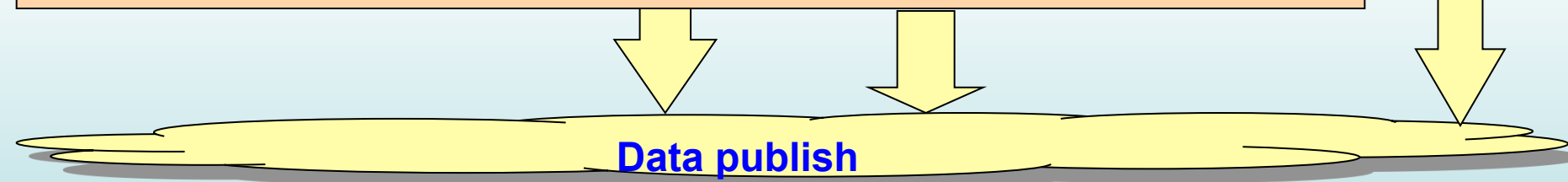
Operational Agency1 Operational Agency2 Operational Agency3



Standardization of Meta data of Metadata format and data format



Data Integration System



Data publish

A Different Sort of Data - ELOKA

- **Objective: facilitate and support the collection, preservation and exchange of human records of the Arctic**
 - Written journals
 - Videos
 - Sound recordings
- **<http://eloka-arctic.org>**



Thoughts on climate data product standards

- **Use validated, peer-reviewed methods**
 - Idea of “peer-reviewed” data sets?
 - Assessments of data sets
- **Demonstrate long-term consistency**
 - Operational products can provide targeted information for real-time users as well as validation for climate products
- **Bear a reasonable resemblance to reality and a confidence level in that resemblance to reality**
 - data **quality/error information** provided
- **Processing transparent and reproducible**
 - Archived in a self-describing format, but distributed in a variety of usable formats (e.g., GIS, KML, GeoTIFF, browse)
 - Source data and processing software available
- **Standardized data citation, data set DOIs, etc.**
 - Editors and reviewers need to make citation a requirement
 - Make dataset publication on par with journal article publication

Thank you!

