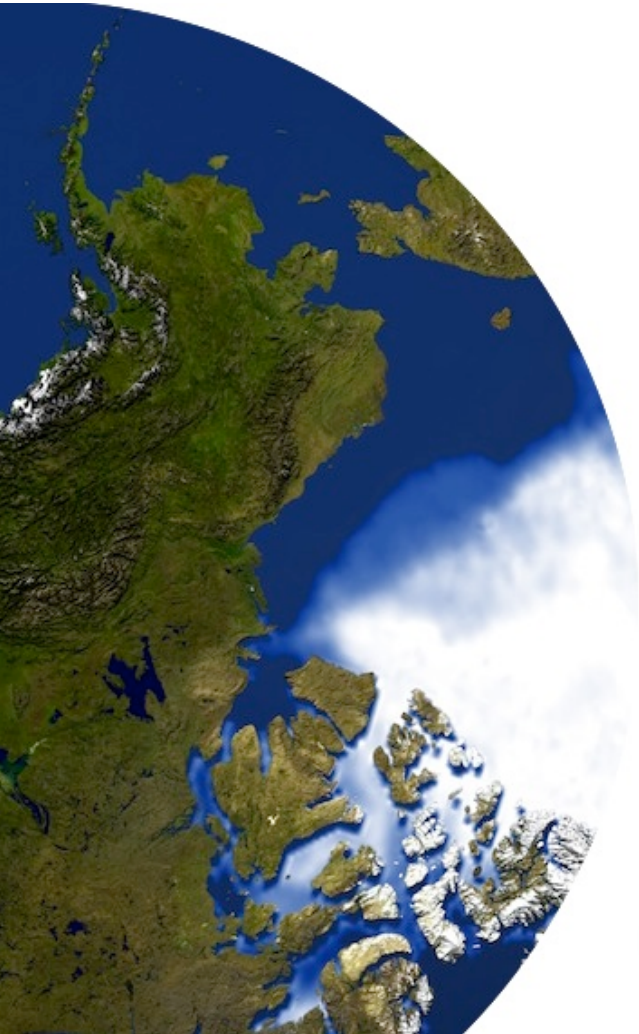
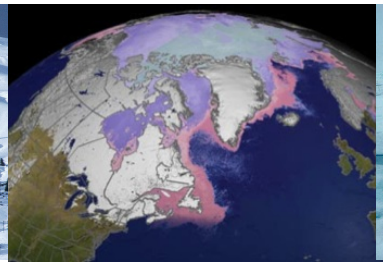
# The Global Cryosphere Watch



Jeff Key

*NOAA/NESDIS, Madison, Wisconsin USA*

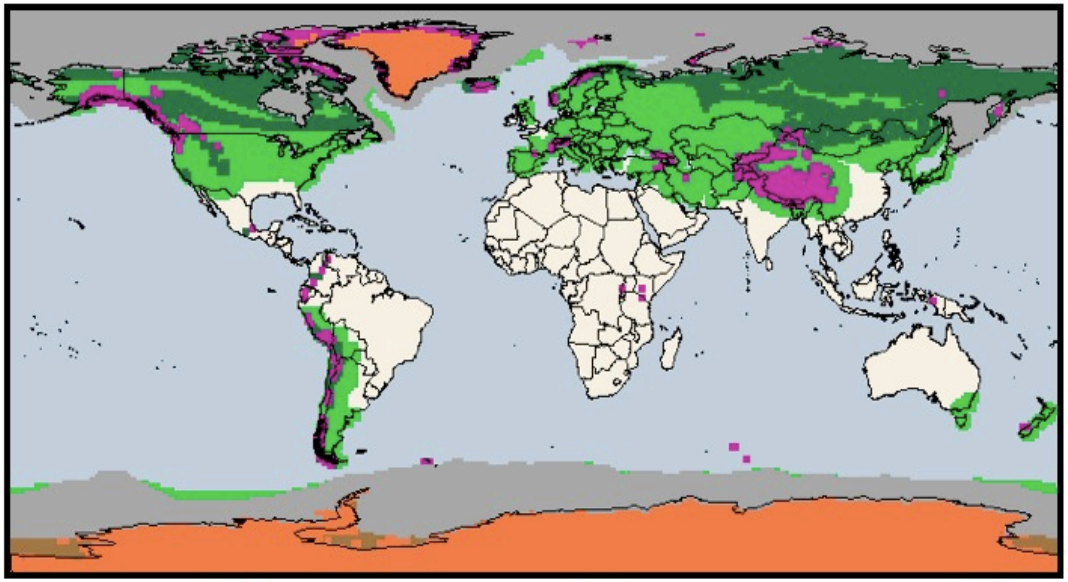


GCW Global Cryosphere Watch

South America GCW Meeting, Santiago, 27-29 October 2014

WMO

## Global Cryosphere by Type



Glacier

Ice Sheets

Ice Shelves

Sea Ice

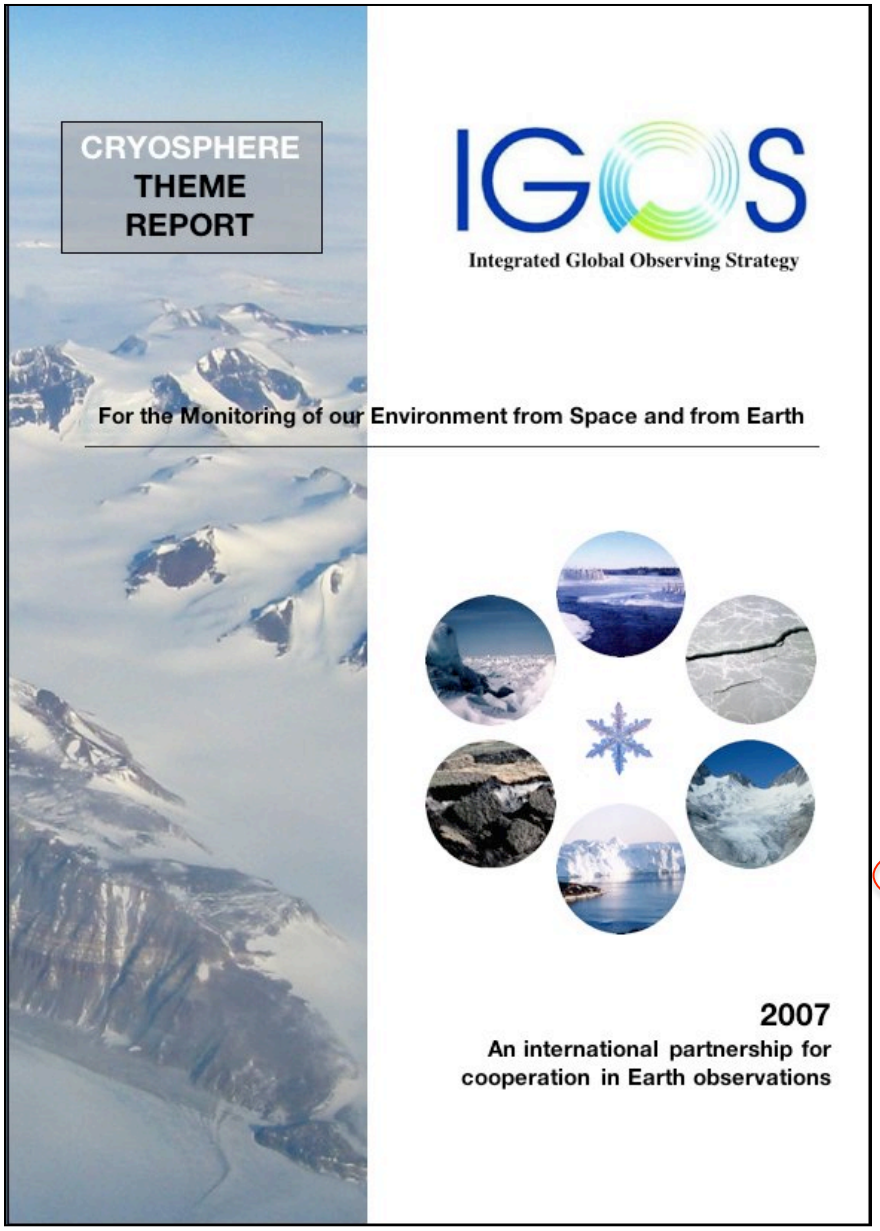
Permafrost

Snow Cover

# Assessment with the goal of integration:

## ***Integrated Global Observing Strategy Partnership***

The IGOS themes were developed primarily to assess current observing systems, including capabilities and requirements.

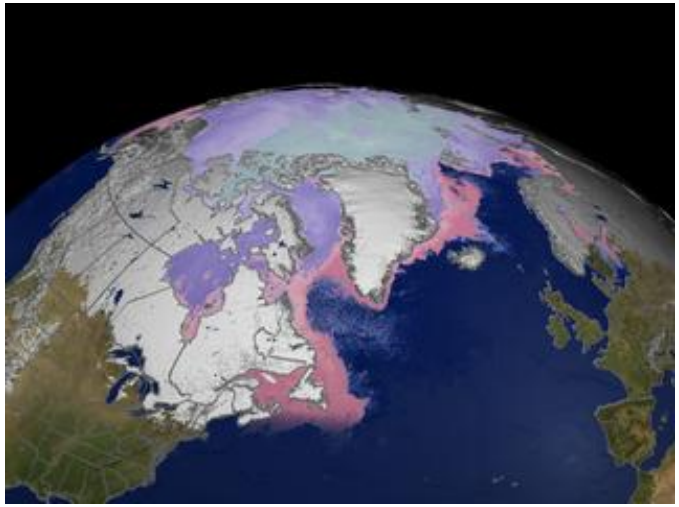



# *The IGOS Cryosphere Theme (2007)*

*Global Cryosphere Watch*

# The Global Cryosphere Watch (GCW)

The 16th WMO Congress (2011) agreed that *"WMO needs to have a focus on global cryosphere issues to be able to provide authoritative information to meet Members' responsibilities on regional and global weather, climate, water and related environmental matters"* and decided to embark on the development of the Global Cryosphere Watch (GCW), **as an IPY Legacy**, with a view of an operational GCW.



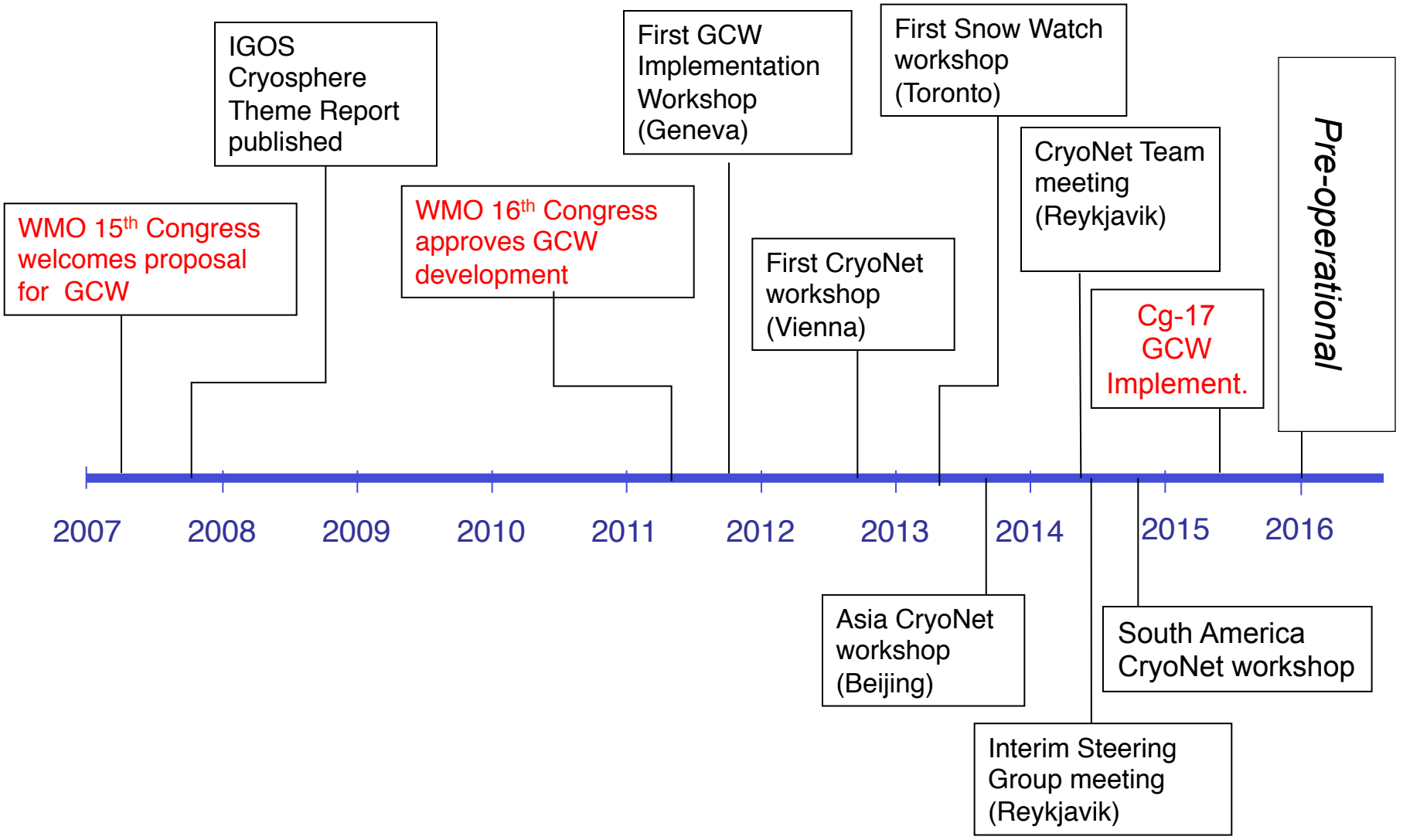
# Global Cryosphere Watch – Mission & Objectives

**Mission**: *GCW will provide authoritative, understandable, and useable data, information, and analyses on the past, current and future state of the cryosphere to meet the needs of WMO Members and partners in delivering services to users, the media, public, decision and policy makers.*

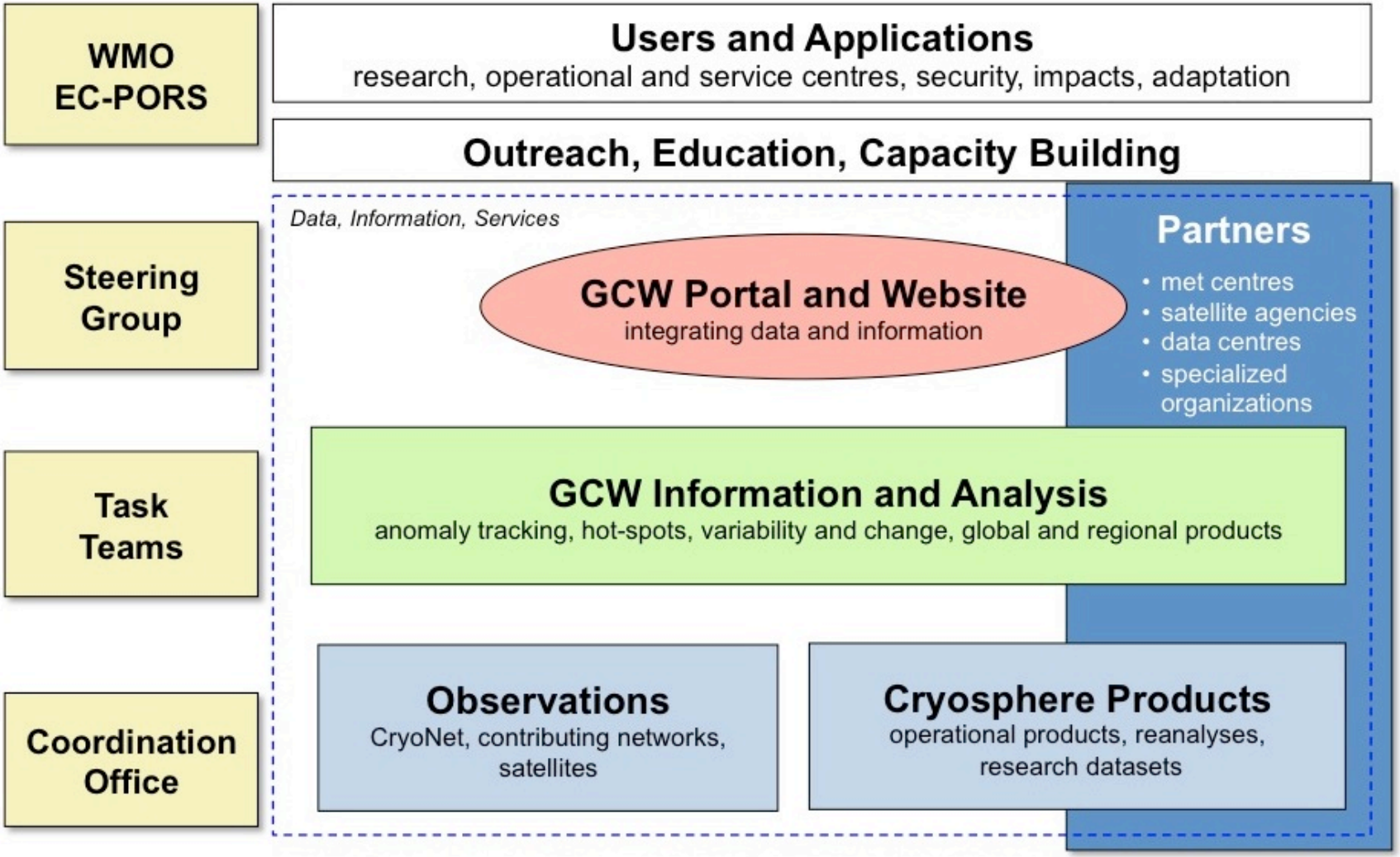
**GCW will:**

- Implement the IGOS (Integrated Global Observing Strategy) Cryosphere Theme (CryOS);
- **Facilitate reliable, comprehensive observations through an integrated observing approach in collaboration with relevant national and international programmes and agencies**;
- Provide the scientific community with the means to predict the future state of the cryosphere;
- Facilitate the assessment of changes in the cryosphere and their impact; support decision making and environmental policy development;
- Provide authoritative information on the current state and projected fate of the cryosphere for use by the scientific community, media, public, decision and policy makers – meet user needs.

# GCW Development History



# Organization: GCW Conceptual Framework




*The WMO Executive Council expert panel on Polar Observations, Research, and Services (**EC-PORS**) oversees GCW.*

# What is GCW doing?

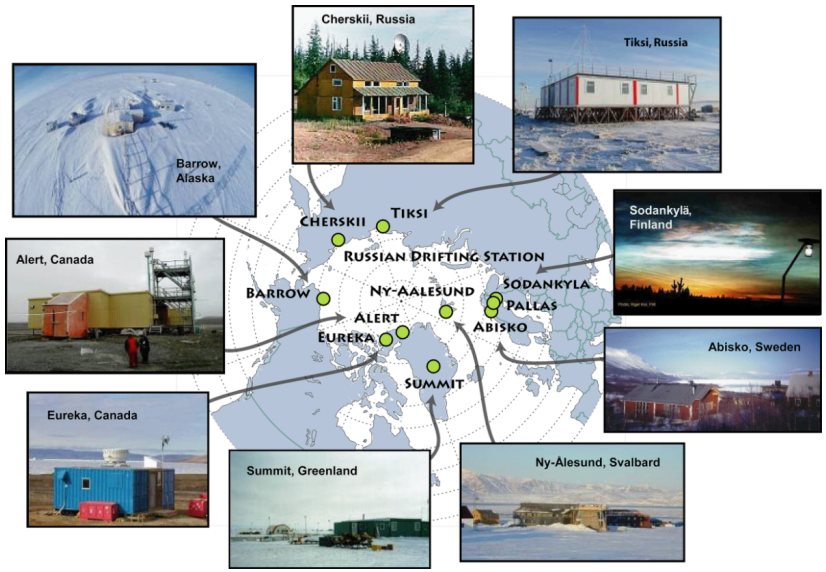
- developing a **network of surface observations** called "CryoNet", which builds on existing networks;
- developing **measurement guidelines** and best practices;
- refining **observational requirements** for the WMO Rolling Review of Requirements;
- engaging in and supporting, **intercomparisons of products**, e.g., the **GCW Snow Watch** project;
- contributing to WMO's space-based capabilities database (with PSTG);
- creating **unique products**, e.g., the SWE Tracker, in collaboration with partners;
- engaging in **historical data rescue** (e.g., snow depth);
- building a **snow and ice glossary**;
- developing international training and outreach materials;
- providing **up-to-date information on the state of the cryosphere**;
- providing **access to data** through a portal;
- co-sponsoring workshops.

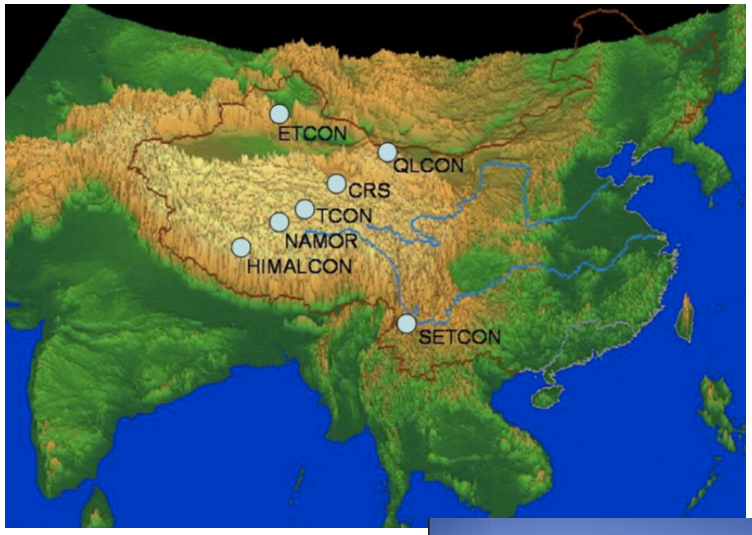
# CryoNet – the core GCW Network

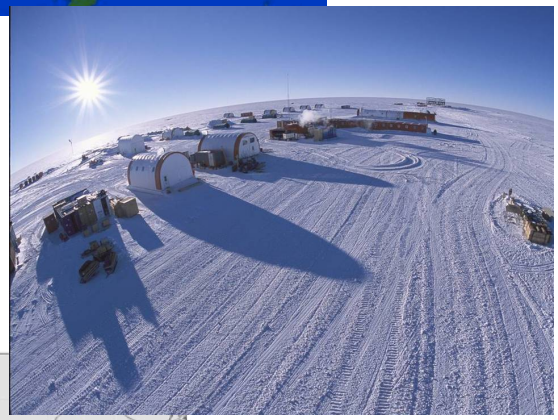
***…an immediate priority in GCW development.***

- Establish the core network of GCW surface measurement sites – CryoNet.
- CryoNet is one part of the whole GCW observing system, which is a component observing system of the WMO Integrated Global Observing System (WIGOS).
- CryoNet covers all components of the cryosphere (glaciers, ice shelves, ice sheets, snow, permafrost, sea ice, river/lake ice) through an extensive approach of in-situ observations.
- CryoNet is initially comprised of existing stations/sites, rather than creating new sites.

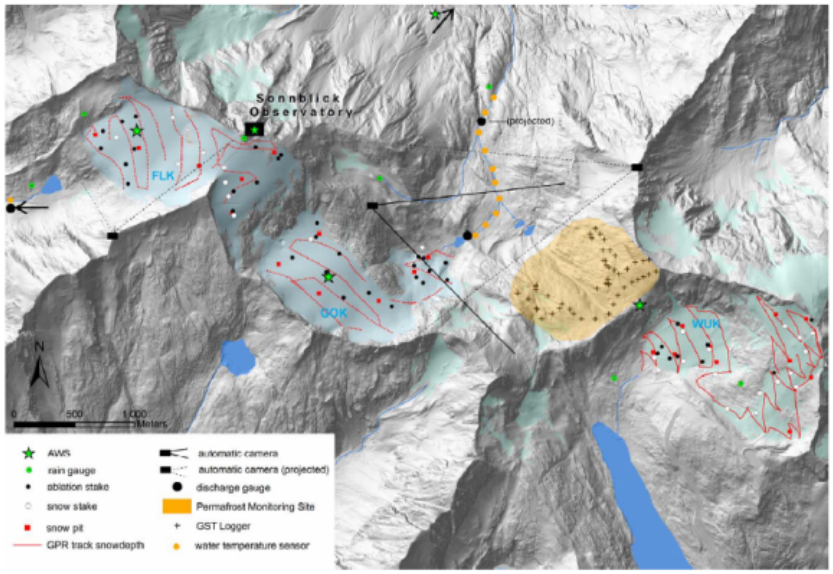
# GCW CryoNet

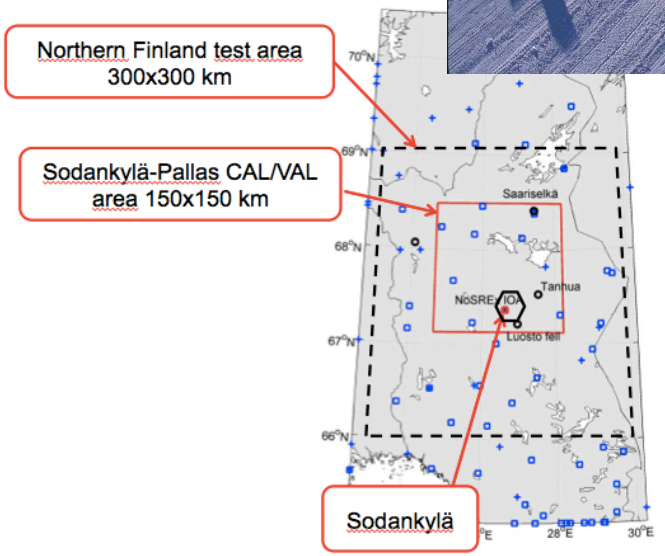


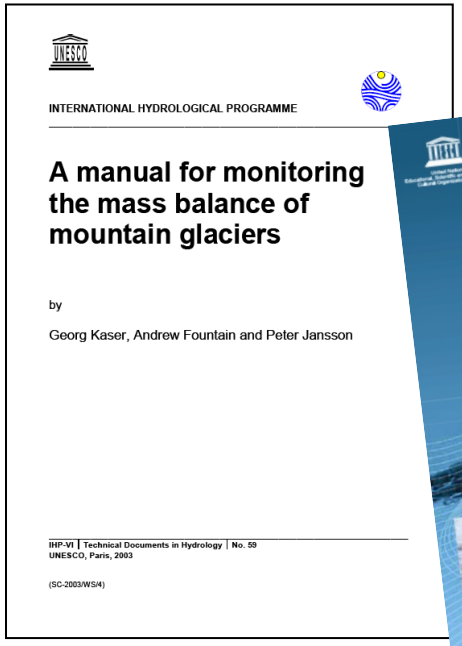



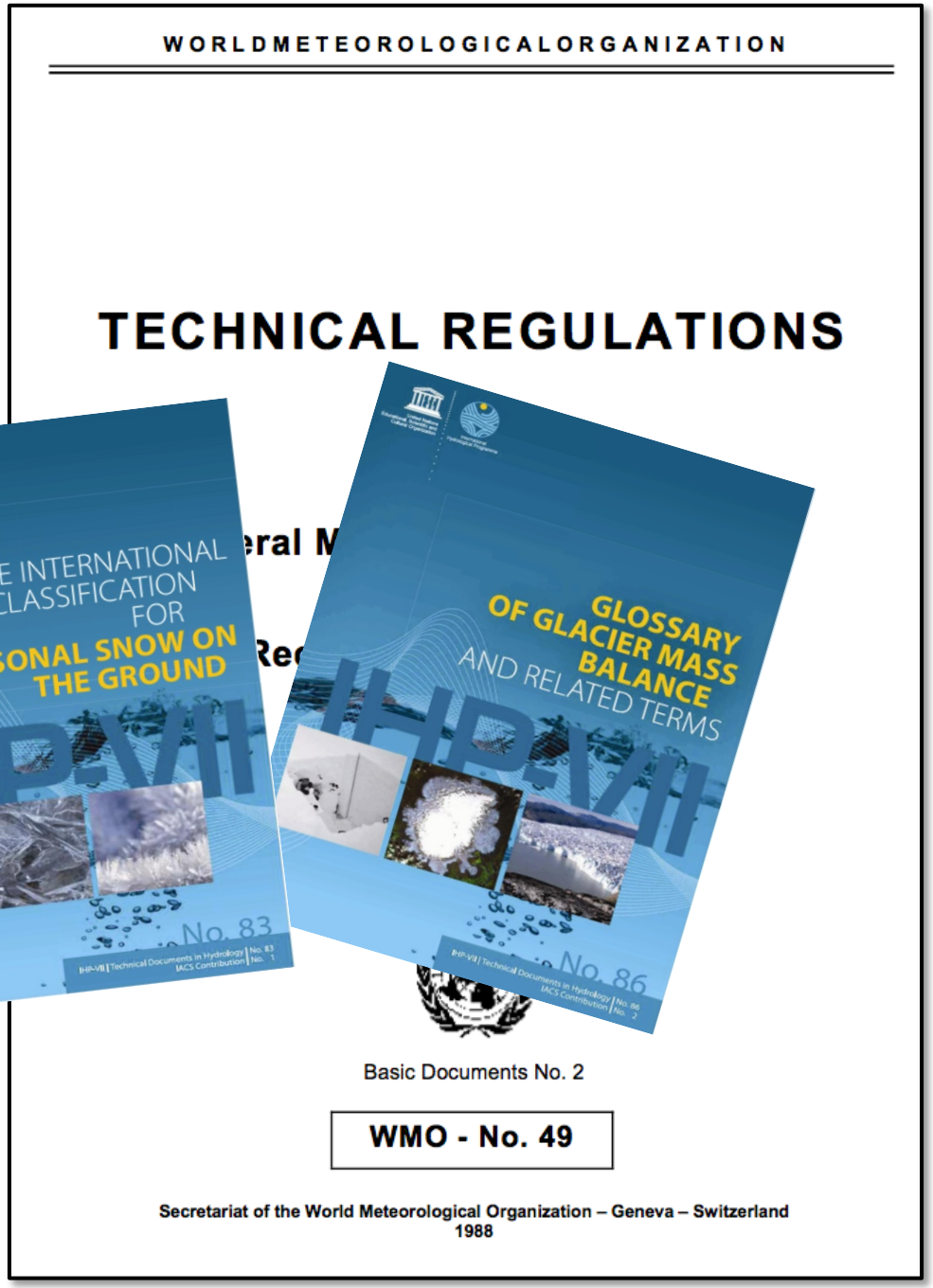
SONNBLICK network:



# Measurement standards and practices





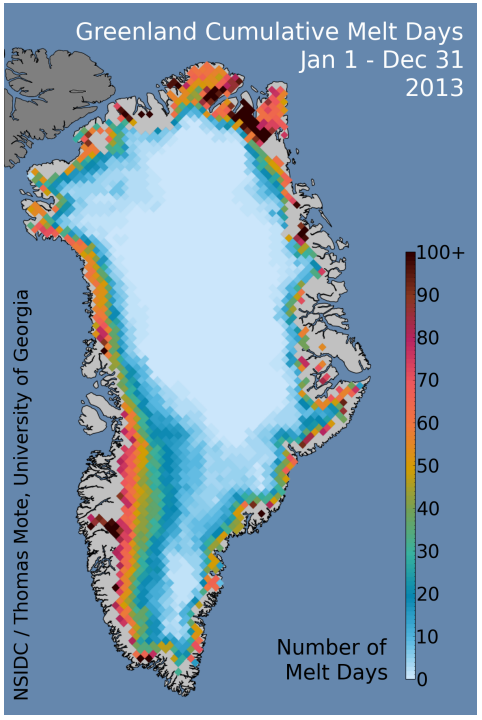

**"IUGG urges snow and ice scientists, practitioners, and scientists from related disciplines to adopt these new schemes as standards."**

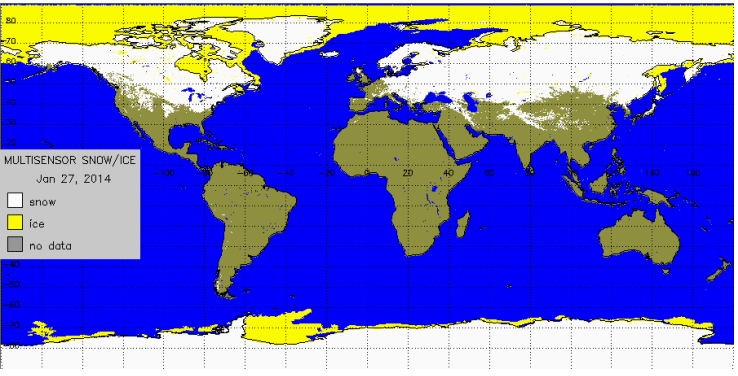
# Requirements and Capability for observations

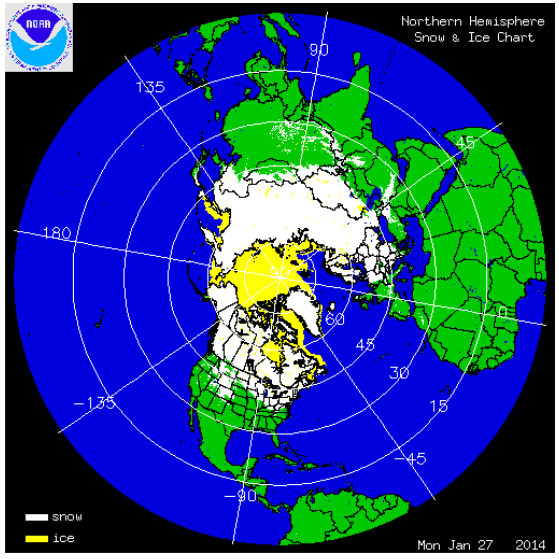
- GCW Requirements are being formulated and documented on the GCW website;
- They will draw from various sets of existing user requirements and will be vetted by the scientific community;
- Those requirements will become part of the WMO Rolling Review of Requirements (RRR);
- Will be accessible through the Observing Systems Capability Analysis and Review Tool (OSCAR), the official source for WMO requirements, which has a cryosphere theme;
- **Need for a new application area "GCW".**

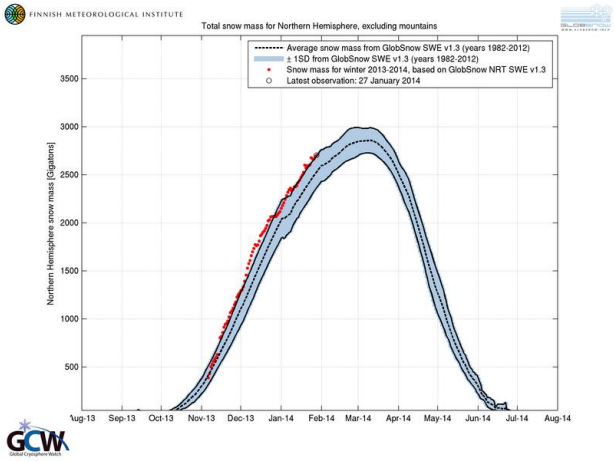
# Other Products and Services

- Identification and development of initial products
- Development of hemispheric snow ”anomaly” trackers for snow cover & SWE
- An inventory of snow datasets
- Product intercomparison:
  - Snow intercomparison project ESA SnowPEX
- Glossary

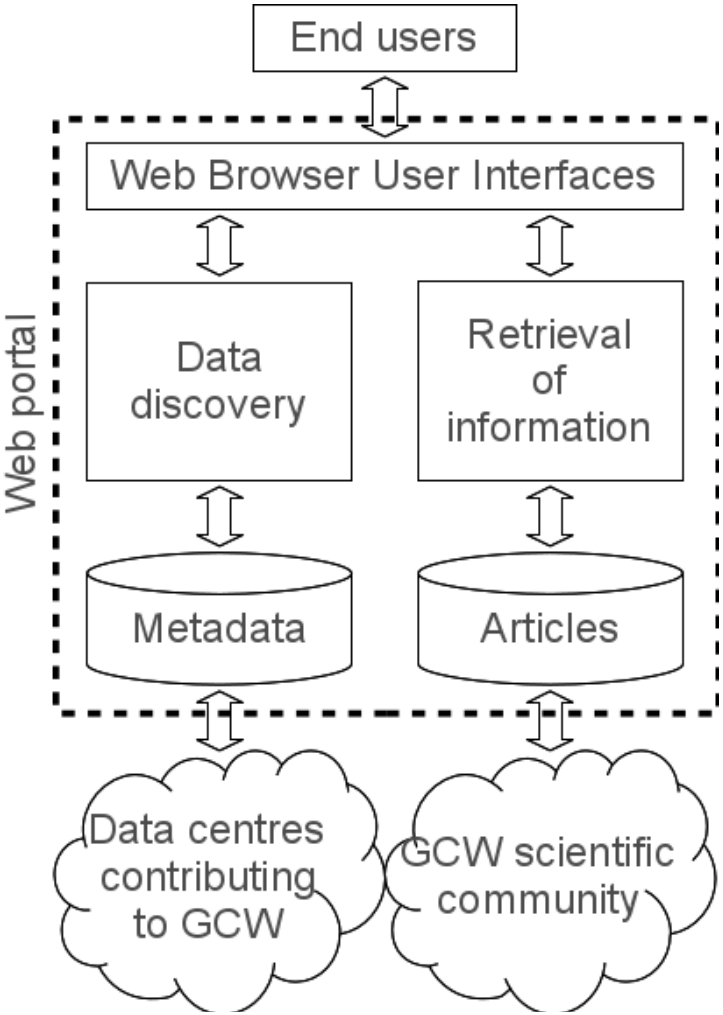


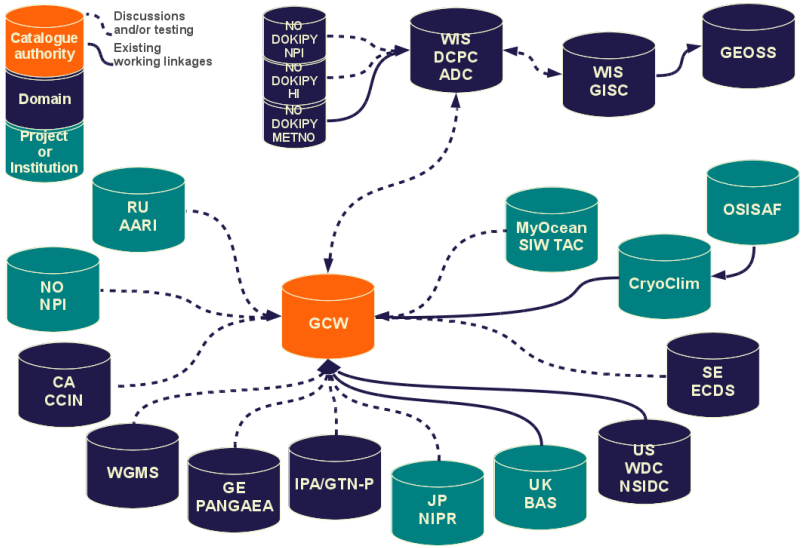



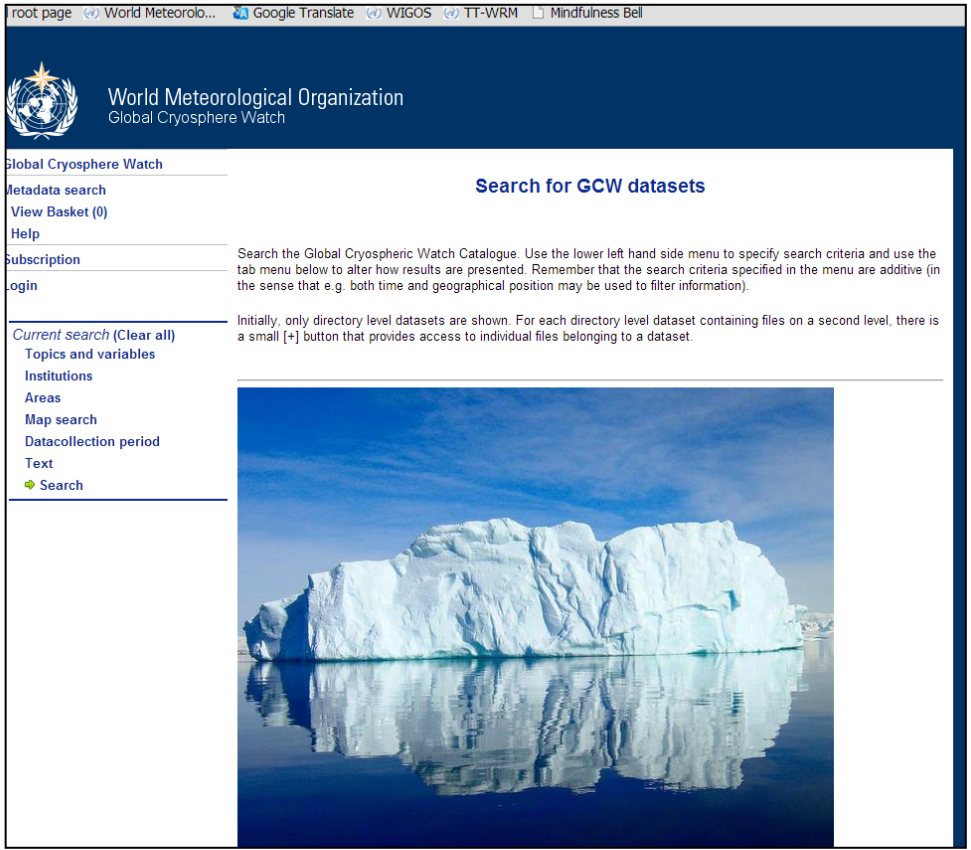



# Portal and Website




http://gcw.met.no

# Portal and Website

- About GCW – impact, framework
- GCW News
- Cryosphere now - products
- CryoNet – site requirements, practices
- Activities – mtgs, projects
- Outreach – forum, video
- References – Glossary, acronyms, GCW documents

http://globalcryospherewatch.org

# Why be a part of CryoNet and GCW?

- Being a CryoNet site means being part of an international, operational, global observing system providing observations of known quality for research and knowledge beyond a site's local region.
- Being part of a global network not only brings better visibility, but also a recognition of the importance of the observations made at your site.
- This in turn can bring better support, either funding or logistical support.
- GCW promotes the exchange of knowledge and data, so CryoNet sites may see broader use of their data and products.