Some glacier-biased thoughts on CryoNet as proposed by the Global Cryosphere Watch

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Once upon a time…
global terrestrial network of glaciers | thoughts on the proposed gcw-cryonet
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Global Terrestrial Network for Glaciers (GTN-G)
Steering Committee

Advisory Board

Executive Board

Global Land Ice Measurements from Space

World Glacier Monitoring Service

US National Snow and Ice Data Center

available funding for operational work
A worldwide scientific collaboration network

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GCOS Tiered Monitoring System

A multi-level, integrative strategy combining:
local process understanding with global coverage,
in-situ measurements with remote sensing, and
traditional observations with new technologies.
Global Terrestrial Network for Glaciers: strategy

**main goals of long-term observations:**
- process understanding
- model validation
- change detection
- impact assessments

**change detection:**
- rate of change
- acceleration trends
- pre-industrial variability
- change patterns

**integrated / tiered observing strategy**

**Tier 1:** multi-component obs. system across environmental gradients

**Tier 2:** process understanding and model calibration

  => extensive energy/mass balance, flow

**Tier 3:** regional indicators

  => mass change (index stakes, photogrammetry, LIDAR)

**Tier 4:** regional representativeness

  => cumulative length change; DEM differencing

**Tier 5:** global coverage

  => inventories (remote sensing/geoinformatics)

Haeberli et al. (2000)
One-stop data-portal on www.gtn-g.org
Terminology, guidelines and standards, assessment reports


Zemp et al. (in prep): Review Article: Uncertainty and re-analysis of glacier mass balance observations. The Cryosphere.
global terrestrial network of glaciers | thoughts on the proposed gcw-cryonet
Global Atmosphere Watch
- WMO-led
- global network of meteo stations
- run by national meteo services
- with observations based on common WMO standards,
- stored at several world data centers,
- made available through joint web-interface run by MeteoSwiss.

Global Cryosphere Watch
- ???-led
- global network of ???
- run by ???
- with observations based on common ??? standards,
- stored at ???,
- made available through a joint web-interface run by ???

GAW can build on a well-funded and operational network of national meteo-services while GCW will have to build mainly on data from the scientific community without funding for long-term monitoring.
As a consequence, GCW-CryoNet...

- must not build up structures that are redundant to existing monitoring programmes in order to save limited resources.

- must be careful with using terminology of existing monitoring programmes in order to avoid confusion (e.g., tiers, reference sites).

- must be well coordinated with existing monitoring programmes and their operational bodies

- should size its goals according to available resources.

- should come up with well-defined tasks/products that supports both the data provider (i.e., institutions running the monitoring sites) and the data user (e.g., the scientific community).
Based on these basic consideration, I see the largest potential in:

- (a) the integration of existing observation programmes of individual cryospheric components.
  
  or

- (b) fostering a network of high elevation automatic weather stations, including long-term cryospheric monitoring sites.

- (c) developing a label (e.g., reference/super site) for a network of existing monitoring sites (e.g., research stations) that are running long-term cryospheric observations. Such a label should only be assigned to monitoring sites that fulfill a well-defined set of criteria, e.g.:
  - monitoring of at least two cryospheric components
  - for more than 30 years
  - together with meteorological measurements
  - making these data freely available
  - …

- (d) increasing the visibility and funding of long-term monitoring sites
However, what to do about cryospheric data without responsible data center?!

**GCW CryoNET**

- **Glaciers** GTN-G
- **Permafrost** GTN-P
- **Ice sheets**...
- **Snow**...
- **Sea ice**...
- **Lake & river ice**...

*active compilation of standardised & quality checked data*

*scientific observations of the cryosphere*
Example of a potential supersite: Tarfala Research Station, Sweden

- Research station run by the University of Stockholm
- Open to scientist
- Long-term monitoring including
  - Climate data since 1965
  - Hydrological data since 1980
  - Glacier length and area changes since 19th century
  - Glacier mass balance since 1945/46
  - Permafrost data since 2000
  - Snow measurements since …
- All data freely available for scientific and educational purposes
- Repeatedly challenged by funding problems

Photo by M. Hambry, www.glaciers-online.net
More reference and supersites to be found from glaciers with long-term mass balance monitoring programmes
I think it is now time for GCW to:

- Clearly position itself within existing international organizations dealing with the cryosphere
- Come up with specific tasks and products which
  - are well scaled in view of available resources,
  - complement existing tasks and products,
  - are of benefit for both data providers and users.

In other words:

Please add value (and not just another acronym) to the zoo of international organizations and focus on few but feasible tasks.

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