

# CryoNet

## Network of Cryospheric Surface Observations

GCW Global Cryosphere Watch


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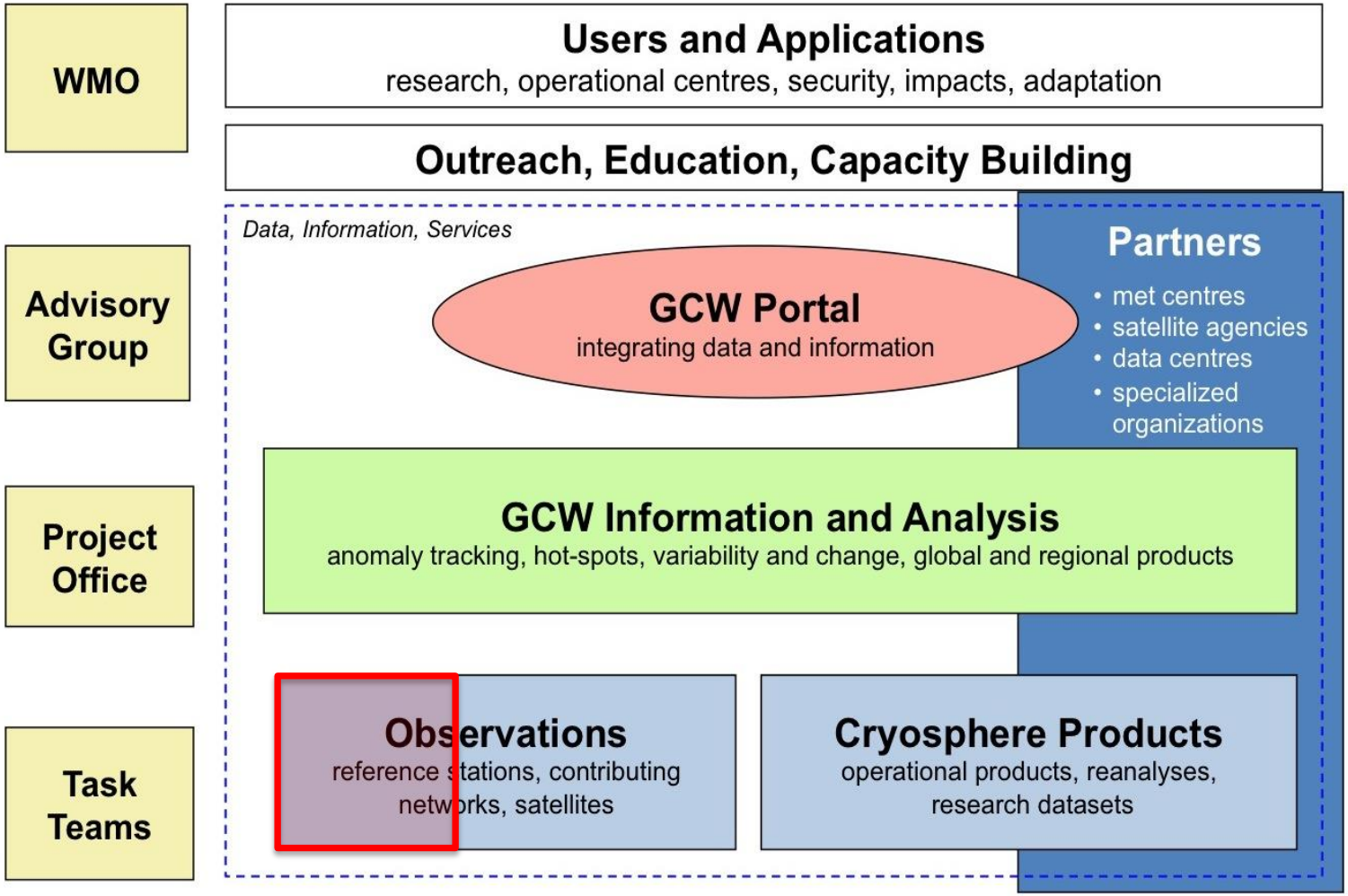
# CryoNet within GCW

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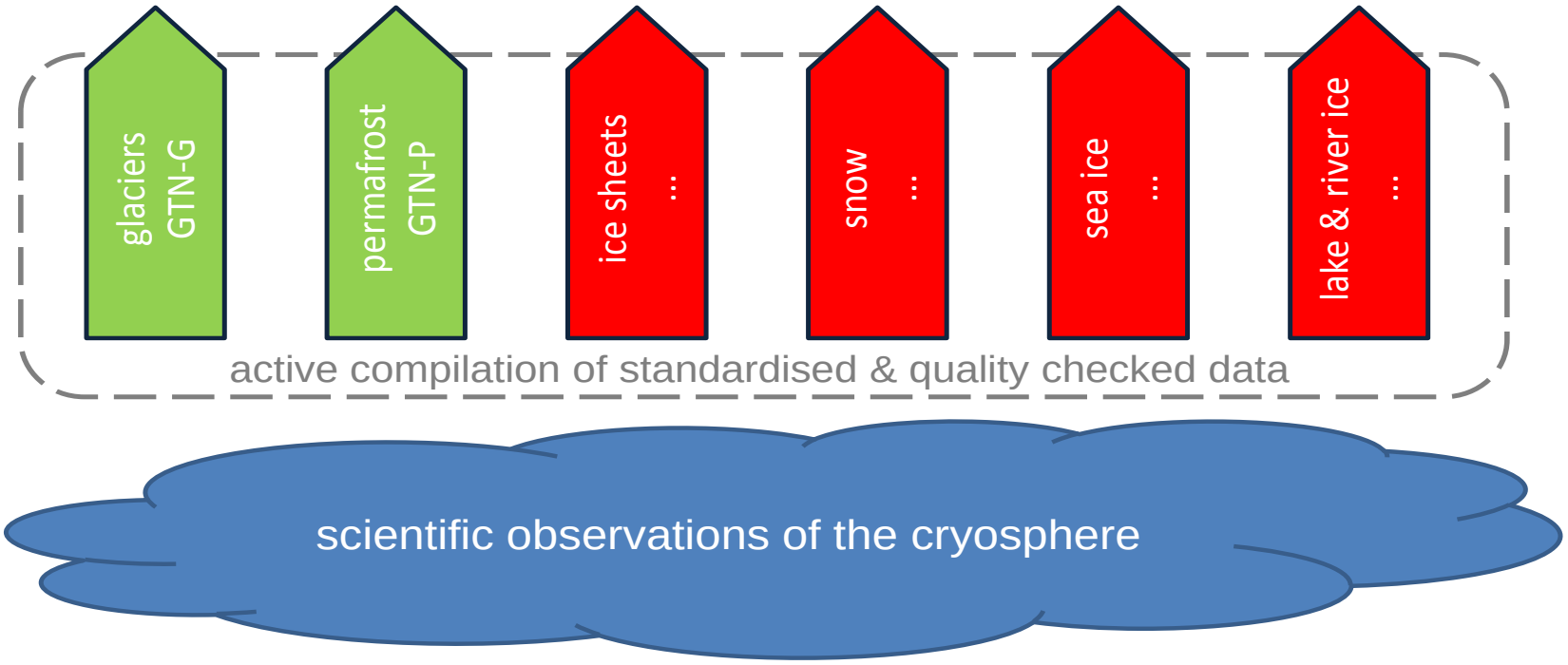
# Motivation for CryoNet




M. Zemp, 2011

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# CryoNet objectives

CryoNet will link with different cryospheric observational networks to achieve its comprehensive potential through

- Extensive monitoring of the cryosphere through harmonized measurements
- Providing cryospheric-data for improved process understanding and modelling
- Providing calibration and validation data for satellite measurements
- Linking cryospheric ground truth observations to cryospheric models
- Training for cryospheric observations
- Standardized practices for cryospheric observations
- Long-term, sustainable observing and monitoring.

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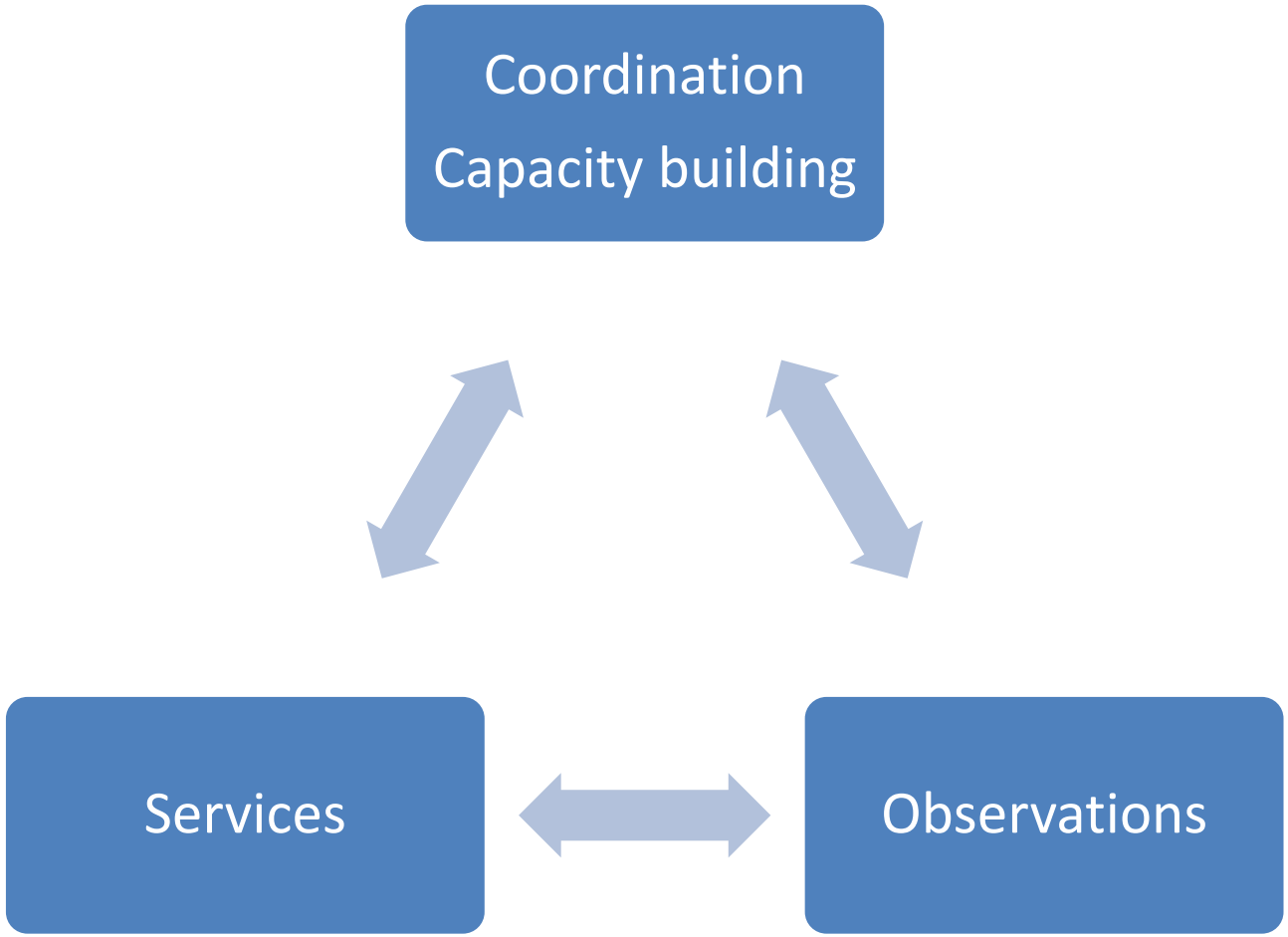
# CryoNet activities

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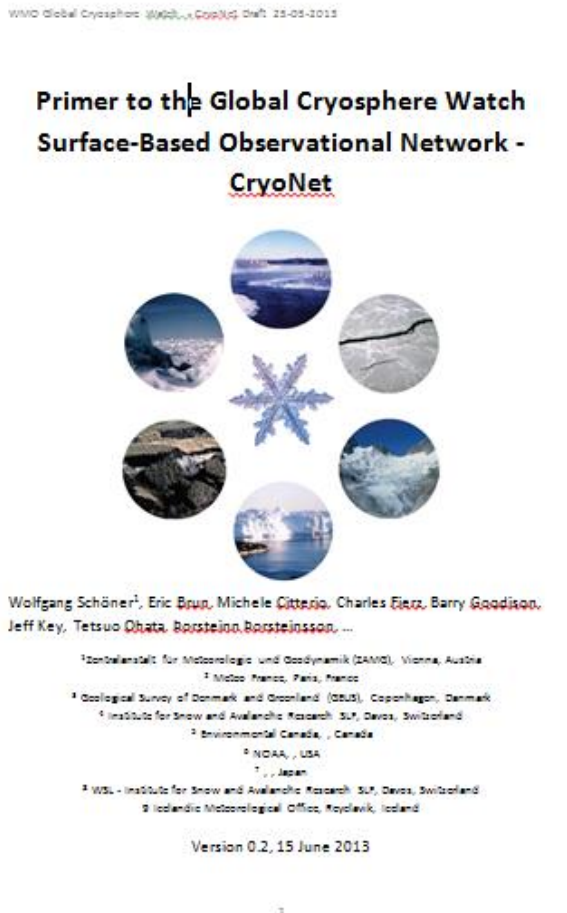
# CryoNet activities so far

- 1st CryoNet WS (Nov. 2012, Vienna, Austria)
- Questionaires
- Cryosphere Station inventory
- Primer to GCW CryoNet (draft)
- 2nd CryoNet WS (Dec. 2013, Beijing China)
- CryoNet team meeting (Reykjavik, Island, Jan 2014)
- Joint CryoNet and Portal team meeting (Davos, June 2014)
- Questionaire at Website



WMO Global Cryosphere Watch, CryoNet Draft 25-05-2013

**Primer to the Global Cryosphere Watch Surface-Based Observational Network - CryoNet**

Wolfgang Schöner[1], Eric Brun, Michele Citterio, Charles Fierz, Barry Goodison, Jeff Key, Tetsuo Ohata, Borsteinn Sigurdsson, ...

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[5] Environmental Canada, , Canada
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[9] Icelandic Meteorological Office, Reykjavik, Iceland

Version 0.2, 15 June 2013

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# The site types of CryoNet

## Baseline Sites

- Single sphere
- Compliant with CryoNet agreed practices
- Target of long-term continous

## Reference Sites

- Single sphere
- Compliant with CryoNet agreed practices
- Calibration/Validation
- Long-term financial commitment
- Long-term continous
- near real time availability of data where possible

## Integrated Sites

- Multi sphere
- Compliant with CryoNet agreed practices
- Calibration/Validation
- Long-term financial commitment
- Strong research focus
- Training
- Onsite staff

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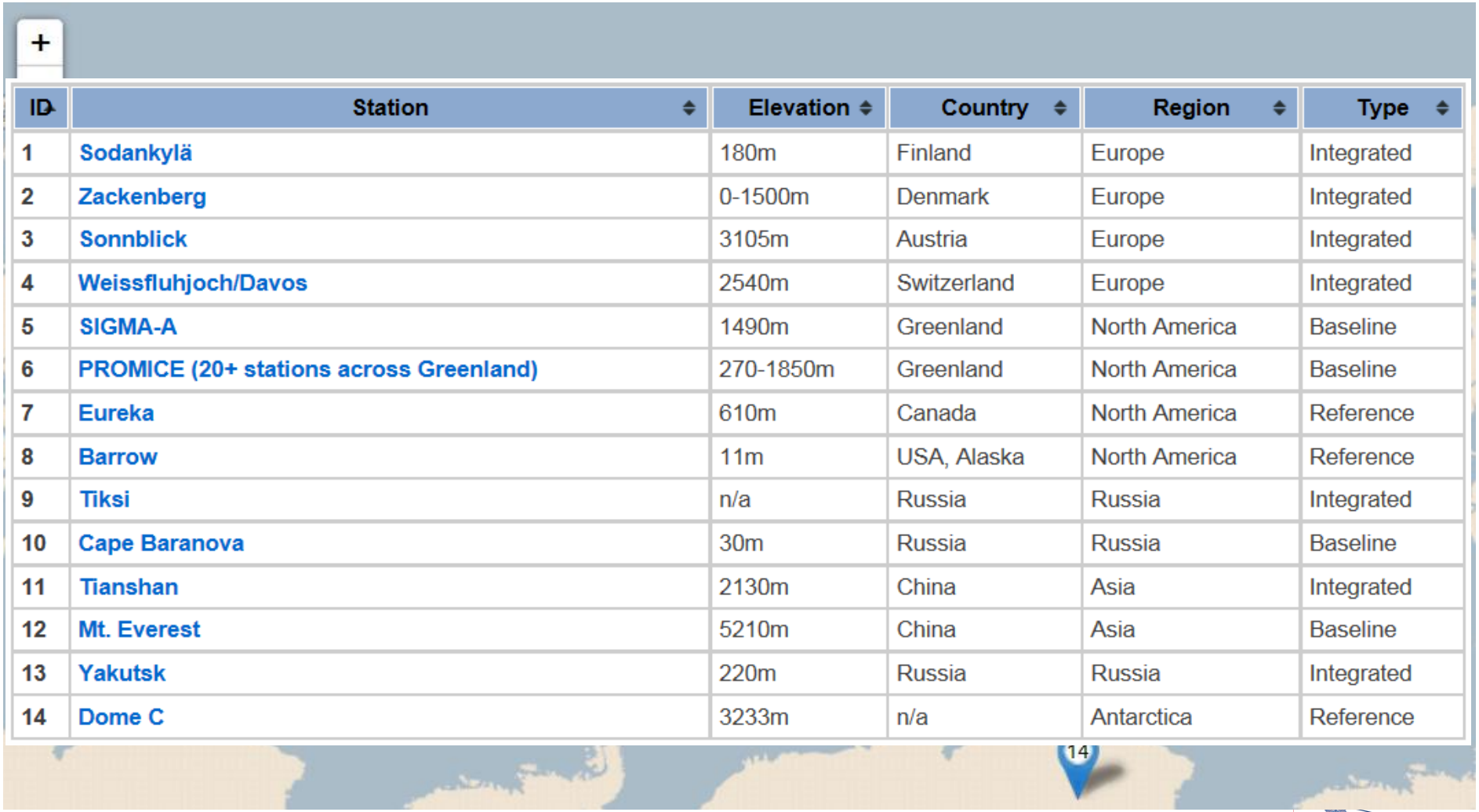
# Initial CryoNet stations

| ID | Station | Elevation | Country | Region | Type |
|---|---|---|---|---|---|
| 1 | Sodankylä | 180m | Finland | Europe | Integrated |
| 2 | Zackenberg | 0-1500m | Denmark | Europe | Integrated |
| 3 | Sonnblick | 3105m | Austria | Europe | Integrated |
| 4 | Weissfluhjoch/Davos | 2540m | Switzerland | Europe | Integrated |
| 5 | SIGMA-A | 1490m | Greenland | North America | Baseline |
| 6 | PROMICE (20+ stations across Greenland) | 270-1850m | Greenland | North America | Baseline |
| 7 | Eureka | 610m | Canada | North America | Reference |
| 8 | Barrow | 11m | USA, Alaska | North America | Reference |
| 9 | Tiksi | n/a | Russia | Russia | Integrated |
| 10 | Cape Baranova | 30m | Russia | Russia | Baseline |
| 11 | Tianshan | 2130m | China | Asia | Integrated |
| 12 | Mt. Everest | 5210m | China | Asia | Baseline |
| 13 | Yakutsk | 220m | Russia | Russia | Integrated |
| 14 | Dome C | 3233m | n/a | Antarctica | Reference |



# CryoNet sites must meet a minimum set of requirements: (extraction only, not full list!)

1. The site location is chosen such that, for the variables measured, it is spatially/temporally representative for measuring one or several components of the cryosphere.

2. CryoNet sites have to be active and perform sustained observations according to CryoNet agreed practices.

3. Technical personnel are trained in the operation of the equipment at the site.

4. For reference and integrated sites, there is an intent by the responsible agencies to long-term observations of at least one of the CryoNet variables.

5. The relevant CryoNet observations are of documented quality. The measurements are made and quality controlled according to CryoNet agreed practices.

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# CryoNet primer



## Primer to the Global Cryosphere Watch Surface-Based Observational Network - CryoNet

Wolfgang Schöner[1], Eric Brun, Michele Citterio, Charles Fierz, Barry Goodison, Jeff Key, Tetsuo Ohata, Borsteinn Borsteinsson, ...

[1]Zentalanstalt für Meteorologie und Geodynamik (ZAMG), Vienna, Austria
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[4] Institute for Snow and Avalanche Research SLF, Davos, Switzerland
[5] Environmental Canada, , Canada
[6] NOAA, , USA
[7] , , Japan
[8] WSL - Institute for Snow and Avalanche Research SLF, Davos, Switzerland
[9] Icelandic Meteorological Office, Reyjavik, Iceland

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# International CryoNet team

| Name | Affiliation |
|---|---|
| **Wolfgang Schöner (Chair)** | ZAMG, Austria |
| **Matthias Bernhardt** | LMU, Germany |
| **Michele Citterio** | GEUS, Denmark |
| **Charles Fierz** | WSL / SLF, Switzerland |
| **Christophe Genthon** | LGGE, France |
| **Barry Goodison** | Free Spirit, Canada |
| **Gino Casassa** | Geostudios, Chile |
| **Kaji Luojus** | FMI, Finland |
| **Jeff Key (GCW)** | NOAA, US |
| **Sandy Starkwater** | NOAA,US |
| **Vasily Smolyanitsky** | AARI, Russia |
| **Hironori Yabuki** | JAMSTEC, Japan |
| **Þorsteinn Þorsteinsson** | IMO, Iceland |
| **Cunde Xiao** | CMA, China |
| ***Permafrost*** | ??? – IPA |
| ***Cryospheric modelling*** | |
| ***Remote sensing*** | Affiliation |

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# Feedback from the questionaires

- ✓Implementation of tiered network
- ✓High need for standards and guidelines in cryospheric observations (many counts)
- ✓Serve science and practitioners
- ✓Cooperate with existing networks
- ✓Fill gaps in existing networks
- ✓Data policy and data provision

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# CryoNet sites must meet a minimum set of requirements:

6. Associated standard meteorological in situ observations, when necessary for the accurate determination and interpretation of the GCW variables, are made with documented quality.

7. The data and metadata including changes in instrumentation, traceability, observation procedures are submitted to a data centre, which is interoperable with the GCW portal in a timely? manner. Metadata are also provided to the WMO Operational Information Resource (WIR) and maintained regularly.

8. The station characteristics and observational programme are kept up-to-date in the GCW station information database.

9. A station logbook for observations and activities that may affect observations is maintained and used in the data validation process.

9. User needs have been considered in the observation design process.

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