

WORLD METEOROLOGICAL ORGANIZATION GLOBAL CRYOSPHERE WATCH

REPORT No. 6
2015

Final Report of the Steering Group Meeting

Second Session

Copenhagen, Denmark, 21-23 January 2015



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Chair, Publications Board
World Meteorological Organization (WMO)
7 bis, avenue de la Paix
P.O. Box 2300
CH-1211 Geneva 2, Switzerland

Tel.: +41 (0) 22 730 8403
Fax: +41 (0) 22 730 8040
E-mail: Publications@wmo.int

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EXECUTIVE SUMMARY

The second session of the GCW Steering Group took place in Copenhagen, Denmark from 21 to 23 January 2015, hosted at GEUS, National Geological Survey of Denmark and Greenland.

During the session the CryoNet Team suggestion for improved site type definitions was approved, and 36 sites were approved for a pre-operational testing phase. Approval of the Permanent Representatives (PR) of Members with WMO would be sought for inclusion in the pre-operational testing phase of sites operated by their respective countries.

The development of the GCW Portal had progressed, a “test session” would be setup and the portal would be presented at a Congress side event. The interaction with contributing data centres and the importance of protecting their visibility were discussed. Better coordination would be sought with ICSU-WDS. The GCW website is functional and up to date thanks to the continued effort of J. Key and stable financial support would be needed to maintain it.

The GCW working groups work plans were discussed. The Integrated Products Working Group was acknowledged for its successful contribution through Snow Watch and collaboration would be fostered between the Snow Watch Team, the National Snow and Ice Data Center (NSIDC) and the ESA SnowPEX consortium. The Observations Working Group Best Practices Team would work on reviewing and documenting the best practices that have to be applied within CryoNet. A meeting of this team would be organized before EC-67 (2016) in order to finalize the GCW Best Practices document, as the final list of CryoNet sites should be available by January 2016 to allow for the time required to prepare documents for EC-67. The Information and Services Working Group would further work on the Portal, the Website and Outreach, and the Terminology Teams. GCW representatives would be nominated to liaise with the three Task Teams of the Inter-Commission Coordination Group on the WMO Integrated Global Observing System (ICG-WIGOS), and A. Snorrason will act as the GSG contact with ICG-WIGOS.

The meeting agreed on the future meetings/workshops listed below:

- Joint UNESCO-GCW-CryoNet teams meeting in South America, October 2015 (venue TBD);
- The Fifth CryoNet Team meeting in Boulder, USA, 7-9 December 2015;
- The Third session of the GSG meeting in Boulder, USA, 10 -11 December 2015;
- The Second CryoNet Asia Workshop in Salekhard, Russia, February 2016;
- The Third Portal Team and first Terminology Teams meeting (1Q of 2016, venue TBD);

Preparations were ongoing for a Congress Side Event “Round Table Discussion on WMO Polar and High Mountain Activities”, Geneva, 28 May 2015, led by A. Snorrason. A set of brochures had been created to provide overviews of GCW and the GCW Data Portal, and posters would be produced from this material. The meeting was updated on the documents being finalized for submission to Congress XVII. WMO Secretariat would prepare a draft resolution on CryoNet and circulate it for finalisation in order to be available by the next EC-PORS meeting in September 2015. An immediate priority is to set-up a GCW Project Office and to get sufficient budget to maintain momentum on GCW activities. GSG members would activate their contacts in order to request more resources for GCW from their respective countries.

The meeting reviewed the status of all actions from previous meetings. Contacts with PR were ongoing to complete and consolidate the role of national GCW Focal Points. GCW Regional Groups (RGs) would be formed to foster multi-national collaboration between Members with interests in the same region. GCW engagement with the proposed Polar Regional Climate Centre (PRCC) meeting and liaison with GPPS and YOPP were planned.

A GCW-ClIC Partnership would be explored, as well as the possibility to incorporate in CryoNet sites involved in the Solid Precipitation Intercomparison Experiment (SPICE) and interested to continue cooperation. Ways to promote the visibility of GCW both inside and outside WMO were discussed. It was agreed that regular teleconferences between GSG and the Working Group would be organized in between meetings. Finally, a new structure of GCW and a procedure for SGS membership was defined.

1. ORGANIZATION OF THE MEETING

1.1 Welcome and opening

The second session of the GCW Steering Group took place in Copenhagen, Denmark from 21 to 23 January 2015. The Session was held at GEUS, the National Geological Survey of Denmark and Greenland.

The GCW Steering Group (GSG) Chairman, A. Snorrason, welcomed the participants and reviewed the main objectives of the meeting. He acknowledged the work done in the previous days by the CryoNet and Portal teams mentioning that GSG should address the new configuration of the surface-based network as well as the new sites/stations structure.

W. Zhang, Director of the Observing and Information Systems Department of the World Meteorological Organization (WMO) welcomed all the participants on the behalf of WMO. He emphasized the importance of this session in the view of the forthcoming WMO Congress next June in Geneva, Switzerland, which represents a crucial step in the GCW development. He also reaffirmed the necessity to strengthen the links with the Global Framework for Climate Services (GFCS), Regional Associations (RAs) and the Technical Commissions (TCs).

1.2 Adoption of the agenda

The programme for the meeting was adopted without significant changes. The final programme is attached as **ANNEX 1**.

1.3 Working arrangements

M. Citterio as the host for this meeting warmly welcomed participants and provided the meeting with all the important information concerning the venue.

1.4 Participant introductions

Participants (**ANNEX 2**) briefly introduced themselves and identified their interests and background relevant to the themes of the meeting.

1.5 All documents and presentations prepared for, or given at, the meeting are available online at:

http://www.wmo.int/pages/prog/www/OSY/Meetings/GCW%20Steering%20Group/GSG2_Copenhagen/GCW-GSG-2.html

2. CRYONET

2.1 Practices to be applied for CryoNet

Discussions revolved around the best practices that need to be applied by any candidate site or station willing to be part of CryoNet. The GCW standards and best practices for cryospheric measurements are currently being compiled. An initial inventory of existing documents describing measurement practices is available through the GCW Website at: <http://globalcryospherewatch.org/cryonet/methods.html>.

Following the discussion, W. Schöner gave an overview of the main recent progress of the Primer to CryoNet document. He mentioned that this document should be updated according to the decisions made in the CryoNet meeting over the last two days.

The CryoNet team proposed new site type definitions (Fig. 1) for consideration by GSG. The meeting adopted the new CryoNet structure and agreed to use the new figure in all documentation and communications. The meeting further suggested showing examples of both an Integrated and Basic sites when describing CryoNet to allow for an easier understanding of the design.

| CryoNet Sites | |
|--|--|
| Basic Sites (Cryosphere only) | Integrated Sites (Multiple spheres) |
| <ul style="list-style-type: none"> • Monitor single or multiple components of the cryosphere • Observe multiple variables of each component • Measure auxiliary meteorological variables • Comply with GCW best practices • Be currently active • Commit to long-term operation • Make data freely available, whenever possible in (near) real time | <p>In addition to CryoNet Basic Site characteristics:</p> <ul style="list-style-type: none"> • Monitor at least one other sphere (e.g., hydrosphere, biosphere, atmosphere) • Have a broader research focus • Have supporting staff • Have training capability |
| CryoNet Stations (Sites contain one or more stations) | |
| Primary Stations | Baseline Stations |
| <ul style="list-style-type: none"> • Have target of long-term operation • Have a 4 year initial commitment | <ul style="list-style-type: none"> • Have long-term operational commitment • Have a long-term record (10+ years) |

Figure 1: New definition of the site types in CryoNet

Action 2.1.1: Use the figure of the new CryoNet site type definitions in every communications and presentations and update all existing documentations (i.e. the GCW-IP, WIGOS Manual, GCW document to Cg-17, etc.) and the GCW Website accordingly.

2.2 Approval of the list of stations of CryoNet

Attendees noted that even a single station can be of significant value in regard to climate change analysis. This parameter has to be taken into account when defining the “check list” for approving a site. The meeting recalled that though GSG has the authority to decide on the list of sites/stations to be considered for inclusion in CryoNet, the final list eventually has to be vetted by the WMO Executive Council Panel of Experts on Polar Observations, Research and Services (EC-PORS) and adopted by EC. The meeting finalized a list of 36 sites for a pre-operational testing phase. The list is given in **ANNEX 3**.

For details see <http://globalcryospherewatch.org/cryonet/sites.php?category=core>

The meeting furthermore agreed to send a letter to all Permanent Representatives (PRs) of Members with WMO in order to seek their approval on the list of identified sites operated by their respective countries for inclusion in the pre-operational testing phase. Site managers will also be informed afterwards.

Action 2.2.1: Send a letter to PRs to seek their approval on the list of identified sites to be included in the pre-operational testing phase.

3. GCW PORTAL AND WEBSITE

3.1 Status of the development of GCW Portal, including its function as DCPC

Ø. Godøy provided the meeting with an exhaustive summary of the latest development of the [GCW Data Portal](#) (see Doc 3.1). He further raised several important points and questions related to the Portal. For example, he pointed out the lack of collaboration between the WMO World Information System (WIS) and the International Council for Science World Data System (ICSU WDS). He suggested having WIS represented at the International Conference on Data Sharing and Integration for Global Sustainability (SciDataCon) conferences in order to bridge systems. Furthermore, there is no WMO representative on the ICSU Committee and/or attending ICSU meetings. The two systems are running apart from each other. In consequence, there is a need to bridge this gap and in a more general sense, the interactions with other communities should also be further developed. This is especially important for GCW where much of the relevant data are hosted by WDS centres. In response to that issue, the meeting asked Ø. Godøy whether he would agree to act as the GCW representative, and he accepted.

Ø. Godøy suggested that data centres contributing to the GCW Data Portal should be in contact with the Portal Team. This would facilitate, inter alia, tracking changes that occur in those centres. He also recalled that visibility of data centres represents an important issue which relates to some extent to funding. Data centres do not want to be “absorbed” into a larger broker. It does imply that interaction and communication with data centres have to be properly managed.

As a case study, the meeting defined a task for both the Portal and the CryoNet Teams. The aim would be to test how data/metadata can be ingested into the GCW Data Portal. Data/metadata from two sites (Sonnblick and Davos) have been identified for this “test session”.

Some other issues remained to be addressed such as follow:

- Should the National Snow and Ice Data Center (NSIDC) be the GCW archive?
- Should WMO act as data centre for some providers?
- In case data are sent to different data centres, which one(s) should be considered by the Portal?
- ISO 19115 is not a specific enough format because it allows almost everything.

Action 3.1.1: Set up a “test session” to harvest data/metadata from Sonnblick and Davos sites into the GCW Data Portal.

Action 3.1.2: Ø. Godøy to present the GCW Data Portal at the Congress side event.

3.2 Status and development of the GCW website

This session provided information on the status and development of the GCW Website. J. Key recalled that assessments of the different cryospheric components should be written at least annually. He also mentioned that the GCW Website will be presented at the Congress side event.

The meeting took the opportunity to reiterate its thankfulness to J. Key for his tremendous effort in maintaining the GCW Website. It furthermore recognized that in the near future,

additional human and financial resources will be needed to support J. Key to keep the site current and operating.

V. Smolyanitsky proposed to provide an updated version of the catalogue of sea ice data to populate the GCW Website.

More information on the GCW Website can be found at: <http://globalcryospherewatch.org>

Action 3.2.1: V. Smolyanitsky to provide information on sea ice to populate the GCW Website.

4. WORK PLAN

4.1 Status of the work of GCW Teams, including Membership

Integrated Products Working Group:

K. Luoju presented an extensive overview of the last development of the Snow Watch initiative. The meeting acknowledged the impressive work done by the team and recognized that the Snow Watch initiative represents a successful contribution to GCW. It furthermore proposed to use the Snow Watch initiative as a showcase at the Polar and High Mountain activities side event during the WMO Congress. This would emphasize how, through GCW, this initiative has served to significantly improve snow data availability. Participants suggested applying the same concept to the other cryospheric components under GCW by establishing subsequent groups.

The meeting noted that the new snow data inventory has the potential to be ingested into the GCW data catalogue and thus it was suggested to involve the Portal Team in the exchange activities. It further suggested highlighting this inventory through the GCW Website.

Participants finally recommended fostering collaboration between the Snow Watch Team, the National Snow and Ice Data Center (NSIDC) of USA, and the ESA SnowPEX consortium.

Action 4.1.1: Foster collaboration between the Snow Watch Team, the National Snow and Ice Data Center (NSIDC) and the ESA SnowPEX consortium.

Observations Working Group:

The meeting reviewed the work plan of the Observations Working Group presented by W. Schöner. Participants raised the issue concerning the best practices that have to be applied within CryoNet. A clear definition of those practices has to be documented. The Primer to CryoNet should refer to that and point out which practices are actually considered. Basically, existing measurement methods (e.g. IPA for permafrost) could be endorsed by GCW.

The Best Practices team will review the observing practices already used by the scientific community. The Best Practices team is composed of G. Casassa, T. Torsteinsson, C. Fierz (snow), M. Citterio (glacier), W. Schöner (glacier, snow), V. Smolyanitsky (sea ice), TBD (permafrost) and additional experts (TBD) for the other cryospheric components (freshwater ice, ice sheet). A meeting of this team will be organized before EC-67 (2016) in order to finalize the GCW Best Practices document. The meeting suggested keeping EC-PORS posted on the furtherance of this activity.

The meeting recalled that the final list of CryoNet sites should be available by January 2016 to allow for the time required to prepare documents for EC-67.

Action 4.1.2: Send an email to Matthias Bernhardt to ask whether he is still interested to be part of the CryoNet team since he has not been active for a while.

Action 4.1.3: Organize a meeting of the Best Practices team before EC-67 (2016).

Information and Services Working Group:

Ø. Godøy as the chair of the Information and Services Working Group elaborated an extensive work plan for the Portal, the Website and Outreach, and the Terminology Teams. However, he noted that some tasks require involvement of dedicated experts and that it may be difficult to progress as planned with only in kind resources.

Attendees recognized the need to nominate GCW representatives to liaise with the three Task Teams of the Inter-Commission Coordination Group on the WMO Integrated Global Observing System (ICG-WIGOS). These representatives would be supported by the WIGOS Office to attend the meetings. In addition to the three GCW representatives, A. Snorrason volunteered to act as the GSG contact with ICG-WIGOS.

The meeting noted that the Terminology Team should review existing glossaries related to the cryosphere, climate, and forecast communities in the view to develop the GCW Glossary. G. Casassa agreed to take care of this task. Participants further mentioned the importance to clearly identify who the GCW users are in order to develop the Data Portal in accordance with their perspectives and needs.

Action 4.1.4: Inform ICG-WIGOS Chair that A. Snorrason will represent GCW in ICG-WIGOS.

Action 4.1.5: Nominate GCW representatives to liaise with the ICG-WIGOS Task Teams.

4.2 Work Plan of GCW Teams

GCW Working Group work plans are given in **ANNEX 4**.

4.3 Next meetings and workshops

The meeting agreed on the future meetings/workshops listed below and recommended examining the possibility to convoke only selected members of the concerned teams to meetings depending on topics to be addressed:

- Joint UNESCO-GCW-CryoNet teams meeting in South America, October 2015 (venue TBD);
- The Fifth CryoNet Team meeting in Boulder, USA, 7-9 December 2015;
- The Second CryoNet Asia Workshop in Salekhard, Russia, February 2016;
- The Third Portal Team and first Terminology Teams meeting (first quarter of 2016, venue TBD).

5. PREPARATION FOR Cg-17

5.1 Preparation of a Congress Side Event “Round Table Discussion on WMO Polar and High Mountain Activities”, Geneva, 28 May 2015, for GCW related programmes

The session discussed the preparation of a potential presentation of the GCW activities as part of a Polar Side Event at the Congress. Because the purposes of this side event are inter alias to communicate on GCW and to try to influence discussion on GCW issues at Cg-17,

this event should take place before the documents are presented to the Congress for approval. Actually, this event is planned at lunch-time on 28 May 2015. Discussion revolved around a draft document provided by Bruce Angle. It was recognized that CryoNet, the Snow Watch initiative as well as the GCW Data Portal and the GCW Website should be included in this side event presentation. A. Snorrason agreed to lead the presentation for the cryospheric observation topic. However, there is a need to designate someone to assist him in the preparation of all the necessary documents. C. Fierz agreed to give a talk about High Mountains as part of the panel presentations. M. Citterio will provide additional names for other potential talks to A. Snorrason. The session noted that WIGOS will have a display with computers which could provide some facilities for presentations.

Action 5.1.1: Designate someone to assist A. Snorrason in preparing documents and presentations (e.g. Power Point slides).

Action 5.1.2: C. Fierz to give a talk about High Mountains as part of the panel presentations at the Congress Side Event.

5.2 Update of the GCW Brochures

A set of brochure (hand-outs) has been created to explain what the cryosphere is and to provide overviews of GCW and the GCW Data Portal. The meeting briefly reviewed the latest changes made in the GCW brochures and decided to create an additional hand-out on the GCW Website.

Action 5.2.1: Create hand-out on the GCW Website.

Action 5.2.2: Create posters on GCW (from hand-outs), GCW Data Portal, Snow Watch and CryoNet.

5.3 Documents to Cg-17 on GCW

The meeting updated the documents that will be submitted to Congress XVII.

Action 5.3.1: M. Ondráš to send the final version of the GCW-IP to the team for review.

Action 5.3.2: A. Snorrason to inform EC-PORS members on the on-going work of GSG (notably, the changes in the GCW structure adopted by the meeting).

5.4 Draft resolution on CryoNet

The meeting recognized the need to have a resolution on CryoNet. This resolution should be available by the next EC-PORS meeting in September 2015. WMO Secretariat will prepare a draft and will circulate it between the GSG members.

Action 5.4.1: WMO Secretariat to draft a resolution on CryoNet and to make it circulated between the GSG members.

5.5 Resources for GCW Implementation in the next financial period

The meeting recognized that another immediate priority is to set-up a GCW Project Office and to get sufficient budget for at least one full staff position (P4) to manage GCW activities. There is a need to have a minimum momentum budget to maintain GCW activities and therefore, a need to seek additional resources right after the Congress. In this regard, a letter should be sent to Permanent Representatives (PRs) of Members with WMO to inform

them of the latest development and activities of GCW. The meeting acknowledged the trust fund contribution from Canada for the next 5 years. GSG members should activate their contacts in order to raise more resources for GCW.

Action 5.5.1: GSG members to activate their contacts in order to raise more resources for GCW from their respective countries.

6. ALL OTHER BUSINESS

6.1 Review of actions from previous meeting

Actions from previous meetings related to GCW activities have been compiled into a single document. The meeting reviewed the status of all actions during the session.

Action 6.1.1: Establish a primary list of cryospheric terms (before any definition; see also 4.1 above).

6.2 GCW Focal Points

The meeting noted that a letter was sent to PRs to invite them to reaffirm their national GCW Focal Points. It recalled that Focal Points are potential candidates for committees and ideally, they should be the CryoNet site managers.

It was also noted that Denmark does not have Focal Point at the moment. M. Citterio, who is in contact with several people in Denmark and actively engaged in GCW, proposed himself to act as Focal Point. A formal nomination remains however mandatory.

The meeting decided to develop a newsletter (quarterly) and to distribute it to GCW Focal Points. Aims of this newsletter are to inform them more frequently of the on-going GCW activities, to improve communication and to keep them engaged. A map on the GCW Website displaying locations of the Focal Points would be helpful.

The meeting noted that Arkady Koldaev was nominated by the Commission for Instruments and Methods of Observations (CIMO) to act as Focal Point to GCW.

Action 6.2.1: To send hand-outs to GCW Focal Points.

Action 6.2.2: To develop a map on the GCW Website to display locations of the Focal Points.

6.3 Regional GCW/CryoNet activities

The meeting reaffirmed that GCW Regional Groups (RGs) will be formed where it will foster multi-national collaboration between Members with interests in the same region (e.g., in Asia for Third Pole issues and for the pan-Arctic for high latitude northern issues). There is however, a need to allow for some flexibility when forming such regional groups (e.g. Tropical glaciers and/or Regional Association I).

It is also important to maintain a certain level of communication between the representatives of regional groups in order to keep them informed of others activities. To do so, it would be interesting, whenever possible, to take advantage of scientific conferences to organize ad-hoc meetings or teleconferences.

6.4 Support/contribution to Polar Regional Climate Centre

In this session the meeting discussed how GCW could/should be engaged to the proposed Polar Regional Climate Centre (PRCC) meeting; who/which task team should take responsibility to develop GCW contributions and who should represent GCW.

The meeting followed the recommendations made at the EC-PORS-5 meeting by nominating A. Devaris as the GSG representative for the PRCC meeting.

6.5 Support/contribution to GIPPS and YOPP

The meeting discussed the form of support and/or contribution to be provided to GIPPS and YOPP and identified who will lead the GCW contribution/collaboration and ensure necessary activities are initiated. The meeting nominated M. Citterio and W. Schöner in addition to B. Goodison to liaise with T. Jung (AWI) and to address these issues.

Action 6.5.1: M. The Secretariat will provide the GIPPS and YOPP Implementation Plans to the GSG members.

Action 6.5.2: M. Citterio and W. Schöner to first review the GIPPS and YOPP Implementation Plans and secondly, to draft an initial plan of action for GCW.

6.6 GCW-CLiC Partnership

J. Baeseman, Director of the Climate and Cryosphere Project, shared her thoughts through a document that explains several possible ways to foster the partnership between GCW and CLiC. The meeting reviewed this document.

J. Key will attend the 11th Session of the CLiC Project's Scientific Steering Group hosted by the National Center for Atmospheric Research (NCAR) in Boulder, USA from 9 to 13 February 2015. He will take this opportunity to report to J. Baeseman on the ideas evoked during the GSG meeting.

Action 6.6.1: J. key to summarize ideas evoked by GSG and to formulate a response to J. Baeseman.

6.7 SPICE beyond 2015

The Solid Precipitation Intercomparison Experiment (SPICE), which started in October 2013 will end after this winter season (2015). Because some sites hope to remain operating under some venue, the meeting envisaged a possibility to formally incorporate them into the GCW network as contributing sites or into CryoNet as core sites. However, it is required to know what the intentions are, at the national level, for those sites. In this regard, reports on activities could help to evaluate the situation and to advise accordingly EC-PORS at the next meeting (scheduled in September 2015) for approval.

Action 6.7.1: GSG to liaise with the CIMO focal point for the follow-up.

6.8 Point of contact for the GEO Cold Regions activity

The meeting examined the possibilities to strengthen the relationship with the Group on Earth Observations (GEO). It agreed that a member should be nominated to serve as the GCW point of contact with GEO. However, due to the fact that Dr Y. Qiu is leaving the GEO secretariat, no decision will be taken until his replacement is formalized. The meeting also mentioned that this link could be set at a higher level.

6.9 Visibility of GCW

The meeting discussed the different opportunities to further improve the GCW visibility both inside and outside WMO. Suggestions to formally represent GCW at some important scientific conferences were raised by the participants, for example at the Earth Observation and Cryospheric Science 2016, the European Geoscience Union, the American Geophysical Union and/or the ArcticNet Canada etc.

Additional possibility would be to write a short notice after each GCW meetings to widely inform the public and media on the main GCW news and evolutions. Mailing list such as the CRYOLIST could be used to advise the community. Another proposition was to develop a brief commercial-like movie with the same purposes. For this initiative it would be interesting to liaise with the young communities (e.g. Association of Polar Early Career Scientists (APECS), Permafrost Young Researcher Network (PYRN), Ice Core Young Scientists (ICYS)), which are most often enthusiastic in developing such a material. This would also be a mean to involve them into GCW.

However, to properly handle those propositions it is urgent to first completely populate the Website and Outreach Team and then to add these tasks into its work plan.

Action 6.9.1: Populate the GCW Website and Outreach Team and develop a strategy to improve the visibility of GCW inside and outside WMO.

6.10 GCW Virtual Project Offices

B. Goodison raised the subject of potential establishment of GCW Virtual Project Offices. The meeting recalled that this topic was addressed by the WMO Secretariat but no offer has been formulated from Members so far.

6.11 How will GSG operate between meetings?

The GCW Steering Group provides guidance on the Working Groups and Task Team formation and on initial GCW activities and tasks to be conducted, given the available budget. It currently reports to EC-PORS. The meeting briefly discussed the way for GSG to operate between meetings. Participants proposed to set up regular teleconferences to allow for short inter-sessional discussions in order to either tackle urgent actions or to prepare physical meetings. This would also help to keep GSG informed of actions being taken by Secretariat and other working groups.

Action 6.11.1: Organize regular teleconferences between GSG and the Working Group leaders to oversee the furtherance of the identified activities.

6.12 GSG membership

The GSG members agreed on a new GCW group and team structure. The organizational framework of GCW includes hereafter a Steering Group (GSG), three Working Groups and seven teams (see Fig 2):

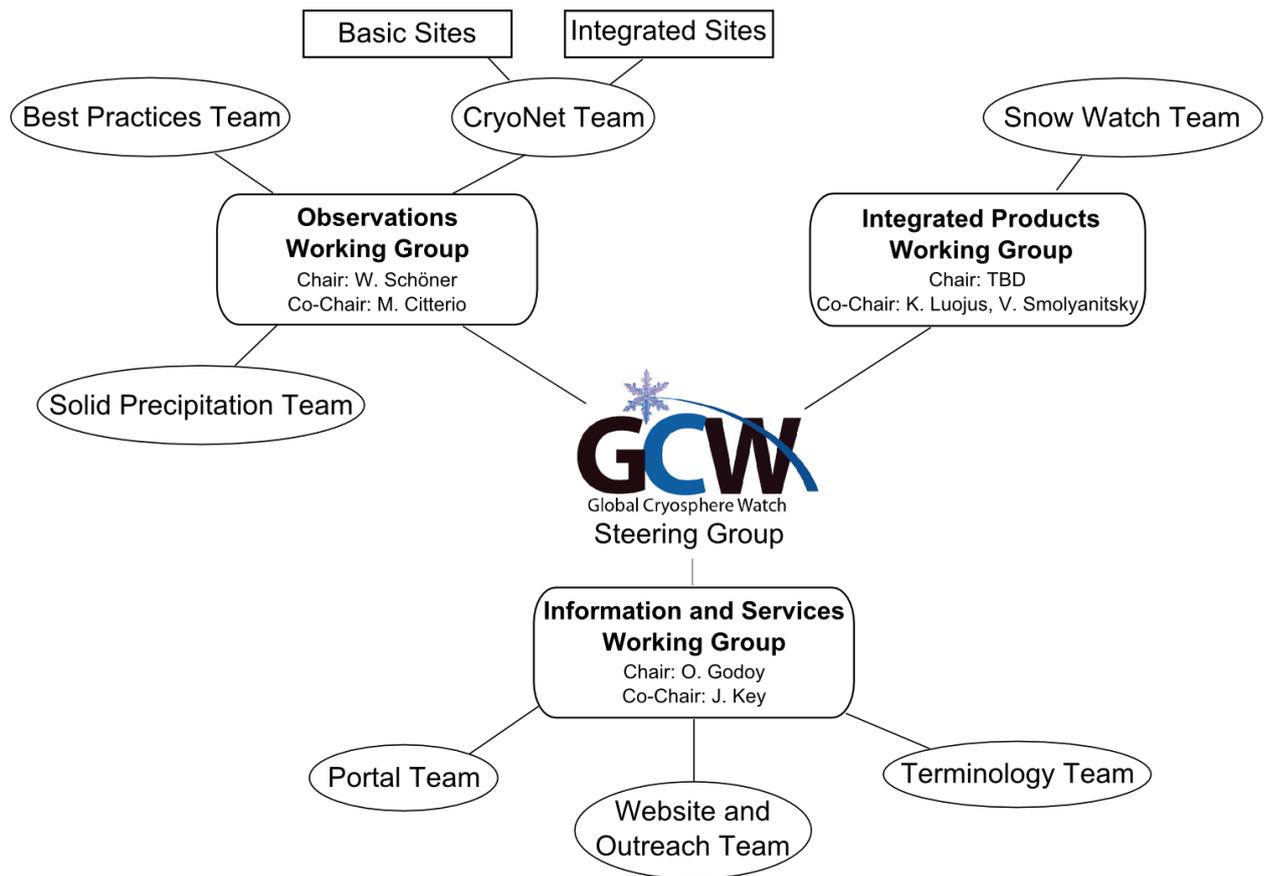


Figure 2: New GCW structure.

This new structure impacts the GCW memberships and redistributes responsibilities and affiliations within the Working Groups and Task Teams. Both the GCW-IP as well as the Terms of Reference of the newly established GCW Working Groups must be updated accordingly. Working Group responsibilities were drafted by the meeting participants. The meeting nominated Steve Colwell as a new GSG member. Participants proposed to nominate Walt Meier as the Chair of the Integrated Products Working Group. It further noted that it is important to consider external experts who express their willingness to contribute to the GCW development. The updated list of GSG membership is given in **ANNEX 5**. Note that this list has to be approved by EC-PORS.

A procedure to nominate experts to be part of GCW will be applied from now on and is defined as follows: (1) discussions at GSG meetings or during inter-sessional teleconferences to determine needs and to identify experts with appropriate competences; (2) ask officially the Permanent Representative of Members with WMO or the organization manager of the expert's country; (3) when approved by the PR or the organization manager, contact the expert. Particular attention is needed to maintain some homogeneity in the regional distribution depending upon expert availabilities.

The GSG Chair and Vice-Chair will look at possible gaps in the composition of the GSG membership (expertise of members, organizations, regional representations, and overlap with EC-PORS etc.). A crucial question remains open on the ideal size of the group.

Action 6.12.1: Update the GCW-IP and the Terms of Reference of the newly established GCW Working Groups accordingly to the new structure of GCW.

Action 6.12.2: Contact Walt Meier in order to see if he would agree to chair the Integrated Products Working Group.

Action 6.12.3: Contact Giovanni Macelloni to know in which task team, according to the new GCW structure, he would like to actively contribute to.

Action 6.12.4: Formalize the nomination of experts to GCW teams through PRs.

7. NEXT GSG MEETING

7.1 Next GCW Steering Group meetings

A. Snorrason and J. Key will report on the most recent GCW activities to the EC-PORS members. The GSG chairman suggested that 5 to 6 persons involved in both the EC-PORS and GSG should meet just after the EC-PORS-6 meeting, actually on Friday, 11 September 2015 to further consider EC-PORS decisions and develop the GCW strategy accordingly. The GSG chairman mentioned that the GSG meetings should be regularly organized around January each year. The forthcoming GCW meetings are planned as follow:

The Third session of the GSG meeting will be held in Boulder, Colorado, USA, from 10 to 11 December 2015.

Action 7.1.1: To provide the WMO Secretariat with an official invitation for the preparation of the meetings in Boulder, USA.

A summary of all actions is given in **ANNEX 6**.

The meeting was adjourned Friday 23 January 2015 at 04:00 PM.

ANNEX 1: Agenda

MEETING AGENDA

- 1. ORGANIZATION OF THE MEETING** (A. Snorrason)
 - 1.1 Welcome and opening
 - 1.2 Adoption of the agenda
 - 1.3 Working arrangements
 - 1.4 Participant introductions
- 2. CRYONET**
 - 2.1 Practices to be applied for CryoNet (W. Schöner)
 - 2.2 Approval of the list of stations of CryoNet (In-session)
- 3. GCW PORTAL AND WEBSITE**
 - 3.1 Status of the development of GCW Portal, including its function as DCPC (Ø. Godøy)
 - 3.2 Status and development of the GCW website (J. Key)
- 4. WORK PLAN**
 - 4.1 Status of the work of GCW Teams, including Membership (W. Schöner, J. Key, K. Luoju)
 - 4.2 Work Plan of GCW Teams (A. Snorrason)
 - 4.3 Next meetings and workshops (A. Snorrason)
- 5. PREPARATION FOR Cg-17** (M. Ondras, R. Le Bris)
 - 5.1 Preparation of a Congress Side Event(s) for GCW (ad-hoc programme)
 - 5.2 Update of the GCW Brochures
 - 5.3 Documents to Cg-17 on GCW
 - 5.4 Draft resolution on CryoNet
 - 5.5 Resources for GCW Implementation in the next financial period
- 6. ALL OTHER BUSINESS**
 - 6.1 Review of Actions from previous meeting
 - 6.2 GCW Focal Points
 - 6.3 Regional GCW/CryoNet activities
 - 6.4 Support/contribution to Polar Regional Climate Centre
 - 6.5 Support/contribution to GIPPS and YOPP
 - 6.6 GCW-CliC Partnership
 - 6.7 SPICE beyond 2015
 - 6.8 Point of contact for the GEO Cold Regions activity
 - 6.9 Visibility of GCW
 - 6.10 GCW Virtual Project Offices
 - 6.11 How will GSG operate between meetings?
 - 6.12 GSG membership
- 7. NEXT GSG MEETING**
 - 7.1 Next GCW Steering Group meetings (A. Snorrason)

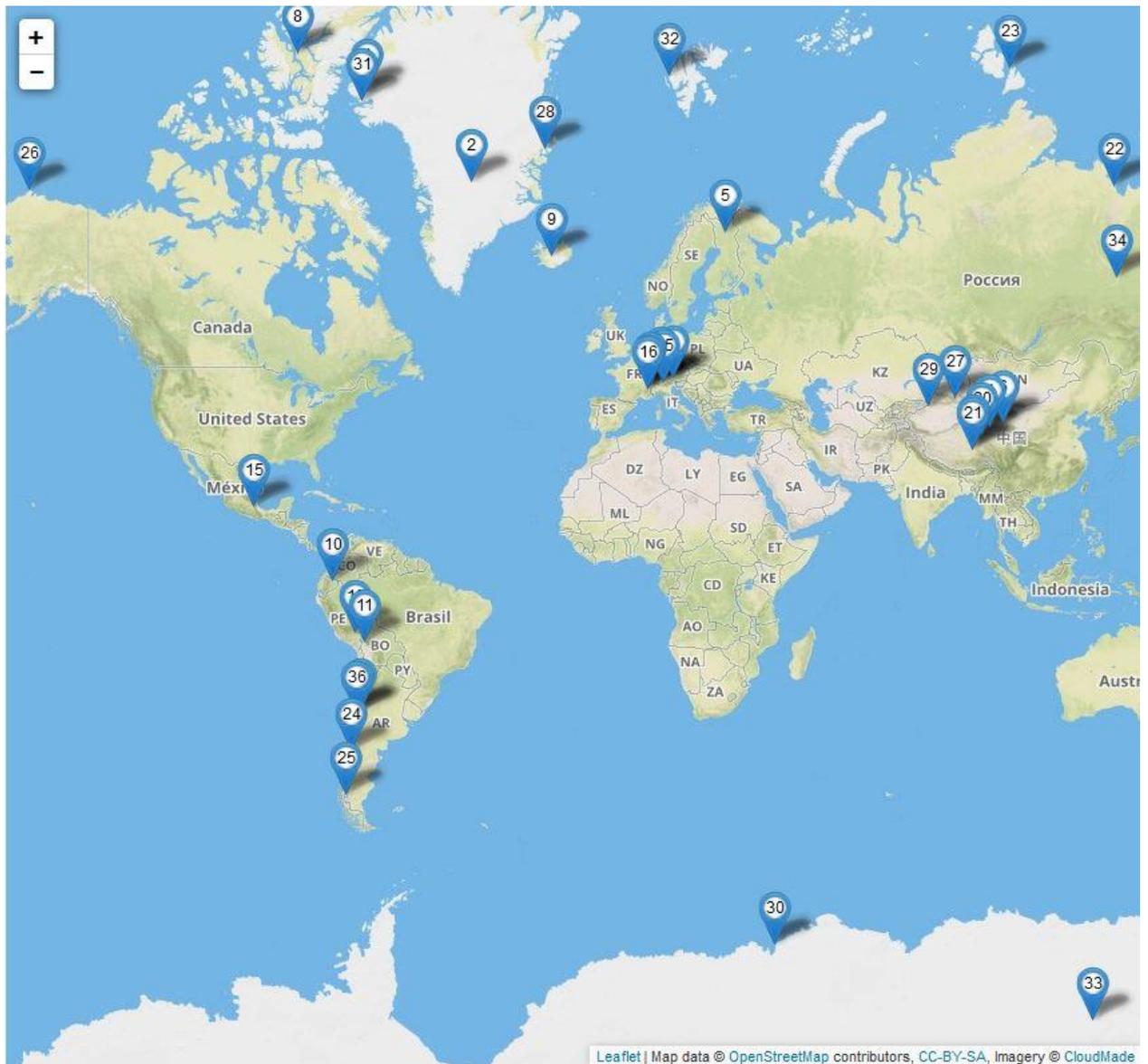
ANNEX 2: List of Participants

| N° | Name | Organization | Email |
|----|------------------|---|--|
| 1 | Aimee Devaris | Director, Alaska Region, National Weather Service NOAA. National Weather Service, 222 West 7th Avenue, 23, Suite 517, Anchorage, Alaska 99513, United States of America. Phone: +(1 907) 271 5126 | aimee.devaris@noaa.gov |
| 2 | Arni Snorrason | Permanent Representative of Iceland with WMO. Director-General. Icelandic Meteorological Office (IMO), Bustadavegur 9, IS-150 Reykjavik, Iceland. Phone: +(354) 522 6000 | arni.snorrason@vedur.is |
| 3 | Barry Goodison | 4 Vezina Pl., Kanata, Ontario K2K 3G9, Canada | barrygo@rogers.com |
| 4 | Charles Fierz | International Association of Cryospheric Sciences (IACS). WSL Institute for Snow and Avalanche Research SLF, Flüelastrasse 11, CH-7260 Davos Dorf, Switzerland. Phone: +(41 81) 417 01 65 | fierz@slf.ch |
| 5 | Gino Casassa | Director of the Glaciological Department at the Instituto de la Patagonia, Universidad de Magallanes, Av. Bulnes 01855, Punta Arenas, Chile | gino.casassa@gmail.com |
| 6 | Jeff Key | Cooperative Institute for Meteorological Satellite Studies, University of Wisconsin-Madison, 1225 West Dayton Street; Madison; WI 53562; USA, Phone: +1 608 263 2605 | jkey@ssec.wisc.edu |
| 7 | Kari Luojus | Finnish Meteorological Institute (FMI), Erik Palménin aukio 1, FI-00560 Helsinki, Finland. Phone: +358 40 5058417 | kari.luojus@fmi.fi |
| 8 | Michele Citterio | GEUS - Geological Survey of Denmark and Greenland, Øster Voldgade 10, DK-1350 Copenhagen K, Denmark | mcit@geus.dk |
| 9 | Miroslav Ondráš | Chief, WMO Observing Systems Division, Observing and Information Systems Department. World Meteorological Organization, 7 bis, Avenue de la Paix, P.O.Box 2300, CH-1211 Geneva 2, Switzerland | mondras@wmo.int |
| 10 | Øystein Godøy | Norwegian Meteorological Institute, Postboks 43 Blindern, 0313 Oslo, Norway. Phone: +47 22 96 30 00 | o.godoy@met.no |
| 11 | Raymond Le Bris | Scientific Officer, WMO Observing Systems Division (OSD). World Meteorological Organization, 7 bis, Avenue de la Paix, P.O.Box 2300, CH- | rlebris@wmo.int |

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|----|---------------------|--|--|
| | | 1211 Geneva 2, Switzerland | |
| 12 | Tetsuo Ohata | Japan Agency for Marine-Earth Science and Technology (JAMSTEC) | ohatat@jamstec.go.jp |
| 13 | Vasily Smolyanitsky | Arctic and Antarctic Research Institute (AARI), Bering str., 38, St.Petersburg, Russian Federation. Phone: +7 812 337-3149 | vms@aari.aq |
| 14 | Wenjian Zhang | Director, WMO Observing and Information Systems Department and Space Programme. World Meteorological Organization, 7 bis, Avenue de la Paix, P.O.Box 2300, CH-1211 Geneva 2, Switzerland | wzhang@wmo.int |
| 15 | Wolfgang Schoener | Zentralanstalt für Meteorologie und Geodynamik (ZAMG), Hohe Warte 38, A-1190 Wien, Austria. Phone: +43(1)36026-2290 | wolfgang.schoener@zamg.ac.at |

ANNEX 3: Cryospheric observing sites identified for the pre-operational testing phase of CryoNet.

| Site | Operating Country | Location | Integrated? |
|---|-------------------|----------------|-------------|
| 1 SIGMA-A | Japan | Greenland | no |
| 2 PROMICE Greenland Ice Sheet Monitoring Network | Denmark | Greenland | no |
| 3 Sonnblick | Austria | Austria | yes |
| 4 Qilianshan Station of Glaciology and Ecologic Environment | China | China | no |
| 5 Sodankylä-Pallas | Finland | Finland | yes |
| 6 Qilian | China | China | yes |
| 7 Tanggula Cryosphere and Environment Observation Station | China | China | no |
| 8 Eureka | Canada | Canada | no |
| 9 Hofsjökull | Iceland | Iceland | no |
| 10 Antisana 15 alfa | Ecuador | Ecuador | no |
| 11 Zongo Glacier | France | Bolivia | yes |
| 12 Morenas Coloradas Rockglacier | Argentina | Argentina | no |
| 13 Quelccaya Ice Cap | USA | Peru | no |
| 14 Davos | Switzerland | Switzerland | yes |
| 15 Glaciar Norte | Mexico | Mexico | no |
| 16 Saint-Sorlin Glacier | France | France | yes |
| 17 Argentiere Glacier | France | France | yes |
| 18 Mer de Glace Glacier | France | France | no |
| 19 Gebroulaz Glacier | France | France | no |
| 20 Xidatan | China | China | yes |
| 21 Tanggula | China | China | yes |
| 22 Tiksi | Russia | Russia | yes |
| 23 Ice Base Cape Baranova | Russia | Russia | yes |
| 24 Vuriloches | Argentina | Argentina | no |
| 25 Aonikenk | Argentina | Argentina | no |
| 26 Barrow Baseline Observatory | USA | USA | yes |
| 27 Tianshan | China | China | no |
| 28 Zackenberg | Denmark | Greenland | yes |
| 29 The Koxkar Glacier Camp (KGC) | China | China | yes |
| 30 Syowa | Japan | Antarctica | yes |
| 31 SIGMA-B | Japan | Greenland | no |
| 32 Rabben Station in Ny-Alesund | Japan | Svalbard | no |
| 33 Dome-C | France | Antarctica | no |
| 34 Spasskaya Pad (Yakutsk) | Japan | Russia | yes |
| 35 Forni Glacier | Italy | Italy (Europe) | no |
| 36 Valle Nevado | Chile | Chile | no |



ANNEX 4: GCW Working Group Work Plans

Information and Services Working Group:

| # | Task | Deliverable/activity | Due | Responsible | Status | Comment |
|---------------------|---|--|---------------|---------------|----------------------|--|
| <i>Portal Team:</i> | | | | | | |
| 1 | Integrate relevant data centres | Much of the data that is relevant for GCW is hosted by non WMO data centres. Using relevant networks like CliC, ICSU WDS, WIS and others, relevant data centres are identified and contacted. | Continuous | Øystein Godøy | Ongoing | Integration of data centres depends on the availability of metadata interoperability interfaces. |
| 2 | Software development | The GCW catalogue is depending on contributing data centres and the description these provide of their data. As this documentation varies in structure and content, translations are required to provide a unified search interface to all data. This requires continuous adaptation of the software as well as implementation of semantic translations. Interfaces to data are also likely to evolve over time and the software need to be adapted accordingly to provide higher order services on data where possible. | Continuous | Øystein Godøy | Ongoing | |
| 3 | Establish GCW Catalogue Interoperability Group | Based on the data centres already integrated with the GCW catalogue a GCW interoperability group is identified. This group will act as a reference group for the development of interoperability guidelines. The group cooperates using electronic tools. | Continuous | Øystein Godøy | Not formally started | Should this relate to the combined SAON/IASC data committee and the Polar Data Forum? |
| 4 | Develop catalogue interoperability guidelines | As GCW depends on a number of data centres that belong to different data management frameworks or are independent, it is useful to develop a formal document of the interoperability standards supported as well as references to relevant documentation developed by e.g. WMO, ICSU WDS, Research Data Alliance and | Drafts 2015Q3 | Øystein Godøy | Not started | This depends on the involvement of a GCW interoperability group. |

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| | | GEOSS. The purpose is to have material on best practises that may help data centres establish machine interfaces that support the distributed nature of GCW data management while acknowledging that GCW depends on a heterogeneous community. | | | | |
| 5 | Establish the GCW catalogue as a WIS DCPC | Following the joint CryoNet and Web Portal meeting the Davos June 2014, steps to establish the GCW catalogue as WIS DCPC is being taken. This process includes planning of the necessary steps prior to sending a formal application to WMO and subsequently the formal process of evaluation of the proposal by WMO before a potential acceptance. | Approved DCPC by 2016Q4 | Øystein Godøy Bard Saadatnejad | Planning | Due estimate taking into account the approval process of WMO. |
| 6 | Analyse the problem of duplication of metadata through harvesting | Duplication of metadata records in global catalogues may arise from metadata harvesting as the same metadata may have many paths to a global catalogue. The intention is to describe this problem and to identify potential solutions including those identified by other efforts (e.g. RDA, WMO, ICSU). | 2015Q4 | Øystein Godøy | Not started | |
| 7 | Develop a GCW Catalogue Operations Manual | Development of a GCW Catalogue Operations Manual will increase the transparency of the GCW Catalogue. It will address issues raised in this work plan and provide the basis for bilateral agreements with contributing data centres. | 2015Q4 | Øystein Godøy (Steve Foreman) | Planning | |
| 8 | Develop bilateral agreements with contributing data centres | To avoid duplication of data in global catalogues like WIS and GEOSS, bilateral agreements with contributing data centres are required to define whether harvested metadata should be exposed using machine interfaces by the GCW catalogue or not. A template for agreements has to be developed. While WIS has formal procedures for interaction between data centres, many of the GCW contributing data | Draft 2016Q1 Continuous | Øystein Godøy (Steve Foreman) | Planning | This may be separated in two issues. One relating to exposure towards WIS and one on the relation between WIS and GEOSS. If there is a mechanism determining selective exposure of metadata between WIS and GEOSS that can be |

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| | | centres are not WMO members and a pragmatic approach is required to slightly formalise the interaction (e.g. expected service level and error handling) between the GCW catalogue and contributing data centres. | | | | utilised in this context. The reference group for this work is the GCW Catalogue Interoperability Group. Check e.g how this is handled in GAW. |
| 9 | Adapt harvested metadata to WMO requirements | The metadata harvested by the GCW catalogue comes from a variety of data centres using a number of standards that differs from the WMO standards. Harvested metadata must be adapted to WMO requirements prior to potential exposure through WIS. | Continuous | Øystein Godøy Bard Saadatnejad | Ongoing | Exposure of harvested metadata through WIS depends on the consent of the originating data centre. It is especially important to avoid duplication of records in GEOSS as WIS is connected to GEOSS. Tools for adaptation of metadata is being developed, but procedures is required as well. |
| 10 | Connect GCW catalogue to WMO GTS for datasets generated by non-WMO members | Much of the GCW community and datasets are external to WMO. Some of these datasets may be useful in real time applications and to support this the GCW catalogue must be able to provide these data on GTS upon request from the GCW community. | | Øystein Godøy | Not started | Real time access to requested data can also be supported through Internet, but without the guaranteed timeliness of WMO GTS. |
| <i>Website and Outreach Team:</i> | | | | | | |
| 11 | Implement web page to show surface network sites by category | Display core (CryoNet), contributing, and candidate sites together or separately; add tool to filter sites based on cryosphere element (e.g., display only snow sites). | March 2015 | Jeff Key | Started | The Steering Group has to decide if candidate (proposed) sites should be displayed on a public web page. |
| 12 | Add database table and search tool for Snow Watch snow product inventory | The Snow Watch snow product inventory will be implemented as a database table that allows for display and filtering based on a variety of characteristics, e.g., coverage, parameters, spatial resolution. This implementation can also be used for other inventories. | March 2015 | Jeff Key | Not started | The first complete draft of the inventory will be available by February 2015. |
| 13 | Add ice thickness | Add a sea ice thickness tracker based on | Sept 2015 | Jeff Key | Started | |

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| | “trackers” | satellite imager data, possibly with modeled ice thicknesses. | | | | |
| 14 | Update glossary and requirements as needed | Add additional glossary terms and sources as needed. Update observational requirements as needed. | Continuous | Jeff Key | Ongoing | |
| <i>Terminology Team</i> | | | | | | |
| 15 | Establish partnerships for glossary development | Partnerships with other organizations that have cryosphere interests, notably IACS, will foster community consensus for the glossary definitions. Jointly formulate a plan for completing the GCW Cryosphere Glossary. | Dec 2015 | Charles Fierz, Jeff Key | Started | |
| 16 | Update glossary with additional sources | Add IPCC cryosphere term definitions to the glossary | Sept 2015 | Jeff Key, Charles Fierz | Started | |

Integrated Products Working Group

Snow Watch Team work plan for the period 2015-2016:

| No. | Task | Deliverable/Activity | Due | Responsible | Status | Comment |
|------------|---|--|-------------|--|---------------|--|
| 1 | Organize a follow-up Snow Watch meeting in 2015-2016 time frame | Snow Watch meeting | End of 2016 | Luojus, Brown, Derksen, Robinson | | Initial plans for a 1.5 day meeting in conjunction with another snow conference |
| 2 | Populate the Snow Watch team with the "right" people | Updated team listing on GCW website | End of 2015 | Brown, Luojus, Derksen, Robinson | | S. Helfrich (NOAA) has been proposed from within the Snow Watch team |
| 3 | Organize periodic (quarterly/bi-yearly) teleconferences to follow the progress of Snow Watch activities | Minutes of telecon. | on-going | Luojus, Brown | | |
| 4 | Develop and maintain GCW Snow Products inventory | Snow products inventory on the GCW-website | 06/2015 | Brown | | 1st version to be available by February 2015 |
| 5 | Include Øystein and Jeff Key with the preparations for snow inventory | | 03/2015 | Brown | | Add maturity aspects (Jeff); check that vocabulary is compatible with portal (Øystein) |
| 6 | Identify person(s) to assist Jeff in developing Snow Watch section of the GCW website | "Snow Watch" section of the GCW website | 06/2015 | Derksen, Luojus | | |
| 7 | Liaise with the ESA SnowPEX consortium | | End of 2015 | Luojus, Derksen | | |

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|---|--|--|-------------|--------------------------|--|---|
| 8 | Liaise with the people working on development of the global archive of historical in situ snow data (follow up from ECMWF workshop 10/2014) | | End of 2015 | Brown | | |
| 9 | Prepare a note (doc/ppt) on progress of real-time exchange of snow obs and GCW-endorsement/suggestion for future actions to be presented (at/before?) Cg17 | | 03/2015 | Luojus, De Rosnay | | Material intended for round-table discussion before congress; |

Observations Working Group

| Activity | Deliverable | Deadline | Responsible | Members | Comment |
|--|---|-----------------------|---|--|---|
| Update documents for Cg17 | | 2015-01 | Secretary | | |
| Update GCW regularly material | | ongoing until 2016-01 | Secretary | | |
| Editing of questionnaires by expert | Questionnaire update | 2015-02-08 | Gino Casassa, Jeff Key | | |
| Update CryoNet Primer | CryoNet Primer | 03-2015 | Wolfgang Schöner | CryoNet team | Integrate new site types structure and contributing sites |
| Review available and propose GCW agreed observing practices | GCW agreed practices | 11-2015 | Thorsteinn Thorsteinsson, Charles Fierz | Gino Casassa, Michele Citterio, Wolfgang Schöner, Vasily Smolyanitsky, additional experts for cry-components tbd | Table with experts for various cryo-components to be invited for the group, entire group structured into sub-groups for cryo-components To be established as a new task team |
| Developing the process for assessment of sites proposed to CryoNet | Document on procedure for assessment of CryoNet sites | 2015-11 | Sandy Starkweather | CryoNet team | |
| Consider defining minimum program for CryoNet sites | Document on minimum program for CryoNet sites | 2015-11 | Wolfgang Schöner | Charles Fierz, Michele Citterio, Christophe Genthon, Vasily Smolyanitsky, lake ice | Liste of variables measured for each cryo-component |

| | | | | | |
|--|------------------------------|------------------|--------------------------------|-----------------------------|---|
| Selection of CryoNet sites | List of CryoNet sites for EC | 2015-12 | Wolfgang Schöner | CryoNet team | to be approved by ECPORS (first info go to ECPORS in 09-2015, final approval by email) |
| CryoNet team meeting | Report | 3days in 12-2015 | Wolfgang Schöner | Secretary | suggested location: Boulder, suggested date: week before AGU2015 |
| Joint CryoNet-Portal team meeting | Report | 1day in 12-2015 | Wolfgang Schöner, Østein Godøy | Secretary | Topic for meeting (beside others): How will CryoNet (meta)data be integrated into GCW portal? |
| 2nd CryoNet Asia workshop | Report | 3 days 02-2016 | Vasily Smolyanitsky | Secretary, Wolfgang Schöner | |
| Joint UNESCO-GCW-CryoNet meeting in SA | Report | 10-2015 | Gino Casassa | | Join activities of GCW and UNESCO |

ANNEX 5: GCW Steering Group Membership

| N° | Name | Organization | Email | Country |
|----|-------------------|---|--|-------------|
| 1 | Aimee Devaris | Director, Alaska Region, National Weather Service NOAA. National Weather Service, 222 West 7th Avenue, 23, Suite 517, Anchorage, Alaska 99513, United States of America. Phone: +(1 907) 271 5126 | aimee.devaris@noaa.gov | USA |
| 2 | Arni Snorrason | Permanent Representative of Iceland with WMO. Director-General. Icelandic Meteorological Office (IMO), Bustadavegur 9, IS-150 Reykjavik, Iceland. Phone: +(354) 522 6000 | arni.snorrason@vedur.is | Iceland |
| 3 | Barry Goodison | 4 Vezina Pl., Kanata, Ontario K2K 3G9, Canada | barrygo@rogers.com | Canada |
| 4 | Charles Fierz | International Association of Cryospheric Sciences (IACS). WSL Institute for Snow and Avalanche Research SLF, Flüelastrasse 11, CH-7260 Davos Dorf, Switzerland. Phone: +(41 81) 417 01 65 | fierz@slf.ch | Switzerland |
| 5 | Cunde Xiao | China Meteorological Administration (CMA), 46 Zhongguancun Nandajie, Haidian District, Beijing 100081, China | cdxiao@lzb.ac.cn | China |
| 6 | Gianpaolo Balsamo | ECMWF, Shinfield Park, Reading, RG2 9AX, England. Phone: +44 118 9499246 | gianpaolo.balsamo@ecmwf.int | UK |
| 7 | Gino Casassa | Director of the Glaciological Department at the Instituto de la Patagonia, Universidad de Magallanes, Av. Bulnes 01855, Punta Arenas, Chile | gino.casassa@gmail.com | Chile |
| 8 | Jeff Key | Cooperative Institute for Meteorological Satellite Studies, University of Wisconsin-Madison, 1225 West Dayton Street; Madison; WI 53562; USA, Phone: +1 608 263 2605 | jkey@ssec.wisc.edu | USA |
| 9 | Jenny Baeseman | Climate and Cryosphere Project. Norwegian Polar Institute. Fram Centre, Postbox 6606 Langnes, NO-9296 Tromsø. Phone +47 77750151 | jbaeseman@gmail.com | Norway |
| 10 | Kari Luojus | Finnish Meteorological Institute (FMI), Erik Palménin aukio 1, FI-00560 Helsinki, Finland. Phone: +358 40 5058417 | kari.luojus@fmi.fi | Finland |
| 11 | Mark Drinkwater | Head, Mission Science Division (EOP-SM). European Space Agency (ESA), ESTEC, Keplerlaan 1, NL-2201 AZ Noordwijk, The | mark.drinkwater@esa.int | Netherlands |

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|----|---------------------|--|--|--------------------|
| | | Netherlands. Phone: +(31 71) 565 5673 | | |
| 12 | Michele Citterio | GEUS - Geological Survey of Denmark and Greenland, Øster Voldgade 10, DK-1350 Copenhagen K, Denmark | mcit@geus.dk | Denmark |
| 13 | Øystein Godøy | Norwegian Meteorological Institute, Postboks 43 Blindern, 0313 Oslo, Norway. Phone: +47 22 96 30 00 | o.godoy@met.no | Norway |
| 14 | Steve Colwell | British Antarctic Survey (BAS), High Cross, Madingley Road, Cambridge, CB3 0ET, United Kingdom. Phone: +(44 1223) 251 482 | src@bas.ac.uk | UK |
| 15 | Sue Barrell | Bureau of Meteorology. G.P.O. Box 1289, Melbourne 3001, VIC, Australia. Phone: +61 3 9669 4222 | s.barrell@bom.gov.au | Australia |
| 16 | Tetsuo Ohata | Japan Agency for Marine-Earth Science and Technology (JAMSTEC) | ohatat@jamstec.go.jp | Japan |
| 17 | Vasily Smolyanitsky | Arctic and Antarctic Research Institute (AARI), Bering str., 38, St.Petersburg, Russian Federation. Phone: +7 812 337-3149 | vms@aari.aq | Russian Federation |
| 18 | Wolfgang Schoener | Univ.-Prof. Dr. at the University of Graz. Karl-Franzens-Universität Graz, Raum-Nr.: Heizhaus 0044, Heinrichstraße 368010 Graz, Austria. Phone: +43 (0)316 380 - 829 | wolfgang.schoener@uni-graz.at | Austria |

ANNEX 6: Action sheet

| # | N° | Action | Responsible | Status/ Deadline |
|----|---------------------|--|------------------------------|---------------------|
| 1 | Action 2.1.1 | Use the figure of the new CryoNet site type definitions in every communications and presentations and update all existing documentations (i.e. the GCW-IP, WIGOS Manual, GCW document to Cg-17, etc.) and the GCW Website accordingly. | All | On-going |
| 2 | Action 2.2.1 | Send a letter to PRs to seek their approval on the list of identified sites to be included in the pre-operational testing phase. | Secretariat | Done |
| 3 | Action 3.1.1 | Set up a “test session” to harvest data/metadata from Sonnblick and Davos sites into the GCW Data Portal. | Portal and the CryoNet Teams | December 2015 |
| 4 | Action 3.1.2 | Ø. Godøy to present the GCW Data Portal at the Congress side event. | Ø. Godøy | May 2015 |
| 5 | Action 3.2.1 | V. Smolyanitsky to provide information on sea ice to populate the GCW Website. | V. Smolyanitsky | May 2015 |
| 6 | Action 4.1.1 | Foster collaboration between the Snow Watch Team, the National Snow and Ice Data Center (NSIDC) and the ESA SnowPEX consortium. | Snow Watch Team | On-going |
| 7 | Action 4.1.2 | Send an email to Matthias Barnhart to ask whether he is still interested to be part of the CryoNet team since he has not been active for a while. | Secretariat | March 2015 |
| 8 | Action 4.1.3 | Organize a meeting of the Best Practices team before EC-67 (2016). | Secretariat CryoNet Teams | March 2016 |
| 9 | Action 4.1.4 | Inform ICG-WIGOS Chair that A. Snorrason will represent GCE in ICG-WIGOS. | A. Snorrason | On-going |
| 10 | Action 4.1.5 | Nominate GCW representatives to liaise with the ICG-WIGOS Task Teams. | GSG Secretariat | Done |
| 11 | Action 5.1.1 | Designate someone to assist A. Snorrason in preparing documents and presentations (e.g. Power point slides). | Secretariat | On-going |
| 12 | Action 5.1.2 | M. Citterio to provide additional names for other potential talks to A. Snorrason. | M. Citterio | April 2015 |
| 13 | Action 5.1.3 | C. Fierz to give a talk about High Mountains as part of the panel presentations at the | C. Fierz | May 2015 |

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| | | Congress Side Event. | | |
| 14 | Action 5.2.1 | Create hand-out on the GCW Website. | Secretariat GCW Website Team | Done |
| 15 | Action 5.2.2 | Create posters on GCW (from hand-outs), GCW Data Portal, Snow Watch and CryoNet. | Secretariat | April 2015 |
| 16 | Action 5.3.1 | M. Ondráš to send the final version of the GCW-IP to the team for review. | M. Ondráš | Done |
| 17 | Action 5.3.2 | A. Snorrason to inform EC-PORS members on the on-going work of GSG. | A. Snorrason | September 2015 |
| 18 | Action 5.4.1 | WMO Secretariat to draft a resolution on CryoNet and to make it circulated between the GSG members. | Secretariat | June 2015 |
| 19 | Action 5.5.1 | GSG members to activate their contacts in order to raise more resources for GCW from their respective countries. | GSG members | On-going |
| 20 | Action 6.1.1 | Establish a primary list of cryospheric terms (before any definition). | Terminology Team | September 2015 |
| 21 | Action 6.2.1 | Send hand-outs to GCW Focal Points. | Secretariat | June 2015 |
| 22 | Action 6.2.2 | Develop a map on the GCW Website to display locations of the Focal Points. | GCW Website Team | June 2015 |
| 23 | Action 6.5.1 | The Secretariat will provide the GIPPS and YOPP Implementation Plans to the GSG members. | Secretariat | April 2015 |
| 24 | Action 6.5.2 | M. Citterio and W. Schöner to first review the GIPPS and YOPP Implementation Plans and secondly, to draft an initial plan of action for GCW. | M. Citterio W. Schöner | December 2015 |
| 25 | Action 6.6.1 | J. Key to summarize ideas evoked by GSG and to formulate a response to J. Baeseman. | J.Key | Done |
| 26 | Action 6.7.1 | GSG to liaise with the CIMO focal point for the follow-up. | GSG | On-going |
| 27 | Action 6.9.1 | Populate the GCW Website and Outreach Team and develop a strategy to improve the visibility of GCW inside and outside WMO. | GSG Secretariat | May 2015 |

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| 28 | Action 6.11.1 | Organize regular teleconferences between GSG and the Working Group leaders to oversee the furtherance of the identified activities. | GSG Secretariat | On-going |
| 29 | Action 6.12.1 | Update the GCW-IP and the Terms of Reference of the newly established GCW Working Groups accordingly to the new structure of GCW. | GSG Secretariat | Done |
| 30 | Action 6.12.2 | Contact Walt Meier in order to know if he would agree to chair the Integrated Products Working Group. | Walt Meier would like to be involved in GCW, but doesn't have time for a WG leading role. J. Key volunteered to temporarily lead the group | Done |
| 31 | Action 6.12.3 | Contact Giovanni Macelloni to know in which task team, according to the new GCW structure, he would like to actively contribute to. | Secretariat | March 2015 |
| 32 | Action 6.12.4 | Formalize the nomination of experts to GCW teams through PRs. | Secretariat | On-going |
| 33 | Action 7.1.1 | To provide the WMO Secretariat with an official invitation for the preparation of the meetings in Boulder, USA. | J. Key S. Starkweather | April 2015 |