**Discussions on the procedure for assessing mobile platforms for inclusion in the CryoNet Network**

**The issue: Can mobile platforms be CryoNet stations?**

Minimum requirements for CryoNet stations and sites are given at <http://globalcryospherewatch.org/cryonet/requirements.html>. The minimum requirements as given in the WIGOS Manual (May 2016) are given towards the end of this document.

In this discussion, “mobile platforms” refers to drifting buoys, manned drifting stations, and ships that might return to the same location year after year. The main questions are:

1. Does a CryoNet station need to make continuous, year-round measurements?
2. Does a CryoNet station need to be at a fixed location?
3. Are there mobile platforms that operate in the same manner for 4 or more years (a CryoNet requirement)?

The following are comments by various individuals and by the GCW Steering Group (Cambridge, Jan 2017) on the subject. They are listed chronological order (i.e., oldest first). Discussion points to be presented to EC-PHORS-7 (Mar 2017) are given at the end.

# GSG-4:

Dr Schöner indicated that several submissions received in 2016 are for mobile/ship based observations, however, their assessment is on hold until a specific assessment procedure is developed. Recognizing that for CryoNet stations *“****The responsible agencies shall be committed, to the extent reasonable, to sustaining long-term observations of at least one cryosphere component. There shall be a commitment to continue measurements for a minimum of four (4) years.”*** additional guidance must be developed on how to assess the mobile observing platforms, recognizing that there could operate intermittently and that their location is not fixed. At the same time, the participants agreed that the GCW Observing Network must include ocean/sea observations. Mr Charpentier noted that buoys and ship based observing systems are WIGOS stations and provide critical observations over oceans, a data sparse area. The GCW should actively work with JCOMM for recruiting observing platforms for the GCW Observing Network.

The GSG tasked Dr Smolyanitsky and the CryoNet Team to develop a policy regarding the evaluation of the observing systems on ships and buoys (mobile platforms), considering the issues of sustainability and continuity of observations, and present it for approval by the EC PHORS. **[action]**

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Rodica: identify questions to be addressed in the evaluation guidlines, e.g.

* how critical is the intermittence of observations, when this is planned?
* is the mobility of the platform an issue diminishing the value of observations?
* What would be the ideal configuration of an ocean based CryoNet station and how could this be achieved in practice? etc...

# JEFF (07.02):

Here is my opinion on the general idea: **Mobile platforms should be an integral part of the GCW surface network but they should not be CryoNet stations**. CryoNet stations are meant to provide a long, consistent, and high-quality record. Though not explicitly stated in our minimum requirements, the implication of a long, consistent record is that the measurements are for the same location. (We only use "consistency" in the definition of a contributing station. We should probably add it to the minimum requirements somewhere.) A station that moves (buoy, ship) and that may only provide observations for part of the year (ship) cannot provide a consistent record.   
  
Having said all that, I can imagine arguments to the contrary. Did we define "There must be a commitment to continue measurements for a minimum of four (4) years" to mean four years continuously? Or could it be four years but only in the summer each year? I don't think we said anywhere that the station has to be in the same location all the time, did we? Only that it has to be representative of the region. So if we didn't say that four years of measurements means continuous through the year, and if we didn't say that a station has to be in the same location, then I suppose it could be a CryoNet station if it meets the other requirements.   
  
If we want measurements throughout the year and in the same location, then the easiest way to deal with this action item is to simply say that mobile platforms are contributing stations for those two reasons. Then we're done for now.  
  
Charles:

Jeff makes good points indeed. In particular, he hints to the flexibility of our definitions :)

While I agree in principle with his first paragraph (makes a lot of sense), I'd advocate that a moving station measuring year for year in the same region and having all ancillary measurements 'on-board' could be a CryoNet station. **How big a region may be opens the next question and whether ships can be looked at as CryoNet stations if cruising year for year along the same route during the same period of the year.**

# VASILY

That's fine...but

We need to remember that in such case for sea ice we would have measurements at the CryoNet coastal stations within a narrow fast ice stripe only, and a negligible amount of obs for drifting ice. My idea was to rely for the final decision for the sea ice in CryoNet to experience of the ice services and the procedure of approval for mobile CryoNet station to JCOMM co-presidents.

I will bring the issue what the ice services will be making for CryoNet on the 28th of February and further during the ETSI6 session.

Vasily

# MICHELE

**If a ship proposed as CryoNet drifting platform goes back every year to the same point and measures a variable for which the table of CryoNet minimum temporal requirement indicates ‘annually’, then I think it’s fine**. In fact I’d argue that being a drifting platform is immaterial in such case, since the measurement is always done in the same point and what we really care about is the measurement. The spatial accuracy of ‘same point’ is also variable-dependent and it would be specified in the best practices.

# JEFF (08.02)

the responses from Charles, Vasily, and Michele seem to support the possibility of a mobile station being part of CryoNet. I won't argue against that. (Well I did, but that was mostly to stimulate the conversation.) Vasily wants the JCOMM co-presidents for formulate a procedure for approving mobile stations as CryoNet stations. How long will that take? It does not have to be complicated.   
  
Wolfgang

**08.02.2017**

My proposal is not to decide on the mobile platforms as CryoNet stations now but keep them as pending. If I remember well this was also a decision at Cambridge.

**14.02.2017**

I am not really convinced by our concept for mobile platforms as part of CryoNet. I have no doubt that mobile platforms are important and should be part of GCW and maybe part of CryoNet at a later stage. However, I afraid of opening a new door for mistiness in our concept of CryoNet stations and thus the need for answering many requests from potential candidates for CryoNet stations. However, I also have to say that I am not very familiar with sea ice observations and maybe wrong with my resistance.

In fact, I had the feeling that the list of CryoNet recommended and desired variables for sea-ice is rather based on coastal near observations at research stations and less from vessels (both for the list of variables and the timescale of observations). Additionally, if we open the door for “consistent” instead of “continuous” measurements this applies for all cryo components. Which brings me back to my fear of many requests, such as: What do we mean by doing the measurements consistent? Is measuring x days a year every year enough to be CryoNet? Why are my measurements not enough?

I think I have to stop here…

My feeling is that we step/jump a bit between “open CryoNet for all potential observations” vs. “ being driven by products/services (the “Watch” of GCW) for the list of CryoNet observations” (and we should prefer the latter).

OK, no problem with me to be overruled. Just to explain my skepticism.

If we go to EC-PHORS with our proposal for mobile platforms being part of CryoNet. What does it mean for vessels already submitted in the questionnaire (they are now submitted as contributing stations)? Do we want to have them included in the list of CryoNet stations for approval by EC-PHORS now or in the coming year?

And finally once again, also GCW contributing stations are important for GCW. So, why not make mobile platforms contributing and keep our recent minimum requirements for CryoNet unchanged?

Wolfgang

# Rodica

Here is my perspective:

1. I’m not supporting asking JCOMM to take the decision: GCW needs to submit a proposal to EC-PHORS and JCOMM; CryoNet is a GCW network, and GCW needs to assert the ownership by putting forward concepts. Doesn’t need to be perfect, it needs to be based on what we know today.
2. On postponing the decision: I’m not in favour of it; not wise at this time to say that we need to reflect more. We are in the implementation phase, and we are developing the concepts: we may not get it perfect the first time. But we need to start somewhere. After all, the land based network went through an evolution, so evolving the concept of mobile platforms as GCW stations (CryoNet or otherwise), is not different.
3. My proposal it to take an initial more inclusive view: it’s about building the network and the relationships: the decision on whether of not these platforms could be CryoNet should be driven by purpose , and impact, e.g.
   1. is there a benefit for being inclusive now (i.e. 2017-2019);
   2. is there a loss by not including such platforms in the CryoNet?
   3. Is this an opportunity to enable further development of observing capacity or consistency in observations by taking an inclusive approach during the implementation phase?
4. My proposal:
   1. Define “Consistency” for mobile platforms: **a mobile platform would be considered as a CryoNet if it goes back every year to the same point/area and measures a variable for which the table of CryoNet minimum temporal requirement indicates ‘annually’; (adapted from Michele’s response)**
   2. The proponents needs to submit a map of the measurement area, to show consistently.

As Charles noted: **How big a region may be opens the next question and whether ships can be looked at as CryoNet stations if cruising year for year along the same route during the same period of the year:** this could be a decision possible only with additional information from the “testing” of the concept.

* 1. If the measurement is partial throughout the year (e.g. 6/12 months), but consistently from during the same interval, is this a benefit or an issue?
  2. Next steps:
     1. refine the concept with data from participating stations and the consultation with others (JCOMM, satellite community, etc: what is the value of that data?) ;
     2. the final decision will be taken before/as part of the operationalization of GCW.

# Wolfgang, 14.02.2017

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Wolfgang

# Jeff, 14.02.2017

I can see it both ways. It's certainly easier to say that mobile platforms will always be contributing stations because they (a) don't sample the same location, (b) they might not take measurements continuously, or (c) they don't last long (e.g., buoys). 

I think we need a decision on this, even if we change it in the future. If we remain about equally divided in our opinions, then the safe course of action is to say that mobile stations can only be contributing stations, but state that this may be re-evaluated in the future.

It would be more difficult to "demote" mobile stations from CryoNet status to contributing if we later decide that allowing them to be CryoNet stations was a bad idea.

# CryoNet Criteria (Rodica)

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| CryoNet Criteria from the Manual on the WMO Integrated Global Observing System  Annex VIII to the Technical Regulations | Mobile Platforms | Comments |
| 1. **Meeting Core CryoNet Measurement Requirements**: The station shall measure at least one of the variables of one of the cryosphere components (i.e. snow, solid precipitation, lake and river ice, sea ice, glaciers, frozen ground and permafrost). The station location shall be chosen such that cryospheric measurements are representative of the surrounding region, and such representativeness shall be clearly described. | measuring at least one variable of one component: Yes  Representativeness of surrounding region: to be described??? | Surrounding region may need to be defined, if covering an area. |
| 2. **Commitment of Operational Continuity:** The station shall be active. The responsible agencies shall be committed, to the extent reasonable, to sustaining long-term observations of at least one cryosphere component. There shall be a commitment to continue measurements for a minimum of four (4) years. | Sustain long term obs of at least one component  Commitment to continue measurements: min 4 years: possible |  |
| 3. **Metadata Up to Date and Availability:** The station metadata, including all metadata describing the station characteristics and observing programme, shall be kept up-to-date and available in the GCW Portal as the interface to the WIGOS Information Resource (WIR). | Possible to be met; |  |
| 4. **Compliance with Agreed Regulatory Practice:** The station observational procedures, the instruments and method of observations, quality control practices, etc., shall follow GCW endorsed regulations, manuals, guides and, to the extent possible, the recommended best practices. | possible |  |
| 5. **Data and Ancillary Data Freely Available:** Data shall be made freely available, and whenever possible in near real-time. In situ ancillary meteorological observations, as required by CryoNet practices shall also be available with documented quality. | possible |  |
| 6. **Competency of Staff:** Personnel shall be trained in the operation and maintenance of the station | possible |  |

Text: likely possible to be met

Text: most likely an issue for mobile platforms

Text depending on the information provided

# Very draft Proposal for submission to EC-PHORS (for discussions)

1. option 1: all mobile platforms are Contributing Stations:
2. option 2: mobile platforms could be deemed as CryoNet stations provided that: the organization commits to continuity of observations , and with additional specification on the definition of continuity
3. option 3: mobile platforms could be deemed as CryoNet stations, provided that the organization provides information of the area surveilled and that this is consistent over the period the station is considered a CryoNet station.

As defined, A GCW Contributing station shall be a station that provides useful measurements of the cryosphere but does not meet minimum requirements for a CryoNet station, or in some other way does not provide the quality and/or consistency of data required by CryoNet stations.

Issues for consideration:

* a mobile platform CryoNet station will not represent the same region, depending on the itinerary;
* only a station reporting the variable “Sea ice phenomena (dates of freeze-up, fast-ice formation/breakout, melt onset, break-up)”, which is observed yearly, could qualify as CryoNet, if returning to the same point, every year.
* If the mobile platforms could be only Contributing stations, they will not be bound by the minimum observing requirements, which means that:
  + the compliance with agreed regulatory practices is not a requirement; thus, the development of Sea Ice Best Practices is not a priority.
  + The requirements for metadata availability and up to date (#3) and data and ancillary data being freely available (#5) cannot be imposed