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| WORLD METEOROLOGICAL ORGANIZATIONCOMMISSION FOR BASIC SYSTEMSOPAG on DPFSEXPERT TEAM ON OPERATIONAL PREDICTIONS FROM SUB-SEASONAL TO LONGER-TIME SCALESBeijing, China, 11-15 April 2016 |  | CBS-DPFS/ET-OPSLS/Doc.3.4(1.IV.2016)\_\_\_\_\_\_\_Agenda item : 3.4ENGLISH ONLY |

**Report back from the WMO Scoping Workshop on: Establishing Polar Regional Climate Services and an Arctic Polar RCC**

*(Submitted by B. Denis)*

##### Summary and purpose of document

This document report back from the WMO Scoping Workshop on Establishing Polar Regional Climate Services and an Arctic Polar RCC held in Geneva, Switzerland, 17-19 November 2016. A short summary of the workshop is given as well as the potential implications for the GPCs and LRF Lead Centres.

##### Action Proposed

Following the presentation of the report at this meeting, the participants are invited to discuss the potential implications for the GPCs and Lead Centres.

**1) Introduction**

A scoping workshop in preparation of the establishment of an Arctic Polar Regional Climate Centre was held In Geneva, 17-19 November 2015. Workshop Participants included various stakeholders in Arctic climate matters that are involved in the operational activities and in the development and delivery of products and services. The workshop included experts in associated research and selected representatives of user sectors and policy domains. As member of the ET-OPSLS, Dr. Bertrand Denis (GPC-Montreal) was invited to give a presentation on the role of the WMO Operational Global Producing Centres (GPCs) for Subseasonal and Longer Time Scale Predictions

As we know, WMO RCCs are mandated to deliver high-quality regional-scale products (primarily to NMHSs) by using data and products from GPCs and other global centres that benefit from national data, products, know-how and feedback they receive from the NMHSs. Because of the extend of the domain, the high-latitude physical environment, and the specific user needs, it is expected that a Polar RCC would request products and services from GPCs and LRF Lead Centres not commonly provided to traditional RCCs.

This report summarizes the workshop with an emphasis on the talk presented on behalf of the ET-OPSLS. It gives the meeting participants an overview of potential implications for the GPCs and LRF Lead Centres. More information on the Polar RCC scoping meeting, including the workshop concept note, the list of participant and the presentations are available here:

<https://www.wmo.int/pages/prog/wcp/wcasp/meetings/PRCC_Scoping_Workshop2015.html>

**2) Workshop summary**

 The scoping workshop objectives/potential outcomes were:

1. Appraisal of opportunities and challenges including governance aspects relating to development and delivery of climate services in the Polar Regions, including climate data, monitoring and prediction aspects, and in identifying the associated user needs ;
2. Scoping of the Arctic PRCC-Network concept and implementation:
	1. List of priority PRCC functions;
	2. Description of the PRCC implementation strategy including the structure of the Arctic PRCC-Network
3. Identification of Member capacities to engage users at national and regional levels and to deliver PRCC services for their benefit; and
4. Recommendations on the next steps in establishing an Arctic PRCC-Network.
* **Goal of the workshop relevant for the ET-OPSLS:**
* **Discuss potential products that may be of particular interest to this region and to the users in this region;**
* **Mapping requirements and capacities; and**

Dr. B. Denis kindly accepted to represent the ET-OPSLS and to give a talk the first morning of the workshop on the supporting role of GPCs and LRF Lead Centres and how they could contribute to a PRCC network by providing polar predictions, including potentially sea-ice predictions.

The actual presentation can be found here (link to be verified):

<https://www.wmo.int/pages/prog/wcp/wcasp/meetings/documents/presentations/2.4-Bertrand-role-of-GPCs-PRCC_final.pdf>

The talk presented to the audience touched upon these topics:

* Role and functions of the ET-OPSLS
* Role and functions Global Producing Centres of Long-range Forecasts (GPCs)
* Lead Centres for Long Range Forecasts: purpose and functions, websites
	+ Lead Centres for Long-range Forecast Multi-Model Ensembles (LC-LRFMME)
	+ Lead Centres for the Standard Verification System for Long-range Forecasts
* Current product examples
* GPCs and RCC’s requests for new products
* Next steps

The audience was informed by the speaker that GPCs and LRF Lead Centres have in the past fulfilled RCC’s requests for new products, for example:

* Sea Surface Temperature (SST)
* Ocean Climate Indices (Nino3.4 and others)

and in the context of a Polar RCC, the GPCs could potentially:

* Provide maps with polar projections
* Consider adding new products relevant to Polar regions, for example:
	+ Snow related quantities (water equivalent, cover)
	+ Sea ice (forecasts, verification, expected skill)

The scoping workshop attendance was also briefed on the following considerations:

The ET-OPSLS would consider RCCs requests for new products:

* Timing was good. Next ET-OPSLS meeting in April 2016
* Forecast products would need R&D for predictability studies and suitable packaging
* The degree of comfort with current sea ice forecast skill is variable amongst the GPCs
* Some GPCs data policy might need to be amended
* Sea ice forecast cannot be mandatory since not all GPCs have sea ice model component
* Such products would be on the list of GPCs Recommended Products to produce

It has to be noted that a week prior to that scoping workshop, Dr. B. Denis had set up an informal side-meeting with some of GPC representatives present at the First WMO Workshop on Operational Climate Prediction held in Pune, India. The objective was to obtain a preliminary idea of the GPCs potential contributions, in particular in terms of LRF of sea-ice conditions. Out of the 12 GPCs, 5 GPCs mentioned having some sea-ice prediction model capability with their current system, another 5 would expected to get that capability with their upcoming next system version, and 2 had no existing capability currently or in the near future.

Later during the workshop, participating countries presented their views of the would-be PRCC operational structure (network-node vs geographically distributed) as well as their potential contributions in term of products and services. The need for those were discussed and listed during breakout sessions. The list of identified parameters of interest is reported here:

* Cryosphere
	+ Sea and Freshwater Ice
	+ Snow Cover
	+ Glaciers, Ice Caps, and Ice Sheets
	+ Permafrost
* Atmosphere
	+ SLP, Ta, precipitation
	+ Storminess, winds, atmospheric circulation patterns
* Polar oceanography
	+ Water temperature, Salinity
	+ Sea level
	+ Waves
	+ River runoffs
* Land issues
	+ Coastal and river erosion
	+ Fresh water runoffs

It seems that sea ice is for the Polar Regions as important as precipitation is for low and mid-latitude regions, and that the cryosphere as an whole would deserve from a PRCC much more attention than what is usually required for a RCC covering other regions of the world.

It has also been reported that the prediction timescales needed for the products to be provided by a PRCC to their users would cover a large range, from weeks to about a year. Shorter timescale are also needed but are traditionally out of scope for a RCC. Long-lead forecasts such as 6 months are needed for sea ice for transportation purposes, for instance.

It must be noted that by the end of the scoping workshop, no formal requests to the ET-OPSLS had had been formulated but that was expected to happen within the following months.

**3) Implications for GPCs and LRF Lead Centres**

There are a number of potential implications for GPCs and LRF Lead Centres :

* Could they provide maps with polar projections with various orientations (for instance, the ability to have North America, Asian, Europe at the bottom of the map)?
* Could they provide sea ice predictions? If yes,
	+ Is the predictability high enough for the predictions to be useful? If yes, up to which lead time?
	+ Which variables (concentration and/or thickness or other related parameters)?
	+ At which temporal resolution? Daily sea ice output would be best for predicting probability of breakup, for example
	+ Can sea ice forecasts be easily add to the GPCs model output?
	+ Is sea ice already available from hindcasts?
	+ What verification metrics should be used?
	+ Do the GPCs data policy need to be modified?
	+ Implications for the LRFMME Lead Centres
	+ Change of map projections to included polar views
	+ Would need to collect and distribute sea ice forecast data from contributing GPCs
	+ Would need to add sea ice forecasts products (to be defined) and hindcast verifications to the product offering on the LRFMME web site
* Would we be ready for the demonstration phase (due in early 2017)?

As we can see, the list of potential implications is important. It is clear that sea ice prediction output cannot be put on the mandatory list of variables but the ET should discuss the possibility of adding it the list of recommended products.

It should be noted that Canada has offered to co-lead, with potentially another GPC (TBD), the development of sea ice LRF capabilities in support of the PRCC. That would include development of experimental forecast products, expected skill based of hindcasts, and MME predictions amongst other things. It is expected that some or all of these capabilities would eventually be transferred to the LRFMME Lead Centre for operationalization.

**4) The next steps**

As a follow-up of the workshop, the WMO secretariat has sent out a call letter for asking precisions on potential national contributions of the participating countries. Also, it was expected that the GPCs and LRF Lead Centres would be formally consulted through the ET-OPSLS for inputs on the LRF functions in support of the PRCC operations. It should be noted that since Canada, The Federation of Russia and The United State of America would be contributing countries; their own GPC should have normally already been consulted for inputs through their NMHS agency (GPC-Montreal, GPC-Washington, GPC-Moscow).

As of April 2016, the Secretariat is in the process of making the primary consolidation of the inputs, and analyzing the capabilities and commitments to perform the mandatory PRCC functions (to be confirmed or updated by the Secretariat).

It was expected at the time of the workshop that an Arctic-RCC-Network Implementation Plan would be produced by September 2017, with a demonstration project starting in early 2017.

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