

CLIVAR REPORT

Climate and Ocean: Variability, Predictability, and Change



Meeting report

The 2nd Session of the CLIVAR/CliC Northern Ocean Region Panel

15 – 22 September, 2021, online due to COVID-19

October 2021

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ACTION ITEMS

1. Sheldon will make the outline of the heat flux review paper (**Sheldon**).
2. Invite some people from Hackweek to give a 10-minute presentation introducing their interests, overview of the Hackweek, what they expect to get. (**not sure who will do this**)
3. Organize the boot camp in summer in 2022. (**Ruth**)
3. Ben will contact the person in Helgoland directly for the venue of the boot camp. (**Ben**)
4. Amy and Ruth will summarize the funding available and the needed money before the next telecon. (**Amy, Ruth**)
5. Liping will set up a Google Doc for the nominees of NORP member (both the ex-efficio and the ECS/shadow member and candidate). (**Liping**)

1. Introduction

The 2nd session of CLIVAR/CliC Northern Ocean Region Panel (NORP) was held on 15 and 16 September 2021 online. This panel meeting was held on the background of the pandemic when the online meeting has been becoming popular. To accommodate different time zones, NORP-2 was divided into two parts with 1.5-hr per part. All the NORP members participated in this meeting.

At the beginning of the meeting, Amy, the co-chair of NORP, made the opening remark. With the on board of the two new members this year, the members made the self-introduction, introducing their affiliation and expertise background.

2. Scientific items

After the publication of the ‘Freshwater in the Arctic Ocean 2010-2019’ led by Amy Solomon, the panel realized that the freshwater and heat flux budget in the Arctic is critical to the climate change. NORP decided to lead two review papers on the seasonality of freshwater and the heat flux in the climate system in the future.

2.1 Heat flux in the climate system

The ocean plays an interesting role in the ocean-ice-atmosphere system. The state of the Arctic is changing through two ways of the heat flux transport: the direct contact of inflow water from the Atlantic to the Arctic sea ice and the vertical transport of the heat flux. This planned paper will be from past observations/models to future prospects, trying to study the future evolution in the Arctic in the climate system by using the data analysis, model simulation/prediction/projection and theoretical analysis. The interaction among different components of the climate system, with the emphasis of the key process will be researched. This work will enhance the connection with the other CLIVAR panels and the WCRP Lighthouse Activities.

Sheldon will lead this paper.

2.2 The seasonality of the Arctic freshwater

NORP realized that the seasonality of the Arctic freshwater should be valued, and NORP planned to lead a review paper about this.

The atmosphere dynamic shows high seasonality which changes with time. Go back to this review paper, firstly, we can think about to start from the climatological seasonality, and then to look at the changes of the shift of the seasonality, and then the forces (atmosphere, river charge). Second, we can look at the seasonal cycle of the liquid and solid freshwater. The third part will be the linkage, how liquid freshwater and sea ice respond to the forcing, including the climatological and changes seasonality.

- Do we only focus on the inter Arctic or let the subpolar be included?

- There was a long discussion about using of the CMIP6 data. By using this, we can look at the past, present and future. Some people had some concern. First thing is to include CMIP6 data will increase the workload. Ben indicated that the seasonality in the Arctic upper ocean is very tricky, there is a large spread in the model, even the climatological seasonal cycle is fantasy, the PHC (Polar Science Center Hydrographic Climatology) is great for modeling but it might not be the reality. Xiangdong was hesitating whether to use the ocean reanalysis data or jump to CMIP6 simulation. Climate simulation of Arctic is not very good; the diffusion is strong and simulated freshwater has large bias. However, it may still be interesting to show some results about the current status in the model simulation, which will be useful for the modeling community to improve the model. Amy suggested to more constrain to observations. We can preliminary look at the CMIP6 data, if it performs good in the Arctic, we will consider to use it. Celien suggested one paper about the Arctic freshwater in CMIP 6, of which the author would be a great addition to NORP.

This work may have the potential of real application. For example, the rainfall/snowfall change in the Greenland will have impact on the infrastructure.

Xiangdong has made a preliminary outline, will start at the end of this year.

3. Panel business

3.1 Membership rotation and diversity of the membership (Early Career Scientist, nation, gender)

NORP was proposed on the CLIVAR Open Science Conference in September 2016 and the CliC SSG meeting On February 2017 and was finally endorsed by the 38th Session of the WCRP Joint Scientific Committee on April 3, 2017. Officially established in 2018, almost all of the NORP members will end their term by the end of 2022, a transition plan should be given to insure the continue of the panel activities. NORP also would like to take this opportunity to promote the diversity of the panel. It was decided that about one third of the panel will be ECS in further. As a transition, NORP will invite some ECSs to join in the NORP activities, and appoint them to be the candidates in appropriate time. In addition, people from unrepresented nation will be invited to join the panel.

3.2 The WCRP Lighthouse Activities

After the discussion, NORP has formed a series of activities that will link to the Lighthouse Activities.

a) Intelligent Learning Algorithms (ILA) and data presentation.

Over the world, there are a lot of ongoing projects about the ILA and about the data presentation and provision. For data presentation, for example at the Alfred Wegner Institute (AWI), there is a nice tool called webODV that can dramatically improve the efficiency of research and data display. For the ILA, AWI is looking at some QSIT data products. Although those two aspects are not the overarching direction in many countries, they will help a lot in dealing with the observation data particularly for the autonomous data.

b) Coordination across nations for the archiving of Arctic data.

A high-level objective for NORP is to host a forum to bring together national representatives to discuss next steps in coordinating the archiving of Arctic observations. This was discussed in a meeting with Sandy Starkweather, the Executive Director of the Arctic Observing Network (AON). A number of efforts are currently underway, for example, the Copernicus center has the climate data store which gathers a large amount of information and makes it searchable, although it is a European focus it is global data and also has some Arctic data. The National Snow and Ice Data Center (NSIDC) in the US and other institutions have a lot of Arctic data. There are big players coming in and lots of resources to offer, so it may be worth trying to influence those kinds of big players. The objective is not to develop new infrastructure but more on connecting existing infrastructures.

When it comes to international coordination, it always comes back to the funding. Different groups are never in sync and never have the same goals, so they have to compete for funding and propose something slightly different from everyone else. WCRP should go to the national funding agencies, the international funding group parties to coordinate national calls.

Firstly, it is necessary to convince the national funding agencies that they will at least provide the context or framework for the national calls. This may be the only way to overcome this fragmentation both in observation and modeling. Communities like the Sustaining Arctic Observing Networks (SAON, The SAON Board was established following a decision by the Ministers of the Arctic Council in the Nuuk Declaration) should be a player in this because it's supported by several governments in the Arctic nations. This should be one way that WCRP allies with communities like SAON and the International Arctic Science Committee (IASC).

c) Modeling the Arctic climate has been overlooked by WCRP

For the ultra-high-resolution simulation, some institutions are doing the similar thing, while the distribution of the resources is unbalanced, so we can link to them and act as the coordinate role. Also, the word in the document: "ultra-high-resolution (kilometer-scale or finer) of the global Earth system and its individual components", neglects the need for regional modelling, the regional ultra-high-res modeling should be mentioned.

d) NORP contribution to the other 4 LHAs

NORP is planning a CMIP6 boot camp in 2022 that maps into the other 4 LHAs. One topic that will be considered is the impact of Arctic variation on sea level rise. This will provide for the two-way interaction between the training providers and the climate researchers needing training planned for LHA WCRP Academy.

3.3 Joint NORP-SORP Workshop on Freshwater Storage and Transport

- Ben have talked with the SORP co-chairs, but there was no progress right now.
- If we will have a virtual getting together later this year to discuss the topics for the meeting?
- Amy will tell IASC this workshop can't happen this year. Amy will keep Ben posted about the exchange with IASC.
- Some options of the venue: The EGU, the OSM,
 - EGU will be April next year, we can try to apply for a workshop as part of the EGU Galileo conference.
 - OSM is more ocean related, the SORP may be a bit interested in. For NORP, there will be some different audience. But the travel is difficult for Hawaii, there is a new round of quarantine these days.
- Anyone who have suggestion or feedback, please contact Ben. Ben will contact the SORP people including today's discussion in the email.

There is big uncertainty of the OOPC heat and freshwater workshop. Matt will step away from this area and someone is need to restart the planning.

3.4 Follow-up on conversation with Sandy Starkweather

Before we met with Sandy, NORP has already decided that the priority of the panel is to have a forum. Not necessary to have a defined agenda, but to bring different communities together to talk about what kind of archives can have the potential to coordinate the data available from the high level and from different nations. During the meeting, Amy reviewed the discussion with Sandy several months ago.

- The theme could be the "Shared Arctic Variables". The outcome will be more coordination of the Arctic data.
- The trial expert groups are going to form in the coming year which will need competent members, Arild is happy to suggest NORP membership to those groups, which might be a way to get engaged in the Arctic PASSION. If one or two NORP are involved in one of those groups, this forum would be great for the representatives to discuss.
- Arctic PASSION has a concrete to establish the first panel starting at the ASSW in March. With the inputs from the SAON ROADS, the Arctic PASSION will kick off some panels in the coming year.
- Aril will keep Amy been posted about the Arctic PASSION panels.

- Amy thought this could be part of the discussion within the NORP-SORP workshop.
- Maybe we could drop this forum and focus on other NORP activities.

3.5 What to tell SORP and what we want to do with them

- If Celine meet SORP before Ben managed to get base with them, she will mention NORP's plan to SORP.
- Celine will let Amy know the agenda of the SORP meeting once she got it.
- We should know what SORP expects from NORP.
- Celien's thoughts: the freshwater review at the two poles, the similarity and contrast.
- Some of the members thought that the ice-sheet ocean interactions at the two poles in an integrated way might be a point for the two panels to think about. Patrick will share a reference about this work.
- The Horizon Europe call will be end on 26th Sep, where there is the funding related to the AMOC and Southern Ocean. We can think about the joint actions that are related to the funding processes, how SORP and NORP can interact with those funding.
- Invite SORP to join the boot camp. Use the PANGEO cloud computing or use regular old server?
- Ruth suggested to discuss during the SORP meeting the consistency of the performance of the Earth's Climate System at different regions, especially for the downscaling. Dorotea said the reason is partly from the fact that the physics of sea ice models as a component of climate model is tuned in the Arctic, while the observation in both poles is lacking. Another reason maybe that the resolution of the ocean model is not fine enough.

3.6 Ocean Hackweek

Oceanhackweek is a 5-day learning hackathon aimed at exploring, creating and promoting effective computation and analysis workflows for large and complex oceanographic data. By democratizing data access and increasing exposure to technological assets, our goals are to accelerate research, promote collaboration and cultivate data science literacy among the ocean sciences community.

- Patrick simply introduced the Ocean Hackweek. It is hosted once a year, of which the theme, the potential organizers, and the sponsors change every year. it's a very fluid and successful organization.
- Maybe this is another way to collaborate with SORP or other panels.
- We could think about it once there are some specific projects and there are clear workflows developed.

Action:

Invite some people from Hackweek to give a 10-minute presentation introducing their interests, overview of the Hackweek, what they expect to get.

3.7 summer school

The CMIP6 boot camp will be planned to the next summer time. Hopefully in person, with a contingency of hybrid or online.

Potential venue: Helgoland. Ben will contact the people there to check the availability.

Number of Participants: Will be determined by the accommodation.

Advertising: We should advertise this in the next couple of months, maybe through the OSM, the Arctic Frontiers science conference (Arild), the kick-off meeting of a European project (Arctic PASSION? Dorotea), the polar meeting (Amy, Ruth).

Funding resources:

- We can apply for the CLIVAR funding (from WCRP) at the end of this year (about 5000 CHF). Maybe CliC can provide the same. (The money can't be carried over, but we can apply for it year by year.)
- Polarprediction: 2000 \$ (at the latest 2022)
- IASC: 5000 \$ (at the latest 2022)
- The PolarRES+ PROTECT: 5000 Euro. Can support travel support for any researchers who are associated with those projects to participate. (at the latest 2023)
- It's too late to apply for the US funding for next year's activities.
- Danish funds under NCKF: probably to next year, can't guarantee.

Logistics:

Mercator Ocean International has people continuously organizing training workshops. If we can get their involvement, we can solve the logistic and organization issues. Laurent is happy to be the link and kick off an email conversation.

The current situation of the COVID-19 in each country is discussed. The rules and situation are different and may change from nation to institution, and are changing with time.

Who will be the organizer? Will be discussed in October telecon.

Action:

Ben will contact the person in Helgoland directly. (Has done)

Amy and Ruth will summarize the funding available and the needed money before the October telecon.

4. AGENDA

2nd Session of the CLIVAR/CliC Northern Oceans Region Panel

15 Sep (Wednesday) at 14:00-15:30 UTC
& 22 Sep (Wednesday) at 15:00-16:30 UTC

Chaired by Amy Solomon and Ruth Mottram

Part 1: 15 Sep (Wednesday) at 14:00-15:30 UTC

1. Opening remark of the co-chairs (Amy and Ruth, 3 m)

2. Scientific discussion (part 1)

2.1 Member introductions (10 m)

3. Business (part 1)

3.1 Membership and Inviting ECSs to panel (7 m, will continue in the second session)

3.2 Discussion on WCRP LHAs (30 m)

3.3 Joint NORP-SORP Workshop on Freshwater Storage and Transport (Ben, 20-45 m)

3.4 Follow-up on conversation with Sandy Starkweather (20-45 m)

Part 2: 22 Sep (Wednesday) at 15:00-16:30 UTC

2. Scientific discussion (part 2)

2.2 Discussion of the review paper on the heat flux review paper (Sheldon, 20 m)

2.3 Discussion of the review paper on the seasonality of the Arctic freshwater (Xiangdong, 20 m)

3. Business (part 2)

3.1 Membership and Inviting ECSs to panel (5-10 m)

3.5 What to tell SORP and what we want to do with them (Celine, 15-45 m)

3.6 Ocean Hackweek (15-45 m)

3.7 summer school (15-45 m)

3.8 AOB...

4. warp up

