

CLIVAR/CliC Northern Oceans Region Panel

Co-chairs: Amy Solomon (Amy.Solomon@noaa.gov)
Ruth Mottram (rum@dmi.dk)

Panel overview

~1-2 paragraphs background with a summary of panel current main mission and 2018-2019 activities and obstacles, if any.

NORP serves as an international forum for coordinating and strategizing activities on the role of the Arctic Ocean in the context of the global climate system from a coupled perspective. NORP facilitates progress in the development of tools and methods to monitor and assess climate variability and change, and evaluate climate predictability of the ocean-atmosphere-ice system in the Arctic and Subarctic Ocean. NORP coordinates efforts to enhance the ability to monitor the coupled system, understand the driving mechanisms of the system change from a coupled process perspective, and predict the evolution of the emerging New Arctic climate. NORP plays a central role in coordinating, monitoring, and evaluating the progress of such activities during and beyond the Year of Polar Prediction.

NORP co-chair Fyfe stepped down at the beginning of 2019 and Ruth Mottram replaced him as the new co-chair.

Achievements for 2018-19

Achievements this fiscal year include:

- 1) Contributions to OceanObs19 white paper on “Ocean climate observing requirements in support of Climate Research and Climate Information”.
- 2) Co-organizing for pre-AGU Workshop on Freshwater Fluxes from the Greenland Ice Sheet.
- 3) Co-convening sessions for 2019 IGS Sea Ice Symposium on “Sea ice, ocean and climate connections in the Northern Oceans and the Southern Oceans”.
- 4) Co-convening 2018 AGU Annual Meeting session on “Sea Ice–Ocean–Atmosphere Interactions in the “New” Arctic and Southern Oceans”.
- 5) Co-convening 2019 AGU Annual Meeting sessions on “Sea Ice–Ocean–Atmosphere Interactions in the “New” Arctic and Southern Oceans” and “Extratropical and High-latitude Storms, Teleconnections, Extreme Events, and the Rapidly Changing Polar Climate”.
- 6) Co-convening 2019 EGU Annual Meeting session on “Changes in the Arctic Ocean, sea ice and subarctic seas systems: Observations, Models and Perspectives”.
- 7) Presentations on NORP activities at US CLIVAR Summit, IASC Annual Meeting, FAMOS Annual Meeting, CLIVAR SSG, and CliC Annual report-out.
- 8) Monthly telecons with reports of international Arctic collaborations and campaigns, updates on scientific studies, planning for future activities.

- 9) Planning for NORP Bootcamp Summer School tentatively to be held in Helgoland, Germany in Summer 2021.
- 10) Planning for GOOS/GCOS workshop on heat and freshwater transport and storage in models and observations to be held in Exeter, UK in April-May 2020.

Plans for 2020 and beyond

- 1) 2nd NORP Panel Meeting in Spring 2020
- 2) Co-organize GCOS/GOOS Workshop on heat and freshwater transport and storage in models and observations April 27-May 1 2020 and lead review paper on “Arctic Ocean heat and freshwater transport and storage in models and observations”.
- 3) FAMOS 2020 Talk on NORP activities and near-term scientific objectives.
- 4) EGU 2020 session on “Changes in the Arctic Ocean, sea ice and subarctic seas systems: Observations, Models and Perspectives”.
- 5) AGU 2020 sessions on “Sea Ice–Ocean–Atmosphere Interactions in the “New” Arctic and Southern Oceans” and “Extratropical and High-latitude Storms, Teleconnections, Extreme Events, and the Rapidly Changing Polar Climate”.
- 6) Plan NORP 2021 Summer School in coordination with NORP MOSAiC activities to:
 - a. learn/improve big data management skills; from writing the algorithm to visualizing the results;
 - b. get an Earth system perspective by working with students from a different topic;
 - c. improve critical skills: know why models are not perfect and how to detect biases;
 - d. Provide an introduction to current MIPs and SSPs.
- 7) Write white paper on sea-ice ocean metrics for lower-latitude-Arctic interactions for CMIP diagnostics.
- 8) Work with national representatives to secure support for Arctic ocean-sea ice state estimates.
- 9) Advance studies on Greenland ice sheet – ocean interactions: Advocate for inclusion in CMIP7 and Sea level call in Horizon2020.
- 10) Coordinate archiving/mirroring of past/future campaign/in-situ data for assimilation and analysis: Coordinate with CLIVAR Global Synthesis and Observations Panel.
- 11) Continue monthly telecons.

Articles published in 2018/19 as part of panel activities (if any)

Stammer D, Bracco A, AchutaRao K, Beal L, Bindoff NL, Braconnot P, Cai W, Chen D, Collins M, Danabasoglu G, Dewitte B, Farneti R, Fox-Kemper B, Fyfe J, Griffies SM, Jayne SR, Lazar A, Lengaigne M, Lin X, Marsland S, Minobe S, Monteiro PMS, Robinson W, Roxy MK, Rykaczewski RR, Speich S, Smith IJ, Solomon A, Storto A, Takahashi K, Toniazzo T and Vialard J (2019) Ocean Climate Observing Requirements in Support of

Climate Research and Climate Information. *Front. Mar. Sci.* 6:444. doi: 10.3389/fmars.2019.00444

Budget and other needs for 2020

Please keep in mind that the overall budget of CLIVAR is limited and this needs to be distributed between all activities and the SSG meeting.

NORP requests 10K euros to support member travel to the panel meeting and the workshop.

NORP requests support for members to participate in the second face-to-face panel meeting to be held in Reykjavik, Iceland in conjunction with the Arctic Science Summer Week in March-April 2020 or Exeter, UK in conjunction with the GOOS/GCOS Workshop on heat and freshwater transport and storage in April-May 2020. We request funds to support travel to/from the meeting.

Annex A

Proforma for CLIVAR Panel requests for SSG approval for meetings

1. **Panel name: Northern Oceans Region Panel**
2. **Title of meeting or workshop:** GCOS/GOOS Workshop on heat and freshwater transport and storage in models and observations & the second session of NORP (NORP-2)
3. **Proposed venue:** Exeter, UK
4. **Proposed dates:** April 2020
5. **Proposed attendees, including likely number:** 14 NORP panel members
6. **Rationale, motivation and justification, including: relevance to CLIVAR science & WCRP Grand Challenges, and any cross-panel/research foci links and interactions involved:** This will be the second NORP in-person meeting since its establishment. The meeting will discuss the NORP future plans, and the member problems (some member may rotate off at the end of 2020). The GCOS/GOOS workshop will be co-organized by NORP, which will spread the NORP influence. This workshop is designed to identify observational and modeling gaps and opportunities to advance the understanding of heat and freshwater storage and transports in the global ocean. This workshop will support the WCRP Grand Challenges “Melting Ice and Global Consequences”, “Weather and Climate Extremes”, “Regional Sea-Level Change and Coastal Impacts”, and “Near-term Climate Prediction”.
7. **Specific objectives and key agenda items:** This workshop will bring together experts across the many disciplines involved in freshwater and heat storage and transport in observations and climate models, as well as graduate students and post-doctoral scholars working in this research area, to assess the current state-of-knowledge, identify research gaps and observational uncertainty and needs, and map out a strategy for progress on both regional and global scales.
8. **Anticipated outcomes (deliverables):** NORP-2 report, and a review paper on “Arctic Ocean heat and freshwater transport and storage in models and observations”.
9. **Format:** the NORP-2 will be a side meeting of the GCOS/GOOS workshop.
10. **Science Organizing Committee (if relevant) :** Amy is on the organizing committee of the GCOS/GOOS workshop.
11. **Local Organizing Committee (if relevant)**
12. **Proposed funding sources and anticipated funding requested from WCRP:** NORP requests 10K euros to support member travel to the panel meeting and the workshop.