

World Climate Research Programme JOINT SCIENTIFIC COMMITTEE (JSC) 41st online session

CliC Report (draft 1)

1. Highlights for JSC

- Highlight 1
The CliC co-sponsored ISMASS – Ice Sheet Mass Balance and Sea Level – project has sponsored major workshops on links between high- and mid-latitude climate change (Sheffield, November 2015) and on ice sheets (Brussels, Belgium, February 2017 and Davos, Switzerland, June 2018) that have resulted in the publication of the following high-profile review paper:
[Hanna, E, F Pattyn, F Navarro, V Favier, H Goelzer, MR van den Broeke, M Vizcaino, PL Whitehouse, C Ritz, K Bulthuis, B Smith \(2020\) Mass balance of the ice sheets and glaciers–progress since AR5 and challenges. Earth-Science Reviews, 102976](#)
- Highlight 2
The annual Polar CORDEX meeting scientific presentations focussed on following key topics:
 - (i) Surface mass balance of Greenland and Antarctic ice sheets - changes and key drivers. According model inter-comparisons have been accomplished. Simulated recent and future climate change over the Antarctic Peninsula region were presented.
 - (ii) Coupled modeling, its challenges and benefits. For the Arctic, results from atmosphere-ocean models with respect to cyclones and their feedbacks, and improved model physics have been presented. The intra-annual prediction of Arctic sea ice is a promising new capability. For Antarctica, efforts towards coupling the atmosphere with ocean and ice sheet components have been presented.
 - (iii) Model evaluation. Studies over Greenland and near Svalbard were presented. For the Arctic Ocean, a multi-model intercomparison with the ACSE2014 campaign data has been accomplished. Arctic and Antarctic sea-ice lead data sets have been compiled.
 - (iv) Challenges of high-resolution downscaling: Impacts of sea-ice forcing, different physics, resolution, uncertainty assessment, methods to select CMIP6 models.

2. Primary science issues (looking ahead, 3 to 5 years)

- Improved understanding and quantification of the role of the cryosphere in the global climate system, its variability and change.
- Improved utilization of cryospheric observations as indicators of global and regional climate change.
- Improved understanding of the physical, chemical and other processes that govern behaviour of the cryosphere, and the representation of these processes in Earth System Models.
- Improved ability to make quantitative predictions and projections of the cryosphere in a changing climate.

The CliC SSG is planning to update the 2017-2021 Action Plan and discussed this at the SSG15 meeting in December 2019. Some of the priorities discussed are to: strengthen the links and communication with other organizations and within the SSG; identify sources of funding; simplify the structure of CliC with only projects and MIPs; communicate CliC

results to a broader audience including organizations working with policy-makers, social science and indigenous knowledge and strengthen the links with those organizations; identify research gaps where CliC could have an impact; establish travel grants for early career or scientists from underrepresented cryosphere regions to participate in CliC sponsored workshops.

3. Issues and challenges, for example:

- How you work with other WCRP activities
CliC has a number of ongoing collaborations with the other WCRP Core Projects and was represented at the last CLIVAR and GEWEX SSG meetings. CliC and CLIVAR both support the Southern Ocean Region Panel (SORP) and the Northern Oceans Regional Panel (NORP). CliC and GEWEX jointly provide input to the Land Surface, Snow and Soil Moisture Model Intercomparison Project (LS3MIP). The Polar Climate Predictability Initiative (PCPI) is an activity that both CliC and SPARC lead together. Finally, CliC has been supporting the Polar-CORDEX project (Arctic and Antarctic Domains).
- How you see your community evolving
 - Growth in the cryosphere modelling community with a focus on integration of all aspects of the cryosphere into earth system models.
 - Expansion of research on Antarctic sea ice and connections with ocean circulation, carbon cycle, and marine biology.
 - Increased focus on the third pole and strengthened links to water resources, ecosystem services and carbon cycle research.
 - Increased engagement with communities living in polar and high mountain regions to ensure adequate modeling and access to relevant climate information.
- How you work with partners outside of WCRP
CliC jointly supports a number of long-term activities as follows:
 - BEPSII - Biogeochemical exchange processes at Sea Ice Interfaces (joint with SCAR, SCOR and SOLAS)
 - Antarctic Sea Ice Processes & Climate (ASPeCt) (joint with SCAR)
 - Ice Sheet Mass Balance and Sea Level (ISMASS) (joint with SCAR and IASC)Permafrost Carbon Network (part of the Study of Environmental Arctic Change (SEARCH) project – jointly with IPA, IASC).
CliC has strong links with ESA and co-sponsored the ESA Living Planet Symposium 2019, held in May, 2019, in Milan.
CliC supported, with a number of other organizations, the MOSAiC School 2019 organized by APECS and AWI.
CliC also provides funding for the annual meetings of other groups such as the Arctic Sub-arctic Ocean Fluxes (ASOF) project and the International Ice Charting Working Group (International Workshop on Sea Ice Modelling, Data Assimilation and Verification).
- How the current funding affects your community, your activities, your service
While our projects could use additional funds to engage more participants and broaden their events, CliC managed to sponsor 16 meetings in 2019. However CliC has not been able to undertake new activities due to the limited funding and the lack of a project office. Additional funding needs to be secured to expand CliC's impact and continued operation.