

## 46th Session of the WCRP Joint Scientific Committee (JSC)

12-16 May 2025

### Update report for the WCRP Joint Scientific Committee

### Climate & Cryosphere (CliC)

#### High-level publications

- Feb 7, 2025: [The Polar Special Issue of Science](#), co-coordinated by CliC, including 2 CliC-led papers on Arctic and Antarctic change: [Antarctica in 2025: Drivers of deep uncertainty in projected ice loss](#) and [Disappearing landscapes: The Arctic at +2.7°C global warming](#)
- Arctic Report Card chapter, Arctic Terrestrial Carbon Cycling DOI: 10.25923/0gpp-mn10, <https://arctic.noaa.gov/report-card/report-card-2024/arctic-terrestrial-carbon-cycling/>
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- Chen, J.-J., N. C. Swart, R. Beadling, X. Cheng, T. Hattermann, A. Jüling, Q. Li, J. Marshall, T. Martin, M. Mulwijk, A. G. Pauling, A. Purich, I. J. Smith, and M. Thomas (2023) Reduced Deep Convection and Bottom Water Formation Due to Antarctic Meltwater in a Multi-Model Ensemble, *Geophysical Research Letters*, **50**, e2023GL106492. <https://doi.org/10.1029/2023GL106492>, available at: <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2023GL106492>
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- Haddon, A, et al. 2024. Environmental controls and phenology of sea ice algal growth in a future Arctic. *Elem Sci Anth*, 12: 1. DOI:<https://doi.org/10.1525/elementa.2023.00129>
- Hanna, E. et al. (2024) Influence of high-latitude blocking and the northern stratospheric polar vortex on cold-air outbreaks under Arctic Amplification of global warming. *Environmental Research: Climate* 3(4): 042004, doi: [10.1088/2752-5295/ad93f3](https://doi.org/10.1088/2752-5295/ad93f3).
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### Capacity Building/Education and Training Highlights

- We are planning a CliC Open Science Conference (400 persons +/-) to be held in Wellington, New Zealand in February 2026. Full details can be found at [clc2026.com](http://clc2026.com).
- A NORP/SORP summer school on “[Polar Climates: Theoretical, Observational and Modelling Advances](#)” was held in person and virtually in Trieste, Italy in July 2024. The school was followed by a 3-day workshop on the “[Role of Sea Ice and its Variability in the Climate System](#)”. The school and workshop were hosted by the [International Center for Theoretical Physics](#) (ICTP) and co-organized between the CLIVAR/CliC/SCAR Southern Ocean Region Panel (SORP) and the CLIVAR/CliC Northern Oceans Regional Panel (NORP). About 80 students and postdocs attended the NORP-SORP-ICTP summer school and workshop. The school and workshop were supported by ICTP, CLIVAR, CliC, SCAR and IASC. [NORP-SORP SummerSchool\\_IASCFinalReport2024.docx](#)
- Discussions between our Arctic (ASIWG) and Antarctic (ASPeCt) sea-ice working groups have recognized a need for a new edition of the [Field Techniques for Sea Ice Research](#) book to help support sea ice observations leading up to and during the 5th IPY. Writing a

new edition may become a future joint activity between the ASIWG and ASPeCt as well as the broader sea ice community.

- The Ice Sheet Model Intercomparison Project held its kickoff meeting for its next phase, ISMIP7, on June 10-14, 2024, in a hybrid format hosted in Sterling, Virginia. ISMIP7 is an official Coupled Model Intercomparison Project (CMIP) community activity that will define a set of standard ice-sheet model experiments for projecting the future of the Antarctic and Greenland Ice Sheets. These simulations will be conducted by modeling groups from around the world in the coming three years, and the resulting multimodel ensemble will be a critical element informing sea-level projections in the IPCC's AR7 planned for 2029. The aim of the ISMIP7 kickoff workshop was to define the goals of ISMIP7 and begin formulating an experimental protocol through the coordination of 6 focus groups. The outcome of the workshop was to lay the groundwork for finalizing experimental protocols in the next year, with a timeline of having ice-sheet modellers begin their simulations in summer 2025 to support CMIP7 publication deadlines in 2027.
- Our Permafrost Carbon Network activity has published a comprehensive video about their work at <https://www.permafrostcarbon-aware.org>. Their annual meeting at AGU to discuss new synthesis projects had more than 120 participants, half of which were first time participants and many of whom were ECRs.
- A special CLIVAR Exchange issue highlighting emerging Southern Ocean and Antarctic programs and featuring in particular programs developed in the Global South was collected, internally reviewed by SORP panel members, and edited by the CLIVAR ICPO. The issue, "Highlighting Ocean Research, Data and Networks of Antarctic Programs" consisted of articles from five different countries: Argentina (two contributions), Brazil (two contributions), India (one contribution), New Zealand (one contribution) and South Africa (two contributions) and was published in October 2024 ([10.36071/clivar.83.2024](https://doi.org/10.36071/clivar.83.2024)).
- In 2023, SORP instigated a quarterly seminar series, [PROS4SORP](#), as a way to build a more coherent community and raise awareness of SORP activities. The seminar series continued in 2024 with four presentations. Generally, 100-200 people register for the zoom links for the seminar. Each webinar was attended by on average 50-70 people. SORP plans to continue the successful PROS4SORP webinar series in 2025. Two speakers are scheduled: Petra Heil in February/March and Sarah Gille in April.

#### **Linkages with other Core Projects, Lighthouse Activities, Academy, etc.**

- CliC is spinning up a new, cross-cutting Impacts of Changes in the Mountain Cryosphere (IC-MONTC) activity group that links nicely with GEWEX, ANDEX, MRI and other project activities.
- Co-Chair E. Hanna attended the GEWEX SSG meeting in person in Budapest in April 2024 and discussed potential collaborations.
- Co-Chair E. Hanna also presented CliC at the APARC 2024 SSG meeting and has been in discussion with APARC leads about collaborating with APARC on our Arctic-midlatitude climate project.
- Link with CLIVAR through NORP/SORP Summer School highlighted in Sect. 2.

- IPO Director K. Alverson attended the RiFS Scientific Steering Group Meeting in Montreal in September 2024, presented CliC activities most relevant to RiFS and discussed future possible collaboration in the area of regional societal impacts of cryospheric change.
- SSG Member L. Vargo attended the GEWEX Scientific Steering Group Meeting in Wellington, NZ in February 2025 and presented CliC activities most relevant to GEWEX and discussed future possible collaboration in the area of hydrology and cryospheric change.
- Representatives of several WCRP groups attended the 2024 CliC SSG meeting in Pucón, Chile and presented updates, including: GEWEX (Xubin Zeng), RiFS (Naomi Goldenson), WCRP Academy (Narelle van der Wel), WCRP EMCR Tiger Team (Lauren Vargo)

### **Partnerships with entities outside of WCRP**

- E. Hanna participated in ASSW2024 Edinburgh and discussed enhancing future CliC-IASC collaboration with the IASC senior leadership team.
- ASPeCt hosted the Antarctic sea-ice session at COP29, Baku, Azerbaijan: "Antarctic Sea Ice at a Crossroads: Status Quo and Future Implications". Since 2016, Antarctic sea ice has remained below the long-term average, with extreme lows in recent summers and winters. This rapid change is not entirely understood, and scientists have yet to attribute causality and identify the range of consequences. This expert briefing addressed the current state of Antarctic sea ice, its global climate and ecosystem impacts, their implications in recent climate projections, and open dialogue with policy and other stakeholders.
- BEPSII contributed to three events at COP29 in Baku (Azerbaijan), 11-22 Nov. 2024. Both co-chairs Letizia Tedesco and Jacqueline Stefels were present in person and contributed to the organisation of three side events. Their participation was supported by CliC and SCAR. On 14 Nov. BEPSII organised a panel discussion on the changing sea ice biogeochemistry in polar oceans at the Ocean Pavilion; on 14 Nov. Jacqueline Stefels gave a presentation on the relevance of sea-ice ecosystems and biogeochemistry for the functioning of the Southern Ocean food web in a side event led by ASPeCt (Stephanie Arndt) at the Cryosphere pavilion; on 15 Nov. BEPSII organised a side event at the Cryosphere Pavilion on "Vanishing Sea Ice: What It Means for Our Oceans and Ecosystems". [A short interview with Jacqueline and Letizia](#) can be viewed on the BEPSII YouTube channel. Following their contributions at COP29, Letizia and Jacqueline initiated the issuing of an urgent statement from the scientific community to the world leaders at COP29, expressing deepest concerns about the current state of the climate and ongoing changes in the cryosphere. The press release "[An S.O.S. from the Poles to World Leaders at COP29](#)" was a concerted action from BEPSII, CATCH, ASPeCt, QuIESCENT and PACES and was endorsed by 20 international scientific organisations, including WCRP, Future Earth, SCAR, CliC and SOLAS.
- ASPeCt and BEPSII co-organised an [IPY-5 Planning Workshop](#) with CATCH, QuIESCENT and PACES on the polar atmosphere and climate. The focus was on identifying the current state and any gaps in polar atmosphere-ice-ocean research with respect to chemical, biogeochemical and physical processes in the Arctic and Antarctic and links to climate change. The IPY-5 meeting included 21 ECRs in attendance, and who helped to run the workshop. From this workshop, the priority research areas identified were: 1. The water



cycle; 2. atmospheric composition; 3. biogeochemistry and ecosystems; and 4. the energy budget. A detailed synthesis and overview concept will be published as a white paper in 2025. Collaborative projects will already start now in preparation of the 5th IPY. To do this the [workshop URL](#) will be used as a digital hub. A follow up mailing list exists: [ipy2032workshop@univ-grenoble-alpes.fr](mailto:ipy2032workshop@univ-grenoble-alpes.fr).

- Link with SCAR and IASC through NORP/SORP Summer School highlighted in Sect. 2.
- We have appointees to the 4 subgroups of the [IPY planning taskforce](#).
- CliC held its 2024 SSG meeting alongside the SCAR Open Science Conference in Pucón, Chile and used this opportunity to strengthen cooperation with SCAR and its working groups. Representatives of several partner organizations participated in the meeting, including: APECS (José Queirós), IACS (Sandra Barreira), IGS (Edward Hanna), PSECCO (Mariama Dryák-Vallies), SCAR-INSTANT (Tim Naish), and WMO-PHORS (Thamban Meloth).
- CliC organized an [IC-MontC virtual side event](#) at the launch event for the International Year of Glaciers' Preservation at WMO in January, 2025. [More information and recordings are available here](#).
- CliC co-sponsored and attended the AccelNet-ACCORD 1st Annual Meeting, December 7-8, 2024. The goal of the ACCORD project is to build the first multidisciplinary network of networks focused on climate change across the Andes, by taking advantage of the multidisciplinary expertise of the 10 largest international networks to produce scientific breakthroughs.
- CliC (lead by L. Vargo and the IPO) continues to engage with SCAR's AntClimNow (Near-term Variability and Prediction of the Antarctic Climate System) to help develop their Antarctic Indicators Working Group.
- IPO Director K. Alverson participated in the 2024 meetings of the WMO Arctic Climate Forum virtually (23-24 October).
- IPO Director K. Alverson participated in the 2024 meeting of the WMO Global Cryosphere Watch in Anchorage, Alaska in February 2024.
- CliC SSG Members Thamban Meloth, Yao Tandong, and Ruth Mottram participated as members in meetings of the WMO EC-Phors in February, 2024 in Oslo, Norway on High-level event on Cryosphere: from science to policy to action, and in June 2024 at the WMO headquarters: Side-event: Antarctica – a global continent: towards a WMO Antarctic dialogue.
- IPO Director K. Alverson led the CliC coordination of the international peer review of the Arctic Council's AMAP 2024 Arctic Climate Update, to be published early in 2025.
- CliC serves as stakeholder for The Glacier Mass Balance Intercomparison Exercise (GlaMBIE), which is a European Space Agency project, building on existing activities and the network of the International Association of Cryospheric Sciences (IACS) working group on Regional Assessments of Glacier Mass Change (RAGMAC). CliC participated in their Stakeholder Board meeting online in September, 2024, to discuss their Glacier Mass Balance Intercomparison Exercise, the results of which were published in Nature in

February 2025: [The GlaMBIE Team. Community estimate of global glacier mass changes from 2000 to 2023. Nature \(2025\). https://doi.org/10.1038/s41586-024-08545-z](https://doi.org/10.1038/s41586-024-08545-z)

- Several partner organizations have agreed to support the Climate and Cryosphere Open Science Conference, including: New Zealand, Australia, SCAR-INSTANT, Victoria University of Wellington Antarctic Research Centre, Korea Polar Research Institute (KOPRI), International Association of Meteorology and Atmospheric Sciences (IAMAS) International Commission on Climate (ICCL), Securing Antarctica's Environmental Future (SAEF), International Association of Cryospheric Sciences (IACS), and International Glaciological Society (IGS).

### **Future Science Directions for JSC Consideration**

- Impacts of Changes in the Mountain Cryosphere (IC-MONTC) mentioned above. CliC is working with the Mountain Research Initiative through cooperation in IC-MontC to hold a joint workshop on high-resolution climate modelling in areas of complex mountain topography, where snow and ice commonly cover the land surface. This workshop is to be held at the International Mountain Conference in Austria in 2025.
- CliC IPO Director K. Alverson and SSG members Miriam Jackson, Mine Islar and Yao Tandong will participate in the Paris opening of the UNESCO led, International Decade for Action on Cryosphere Research, in March 2025, to showcase CliC scientific leadership for the decade and strengthen linkages with UNESCO and its International Oceanographic Commission.
- Arctic-midlatitude climate linkages activity could perhaps be expanded to include an Antarctic/Southern Hemisphere remit, in association with other groups/activities.
- CliC notes the completed JSC review and has taken action to improve our operations based on the suggestions therein.

### **New Activities**

- ASIWG is involved in the production of the annual Sea Ice Outlook (SIO) initiative, as part of the Sea Ice Prediction Network. This report provides an open process for those interested in Arctic sea ice to share ideas about the September minimum sea ice extent. SIO produces reports in June, July, and August containing a variety of perspectives on Arctic sea ice — from observations of current conditions, to advanced numerical models, to qualitative perspectives from citizen scientists. The ASIWG is actively seeking to establish linkages with other working groups to optimize the usefulness of the SIO activity: <https://www.arcus.org/sipn/sea-ice-outlook>
- Through the EU-funded PolarRES project led by Priscilla Mooney, and involving Andrew Orr, members our PolarCORDEX activity have downscaled two CMIP6 GCMs over the Arctic CORDEX and two CMIP6 GCMs over the Antarctic CORDEX domains using multiple regional climate models. The two CMIP6 GCMs for each polar region were chosen to represent a 'storyline' approach, based on physically consistent future changes in atmospheric and ocean circulation. Results from PolarCORDEX are also being used for

ISMIP7 (Ice Sheet Model Intercomparison Project for CMIP7). Plans to contribute to the downscaling of CMIP7 are under consideration.

- GlacierMIP aims to develop new community-based global-scale future projections and ensure they are published in time for inclusion in the AR7 main report. For this, they are currently in close communication with other community efforts (e.g., CMIP7, ISMIP7, ISIMIP) to ensure a consistent setup that will allow, among others, for output to be compared and combined (e.g., forcing with same climate forcing).

## **General**

- CliC's new Strategic Plan is in progress and will be submitted to the JSC 46 meeting for approval.
- CliC's ISMIP working group was awarded the Richardson Medal by the International Glaciological Society at its conference in Northumbria in August 2024.
- As mentioned, CliC is organizing an Open Science Conference to be held in Wellington, New Zealand in February 2026. Full details can be found at [clic2026.com](https://clic2026.com).