



20th Meeting of the
**CliC Scientific
Steering Group**
REPORT

August 24–26, 2024
Pucón, Chile



Climate and Cryosphere
Core Project of the WCRP
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20th Meeting of the CliC Scientific Steering Group

The 20th CliC Scientific Steering Group Meeting was held Saturday-Monday, August 24-26, 2024, at the Universidad de la Frontera Campus Pucón, Caupolicán 78, Cryobacterium Room, Pucón, Chile. The meeting was hybrid throughout with various members and guests participating via Zoom.

Members Attending in Person

Edward Hanna, Juan Höfer, Narelle van der Wel, Ramiro Saurral, Sandra Barreira, Sergi Gonzalez-Herrero, Thamban Meloth, Tim Naish

Members Attending Remotely

Amy Lovecraft, Lauren Vargo, Rob DeConto

Member Regrets

Ben Galton-Fenzi, Camille Lique, Ray Bradley, Shin Sugiyama

IPO Staff

Katie Quigley (remote), Keith Alverson, Meghan Taylor

Guests in Person

Alix Post, José Queirós, Laura Dalman, Mariama Dryák-Vallies, Mark Curran, Norman Mueller, Takuji Nakamura, Ted Scambos

Guests Remotely

Andrew Orr, François Massonnet, Letizia Tedesco, Miriam Jackson, Naomi Goldenson, Petra Heil, Petteri Uotila, Regine Hock, Ruth Mottram, Ted Schuur, Tony Payne, Xubin Zeng

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Executive Summary

The CliC Scientific Steering Group held its 20th meeting in Pucón, Chile alongside the [11th Scientific Committee on Antarctic Research \(SCAR\) Open Science Meeting](#) in order to sustain and improve linkages with the Antarctic Research Community. The Steering Group was provided updates from all CliC working groups and a number of partner organizations. Foci of discussion included CliC engagement in, and support for, the UN Decade for Cryosphere Science (2025-34) and International Polar Year (2032-33), ongoing and potential future CliC synthesis papers and assessments, and the finalization of the draft CliC Strategic Plan for 2025-35. As part of broader ongoing efforts to revitalize and strengthen the CliC community of scientists, the Steering Group agreed to hold a Climate and Cryosphere Open Science Meeting in Wellington, NZ in 2026 in cooperation with co-sponsors which are likely to include the International Association of Cryospheric Sciences and the International Glaciology Society.

An archive of CliC Scientific Steering Meeting reports is available [on our website](#).

Summary of Actions

Action 20-1: IPO to contact UNESCO regarding supporting the UN International Decade on Cryosphere Research (2025-34)

Action 20-2: IPO to hold an open call related to participation in the 5th International Polar Year 2032-33.

Action 20-3: Co-chair and IPO Director to seek to augment our 2025 WCRP funding allotment with an ask for an additional 5k to support a writing workshop that minimizes travel – thus probably in Amherst to finalize the document that is primarily being developed online and by Zoom. Assuming funding is obtained, IPO to organize the workshop in the December 2024 to March 2025 Timeframe.

Action 20-4: IPO to make the full list of CliC SSG Liaisons, both internally with our working groups, and with external partners public on the website.

Action 20-5: Co-chairs (via IPO) to write to Julie Jones and Marilyn Raphael thanking them for their leadership and successful work with PCPI. Formally close the activity.

Action 20-6: Sandra Barreira to focus the river and lake ice working group proposal, including with IACS, for further consideration at the next, 2025 meeting of the Steering Group.

Action 20-7: IPO to hold a call to our working groups for 2025 support, in late 2024, noting that funding will be decided based on alignment with the priorities in our strategic plan (as yet not available).

Action 20-8: IPO to publicize the CliC Terms of Reference on our website.

Opening and Welcome

The meeting was opened by the co-chair, Edward Hanna, and all members introduced themselves, their areas of expertise and their host institution affiliations. Newly appointed members with terms that are formally starting in 2025 were all invited to the meeting as guests.

Presentations from CliC Working Groups

ASIWG - presented by Meghan Taylor

The Arctic Sea Ice Working Group plans a workshop in Boulder at Arctic Science Summit week in 2025. They continue to regularly contribute to the BAMS State of Climate report and NOAA's Arctic Report Card. They plan to participate in an IPCC sea ice meeting in Hobart in March 2027. The steering group appreciated the presentation. There was some discussion regarding to what extent the many CliC sea-ice groups (ASpECT, ASIWG, BEPSII, SIMIP) coordinate with each other or might be brought closer together.

ASPeCt - presented by Petra Heil

Antarctic Sea Ice Processes and Climate. Attention was drawn to the Nilas.org sea ice information portal, which includes monthly sea ice report cards. Aspectsouth.org is the new website. It was pointed out that planning of autonomous observatories for operational coverage could take more into account science requirements. The steering group noted ASPeCT progress and noted that CliC needs to update its links to the new ASPeCt website.

BEPSII - presented by Letizia Tedesco

The Biogeochemical Exchange Processes at Sea Ice Interfaces (BEPSII) project is co-sponsoring an IPY Planning workshop at the end of November in France. Their next business meeting is in March 2025 and a field school is planned to be held in Japan in 2026. BEPSII will be participating in a cryosphere side event at COP29 in Baku. BEPSII has recently produced a policy brief on sea ice. BEPSII research is working to include ice algae in models for CMIP7. BEPSII is also involved in an exchange programme for Early Career Researchers every two years. The Steering Group noted BEPSII progress and plans and reacted positively to the BEPSII policy brief.

GlacierMIP - presented by Regine Hock

A Global Glacier Monitoring Intercomparison Project (GlacierMIP) workshop is planned in Oslo for February 2025 as is a new GlacierMIP phase focused on projections for inclusion in IPCC AR7. The group is a bit Europe centric, with some US participation and seeks CliC assistance in broadening its geographic coverage. Partly the geographic issue is related to stringent numerical model requirements required for participation. The Steering Group noted progress and plans. Specific suggestions for broadening the geographic coverage of the working group (which is currently mainly Europe-U.S. focused) included India (Thamban Meloth suggested he could look into this) and National Institute of Polar Research in Japan (Ted Scambos can provide contacts), which runs both glacier models but also Earth system models that include glaciers.

ISMASS - presented by Edward Hanna

Ice Sheet Mass Balance and Sea Level is cosponsored by CliC, SCAR and IASC. ISMASS has continued to be active, holding major community workshops in 2022 (Reykjavik) and 2023 (Trieste), and publishing a major review paper on timescales of ice sheet variability in NATURE REVIEWS EARTH & ENVIRONMENT in January 2024. They are seeking new leadership and better balance in the leadership, which is currently all senior male scientists. The Steering group welcomed the progress and plans presented on behalf of ISMASS.

ISMIP6/7 - presented by Tony Payne

It was noted with congratulations that the Ice Sheet Model Intercomparison Project (ISMIP) team had received the Richardson Medal from the International Glaciological Society in 2022. ISMIP maintains a tight focus on delivering for CMIP7, and thus IPCC AR7, and appreciated CliC financial support for workshops essential to catalyze progress. The committee discussed ISMIP core funding and asked the IPO to continue to offer letters of support for ISMIP funding proposals, as may be requested by the leadership, as has been done in the recent past. One member noted that the Thwaites project has recently published on the declining importance of ice cliff failure and increasing importance of pumping of warm seawater under the ice sheet, which may pose significant modeling challenges for ISMIP moving forward. The steering group noted ISMIP progress with concern expressed regarding the sustainability of funding for this key activity underpinning IPCC reports.

LINKAGES - presented by Edward Hanna

Linkage Between Arctic Climate Change and Mid-Latitude Weather Extremes was presented. The group held a small (19-person) but very productive workshop in Lincoln, UK, in September 2023, which included good Early Career representation, and has written up the science results for a mainstream climate journal, expected to be published in late 2024. The Steering group welcomed the progress and plans presented on behalf of Linkages. There was a suggestion that the group consider adding Antarctic-midlatitude linkages to their remit, rather than having only an Arctic focus. This may be difficult with the existing capacity and expertise but Edward would discuss this idea with Jim Overland. Or alternatively maybe we should close this group based on its very successful outcomes and entertain proposals for perhaps forming a new broader group on polar teleconnections.

NORP - presented by Petteri Uotila

Northern Oceans Regional Panel. It was noted that there were plans to run a workshop on ocean heat in polar regions and connections to lower latitudes. SORP, along with NORP and the CLIVAR Ocean Model Development Panel OMDP. Seasonal freshwater variability and its relation to heat as well as connections to lower latitudes and fluxes will also be a focus. The workshop is planned for the boreal spring of 2025 and may be held in Colorado at the Arctic

Science Summit Week or the polar met-ocean AMS conference. NORP has no plans for the proposed pan-CLIVAR meeting in 2025 in Indonesia. The steering group noted NORP progress and CliC's continued support for this joint working group with CLIVAR.

PCN - presented by Ted Schuur

The Permafrost Carbon Network has more than 500 members. They have published estimates that 50-200 billion tons of carbon could be released to the atmosphere associated with permafrost thawing due to global warming (roughly the equivalent of a large industrialized country's emissions). They support AWARE – Arctic carbon warning network and have produced [a mini-documentary](#) now online, produced with CliC support. PCN will have its next meeting the Sunday before AGU. The steering group welcomed PCN's work and plans. In discussion it was noted that direct impacts of permafrost thaw on infrastructure and people are also important aspects of thawing permafrost.

Polar CORDEX - presented by Andrew Orr

Polar Coordinated Regional Downscaling Experiment. A long list of peer-reviewed publications arising from Polar CORDEX activities and members was shown. MOSAIC observations are used for RCM validation. The annual Polar Cordex meeting will be in October in Potsdam, at which time Annette Rinke will be replaced by Priscilla Mooney as chair. Polar CORDEX is running a session at AGU in December. A SCAR AntClimNow-CORDEX complementary workshop was suggested. A request of 5k for travel support to the Annual Meeting was tabled, and the IPO clarified we have already received this request, and budgeted for it. The steering group noted Polar CORDEX progress, including the CliC financial contribution to the 2024 Steering Group meeting, and further indicated CliC interest in growing our cooperation with CORDEX on high resolution modeling to also include mountain regions, specifically through the new IC-MONTC working group.

SIMIP - presented by François Massonnet

The Sea Ice Model Intercomparison Project plans a hackathon across five continents to analyze the first CMIP7 results when they are available. SIMIP created the “sea ice changes, drivers and impacts’ opportunity and will populate it with CMIP6 Variables by August 30. They have

communicated to their email list to update data requests for CMIP7. They are also seeking to make a cadastre of sea-ice research. Around 20-25 modelling groups are involved in SIMIP. However, an underrepresentation of the Asian sea-ice community in SIMIP was noted. The Steering Group appreciated the presentation and plans. There was some discussion with BEPSI about including carbon related sea ice variables in the 'ask', though it was unclear how many models could deliver these. The IPO was asked to distribute this data request to other relevant CliC groups as well.

SORP - presented by Ted Scambos

The Southern Ocean Regional Panel is cosponsored by CLIVAR, CliC and SCAR. They held a successful 2024 summer school in Trieste and held 4 webinars PROS4SORP over the past year with about 100 Participants. SORP has no plans for a Pan-Clivar meeting in Indonesia in 2025, and their 2025 meeting or activity is likely to be at BACO25. The Steering group welcomed the progress and plans presented on behalf of SORP.

Presentations from Partner Organizations

APECS - presented by José Queirós

The Association of Polar Early Career Scientists has an official delegation to COP 29. They have also been running trainings and webinars for professional development and maintain a mentor database for the community. APECS participated in a Polar Symposium in Monaco in 2024 and the EU Polar Science Week. They also launched, with the Prince Albert II of Monaco Foundation (PA2F), the IASC Fellowships Program 2024. The steering group noted the presentation and looks forward to continued cooperation with APECS and discussed the possibility of running joint webinars in collaboration with members of APECS.

GEWEX - presented by Xubin Zeng

The Global Energy and Water Exchange project supports four panels – though there are dozens of activities. The presentation included four specific suggested areas for potential cooperation

with CliC. (1) The International Network for Alpine Research Catchment Hydrology (INARCH) which might for example interact with IC-MONTC. (2) GEWEX Modeling and Process Studies over Polar Regions (3) GEWEX Land Atmosphere Feedback Observatories (GLASS GLAFOS) and (4) Snow depth and Snowfall. The Steering Group appreciated the presentation from GEWEX and the four specific suggestions for cooperation with CliC. It was noted that the GEWEX structure with a more limited number of ‘panels’ to support, rather than directly interacting with so many working groups, may be a model for CliC to emulate.

IACS - presented by Sandra Barreira

Sandra is leader of the freshwater division of the International Association for Cryospheric Sciences, and the agreed liaison between CliC and IACS. IACS’ next assembly will be BACO25. IACS supports joint bodies with external groups – the World Glacier Monitoring Service being one such example – and is open to cosponsoring activities with CliC in this way. The CliC IPO director has been in discussion with the Secretary General of IACS, Richard Essery, about co-sponsorship of the planned climate and cryosphere Open Science Conference in New Zealand in February 2026. IACS has responded positively to the proposal so far. The steering group noted the presentation and looks forward to continued cooperation with IACS, in particular at BACO25.

IGS - presented by Edward Hanna

The CliC co-chair and IPO director have been in discussion with the International Glaciological Society President Gwenn Flowers, and here in Pucón with their past president Francisco (Paco) Navarro about co-sponsorship of the planned climate and cryosphere Open Science Conference in New Zealand in February 2026. IGS has responded positively to the proposal so far. The steering group noted the presentation and looks forward to continued cooperation with IGS.

PSECCO - presented by Mariama Dryák-Vallies

The Polar Science Early Career Community Office is a national level office at the U Colorado Boulder specializing in skills training, resources and inclusivity for ECRs. CliC is helping to sponsor their Early Career Summit (with the Early Career Ocean Project (ECOP) and APECS at

the Arctic Science Summit Week in 2025 in Boulder, Colorado. The Summit aims to collate ECR input to the coming International Polar Year. They described some of their recent professional development workshops including one on Belonging, Justice, Equity, Diversity and Inclusion (BaJEDI) and one for Polar Postdoctoral Leadership, and also BaJEDI microgrants project and webinar series. The steering group noted the presentation and looks forward to continued cooperation with PSECCO.

RIfS - presented by Naomi Goldenson

The Regional Information for Society (RIfS) Core Project pilots exemplar Regional Studies that can help provide actionable climate information, sometimes in cooperation with other WCRP projects. Recent focus has been on the 'robustness' of climate information available to decision makers. An example of a regional shared effort with another WCRP project (GEWEX) is ANDEX (Note: ANDEX is solely a GEWEX Project, but RIfS is exploring synergies and how to engage with it). Africa is a priority for RIfS. RIfS will be hosting the [Global Extremes Platform](#), with an in-person kick off meeting in Nanjing in November. The CliC IPO Director will attend the next RIfS SSG meeting in person to propose, and gauge possible interest in, cooperating with CliC, for example through the new Mountain working group. SSG member Amy Lovcraft is the CliC SSG liaison with RIfS. The steering group noted the presentation and looks forward to a way forward on future cooperation with RIfS.

SCAR-INSTANT - presented by Tim Naish

INSTAbilities and thresholds in ANTArctica investigates the Antarctic Contribution to Sea Level Rise with a focus on instabilities and thresholds. There are broad disciplinary contributions from paleo, data, modeling. Four years into the eight-year program, which was reviewed this week at the SCAR meeting, with good progress noted. INSTANT Is looking to interact more with CliC (e.g. via ISMIP). The West Antarctic ice sheet is going to go. There is a threshold beyond which it is irreversible. It has happened in the past at relatively low levels of global warmth. The main question is the timing. There was a broad discussion of uncertainties in ice sheet calving laws and fundamental questions on mechanisms of instability. A special issue of the Cryosphere is under development. The steering group noted the presentation and looks forward to continued cooperation with SCAR-Instant.

WCRP Academy - presented by Narelle van der Wel

The Academy launched its website and catalogue at the WCRP Open Science Conference in Kigali, Rwanda in October 2023. They are working toward supporting multiple languages and including webinar series, and anticipate that eventually there will be a tracking system in place. The Academy is just spinning up so for now the best thing CliC can do to collaborate is to ensure that we are posting all opportunities (like summer schools) on behalf of working groups. The steering group noted the presentation and looks forward to continued cooperation with the WCRP Academy.

WCRP EMCR Tiger Team - presented by Lauren Vargo

Lauren Vargo is the CliC appointed member of this new group that is working toward strengthening EMCR engagement by WCRP projects and activities. A concept paper, resulting from the EMCR Symposium OSC in Kigali last autumn, is being prepared to address the questions of young scientists. There is, in development, an EMCR Hub (EMCR Corner) on the WCRP website, which is designed to connect existing EMCR networks and serve as a platform for EMCR news and highlights. The Hub will work closely with the WCRP Academy and feature regular updates on activities from EMCR communities to increase their visibility and opportunities for EMCRs. The steering group noted the presentation and looks forward to continued cooperation with the WCRP Early and Mid-Career Tiger Team. There was discussion between the SSG and especially ECR guests about how CliC can also improve ECR engagement, and better information about how ECR support is occurring, how much it is helping, and whether new tactics should be employed.

WMO-PHORS - presented by Thamban Meloth

Thamban is a member of the WMO Panel on Polar and High Mountain Observations and the agreed liaison between CliC and PHORS. PHORS provides strategic, advocacy, and engagement recommendations to the WMO Executive Council (EC), focusing on polar and high mountain regions. The PHORS-2024 in-person meeting was held in Oslo in Feb 2024. The meeting also included a very well attended high-level event with the theme “The Cryosphere under Climate Change - Advocating for the Frozen Surfaces of our Planet”. Several priority actions were recommended for submission to the 78th session of the Executive Council

(EC-78). As an outcome of this meeting, two resolutions were submitted to EC-78, namely “WMO Cryosphere high-level ambitions” and “Role of WMO on the coordination of meteorological programmes in Antarctica”. The WMO EC-78 [adopted these resolutions](#). The next in-person PHORS meeting is proposed in the first quarter of 2026, potentially being hosted by New Zealand. It was suggested to consider whether this would align with a CliC OSC should this take place in NZ in a similar timeframe. The steering group noted the presentation and looks forward to continued cooperation with PHORS.

UN Decade for Cryosphere Science (2025-34) and International Polar Year (2032-33)

The Steering group discussed how CliC can best position itself to benefit from, and contribute to, these two major climate and cryosphere relevant and upcoming international periods. It was noted that IPY does not include the mountain cryosphere outside polar regions, but the UN decade does. Guests representing the Early Career Groups PSECCO and APECS indicated they are very much working towards engagement in IPY. It was suggested that CliC should have an open call for IPY actions – these could include planned actions seeking CliC endorsement or as-yet unplanned actions. With regard to the International Decade the WCRP representative asked how we communicate directly with UNESCO. The IPO reminded the SSG that WCRP is co-sponsored by IOC-UNESCO and suggested we communicate with a letter to the UNESCO DG, to put CliC on her radar, while simultaneously contacting relevant folks in the secretariat, for example at the Hydrographic and Oceanographic Commissions, in order to position CliC on UNESCO's planning as they are the lead agency for implementing the UN Decade on Cryosphere Science.

Action 20-1: IPO to contact UNESCO regarding supporting the UN International Decade on Cryosphere Research (2025-34)

Action 20-2: IPO to hold an open call related to contributing to the 5th International Polar Year 2032-33.

Assessments, Reviews and Syntheses

WCRP Cryosphere Review Paper

This paper arose from the WCRP Open Science Conference in Rwanda in October 2023. Tim Naish is the lead author and coordinator. It will be submitted to the open access journal *Frontiers* and October 2025 is the expected submission timeline. CliC contributors have been and continue to be welcome. Petra Heil (sea ice) and Ed Hanna (polar climate change), for example, have contributed. Amy Lovecraft is involved in the concluding 'impacts' section, which is directly applicable to the CliC strategic plan. If you would like to get involved, do so soon! Permafrost and high mountains might be targets for new inputs as they are perhaps not as well covered as other cryosphere topics in the current draft.

Antarctic Report Card

This effort has been led so far mostly by Tom Bracegirdle and SCAR under the name of 'Antarctic Indicators'. Lauren Vargo is the CliC liaison and working group member. Sergi, Juan and Sandra all expressed interest in joining Lauren in this effort. SCAR is forming a new Action group for annual Antarctic climate reporting, and CliC has indicated our interest in participating in and co-sponsoring the group. There are good existing products (most notably the Antarctic sections of the WMO and BAMS State of Climate reports) so this effort needs to build on, and not duplicate, those. The target audience may be policymakers associated with the Antarctic Treaty.

Science Special Issue

The IPO director introduced this item on behalf of the coordinator, Ray Bradley, who was out of communication range in Northern Greenland. The special issue is slightly delayed but appears to be coming together nicely. There are three papers – broadly covering the Arctic, Antarctic and Mountain cryosphere, and possibly an editorial.

Disappearing landscapes: The Arctic at +2.7 °C global warming (Submitted)

Authors: Julianne Stroeve, Dirk Notz, Jackie Dawson, Ted Schuur, Dorthe Dahl-Jensen, and Celine Gieße

Antarctica's Indefinable Mystery: Filling the Gap Between Uncertainty and Understanding

(mid-September submission expected)

Authors: Helen Amanda Fricker, Benjamin K. Galton-Fenzi, Catherine Colello Walker, Bryony Isabella, Diana Freer, Laurie Padman, and Robert DeConto

Mountain Paper Title TBD (mid-October submission expected)

Authors: Miriam Jackson, Dongfeng Li, Adina Racoviteanu, Mine Islar and Kosar Bano

Possible New Assessments or Synthesis

The steering group brainstormed ideas for new synthesis and assessment activities.

One suggestion was a **Southern Hemisphere Linkages and Teleconnections** paper with impacts of Antarctic change on low and mid latitudes, parallel to the review paper that Linkages did for the Arctic. CliC could for example hold a workshop to help develop such a paper, perhaps in the runup to, or alongside, the Open Science Meeting in New Zealand in February 2026. There would be potential interest from, inter alia, southern South America (including Brazil), Australia, New Zealand, India, South Africa, Korea.

A second topic to be considered is **Geoengineering**. The SSC broadly discussed polar and cryosphere geoengineering. There are some published papers (Martin Siebert) that are highly critical and assert we should instead focus all our attention on mitigation and adaptation. There are some scientists (U. Chicago) whose publications are more cautiously positive to explore the topic. It was agreed that cryosphere Geoengineering is an important issue for CliC to engage on. SCAR will set up a climate action group, one of whose roles will be to investigate geoengineering. It may be possible to have a discussion on this topic at AGU. BEPSI indicated it has [tackled the Geoengineering topic](#) and is still very interested in it. BEPSI is contributing to a white paper lead by Gabriela Schaepman and Julia Schmale, which is the outcome of an IASC activity on the topic and would be interested to follow up with other ongoing activities that are addressing the biogeochemical and ecological implications of such measures. WMO is keeping a bit of an eye on the topic, primarily solar radiation management and carbon capture and storage. The steering group agreed that CliC may wish to consider an assessment paper on this topic, but maybe more of an assessment of possible unintended consequences of cryospheric geoengineering, rather than an assessment of possible geoengineering solutions. If CliC does

move forward on this topic it may consider partnering with the WCRP Lighthouse Activity on climate interventions.

Revising the CliC Strategic Plan

Discussion around the revision and finalization of the draft CliC Strategic plan occurred in several different sessions during the meeting. The Steering group noted the feedback on the draft plan that had been received so far, from the WCRP JSC as part of its ongoing review of CliC. It was suggested that we may wish to take the opportunity to organize CliC around a handful of strategic priorities, as panels, and subsume the working groups, tasks and activities within these. Another suggestion was that CliC *modus operandi* could include ‘endorsing’ activities that are primarily funded from funding agencies. Hence the need to engage more with those agencies in order to link their proposals to CliC strategic priorities.

It was noted that ‘extreme events’ are a huge topic in the community, yet mentioned only once in the existing draft. Also noted was that observations in the cryosphere are less standardized than many other climate measurements – for example atmospheric and oceanic. It was proposed the strategy draw on the Cryosphere section of the draft WCRP plan for consistency, and to refer to and reference the upcoming Science special issue and the Frontiers WCRP paper. The strategy should balance modeling, observation, process understanding and impacts.

The Steering Group agreed to move forward with appointing, as far as possible, a balanced (by geography, expertise, gender etc) writing group of approximately six people, led by the co-chair Edward Hanna, and including the IPO, which will work together on a shared google document version of the strategy and meet approximately monthly by Zoom. In the near term, on the shared electronic document it was agreed that Edward Hanna will take lead on intro and vision, Amy Lovecraft on services and hazards section and Keith Alverson on a theory of change section. It was agreed the IPO should communicate with the full SSG and all working group leads to find volunteers for this writing group – providing a clear sense of time commitment and timeline.

Action 20-3: Co-chair and IPO Director to seek to augment our 2025 WCRP funding allotment with an ask for an additional 5k to support a writing workshop that minimizes travel – thus probably in Amherst to finalize the document that is primarily being developed online and by Zoom. Assuming funding is obtained, IPO to organize the workshop in the December 2024 to March 2025 Timeframe.

Outreach and Communications

Katie Quigley presented remotely from the IPO. The CliC social media presence is strong and growing. We have started and tested an Instagram account, but it is currently our lowest priority. Facebook is now being regularly updated with the material from our website announcements. LinkedIn is growing in popularity among Early Career Researchers and is perhaps a priority for us to increase. There was no enthusiasm amongst the Steering Group for the idea of contracting AGUTV at a cost of approximately 25k. This was deemed too expensive for CliC, which should instead prioritize our limited funds towards supporting our working groups. It was noted that the inaugural CliC webinar series had a good start last spring. We will run this again next spring using some lessons learned which were broadly discussed.

The **CliC Annual report** was discussed, and the SSG noted that it preferred to produce two reports, if we have the time and resources to do so. This would be the type of bottom-up compiled report that has been produced in recent years plus a more ‘corporate’ style top down report with highlights, leadership, structure, budget and environmental footprint reporting in a glossy short document.

The Steering Committee appreciated the presentation and expressed its satisfaction with CliC Outreach and Communication efforts.

Working Group Decisions and Liaison Appointments

Liaison Decisions

Edward Hanna was agreed to be the liaison to GPEX (in addition to existing role as GEWEX liaison). Juan Höfer was agreed to be the liaison to SOOS, CIIVAR. Edward Hanna is the CliC representative on the IPY working group, while Mike Sparrow and Narelle van der Wel represent CliC interests on the smaller IPY executive planning committee.

Action 20-4: IPO to make the full list of CliC SSG Liaisons, both internally with our working groups, and with external partners public on the website.

Working Group Decisions

The issue of consolidation of Working Groups was broadly discussed. The Steering Group decided that any new WGs created by CliC should have clear deliverables and be formed for five years in the first instance but be renewable. It was noted that CliC can support both 'permanent' and temporary working groups.

It was agreed to thank the Polar Climate Predictability Initiative (PCPI) for its successful work and close the activity.

The proposal to create a new working group IC-MontC (Impacts of changes in the mountain cryosphere) was approved for five years 2025-2029, with renewal possible. The Steering Group asked that members ensure participation from all regions of the world with mountain cryosphere. Sergi noted that his institution would be interested to participate. The IPO was asked to make an open call for membership and leadership for the new working group. It was noted that IC-MontC had requested strategic funding for 2025 from the WCRP and the request appears likely to be funded with USD 25k. These funds will go to supporting a joint workshop

with MRI at the International Mountain Conference in Innsbruck, September 14 – 18 2025 with a focus on high-resolution atmosphere modeling coupled with cryosphere and hydrology for impacts.

The river and lake ice working group proposal included five research lines. Ice dynamics. Climate impacts. Hydrology and water quality. Ecology and biodiversity. Technology and Monitoring. It was noted the remit of the proposed group was too broad and needed to be narrowed down somewhat. It was noted that IACS has not yet approved its possible co-sponsorship of this working group and are neutral about CliC co-sponsorship. The Steering Group decided to ask Sandra to continue to prepare and focus this proposal, including with IACS, for further consideration at the next, 2025 meeting of the Steering Group.

Action 20-5: Co-chairs (via IPO) to write to Julie Jones and Marilyn Raphael thanking them for their leadership and successful work with PCPI. Formally close the activity.

Action 20-6: Sandra Barreira to focus the river and lake ice working group proposal, including with IACS, for further consideration at the next, 2025 meeting of the Steering Group.

Funding

It was noted that the WCRP 2025 funding allotment was likely to be 80k CHF, of which 50k is core support, augmented by strategic support for proposals submitted as 25k for IC-MontC and 5k for the Early Career Researcher meeting at ASSW in Boulder. A further 5k will be requested for a writing workshop finalizing the CliC Strategic Plan. The steering group instructed the IPO to to budget as follows:

- 25k - 2025 SSG Meeting in Korea
- 25k - 2025 support to CliC working groups for activities in 2025
- 25k - IC MontC (probably workshop in Innsbruck at International Mountain Congress, September 2025)
- 5k - Early Career Scientist event (Boulder ASSW, March 2025)
- 5k - Writing and Finalizing workshop for Strategic Plan (Amherst, first quarter 2025 TBD)

- 0 - co-chair travel in 2025
- 0 - flexible funding at IPO in 2025

The steering committee agreed that for 2026 there would be no open call for support to working groups, nor a standalone SSG meeting. Instead, all available core funds will go to support participation in our Open Science Conference in Wellington.

Then, in 2027, we hope to again have an open call to our working groups, supporting proposals that are deemed to be fully aligned with the priorities in the strategic plan.

Action 20-7: IPO to hold a call to our working groups for 2025 support, in late 2024, noting that funding will be decided based on alignment with the priorities in our strategic plan (as yet not available).

CLiC SSG Terms of Reference

The SSG adopted the draft Terms of Reference (Meeting document 20-20) and instructed the IPO to make them public on the CLiC website.

Action 20-8: IPO to publicize the CLiC Terms of Reference on our website.

2025 SSG Meeting

The Steering Group agreed to hold its next meeting alongside BACO25 in Korea in July 2025.

2026 Climate and Cryosphere Open Science Conference

The Steering Group agreed to hold a Climate and Cryosphere Open Science Meeting in Wellington, NZ in 2026 at a time to be decided by the local hosts Tim Naish, James Renwick and Lauren Vargo. It was noted the timing would likely be February, 2026.