

Busan Atmosphere Cryosphere Ocean Conference BACO-25: Our Interconnected Earth

Keith ALVERSON^{*1}, Silvia BLANC², Richard ESSERY³, and Myong-In LEE⁴

¹*Climate and Cryosphere International Project Office, World Climate Research Program, University of Massachusetts at Amherst, USA and IAMAS Secretary General*

²*Faculty of Natural Sciences, University of Buenos Aires, Argentina and IAPSO Secretary General*

³*University of Edinburgh, UK and IACS Secretary General*

⁴*Department of Civil Urban Earth and Environmental Engineering, Ulsan National Institute of Science and Technology, Ulsan, South Korea and Secretary General of the Local Organizing Committee*

(Received 3 September 2025; accepted 18 September 2025)

ABSTRACT

The IUGG Associations for Atmosphere, Oceans and Cryosphere—IAMAS, IAPSO and IACS—held a Joint Scientific Assembly in Busan, South Korea, from 20 to 25 July 2025. This was the first joint assembly of all three associations since 2009, when they met in Montreal, Canada. It was the first time any of the associations had been hosted in Korea, and it had been two decades since any of them had met in Asia. The choice of Busan as the venue supported high levels of participation and smooth conference operations. The Local Organizing Committee, chaired by Prof. Kyung-Ja Ha of Pusan National University, oversaw the successful organization of the event. The assembly brought together 1725 participants in total, including 1282 researchers and 443 invited participants and individuals involved in side events, exhibitions, media coverage, and volunteer work. Participants came from 46 countries across Asia, Europe, North America, South America, Africa, and Oceania. IAMAS had 736 participants, IAPSO 321, and IACS 225. Survey data from 951 respondents revealed that Early Career Scientists, defined as those within 10 years of receiving their PhD, accounted for approximately 25% of participants. The demographic profile skewed young, with 66% of attendees in their 20s and 30s. The scientific program was organized by Prof. Seon-Ki Park (Chair), the Secretaries General from all three Associations, and the Local Organizing Committee. Reflecting the theme “Our Interconnected Earth,” the scientific program emphasized integrated approaches to climate systems, addressing climate change and environmental challenges through collaborative, transdisciplinary research.

Citation: Alverson, K., S. Blanc, R. Essery, and M.-I. Lee, 2026: Busan Atmosphere Cryosphere Ocean Conference BACO-25: Our Interconnected Earth. *Adv. Atmos. Sci.*, **43**(5), 1095–1101, <https://doi.org/10.1007/s00376-025-5583-2>.

1. Meeting summary

Three associations of the International Union of Geodesy and Geophysics (IUGG)—the International Association of Meteorology and Atmospheric Sciences (IAMAS), the International Association for the Physical Sciences of the Oceans (IAPSO), and the International Association of Cryospheric Sciences (IACS)—held a Joint Scientific Assembly in Busan, South Korea, from 20 to 25 July 2025 (Fig. 1). This was the first joint assembly of all three associations since 2009, when they met in Montreal, Canada. It was the first time any of the associations had been hosted in Korea, and it had been two decades since any of them had met in Asia. Busan’s facilities and setting supported the Assembly exceptionally well. The decision to host the Busan Assembly was made in 2017 (Turner and Nakajima, 2018), and though originally planned for 2021, the meeting was postponed to 2025 after the global pandemic necessitated a virtual assembly in 2021. The Local Organizing Committee, chaired by Prof. Kyung-Ja Ha of Pusan National University, oversaw the successful organization of the event. The assembly brought together 1725 participants in total, including 1282 researchers and 443 invited participants and individuals involved in side events, exhibitions, media coverage, and volunteer work. Participants came from 46 countries

* Corresponding author: Keith ALVERSON
Email: kalverson@umass.edu

across Asia, Europe, North America, South America, Africa, and Oceania. IAMAS had 736 participants, IAPSO 321, and IACS 225. Survey data from 951 respondents revealed that Early Career Scientists, defined as those within 10 years of receiving their PhD, accounted for approximately 25% of participants. The demographic profile skewed young, with 66% of attendees in their 20s and 30s.

The scientific program was organized by Prof. Seon-Ki Park (Chair), the Secretaries General from all three Associations, and the Local Organizing Committee. Reflecting the theme “Our Interconnected Earth,” the scientific program emphasized integrated approaches to climate systems, addressing climate change and environmental challenges through collaborative, transdisciplinary research. The program featured 68 symposia, nearly half of which were organized as joint sessions across more than one association. Among these, nine were joint sessions in which all three associations participated. Four plenary lectures were delivered, with the opening address given by Dr. Hoesung Lee, Chair of the IPCC Sixth Assessment Report, on the theme “Climate Action for All.” In total, the conference hosted 764 oral presentations and 329 posters.

This was the first-ever IUGG Association event in Korea, and it enhanced public awareness of geoscience and strengthened outreach through diverse cultural and public programs. Highlights included the Earth Environment Film Festival on 20 July at the Busan Cinema Center, which screened a documentary on extreme weather events and climate change, followed by a discussion with Prof. Jung-Eun Chu of City University of Hong Kong and television personality Julian Quintart, attracting 265 attendees. On 24 July, a public lecture and mentoring sessions for high school students and teachers engaged 110 participants. A volunteer program brought in 97 undergraduate students to assist with conference operations and gave them the opportunity to attend sessions for free. Media coverage was significant, with 63 articles published by 50 outlets.

The assembly also embraced sustainability. In place of printed program books, participants accessed schedules through an online platform and mobile application. Poster printing and recycling services were provided on-site. Beverage distribution data were collected to quantify potential reductions in single-use items. Instead of throwing away thousands of single-use paper cups, attendees were encouraged to bring reusable cups. In total, this amounted to about 6300 single-use 12-oz paper cups avoided. While modest, the reduction in waste and carbon footprint was symbolic, corresponding to an estimated 0.65 metric tons of CO₂-equivalent (EPA, 2023), roughly equivalent to the emissions generated by two round-trip flights between Seoul and Busan.

2. IAMAS

The IAMAS plenary talk by Prof. Tong Zhu (Peking University) provided an overview of the impacts of air pollution and climate change on human health, with an eye to policy impact. His findings have greatly supported China’s Air Pollution Prevention and Control Action Plan, which has drastically improved the air quality over the past decade in China. An interesting discussion arose during the question-and-answer period, including a discussion on whether the impacts of air pollution and climate change on other species have received sufficient attention, for example due to wildfires.

Directly following the plenary talk, IAMAS vice-president Mary Scholes presented the 2025 IAMAS Early Career Researcher award to Hannah Christensen (Oxford University; Fig. 2). Hannah had been nominated by the president of the IAMAS Commission on Dynamical Meteorology, Thomas Spengler. She gave a brief plenary presentation on her research, with a focus on the juxtaposition of weather forecasting models, which are routinely tested and evaluated with hindcasts, as compared to climate models, for which the limited observational record restricts opportunities for performance evaluation, and speculated about the degree to which the potential skill of a climate model can be assessed by looking at the reliability of weather and seasonal forecasts produced by the same model.

IAMAS held two open plenary meetings for National Delegates and commissions, and all but one of the IAMAS commis-



Fig. 1. Organizers and participants at the BACO 2025 Opening Plenary Session.

sions also held business meetings in Busan. The traditional IAMAS dinner, which rekindled friendships and provided space for informal conversations between the two formal meetings, and before final decision making, was held at a nearby Italian restaurant with a nice view of the water and Busan skyline, and was attended by 40 people (Fig. 3). All of the decisions made by the IAMAS National Delegates were unanimous, obviating the need for voting. These included:

- Approval of the 2024 financial report.
- Changes to the IAMAS statutes, primarily to allow remote participation by National Delegates for the purposes of decision making at IAMAS Assemblies.
- Acceptance of the University of Manchester, UK bid to host IAMAS in 2029.



Fig. 2. From left to right: IAMAS 2025 Early Career Research Awardee, Hannah Christensen (UK), Vice-President Mary Scholes (South Africa), President Andrea Flossmann (France) and Plenary Speaker Tong Zhu (China).



Fig. 3. Participants at the IAMAS Open Business Meeting at BACO-25, including members of the IAMAS Bureau, Commission Presidents, and National Delegates.

- Formation of a new International Commission on Tropical Meteorology (ICTM). *For further information on this new commission, contact its inaugural president Thara Prabhakaran at the Indian Institute of Tropical Meteorology (thara@trop-met.res.in).*

- Formation of a nomination committee for leadership change in Incheon in 2027 chaired by past IAMAS president Joyce Penner (USA), and including current president Andrea Flossmann (France, ex-officio), Colin Price (IAMAS Delegate, Israel), Jing Li (Early Career Researcher Committee Chair, China), and Thara Prabhakaran (ICTM President, India). *To nominate someone for an IAMAS leadership position, contact the committee chair Joyce Penner (penner@umich.edu).*

3. IAPSO

The IAPSO plenary talk was delivered by an early career, leading expert on ocean–atmosphere interaction, climate dynamics, and extreme weather events in the Indo-Pacific region, Dr. Roxy Mathew Koll (Indian Institute of Tropical Meteorology; Fig. 4). During his talk, entitled “Tropical Climate Shifts: the Indo-Pacific Warm Pool, Madden–Julian Oscillation and Monsoon in a Warming World”, he shared insights on tropical climate shifts and made an emphatic appeal to the international community about the urgency of “closing the gaps in observations and seizing opportunities for climate action since ocean changes are driving global extremes”. His lecture conveyed his commitment to scientific research on climate change and its impacts, mainly in the South Asia region.

Every two years, IAPSO has the great satisfaction of awarding three prestigious medals: the Prince Albert I Medal, the Early Career Scientist Medal, and the Eugene LaFond Medal. These awards demonstrate the IAPSO community’s interest in supporting high-level scientific research and encouraging the efforts of early career researchers as well as those from developing countries.

In 1919, the International Union of Geodesy and Geophysics (IUGG) was established with six constituent sections, one of which, IAPSO, was devoted to physical phenomena within the oceans. The first President of IAPSO was Prince Albert I of Monaco. In 2000, the IAPSO President proposed that Prince Albert I be recognized for his pioneering contributions to ocean science by the establishment of a medal in his name. Prince Rainier III of Monaco accepted this proposal, and in the years since, the Principality of Monaco has supported IAPSO in conferring the biennial Prince Albert I Medal on a scientist who has made outstanding contributions in physical sciences of the oceans.

The recipient of the 2025 Medal was Dr. Nadia Pinardi, Professor of Physical Oceanography at the University of Bologna, Department of Physics and Astronomy, internationally recognized for her outstanding contributions to defining the principles, methods, and applications of ocean modeling and forecasting (Fig. 5). Dr. Pinardi presented a plenary lecture entitled “Transforming marine science into trustable and societally relevant knowledge.”

Since 2019, IAPSO has honored early career scientists for their outstanding research in the physical sciences of the oceans, including both physical and chemical oceanography, and for their cooperation in international research. The 2025 IAPSO Early Career Medal was awarded to Dr. Adele K. Morrison (Australian National University) for her groundbreaking



Fig. 4. Dr. Roxy Mathew Koll, IAPSO Invited Speaker giving his plenary lecture.

contributions to Southern Ocean dynamics, particularly her work on the role of mesoscale eddies in governing ocean circulation, the transport of heat and carbon, and the interaction between ocean currents and Antarctic ice shelves. After receiving the award, she presented a plenary lecture on “Dynamical linkages between distinct oceanic regimes around Antarctica.”

IAPSO has a long-standing commitment to assisting scientists based in developing countries. A first relevant decision took place in 1983 at the General Assembly in Hamburg, when IAPSO set up a Commission for Oceanographic Advice to Developing Countries chaired by Eugene LaFond (Smythe-Wright et al., 2019). Some years later, the IAPSO Executive Committee took the decision to give a biennial award for the best scientific presentation by a scientist from a developing country and named it after LaFond. The 2025 Eugene LaFond Medal was awarded to Dr. Riesna R. Audh from the University of Cape Town, South Africa for her oral presentation “Rafting of Growing Antarctic Sea Ice Enhances In-Ice Biogeochemical Activity in Winter” (Fig. 5).

Three IAPSO Executive Committees held three Business Meetings during the conference on 21, 23 and 25 July 2025. The meeting on 23 July was open to the all of IAPSO, and followed by a pleasant dinner attended by 65 people. The topics discussed during these business meetings included:

- Results of IAPSO awards.
- Biennial financial report.
- Advances of the Best Practice Study Groups (BPSG) Programme, 2023–25.
- Requests for sponsorship of scientific meetings with and without financial support.
- Preliminary report of IAPSO participation in BACO-25.
- Resignation of the sitting Vice-President. Election of a new Vice-President (2025–27).
- Nominations for new EC members to be decided in 2027.
- Report on Early Career Scientists Activities, 2023–25.
- Evaluation of reports from IAPSO Commissions, Joint Committees, Working Groups, Services and Inter-Association Activities.
- Upcoming IUGG General Assembly in 2027.
- IAPSO achievements during 2023–25 and future challenges.
- Concluding remarks about the Joint IAMAS/IACS/IAPSO Assembly in Busan.

4. IACS

The IACS plenary talk was given by Prof. Ayako Abe-Ouchi (University of Tokyo) on “Dynamics of ice sheet and sea ice under changing climate in the geological past and future”.

Highlights of the IACS programme included an invited session on the UN International Year of Glaciers’ Preservation and a large number of presentations for the symposium on “Cryospheric biogeochemical cycles and environmental effects”.

An IACS plenary meeting was held on Thursday 24 July, with an online link provided for national delegates who could not attend in person. With no Bureau elections scheduled in 2025 and no motions submitted for voting, this was an information session on IACS activities and plans, and included presentations by the IACS Early Career Award 2025 winners Marie Bouchet and Giacomo Traversa. The plenary was followed by the traditional *Festa Cryospherica* dinner, which was



Fig. 5. Left: Dr. Adele Morrison (left) and Prof. Nadia Pinardi (right) with IAPSO President, Dr. Hans van Haren. Right: Riesna R. Audh, recipient of the Eugene LaFond Medal, with the IAPSO President.

attended by 47 people.

A student and early career lunch was hosted after the BACO-25 closing ceremony, and included presentations of the Graham Cogley Awards for outstanding student presentations at BACO-25 to Jung Hyun Park (poster) and Kai Man (oral). The award in memory of Graham Cogley is generously sponsored by the Cogley family and is presented in alternating years by IACS and the International Glaciological Society.

The IACS Annual Bureau Meeting was held in Busan on 25 and 26 July (Fig. 6), immediately after the close of BACO-25. Decisions included approval of a new IACS working group on Compilation and Standardization of Snow on Sea Ice Data and a proposal to hold a joint assembly of cryospheric organizations in 2029 (venue to be confirmed). Concern was noted about the withdrawal of US Department of Defense support for satellite sea-ice monitoring, but data from the Japanese AMSR2 sensor will be able to fill the gap.

Following the end of the Annual Bureau Meeting, the presidency of IACS passed from Liss Andreassen to Mathieu Morlighem, who will serve as IACS President for 2025–29. Liss will now continue as Immediate Past President until the IUGG General Assembly in 2027.



Fig. 6. IACS Bureau members in Busan. From left: Farooq Azam, Andrew Mackintosh, Liss Andreassen, Mathieu Morlighem, Richard Essery, Ji-Woong Yang, Anaïs Orsi.

5. Conclusion

Participants at the BACO-25 Joint Assembly in Busan enjoyed a rich tapestry of atmospheric, oceanographic and cryospheric science. From students delivering their first international presentation to high-profile plenary lecturers, all enjoyed the engaging program. The location in Korea was particularly amenable to participation from East Asia, with its strong and growing community of researchers in Earth Sciences. Participants also enjoyed the cultural history and exciting beachside entertainment in Busan, on the southern tip of the Korean Peninsula. For the future, IACS decided to meet together with other cryospheric organizations in four years' time at an as yet undetermined location, while IAMAS and IAPSO took the decision to meet together again in 2029, hosted by the University of Manchester, UK. Following historical precedent, all three associations will meet in two years at the next IUGG General Assembly, also in South Korea, in 2027. The community looks forward to reconvening at the 2027 IUGG General Assembly in Incheon.

Acknowledgements. K. ALVERSON acknowledges support from USA NSF (Grant No. OPP2213875) and NASA (Grant No. 80NSSC22K1707).

REFERENCES

- Smythe-Wright, D., W. J. Gould, T. J. McDougall, S. Sparnocchia, and P. L. Woodworth, 2019: IAPSO: Tales from the ocean frontier. *History of Geo- and Space Sciences*, **10**(1), 137–150, <https://doi.org/10.5194/hgss-10-137-2019>.
- Turner, J., and T. Nakajima, 2018: Report on IAMAS activity since 2015 and the IAPSO-IAMAS-IGA scientific assembly—Good hope for earth sciences. *Adv. Atmos. Sci.*, **35**(4), 371–375, <https://doi.org/10.1007/s00376-017-7240-x>.
- U.S. Environmental Protection Agency (EPA), 2023: WARM Version 16: Management practices documentation. U.S. Environmental Protection Agency. Retrieved from <https://www.epa.gov/waste-reduction-model/versions-waste-reduction-model>.