

Asian Forum of Polar Sciences – European Polar Board Joint Workshop

20th October 2022

EPB: N Koc, M Cabrita, V Puig, A Quesada, J Francis, O Oktar, N Biebow (Chair), R Badhe (Executive Secretary)

AFoPS: P Jiang, R Mohan, T Nakamura, J Jeong, A Abu Samah (Chair), S A Chavanich

Observers: J Hendrikx (NZ), M Leppe (CL)

Agenda (in CET):

1. 08:30–08:40 Welcome from EPB and AFoPS Chairs
2. 08:40–09:50 Introductions to individual polar programs in AFoPS
3. 09:50–10:50 Introductions to European Polar Board Member programs
4. 10:50–11:00 Coffee break
5. 11:00–12:00 Discussion on international collaborations

1. Welcome and introduction to EPB and AFoPS from Chairs

EPB Executive Secretary R Badhe welcomed all attendees to the meeting. AFoPS Chair Prof. Dato' Dr. Azizan Abu Samah welcomed all attendees and expressed his wish to see further collaboration between the EPB and AFoPS. EPB Chair N Biebow greeted the attendees and expressed her hope that the meeting would provide a foundation for further work together, remarking the main message on both AFoPS and EPB websites on the international cooperation. She stressed that EPB members are diverse and include universities, logistics providers, funding agencies, and more. The EPB's mandate is to represent all European countries participating in polar research. It also coordinates with the European Commission and participates in EU-funded projects. It hosts the Polardex infrastructure databank, and it was stressed that talking about joint infrastructure is important. Given Asia's world-class polar research infrastructure, N Biebow emphasized the importance of interoperability, access and standardization. R Badhe noted that the meeting is recorded, and that slides from all presentations will be made available after the meeting.

2. Introductions to individual polar programs in AFoPS

Polar Research Institute of China (PRIC): P Jiang, Deputy Director of Science and International Cooperation at the Polar Research Institute of China (PRIC), spoke about China's polar research programs and capabilities. He presented the PRIC's organizational structure, including the division between scientific research and logistics operation. Over 50 scientists are engaged in polar research through PRIC, and China operates four stations in Antarctica as well as two in the Arctic. He also presented on the China's two icebreakers and one research aircraft, as well as China's MOU with Thailand on polar research. He finished by expressing his wish for more international cooperation with AFoPS and EPB.

National Centre for Polar and Ocean Research (NCPOR): R Mohan presented India's polar program, which is hosted at the National Centre for Polar and Ocean Research (NCPOR), an autonomous body within the Ministry of Earth Sciences, located in Goa. India participates in COMNAP, SCAR, CCAMLR, SOOS, AFoPS, IASC, and many other international organisations. NCPOR focuses on all the three poles (Antarctic, Arctic and Himalaya) including the Southern Ocean. It has broad research areas with many projects, from atmosphere down to lake and ice cores, including the human physiology and medicine. It operates an Arctic station in Svalbard, and conducts science in the Himalayas via its Third Pole initiative, operating a small research base there, focusing on glaciology. India operates two research bases in Antarctica and charters both vessels and flights for logistical needs. It has a small atmospheric lab, and a buoy in a fjord for taking oceanographic data. India participates in bilateral and multilateral projects with Japan, UK, Sweden, Norway, Korea and Belgium. BAS recently joined a project India is conducting on shallow ice cores.

National Institute of Polar Research (NIPR): T Nakamura introduced Japan's National Institute of Polar Research (NIPR), founded 49 years ago with a mandate to do comprehensive research and observations on the

polar regions, and is one of the 17 inter-university research institutes in Japan under the Ministry of Education, Culture, Sports, Science and Technology (MEXT); gateway to the universities in Japan. NIPR's annual budget is approx. 4 billion JPY, with over 250 employees, 90 scientists and 20 PhD students as part of the member of SOKENDAI (Graduate University for Advanced Studies). Its science divisions are space and atmospheric sciences, geosciences, meteorology and glaciology, bioscience, and polar engineering. NIPR is one of four institutes under ROIS (Research Organisation of Information Systems) and it prioritizes data science and open science. NIPR has operated in the Antarctic since 1956 and the Arctic since the 1970s. Japan has 2 stations in the Antarctic, with one operating year-round. Japan also operates one icebreaker. It operates a small observatory in Svalbard, as well as satellites for polar observation. The NIPR has MOUs with 24 countries and 52 institutions.

Korean Polar Research Institute (KOPRI): J Jeong introduced the Korean Polar Research Institute (KOPRI), which has been a government-sponsored institution since 2004. It operates under the Ministry of Oceans and Fisheries as the umbrella ministry and KIOST as the mother institution that provide legal foundation. KOPRI has \$90 million research budget, 99% of which is publicly funded. It employs 490 staff including 150 PhD holders. It has five research divisions (atmospheric, earth, glacial, ocean and life sciences), one center on GIS and remote sensing, and two mission-oriented units (cryogenic novel materials and frontier exploration) It includes Scar Horizon Scan and ICARP III priorities when designing its projects, and currently conducts 16 in-house projects and oversees 10 government R&D projects. Most projects are multidisciplinary, running on three-year funding cycles, with a focus on climate change, observation, prediction, and response to rapid Arctic changes. KOPRI participates in SOOS, MoSAiC, ArcticPASSION, SIOS, and many other international projects and organisations. It operates 2 Antarctic research stations, as well as an Arctic station on Svalbard. It operates a single icebreaker, and is preparing a second one to be managed by KOPRI. It has partnerships with 9 institutions from AFoPS countries (China, Japan, and Malaysia), and a total of 124 MoUs with international partners

National Arctic Research Centre (NARC), Malaysia: Azizan Abu Samah presented Malaysia's National Antarctic Research Centre, which is under the purview of the Ministry of Environment and Water. It is funded by a trust, the Ministry of Education, and the Ministry of Science, Technology and Innovation. It recently increased its university affiliations from seven to nine for smart partnership initiatives that includes public and private universities. The first Malaysian polar research began in 1983, and in 1997 a decision was taken to undertake research in the Antarctic. The two main priorities for the NARC are climate science and biodiversity, and it works on post-colonial governance issues. Malaysia does not have any logistics dedicated to polar research, but operates primarily via MOUs with partners such as China, Korea, USA and several European and Asian nations.

Polar Science Consortium of Thailand: S A Chavanich presented the Polar Science Consortium of Thailand, established in 2016 as part of the IT Foundation under the initiative of HRH Princess Maha Chakri Sirindhorn. It is composed of several universities and research institutes, and has been a member of AFoPS since 2017. Its research priorities include biology, physics, and astronomy. While it is a new organization, it organised the SCAR AAA Workshop in 2017 and participated at Arctic Science Ministerial. It does not own any polar infrastructure, but it does collaborate with China, Japan, Korea, Norway and Chile to conduct expeditions and research. There is a strong desire to expand its activities, and currently sponsors students to get PhDs abroad, turning them into ambassadors for the program to build bilateral ties. It has MOUs with China and Norway.

Question and answer session:

The floor was then opened for questions. V Vitale asked if W Luo could elaborate on China's new station in the Antarctic. W Luo responded that the environmental proposal is being evaluated and construction will begin this summer. It is anticipated to host 80 summer staff and 30 winter staff. The conceptual design is almost complete, and it is anticipated to begin building and operations in 3-5 years.

P Skold asked if any of the AFoPS members conducted active research on ship design and sustainability. J Jeong responded that this is considered to lie within sustaining infrastructure, and that sustainability and ship design falls within the current management plan in KOPRI.

A Quesada commented that diversity is important in research, and asked if AFoPS has a collaborative platform for proposals. S-J Kim responded that there are initiatives to strengthen cooperation, such as an exchange program for Early Career Researchers. J Jeong added that currently the collaboration is at the grassroots level, and that AFoPS members have endorsed this approach. T Nakamura added that AFoPS is not a legal entity, and so it contributes as is practical for its Members. A Abu Samah added that AFoPS provides a lot of capacity for smaller programs, including research support and connectivity. R Mohan concluded that AFoPS has provided an umbrella to start many research projects, and that there is an aim to bring Asian countries closer together for a joint project in the near future. R Badhe thanked the participants for their questions and the presentations.

3. Introduction to European Polar Board Member programs

R Badhe introduced the EPB, noting that several documents including program overviews and project descriptions had been sent as preparatory material to AFoPS members, and thanked the EU PolarNet2 project for authoring them.

National Research Council of Norway (NRC): N Koc presented the Research Council of Norway, and thanked all participants for the opportunity to attend. She noted Japanese participation on a recent voyage on a Norwegian tall ship, and underlined that international cooperation is crucial for solving challenges in a logistically challenging region. Norway's research priorities are climate and the environment, ecosystem management, and international law. It has the goal of being a leading nation in polar research and to contribute to knowledge for business and community development, policy making, and global interest. The Norwegian Polar Institute (NPI) is part of the Climate and Environment Ministry, and serves as a strategic and professional advisor for the management of polar regions. It is responsible for Norwegian claims in Antarctica, and operates a large logistics program. It hosts many AFoPS members in Svalbard's research stations, and operates the Troll research station in Antarctica. It also operates one icebreaker. It actively participates in sharing opportunities to make its stations and vessels available to other researchers.

Foundation for Science and Technology: M T Cabrita presented Portugal's polar program, based in the Institute of Geography and Spatial Planning in Lisbon. Established in 2011, it is the first program of its kind in Portugal, and is funded by the Portuguese Foundation for Science and Technology. Several universities work together within the program, though it is relatively small. It is a member of ATCM, COMNAP, SCAR, and others. Research priorities include observation, forecasting, human impact, and sustainable development. Their goal is to establish polar sciences as a key national research area, to contribute to polar logistics, and to strengthen international cooperation. They are currently working on a five year strategic plan for research. Portugal does not operate any polar infrastructure, but charters flights. It has an LOU with Korea, cooperation with China, and MOUs with Brazil, Italy, New Zealand, Spain, and the UK.

Alfred Wegener Institute (AWI): V Willmott Puig presented Germany's polar program, operated by the Alfred Wegener Institute, which uses German government and EU funding. Three federal documents talk about polar science, and specify research priorities: polar amplification, ice sheets, permafrost, ecosystems, model development, future projections and forecast. AWI also coordinated the MoSAIC expedition, and leads EU PolarNet2. It operates PRV Polarstern and Maria S Merian as icebreakers, and shares an Arctic station with France. It operates two aircraft and the FRAM ocean observatory. They operate four stations in the Antarctic as well. It has 35 official partnerships, including an MOU with Japan and China.

Spanish Polar Committee (SPC): A Quesada presented the Spanish Polar Committee, and emphasized again the importance of diversity in polar research, and as such welcomed again the collaboration opportunities with AFoPS. He described how the SPC is a coordinating body for all different players in polar research, including universities, institutes, the military, and others. The SPC coordinates funding and logistics, but does not have an independent budget. In Spanish law, no research is prioritized and all disciplines are held as equal. The SPC arranged participation in large proposals, finds relevant projects, and pushes researchers to participate. It has MOUs with several nations to use their infrastructure, and operates 2 stations in Antarctica, with one operated

by the Army. Spain operates 2 research vessels, with one being ice-capable. It lists among its partners Germany, Portugal, Colombia, Canada, and Korea.

British Antarctic Survey (BAS): J Francis reported on the activities of the British Antarctic Survey, which is a part of the Natural Environment Research Council and UK Research and Innovation. It relies exclusively on government funding, and has ties to the Foreign and Commonwealth office. Its scientific staff is funded by the NERC, while the larger budget is for logistics and infrastructure. Its priorities are observing how polar regions are responding to climate change, ice and sea ice dynamics, atmospheric weather, space weather, ecosystem science with an emphasis on fishes, AI and machine learning, and EDI initiatives. A major priority at the moment is reducing the carbon footprint of research, with one method focusing on using existing data for research projects. BAS operates five Antarctic research stations, five aircraft, many autonomous instruments and drones, and one icebreaker in both poles. It also operates a research station on Svalbard. Currently, it is modernizing its research logistics, including a new aircraft and renovating the Rothera research station. BAS collaborates with Malaysia and Korea, and has signed MOUs with many European polar research organisations. While BAS always welcomes collaboration, the backlog of projects and limited capacity has put limits on this.

Turkish Polar Research Institute (TPRI): O Oktar talked about the Turkish Polar Research Institute, founded in 2019. The TPRI reports directly to the President's Office, and is the national contact point for all polar research activities. It organizes polar expeditions and provides calls for funding. It does not prioritize research, and is open to all disciplines. It participates in AFoPS as an observer while being a member of the EPB, and has recently applied to be part of the ATCM. It operates the Horseshoe Island research camp, with an automatic weather station. MOUs have been signed with Japan and Korea on scientific and logistic cooperation.

R Badhe thanked the presenters and invited questions, the first of which came from Malaysia's A Abu Samah. He mentioned that AFoPS continues to work to include more programs, and asked if the EPB is attempting to grow further and to include more European countries. N Biebow responded, saying that the EPB is already quite large and includes nearly every European country conducting polar research, thus there is no formal initiative to expand the EPB. She further mentioned that the EPB's connections to the European Commission, which is the largest funder of polar research, forces polar researchers to collaborate, therefore collaboration is already at a very high level. There is some talk about negotiating further funds to support smaller projects for EPB members, but no action has been taken. She concluded by saying that EU projects often include the possibility of collaboration with Asian partners. R Badhe interjected, saying that the EPCO presentation earlier had shown more avenues for collaboration.

R Mohan stated that the EPB seemed quite cohesive regarding funding and cooperation, and asked whether there are opportunities for so-called mega projects that AFoPS could participate in. N Biebow responded that this is certainly possible, and that discussions were ongoing but details could not be discussed. She reminded that not all AFoPS members can receive EC funding, but if funding is not considered there are many opportunities. R Badhe added that there are many smaller projects such as Arctic PASSION and CHOICEe that AFoPS members are welcome to collaborate with. V Vitale pointed out that KOPRI is a full member of Arctic PASSION and SO-CHIC already.

4. *Coffee Break*

5. Discussion on internal collaborations

R Badhe invited the Observers at the meeting to briefly present themselves.

J Hendriks, New Zealand's Chief Scientist for Antarctica, presented briefly about their research, the good relationships that New Zealand shares with many AFoPS members, and the Scott research base in Antarctica which is being rebuilt. He echoed the statement by BAS that collaboration is encouraged, but that logistical constraints place limits on it.

M Leppe from Chile gave a warm welcome, noting that Chile has agreements with many of the programs and organizations represented at the workshop. He talked about the installation of sensors down the coastline of Chile to monitor climate change, the renewal of their Antarctic station and conversion to be year-round, and the impending launch of Latin America's first indigenous icebreaker at the end of 2024.

The discussion portion of the workshop began with comments by J Francis from BAS about the cost of fuel for polar research logistics and how it affects operations. As an example, she cited the RRS Sir David Attenborough, which uses large amounts of fuel and is thus subject to budgetary limits on fuel expenditure. This means there is less flexibility than before. In response, BAS is investing in autonomous vehicles to do research, in a 'mothership' model to reduce travel distance. She noted the recent BBC series, where Sir Attenborough warns about peoples' carbon footprint. She noted too that grant authorities are more amenable to accepting proposals where no fieldwork is needed, something which is made easier because of the open-data requirements of doing research in Antarctica. This has caused some changes in how BAS works.

Malaysia's A Abu Samah commented that they have a strong collaboration with BAS, and that doing Antarctic research without traveling to the Antarctic is very possible. He also pointed out that inclusivity and diversity are important in the region, and that funding is often biased towards national priorities. Korea's S-J Kim commented that climate change has a large influence on monsoons across Asia, and thus a lot of data is needed for the region.

R Mohan asked if, besides calculating expenditure, would BAS prioritize projects based on cost or based on science priorities? J Francis responded that the priority is always the science, but that before the logistics costs were not included in project costs, and thus fuel costs may now affect when projects are scheduled and the distances travelled to gather data.

V Vitale pointed out that optimization is key – attention to the poles is increasing, so while activities could be decreased, it is key to find a good ratio between scientific needs and logistical strain. While cost is important, the science cannot be compromised. A Quesada added that different countries have different priorities and energy situations. COMNAP has a clear priority – to ensure that ships are always full and always moving, never stationary waiting and burning fuel. He added that there is a need to collaborate more, optimize resources, and ensure everything is working at capacity.

R Badhe further asked the AFoPS delegates about what collaborative opportunities might exist. A Abu Samah responded that a global framework would be ideal, including tropical/polar connections with logistics and data sharing underpinning it. AFoPS and EPB operational planning would allow for solutions to be drafted, and he used a three-year plan for Antarctic research as a potential example to help sum up collaboration opportunities, enhance efficiency, and reduce fuel use.

R Badhe brought up Polardex, which collaborates with SOOS's DueSouth platform, and the need to keep it regularly updated. J Francis added that sharing engineering expertise could be very valuable considering the time and effort spent on the maintenance of long-term monitoring equipment. She postulated that there must be a lot of technology and skills to make the equipment more reliable, and asked if anyone had engineers who could discuss the issue, inviting EPB to facilitate such an exchange. N Biebow mentioned the MoSAIC expedition and the EUPN2 project to help create collaborative models for data. She also mentioned her stint at ESA to help them align polar research and monitoring priorities. She talked about how ESA is eager to collaborate, and how using satellites for data gathering reduces environmental impacts. She pointed to the technological progress of getting measurements on ice and permafrost from space. She encouraged all present to plan joint initiatives. R Mohan asked EPB members for their thoughts on restricting curiosity-based science, and how much polar research is contributing to climate change, encouraging all to look at the situation holistically.

H Burgess, President of IASC, addressed the workshop to make several points. Regarding funding, he said that close collaboration between polar programs is very important, and that scientific priorities and carbon footprint are both important. He stated that mechanisms exist to bring funders together, notably the Arctic Science Funders Forum which is currently on hold due to political issues but will restart in the future. He asked all attending to push for the restarting of the group's work. His second point was the need for everyone to participate in the ICARP IV process, and he briefly outlined the process including consultations in 2023. He

stated that it is a genuinely open process, and that all are encouraged to contribute. He stated that he hopes to coalesce funding around the priorities resulting from that.

J Hendriks stated that Antarctica New Zealand is mandated to be carbon neutral by 2025, and that workflow is being adjusted to quantify emissions. Through this, it was revealed that travel produces large amounts of emissions. Reduction of on-site emissions is also possible via renewable energy installations.

R Badhe thanked the AFoPS Secretariat for the discussion. She mentioned that after five years there is a new outlook and basis for sharing information. She stated that the EPB is open to cooperation, and that AFoPS members should feel free to contact the Secretariat and EPB Members for further discussion. N Biebow stated that she felt the session had been interesting and useful, and a good basis for discussion between the EPB and AFoPS, as well as between individual members. A Abu Samah concluded the meeting, stating that cooperation works when people speak openly to one another, and that the job of AFoPS and the EPB is to link people, as this is the most sustainable way of working.

End of meeting.

Appendix

1. Introductions to individual polar programs in AFoPS (presentations):

<https://www.dropbox.com/sh/lpd92zfi3regys2/AACegsf5npENET9Zq-h5X74ca?dl=0>

2. Introduction to European Polar Board Member programs (presentations):

<https://www.dropbox.com/sh/l0virzeedz6omi7/AAACWpIvc0zFDcLE7Pq0mS2la?dl=0>