

The development of the Asian Forum for Polar Sciences (AFoPS)



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ABSTRACT

The Asian Forum for Polar Sciences (AFoPS), an international forum of Asian polar research institutes, was established for the advancement of polar sciences among its members in 2004. The Forum has served as an important medium of Asian collective endeavors for polar affairs in human and information exchange, research collaboration, and logistics cooperation for the last decade. The historical development of the AFoPS in retrospect can be divided into four phases: inception and establishment (2003–2004), growth and expansion (2005–2007), review and restructuring (2008–2011), and achievements and further measures (2012–2014). The progress of the AFoPS has not been linear and this trend will continue into the next decades. The Forum, however, clearly made achievements in this period of time, realizing multilateral research and logistics cooperation that would have been previously unimaginable; by doing so, it has laid the foundation for the future. Responsible for a great portion of the world's polar activities, the AFoPS will rise to meet the expectations of the world by producing notable research output, initiating international cooperative programs, and supporting non-polar Asian countries with education and research collaboration. These are the tasks of the AFoPS for the next decade and they require strategy that promotes and facilitates collaboration in a practical way and draws attention of non-polar Asian countries to the polar sciences.

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1. Introduction

The Antarctic Treaty was signed in 1959 and subsequently came into force in 1961 after its unanimous ratification by twelve nations who had collaborated in Antarctic research activities during the International Geophysical Year from 1957 to 58. Since then, it has played a pivotal role in governing the region south of 60°S and provided a meeting ground to discuss the practical matters about the region. Originating from the freedom of scientific investigation in Antarctica, as applied during the International Geophysical Year, science legitimized international control over Antarctica by creating a mechanism for its management and a goal for its continued rational use. Due to the vastness of Antarctica, which is beyond the logistic capacity of any country to study alone, and also there is a common interest in facilitating international scientific cooperation. These common interests explain why conducting substantial research is required for consultative status to vote in the annual Antarctic Treaty Consultative Meetings (ATCM). Currently, there are 52 nations in the Treaty and among them 29 nations are

consultative parties ([ATS webpage](#)). Only 5 Asian nations are members of the Treaty and 4 of them are consultative parties.

The Scientific Committee on Antarctic Research (SCAR), founded in 1958, is the single international, interdisciplinary, non-governmental organization which can draw on the experience and expertise of an international group of scientists over the wide scientific disciplines. SCAR has the mandate for initiation, promotion and co-ordination of scientific research in Antarctica. SCAR also provides international, independent scientific advice to the Antarctic Treaty system ([SCAR webpage](#)). SCAR currently has 39 members and among them are 5 Asian nations.

The Arctic is composed of the Arctic Ocean and northern territory of 5 Arctic coastal countries. The Arctic Ocean was opened to international access by the Murmansk speech of Soviet president Mikhail Gorbachev in 1987, which declared that scientific exploration of the Arctic is of immense importance for the whole of mankind. Emerging from the Murmansk speech, the International Arctic Science Committee (IASC) was founded in 1990 and currently 4 Asian countries are involved. The IASC mission is to encourage and facilitate cooperation in all aspects of Arctic research, in all countries engaged in Arctic research and in all areas of the Arctic region ([IASC webpage](#)).

The Arctic has special importance to Asia since climate in the

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northern hemisphere is strongly coupled with the Arctic. Frequent occurrences of devastating winter cold air outbreaks in East Asia may be closely linked with the weakening of Arctic oscillation polarity, which is in part related to the marked sea ice melting in the Arctic (Kim et al., 2014). It is increasingly important to understand the feedback processes, of which various components are interacting in the Arctic and Sub-arctic, and to project global warming in the future. The Arctic Council established in 1996 consists of a circumpolar community of the 8 countries and 6 indigenous peoples' organizations inhabiting the region north of the Arctic Circle. The Arctic Council facilitates knowledge discovery and contributes to informed decisions about "common Arctic issues" on sustainable development and environmental protection. From Asia, China, India, Japan, Korea and Singapore are participating in the Arctic Council as permanent observers (Arctic Council webpage).

Besides the above international polar organizations, there are groups that have regional membership or regional elements in their objects to coordinate science programs with neighboring nations and to share a common view on polar affairs. These groups include the European Polar Board (EPB) and the Asian Forum for Polar Sciences (AFoPS) that are interested in the North and South Poles, Reunión de Administradores de Programas Antárticos Latinoamericanos (RAPAL) for the Antarctic, the European Project for Ice Coring in Antarctica (EPICA), and the Pacific Arctic Group (PAG) for the north Pacific sector of the Arctic Ocean.

The Asian Forum for Polar Sciences (AFoPS) celebrated its 10th anniversary in 2014. The AFoPS is composed of polar research institutes of China, India, Japan, Korea and Malaysia as members aim for research coordination, cooperation in operational support, and information exchange on the Arctic and Antarctic. The Forum has served as a catalyst for logistic cooperation, research collaboration and human exchange amongst Asian polar communities for the last ten years. In addition, the collective endeavor of the Asian countries within the AFoPS contributed to their elevated reputation in world polar science communities including the Council of Managers of National Antarctic Programs (COMNAP), SCAR and IASC.

Despite its noteworthy ten years' achievement and development, which includes this special issue, the Forum itself has not been a subject of a serious historical analysis. Considering the time elapsed and poorly managed document archives, it may be an opportune time for a written history of AFoPS, from its genesis to its current status. Through the paper, the Asian collective endeavor within the AFoPS is explored by discussing its inception, the members' common effort in the last ten years, and its recent new efforts.

2. Inception of the AFoPS, 2003–2004

2.1. The birth of an idea of Asian polar science forum

In 2003, the directors of polar science institutes from Japan, Prof. Okitsugu Watanabe, and Korea, Dr. Yeadong Kim, gathered for the COMNAP meeting in Brest, France, as they recognized the need of discourse between Asian countries for polar sciences. Dr. Yeadong Kim, the director of Korea Polar Research Institute (KOPRI) then, contacted his Chinese counterpart, Dr. Zhanhai Zhang, asking if he was interested in the forum idea. It turned out, China shared the same view and readily joined the two. This was later recalled as the genesis of the Asian Forum for Polar Sciences (AFoPS).

The directors and coordinators from the polar research institutes of China, Japan, and Korea came to meet in Shanghai, China, on May 25, 2004. They confirmed their willingness to form the Asian forum and agreed to start working on the terms of reference (ToR) of the forum.

2.2. AFoPS-I in 2004: set its institutional form

The second meeting, later remembered as the AFoPS-I, was held in Jeju Island, Korea, on September 10, 2004. The directors and coordinators from the three member countries gathered again to finalize the ToR and announced that the AFoPS was officially launched (Fig. 1). The national representatives were Dr. Zhanhai Zhang and Mr. Shunlin Liu from Polar Research Institute of China (PRIC), Prof. Okitsugu Watanabe and Yoshiyuki Fujii from National Institute of Polar Research (NIPR) of Japan, and Drs. Yeadong Kim and Hosung Chung from Korea Polar Research Institute (KOPRI).

Chairmanship based on a 2-year rotation was defined by the ToR and the director of KOPRI took the first chair position by consensus. The secretariat was also handed to KOPRI accordingly and Dr. Hosung Chung started his service as the first AFoPS secretary. In addition, the ToR provided a rationale for having working groups (WGs) in the AFoPS. The following 5 WGs were approved and the WG participants were designated to have at least one WG member from any member state: earth science, life science, planetary science, engineering and logistics, and public relations and data management.

The technical issues for managing an international forum were also discussed. The AFoPS logo (Fig. 2) was adopted and the standard programs for AFoPS joint symposiums and WG workshops were suggested. The members also agreed to build and operate the AFoPS website (<http://www.afops.org>), which was delivered by the secretariat.

3. Growth and expansion, 2005–2007

3.1. AFoPS-II in 2005: members began to formalize the sense of 'oneness'

The second AFoPS meeting took place on 19 April, 2005, at Green Lake Hotel, Kunming, China, entitled "informal" by the chair since not all national representatives showed up; Dr. Hajime Ito (NIPR, Japan) was the only participant from Japan. Consequently the members' approval of new member countries (India and Malaysia) was postponed to the next meeting although the members discussed in depth the qualifications of new members or official approval process for the new ones.

The minutes of AFoPS-II showed that the members already perceived themselves as a united international body. Dr. Ito suggested the members integrate AFoPS as a formal program in the



Fig. 1. The AFoPS was officially launched at the meeting held in Jeju Island, Korea, on September 10, 2004 by finalizing its Term of Reference. Dr. Yeadong Kim, the director of Korea Polar Research Institute served as the first Chair by consensus.



Fig. 2. AFoPS logo.

next Arctic Science Summit Week (ASSW). Another participant also insisted that AFoPS should be included in the agenda table for the 1st trilateral ministerial meeting of science and technology, which was then discussed between the governments of China, Japan, and Korea. The possibility of the AFoPS contribution to International Polar Year 2007–2008 was also mentioned.

One WG activity was reported to the members (the upcoming Geoscience WG in association with the 2005 Seoul Symposium of May). The chair also encouraged WG participants to use various international meetings such as the 2005 SCAR Biology Symposium as an opportunity for a life science WG meeting.

3.2. AFoPS-III in 2006: started the era of five members, sharing information

The third AFoPS meeting at Potsdam, Germany, was convened by allocating a day of ASSW for the Forum on March 24, 2006. India and Malaysia were accepted by unanimous consent of the three co-founding members and invited to the next meeting, AFoPS-IV on April 28 in Shanghai, China.

Another noteworthy point from the meeting minutes was that the members began to present their national polar activities. Logistic cooperation between the participants was newly launched as well, indicating information sharing in science and operation/logistics in earnest. The members presented their activity highlights: China reported that series of data collection would be continued in the Arctic region. The icebreaker Xuelong would be on for a modification from October 2006 to October 2007. China shared her plan to charter an icebreaker from the Australian Antarctic Division for logistics to Zhongshan Station during that period. Japan reported on Korea-Japan cooperative research on terrestrial biology in King George Island, Antarctic Peninsula, and the participation of AFoPS scientists in the 47th Japanese Antarctic Research Expedition (JARE). Korea introduced “Pole-to-Pole Korea”, which is a student visit program to the Arctic station in Ny-Alesund, Svalbard Islands. Korea recommended member countries to develop such “Joint education & outreach programs” and suggested cross participation in training camps for wintering members of their Antarctic stations.

For logistics cooperation the following information was shared among the members: while Japanese new icebreaker would come in water during 2009, Japan planned to charter an icebreaker from Australia during 2008. To lessen the burden of logistics by the chartered icebreaker, Japan would reduce the number of overwintering personnel and minimize the quantity of provisions during that period. Korea requested logistics cooperation to China during 2006/2007 austral summer season in the King George Island.

3.3. AFoPS-V and VI in 2007: introduces AFoPS cooperative programs

The fifth AFoPS meeting of February 2007, in Tokyo, Japan, was conjoined with the inauguration of a new Chair: Dr. Yoshiyuki Fujii,

Director-General of NIPR, Japan. The new chair announced the ‘AFoPS invitation fellowship program’, which invites up to three young scientists from AFoPS member countries to study at the NIPR for three months.

WG activities reported: Dr. Sung Min Hong from KOPRI introduced the summary of the first workshop for Glaciology Working Group of AFoPS, held at KOPRI in Incheon, Korea, on September 5–6, 2006. Dr. Zhanhai Zhang from PRIC summarized AFoPS engineering and logistics WG meeting held in Incheon, Korea, on 5 September 2006.

The sixth meeting was held in Kuala Lumpur, Malaysia on September 10–11, 2007. Polar scientists from Indonesia and Thailand were invited as observers and the observers had presentations sharing the status of their polar research. Dr. Irsan introduced the development of the Indonesian Antarctic Research Program under the Australian Program since 1996 and its future with a plan to establish the Indonesian Antarctic Division. Dr. VoranopViyakarn introduced his participation in the JARE46 in the 2004/5 summer season for marine ecological research as the first Thai National Antarctic program by National Science and Technology Development Agency.

New Working Group chairs were announced: Dr. Kazuyuki Shiraishi for WG-ES (earth science), Dr. Hyoung Chul Shin for WG-LS (life science), Mr. Yunlong Sun for WG-E&L (engineering and logistics) and Dr. Yoichi Motoyoshi for WG-P&D (public relations and data management).

Dr. Yoshiyuki Fujii introduced a NIPR program to invite Asian scientists for polar sciences and presented application details. Applicants were requested to attach a letter of recommendation from a National representative of the AFoPS. A report of the Workshop for Antarctic Medical Research and Medicine, held in August 2007, at the NIPR was presented by Dr. Kentaro Watanabe. 49 participants from China, India, Korea and Japan including two medical doctors at Syowa station joined the discussion.

A Sino-Japan cooperative study on Polar Upper Atmospheric Physics (UAP) and a Sino-Japan UAP Symposium that was to be held in mid-November, 2008, was introduced. Comparison of data recorded in Zhongshan and Syowa stations were to be included in the discussion. New facilities of PRIC in Shanghai were introduced with a new pier for the icebreaker Xuelong and an international workshop on The Prydz Bay, Amery Ice Shelf and Dome-A Observatories (PANDA) Project to be held in May in Shanghai.

Information papers to report activities of AFoPS were presented to the Antarctic Treaty Consultative Meetings (ATCM), IP107/ATCM XXX (2007), IP076/ATCM XXXI (2008) and IP089/ATCM XXXII (2009), as was stipulated in ToR (2004) of AFoPS, i.e. to present Asian achievements toward international polar communities.

4. Review and restructuring, 2008–2011

4.1. AFoPS-VII and VIII in 2008, and IX in 2009: AFoPS review committee activated

The next AFoPS meeting was held in Incheon, Korea. While polar scientists from Indonesia, Thailand, Philippines and Vietnam were attending as observers, Dr. Huigen Yang from the PRIC took the third baton of chairmanship.

In the meantime, concerns of the members on relatively underdeveloped collaborative research projects within the AFoPS were growing. The WGs were rather inactive; the initiative for joint journal publication had been delayed. In addition, the members came to agree that they needed more active participation in the other international polar organizations under the name of AFoPS.

This is when the AFoPS review committee was formed. The committee was established with a representative from each

member country. Dr. Yeadong Kim from Korea served as Chair and Dr. Huigen Yang from China as Co-Chair. The committee members were composed of Jianfeng He from China, Rahul Mohan from India, Watanabe Kentaro from Japan, Dongmin Jin from Korea and Siti Aishah Alias from Malaysia.

The review committee was tasked to review AFoPS functions in general and for each WG activities, AFoPS structure, and to recommend a strategy to stimulate AFoPS activity outcomes. The committee came up with a set of questions in regards to these areas and e-mailed the questionnaire to committee members in December 2008 for distribution and 39 replies were received at the end of May 2009. An interim report was submitted to the AFoPS-IX held in Shanghai, China, on July 9–10, 2009.

4.2. AFoPS-X in 2010: review committee submitted recommendations

During the tenth meeting of the AFoPS held at Suzhou, China, on July 8–9, 2010 Dr. Rasik Ravindra from the National Center for Antarctic and Ocean Research (NCAOR) of India was nominated as the next chair and the final report of the AFoPS Review Committee was presented to the members.

The report acknowledged that “the AFoPS has functioned successfully for membership expansion, logistic cooperation, personnel exchange, workshop and training”. But it was also noted, according to the report, “the AFoPS should be more active in stimulating working groups, encouraging collaboration, and taking an active role in international polar communities”. This required a better strategy to promote and facilitate collaboration in a practical way, to draw attention of non-polar Asian countries to the polar sciences and to help them develop their own polar programs. If AFoPS members would cooperate under such a strategy, it may greatly help move the initiative forward to various international polar communities.

Together with the previous e-mail discussions, the Review Committee met on July 9, 2009 with representatives from China, India, Japan, Korea and Malaysia. Productive discussion and comments were made based on the draft interim report. The following recommendations were generated from the feedback to the questionnaire and follow-up discussions for the interim report:

1. Working Groups: Their structure should be flexible; They should consider modeling a SCAR or IASC-like structure; Bottom-up approaches reflecting current collaboration needs; More meetings and human exchange encouraged; WGs should report annually at the AFoPS meetings, after having at least one gathering a year. The members need to provide institutional support for WG activities
2. AFoPS Activities: Recommended to focus upon enhancing exchange of its scientists, providing coordinated projects. Sponsor WG symposium and the AFoPS published journals. Provide educational campaigns and share platform (i.e. ships and stations). AFoPS should focus on the current functions, enhancing AFoPS presence and reputation in the greater international polar community.
3. Support for the non-polar Asian countries, by inviting scientist to the respective polar program of AFoPS members and symposiums or providing training programs, was recommended.
4. External relations: Noted that AFoPS should engage actively in polar issues at various international meetings; Make regular presentations in SCAR, ASSW, ATCM, etc. Publish an AFoPS journal continuously.

In order to reflect the recommendations and promote the sustainable development of AFoPS, the members decided to establish a

working group for revising AFoPS ToR. Dr. Yeadong Kim from Korea was appointed as the working group chair. Each member had a representative in the working group, including Sun Bo from PRIC, Rahul Mohan from NCAOR, Kentaro Watanabe from NIPR, Dongmin Jin from KOPRI and Ewe Hong Tat from Malaysia.

4.3. AFoPS-XI in 2011: terms of reference revised

NCAOR hosted the eleventh AFoPS meeting in Goa, India, on August 25–26, 2011. During the meeting, ‘Working Group for Revising AFoPS Terms of Reference’ submitted the revised ToR and the members agreed to adopt the new ToR.

The new ToR reflected the members’ interest in logistics cooperation as well as research collaboration, by adding “to serve the common interests in polar sciences and logistics” in its objectives and “Encourage logistic cooperation in the polar regions” in the major activities sections. One of the most important progress seen by the revised ToR was that it specified operational principles of the AFoPS Committee, Annual General Meetings (AGMs), and its Working Groups (WGs):

The AFoPS Committee, headed by the chair rotated amongst the national representatives with a 2-year term, works on the basis of consensus and can extend its work during intercession by electronic means. The coordinator from the same nation with the chair serves as the secretary. The responsibility of the committee was newly suggested: it “decides major issues including development of common strategies for science research and logistic cooperation, creation and termination of working groups, endorsement of working group chairs, invitation of observers, accepting new members and endorsement of research programs”.

The referential ground for the Annual General Meetings was also founded in the new ToR. It indicated AGMs to be held at least once a year, attended by national representatives, coordinators, WG members, observers, and other invitees. The chair has responsibility to host and arrange AGMs, where the members’ new science proposals and Working Group reports are presented.

The rationale of the Working Groups was officially stated: they are “to promote and coordinate science program and logistic cooperation within member countries”, “acknowledging the multidisciplinary nature of sciences and the complexity of logistic activities in the Polar Regions”. The six WGs were stipulated: Earth Science (ES), Life Science (LS), Planetary Science (PS), Glaciological Science (GS), Ocean Science (OS), Logistics and Outreach (L&O) – the latter three were newly established. The WGs “formed with participants who are experts in relevant fields nominated by each member country”.

Another noteworthy decision made at the Goa meeting was that the members agreed to publish an AFoPS journal and establish an ad-hoc committee taking full charge to provide a detailed plan to drive the initiative. Dr. Yeadong Kim was designated as the ad-hoc committee chair supported by national representatives from the members: Hyoung Chul Shin, KOPRI; Watanabe Kentaro, NIPR; Ning Xu, PRIC; Ewe Hong Tat, Malaysia; and Rahul Mohan, NCAOR.

5. AFoPS joint publication and further reform, 2012–2014

5.1. AFoPS-XII in 2012 and XIII in 2013: AFoPS journal publication prepared

The 12th AFoPS meeting took place in Delhi, India on August 5–7, 2012. The chairmanship was passed on to Dr. Azizan Abu Samah from the National Antarctic Research Center, University of Malaya, Malaysia. During the meeting the members shared their polar activities for the season not only in the Antarctic but also the Arctic. Information sharing on scientific and logistic cooperation

was also conducted, of which included a workshop on Antarctic medical research and medicine, 2012 (Watanabe, NIPR) and an invitation to winter training course for JARE expedition personnel (Watanabe, NIPR).

In-depth academic presentations on “Progress in Polar Research” followed – 12 papers/presentations were presented including ‘A three dimensional geometry of isochronic layers at Kunlun Station, East Antarctica from a link between Dome A and the Vostok ice core site by radar echo sounding’ (by Xueyuan Tang, China) and ‘Monitoring the Southwestern Southern Ocean using remote sensing and XCTD data’ (by A. J. Luis, NCAOR). In addition, the ad-hoc committee on AFoPS publication presented the plan for AFoPS journal publication: At the beginning stage the AFoPS joint journal was planned to be published as a special issue every year. The chief editor of each special issue would be nominated by a rotational manner and the editorial board also would consist of 3 editors with academic specialty nominated from each member. The 3 nominees should come from each discipline of geosciences, life sciences and physical sciences. Among the three candidate host journals, Chinese *Advances in Polar Science* was chosen to be the first issue of AFoPS joint journal. Related progress was reported to the AFoPS members during the 13th meeting in Penang, Malaysia on October 10–11, 2013 and the special issue of *Advances in Polar Science* entitled “Proceedings of AFoPS 2012” was finally published at the end of the year (Fig. 3).

5.2. AFoPS special preparatory meeting for the 10th anniversary: action groups suggested

The AFoPS members gathered in Suzhou, China on June 13, 2014 as a special preparatory meeting for the 10th anniversary of the AFoPS. During the meeting, the members acknowledged the

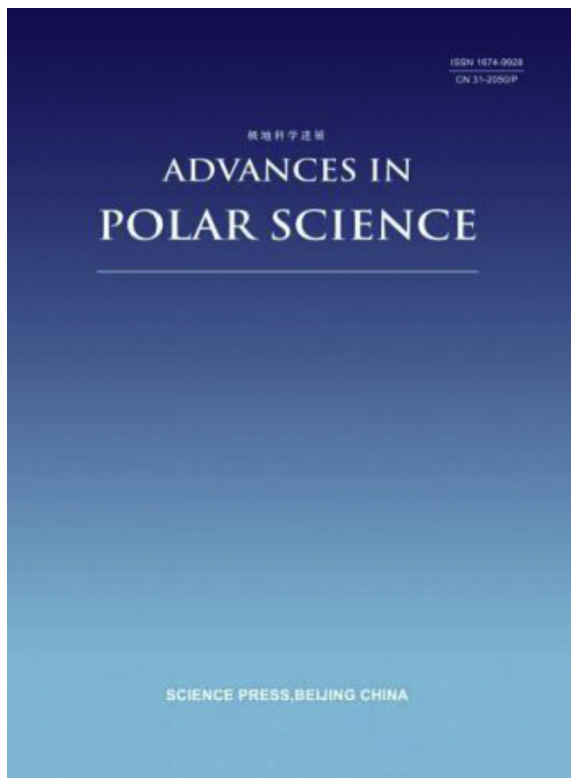


Fig. 3. The first AFoPS journal was published as a special issue of *Advances in Polar Science* by Polar Research Institute of China in 2013.

success of the AFoPS special issue edited by China, reconfirming that the next issues would be prepared by Japan and then Malaysia. The members noted the editing policy of *Polar Science* journal (published by Elsevier) from Japan and agreed to provide guest editors for the next joint journal publication.

The members noted that the WGs' inter-disciplinary activities had been relatively depressed thus far; it was hard to even identify who were participating in which groups. An alternative approach to establish issue-specific Action Groups constituting presently active research at the AFoPS member institutions was suggested. In contrast to the WGs, the Action Groups would be found on a semi-indefinite time frame, beginning a term of 4 or 5 years.

Another issue raised was that a clear-cut job description of the secretariat was needed to avoid confusions when the secretariat responsibility transfers after a two-year term of service. Malaysia, then chair nation, agreed to provide a draft of AFoPS Secretariat Terms of Reference.

The members shared the same view upon cooperation-building with SCAR and IASC; the members welcomed positive signals from the two international polar organizations and agreed to continue the constructive coordination which could lead to a potential memorandum of understanding (MOU) on their trilateral cooperation.

5.3. AFoPS-XIV in 2014: achievements appraised highly while further reform measures suggested

The 10th anniversary symposium and AFoPS-XIV was held on October 7–8, 2014 in Port Dickson, Malaysia, with 25 participants including 2 observers from Thailand. The keynote address by Dr. Yeadong Kim, which provided the groundwork to this paper, opened the symposium (Fig. 4). The members presented 10 notable academic papers, which was followed by 10 presentations on progress in polar research of the members. Particularly Dr. Nobuo Kokubun from NIPR, Japan, reported on the result of an AFoPS collaborative research, titled “collaborative seabird research plan near King Sejong Station, King George Island, and NIPR contribution to scientific cooperation with AFoPS members” which caught members' interests.

During the 14th meeting of the AFoPS, further measures for deeper cooperation were discussed. Korea volunteered to handle the re-opening and maintenance of the AFoPS website. Regarding scientific cooperation among the members, Malaysia would lead the “Tropical-Polar Connectivity” project with Korean support. Members agreed to come up with such proposals for cooperative projects and review and endorse them in the next meeting in 2015. The need of a permanent secretariat, as opposed to the currently endorsed rotating model, was re-iterated by Korea and the members agreed to at least review the process and function of the secretariat. Potential new memberships were discussed, too. After some further deliberation, the members agreed that any newly admitted member should represent the national polar program such as the procedure used by SCAR to apply for or attaining the (associate) membership.

Last but not least, an AFoPS review report was delivered to the members. Dr. Hyoung Chul Shin, the presenter of the report, who recommended standardization of AFoPS decision-making process for a more efficient forum/discussion. A confirmed meeting timeline, for example, the agenda would be distributed to the representatives and coordinators 2 months prior to the meeting, or papers that are expected to be presented during the meeting should be submitted to the secretariat at least 1 month prior to the first day of the meeting, which would contribute to more well-organized meetings for the members. In addition, the secretariat needs a fixed and structured secretariat work description



Fig. 4. The AFoPS-XIV held in Port Dickson, Malaysia on October 7–8, 2014 celebrated its 10th anniversary with a special symposium.

Table 1
Populations of regional groups in the Antarctic Treaty Consultative Parties (ATCP).

	AFoPS	EPB	RAPAL	Others	Total
Number of ATCP	4 (13.8%)	13 (44.8%)	6 (20.7%)	6 (20.7%)	29 (100%)
Population (million)	2768 (67.8%)	556 (13.6%)	312 (7.6%)	449 (11.0%)	4085 (100%)

requirements. Endorsing a membership fee for AFoPS, akin to what is practiced by most international polar groups, was also suggested for discussion.

In order to enhance its presence in the greater world polar science community, the committee suggested that AFoPS organize joint symposiums and sessions in major international meetings. In addition, the AFoPS was recommended to prepare information posters (such as Forum of Arctic Research Operators') and hold poster sessions in ASSW to reach out to the Arctic community. It was also stated that more official inter-organizational relations with SCAR and IASC would be beneficial.

6. Observations and conclusions: toward the next 10 years of AFoPS

Climate change is one of the most studied subjects in national polar programs and will remain at the center of polar research over the next decades. All countries will be affected by climate change; climate change is the common problem and subject to be solved together by all mankind in the world. The most vulnerable – the poorest countries and populations – will be the first ones to suffer and to suffer to the most, although they have contributed least to the cause of climate change. The cost of extreme weather including floods, drought and storms is already rising also for developed countries in Asia.

All Asian nations should work on the issues of climate change and take interest in the efforts of international communities to study and mitigate these common phenomena. It is highly desirable to strengthen partnership between Asian nations for polar science and to take the initiative in international polar programs. Partnership can be attained through collaboration of Asian countries involved in polar activities.

The last 10 years of the AFoPS has been successful enough for the members to feel encouraged and proud. The AFoPS has served quite well as a tool for multilateral information exchange and discussion. However, it is time to leap higher. Even if AFoPS countries represent slightly less than half of the world's population (Tables 1 and 2), their influence is not as great as those of other international polar communities. The reason for this shortfall comes from the fact that their history of polar research is relatively short (with the exception of Japan) and only 5 nations are involved in Asia.

The AFoPS should contribute to the members' actual research and logistic operation, by concentrating and coordinating their efforts through the operation of issue-specific Action Groups and collaborative projects, and the permanent, properly functioning secretariat. We cannot neglect to contribute to the greater international polar community, either. Being responsible for a great portion of the world's polar research/operation endeavor, the AFoPS should rise to meet the expectations of the world, by producing notable research publications, initiating international cooperative programs, and supporting non-polar Asian scientists/countries with education and research collaboration. These would be the tasks of the AFoPS for the next decade and a strategy is required to promote and facilitate collaboration in a practical way, to draw attention of non-polar Asian countries to the polar science and to help them develop their own polar programs. When AFoPS members continue to cooperate under this strategy it will generate

Table 2
Populations of regional groups in the International Arctic Science Committee (IASC).

	AFoPS	EPB	Others	Total
Number of members	4 (18.2%)	15 (68.2%)	3 (13.6%)	22 (100%)
Population (million)	2768 (75.0%)	560 (15.2%)	364 (9.8%)	3692 (100%)

greater opportunities contributing to international polar communities.

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