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The Asian Forum for Polar Sciences: An assessment of regional cooperation

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Abstract This paper presents a review of the current status of Asian countries' relations with Antarctica, aimed at deepening understanding of the role of the Asian Forum for Polar Sciences (AFoPS) in the area covered under the Antarctic Treaty. The paper critically examines the current situation regarding the Asian presence in Antarctica and provides a historical outline of the AFoPS. Whereas the activities of individual Asian countries in Antarctica have been extensively analyzed in previous studies, those of the AFoPS constitute a research gap within the scholarly literature. Therefore, an assessment of the role of the AFoPS within the wider Antarctic region from both the policy and scientific perspectives is necessary to better understand its relationship with other international organizations that are active in the area covered by the Antarctic Treaty. Over the course of its relatively short history, the AFoPS has accomplished a number of achievements. These include the signing of a Memorandum of Understanding with the International Arctic Science Committee and the Scientific Committee on Antarctic Research. Additionally, collaborative activities have been undertaken by members of the Forum, entailing, for example, exchanges of personnel, cooperation and support extended within scientific projects. Consequently, AFoPS member countries that traditionally lack a polar background, such as Thailand and Vietnam, have been able to conduct scientific activities in Antarctica.

Keywords **Asia, Antarctica, Asian Forum for Polar Sciences, policy, science**

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1 Introduction

The Asian Forum for Polar Sciences (AFoPS) is the first and only regional Asian consortium that aims to facilitate scientific research for the support and protection of polar environments. AFoPS was initiated by a cluster of Asian countries that have established polar programs, with the objective of strengthening relations between Asia and the polar regions.

For the purpose of this review, Asia includes all countries within Central, East, and Southeast Asia as well as those in the Middle East and South Asia as per the classification of the U.S. Central Intelligence Agency (2017). This paper presents an overview of the existing scholarly literature, highlighting a research gap relating to the role of the AFoPS in the area covered by the Antarctic Treaty (AT, Article VI of the Antarctic Treaty states that the Treaty applies to the area south of 60° South Latitude) (SAT, 2015). It further proposes an investigative approach for enriching knowledge and understanding of the position and role of the AFoPS in relation to research and cooperation focusing on Antarctica among Asian countries.

In recent decades, Asia has featured prominently in scholarly literature and in the media. Within the literature, the widely criticized notion of the "Asian century" has received much attention (Gillen, 2014). This notion was first used by Deng Xiaoping in 1988 during a visit to India. He stated that "no genuine Asia-Pacific century or Asian century can come until China, India and other neighbouring countries are developed" (Chander, 2011). Subsequently in

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2010, the Chinese Premier, Wen Jiabao, asserted that the "Asian century has arrived" (Chander, 2011). Concerns regarding this notion have mainly centered on cultural, economic, and geographic differences that prevail across the Asian continent (Chander, 2011; Gillen, 2014).

Given the increasing interest of Asian countries in Antarctica, and their growing presence there, relations between Asia and Antarctica have assumed importance within the international community. A rising number of Asian countries are involved in research projects in the area under the AT, and there has been a corresponding increase in the number of peer-reviewed publications related to these projects. However, there has been a notable lack of coverage of the role of the AFoPS in relation to Antarctica within this literature. Existing studies have entailed a singular focus on the activities of individual Asian states in the Antarctic region rather than attempting to examine the development of international relations and coalitions on polar issues among these countries. To date, only three academic publications, namely Zhao et al. (2011), Kim and Jeong (2015), and Watanabe et al. (2015), have analyzed the role of the AFoPS and its achievements during the first decade of its existence. Moreover, the Forum's role within the wider geopolitical framework of Antarctica has not received scholarly attention. Therefore, an analysis of this regional Asian forum operating in the area under the AT will contribute to a better understanding of how the increasingly important AFoPS impacts on Asian countries and influences their scientific research and support programs. It can also shed light on how the AFoPS affects the balance of power within the AT System. The AT System comprises the AT, the Protocol on Environmental Protection to the Antarctic Treaty, 1991 (hereafter called the Protocol, entered into force 1998), the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), 1980, and all the Measures and Decisions adopted by the Members during Antarctic Treaty Consultative Meetings (ATCMs) and by CCAMLR.

2 Asia and the polar regions

Several Asian countries, namely India, Japan, the People's Republic of China (PRC), and the Republic of Korea (ROK) have been extensively involved in Antarctic research. Of these countries, India and Japan have research histories that date back to the International Geophysical Year (IGY; 1957–1958, also known as the third International Polar Year). Japan is an original signatory of the AT, which was negotiated and signed by twelve countries in Washington DC on December 1 1959, entering into force on June 23 1961. The research engagements of other countries in Antarctica have been more recent: the PRC became an AT signatory in 1983 and a Consultative Party in 1985, and the ROK became an AT signatory in 1986 and a Consultative Party in 1989 (SAT, 2014). India, Japan, the PRC, and the ROK also became signatories to the Protocol, 1991, when it entered into force on January 14 1998. Twenty years later, these countries demonstrate an enduring commitment to maintaining Antarctica as a "natural reserve, devoted to peace and science" (Article 2 of the Protocol). In 2016, this commitment was further evidenced by the involvement of Japan and the ROK in the development of Working Paper 38 titled *Confirming Ongoing Commitment to the Prohibition of Mining Activity in Antarctica, other than Scientific Research – Antarctic Mining Ban*, submitted by the United States, Argentina, Australia, Belgium, Chile, the Czech Republic, Finland, France, Germany, Italy, Japan, the ROK, the Netherlands, New Zealand, Norway, Poland, South Africa, Spain, Sweden, the United Kingdom, and Uruguay. This Working Paper was submitted by 21 co-signatories of the Protocol at the ATCM XXXIX–CEP XIX held in Santiago in 2016. In it, all of the signatories reaffirmed their commitment to Article 7 of the Protocol, which prohibits any activities relating to the use of mineral resources for purposes other than scientific research.

Malaysia has been a Non-Consultative Party to the AT since 2011, and signed the Protocol five years later, in 2016. Turkey, which is widely considered to occupy a bridging position between Europe and Asia, is also a Non-Consultative Party to the AT (note: Turkey ratified the AT and the Protocol on January 24 1996 and October 27 2017, respectively), while Thailand, Vietnam, and the Philippines have become involved in Antarctic-related matters in recent years. In October 2016, Malaysia, the Philippines, Thailand, Turkey, and Vietnam participated as observers in the AFoPS Annual General Meeting (AGM) held in Incheon in the ROK. Moreover, other Asian countries that were not represented during the AFoPS meeting have demonstrated interest, for varying reasons, and differing levels of engagement with Antarctica. The following countries have become Non-Consultative Parties to the AT: the Democratic People's Republic of Korea (in 1987), Pakistan (in 2012), Mongolia (in 2015), and Kazakhstan (in 2015). Pakistan also ratified the Protocol on March 31 2012 (SAT, 2014).

India, Japan, the PRC, and the ROK applied for and were granted observer status in the Arctic Council at the Ministerial meeting held on May 15 2013 in Stadshuset, Kiruna, Sweden (Kim, 2014; Goodsite et al., 2016). Since 1998, thirteen non-Arctic states (Germany, Poland, the Netherlands, the United Kingdom in 1998; France in 2000; Spain in 2006; India, Italy, Japan, the PRC, the ROK, Singapore in 2013 and Switzerland in 2017) have been approved as observers to the Arctic Council. Japan's historical involvement in Arctic activities is further evidenced by the attendance of A. Tanakadate, president of the Japanese Polar Committee, at the first meeting of the International Commission for the Polar Year, held in 1930 (August 26–30) in Leningrad, Union of Soviet Socialist Republics (Lüdecke and Lajus, 2010). This meeting was intended to provide a practical background for the second

International Polar Year (IPY) (Laursen, 1949). Japan and India were two of the original signatories of the Status of Spitsbergen signed in Paris on February 9 1920, which entered into force on August 14 1925 (Rajan and Krishnan, 2016; Status of Spitsbergen, 1920). The PRC joined the Status of Spitsbergen in 1925 (State Council Information Office of the PRC, 2018). Among the Asian countries, India, Japan, the PRC, and the ROK have established permanent Arctic research stations located in Ny-Ålesund. These respective stations are Himadri (2008), Rabben (1990), the Yellow River (2004), and Dasan (2002).

2.1 Asian countries and AFoPS membership

Following a side meeting conducted during the AGM of the Council of Managers of National Antarctic Programs (COMNAP) held in Brest, France, in 2003, Japan and the ROK decided to form an "East Asian group". The PRC subsequently joined this group as a result of online communication (Zhao et al., 2011). Thus, AFoPS was established by the Polar Research Institute of Japan, the PRC, and the ROK in May 2004. The group's first official meeting was held in Shanghai on May 25 2004 to discuss the structure of the AFoPS. Subsequently, during the sixth AFoPS Delegates Meeting held in Tokyo in February 2007, India and Malaysia, through their representatives, joined the AFoPS to become its fourth and fifth members (AFoPS, 2009). One year later, at a meeting held at the Korean Polar Research Institute (KOPRI) in Incheon in September 2008, researchers from Indonesia, the Philippines, Thailand, and Vietnam were invited to join the Forum as observers (AFoPS, 2014). Sri Lanka too was admitted as an observer in 2015.

The year 2016 marked an important milestone for the Forum for two reasons: Thailand was accepted as a member, and the AFoPS signed a Memorandum of Understanding (MoU) with the International Arctic Science Committee (IASC) and the Scientific Committee on Antarctic Research (SCAR).

Thailand was the first non-signatory of the AT to be accepted as an AFoPS member. This means that Thailand does not have to operate within the parameters of the AT or the Protocol in the area under the AT. Thus, the AT's requirements of use only for peaceful purposes and making scientific results freely available do not strictly apply to Thailand. Moreover, all of the established provisions for protecting the Antarctic's environment through the Protocol, including the ban on mineral resources activities (Article 7), do not apply to Thailand. However, as McColloch (1992) points out, customary international law now applies in Antarctica. Nonetheless the concepts of peaceful use, scientific collaboration, and the ban on mining activities are recognized as general principles that may acquire acceptance as binding customary international law. Thai representatives submitted Working Paper 09 as an expression of interest in Thailand's acquisition of AFoPS membership during the AFoPS XIX AGM (AFoPS, 2016). After reviewing and discussing this Working Paper, delegates of the five member countries decided to accept Thailand as a full member, in principle, requiring the Thai government to submit additional documentation prior to the official announcement of Thailand's acceptance as the sixth member of the group, which was made during the AGM in 2017 (AFoPS, 2017). The request for additional documentation was made on the basis of the AFoPS XIX AGM Working Paper 08, *Draft Procedures of Membership and Observer Accreditation,* which states: "1.4. The application for membership will be submitted by the national member[s] of SCAR, IASC, COMNAP, FARO or other relevant international polar organizations, or by some other means if a country has no national member of the abovementioned organizations, in which case advice should be sought from the Secretariat".

Thailand is, in fact, an associate member of SCAR through the Polar Science Consortium of Thailand (PSCT) (SCAR, 2017). However, the country's AFoPS membership application was submitted through an information technology initiative of Her Royal Highness Princess Maha Chakri Sirindhorn Foundation (IT-HRH Princess Foundation), which serves as the secretariat of the Thailand National Polar Research Program. The additional documents were requested to provide an assurance that these two separate entities would provide support to the Thailand National Polar Research Program. Therefore, Thailand's acceptance as an AFoPS member seems to have led to a broadening of the abovementioned *Procedures of Membership and Observer Accreditation*, especially paragraph 1.4, enabling organizations that are not members of SCAR, IASC, COMNAP and the Forum of Arctic Research Operators to join AFoPS.

A MoU was signed by AFoPS with IASC and SCAR representatives during the closing ceremony of the SCAR Open Science Conference held in Kuala Lumpur on August 26 2016. This MoU between the AFoPS and other polar organizations was the first of its kind. It was signed on behalf of the concerned organizations by Yeadong Kim (the AFoPS Chair and previous president, KOPRI), Susan Barr (President, IASC), and Jerónimo López-Martinez (President, SCAR). The MoU will remain in force for five years and will be reviewed and possibly extended in 2021 (AFoPS, 2016a). The MoU was premised on the belief that all three participating organizations share the common goal of working internationally on polar science and technology to increase our understanding of Earth's Polar Regions and their connections to the global system (note: the complete text of the MoU can be found on the websites of all three participating organizations).

This MoU represents a milestone for the AFoPS, which has consequently gained the recognition of SCAR and IASC. It marks an important step forward in the dissemination of Asian achievements within international polar communities, which has been one of the main goals of the AFoPS since its inception.

2.2 AFoPS member countries

A brief overview of the historical activities of the six AFoPS members in Antarctica will shed light on AFoPS' leading role in Asia in Antarctic research (Kim et al., 2010). Many of these countries have a well-established and long-term interest in Antarctic research and could help to guide the research interests of more recent member countries in relation to the area under the AT. A brief excursus to provide salient historical details about these countries and to identify some of the milestones that have been achieved to date will elucidate the importance of collaborations and their potential role in relation to the new actors. The history of these countries' involvement in Antarctica will be presented in chronological order according to the dates of their AFoPS membership.

2.2.1 Japan (AFoPS member since 2003)

Japan's first interaction with Antarctica occurred when an early Japanese explorer, Nobu Shirase, entered a bay of the Ross Ice Shelf on January 16 1912 and embarked on an exploration of the ice front (Barr, 2012). His expedition was not, however, supported by the Japanese government. In 1934, the Japanese whaling company *Nihon Hogei* purchased the Norwegian vessel, *Antarctic,* and conducted its first whaling expedition in 1934–1935 (Gill, 1994). In 1951, Japan became a signatory to the San Francisco Peace Treaty, thereby renouncing its territorial rights, including any claims to Antarctica, under Article 2 (e) (Osada, 1994; Scott, 1999; Tonami, 2017).

On January 29 1957, the Syowa Station was established on East Ongul Island, in the Lützow-Holm Bay, in Dronning Maud Land of Antarctica (COMNAP, 2017). The station was constructed as part of a Japanese project initiated for the IGY in 1956. Scientists on board the *Soya* participated in the first Japanese Antarctic Research Expedition (JARE) to Antarctica (NIPR, 2014a). Japan was one of the twelve original signatories that ratified the AT in 1961 (SAT, 2014). Subsequently, Mizuho Station was established in 1970 and Asuka Station in 1985 (Osada, 1994). Both of these stations are currently temporarily closed and can be re-opened if needed (COMNAP, 2015).

Beginning with JARE-1, Japanese researchers have conducted scientific activities annually in Antarctica, and at the time of writing, JARE-60 is in progress. These activities have entailed establishing international scientific collaborative initiatives and supporting researchers from Asian countries with less Antarctic research experience.

2.2.2 Republic of Korea (AFoPS member since 2003)

The ROK's first encounter with Antarctica occurred in 1978, when Korean boats sailed to the Southern Ocean to fish for krill (Brady and Seungryeol, 2012). Korean interest in Antarctica was officially evidenced in November 1986 when the ROK became the 33rd state to accede to the AT. In 1987, a polar research center was inaugurated as part of the Korea Ocean Research and Development Institute, reflecting national interest in polar topics. Subsequently, KOPRI was established in 2004. Construction of King Sejong Station, the first Korean base in Antarctica, was initiated by the Korean government in 1987, and the base was officially opened on February 17 1988 (Han'guk Haeyang Yon'guso, 1998). The station is located on the Barton Peninsula, on King George Island, which is part of South Shetland Islands in Antarctica and is also the location of the stations of seven other countries (Argentina, Brazil, Chile, the PRC, Poland, the Russian Federation, and Uruguay). The abundance of scientific activity on this small island has provided opportunities for Korean researchers to collaborate with scientists in other institutions. In October 1989, the ROK was granted consultative status within the AT System. The rising influence of the ROK in Antarctica is further evidenced by the amount of capital that has been invested in research: the Korean polar budget increased by 400% from 2004 to 2010 (Brady and Seungryeol, 2012). Part of this expanded budget was allocated for the construction of the Korean vessel, *Araon*, which began in 2006 following a feasibility study, and the vessel was inaugurated in 2009. *Araon* plays a pivotal role in supporting science in both the Arctic and the Antarctic. In 2010, the ROK commenced planning the construction of a second Korean base, Jang Bogo Station*,* in Terra Nova Bay, in the Ross Sea region. This station, which was inaugurated in 2014, was the first Korean base to be constructed directly on the Antarctic continent (Meduna, 2014). Applying renewable energy technologies, it is one of the more eco-friendly and sustainable stations on the continent (Korea Polar Research Institute and Korea Environment Institute, 2012). KOPRI has also explored the possibility of building a gravel runway in collaboration with the Italian Antarctic Program (Programma Nazionale di Ricerche in Antartide), which operates the nearby Mario Zucchelli Station (Pelosi, 2012). Comprehensive Environmental Evaluations (CEEs) were submitted at the ATCM XXXIX–CEP XIX held in Santiago in 2016. These were followed by the submissions of Working Paper 43 and Information Paper 58 at the ATCM XL–CEP XX held in Beijing in 2017. In 2016, the Italian National Antarctic Program initiated the construction of the gravel runway, located at Boulder Clay in the Antarctic region of Victoria Land.

2.2.3 People's Republic of China (AFoPS member since 2003)

The PRC's national engagement with the Antarctic commenced in 1981 with the establishment of the Chinese National Committee on Antarctic Expeditions in May 1982 (Chen et al., 2017) and the subsequent formation of its affiliated institution, the Chinese Antarctic Administration in September 1982 (CAA; Zhao and Allison, 2016). The PRC's request to become a party to the AT, submitted on

July 8 1983 (Chinese National Committee on Antarctic Expeditions, 1985), was the first event in the PRC Antarctic international politics. The PRC obtained consultative status on October 7 1985 (SAT, 2014). From a scientific perspective, during the summer of 1979–1980, two Chinese scientists accompanied the Australian National Antarctic Research Expedition to Casey Station to undertake geological/oceanographic research (Chinese National Committee on Antarctic Expeditions, 1990; Chen et al., 2017). In the same year, the governments of the PRC and Chile discussed the possibility of a research collaboration focusing on fisheries, oceanography, and geological surveys. After joining the AT System, the PRC launched a long-term (i.e., strategic) research plan in Antarctica, commencing with the first independent Chinese Antarctic expedition (CHINARE I) on November 20 1984. Subsequently, the PRC's first research base, the Great Wall Station, was established on King George Island and was inaugurated on February 20 1985 (Chinese National Committee on Antarctic Expeditions, 1985). The PRC greatly benefitted from its cooperation with more experienced countries. Thus, Japan facilitated the training of participants of the first Chinese expedition. The Soviet Union also provided assistance, while Argentina and Chile provided inputs on the most suitable location for the Great Wall Station. In addition, New Zealand and the United States shared their operational expertise in Antarctica (Zou, 2014). The assistance and inputs received by the PRC from other countries that have implemented national Antarctic programs could enable it to play a pivotal role within AFoPS, helping and supporting other emerging Antarctic players. On February 26 1989, Zhongshan Station was inaugurated in East Antarctica (Chinese National Committee on Antarctic Expeditions, 1990), and the PRC government subsequently shifting its priorities from station building to the development of a scientific research program. Accordingly, the Polar Research Institute of China (PRIC) was officially established in 1989 (Zhao and Allison, 2016). The PRC built its third station, Kunlun Station, in 2009 on Dome Argus on the East Antarctic Plateau at an elevation of 4087 m above sea level (COMNAP, 2017). This plateau is the highest and least explored territory in Antarctica and is accessible for only two weeks in the year (Brady, 2012). This station is important because of its inland location, contrasting with the locations of the PRC's first two stations in coastal areas.

In addition, during the ATCM XXXVI–CEP XVI held in Brussels in 2013, representatives of the PRC submitted Working Paper 08 proposing the creation of an Antarctic Specially Managed Area on Dome Argus that "would encircle Kunlun Station at a radius of 120 km (for the clean air sector), 10 km (for the buffer zone), and 30 km (for two scientific zone)" (Brady, 2017b)[211]. In 2014, the PRC established, Taishan, a summer station in Princess Elizabeth Land in East Antarctica (COMNAP, 2017). According to an article published in Xinhua on 27 January 2014, the CAA planned to commence the construction of the fourth Chinese station in Victoria Land in December 2015, using the ROK's design for Jang Bogo Station, viewed as a best practice model for minimizing the environmental impacts from Antarctic research stations (PRIC, 2014). A draft CEE for this station was submitted as Information Paper 037 at the ATCM XXXVII–CEP XVII held in Brasilia, in 2014. The construction work did not commence in 2015, as planned, because of concerns expressed by other ATCM members regarding the construction of this year-round facility (Brady, 2017a). In November 2017, the Chinese icebreaker *Xuelong*, conveying workers and construction materials, sailed to Inexpressible Island in the Ross Sea Region of Victoria Land to begin the construction of the fifth Chinese facility in Antarctica (Xinhua, 2017a, 2017b). CAA, PRIC, and Tongji University prepared a new draft CEE for the Victoria Land Research Station in January 2018, addressing the concerns about the earlier draft raised by the Parties in 2014, and the relevant documents, namely Working Paper 013 and Information Papers 023 (rev.1 and 025) were submitted for discussion to the ATCM XLI–CEP XXI, held in Buenos Aires in 2018 (PRIC, 2018).

2.2.4 India (AFoPS member since 2007)

Apart from the twelve initial signatories to the AT, India was one of the first countries to emphasize the importance of preserving Antarctica's fragile ecosystem (Suter, 1991). Although India's concerns were raised through its representative at the United Nations (UN) General Assembly in 1956, this matter was not given consideration. Because India did not have a research team operating in Antarctica during the IGY, it was excluded from the conference at which the AT was formulated (Suter, 1991). In July 1981, India launched Operation Gangotri, which brought 21 Indian scientists to Antarctica in January 1982 to conduct climatic research and explore how Antarctica's climate system influenced the Indian monsoons (Chaturvedi, 1986; Suter, 1991; Beck, 1994).

Following the completion of its first scientific research project in Antarctica, India became a Consultative Party of the AT System on September 12 1983 and launched its first station, Dakshin Gangotri, on January 26 1984. However, this facility was decommissioned on February 25 1990. On May 25 1998, the Department of Ocean Development of the Indian government inaugurated the National Centre for Antarctic and Ocean Research as the leading agency for implementing the Indian Antarctic program (NCAOR, 2014) that has been renamed National Centre for Polar and Ocean Research (NCPOR) in 2018. Currently, India is operating two year-round stations. The first, Maitri Station, was established in 1989 in an ice-free area of the Schirmacher Oasis in East Antarctica, and the second, Bharati Station, was constructed in 2011 in the Larsemann Hills of the same region (COMNAP, 2017).

2.2.5 Malaysia (AFoPS member since 2007)

In the 1980s, Malaysia strongly opposed the AT System, arguing that the UN should assume a central role in governing Antarctica (Davis, 1994). During the UN General Assembly held in New York in 1982, the Malaysian Prime Minister, Dr. Mahathir Mohammed, asserted that Antarctica was accessible only to a few privileged countries, and he requested the UN to protect what, he argued, should be considered the common heritage of humankind (Hamzah, 2012). The Malaysian government further requested the allocation of any future profits derived from Antarctica's exploitation for the benefit of all of humankind, with priority given to developing countries (Joyner, 1994). Beginning in 1983, with Indonesia's support, Malaysia led the opposition movement to the AT System (Joyner, 1994). However, Malaysia's perspective on Antarctic governance changed in the late 1990s after Malaysian scientists were invited to join researchers from New Zealand at Scott Base (Hamzah, 2010). From that point onwards, Malaysian scientists joined other countries, including other AFoPS members, in conducting research in Antarctica. In 2008, Malaysia became a full member of SCAR and on October 31 2011 the country acceded to the AT (SAT, 2014). It is noteworthy that whereas Japan and the PRC hosted SCAR Delegate Meetings in 1968 and 2000 and in 2002, respectively, in August 2016, Malaysia became the first Asian country to host a SCAR Open Science Conference, a biannual event that has been organized since 2004.

2.2.6 Thailand (AFoPS member since 2017)

Thailand's first engagement with Antarctica occurred in November 1993 when Her Royal Highness, Princess Maha Chakri Sirindhorn, visited New Zealand's Scott Base and the U.S. McMurdo Station (National Science and Technology Development Agency, 2016). Two researchers from Thailand were hosted by the Japanese government to conduct scientific research at the Syowa Station in 2004 and 2009 (National Science and Technology Development Agency, 2016). Having understood the importance of conducting continuous research in Antarctica, and the need for international cooperation, the Princess visited the Chinese Arctic and Antarctic Administration and the Polar Research Institute of China as well the vessel *Xuelong* in April 1993, halting in Shanghai after her voyage to Antarctica (National Science and Technology Development Agency, 2016; Soonthornthum, 2016). These visits marked a turning point for Thailand's presence in Antarctica, evidenced in the signing of two MoUs by the Thai government; one with the CAA on July 30 2013, and a second, three years later, with the PRIC on April 6 2016 (Soonthornthum, 2016; Xinhua, 2016). In 2014 and 2015, Thailand sent three scientists to the PRC's Great Wall and Zhongshan stations to conduct marine biology and oceanography research (Thailand, 2016; Soonthornthum, 2016). There are plans to continue these projects, with the addition of astronomy and geological research, through a proposed collaborative project undertaken with the PRC over the next eight years.

During the SCAR Delegates Meeting held in Kuala Lumpur on August 29–30 2016, Thai delegates presented Working Paper 4c in support of Thailand's application to become a SCAR associate member and its membership was officially approved in 2019. The paper highlighted all of the scientific projects implemented in the polar regions, in which Thailand had been involved over the past four years (Thailand, 2016).

3 Discussion

The status quo regarding the Asian presence in Antarctica has been analyzed by many scholars, who have focused on the activities of individual countries. However, examinations of international cooperation within regional groups have been limited. However, international cooperation, aimed at facilitating research in the Antarctic region is pivotal for the provision of logistic support and for the deployment of scientific projects executed by multiple countries. At a historic time when various countries have incorporated "big science" projects into their scientific agendas, which they may not be able to implement on their own, questions about international collaborative activities and the operations of regional groups in Antarctica need to be addressed appropriately. AFoPS is not the only regional group operating in Antarctica. Other examples include the European Polar Board and the Reunión de Administradores de Programas Antárticos Latinoamericanos, whose members, representing European and South American countries, respectively, are operating in Antarctica. An understanding of the roles of regional groups and organizations both within and outside of the Antarctic region, will contribute to a deeper understanding of international cooperation in Antarctica and how this could foster new partnerships with countries that are not yet perceived as actors in the Antarctic region.

3.1 Towards a better understanding of AFoPS

Both qualitative and quantitative analytical methods can be applied to better understand the role of the AFoPS in the area under the AT and its relations with other organizations operating in the same area. Qualitative analysis, and especially semi-structured interviews entailing focused inquiries (e.g., Lincoln and Guba, 1985) can be used to address the current knowledge gap within the modest body of current literature (Driscoll, 2011) on the role of the AFoPS in the AT area. Semi-structured interviews provide respondents with the opportunity to better express their own ideas (Taylor and Bogdan, 1998).

A quantitative analysis could entail a comprehensive search for literature published from 2004, when the AFoPS was established, onward including all co-authored papers,

in English, by individuals from AFoPS member countries with institutional affiliations to universities and research centers or to governmental entities (e.g., national Antarctic programs). These data could be retrieved using Web of Science and Scopus databases to compile all scientific publications by Asian authors. The use of a single database could lead to limited results because some journals are not listed in these databases. As noted by Whitley (2002), reliance on just one indexing service can lead to inaccurate results; therefore, the use of the abovementioned two databases is recommended. Acquiring an overview of scientific co-authored publications is necessary for understanding the results achieved to date through collaborative initiatives aimed at developing an international polar community. Similarly, it is possible to analyze the involvement of Asian countries in the AT System by examining the number of Background, Information, and Working Papers submitted to the ATCM. A quantitative analysis of these data should include papers submitted from individual countries as well as co-authored papers to better understand the impacts of the AFoPS within the ATCM. The combined use of semistructured interviews along with a quantitative analysis of scientific publications co-authored by Asian researchers would advance understanding of the role of the AFoPS, through collaborative projects, in Antarctica and how this could affect the balance of power within the AT System.

3.2 The role of the AFoPS in Antarctic governance and science

By promoting the highest level of cooperation between Asian countries on polar issues, AFoPS could play a pivotal facilitating role for countries that have recently developed an interest in Antarctica. The forging of connections with other international actors operating in Antarctica, and an analysis of relations and the extent of cooperation among AFoPS members and observers, are crucial and instrumental for the future development of this regional Antarctica-focused group. The AFoPS must be viewed as an important new actor on the Antarctic stage; in fact, over the last 12 years, Asian countries, considered independently, have invested more than ever in Antarctic research and infrastructure (Brady, 2012; Brady and Seungryeol, 2012). A portion of these investments have also led to cooperative projects initiated under the AFoPS umbrella. Pre-Antarctic deployment training of Chinese, Korean, and Malaysian participants in expeditions provided through the Japanese Antarctic Program, or the participation of two Thai researchers during the 51st Japanese Antarctic Research Expedition (JARE-51) exemplify such cooperation (NIPR, 2014b). Considering the large number of countries located in Asia, the number of AFoPS members could dramatically increase, and AFoPS could become one of the more powerful coalitions engaged in Antarctic scientific research, support, and politics. Understanding the current and planned Antarctic-related activities of Asian countries is essential for comprehending and analyzing how their presence in Antarctica is evolving and how this could shape the future of human engagements with the continent. Special consideration of the priorities that these countries are setting for their Antarctica-based activities as well as the extent of their international relations within and beyond the AT System is necessary. To date, 18.9% of members of the AT System (Consultative and Non-Consultative Parties) are Asian countries. Whereas the Philippines, Thailand, and Vietnam do not have strong polar backgrounds and have not formally participated in the AT System, they nevertheless have member and observer status within the AFoPS. Other Asian countries that are currently not Antarctic players, or do not have a strong polar background, may also potentially undertake Antarctic expeditions and initiate Antarctic research programs through the AFoPS. Their presence could change the balance of power within "Antarctic governance."

3.3 Asian countries' governance and scientific presence in Antarctica

For any country aspiring to become a significant Antarctic player, the establishment and continuous operation of an Antarctic research facility, or the advancement of a scientific project, are considered demonstrations of commitment. This finding is confirmed by Article IX, paragraph 2 of the AT: "Contracting Party demonstrates its interest in Antarctica by conducting substantial scientific research activity there, such as the establishment of a scientific station or the dispatch of a scientific expedition".

In fact, a particular country's activities in Antarctica and its interest in becoming a consultative member of the AT System can be evaluated by counting the number of its operational facilities on the continent (Beeby, 1972; Australian Dept. of Foreign Affairs, 1983). Scientific research and publications associated with countries can also be deployed as a scale for assessing their activities and projects in Antarctica and for assessing the extent of the influence of the AFoPS on the activities of Asian countries. The impact of the AFoPS, as a group, within the AT System can be assessed through a comparative analysis of the numbers of working, information, and background papers submitted to the ATCM by authors from individual Asian countries and numbers of co-authored papers submitted jointly by authors from different AFoPS member states. Papers for inclusion in the analysis are those submitted by the four Consultative Parties (India, Japan, the PRC, and the ROK) and the one Non-Consultative Party (Malaysia) to the ATCM–CEP, commencing from 2004 (the year of the AFoPS's establishment) up to the present. Similarly, it is possible to evaluate Asian participation and regional cooperation in scientific research by analyzing the number of peer-reviewed scientific publications submitted in English by researchers affiliated with organizations based in

one the six member states of the AFoPS. International co-authored publications could be used to assess the influence of the AFoPS in fostering joint scientific projects.

3.4 Is a collaborative Asian feasible in Antarctica?

The Norwegian-Swedish-British Antarctic expedition (1949–1952) provides the first example of a shared facility that precedes the AT's entry into force. During this expedition, which mainly focused on glaciological research, Maudheim Station was erected in the territory of Queen Maud Land. Even though several stations hosted foreign scientists during the IGY (1957–1958), and despite numerous examples of international scientific projects, there is only one example of a joint facility in Antarctica: Hallett Station in Victoria Land. This station was commissioned by the United States and used year-round jointly with the New Zealand team from 1956 to 1964. Then from 1964, it was used only as a summer station prior to being abandoned in 1973. The United States also commissioned Wilkes Station, which was inaugurated on January 29 1957 for the IGY in 1958. It was used jointly by the United States and Australia for a two-year period commencing from February 7 1959. Then in 1961, Australia became the sole operator of the station until 1969, when it was replaced by Australia's Casey Station. In the 30-year period between the AT's entry into force in 1961 and the adoption of the Protocol in 1991, there have been only five cases entailing the transfer of facilities from one country to another.

At present, out of 76 open and staffed facilities in Antarctica, there are three examples of shared or joint facilities, and one example of shared logistic and scientific infrastructure between two facilities (Wratt, 2013; van der Kroef et al., 2015; COMNAP, 2017).

Looking toward the future and applying lessons from the past, it appears that Asian countries could advance on a path of cooperation. The MoU on polar collaboration signed by China and Thailand in 2016 could mark the first step toward joint operation of a facility. In addition, the interest expressed in 2014 by Turkey and Iran, both of which lack a strong Antarctic and polar background, could prompt cooperative relations with other more experienced Asian countries that could lead to the realization of a joint Asian research facility in Antarctica. However, this can only happen if these countries are able to focus only on scientific cooperation and not on "national autonomy in the selection of locations for other reasons" (Hemmings, 2011).

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