



History of female Polish pioneers and expeditioners in polar regions

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Abstract: In the paper, we present a gradual transition from domination of men to equal treatment for men and women during the several decades of Polish expeditions to scientific stations in the Arctic and the Antarctic. This research has been based on the data available in the archives and at the database created within the project *Female polar explorers* (*Polarniczki* in Polish), which contains information about the number of female participants of expeditions to Polish research stations. Women participated in the seasonal expeditions almost from the very beginning when Polish research stations were established in 1970s and 1980s, but a significant increase of female participants is visible especially at year-round stations in the second decade of the 21st century. In 1984, the first Polish female scientist overwintered in the Antarctic and in 1996 in the Arctic. In 1986, the first woman became a leader of a summer scientific expedition to Spitsbergen, and in 1991 a first woman became the leader of a year-long expedition to Arctowski Station. In the presented database, there are 825 records, that correspond to 417 surnames of female participants in Polish polar expeditions, 145 participated in more than one expedition. Women who were working at Polish polar research stations represented a variety of occupations, but most of them were scientists or combined science and station service. The collected data clearly show that the days when the presence of women at polar stations was restricted are a thing of the past.

Keywords: the Arctic, Antarctica, women in polar science, women in science, polar scientific stations, polar herstories.



Introduction

Even though Poland is a country situated in the mid-latitudes it has a strong presence in scientific research both in the Arctic and the Antarctic and a long history of polar exploration. It all began at the end of 19th century, when Polish scientists Henryk Arctowski and Antoni Bolesław Dobrowolski participated in the Belgica Expedition (1897–99; Cook 1998), the first scientific expedition that overwintered in Antarctica. The first Polish scientific expedition to the Arctic that overwintered on Bjornøya was organized in 1932, only 14 years after Poland regained independence in 1918 (Birkenmajer 2002). Nowadays Polish scientific institutions manage or use two year-round and eight seasonal scientific facilities in the Arctic and Antarctic (Fig. 1 and Table 1) giving Polish scientists a possibility to conduct research in polar areas. Nevertheless, similarly to many other countries (Nash *et al.* 2019; Politis 2021; Devine 2022; Ryall 2022), the history of Polish polar exploration and scientific research was at the beginning dominated by men.

Fortunately, the world is changing, giving equal possibilities to female and male scientists. During the last decade the topic of women's contribution into various science fields has been undertaken in many projects, some of them concerning polar science and exploration. There are scientific research and popular-science projects that not only promote women's impact but also encourage young female scientists to be involved in polar research.

The book *Women in Antarctica – Women on the ice* (1986) by Elizabeth Chipman, an Australian writer, who was the first female to set foot on the Antarctic mainland in 1975–76, shows the untold history of women's presence in the far South. It was followed by other publications on women's contribution to

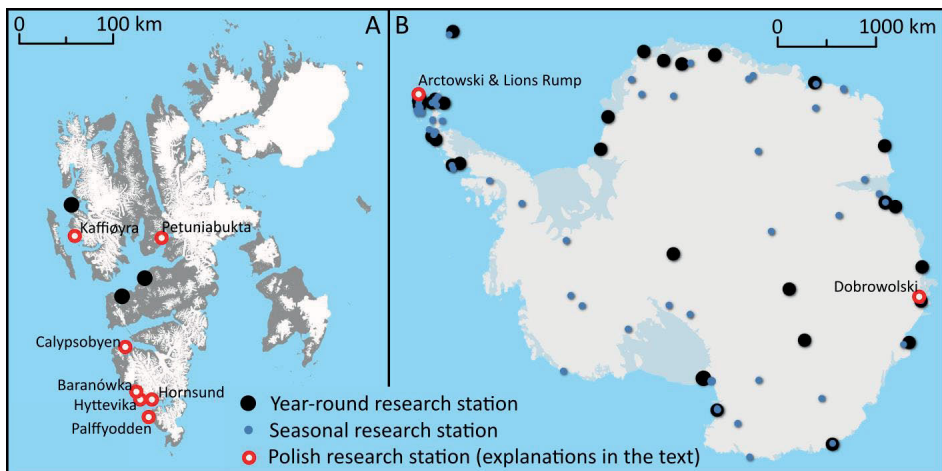


Fig. 1. Research stations in Svalbard (A) and Antarctic (B). Maps based on: Melvær (2014), COMNAP Antarctic Facilities (2023) and SCAR Antarctic Digital Database (2023).

Table 1.

Polish research stations in the Arctic and Antarctica. For the locations see Fig. 1.

| | Official name | Management unit | Common name used in the paper | Operating since |
|------------|--|---|-------------------------------|-----------------|
| Year-round | Henryk Arctowski Polish Antarctic Station | Institute of Biochemistry and Biophysics, Polish Academy of Sciences | Arctowski Station | 1977 |
| | Stanisław Siedlecki Polish Polar Station Hornsund | Institute of Geophysics, Polish Academy of Sciences | Hornsund Station | 1956* |
| Seasonal | Lions Rump | Institute of Biochemistry and Biophysics, Polish Academy of Sciences | Lions Rump** | 2008 |
| | Antoni Bolesław Dobrowolski Polish Antarctic Station | Institute of Geophysics, Polish Academy of Sciences | Dobrowolski | 1959 |
| | – | Governor of Svalbard | Palffyodden*** | 1981 |
| | – | Governor of Svalbard | Hyttevika*** | 1980 |
| | Stanisław Baranowski Polar Station | University of Wrocław | Baranówka | 1970 |
| | Calypsobyen Polar Station | Maria Curie- Sklódowska University in Lublin | Calypsobyen | 1986 |
| | Petuniabukta Polar Station | Adam Mickiewicz University in Poznań | Petuniabukta | 1984 |
| | Nicolaus Copernicus University Polar Station | Nicolaus Copernicus University in Toruń | Kaffiøyra | 1975 |

* year-long expeditions since 1978

** official name: Lions Rump CCAMLR Ecosystem Monitoring Program site – operating similar to seasonal stations

*** no official status of Polish research station; wooden historical huts used seasonally by Polish scientists as field bases.

polar regions, although it was not until two decades later. The beginning of the 21st century brought a new wave of popular-science and non-fiction literature dedicated to the history of female polar explorers and scientists. The books worth mentioning include: *Polar wives: the remarkable women behind the world's most daring explorers* by Kari Herbert (2012), *The Polar adventures of a rich American dame: A life of Louise Arner Boyd* (2017) and *Antarctic pioneer: The trailblazing life of Jackie Ronne* (2022) by Joanna Kafarowski, *Antártica: relatos de EXPLORADORAS en el corazón del planeta (Antarctica: stories from EXPLORERS in the heart of the planet)* by Nadia Politis (2021) and *Polare*

kvinner. Norsk polarhistorie i kjønnsperspektiv (Polar women. Norwegian polar history in a gender perspective) by Anka Ryall (2022).

Along with the paper editions came online resources dealing with female polar stories, also called ‘herstories’. There are separate projects, e.g., Women in Polar Science (2014–2023) started in 2014 or Women in the Arctic and Antarctic (2020–2023) established in 2020, which main aim is to promote different types of women’s activity (scientific, political, professional, sport, etc.) in polar regions. These projects are also platforms that give a possibility to share experience and start collaboration.

Some stories were published only on the Internet. Although they are not peer-reviewed works, they are published either at the official sites of national polar institutions or popular-science websites and should be considered credible. To mention a few examples of such online resources: *The first women in Antarctica* on blog Oceanwide Expeditions (2016), *The evolving role of women at BAS* (The evolving role of women at BAS 2019), *Women in polar research: A brief history* by Morgan Seag (2019) and *Women and minorities in Antarctica* by Laura Boyall (2021). The fact that some scientific conferences had panels dedicated to discuss various topics connected with women’s work and presence in polar expeditions (Starkweather *et al.* 2018; Nash *et al.* 2019; session *Women on Arctic fieldwork* during Arctic Safety Conference 2021) also shows the importance of the topic.

In 2019, Dagmara Bożek started a project *Polarniczki (Female polar explorers)* aiming to gather available information as well as stories about Polish women participation and contribution to expeditions to the polar regions. The project focuses on the following questions: Who were those women? What was their motivation? What were their occupations? How did they perceive the polar environment? Was it only a short adventure or a life-long work? Who was the first one to participate in an expedition and who to overwinter? How many of them were there? Were they treated equally? Dagmara Bożek is looking for answers to these and many other questions.

The project resulted in the popular-science book *Polarniczki. Zdobywczynie podbiegunowego świata (Female polar explorers. Women who conquered the polar world)* (Bożek 2021) and a website dedicated to the project (<https://polarniczki.pl/>), where new stories are published. The answers to the questions mentioned earlier can be found there as well as to some new ones that arise. Gathering information to the project also has led to creation of the database containing information about the number of female participants of expeditions to the Polish research stations. Although the book contains a lot of facts, the full database has not been published yet. It is worth noting that the topic of the history of women in Polish polar expeditions has not yet been more widely described in the scientific literature, neither Polish nor foreign.

Therefore, the aim of this paper is to provide new data to the topic of women presence in the Polish polar research history. The collected information clearly

shows the change from domination of men to equal treatment for men and women over the several decades of Polish polar expeditions to the Arctic and the Antarctic. Additionally, the goal is to present that important part of Polish polar history to the international community.

Methods

Gathering historical data always leaves some level of uncertainty. We have decided to present information that concerns Polish women that have worked in scientific and technical positions at Polish expeditions to Polish polar stations in both types of polar expedition, *i.e.*, year-round (*ca.* twelve months) and seasonal (from a couple of days to a few months long). We are confident that we have managed to gather all available data. However, there have also been foreign female participants in Polish expeditions, Polish women that have participated in expeditions to foreign research stations or that have participated in research expeditions on research vessels. We have not included such cases in the database, since we have too little data.

The main data sources have been the archives of particular stations; some have been published on the Internet. Moreover, the data has been supplemented with the information available in the diaries of expedition participants, books and papers published in the press. Very important data sources were also interviews with expedition members, polar scientists and logistical support managers. Altogether, 61 interviews were completed up to September 13, 2023.

Since some of the women participated in more than one expedition, while counting female expedition participants and their professions, we counted separately the 'cases' and the individuals. We have presented the number of women compared to the number of men only for overwintering groups at Arctowski and Hornsund stations and for Kaffiøyra, since in these cases complete data about each expedition participants' number is available. In the database, we included data up to 2023, excluding data from Arctic summer expeditions and a year-long expedition to Hornsund Station that started in June 2023 and expeditions to the Antarctic that started at the end of 2023.

In this paper, we take into consideration data concerning ten scientific facilities in polar regions maintained or used by Polish research institutions. There are two year-round stations (Arctowski Station and Hornsund Station), six seasonal stations operating every year or occasionally during Arctic and Antarctic summer (Lions Rump, Dobrowolski, Baranówka, Calypsobyen, Petuniabukta and Kaffiøyra) and two huts (Palffyodden and Hyttevika) used by different scientific groups during field works. Although Lions Rump is a summer camp run by Arctowski Station, we have decided to present data concerning that facility separately. People who worked there usually had very little contact with Arctowski Station staff, which was limited to a few short visits during

the summer season. In order to make it easier for a reader, we have used common names of research stations instead of official ones, explanations are given in Table 1.

Results

Milestones. — First Polish female expeditioners were not scientists. In 1900, Stefania Neugebauer, *née* Tschinkel with her husband Franciszek Neugebauer, a physician from Warsaw, and Zofia Kindler from Łódź, were the first known Polish female tourists who reached the Arctic. They participated in a cruise to Spitsbergen on the Augusta Victoria vessel of H.A.P.A.G. line from 4th until 26th of July 1900 (Sobczyk 2020). The first Polish woman to live on Svalbard was Irena Guzowska. She and her husband Stanisław Guzowski, an engineer and a pioneer in the modernization of coal mines on Spitsbergen, came to Ny-Ålesund in 1956, where he served as the deputy director of the mine (Schramm 1996).

The first Polish woman to Antarctica was Alina Centkiewicz (Fig. 2). In 1958–59, together with her husband Czesław Centkiewicz, she took part in an expedition to East Antarctica. Officially, she was not an expedition member, but a writer and a scholarship recipient of the Polish Ministry of Culture (Cisak 2015; Bożek 2021). Here, it is worth stressing that before Polish female scientists began participating in national polar expeditions, they had taken part in foreign expeditions.

Here, Aniela Kozłowska should be mentioned. She was a botanist, paleobotanist and phytosociologist, a graduate of Jagiellonian University in Cracow

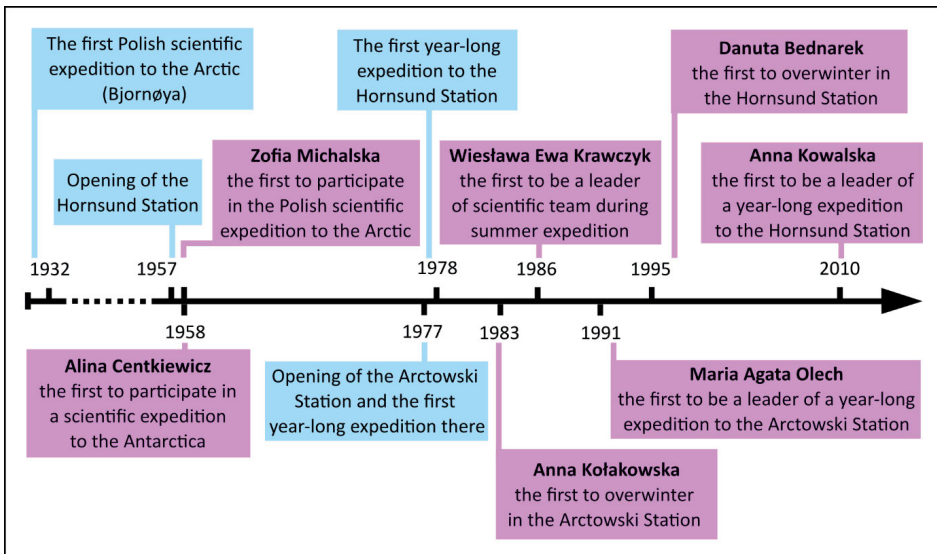


Fig. 2. Female's milestones in the history of the Polish polar stations (pink) in the timeline of Polish polar history milestones in the 20th century (blue).

and a participant in international scientific expeditions, who conducted research at the Abisko polar station in northern Sweden in 1933 (Hausbrandt 1983). It was not until more than 20 years later when the first female researcher took part in a Polish expedition to the Arctic. It was Zofia Michalska, a geographer from the University of Warsaw (Figs. 2–3). She came to Spitsbergen in 1958 together with her supervisor, geologist Stefan Zbigniew Różycki (Siedlecki 1964).

The 1950s were the beginning of the women's presence in Polish polar expeditions. From the 1970s and 1980s increasingly regular participation of women in summer expeditions to the Arctic and Antarctic is observed. In the history of Polish polar expeditions, this is the period when Polish year-round and seasonal research stations were established and began their activities (Table 1 and Fig. 2). All of them have been functioning until today. The 1970s was also the period when women's participation in polar expeditions slowly began to be recognized internationally (Seag 2019). Consequently, the 1980s was a period that marked some significant changes in the history of women on polar



Fig. 3. Female Polish polar pioneers: (A) Zofia Michalska, (B) Maria Agata Olech on a ship anchoring in Admiralty Bay close to Arctowski Station, (C) Anna Kołakowska close to Arctowski Station, (D) Wiesława Ewa Krawczyk in Svalbard (Kinnvika). Photo sources: A: wikipedia.org; B, C and D: private archives (C photo credits: E. Kołakowski, D photo credits: A. Kies).

expeditions. Anna Kołakowska, a biotechnologist, was the first Polish female scientist to participate in two year-long expeditions to Arctowski Station (1983–84, 1985–86). The first woman overwintered in Hornsund Station 10 years later. It was Danuta Bednarek, a geologist, in 1995–96. In 1986, the first woman became a leader of a summer scientific expedition to Baranówka on Spitsbergen. It was Wiesława Ewa Krawczyk, a geochemist (Figs. 2–3).

The real breakthrough came in the 1990s, when Maria Agata Olech, a lichenologist, was the first woman to become a leader of a year-long expedition to Arctowski Station (1991–92; Fig. 3). In comparison, the first female leader of a year-long expedition to the Hornsund Station was Anna Kowalska, a geographer, almost 20 years later in 2010–11 (Fig. 2).

Database results. — In the database collected within the *Female polar explorers* project, there are 825 records, which correspond to 417 surnames of female participants in Polish polar expeditions. Number of women in individual years in a particular research station is given in Table 2 and Fig. 4. Out of the 417 mentioned, 145 are women who have participated in expeditions more than once. The most prominent examples are: Barbara Wiśniewska-Wojtasik, a hydrobiol-

Table 2.

Number of women that have participated in expeditions to Polish research stations.

Colour intensity marks high numbers; 'no' – no data; '-' – no expeditions.

In case of expeditions that had begun in one year and ended in the next one, the participant was assigned to the year of the beginning.

| Year | Arc-towski | Horn-sund | Bara-nówka | Kaf-fjøyra | Calypso-byen | Petunia-bukta | Palffy-odden | Hytte-vika | Lions Rump | Dobrowolski |
|------|------------|-----------|------------|------------|--------------|---------------|--------------|------------|------------|-------------|
| 1958 | - | 1 | | - | - | - | - | - | - | - |
| 1960 | - | 1 | - | - | - | - | - | - | - | - |
| 1970 | - | - | 0 | - | - | - | - | - | - | - |
| 1974 | - | - | 3 | - | - | - | - | - | - | - |
| 1975 | - | - | - | 0 | - | - | - | - | - | - |
| 1976 | 0 | - | - | - | - | - | - | - | - | - |
| 1977 | 4 | 1 | - | 0 | - | - | - | - | - | - |
| 1978 | 5 | 2 | 0 | 3 | - | - | - | - | - | - |
| 1979 | 9 | 3 | 1 | 0 | - | - | - | - | - | 0 |
| 1980 | 1 | 10 | 3 | 2 | - | - | - | 2 | - | - |
| 1981 | 0 | 0 | - | - | - | - | 1 | - | - | - |
| 1982 | 0 | 1 | - | 0 | - | - | 1 | - | - | - |
| 1983 | 2 | 1 | 2 | - | - | - | 1 | - | - | - |
| 1984 | 0 | 1 | - | - | - | 0 | 1 | - | - | - |
| 1985 | 2 | 0 | 1 | 0 | - | 0 | 2 | - | - | - |
| 1986 | 2 | 4 | 2 | - | 2 | 0 | - | - | - | - |

| Year | Arc-towski | Horn-sund | Bara-nówka | Kaf-fjøyra | Calypso-byen | Petunia-bukta | Palffy-odden | Hytte-vika | Lions Rump | Dobro-wolski |
|------|------------|-----------|------------|------------|--------------|---------------|--------------|------------|------------|--------------|
| 1987 | 5 | 1 | - | - | 2 | 1 | - | - | - | - |
| 1988 | 4 | 2 | - | - | 0 | - | - | 1 | - | - |
| 1989 | 3 | 2 | - | 1 | 1 | 0 | 1 | - | - | - |
| 1990 | 2 | 1 | - | - | 0 | - | - | - | - | - |
| 1991 | 1 | 1 | - | - | 1 | - | - | - | - | - |
| 1992 | 0 | 1 | - | - | 0 | - | - | - | - | - |
| 1993 | 0 | 3 | - | - | 2 | - | - | - | - | - |
| 1994 | 0 | 1 | 1 | - | 1 | - | - | - | - | - |
| 1995 | 1 | 3 | - | 0 | 1 | - | - | - | - | - |
| 1996 | 1 | 3 | - | 1 | 1 | - | - | - | - | - |
| 1997 | 3 | 1 | 1 | 2 | - | - | - | - | - | - |
| 1998 | 1 | 4 | 1 | 1 | 0 | - | 1 | - | - | - |
| 1999 | 3 | 2 | 1 | 1 | 0 | - | - | - | - | - |
| 2000 | 1 | 3 | 1 | 5 | 1 | 0 | - | - | - | - |
| 2001 | 2 | 2 | 1 | 5 | 0 | 3 | - | - | - | - |
| 2002 | 1 | 4 | 1 | 3 | 0 | 2 | - | - | - | - |
| 2003 | 4 | 3 | 2 | 2 | - | 2 | - | 1 | - | - |
| 2004 | 3 | 4 | 3 | 1 | - | - | - | 3 | - | - |
| 2005 | 4 | 3 | 2 | 1 | 1 | 5 | - | 2 | - | - |
| 2006 | 7 | 2 | 2 | 0 | 0 | 2 | - | 2 | - | - |
| 2007 | 6 | 6 | 4 | 0 | 1 | 5 | - | 2 | - | - |
| 2008 | 9 | 11 | 3 | 1 | 0 | 2 | 2 | 2 | 1 | - |
| 2009 | 10 | 10 | 3 | 1 | 0 | 4 | - | 1 | 3 | - |
| 2010 | 4 | 12 | 4 | 1 | 1 | 1 | 1 | 4 | 1 | - |
| 2011 | 3 | 4 | 3 | 2 | 1 | 2 | - | 2 | 2 | - |
| 2012 | 2 | 11 | 4 | 0 | 0 | 5 | - | 3 | 1 | - |
| 2013 | 3 | 12 | 2 | 4 | 1 | 3 | - | 2 | 1 | - |
| 2014 | 7 | 7 | 1 | 3 | 3 | 3 | - | 2 | 0 | - |
| 2015 | 10 | 23 | 5 | 3 | 4 | 4 | 1 | 2 | 2 | - |
| 2016 | 8 | 12 | 6 | 2 | 6 | 10 | - | - | 2 | - |
| 2017 | 6 | 14 | 7 | 3 | - | 5 | - | 4 | 1 | - |
| 2018 | 12 | 13 | 4 | 2 | - | 9 | - | 6 | 2 | - |
| 2019 | 10 | 8 | - | 1 | - | 15 | 3 | 1 | 2 | - |
| 2020 | 9 | 14 | 3 | 1 | - | 0 | - | - | 3 | - |
| 2021 | 17 | 26 | - | 2 | 1 | 1 | 3 | no | 2 | 1 |
| 2022 | 11 | 7 | 1 | 2 | 1 | 4 | no | no | - | - |
| 2023 | no | 17 | 1 | 2 | 3 | 5 | no | no | - | - |

ogist – 17 expeditions (all Arctic seasonal expeditions); Małgorzata Błaszczuk, a glaciologist – 17 expeditions (16 Arctic seasonal and one Arctic year-long expeditions); Maria Agata Olech, a lichenologist – twelve expeditions (two Arctic seasonal expeditions, eight Antarctic summer expeditions and two Antarctic year-long expeditions); Katarzyna Greń, a geomorphologist – twelve expeditions (eleven Arctic seasonal and one Antarctic year-long expeditions); Wiesława Ewa Krawczyk, a geochemist – twelve Arctic seasonal expeditions. Besides the mentioned five records, there were 140 others that participated in polar expeditions from two up to eleven times. It indicates a strong commitment to the job, showing that in many cases working in polar regions is a long-term choice of professional career.

Women have participated in the seasonal expeditions almost since the very beginning when Polish research stations were established, but a significant increase of female participants is visible especially at year-round stations in the second decade of the 21st century. Despite the lack of comprehensive data on the subject, our observations indicate that, in year-round research stations, the ratio of male to female personnel is typically equal during the summer months.

For various cultural and social reasons, women's participation in year-long expeditions had been opposed for a long time. Even though, as mentioned above, there were women who overwintered in Arctowski Station in the 1980s and in Hornsund Station in the 1990s, it was not until the second decade of the 21st century, when women became regular participants of year-long expeditions (Fig. 4). During the last decade usually, there were 1–4 female participants in a year-long wintering group that consisted of 8–12 people. At Hornsund Station, from 1978, the number of participants in the wintering group has remained almost the same, and women have wintered regularly since 2008. At Arctowski Station, the number of wintering staff after 2004 has noticeably decreased to about ten people, and regular participation of women in year-long expeditions has been observed since 2015.

The seasonal station Kaffiøyra has a completely different dynamics of expeditions. They have not always been organized every year, and the number of participants has clearly varied over the years, due to logistic and financial issues. However, unlike year-round stations, women have participated in summer expeditions to the Kaffiøyra station almost since its opening.

There were 83 cases that a woman was a participant of a year-long expedition – 41 times in Hornsund Station, 41 in Arctowski Station and once in Kaffiøyra, which was exceptional since it was the only one year-long expedition to that station. In general, there were 71 women that overwintered. Ten out of mentioned 83 cases are women who overwintered more than once. Nine of them overwintered twice and one, *i.e.*, Joanna Perchaluk, four times in Hornsund Station.

Women who were working at Polish polar research stations represented a variety of occupations, but most of them were scientists or combined science

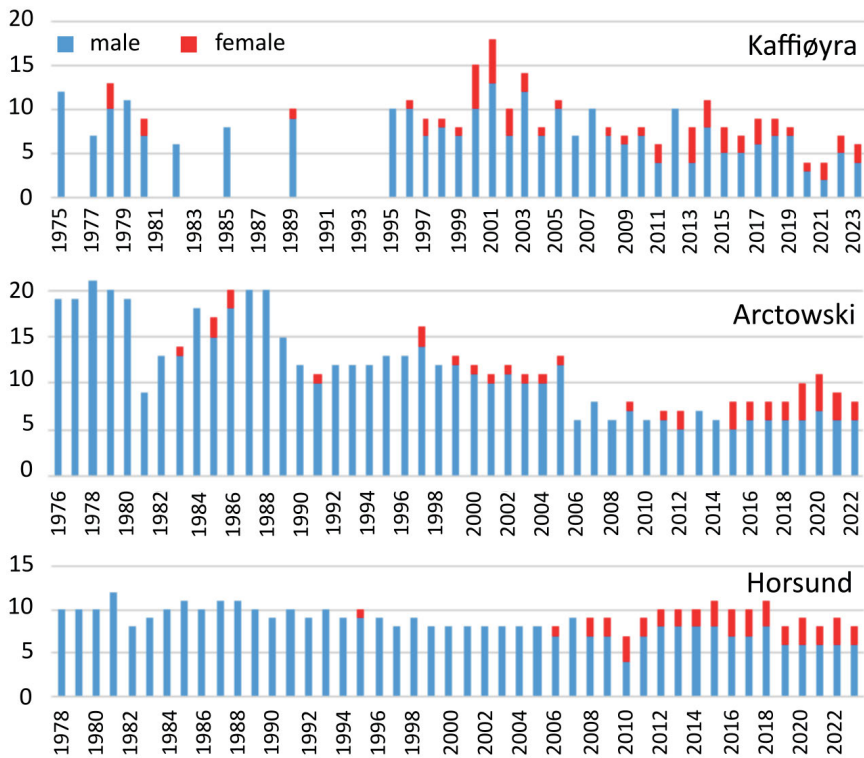


Fig. 4. Number of men and women participating in expeditions to Kaffiøyra and year-long expeditions to Hornsund and Arctowski stations. Data source: list of expeditions to Arctowski Station on <https://arctowski.aq/en/list-of-expeditions/> (accessed on 3rd of October 2023), list of expeditions to Hornsund Station on https://hornsund.igf.edu.pl/?page_id=1048&lang=en (accessed on 3rd of October 2023), list of expeditions to Kaffiøyra on <https://stacjapolarna.umk.pl/uczestnicy/> (accessed on 3rd of October 2023), and list of female expeditioners participating in Polish polar expeditions to the Arctic and Antarctic on <https://polarniczki.pl/uczestniczki-wypraw/> (accessed on 3rd of October 2023).

and station service (Table 3). In Table 3, the category ‘science and station service’ includes all who were conducting research at seasonal stations and who were involved in environmental monitoring conducted at the year-round stations. Seasonal expeditions usually consist of less than ten people who beside scientific research share all other duties. Similarly, people employed as environmental observers are also responsible for help in the general station maintenance. The category ‘science’ includes those who were conducting their own research during summer at a year-round station. In such cases, usually, they can focus only on the research and are not involved in the station’s service. Those two categories together constitute 83% of all cases, followed by positions in education, kitchen work, administration and logistics (Table 3).

The history of women in Polish polar expeditions shows equal status of women in science, recognized quite early. The data collected shows a very small

Table 3.

Job positions of women working at Polish research stations.

| Job position | Number of cases | Share [%] |
|------------------------------------|-----------------|-----------|
| Scientific and station's service | 402 | 48.7 |
| Scientific | 283 | 34.3 |
| Educational | 26 | 3.2 |
| Cook | 15 | 1.8 |
| Logistic | 15 | 1.8 |
| Cook's assistant | 14 | 1.7 |
| Administrator | 8 | 1.0 |
| Administrator and cook's assistant | 9 | 1.1 |
| Other | 14 | 1.7 |
| Journalist | 11 | 1.3 |
| Year-long expedition leader | 8 | 1.0 |
| Medic or paramedic | 6 | 0.7 |
| Summer expedition leader | 4 | 0.5 |
| Motorboat driver | 3 | 0.4 |
| Station service – other | 3 | 0.4 |
| Artist | 2 | 0.2 |
| Electronic engineer | 1 | 0.1 |
| Architect | 1 | 0.1 |

percentage of women employed in technical positions. There are also positions at year-round stations for which women were not hired at all, including: power engineer, mechanic, electrician, IT specialist. This is due to the fact that in Poland there are still few women working in technical positions in comparison to men (Paliychuk 2023), and that few women apply for technical positions at the research stations in the recruitment process. Thus, it is worth noting three technical positions held by women that stand out: an architect (Krystyna Baranowska, Baranówka, seasonal expedition 1974), an electronics engineer (Sylvia Łukawska, Arctowski Station, year-long expedition 2012–13) and a zodiac driver (Justyna Olbrycht, Arctowski Station, seasonal expeditions 2018, 2019 and 2020).

Discussion

International context of the milestones of Polish female presence in polar regions.— The history of Polish women's participation in polar expeditions mirrored similar activities by women of other nationalities. In the 1920s,

American Louise Arner Boyd, known as the ‘Arctic Diana’, was a participant and organizer of scientific expeditions to the Arctic (Kafarowski 2017; Isaksson and Ryall 2023). In the 1950s, she was the first woman to fly over the North Pole (Kafarowski 2017). Also in the 1920s, a Russian marine geologist Maria Klenova took part in research cruises to the Arctic. In 1929, she became the first woman in the world to lead a marine scientific expedition. She was also the first woman to carry out a program of scientific work in her own discipline in Antarctica during the First Soviet Antarctic Expedition 1955–56, when Mirny station was established (Oceanwide Expeditions 2016; Kawalli 2021). In contrast, the story of Americans Edith Jackie Ronn and Jennie Darlington was totally different. They were the first women to overwinter in Antarctica in 1947–48. Together with their husbands, Finn Ronne and Harry Darlington, respectively, they took part in the research expedition – one as a secretary, second as a hostess (Kawalli 2021; Kafarowski 2022).

As shown above, it is evident that the participation of Polish women in polar expeditions chronologically does not deviate from the situation in the history of polar research of other countries. An interesting topic for further exploration is the question of how the statistics of women’s participation in Polish polar expeditions relate to similar data from foreign polar national programs. This type of comparison was not carried on in the *Female polar explorers* project.

Project dissemination. — The importance of promoting a women’s contribution to polar research is also worded in the interest that the *Female polar explorers* project evoked. Information about it has appeared in various types of Polish media (radio, newspapers, *etc.*) and forms (a podcast, an interview, a report, a reference in a scientific publication, *etc.* <https://polarniczki.pl/> 2019–2023 (accessed on 3rd November 2023)). In addition, the project has attracted the interest of foreign scientists, as evidenced by academic publications where the history of Polish female polar explorers and the information about the documentary film ‘Ant/Arctic Women’ is included (Rogatchevski and Szymala 2023). The aforementioned documentary film directed by Kuba Witek is another example of the further development of the project. The documentary is based on a book *Female polar explorers. Women who conquered the polar world* by Dagmara Bożek and tells personal stories of five female Polish scientists, who worked in polar regions in past decades (Witek 2023). In 2023, the film was screened at Polish and foreign film festivals, where it won several awards and was presented at closed screenings organized for public and scientific institutions. It is worth emphasizing here that both the project, the book and the film have helped to popularize the scientific activities of Polish women in the polar regions and spread the term *polarniczka* (*female polar explorer*) as an equivalent to the male form *polarnik* (*polar explorer*) in Polish language.

Conclusions

The data collected on the activities of women at Polish research stations in the Arctic and the Antarctic clearly show that the days when the presence of women at a polar station was restricted are a thing of the past. Today, the number of women working at Polish research stations is growing, and they are taking up more and more positions within the expedition, not only scientific and administrative ones. The perception of women's professional competence is also changing, resulting in the emergence of women in leader positions during year-long polar expeditions.

The milestones in the history of women on Polish polar expeditions presented in this paper are the turning points. Putting the collected surnames of female participants in polar expeditions into numbers shows the gradual transition from the absence of women on expeditions to their full-fledged participation. The project *Female polar explorers* is still ongoing and we will be thankful to anyone who is willing to share his or her memories or data.

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