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POLISH POLAR RESEARCH IN THE FIELD OF METEOROLOGY AND CLIMATOLOGY

Introduction

The history of polar research in meteorology and climatology being conducted by Poles as part of scientific expeditions is very long, dating back to 1897-1899, when Henryk Arctowski and Antoni Dobrowolski worked in Antarctica as members of the Belgian Antarctic expedition. Meanwhile, Birkenmajer

reports (2017) that during the First International Polar Year (1882-1883) the head of the meteorological station in Malye Karmakuly on Novaya Zemlya (Russian Arctic) was the Pole Leon Hryniewiecki – a doctor by education. This Antarctic expedition was the impetus, after Poland had regained independence, to organise many independent Polish polar expeditions, conducting meteorological research to a greater or lesser extent.

This article reviews and summarises the achievements of Polish meteorological and climatological research in polar regions. Because its history extends already to one hundred and twenty years, this is not the first attempt at such a synthesis. However, never before, except for the study by Przybylak (2000a) that was territorially limited to Spitsbergen, has this task been undertaken in a single review article. The authors' task was somewhat facilitated by the jubilee 25th Seminar of Polar Meteorology and Climatology (in Gdynia in 2015), when polar meteorological and climatological research conducted in the post-war period by employees and students of Polish universities and research institutes was summarised. The papers presented at that time were published in the 25th issue of *Problemy Klimatologii Polarnej* (Gluza, Siwek 2015; Marsz, Styszyńska 2015; Migala et al. 2015; Niedźwiedź 2015; Przybylak et al. 2015; Rachlewicz, Zwoliński 2015; Ustrnul 2015). Earlier, the results of Polish polar research, though concerning all scientific disciplines, were presented for the 40th anniversary of independent Polish expeditions and were published in the second issue of the journal *Czasopismo Geograficzne* in 1973 (Baranowski 1973; Birkenmajer 1973; Dylik 1973; Galon 1973; Kosiba 1973; Różycki 1973).

The history of research before World War II

By 1939, Poles had taken part in six polar expeditions, including four organised by Polish research institutions or associations. Basic information on the scope of the meteorological observations then carried out and the studies resulting from these expeditions are presented below. A three-person trip to Spitsbergen in 1936 has been omitted, as it was of a purely sporting and exploratory nature (Birkenmajer 1973).

Meteorological observations made during the cruise of the ship *Belgica* in 1897-1899 financed by the Brussels Geographical Society significantly contributed to knowledge of the Antarctic climate. They were led by two prominent Polish researchers, Henryk Arctowski, the expedition's principal scientist, and Bolesław Dobrowolski. Among numerous studies summarising the expedition, the most important include *Reports scientifiques. Expedition Antarctique Belge, Resultats du Voyage du S.Y. Belgica ...* (Arctowski 1904) and *The Natural History of Ice* (Dobrowolski 1923).

The first independent Polish polar expedition was organised by the National Meteorological Institute (PIM) as part of the 2nd International Polar Year 1932/1933. Its destination was Bear Island (Svalbard Archipelago) in the western Barents Sea. Five researchers took part in the summer part of the expedition – Czesław Centkiewicz, Jan Gurtzman, Jan Lugeon, Władysław Łysakowski and Stanisław Siedlecki. Three of them spent the full thirteen months in Svalbard, conducting regular meteorological observations (Siedlecki), terrestrial magnetism measurements (Łysakowski) and research on the ionosphere and the aurora borealis (Centkiewicz). These became the foundation of the work *Wyniki spostrzeżeń polskiej wyprawy Roku Polarnego 1932/33 na Wyspie Niedźwiedziej* [Observation results of the 1932/33 Polar Year Polish expedition on Bear Island] (Lugeon et al. 1936). Further details on the meteorological observations then made can be found in the article by Przybylak (2000a), which study also describes later trips to Svalbard, this time to the island of Spitsbergen in 1934 (Torell Land) and 1938 (Kaffiøyra Plain). The observational source materials from both expeditions are lost. Rather general information about the weather conditions on Torell Land can be found in publications by Różycki (1936a,b), part of which was also cited in the study by Przybylak (2000a).

In addition to expeditions to Spitsbergen (Table 1), Poles also participated in studies of Greenland in 1934 and 1937. In the first expedition, organised by the Danish Geodetic and Geophysical Institute, the only Polish researcher to take part was Aleksander Kosiba. He was a member of the geophysical and geodetic group whose tasks included documenting meteorological conditions (Kosiba 1973). Kosiba does not mention conducting meteorological observations during the expedition, but his participation in the expedition resulted in the first monograph on Greenland to be published in Polish (Kosiba 1937), which devoted one chapter to the island's climate. The first independent Polish expedition to Greenland (the area between the Nordre Ström fjord and Disco Bay) arranged in 1937 by the Geographical Society in Lviv yielded a much richer bibliography (Kosiba 1973; Józefczyk et al. 2010; Köhler 2017; Miękała et al. 2017). Seven people took part in it, and its principal investigator was A. Kosiba. Meteorological measurements were carried out at the expedition base ($\varphi = 67^{\circ}50'N$, $\lambda = 50^{\circ}10'W$, $h = 23$ m a.s.l.), at three observation times (7:00, 13:00 and 21:00 local time) from 18 June to 23 August. They were mainly performed by S. Siedlecki, assisted by Alfred Jahn, who was prevented from doing field work by a leg injury (Jahn 1969, 1991; Józefczyk et al. 2010). The meteorological observation results have been preserved, except for the heliograms, which were destroyed during World War II. In recent years, some of the surviving documentation has been found at the University of Wrocław (UWr), and further materials are available courtesy of the Kosiba family and Dr Maria Jahn (Józefczyk et al. 2010). The cited publication contains a detailed description of the scope of meteorological observations and a brief discussion of meteorological conditions. A. Kosiba also described

the extensive scope of observations made during the 1937 expedition in the article *O udziale Polaków w badaniach Grenlandii* [On the participation of Poles in studies of Greenland] (1973). It should be noted that in this work, the researcher most likely gave an incorrect height (9 m above ground level) for measuring wind force with a Wild anemometer. According to preserved meteorological diaries (cited by Józefczyk et al. 2010), it was 4.5 m a.g.l. Kosiba also mentions that automatic air temperature and humidity measurements (a thermograph and a hygograph) and atmospheric pressure (a barograph) began on June 27, 1937 on the ice sheet ($\varphi = 68^{\circ}01'N$, $\lambda = 50^{\circ}00'W$), at 568 m a.s.l. and 18 km from its west bank.¹ The information he provides does not make clear whether the materials from these observations survived – this documentation has not thus far been found in the family collections of A. Kosiba or A. Jahn, nor at the University of Wrocław.

The history of research after World War II

The activity of Poles in polar meteorological and climate research after 1945 is so substantial as to be treated in three thematic blocks: *Scientific expeditions – area and scope of research*, *Research issues* and *Conferences, publications and academic dissertations*. Analysis also clearly distinguishes three major periods of heightened activity. The first was associated with two initiatives – the International Geophysical Year 1957/1958 (also known as the 3rd International Polar Year) and the International Geophysical Cooperation 1959. It was at that time that the Polish Academy of Sciences organised a nationwide year-round expedition to Hornsund (Spitsbergen), during which the polar station that exists to this day was built (1957). In addition, summer expeditions were organised in 1958-1960 and 1962 (Przybylak 2000a). There was another period of increased polar activity in the second half of the 1970s, when the polar station in Hornsund was reactivated and a new one was built on King George Island (Antarctica). At the same time, “regional” summer expeditions were organised, mainly by universities (Nicolaus Copernicus University, Szczecin Maritime University, University of Silesia, University of Wrocław, University of Warsaw and the Jagiellonian University). Martial law and economic difficulties significantly reduced the polar activity of Polish researchers in the 1980s. However, expeditions that continue to this day were begun in that period by Adam Mickiewicz University (1984) and Marie Curie-Skłodowska University (1986). The latest increase in interest in polar research (including meteorological and climatological research) dates to the 1990s and associated with the 4th International Polar Year 2007-2009 and its preparatory period (2005-2007). This commitment seems not to be diminishing and is increasingly visible in national and international research projects.

¹ Automatic recordings were made monthly.

Scientific expeditions: area and scope of research

Until the early 1990s, research by Polish scientists into Arctic and Antarctic weather and climate conditions largely consisted in working on the results of meteorological observations made during polar expeditions. Later, and especially with the spread of the Internet and free access to data, meteorological data available in global data centres and meteorological institutes of the polar states began to be used increasingly extensively for this purpose. The topics touched by new scientific studies also began to change, from initially narrowly addressing local issues and usually reporting raw data, towards the broader and more significant research issue of global warming, which is particularly visible in the Arctic. This aspect is described in more detail in the section *Research Issues*.

All land polar expeditions since World War II are listed in Table 1, along with information about the type of research carried out. In this period, as already signalled by the authors, there is a clear change in research activity in the field of meteorology and climatology. Most of the polar expeditions in the years 1957-2018, in which measurements were made by meteorologists or climatologists or students of climatology, were organised or co-organised by the following scientific institutions: IG PAS (42), NCU (35), UMCS (26), UWr (23) and AMU (20). Other universities and research institutes organised several expeditions. Meteorological measurements and observations were carried out at that time in Antarctica (Arctowski Station and Dobrowolski Station) and in the Arctic (Siedlecki Station and regional stations), though the northern polar zone was clearly predominant, and Spitsbergen in particular (Figs 1 and 2). The Institute of Meteorology and Water Management (IMGW) played an important role in organising and conducting observations at Polish polar stations from the time of their very creation. It participated actively in implementing the programme of each central expedition that operated from the aforementioned stations.

One of the basic tasks of the first centrally organised polar expeditions (both at the PAS Siedlecki station in Hornsund and at the PAS Arctowski station) was to build classic meteorological stations equipped with standard measuring instrument sets, allowing the synoptic stations' observation programmes to be implemented. From the moment of their launch, they made measurements and observations at three-hour intervals, i.e. main and intermediate synoptic hours. The results were transmitted to the Global Telecommunications System as SYNOP reports, so both stations were from the very outset registered with the World Meteorological Organisation (Siedlecki Station as number 01003, Arctowski Station as 89052). The Hornsund station was included into the Norwegian observation and measurement network and forwarded the relevant reports to Longyearbyen. Additionally, at the request of the Norwegians, specialist tests were conducted for aviation safety requirements and, if necessary,

METAR reports were sent to Longyearbyen. At the Arctowski station there was a small meteorological forecasting office in the early days, due to the facility's distinct nature and the fisheries research programmes being implemented there. Let us here note that meteorological research at both Polish polar stations was both technically and substantively supervised and coordinated by a purpose-made cell under the IMGW and called the Independent Laboratory of High-Seas and Polar Research (1978), which was managed from the outset by Danuta Wielbińska from the Gdynia branch. It is thanks to her knowledge, efforts and persistence that these studies were launched and then continued for many years. She also initiated the publication of meteorological yearbooks, which are discussed in more detail in the final part of the article. Early in 1990, the laboratory changed name, and management was entrusted to Mirosław Miętus.

Although meteorological measurements and observations were also made in Iceland and the Northern Urals (Fig. 1), Spitsbergen undoubtedly was and remains the most important region for polar research conducted by Poles, as evidenced by the number of expeditions organised (Table 1), their wide territorial scope (Fig. 3), the number of polar stations (Fig. 2) and the abundant associated bibliography. The types of meteorological observations distinguished by Przybylak (2000a) for Spitsbergen, which in this paper are updated and expanded to both polar zones, are clearly dominated by the "meteorological measurements" category (most often standard, MM), then topoclimatic investigations (TI) and somewhat less often investigations of components of radiation balance (ICRB) (Table 1).

Meteorological measurements and observations were made not only during the above-described polar land expeditions, but also during marine

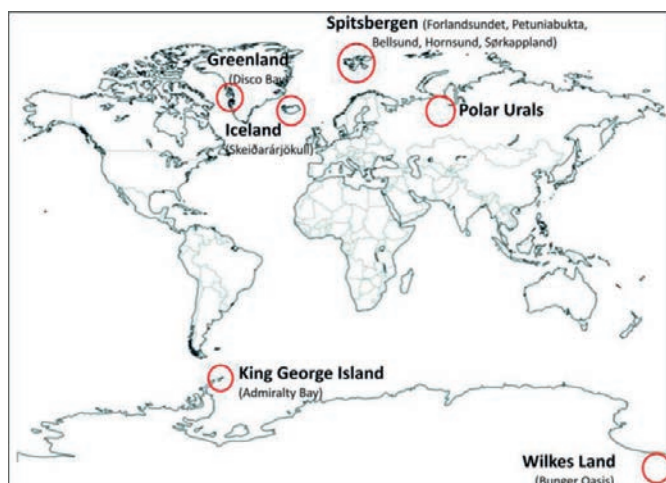


Fig. 1. Areas of Polish polar meteorological and climatological investigations in the world

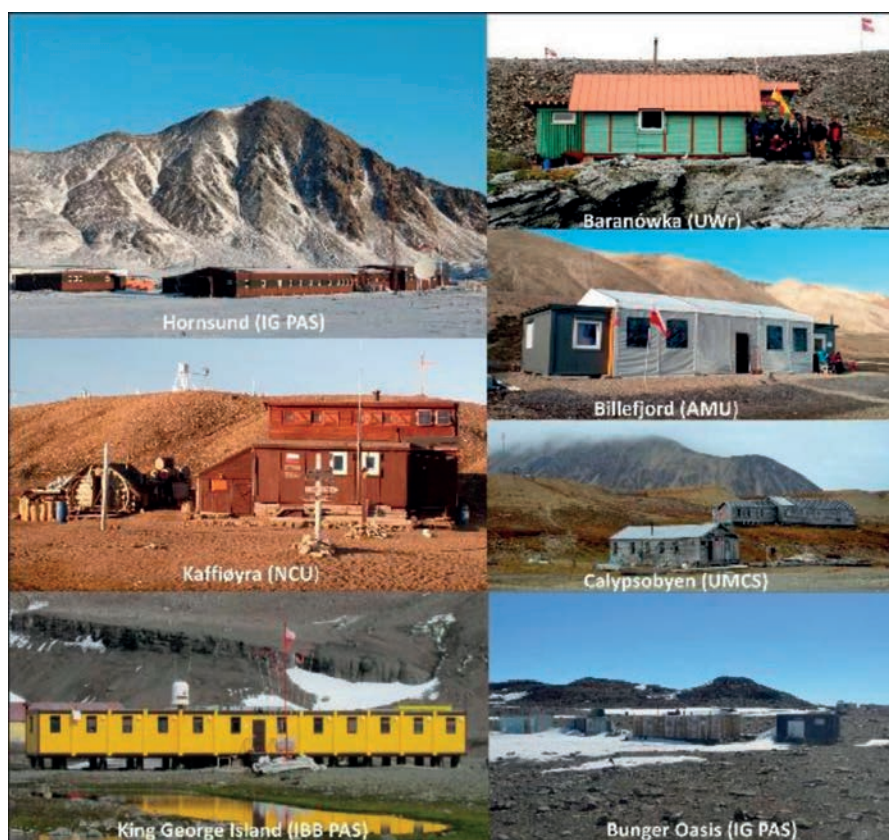


Fig. 2. Polish Arctic and Antarctic stations

expeditions organised by the Maritime University of Gdynia² and the Institute of Oceanology PAS in Sopot. During each of the ship's Antarctic and Arctic cruises (including standing at anchor) organised by GMU in Gdynia from 1977 to 1988, meteorological observations were made every three hours. They were then sent by radio as SHIP reports, and, in accordance with applicable regulations, the original observation logs were forwarded to the port meteorological agent from the IMGW's Maritime Department for inspection. This material was digitised and saved in a form determined by the WMO, and then delivered to the regionally appropriate maritime data centres. These data eventually ended up in the ICOADS global maritime observation and measurement da-

² In 2001, it was renamed from "Wyższa Szkoła Morska" to "Akademia Morska", and in 2018 to "Uniwersytet Morski w Gdyni".



Fig. 3. Area of investigations of Polish polar expeditions to Svalbard during which meteorological measurements were carried out (Przybylak 2000a); key: 1 – settlements, 2 – areas of investigations of regional (summer) polar expeditions organised mostly by universities (AMU – A. Mickiewicz University, NCU – Nicolas Copernicus University, UW – University of Warsaw, UMCS – Maria Curie-Skłodowska University, UWr – University of Wrocław, US – University of Silesia, JU – Jagiellonian University, 3 – scientific mountain-climbing or pure mountain-climbing expeditions, 4 – area of investigations of the “central expeditions” (mostly year-round)

tabase.³ The results of maritime observations by Gdynia Maritime University and the Institute of Oceanology PAS in Sopot were and continue to be widely used in works on the maritime climate of both circumpolar areas. Their availabil-

³ The ICOADS database was established in 2001 on the initiative of Scott D. Woodruff (NOAA) and with the support of the WMO Commission for Marine Meteorology. It was an extension of the American COADS base that was launched in 1985

Table 1. List of Polish polar land expeditions to Svalbard during which meteorological observations were carried out (Przybylak 2000a, updated)

Expedition name	Years	Organiser	Study area	Research type
Interwar period				
Polish expedition of the II International Polar Year	1932/33	National Meteorological Institute (PIM)	Bear Island (Tunheim)	MM (S. Siedlecki)
Expedition to Torell Land	20 Jun – 28 Aug 1934	High-Mountain Club of the Polish Tatras Association (PTT)	Spitsbergen – Torell Land	MM (S. Siedlecki)
Polish Glaciological Expedition	5 Jul – 6 Sep 1938	Polish Polar Circle of the Polish Research Expedition Association (PTWB)	Spitsbergen – Kaffiöyra (Oscar II Land)	MM (S. Bernadzikiewicz)
Post-war period				
Central Polish expeditions (national)				
Expedition of III International Geophysical Year and International Geophysical Cooperation Year	wintering (1957/58) summer expeditions 1957-60, 1962	Polish Academy of Sciences	Spitsbergen – Hornsund fjord area	MM, TL, ICRB, OI
Wroclaw expeditions	1970-75 (summer)	University of Wroclaw and PAS, 1975 – PAS Institute of Geophysics and Department of Palaeozoology	Spitsbergen – Hornsund fjord area	MM, TL, ICRB, OI
Central expeditions: new cycle	from 1978 (year-round)	Institute of Geophysics PAS	Spitsbergen – Hornsund fjord area	MM, TL, ICRB, OI
Regional expeditions (summer)				
Toruń Polar Expeditions	1975, 1977-80, 1982, 1985, 1989, 1997-2000, 2005-17	Institute of Geography (Faculty of Earth Sciences) NCU	Spitsbergen – Oscar II Land	MM, TL, ICRB, OI

Expedition name	Years	Organiser	Study area	Research type
Second Expedition of the MUS Polar Section of the Scientific Circle for Marine Studies	1976	Polar Section of the Scientific Circle for Oceanic Research, Maritime University of Szczecin (MUS)	Spitsbergen – Skottehytta on the Gulf of Petunia	MM
Expedition of the Szczecin Arctic Club	1976	Szczecin Arctic Club	Spitsbergen – traversal Lomonosov Plateau New Friesland	MM
Szczecin Arctic Expedition	1977	Nautical Scientific Circle of the Maritime University of Szczecin, Agricultural Academy in Szczecin and Institute of Geography of the University of Silesia (US)	Spitsbergen – Bellsund (Malbukta)	MM
Polar Expeditions of the University of Silesia	1978, 1979, 1983, 1986	Institute of Geography of the University of Silesia 1983, with the Institute of Geography of the University of Wrocław and the PTTK Mountain Club in Szczyrk	Spitsbergen – Sörkappland (Gas Bay) – 1986 – forefield of the Wrenskiöld glacier	MM, TL, ICRB (1978, 1983), OI
University of Warsaw Geography Student Expeditions	1978, 1980	Scientific Circle of the Faculty of Geography and Regional Studies, University of Warsaw	Spitsbergen – Nordenskiöld Land	MM
Wrocław expeditions	1979-80, 1983-86, 1989, 2005-10	Institute of Geography of the University of Wrocław, 1983 – with the Institute of Geography of the US, 1985 – with the Masaryk University in Brno	Spitsbergen – Wedel Jarlsberg Land	MM (except 1989), TL, ICRB (except 1984 and 1986), OI
Expeditions of the Institute of Geography of the Jagiellonian University (Kraków)	1980-84	Institute of Geography of the Jagiellonian University (Kraków)	Spitsbergen – Sörkappland (Palffyodden)	1980 – MM, ICRB, TL, OI; 1981–1983 – MM and TL, 1984 – MM

Expedition name	Years	Organiser	Study area	Research type
Poznań expeditions	1985 2000-03 2005-18	Institute of Quaternary Studies (now the Institute of Geoecology and Geoinformation) and the AMU Institute of Physical Geography and the Agricultural Academy	Spitsbergen – Skot- tehytta on the Gulf of Petunia AMU “Petuniabukta” Polar Station	MM, ICRB TI, OI
Expedition of the UAM Students Scien- tific Circle of Geographers Svalbard 87	1987	AMU Student Geographer Scientific Circle	Spitsbergen – marginal zone of Hörbye glacier, Gulf of Petunia	MM, TI
Geographic Expeditions of Marie Curie- Sklódowska University	1986-96, 1998-99, 2001-02, 2005-11, 2014-15	Mainly the UMCS Institute of Earth Sciences	Spitsbergen – Bellsund	MM, TI (1986–90), ICRB (1987), OI

Key: MM – meteorological measurements (mostly standard); TI – topoclimatic investigations, ICRB – investigations of components of radiation balance;
OI – other climatic investigations

ity for Circum-Antarctic waters was particularly important for the years before 1985, when satellite observation was not yet of sufficient quality.

A similar range of meteorological observations, enriched with measurements of marine aerosols, has been made during the annual summer cruises of *s/y Oceania* (since 1988) organised by the Institute of Oceanology PAS in Sopot within the European Arctic seas and the Arctic Ocean (oral information: Waldemar Walczowski).

Research issues

As mentioned before, until the early 1990s, new scientific studies had mainly been based on research materials collected during polar expeditions. Thus, the issues tackled by scientists had been limited to the prevailing local conditions around the research station (if the expedition organiser had such a facility) or to the area in which a given polar expedition had operated. This resulted in works on meteorological and topoclimatic conditions of the study area that were usually descriptive. This approach related to observations made not only in Spitsbergen, but also in Antarctica, Iceland and the Northern Urals (Table 2, item 1). The research issues described in items 5-9, and 11-13 of Table 2 were treated in significantly less depth at that time.

After 1990, the research issues described above did not disappear, but gradually evolved towards more comprehensive and complex or multidisciplinary studies, especially in the last ten or fifteen years. Due to the increasingly pronounced global warming that is presenting also in polar areas (especially in the northern zone, but also the Antarctic Peninsula), this subject has become dominant in polar research (Table 2, item 2) and has been taken up by most Polish scientific institutions. The most important monographic studies and chapters in monographs to comprehensively present the climate and climate change in polar regions include those of Niedźwiedź (1997) and Przybylak (2003, 2016). The shortness of the continuous instrumental observational measurement series for polar areas has also increased Polish researchers' interest in climate reconstruction for the early instrumental period (Table 2, item 3). The first such work, which used meteorological measurements from polar expeditions to the Canadian Arctic, appeared in 2000 (Przybylak 2000b). Issues relating to reconstructing the Arctic climate have since been addressed with increasing frequency. Currently, it is being extensively – predominantly, even – undertaken at the Nicolaus Copernicus University. To date, the university has implemented as many as nine research projects of KBN, MEiN, MNiSW and NCN (See key to Table 3 for institution names) in the field of historical Arctic climatology (Table 3). To a lesser extent, these issues have also been addressed at the University of Wrocław, the University of Silesia and the Adam Mickiewicz University, based on dendrochronological data.

Table 2. Main research issues within polar meteorology and climatology investigated by Polish researchers, 1957-2018

No.	Research issues	Scientific facility
1	Recognition of meteorological and topoclimatic conditions in various parts of: a) Svalbard and Antarctica; b) Skeiderarjökull in Iceland; c) Northern Urals; d) in the polar seas	a) UWŕ, NCU, US, AMU, UMCS, JU, IG PAS, IBB PAS, IMGW; b) NCU; c) JU; d) GMU, IO PAS
2	Arctic and Antarctic climate and its changes	NCU, US, UWŕ, AMU, GMU, IMGW
3	Reconstruction of the Arctic climate of the 19th and early 20th century	NCU, UWŕ, AMU
4	Recognition of the role of atmospheric and oceanic circulation in shaping Arctic and Antarctic climate and weather	US, GMU, NCU, UMCS, AMU, UWŕ, JU, IMGW, UL
5	The impact of meteorological conditions on ground temperature and permafrost dynamics	JU, UWŕ, NCU, US, AMU, UMCS, IMGW
6	Assessment of the biometeorological conditions of Svalbard and Jan Mayen and other polar regions	UWŕ, NCU, UMCS, AMU, IMGW
7	The climate-forming role of seas in the Norwegian Arctic	IMGW, GMU, NCU
8	The influence of meteorological conditions on sea and glacier ice, and <i>vice versa</i>	GMU, UWŕ, US NCU, UMCS, IMGW
9	The structure of weathers and their seasonal variation in Svalbard and Antarctica	GMU
10	Remote-sensing analyses and the tools of GIS and models in research into selected aspects of the Svalbard climate	AMU, UWŕ, NCU, SRC
11	Recognition of microclimatic conditions in Svalbard	NCU, UMCS
12	Radiation and heat balance and its components	IG PAS, NCU, UWŕ, US, UMCS, AMU, UL, IMGW
13	The influence of climate and climate changes on the biotic and abiotic environment	UWŕ, NCU, UMCS, AMU, JU, US

Key: UWŕ – University of Wrocław, NCU – Nicolaus Copernicus University, US – University of Silesia, AMU – Adam Mickiewicz University, UMCS – Maria Curie-Skłodowska University, JU – Jagiellonian University, IG PAS – Institute of Geophysics of the Polish Academy of Sciences, IBB PAS – Institute of Biochemistry and Biophysics of the Polish Academy of Sciences, IMGW – Institute of Meteorology and Water Management, GMU – Gdynia Maritime University, IO PAS – Institute of Oceanology of the Polish Academy of Sciences, UL – Łódź University, SRC – Space Research Centre

One extremely important research issue in this period has interested most Polish polar climatologists at almost all research centres – the recognition of the role of atmospheric and oceanic circulation in shaping the climate and weather in the Arctic and Antarctic (Table 2, item 4). This topic has undoubtedly been presented most often in works of employees at US, GMU and NCU. It is worth mentioning here the catalogue of circulation types over Spitsbergen by Tadeusz Niedźwiedź (2013⁴), which since its creation in the mid-1980s (when it initially covered the period 1951-1980) has been extensively used in many studies in Poland and abroad. The catalogue is regularly updated, and has now also been extended to earlier years, starting from December 1897, in cooperation with Ewa Łupikasz (including as part of project NCN No. 2015/19/B/ST10/02933).

To conclude this brief review of Poles' research activity, we should also mention the newest research issues to have been taken up by our scholars (Table 2, item 10) regarding the use of remote-sensing analyses and GIS tools and models to analyse selected aspects of Svalbard's climate and topoclimate. In this respect, the Poznań and Wrocław institutions have made the greatest achievements. The topic has also recently been taken up at Nicolaus Copernicus University as part of a doctoral dissertation. For more detailed information on research issues in meteorology and polar climatology, see the studies listed in the introduction to the 25th issue of *Problemy Klimatologii Polarnej*.

Funding for polar research, including in meteorology and climatology, has faced significant problems over the years. Often the success of expeditions, especially regional ones, has depended on expedition participants' skill in raising funds from beyond the universities. At the beginning of the 1990s, "grants" appeared in Poland's science funding system. Initially, support for research projects in polar research was very difficult to obtain but, over time, when the problem of the Arctic's dramatic warming and this phenomenon's impact on the weather and climate of lower latitudes gained more publicity, state institutions' interest in such programmes also increased. As a result, meteorological and climatological research into polar areas in 1992-2018 received financial support in twenty-seven research projects (Table 3) implemented at four universities (NCU, AMU, UMCS and UW).

Conferences, publications and academic dissertations

The increased activity of Polish scientists in polar research, dating back to the mid-1970s and perhaps even the beginning of 1970 (Wrocław expedition), was reflected in annual conferences, called "polar symposia" that were held

⁴ <http://www.kk.wnoz.us.edu.pl/nauka/kalendarz-typow-cyrkulacji/>

Table 3. Scientific projects in polar meteorology and climatology carried out in Poland, 1992-2018

No.	Title	NCU	Project type	Principal investigator	Years
1	Arctic and Antarctic climate comparison		KBN 662699102 (research)	G. Wójcik	1992-95
2	Arctic climate in the 19th and early 20th century		KBN 3 P04E 057 22 (own)	R. Przybylak	2002-05
3	Norwegian Arctic bioclimate volatility, 1971-2000		KBN 3 P04E 045 25 (supervised)	R. Przybylak (A. Arażny)	2003-05
4	Changes in air temperature in Antarctica in the 20th century		KBN 2 P04E 012 26 (own)	M. Kejna	2003-07
5	Structure, evolution and dynamics of the lithosphere, cryosphere and biosphere in the European Arctic sector and in the Antarctic		PBZ-KBN 08/P04/2004 (commissioned)	R. Przybylak (coordinator of task 2a)	2004-07
6	Regional and local determinants of geodiversity in NW Spitsbergen		NCU Rector's project (research)	R. Przybylak	2005-07
7	Climate variability of the American Arctic in the 19th century		MEiN 153/P01/2006/30 (supervised)	R. Przybylak (Z. Vizi)	2006-08
8	Identifying the functioning of ecosystem mechanisms in West Spitsbergen based on the spatial structure of the air temperature field		MNSW 113/IPY/2007/01/d (special)	R. Przybylak (research task coordinator)	2007-09
9	History of the Arctic climate in the 19th and early 20th century based on early instrumental data (ACEIP)		MNiSW 31/IPY/2007 (special)	R. Przybylak	2007-10
10	Meteorological conditions during the First International Polar Year 1882/1883 and their comparison with modern conditions		MNiSW N306281136 (supervised)	R. Przybylak (P. Wyszyński)	2009-10
11	Arctic Climate and Environment of the Nordic Seas and the Svalbard - Greenland Area (AWAKE)		Polish-Norwegian project (own)	R. Przybylak (principal investigator task 3)	2009-11
12	Atmospheric circulation changes and their impact on extreme thermal and precipitation conditions in the Canadian and Norwegian Arctic, 1951-2010		NCN 2011/01N/ST10/07654 (own)	R. Maszewski	2011-13
13	Climatic and glaciological interactions in global warming conditions Study on the example of SSSI No. 8 (King George Island, West Antarctica)		NCN N N306722540 (own)	M. Kejna	2011-14

No.	Title	Project type	Principal investigator	Years
14	Contemporary and historical changes of Svalbard climate and topoclimate	NCN DEC-2011/03/B/ST10/05007 (own)	R. Przybylak	2012-16
15	Arctic climate system study of ocean, sea ice and glaciers interactions in Svalbard area (AWAKE-2)	Polish-Norwegian project (own)	R. Przybylak – coordinator of WP6	2013-16
16	Climate variability of the Russian Arctic and Subarctic in the last three hundred years	NCN DEC-2012/07/B/ST10/04002 (own)	P. Wyszynski	2013-16
17	Causes of global warming in the Arctic in the first half of the 20th century	NCN 2015/19/B/ST10/02933	R. Przybylak	2016-19
AMU				
1.	Circulation of matter in the Arctic terrestrial geoecosystem on the example of Billefjorden, Central Spitsbergen	KBN 6PO4E 041 21	G. Rachlewicz	2001-03
2.	Transport and transformation of sediments in glaciated high-Arctic basins (Billefjorden – Central Spitsbergen)	MNiSW N306-058 32/3651	G. Rachlewicz	2007-08
3.	The functioning of modern polar geoecosystems around the Gulf of Petunia. Current status, threats, protection (Billefjorden, central Spitsbergen)	MNiSW 305 098835	J. Szpikowski	2008-10
4.	The evolution of the land ice masses of Dickson Land after the Little Ice Age, their modern state and functioning	NCN N306 062940	J. Malecki	2011-13
5.	Cryosphere reactions in contrasting high Arctic conditions against the background of environmental changes in Svalbard	NCN 2011/03/B/ST10/06172	G. Rachlewicz	2013-16
6.	Svalbard Archipelago wind fields in the light of climate change projections using dynamic downscaling	NCN 2014/15/B/ST10/04455	B. Czernecki	2015-19
7.	Accumulation of aeolian and niveo-aeolian material in periglacial and glacial environments in central Spitsbergen	NCN 2014/15/N/ST10/00825	K. Rymer	2016-18
UMCS				
1.	Structure, evolution and dynamics of the lithosphere, cryosphere and biosphere in the European Arctic sector and in the Antarctic	PBZ-KBN 08/P04/2004 (commissioned)	K. Pękala (coordinator of research task)	2004-07

No.	Title	Project type	Principal investigator	Years
2.	Energy exchange in various conditions of selected polar ecosystems (in the Bellsund region) as an indicator of global and regional climate change	MNiSW N306 007 31/0373	A. Gluza	2006-09
3.	Dynamics of physicochemical, chemical and biological properties in the Arctic soils of western Spitsbergen's coastal lowlands on the example of the Bellsund Coast	MNiSW N305 118 31/3955	J. Melke	2006-09
4.	Dynamics of matter circulation in a polar basin subject to deglaciation (Scottelva, Spitsbergen)	MNiSW No. N N306 525738	A. Gluza	2010-12
UWr				
1.	Structure, evolution and dynamics of the lithosphere, cryosphere and biosphere in the European Arctic sector and in the Antarctic	PEZ-KBN 08/P04/2004 (commissioned)	K. Migala (coordinator of research task)	2004-07
2.	Identifying the functioning of ecosystem mechanisms in West Spitsbergen based on the spatial structure of the air temperature field	MNiSW 113/IPY/2007/01/d (special)	K. Migala	2007-09
3.	Svalbard Archipelago wind fields in the light of climate change projections using dynamic downscaling	NCN 2014/15/B/ST10/04455	M. Kryza	2015-19

Key: KBN – State Committee for Scientific Research, MEiN – Ministry of Education and Science, MNiSW – Ministry of Science and Higher Education, NCN – National Science Centre

continuously (with the exception of 1973) in the period 1972–2001. They have been held every two years since 2002 (except for a break in 2006–2007) (Pereyma 2014). These meetings have always been an opportunity to exchange achievements and experiences in polar research from all scientific disciplines, including meteorology and climatology. So far, thirty-seven polar symposia have been held, yielding numerous publications (Fig. 4). By the early 1990s, a significant number of Polish academic centres were already heavily involved in studying the weather and climate of polar regions, including organising expeditions. It was thus decided to establish a *Meteorology and Climatology Commission* within the Polar Research Committee of the Polish Academy of Sciences, with the main task of holding annual polar meteorology and climatology seminars. The first took place in 1991 in Toruń (NCU), the next in Gdynia (the Maritime University). Until 2007, these two universities held meetings alternately, before joining other academic centres, such as the US, AMU, UMCS, the Institute of Oceanology PAS and UWr (2019). In total, twenty-seven seminars have taken place (Fig. 5). The 2012 restructuring of the Polish Academy of Sciences dissolved the *Meteorol-*

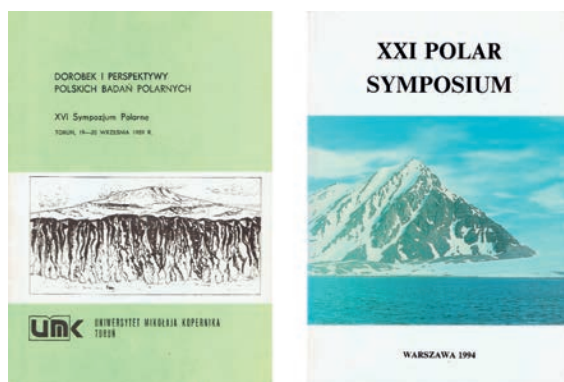


Fig. 4. Conference proceedings published after the 16th and 21st Polar Symposiums

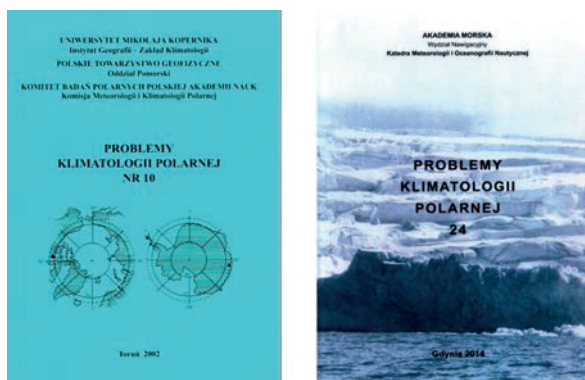


Fig. 5. *Problems of Polar Climatology*, No. 10 and 24

ogy and Climatology Commission. Since 2013, the *Polar Meteorology and Climatology Seminars* have been under the patronage and joint organisation of the *Polar Climatology and Cryology Team of the Polar Research Committee of the Polish Academy of Sciences*.

A journal (yearbook) entitled *Problemy Klimatologii Polarnej* (Fig. 6) was launched in 1992, and mostly publishes articles prepared and delivered during the *Polar Meteorology and Climatology Seminars*. Most issues of *Problemy...* have been published by GMU in Gdynia, but some initially also by NCU in Toruń (four issues: 2, 5, 8 and 10). In connection with the dissolution of the Department of Nautical Oceanography and Meteorology of GMU in 2015 (Marsz 2015, word *From the editor* in vol. 25) the Association of Polish Climatologists took over publication of the magazine. So far, twenty-five issues (2-26) of the journal have been issued (vol. 1 came out not as a bound print, but as a collection of non-stitched materials). In recent years, polar researchers have shown less interest



Fig. 6. 20th Seminar of Polar Meteorology and Climatology, Toruń, 7-8 May 2015



Fig. 7. 2nd International Conference Polar Climate and Environmental Change in the Last Millennium, Toruń, 24-26 August 2015

in publishing results in *Problemy Klimatologii Polarnej*. This is the result the Ministry of Science and Higher Education changing the assessment of academic facilities in ways that promote publication in high-impact scientific journals. This policy will undoubtedly lead to the disappearance of many Polish titles, probably including *Problemy Klimatologii Polarnej*.

Polish polar meteorological and climatological research has had a successively growing role over the last 20-30 years. Increasingly, its results have been presented at scientific conferences not only domestically but also abroad. A similar trend is also clearly seen in the number of articles published in foreign journals on what is known as the "Philadelphia list". Building on this, Nicolaus Copernicus University organised an international conference on the reconstruction of the polar climate and environment of the last millennium. Two conferences have been held so far – in 2010 and 2015 (Fig. 7) – and the next is planned for 2020. After the second successful conference, it was decided to make it a regular event.

In addition to publications resulting from scientific conferences, the rich body of works by Polish climatologists also includes: i) monographic works, including many written for academic degrees (Tables 4 and 5), ii) special publications presenting the results of polar expeditions (Fig. 8) and iii) extremely valuable (especially in the long term) items presenting source meteorological observations. Twenty-six monographic publications (including doctoral and post-doctoral dissertations; Tables 4 and 5) appeared in the discussed period – the most recent title being *The Climate of the Arctic* (Przybylak 2016). Most of these books were published by employees of NCU (11) and GMU (8), while researchers from other academic centres (UWr, JU and US) account for one to four items. In the 1970s, '80s and early '90s, the ambition of the participants of polar expeditions was to present the results in special publications, most often in university scientific journals or separate monographs (Fig. 8). Currently, more emphasis is placed on publications in foreign or Polish journals with a high impact factor (IF).

From the point of view of historical climatology, publications that provide source meteorological data are also extremely important, as they allow other scientists to conduct their own research. This standard was basically in operation until the end of the 20th century and briefly into the early 21st century, and then publishing data *in extenso* became very difficult. Meteorological data from the Hornsund station were made available by IMGW (for the years 1957/1958, and 1978/1979 – 1999/2000) and by the Institute of Geophysics PAS (2000/2001 – 2004/2005, observational data after 2005 are available only in electronic form if ordered). The situation is much worse in the case of meteorological years from the Arctowski Station (King George Island), for which data is available only for 1978-1989 (publ. by IMGW), 1990-1993 (AMU), 1995 and 1999 (publ. by UM) and 1996 (publ. by NCU) (Table 6). In the case of regional expeditions, meteorological data have only been published in full for the University of Silesia

expedition (Kamiński 1982a, 1982b) and by NCU (Wójcik et al. 1997, data from all eight expeditions organised up to and including 1989).

Table 4. Main monographic publications in polar meteorology and climatology (excluding those listed in Table 5)

No.	Author/editor	Year of publ.	Title
1	Z. Czeppe	1961	<i>Roczny przebieg mrozowych ruchów gruntu w Hornsundzie (Spitsbergen) 1957-1958</i> [The annual course of ground frost movements in Hornsund (Spitsbergen) 1957-58]
2	Z. Czeppe	1966	<i>Przebieg głównych procesów morfogenetycznych w południowo-zachodnim Spitsbergenie</i> [The course of major morphogenetic processes in south-western Spitsbergen]
3	A. Kamiński	1989	<i>Temperatura powietrza na Spitsbergenie Zachodnim i wyspach przyległych w atlantycko europejskim sektorze Arktyki</i> [Air temperature in West Spitsbergen and adjacent islands in the Atlantic European sector of the Arctic]
4	A.A. Marsz, A. Styszyńska (eds)	2000	<i>The main regional climate features of the Arctowski Polish Antarctic Station</i>
5	R. Przybylak	2002	<i>Variability of air temperature and atmospheric precipitation in the Arctic</i>
6	R. Przybylak	2003	<i>The climate of the Arctic</i>
7	R. Przybylak., M. Kejna, A. Arażny, P. Głowacki (eds)	2007	<i>Abiotyczne środowisko Spitsbergenu w latach 2005-2006 w warunkach globalnego ocieplenia [Spitsbergen's abiotic environment in 2005-2006 in conditions of global warming]</i>
8	A.A. Marsz, A. Styszyńska (eds)	2007	<i>Klimat rejonu Polskiej Stacji Polarnej w Hornsundzie – stan, zmiany i ich przyczyny</i> [The climate of the Polish Polar Station region in Hornsund: condition, changes and their causes]
9	A. Styszyńska, A.A. Marsz (eds)	2007	<i>Zmiany klimatyczne w Arktyce i Antarktyce w ostatnim pięćdziesięcioleciu XX wieku i ich implikacje środowiskowe</i> [Climate changes in the Arctic and Antarctic in the last 50 years of the 20th century and their environmental implications]
10	R. Przybylak, A. Arażny, M. Kejna (eds)	2012	<i>Topoclimatic diversity in Forlandsundet Region (NW Spitsbergen) in global warming conditions</i>
11	A.A. Marsz, A. Styszyńska (eds)	2013	<i>Climate and climate change at Hornsund, Svalbard</i>
12	D. Matuszko, J. Soroka	2013	<i>Zachmurzenie Spitsbergenu na podstawie obserwacji w Polskiej Stacji Polarnej w Hornsundzie. Cloudiness over Spitsbergen based on observations made at the Polish Polar Station in Hornsund</i>
13	R. Przybylak	2016	<i>The climate of the Arctic (second edition)</i>

Table 5. Scientific degrees (PhD and habilitation) obtained in polar meteorology and climatology in the period 1976-2018

Surname and first name	Year	Thesis title	Institution	Supervisor	Publication
Doctoral theses					
Employees of Nicolaus Copernicus University (NCU)					
Przybylak Rajmund	1988	<i>Stosunki termiczno-wilgotnościowe na tle warunków cyrkulacyjnych w Hornsundzie (Spitsbergen) w okresie 1978-1983 [Thermal-humidity relations against the background of circulation conditions in Hornsund (Spitsbergen) in the period 1978-1983]</i>	Faculty of Biology and Earth Sciences, NCU	Doc. Dr hab. Gabriel Wójcik	Przybylak (1992)
Kejna Marek	1995	<i>Temperatura powietrza w rejonie Zatoki Admiralicji (Wyspa Króla Jerzego, Sztetlandy Półudniowe, Antarktyka) na tle cyrkulacji atmosferycznej w świetle danych ze stacji H. Arctowskiego w latach 1985-1989 [Air temperature in the Admiralty Bay area (King George Island, South Shetland Islands, Antarctica) against the backdrop of atmospheric circulation in the light of data from H. Arctowski station in 1985-1989]</i>	Faculty of Biology and Earth Sciences, NCU	Prof. Dr hab. Gabriel Wójcik	Kejna (1999)
Arażny Andrzej	2005	<i>Bioklimat Arktyki Norweskiej i jego zmienność w okresie 1971-2000 [The bioclimate of the Norwegian Arctic and its volatility in the period 1971-2000]</i>	Faculty of Biology and Earth Sciences, NCU	Dr hab. Rajmund Przybylak, Prof. UMK	Arażny (2008)
Vízi Zsuzsanna	2008	<i>Variability of the American Arctic climate in the 19th century</i>	Faculty of Biology and Earth Sciences, NCU	Prof. Dr hab. Rajmund Przybylak	none
Wyszyński Przemysław	2012	<i>Warunki meteorologiczne w Arktyce w czasie trwania Pierwszego Międzynarodowego Roku Polarnego 1882/1883 i ich porównanie z warunkami współczesnymi [Meteorological conditions in the Arctic during the First International Polar Year 1882/83 and their comparison with modern conditions]</i>	Faculty of Biology and Earth Sciences, NCU	Prof. Dr hab. Rajmund Przybylak	none

Surname and first name	Year	Thesis title	Institution	Supervisor	Publication
Employees of University of Wrocław (UWr)					
Baranowski Stanisław	1968	<i>Termika tundry peryglacjalnej SW Spitsbergen</i> [Thermics of the peripheral tundra of SW Spitsbergen]	University of Wrocław (UWr)	Prof. Dr hab. A. Kosiba	Baranowski (1968)
Pereyma Jerzy	1981	<i>Klimat obszaru Hornsundu, Spitsbergen Zachodni</i> [Climate of the Hornsund area, West Spitsbergen]	University of Wrocław (UWr)	Prof. Dr hab. A. Jahn	Pereyma (1983)
Migala Krzysztof	1990	<i>Poziom aktywny zmarzliny w świetle warunków klimatycznych Hornsundu, SW Spitsbergen</i> [Active permafrost in the light of the climatic conditions of Hornsund, SW Spitsbergen]	University of Wrocław (UWr)	Prof. Dr hab. A. Jahn	none
Employees of Gdynia Maritime University / Maritime Academy					
Styszyńska Anna	1982	<i>Pole średniej temperatury powietrza nad wodami mórz wokółantarktycznych i główne prawidłowości jego kształtowania</i> [The average air temperature field over the waters of the Antarctic seas and the main regularities of its formation]	Faculty of Geographical and Geological Sciences Adam Mickiewicz University	Prof. Dr hab. A.A. Marsz	Styszyńska (1985)
Ferdynus Jacek	1997	<i>Główne cechy klimatu morskiego strefy subpolarniej północnego Atlantyku w świetle struktury pogód</i> [The main features of the marine climate of the North Atlantic subpolar zone in the light of the weather structure]	Faculty of Geographical and Geological Sciences Adam Mickiewicz University	Prof. Dr hab. A.A. Marsz	Ferdynus (1997)
Kruszewski Grzegorz	2002	<i>Zlodzenie Zatoki Admiralicji – przebieg i uwarunkowania</i> [Icing of Admiralty Bay: course and conditions]	Faculty of Earth Sciences, University of Silesia in Katowice	Prof. Dr hab. A.A. Marsz	Kruszewski (2002)
Employees of Marie Curie-Skłodowska University					
Rodzik Jan	1985	<i>Morfogenetyczna rola pokrywy śnieżnej w strefie peryglacjalnej Hornsundu (SW Spitsbergen)</i> [The morphogenetic role of snow cover in the peripheral zone of Hornsund (SW Spitsbergen)]	Faculty of Biology and Earth Sciences, UMCS	Doc. Dr hab. Kazimierz Pékala	none

Surname and first name	Year	Thesis title	Institution	Supervisor	Publication
Habilitation theses					
Employees of Nicolaus Copernicus University (NCU)					
Wójcik Gabriel	1976	<i>Wybrane zagadnienia klimatologiczne i glaciologiczne Islandii [Selected climatological and glaciological issues in Iceland]</i>	Faculty of Environmental Sciences, University of Wrocław		Wójcik (1976)
Przybylak Rajmund	1997	<i>Zmienność temperatury powietrza i opadów atmosferycznych w okresie obserwacji instrumentalnych w Arktyce [The variability of air temperature and precipitation during instrumental observations in the Arctic]</i>	Faculty of Geographical and Geological Sciences A. Mickiewicz University in Poznań		Przybylak (1996)
Kejna Marek	2009	<i>Rozkład przestrzenny i zmienność temperatury powietrza na Antarktydzie w drugiej połowie XX wieku [The spatial distribution and variability of air temperature in Antarctica in the second half of the 20th century]</i>	Faculty of Biology and Earth Sciences, Nicolaus Copernicus University in Toruń		Kejna (2008)
Employees of University of Wrocław (UWr)					
Baranowski Stanisław	1977	<i>Subpolarne lodowce Spitsbergenu na tle klimatu tego regionu [Subpolar Spitsbergen glaciers against the background of the region's climate]</i>	University of Wrocław (UWr)		Baranowski (1977a, b)
Employees of Gdynia Maritime University / Maritime Academy					
Styszyńska Anna	2006	<i>Przyczyny i mechanizmy współczesnego (1982-2002) ocieplenia atlantyckiej Arktyki [Causes and mechanisms of modern (1982-2002) warming in the Atlantic Arctic]</i>	Faculty of Geographical and Geological Sciences A. Mickiewicz University in Poznań		Styszyńska (2005)



Fig. 8. Examples of some publications presenting scientific results from polar expeditions

In addition to presenting research results at scientific conferences and publications, another extremely important feature of every researcher's career is the attainment of academic degrees. In the years 1976-2018, on the basis of work in the field of polar meteorology and climatology, twelve persons obtained doctorates and five obtained a doctoral habilitation (Table 5). Eight of the twelve doctoral dissertations have been published.

Conclusions and closing remarks

In summarising the many years of organisational and publishing achievements of Polish polar researchers in meteorology and climatology, it should be emphasised that:

1. There have been four distinct periods (waves) of high activity by Poles in this field: 1) the 1930s, 2) 1957-1962, 3) the 1970s, especially the latter half, and 4) the last thirty years with a peak in 2004-2009 (the preparatory period 2004-2007 and 4th International Polar Year 2007-2009).
2. Polish climatologists conducted research in both polar areas, but by far the greatest achievements and the most studies (including those published in high-IF magazines) concern Svalbard.
3. Polish climatologists and Norwegian researchers have made the largest and more-or-less equal contribution to identifying Svalbard's weather and climate conditions.
4. The research issues cover a very comprehensive range, but the Polish specialisation in meteorological and climatological research – especially that conducted in Svalbard – should be considered micro- and, especially,

Table 6. Meteorological yearbooks from the PAS stations
in Hornsund (S. Siedlecki) and King George Island (H. Arctowski)

No.	Editor	Title	Institution
1	D. Wielbińska	<i>Roczniki meteorologiczne Hornsund 1957/1958, 1978/1979-1988/1989</i> [Hornsund meteorological yearbooks 1957/1958, 1978/1979-1988/1989]	IMGW
2	M. Miętus	<i>Roczniki meteorologiczne Hornsund 1989/1990-1999/2000</i> [Hornsund meteorological yearbooks 1989/1990-1999/2000]	IMGW
3	M. Miętus	<i>Roczniki meteorologiczne Hornsund 1957/1958, 1978/1979-1999/2000</i> (wydanie II poprawione) [Hornsund meteorological yearbooks 1957/1958, 1978/1979-1999/2000 (2nd ed., corrected)]	IMGW
4	J. Kwaczyński, L. Nowosielski	<i>Rocznik meteorologiczny Hornsund 2000/2001</i> [Hornsund meteorological yearbooks 2000/2001]	IG PAS
5	J. Kwaczyński	<i>Roczniki meteorologiczne Hornsund 2001/2002-2004/2005</i> [Hornsund meteorological yearbooks 2001/2002-2004/2005]	IG PAS
6	D. Wielbińska	<i>Roczniki meteorologiczne Arctowski 1978-1988</i> [Arctowski meteorological yearbooks 1978-1988]	IMGW
7	M. Miętus	<i>Roczniki meteorologiczne Arctowski 1989</i> [Arctowski meteorological yearbooks 1989]	IMGW
8	G. Rachlewicz, Z. Zwoliński	<i>Roczniki meteorologiczne Arctowski 1990-1993</i> [Arctowski meteorological yearbooks 1990-1993]	AMU
9	A.A. Marsz, A. Styszyńska	<i>Roczniki meteorologiczne Arctowski 1995</i> [Arctowski meteorological yearbooks 1995]	GMU
10	M. Kejna, K. Łaska	<i>Roczniki meteorologiczne Arctowski 1995</i> [Arctowski meteorological yearbooks 1996]	NCU

topo-climatic research, as well as research on the role of atmospheric circulation in shaping weather and climate.

In the authors' opinion, Polish scientists' future research directions should continue to focus on in-depth identification of contemporary and historical climate changes in both polar zones, as well as on topo- and microclimatic studies. The impact that changes in the Arctic Climate System have on weather and climate in Europe, and central Europe in particular, needs considerably more analysis. The use of polarised remote-sensing data, especially from satellites, as well as modern research tools such as climate models should also increase in climate research (this should initially be implemented in cooperation with foreign scientific centres).

Acknowledgments

The authors thank Prof. Dr. hab. A.A. Marsz for valuable comments on the text, which were helpful in preparing the final version of the article. Rajmund Przybylak's work was carried out as part of the NCN research project No. 2015/19/B/ST10/02933.

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S u m m a r y

The article presents a synthetic review and summary of the achievements of Polish meteorological and climatological research in both polar areas, with a historical perspective. Various aspects of these achievements are discussed, beginning with the organisation of and participation in polar expeditions, the scope of meteorological measurements and observations conducted during research, and results from weather and climate research in the study areas. Publications that have resulted from research other than meteorological measurements and observations conducted as part of polar expeditions are

also described. A detailed analysis of the activity of Polish scientists in the field of polar climatology and meteorology since its inception in the late nineteenth century revealed four distinct periods (waves) of clearly more intense activity: 1) the 1930s, 2) 1957-1962, 3) the 1970s, especially the latter half, 4) the last 30 years, with a peak in 2004-2009 (preparatory period 2004-2007 and IV International Polar Year 2007-2009). Although the meteorological and climatological research conducted by Polish scientists included both polar regions, decidedly the greatest research and publication achievements (including journals from the Journal Citation Reports database) concern Svalbard. It was found that, alongside Norwegian researchers, Polish scientists account for the largest share in the diagnosis of weather and climate conditions in this area. A detailed analysis of the research issues led to the conclusion that Polish meteorological and climatological research is very comprehensive but, nevertheless, its specialisations, especially with regards to studies on Svalbard, are: 1) micro-climatic research, and especially topoclimatic research; and 2) research into the influence of atmospheric circulation in determining weather and climate.