

Appendix 1 to the HRS4R 2022 Report

Publication of popular science articles on polar research and geophysics (14)

No.	Publication date	Author	Title	Number of views
1	24.01.2022	Katarzyna Tołkacz	Profitable science – bioprospecting in polar regions	868
2	14.02.2022	Katarzyna Tołkacz	How does climate change affect the polar bears' menu?	1 277
3	14.02.2022	Barbara Jóźwiak	Does size matter? I.e., megaproblems with macro- and microplastics	891
4	21.03.2022	Barbara Jóźwiak	Small great moss campion, i.e., part one of the Arctic Champions League	1 178
5	01.04.2022	Barbara Jóźwiak	Pocket-sized polar survivor, i.e., a few words about the snow bunting. Part two of the Arctic Champions League	740
6	26.04.2022	Jerzy Giżejowski	Was there ever a jungle in Spitsbergen?	710
7	09.05.2022	Katarzyna Greń	Life at a small polar station	1 026
8	27.05.2022	Oskar Głowacki	Glaciers are speaking to us. All we need is to listen	805
9	13.06.2022	Katarzyna Greń	Lost in the snowy whiteness	563
10	04.07.2022	Barbara Jóźwiak	The magnificent nine. An overview of the Earth's famous and not-so-famous poles	1 280
11	03.08.2022	Michał Łuszczuk	Are polar researchers diplomats? A run-through of science diplomacy in polar regions	265
12	24.08.2022	Barbara Jóźwiak	The walrus – a one-of-its-kind polar record holder. Part three of the Arctic Champions League	239
13	16.09.2022	Michał Łuszczuk	The what and the how of the Arctic Council	56
14	20.09.2022	Adam Nawrot	The oases of Antarctica	342

Preparation of podcasts - interviews with geophysicists and videos with experts

Videos (EDU-ARCTIC.PL project) (7):

1	05.04.2022	Agata Goździk	Permafrost – perennial frozen ground
2	12.05.2022	Agata Goździk	Arctic amplification
3	26.05.2022	Dagmara Bożek	Henryk Arctowski Polish Antarctic Station
4	14.07.2022	Anna Nadolna	Subglacial lakes
5	08.08.2022	Anna Nadolna	Polar bears
6	02.09.2022	Anna Nadolna	Snow
7	29.09.2022	Marek Lewandowski	Bunger Oasis

Podcasts:

Podcast #1. Why are the tropics an engine for global circulation and how do tweets help scientists?

In the first episode, we present an interview with Dr. Dariusz Baranowski, a physicist from the Department of Atmospheric Physics at IG PAS. Dagmara Bożek, a science communication and education specialist, talks about why Polish scientists conduct research in distant Indonesia and what connection it has with weather forecasting in Poland.

[Listen >>>](#)

Podcast #2. Smog being more dangerous than “smok”, i.e., about the quality of our air and more

What is smog and what does it look like? What are aerosols? And finally - how does air pollution affect our health? This is what Dagmara Bożek, a science communication and education specialist, talks about in the next episode of the podcast as part of the "GEOGADKA - Geophysics for everyone" project with Dr. Artur Szkop from the Department of Atmospheric Physics at IG PAS.

[Listen >>>](#)

"Dangerous Earth" exhibitions (1)

In 2022, an exhibition was prepared entitled "Dobrowolski – Reactivation. Antarctic mission (nearly) impossible". The Polish Antarctic Station, located in the Bunger Oasis, had been closed since 1979. At the beginning of January 2022, after a break of more than forty years, four Polish polar explorers - participants of the IV Geophysical Expedition to the A.B. Dobrowolski Polish Antarctic Station - arrived there. The purpose of the expedition was to revitalize and reactivate the base. At the exhibition, we presented not only photos of the amazing journey around the Southern Ocean and the area around the Bunger Oasis, but also the interesting history of Polish expeditions to the Bunger Oasis. We also showed historical and contemporary outfits of polar explorers. Furthermore, we presented the figure of the station's patron - Prof. Antoni Bolesław Dobrowolski - a geophysicist and a traveler, participant of the famous Belgian antarctic expedition on the Belgica ship. The manuscript of Dobrowolski's diary from this expedition was one of the attractions of the exhibition. The exhibition also presented information about the eponymous expedition, which took place in the 2021/2022 antarctic summer season, its objectives and achievements. Thanks to short film interviews with members of the expedition, it was possible to learn how they prepared for this expedition, what were they doing during the 37 days they spent at the station, what surprised them the most and how they found themselves in the reality of the Bunger Oasis. The exhibition was complemented by a 3D model of the station's surroundings and its buildings, made in 2017 on the basis of archival photos by the artist - winner of many competitions - Dr. Jakub Wawrzak from the Department of Graphics at the Faculty of Fine Arts at Nicolaus Copernicus University in Toruń. The opening of the exhibition took place on June 21, 2022, at the Museum of the Earth of PAS in Warsaw. The exhibition was available

inside the Museum for 3 months and was visited by 2309 people. Then, the exhibition was moved to the headquarters of the Institute of Geophysics of PAS, where it was open to school groups and individuals free of charge until the end of February 2023. It was visited by more than 100 people at the Institute.

Polar mapping as part of the Long Night of Museums

Multimedia 3D show - mapping titled "A Year in the Arctic" was prepared as part of the EDU-ARCTIC.PL project and was displayed on the facade of the Jan III Sobieski Palace in Wilanów. The mapping show during the Long Night of Museums in 2022 was watched by **3 748** people.

Open and outdoor lectures as part of the EDU-ARCTIC.PL project (12)

- 1) 6.04.2022, Warsaw (Foksal Press Center), Prof. Monika Kusiak, "Dobrowolski. Reactivation. Antarctic mission (nearly) impossible" (56 participants)
- 2) 9.04.2022, Warsaw (Museum of the Earth of PAS), Dagmara Bożek and Dr. Agata Goździk, "Spring with EDU-ARCTIC.PL" and "Arctica - a litmus test of the climate change" (32 people)
- 3) 20.04.2022, Warsaw (Museum of the Earth of PAS), Dr. Jerzy Giżejowski, "Great polar expeditions" (29 participants)
- 4) 24.04.2022, Gdynia, KOŁOSY 2022 Festival, Dr. Jerzy Giżejowski, "Great polar expeditions: secrets of the wreck of Endurance" (1,000 people)
- 5) 18.05.2022, Warsaw (Museum of the Earth of PAS), Prof. Piotr Głowacki, "Mysterious interiors of glaciers" (13 participants)
- 6) 9.06.2022, Racibórz (Geophysical Observatory, Piast Castle), Dr. Daniel Kępski, "From Racibórz to the pole - polar and geophysical stories" (100 participants)
- 7) 22.06.2022, Warsaw (Museum of the Earth of PAS), Prof. Marek Lewandowski, "Time capsule - a message for our great-great-...grandchildren hidden on Spitsbergen" (17 participants)
- 8) 2.09.2022, Grodzisk Mazowiecki (Science and Passion Festival), Prof. Piotr Głowacki, "Mysterious interiors of glaciers" (120 participants)
- 9) 17.09.2022, Otwock (Observatory of IG PAS in Świder), Dagmara Bożek, "Polar female pioneers. Conquerors of the polar world - author's evening" (23 participants)
- 10) 24.09.2022, Otwock (Observatory of IG PAS in Świder), outdoor meeting "Science opens doors" (60 participants)
- 11) 27.09.2022, a school near the Central Geophysical Observatory of IG PAS in Belsk, Dr. Daniel Kępski, "Life and work at the Hornsund Polish Polar Station" (60 participants)
- 12) 5.05.2022 University of the Third Age UTW Atena in Oborniki Śląskie – 150 people

Lectures and classes as part of the Mobile Geophysical University (Geophysics for everyone project) – 6 classes

No.	Date	Speaker	Title	Event name or organizer
1	08.04.2022	Grzegorz Lizurek	Why is the Earth shaking?	B. Prus High School in Warsaw
2	02.09.2022	Tomasz Wawrzyniak	Life and work at the Polish Polar Station on Spitsbergen	Mediateka, Grodzisk Mazowiecki
3	02.09.2022	Tomasz Wawrzyniak	Life and work at the Polish Polar Station on Spitsbergen	Primary School in Adamowizna
4	11.09.2022	Tomasz Wawrzyniak, Anna Wielgopalan	Arctic landscapes	Science picnic in Józefosław
5	6-8.10.2022	Dagmara Bożek	Polar stand	II Sowie Mountains Science Picnic
6	16.10.2022	Dagmara Bożek, Anna Zdunek	Polar stand	Conference on the occasion of the 90th anniversary of the first polar expedition, Legionowo

Open webinars (44 in total)

As part of the EDU-ARCTIC.PL project:

No.	Title	Date	Speaker
1	Northern lights	11.01.2022	Anna Nadolna
2	Reconstruction of glacier charges (Spitsbergen) based on geomorphological records and various archival sources	18.01.2022	Piotr Zagórski
3	Polish geophysical expedition to East Antarctica	20.01.2022	Dagmara Bożek
4	Poles at the poles	09.02.2022	Jerzy Giżejowski
5	True crime, i.e., stories with a polar thrill	17.02.2022	Anna Wielgopalan
6	Quo vadis, Arctic?	23.02.2022	Jerzy Giżejowski
7	Tardigrades: the art of survival	24.02.2022	Anna Wielgopalan
8	Drones (UAV) as a new tool for obtaining spatial data - application of the "Structure from motion (SfM)" methodology in polar research	03.03.2022	Małgorzata Korczak-Abshire
9	What is the work of a meteorologist at a polar station?	09.03.2022	Piotr Ostrowski
10	Race to the South Pole	16.03.2022	Jerzy Giżejowski
11	Polar drift stations	31.03.2022	Jerzy Giżejowski
12	True crime, i.e., stories with a polar thrill	01.04.2022	Anna Wielgopalan
13	Jeanette's expedition	07.04.2022	Jerzy Giżejowski
14	Climate change and biodiversity in the marine Arctic	20.04.2022	Tomasz Kijewski
15	Fram's expedition	21.04.2022	Jerzy Giżejowski
16	Where do penguins winter? And why do we want to know this?	25.04.2022	Małgorzata Korczak-Abshire
17	AREX: observations of the maritime Arctic from the research vessel Oceania	10.05.2022	Małgorzata Beszczyńska-Moeller
18	Expedition of Endurance	12.05.2022	Jerzy Giżejowski
19	Warm and cold: how did humans adapt to polar climatic conditions?	13.05.2022	Anna Wielgopalan

20	Autonomous ARGO floats in oceanographic research in the Arctic	19.05.2022	Waldek Walczowski
21	Polish polar research	26.05.2022	Jerzy Giżejowski
22	Monitoring and management of the ecosystem of Antarctica – innovations	31.05.2022	Małgorzata Korczak-Abshire
23	Arctic – Land of Stories	01.06.2022	Julian Podgórski
24	Glaciations and postglacial relief in Poland	09.06.2022	Jerzy Giżejowski
25	The charms of Chilean glaciers	14.06.2022	Julian Podgórski
26	Volcanoes and people	30.06.2022	Julian Podgórski
27	Polar stories for a hot summer	06.07.2022	Jerzy Giżejowski
28	Sustainable fishing in the Arctic – good practices in the MSC program	26.09.2022	Katarzyna Frankowiak

Webinars as part of the GEOPHYSICS FOR EVERYONE project (16)

No.	Date	Speaker	Title
1	03.08.2022	Agnieszka Czerwińska	UV radiation and healthy sunbathing
2	17.08.2022	Grzegorz Lizurek	Great earthquakes
3	07.09.2022	Adam Nawrot	Not just a magnifying glass, compass and tape measure
4	14.09.2022	Agata Goździk	Arctic - a litmus test of climate change
5	21.09.2022	Beata Latos	Tropical cyclones
6	28.09.2022	Artur Szkop	Renewable energy - what you need to know
7	05.10.2022	Dagmara Bożek	The history of Polish female polar explorers
8	12.10.2022	Grzegorz Lizurek	Can humans cause an earthquake?
9	19.10.2022	Łukasz Przyborowski	What do we do with this plastic?
10	09.11.2022	Daniel Kępski	A year in the Arctic - 100 questions for the future leader of the expedition to the Hornsund Polish Polar Station
11	16.11.2022	Krzysztof Kochanek	History for the future - flood prediction based on historical information
12	23.11.2022	Jerzy Giżejowski	Protecting mountain catchments from flooding - build up or manage naturally?
13	30.11.2022	Artur Szkop	Smog being more dangerous than "smok"
14	07.12.2022	Agata Goździk	Citizen science
15	14.12.2022	Bartłomiej Luks	Snowflakes
16	21.12.2022	Michał Niedbalski	Christmas under the pole

Organization of the Polar Festival

The Polar Festival took place on June 4, 2022, at the Amphitheater of the Wola Cultural Center in Warsaw. The aim of the Polar Festival was to expand knowledge about the polar

regions, as well as the research of Polish scientists in the Arctic and Antarctica. We started the festival with a trip to the interior of the glacier, to which we were taken by a glaciologist Prof. Piotr Głowacki. We celebrated the 65th anniversary of the Hornsund Polish Polar Station on Spitsbergen and asked questions to polar explorers working at the station thanks to the online connection. One could learn how many Polish research stations there are in the Arctic and Antarctica and what research is being conducted there. Event participants learned about the consequences of climate change for polar animals.

The Festival featured speakers and exhibitors from all institutions in Poland that have permanent or seasonal polar stations in Spitsbergen and Antarctica. Festival participants could visit their stands and, by solving various tasks, collect stamps in their polar passports and receive prizes. In addition to the Institute of Geophysics of PAS, the organizer of the event and the owner of two polar stations: the Hornsund Polish Polar Station and the Antoni Bolesław Dobrowolski Polish Antarctic Station, we hosted the hosts of 4 seasonal stations on Spitsbergen: University of Wrocław with the Stanisław Baranowski Polar Station, Nicolaus Copernicus University in Toruń with the Kaffioyra Polar Station, Maria Curie-Skłodowska University in Lublin with the Calypsobyen Polar Station and Adam Mickiewicz University in Poznań with the Petuniabukta Polar Station. A lecture and a stand were also prepared by the Institute of Biochemistry and Biophysics of PAS - the manager of the Henryk Arctowski Polish Antarctic Station. The Institute of Oceanology of PAS, which owns the research ship Oceania, which conducts research in the Arctic seas, and the Institute of Paleobiology of PAS, which conducts research on rocks in the far north and south, were not to be missed. The implementers of the Poles Together and SUDEA projects also shared their polar experiences.

During the last session of the Festival, one could meet the authors of books and films on polar topics, including authors of the documentary film "Ant/Arctic Women", representatives of Alina and Czesław Centkiewicz Foundation and Zbyszek Szwoch, author of the book "With the paddle and the wind. Kayaking in the waters of the North". Festival participants took part in polar-themed competitions and quizzes. They viewed polar landscapes and even looked inside a glacier thanks to VR goggles. They could try on polar explorers' costumes and see the equipment used by polar explorers to work in the field.

EDUCATION

Online lessons

INTERACT (13)

No.	Title	Speaker	Date
1	INTERACT: Adaptations of plants to the Arctic climate	Dagmara Bożek	05 Oct 2022 09:00
2	INTERACT: Stories of sea ice	Agata Goździk	26 Oct 2022 07:00
3	INTERACT: Written in the Arctic: paleoclimatology	Anna Wielgopolska	04 Nov 2022 09:00
4	INTERACT: The life of glaciers	Bartłomiej Luks	07 Nov 2022 08:00
5	INTERACT: Northern lights	Agata Goździk	10 Nov 2022 08:00

6	INTERACT: The life of glaciers	Bartłomiej Luks	14 Nov 2022 10:00
7	INTERACT: Plankton in the Arctic	Anna Wielgopolan	18 Nov 2022 08:00
8	INTERACT: Northern lights - a magical spectacle in the sky	Agata Goździk	22 Nov 2022 09:00
9	INTERACT: Fauna of the Arctic and Antarctic	Dagmara Bożek	24 Nov 2022 10:00
10	INTERACT: Polar bear - the king of the Arctic	Dagmara Bożek	09 Dec 2022 08:00
11	INTERACT: Written in the Arctic: paleoclimatology	Anna Wielgopolan	09 Dec 2022 08:00
12	INTERACT: Polar bear - king of the Arctic	Dagmara Bożek	14 Dec 2022 09:00
13	INTERACT: Air pollution in polar regions	Daniel Kępski	15 Dec 2022 09:00

Fascinating Earth (4)

No.	Date	Speaker	Title of the webinar
1	26.10.2022	Oskar Głowacki	WHEN THE GLACIER MEETS THE SEA, I.E., ABOUT THE FORMATION OF LARGE ICEBERGERS AND THE UNEQUAL FIGHT AGAINST CLIMATE CHANGE
2	25.11.2022	Daniel Kępski	The electricity of the atmosphere
3	28.11.2022	Daniel Kępski	The electricity of the atmosphere
4	20.12.2022	Artur Szkop	Smog in a jar

Educational packages under the POLAR-STAR project (10):

1. Wzmocnienie arktyczne (Arctic amplification)
2. Arctic amplification
3. Plastik w Arktyce (Plastic in the Arctic)
4. Plastic in the Arctic
5. Permafrost
6. Wieloletnia zmarzlina (Permafrost)
7. Jak przetrwać w Arktyce (Surviving the Arctic)
8. Surviving the Arctic
9. Zorza polarna (Northern lights)
10. Northern lights

Workshops for teachers

1. Scientix Autumn School 21-23.10.2022 [Scientix Autumn School for teachers |](#)
2. Scientix Workshops in Warsaw 17.05.2022 [Scientix Workshops 17.05.2022 |](#)
3. Scientix Workshops in Białystok 4.02.2022 [Scientix Workshops in Białystok|](#)

Webinars for teachers

DATES AND TOPICS:

15 February 2022 [Truths and myths about climate change - where to look for reliable information?](#) – **Dr. Agata Goździk**

1 March 2022 [The story of the plastic duck, or about ubiquitous plastic](#) – **Dagmara Bożek**

15 March 2022 [Renewable energy sources – what do you need to know?](#) – **Dr. Artur Szkop**

22 March 2022 [Water in a nutshell - the most important challenges of water management](#) – **Dr. Tomasz Kijewski, Institute of Oceanology of PAS**

5 April 2022 [Arctic - a litmus test of global changes](#) – **Dr. Agata Goździk**

26 April 2022 [r. Smog being scarier than "smok" and a few words about air pollution](#) – **Dr. Artur Szkop**

Lessons for schools

5 lessons for schools were completed as part of the 2022 Science Festival:

Grades 1-3

Polar bear - the king of the Arctic, Dagmara Bożek, M.A., [27 September at 09:00](#),

Online description: Polar bears, living in the frigid climate of the Arctic, have developed many useful adaptations to help them survive - we will discuss some of them during the class.

Brief description: Meet the polar bear - the king of the Arctic and find out how it copes with polar conditions.

Polar bear - the king of the Arctic, Dagmara Bożek, M.A., [27 September at 10:30](#),

Online description: Polar bears, living in the frigid climate of the Arctic, have developed many useful adaptations to help them survive - we will discuss some of them during the class.

Brief description: Meet the polar bear - the king of the Arctic and find out how it copes with polar conditions.

Grades 4-6

Plastic in the Arctic Dagmara Bożek, M.A., [September 27 at 12:00](#),

Online description: The plastic that reaches the Arctic is a global problem, the tip of the iceberg. This is not only the result of increased production and industrial development, but also of our everyday habits. Plastic waste and even more dangerous microplastics are found everywhere: in oceans, ice, animal digestive systems, and even snow. The impact of plastic on the natural environment is alarming, and scientists are trying to estimate its impact on our health and lives. The aim of the lesson is to encourage students to reflect on our everyday activities and actions to protect the environment.

Brief description: How do our everyday choices affect areas thousands of kilometers away? Where does plastic in snow and ice come from?

Grades 7-8

Arctic - a litmus test of climate change Dr. Agata Goździk, 26 September at 10:30,

Online description: The warming trend in the Arctic has been twice as high as the global average in recent decades. The loss of sea ice reinforces the warming trend because the ocean surface absorbs more solar heat than the surface of snow and ice. How does this affect the planet? What is albedo? What is positive feedback?

Students will learn about albedo, the positive feedback associated with the melting of sea ice, and the impact of reduced snow and ice cover on global temperatures. The next mechanism discussed is related to the thawing of permafrost and the release of greenhouse gases into the atmosphere.

Brief description: The warming trend in the Arctic has been twice as high as the global average in recent decades. Why is this happening? What are positive feedbacks and how do they work in polar regions?

High school

The northern lights - a magical spectacle in the sky Dr. Agata Goździk, 26 September at 09:00,

Online description: The phenomenon of northern lights has fascinated people for centuries. Colorful lights illuminating the night sky were observed as early as in ancient China or Greece. Meanwhile, in the 21st century, the phenomenon of northern lights is well-known. We can explain the mechanisms that control it. We conduct regular observations and measurements both from Earth and from space. We have mathematical models that help us predict when and where it will appear.

What is the phenomenon of northern lights and how does it form? What color can it be? Where can we see it? Does it affect our lives and health? Does it appear only on Earth? What is the Kp index, and what do the Earth's magnetic field and solar wind have to do with it? We will answer these and other questions during the lesson.

Brief description: The phenomenon of northern lights has fascinated people for centuries. What is the phenomenon of northern lights and how does it form? What is the Kp index and what does the Earth's magnetic field and solar wind have to do with it?