



M. CIEPLY

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PRESTIGE FROM POLE TO POLE

Why do we study the polar regions of the Earth?
For the same reason a mountaineer climbs mountains: "Because they are there!" And in addition, they are of great importance to the entire planet and to our country.

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Polish scientists began polar research at the end of the 19th century, but it was not until 1932 that the first expedition took place, setting off from independent Poland to the Norwegian Arctic island of Bjørnøya. That was the time of the Second International Polar Year (2nd IPY). The scientific objectives of the expedition were primarily of an explorative nature, but they also had some very important practical aspects. For twelve months the expedition team conducted meteorological and other geophysical observations, also studying changes in the Earth's magnetic field and propagation of radio waves. The results of the 2nd IPY were significant for the development of radio communication, as well as maritime navigation and aviation (then just developing), not only in the Arctic.

The nature of the research has essentially not changed much since those days. Polish polar scientific stations are still focused on pure research, but their findings are useful in practice, both in the polar regions and at home. Due to the global importance of climate change and the glaciation of polar areas, over the past two decades Arctic and Antarctic research has been being conducted on an unprecedented scale, both worldwide and involving many Polish scholars.

But what does Poland gain from researching such distant, polar regions?

- **We are among an elite group of countries that conduct long-term multidisciplinary research of both polar regions.** This we owe to the work

conducted by the scientific station at Svalbard in the Arctic since 1957, and the more more than 40-year operation of the Arctowski Station on King George Island in the Antarctic Archipelago of South Shetland Islands. The Polish flag flying over modern research facilities is an important sight. Polish polar stations play the role of scientific embassies at the ends of the Earth. It is mainly thanks to this that Poland is an active participant in key intergovernmental organizations. Poland is a member state of the Antarctic Treaty System, and as an Observer State in the Arctic Council. Poland's Ministry of Foreign Affairs has become the initiator and organizer of discussions between the Observer States and the subsequent presidency of the Arctic Council, the so-called "Warsaw Format Meetings." This kind of scientific diplomacy helps build Poland's image on the international stage.

- **Discoveries and innovative findings bring prestige to Polish researchers.** This due to our intensive pursuit of pure research, furthering our understanding of the Earth's polar regions. This also includes their geological structure and the potential location of mineral and biological resources. The latter is important also for the fishing industry. Polar research is also a playing field for a noble kind of international scientific rivalry in discovering new phenomena and species, as well as understanding the changing patterns of the polar environment. At the same time, it is a field of very broad international research cooperation.
- **Knowledge of modern processes of glacier recession can help better understand the phenomena that have previously occurred in Poland.** Only quite recently (from a geological perspective of



PIOTR ANDRYSZCZAK

course) over 80% of Poland was several times covered over by the Scandinavian ice sheet. Its development and disappearance significantly influenced the shape of the terrain and type of surface geological deposits in our country. The deglaciation processes determined the location of mineral resources nowadays used in construction (such as gravel, sand, clay and silt for making bricks), affected the geotechnical conditions that are now crucial for building foundations and communication routes, and influenced the formation of soils.

- **We are gaining knowledge about the trends and pace of climate change on the global scale.** Both polar regions are crucial to this issue. While Antarctica is still a climate stabilizer due to the presence of its large continental ice sheet, the Arctic region is warming up 3–4 times faster than Europe, for example. This phenomenon is called Arctic amplification. This is what is setting the trends of climate change at mid-latitudes, due to the interaction of the atmosphere with the ocean and sea ice. The rapidly shrinking ice cover on the Arctic Ocean increases the atmosphere warming process due to its contact with a warmer sea. Engaging in systematic observations allows us to obtain direct access to our own data, to arrive at our own findings and to contribute to those gained through international collaboration. This is not only the basis for understanding what is happening with the climate, including in our own country. It makes it possible to forecast certain scenarios of climate change in the future. And this certainly has practical implications for economic planning.
- **Long-term research in the Earth's most severe regions also involves many other applied as-**

pects, such as testing the performance of various materials (e.g. clothes), the resilience of technical equipment, and the appropriateness of new technological and logistical solutions (including polar station waste water treatment, as an example). It also gives specialists not only training in a wide range of scientific disciplines, but also great opportunities to gain practical experience. It allows us to test how people deal in extreme conditions. The state-of-the-art knowledge and first-hand personal experience of the polar researchers teaching at the Polish universities belonging to the Polish Polar Consortium help disseminate and harness the latest scientific findings.

Finally, I would like share the reasons why I personally am involved in studying Arctic tidewater glaciers that produce icebergs, in what is called ice-calving. Yes, they are beautiful and are highly challenging to study, so we still don't know much about them. But what is most important is the greatest unknown: what their actual contribution is to raising the level of the world's oceans. Apart from melting, calving apparently also contributes to this phenomenon. A slow rise in sea level of about 3.5 mm/year is already a fact, but accelerated melting, flow and calving of large outlet Greenlandic glaciers, and especially the great West Antarctic glaciers, may in the long run lead to an increased ocean level by meters rather than centimeters. It is crucial to investigate the driving factors behind iceberg formation in order to identify and assess this threat. My colleagues from the Centre for Polar Studies and I, through broad international cooperation, are helping to seek answers. Is it important for the future of Poland's own low coastline and ports? I think that goes without saying. ■