

CLIMATE AND ENVIRONMENT POLISH AND NORWEGIAN RESEARCH ON CLIMATE AND ENVIRONMENT STRATEGIES AND ACTIONS – POLAR RESEARCH – CLIMATE CHANGE – TECHNOLOGY

**International Conference
(Sopot, Poland, 19th–20th November, 2015)**

One of the aims of the Polish-Norwegian Research Programme is to promote bilateral cooperation through popularising and supporting scientific research. The Programme funds research and development within a wide spectrum of areas, from the social through to the environmental sciences.

In November 2015 the Programme's 'Climate and environment' Conference was held. The environment and climate change, including polar research, are important issues addressed within the framework of the Programme. Several environmental and climate-focused Polish-Norwegian projects are being implemented in the Pomerania region. The Institute of Hydroengineering of the Polish Academy of Sciences is leading the '*Vulnerability of the Arctic coasts to climate changes*' project; while the University of Gdansk is promoting three projects, including one with a focus on environment entitled '*Impact of potential leakage from a sub-seabed CO₂ storage site on the marine environment at relevant hydrostatic pressure*' (CO₂MARINE). The Institute of Oceanology of the Polish Academy of Sciences in Sopot (IO PAN) is in turn the promoter of seven Polish-Norwegian Projects, addressing a wide range of the most up-to-date scientific questions:

- *The Arctic climate system study of ocean, sea ice and glacier interactions in the Svalbard area (AWAKE-2)*;
- *Atlantic Water Pathways to the Arctic: Variability and Effects on Climate and Ecosystems (PAVE)*;

- *Climate Change Impact on Ecosystem Health – Marine Sediment Indicators (CLISED)*;
- *Declining size – a general response to climate warming in Arctic fauna? (DWARF)*;
- *Glaciers as Arctic Ecosystem Refugia (GLAERE)*;
- *Source and transformations of Chromophoric Dissolved Organic Matter and its role in surface ocean heating and carbon cycling in the Nordic Seas and European Arctic (CDOM-HEAT)*;
- *The Changing Ocean of the Polar North (POLNOR)*.

All the listed projects concentrate on environmental changes in the European Arctic and the way these link up with rapid climate change, which is significantly amplified in the Arctic regions. Most of the projects aim to study the marine environment by adopting an interdisciplinary approach that takes account of the interconnections between such diverse elements as the cryosphere, atmosphere, hydrosphere and biosphere. IO PAN is also a partner in other Polish-Norwegian projects.

The 'Climate and Environment' Conference was opened by Prof. Krzysztof Jan Kurzydłowski, Director of the National Centre for Research and Development, and H.E. Karsten Klepšvik, Ambassador of the Kingdom of Norway to the Republic of Poland.

The Conference was divided into five sessions. The Policy Panel with six presentations was the main focus of Session I, which commenced with keynote lectures entitled '*From Regional to Global – the reflection of climate signals in Baltic Sea sediments*', given by Prof. Jan Harff, University of Szczecin; and '*Climate change – we know all about that or what?*', given by Knut H. Alfsen from the CICERO Centre for International Climate and Environmental Research. Representatives of the Polish Ministry of Science and Higher Education, the Royal Norwegian Ministry of Education and Research and the Polish Ministry of the Environment then presented the main focus and ongoing activities of their respective institutions. The Session was closed by Lars Horn, a representative of the Research Council of Norway, who addressed the main initiatives of RCN in his talk '*Klima21 and other initiatives*'.

Session II was dedicated to Strategies and actions. The Polish-Norwegian Research Programme project 'Linking systems, perspectives and disciplines for active biodiversity governance' (LINKAGE) was presented by Dr Agnieszka Olszańska from the Institute of Nature Conservation, Polish Academy of Sciences. The three talks that followed then addressed different strategic and coordinating initiatives in environmental research. The EU Strategy for the Baltic Sea Region was discussed as an opportunity for the transnationalisation of projects under the Polish-Norwegian Research Programme, by Tomasz Jałukowicz from the Ministry of Science and Higher Education. Prof. Zbigniew Karaczun then presented the Polish Climate Coalition, while Kristin Elisabeth Thorud from the Research Council of Norway gave an overview of the JPI Oceans initiative. The Joint Programming Initiative on Healthy and Productive Seas and Oceans (JPI Oceans) is a coordinating and integrating strategic platform, open to all EU Member States and Associate Countries who invest in marine and maritime

research and are focused on a long-term integrated approach to marine and maritime research and technology development in Europe.

Polar research was addressed during Session III, which was moderated by Prof. Nalân Koç from the Norwegian Polar Institute. The Projects implemented under the Polish-Norwegian Research Programme that were introduced in more detail to the conference public were:

- **MONICA** – ‘*A novel approach to monitoring the impact of climate change on the Antarctic ecosystem*’, was presented by Prof. Katarzyna Chwedorzewska from the Institute of Biochemistry and Biophysics, Polish Academy of Sciences;
- **AWAKE-2** – ‘*The Arctic climate system study of ocean, sea ice and glaciers interactions in the Svalbard area*’, was presented by Prof. Waldemar Walczowski from the Institute of Oceanology, Polish Academy of Sciences;
- **Arcoasts** – ‘*Vulnerability of the Arctic coasts to climate changes*’ was presented by Dr Maciej Paprota from the Institute of Hydroengineering, Polish Academy of Sciences, as well as Nadeem Ahmad of the Norwegian University of Science and Technology;
- **iAREA** – the ‘*Impact of absorbing aerosols on radiative forcing in the European Arctic*’ was presented by Prof. Krzysztof Markowicz from the University of Warsaw;
- **GLAERE** ‘*Climate change and the fate of Arctic marine fauna*’ and **DWARF** ‘*Declining size – a general response to climate warming in Arctic fauna?*’ were presented together by Prof. Jan Marcin Węśławski from the Institute of Oceanology of the Polish Academy of Sciences.

Additionally, the Project entitled ‘*Impact of post-Little Ice Age glaciers’ retreat on sediment accumulation and carbon burial rates in subpolar fjords*’ was presented by Dr Witold Szczuciński from the Poznań-based Adam Mickiewicz University. The European Roadmap for Research and Infrastructure (ESFRI) Project: ‘*Svalbard Integrated Earth Observing System*’ (SIOS) was in turn presented by Prof. Piotr Głowacki, Institute of Geophysics, Polish Academy of Sciences. The SIOS project, focused on integrated research infrastructure in the Svalbard area is of major importance to both Polish and Norwegian scientists, and their studies of the Arctic climate and environment; as this is currently the only international initiative aimed at optimized, long-term monitoring of the main environmental variables in the European Arctic.

Session IV, dedicated to climate change effects and adaptation, began the second day of the Conference. During this Session the following Projects being implemented under the Polish-Norwegian Research Programme gained a presentation:

- **CHASE-PL** – ‘*Climate change impact assessment for selected sectors in Poland*’ – by Prof. Tomasz Okruszko, Warsaw University of Life Sciences;
- **WICLAP** – ‘*Ecosystem stress from the combined effects of winter climate change and air pollution – how do the impacts differ between biomes?*’ – by Dr Zbigniew Bochenek, Institute of Geodesy and Cartography;
- **WetMan** – ‘*Central European Wetland Ecosystem Feedbacks to Changing Climate – Field Scale Manipulation*’ – by Prof. Radosław Juszczak, Poznań University of

Life Sciences, and Dr Hanna Silvennoinen, Norwegian Institute for Bioeconomy Research;

- **KlimaVeg** – ‘*The impact of climate change on species ranges and composition of plant communities in temperate, boreal and alpine regions*’ – by Prof. Bogdan Jaroszewicz, University of Warsaw, and Prof. John-Arvid Grytnes, University of Bergen;
- **POTPAT** – ‘*Potato pathogen populations in changing climatic conditions of Norway and Poland and the mechanisms of their interaction with the host*’ – by Dr Robert Czajkowski, University of Gdańsk.

After these presentations, ongoing and future Norwegian research activities in the field of climate, the environment and polar research were presented by Dr Herman Farbrot from the Research Council of Norway. At the end of the Session Marcin Grądzki from the Ministry of Environment, Poland, offered an overview of the KLIMADA strategic project on “Development and implementation of a strategic adaptation plan for the sectors and areas vulnerable to climate change”, whose results will form the basis for the preparation of a strategic plan by which Poland is to adapt to climate change.

Session V was devoted to Tools and Solutions (technology). Five projects focused on modern technologies and their applications were presented, including two implemented under the Polish-Norwegian Research Programme. The two latter projects were devoted to the development of a small wind turbine optimised for low windspeed conditions, as well as integrated technology serving an improved energy balance and reduced greenhouse gas emissions at municipal wastewater treatment plants.

The Conference concluded with a short panel discussion addressing opportunities for future funding. Aleksandra Ichnatowicz from the Polish National Contact Point for Research Programmes of the European Union presented the upcoming calls under the *Horizon2020* framework, and Herman Farbrot presented the current and future funding initiatives of the Research Council of Norway, in particular within the KLIMAFORSK and MARINFORSK Programmes, and the Polar Research Programme (POLARPROG).

The Conference in Sopot offered a good example of environmental and climate research being carried out in Poland, at a high international level. The resources provided by the Polish-Norwegian Funds and Polish-Norwegian Research Programme provide for significant promotion of the development of high-quality research initiatives and allow the most up-to-date science questions to be addressed from the climate-related and environmental perspective. The extensive collaboration fostered by the Programme between different institutions, in particular with the involvement of leading Polish and Norwegian scientists, has proved an effective and successful way of helping improve science. Additionally, there are seen to be several fields and regions of common scientific interest to both Polish and Norwegian researchers, with Arctic studies serving as the best example. Strengthened by the Arctic Amplification mechanisms, the climatic and environmental changes are much more intensive in the Arctic region than elsewhere. The Arctic climate feedbacks have global implications, so numerous environmental and

climate-focused Projects are situated in the European Arctic, mostly around Svalbard. The Polish Polar Station in Hornsund (IGF PAN) and the research vessel ‘Oceania’ (IO PAN) are the main infrastructure platforms facilitating the Polish-Norwegian cooperation. A further important issue raised during the Conference was the role of the ocean in Arctic and global change. The feedback loop between the reduction of sea ice cover and warming of the atmosphere and ocean in the Arctic region is still not well understood, and new, cross-disciplinary research initiatives are essential to an elucidation of the potential impacts on the Arctic environment, including its abiotic and biotic elements and socioeconomic dimension.

*Waldemar Walczowski and Agnieszka Beszczyńska-Moeller
Institute of Oceanology PAN, Sopot*