EVENT REPORT:

Polar Science for Global Action –

Strengthening Climate Preparedness through EU Leadership

On **18 November**, the **MEP Group on 'Climate Change, Biodiversity and Sustainable Development**' supported an event co-organised by four major EU-funded research projects – **PolarRES, CRiceS**, **PROTECT**, and **OCEAN:ICE**. The projects showcased their latest findings on how changes in the polar regions are impacting Europe's climate, resilience, and security, fostering dialogue between leading scientists and policymakers on the measures needed to address these challenges.

Dr. Nadine Johnston, Marine Ecologist at the British Antarctic Survey, moderated the event, introducing the topic and setting the stage for the presentations. She emphasised the urgency of polar change, mentioning that the Arctic and Antarctic are undergoing rapid transformations, driving rising sea levels and extreme weather events, and impacting ecosystems and societies worldwide. According to her opening remarks, each of the four EU projects are providing critical insights into how polar science can inform global action and adaptation strategies. Dr. Johnston moved on to underline that to date, the EU has invested over €790 million through Horizon 2020 and Horizon Europe, supporting more than 320 polar research projects – involvement in Arctic Council? And the Antarctic Treaty further underscores Europe's commitment to polar policies and governance.

Following the introduction, **Ms. Larisa Lorinczi**, Policy Officer at DG RTD, European Commission, provided some opening remarks as well, highlighting the importance of science-policy feedback and evidence-based policymaking. She stressed that polar science should be widely communicated and effectively conveyed to policymakers, particularly as the EU enters a phase of programming its next policy documents over the coming six months. She also noted that the European Ocean Pact will encompass polar regions and include an ocean observation initiative. Additionally, the Commission has begun reviewing the EU-Arctic policy and is considering how to contribute to the Fifth International Polar Year.

Building on this context, **Dr. Priscilla A. Mooney** a Research Professor from NORCE and Project Coordinator of PolarRES, introduced this project, which has assessed impacts of climate change in the polar regions. She noted that accelerated warming in the Arctic is not well captured by current climate models because the complex interactions driving this phenomenon remain poorly understood. Key achievements of PolarRES include an improved understanding and model representation of the processes underlying Arctic amplification, as well as enhanced global simulations through better incorporation of polar processes into climate models. The project has also produced innovative climate projections for both the Arctic and Antarctica, providing novel impact assessments of polar climate change.

In addition, Dr. Mooney highlighted research demonstrating how Arctic warming is amplifying extremes in the region, with significant geopolitical, economic, and environmental consequences that are likely to have global repercussions. She stressed that collaboration is essential, encompassing scientific, international, and science-policy partnerships.

Continuing the discussion on polar impacts, **Dr. Gael Durand**, Director of Research at the French National Centre for Scientific Research (CNRS) and Scientific Coordinator of the PROTECT project, which concluded in February 2025 and brought together 27 partner institutions, presented the project's work on understanding the evolution of the land-based cryosphere, ice sheets, and glaciers – a major focus of PROTECT was to quantify uncertainties in sea level projections.

Dr. Durand highlighted the key findings and recommendations outlined in the project's policy brief. Firstly, Dr. Durand highlighted that mitigation is critical; reducing emissions directly limits the mass loss of mountain glaciers and ice sheets, preserves vital water resources, and slows sea-level rise, providing more time for coastal adaptation. Secondly, adaptation is urgent, and regional variability is important, as climate impacts differ significantly across regions. Finally, uncertainties should not be seen as barriers to action – instead, they underscore the need for flexible, adaptive strategies and decision-making.

PROTECT developed tools to support planning, including a sea-level projection tool to explore future scenarios and a coastal risk platform to assess local vulnerabilities. However, these tools require sustained, intentional, and institutional policies to become fully operational. The project also emphasised that significant knowledge gaps remain.

Turning to Antarctic research, **Prof. Ruth Mottram**, Chief Scientific Advisor at the Danish Meteorological Institute and Coordinator of OCEAN:ICE, outlined Antarctica's critical role in the global climate system and the Southern Ocean's connection to worldwide ocean currents. She introduced the OCEAN:ICE project, which uses satellite data, Argo floats, and other methods to study Antarctic processes.

Prof. Mottram highlighted that the Southern Ocean plays a key role in carbon and heat uptake, yet global climate models poorly capture small-scale dynamics, and long-term observational data remain limited. OCEAN:ICE has helped consolidate existing datasets, but sustained investment in research infrastructure is essential.

Prof. Mottram highlighted that Europe leads in ocean-ice research technologies, combining satellite and in situ observations, drilling beneath ice shelves, and deploying autonomous underwater vehicles. Prof. Mottram also reiterated that coupled ice-sheet and climate models remain a long-term task, requiring international collaboration and that addressing polar climate challenges depends on continued global cooperation. Uncertainties around tipping points and interconnected ocean–atmosphere–ice dynamics also demand coordinated research, stable funding, and interdisciplinary collaboration, especially as tourism, funding models, and geopolitical tensions affect research access.

Finally, **Mr. Risto Makkonen**, Research Professor at the Finnish Meteorological Institute and Coordinator of the CRiceS, summarised this project's key findings over its four-year duration. The team observed a significant decline in Arctic sea ice compared with long-term climatology, along with major physical changes detectable via satellite data. Current climate models were noted to inadequately simulate these trends and variability.

Furthermore, CRiceS research demonstrates how rapid sea-ice loss affects polar ocean–atmosphere interactions, triggering physical, chemical, and biological feedbacks. Shrinking ice alters winds, waves, aerosol production, and sea-ice biology, with cascading effects on cloud formation, ocean and atmospheric chemistry, and broader Earth System behaviour. These polar

changes also influence distant regions, including shifts in the North Atlantic jet stream and storm tracks, creating interconnected climate impacts far beyond the poles.

The project's recommendations emphasise that rapidly changing polar regions are integral to the global Earth System. Climate policy decisions should be informed by improved representation of ocean–ice–atmosphere processes in models. Stakeholders and Arctic communities must also be engaged to ensure research outputs are relevant and actionable. Enhanced international collaboration and European leadership in polar science will maximise opportunities and outcomes through shared infrastructure, coordinated observations, and joint modelling efforts, as underlined in his intervention.

The event continued with a **policy panel discussion** featuring **Ms. Larisa Lorinczi** (DG RTD, European Commission), **Dr. Martin Wearing** (European Space Agency), **Dr. Priscilla Mooney** (NORCE), and **Dr. Linda Solstrand Dahlberg** (The Arctic University of Norway).

When asked about the International Polar Year (IPY), **correct titile. Lorinczi** explained that it serves as a catalyst for advancing scientific knowledge, strengthening partnerships across different research communities, and enhancing the science-policy interface. She emphasised that IPY also builds institutional capacity to translate science into actionable policy interactions. Additionally, the EU participates in the Arctic Science Funders Forum, which brings together all scientific funding communities in the Arctic. She noted that the design of Horizon Europe's next framework programme (FP10) is still underway.

Ms. Lorinczi also highlighted the critical role of polar research in informing policymaking, including contributions to Intergovernmental Panel on Climate Change (IPCC) assessments and EU funding programmes. While decarbonisation remains the primary solution to climate change, emerging technologies such as geo-engineering require careful scientific evaluation. Moreover, given the slow pace of emissions' reductions, she stressed that the scientific community must advance modelling, monitoring, and understanding of physical, chemical, and ecological processes to provide robust evidence for policymakers. Ms. Lorinczi stressed that urgent, comprehensive research is now more critical than ever.

On the question of how the European Space Agency (ESA) and the EU research programme can make IPY results actionable, **Dr. Wearing** explained that the ESA can deliver data on temporal and spatial scales that are difficult to achieve with in-situ measurements. He noted that new satellite missions with enhanced capabilities will allow the monitoring of previously unobserved variables (can you give some examples?), contributing to a better understanding of polar climate processes. Collaboration between the ESA and Horizon Europe projects will further enable the development of sophisticated models to support informed policy decisions.

Regarding the most pressing scientific findings for EU policymakers, **Dr. Mooney** highlighted the rapid disappearance of polar sea ice and thawing permafrost, which have far-reaching consequences. In parts of Northern Europe, permafrost thaw not only releases greenhouse gases, but also threatens critical infrastructure. Similarly, melting ice sheets and rising sea levels pose significant risks to coastal communities across Europe.

Dr. Dahlberg, Head of the University of the Arctic´s Brussels Office, the world's northernmost university, emphasised the unique opportunities and responsibilities in relation to its location. Positioned at 69° north with access to the Arctic Ocean, the university leverages its geography, infrastructure, and long-standing connections, to support research on climate change, local impacts, and societal implications, including the knowledge of Indigenous Sámi communities.

She highlighted the institution's commitment to open, inclusive, and international collaboration, noting that Norway's small population necessitates partnerships across Europe and beyond. Additionally, to advancing scientific understanding, the university provides evidence and guidance for governments, businesses, and economic activities in the Arctic. Dr. Dahlberg also stressed the importance of multilateral cooperation through bodies like the Arctic Council, particularly given stalled bilateral relations with Russia, and noted that European science diplomacy strengthens both knowledge and geopolitical ties.

On a question of how the EU and ESA can continue to support international collaboration, **Dr. Wearing** pointed out that initiatives such as the International Polar Year and Antarctica InSync provide platforms for scientists to come together. However, he emphasised that collaboration ultimately depends on funding and political circumstances, and that polar research is inherently linked to global systems rather than being a purely scientific problem. **Ms. Lorinczi** added that science serves as a neutral platform for diplomacy, though Russian activity has disrupted Arctic research and access to key data. She moved on to highlight the importance of science diplomacy, including efforts through the Arctic Research and Innovation Alliance, and underscored EU initiatives such as the Ocean Observation Initiative to safeguard critical data and maintain strong international collaboration, including with ESA.

The panel discussion underscored the importance of country-agnostic collaboration in critical and urgent research areas, even when security relationships are strained. The EU's contributions to research and science policy were recognised, though it was noted that coordination across national and international infrastructures could be strengthened. Norway's Arctic Ocean 2050 programme was cited as a model for long-term, strategic polar research, preparing for an ice-free Arctic by 2050 while fostering international collaboration.

During the **Q&A**, a question on data interoperability prompted a discussion on the challenges of transferring data across scientific fields. It was emphasised that such processes are rarely straightforward and require continuous iteration between data producers and users. Rather than simply depositing datasets in repositories, the use of tools such as Jupyter Notebooks enhances accessibility and enables researchers to process, visualise, and build upon the data.

The discussion also addressed the challenge of sustaining collaboration in polar research beyond the lifespan of individual projects. While strong relationships within consortia are a key driver of cooperation, these links often dissolve between project cycles. To support long-term collaboration at both European and potentially global scales, mechanisms are needed to maintain connections and share outcomes. Dr. Johnston highlighted EU Networks of Excellence as one initiative that helps preserve these links. Furthermore, a representative from the European Research Executive Agency noted the importance of funding access to both physical and virtual research infrastructures for long-term polar research. Projects such as POLARIN aim to integrate Arctic and Antarctic infrastructures, harmonising access and facilitating broader collaboration across the research community.

On the topic of climate diplomacy, it was highlighted that science can serve as a neutral platform for international collaboration, though it is important to balance openness with research security.

The Q&A concluded with a key message for EU policymakers; sustained polar observations and modelling are essential, not only to understand climate risks in the polar regions, but also to strengthen European competitiveness through economic resilience and preparedness for

climate risks originating in the Polar Regions, underscoring the global significance of polar research.

In her **closing remarks**, **Dr. Johnston** reflected on the achievements of the four projects; **PolarRES** has developed novel climate storylines to anticipate regional risks; **PROTECT** is refining sea-level rise projections; **OCEAN:ICE** is improving understanding of ocean–ice feedback; and **CRiceS** is expanding knowledge of sea ice and the links between polar and global climate. She emphasised the importance of sustained international collaboration in polar science, and the need for a dedicated polar framework under FP10, and within the EU's next Multiannual Financial Framework. In addition, she advocated for adapted EU funding criteria to explicitly support foundational research, particularly on sea ice retreat, permafrost thaw, ice sheet loss and sea level rise. Wrapping up the event's discussions, she highlighted that key recommendations include strengthening EU leadership through sustained polar research funding, integrating polar climate risks into European adaptation strategies, and supporting modelling (underpinned by robust observational data and emerging technologies) for policy-relevant climate forecasting. She concluded by highlighting that this is a critical moment, with the European Commission's 10th Framework and the EU budgetary cycle forthcoming, and that the Fifth International Polar Year (and Antarctica InSync) presents a significant opportunity to ensure that science continues to guide policy, maintaining Europe's leadership in climate resilience, cooperation, and innovation.