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Report of the first Town Hall meeting, Brussels, Belgium, 27 September 2016

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1. Introduction

Research has increasingly become critical for elaborating climate-related policies, including energy security, innovation, and sustainable economic growth. Polar research is no exception. Working in regions that have warmed twice as fast as the global average, polar scientists are at the forefront of understanding the future impacts of climate change in the high latitudes and beyond. Not only are areas across the Arctic and parts of the Antarctic showcases of how entire ecosystems alter as carbon dioxide concentrations rise and temperatures increase, the changes in these regions also influence the entire global climate system – affecting sea-level rise, weather patterns and ocean circulation.

In the pursuit of achieving the ambitious climate goal set out in the Paris Agreement – stating the need to "to limit the temperature increase to 1.5°C above pre-industrial levels" – polar science will need to play an active role. The question thus arises how Arctic and Antarctic research can support post-COP21 mitigation efforts to limit global warming to 1.5°C.

To find possible answers, the Horizon2020 Coordination and Support Action EU-PolarNet hosted a Townhall format discussion event themed "*Towards the 1.5°C climate goal – Perspectives from the Polar Regions*" on 27th September 2016 in Brussels, Belgium. The objective of the event was to explore how future polar research projects can deliver tangible benefits for European society – especially with regard to the 1.5°C climate goal.

Determining areas of future research interests, however, also calls for involving all those with a stake in the Arctic and Antarctic. The EU-PolarNet discussion event therefore aimed at stimulating a dialogue between polar scientists, policy makers, industries, NGOs, as well as local and Indigenous communities.

One of EU-PolarNet's main objectives during its five-year project lifetime is to develop an integrated European polar research programme, which is co-designed with all relevant stakeholders. The discussion event thus offered an opportunity to bring various and differing interests and needs on the table and to identify those areas of research that are of immediate relevance to society.

2. The Meeting agenda

EU-PolarNet Townhall Event: "Towards the 1.5°C climate goal. Perspectives from the Polar Regions"	
Morning Session	
Time	
08:30-09:30	**Registration**
09:30-09:45	**Welcome** **Nicole Biebow** (EU-PolarNet Project Manager)
09:45-10:15	**Keynote address** **João Aguiar Machado** (Director-General for Maritime Affairs and Fisheries)
10:15-10:45	**Keynote address** **Paolo Ruti** (Chief, World Weather Research Division, World Meteorological Organisation)
Coffee Break	
11:15-12:45	**Panel** **"The 1.5°C climate target – What does the European society need from polar research?"** *Chair* **Björn Dahlbäck** (Swedish Polar Research Secretariat) *Panellists* **Jannie Staffanson** (Saami Council); **Peter Gibbs** (BBC); **Valérie Masson-Delmotte** (IPCC WG1); **Peter Sköld** (IASSA); **Tero Vauraste** (Arctia Shipping); **Tom Armstrong** (Madison River Group)
Lunch	
13:45-14:15	**Keynote address** **Thomas Stocker** (IPCC WG1)
14:15-15:45	**Panel** **"European priorities for polar research"** *Chair* **Thomas Armstrong** (Madison River Group) *Panellists* **Jane Francis** (BAS); **Marcus Carson** (Stockholm Environment Institute); **Christine Valentin** (WOC); **Attilio Gambardella** (Directorate-General for Research & Innovation); **Carlo Barbante** (CNR, EU-PolarNet); **Maaike Vancauvenberghe** (BELSPO)
Coffee break	
16:30-17:45	**Break-out session** Summarizing the main discussion points and presentation of the conference statement
Reception **Antarctic Art Installation from German artist Julia Schnittger**	

3. The organizing committee

The EU-PolarNet Town hall organising committee was composed as follows:

Name, Affiliation, Country		
Nicole Biebow	AWI	Germany
Kristina Bär	AWI	Germany
Renuka Badhe	EPB	The Netherlands
Linda Capper	BAS	UK
Anton Vandeputte	RBINS	Belgium
Serge Scory	RBINS	Belgium
Johan Etourneau	CNRS	France
Denis-Didier Rousseau (at the early stage of the organization)	CNRS	France
Annette Scheepstra	RUG	Netherlands
Kirsi Latola	OULU	Finland

4. The speakers

4.1 Keynote Speakers

João Aguiar Machado

Director-General at the European Commission's Directorate-General for Maritime Affairs and Fisheries

J. Aguiar Machado is in charge of implementing the new Common Fisheries Policy and to secure sustainable fisheries, a stable supply of seafood for EU markets and also prosperous coastal communities. As the DG in charge of Maritime Policy, his mission is also to promote an integrated approach to all maritime policies. Before taking his current position, he was Director-General at the European Commission's Directorate-General for Mobility and Transport. Previously Mr. Aguiar Machado worked mostly on trade matters and international relations, namely as Deputy Director-General for Trade and Deputy Director-General for External Relations. Mr. Aguiar Machado studied economics in Lisbon and Bruges.

Dr. Paolo Ruti

Chief for World Weather Research Division, World Meteorological Organization

Paolo Michele Ruti was born in Lausanne, Switzerland, in 1967. He received a degree in Physics at the University of Bologna in 1992 and a PhD in Geophysics at the University of Torino in 1995. His research interests include large-scale variability of the atmospheric flow and regional climate variability and change. He was involved in many European projects on climate change prediction (RACCS, 1993-1995) and African Monsoon analysis (AMMA, 2005-2010). He was head of the laboratory on Climate Modelling and Impacts at ENEA research agency, Italy, where he coordinated an EU project on Climate Services over the Mediterranean region (CLIMRUN). He is now Chief for the World Weather Research Division at the World Meteorological Organization. He has published more than 40 papers and book chapters.

Prof. Thomas Stocker

University of Bern, Co-Chair WGI IPCC 5th AR 2008-2015

Thomas Stocker was born in Zürich, Switzerland, and obtained a PhD in Natural Sciences at ETH Zürich in 1987. He has held research positions at University College London, McGill University (Montreal), Columbia University (New York) and at the University of Hawai'i (Honolulu). Since 1993 he is Professor of Climate and Environmental Physics at the University of Bern. His research encompasses the development of climate models of intermediate complexity, modelling past and future climate change and the reconstruction of the chemical composition of precipitation and greenhouse gas concentrations based on ice cores from Greenland and Antarctica. Thomas Stocker has published over 160 peer-reviewed papers in the area of climate dynamics and paleoclimate modelling and reconstruction. He was awarded a Dr Honoris Causa of the University of Versailles (France) in 2006 and the Hans Oeschger Medal of the European Geosciences Union in 2009. Thomas Stocker served as a Coordinating Lead Author in the Third and Fourth Assessment Reports of the IPCC and was elected Co-Chair of Working Group I for the IPCC's Fifth Assessment Report in 2008.

4.2 Panellists

- ***Panel 1: "The 1.5°C climate target – What does the European society need from polar research?"***

Dr. Thomas R. Armstrong

President of the Madison River Group, LLC (MRG), Chair of the Arctic Council's and AMAP's Adaptation Actions for a Changing Arctic (AACA)

Dr. Thomas Armstrong is the President of the Madison River Group, LLC (MRG) which launched on January 1st, 2015. He is also the Chair of the Arctic Council's and AMAP's *Adaptation Actions for a Changing Arctic* (AACA). Prior to these roles, Tom served within the White House Office of Science and Technology Policy as the Executive Director of the United States Global Change Research Program (USGCRP), a 13-agency Federal Program with a $2.5B annual budget. Tom was a key player in the development of the USGCRP's new Ten Year Strategic Plan (2012-2021), the Third Quadrennial National Climate Assessment, President Obama's Climate Action Plan and a wide array of other Executive Office policies, Executive Orders and other activities related to the Federal climate change enterprise. During his tenure, Tom also served as the U.S. Head of Delegation to the International Panel on Climate Change (IPCC) Fifth Assessment Report and helped lead the U.S. government's technical and policy-level reviews of numerous IPCC reports. His recent Arctic responsibilities also include United States Head of Delegation for the Arctic Monitoring and Assessment Programme (AMAP) and Chair of the *Sustaining Arctic Observing Networks* (SAON).

Peter Gibbs

BBC Weather presenter and Met Office meteorologist

Earlier this year Peter Gibbs co-wrote and presented a documentary on the work of the British Antarctic Survey's Halley research station for the BBC's flagship science documentary programme 'Horizon'. This was a very personal journey, as Peter spent two winters at Halley during the early 1980s as a young meteorologist.

He then spent several years as an operational forecaster at the UK Met Office, before joining the national weather presenting team at the BBC in 1997.

Peter is a Fellow of the Royal Meteorological Society and member of their Education Committee. He is also a visiting Fellow at the meteorology department of the University of Reading, UK.

Dr. Valérie Masson-Delmotte

Senior scientist, Laboratoire des Sciences du Climat et de l'Environnement, Institut Pierre Simon Laplace / Co-chair of IPCC Working Group I

Dr. Valérie Masson-Delmotte is a senior scientist from Laboratoire des Sciences du Climat et de l'Environnement, Institut Pierre Simon Laplace. She is the Co-chair of IPCC Working Group I for the AR6 cycle. Her research interests are focused on quantifying and understanding past changes in climate and the atmospheric water cycle, using analyses from ice cores in Greenland, Antarctica and Tibet, analyses from tree-rings as well as present-day monitoring, and climate modelling for the past and the future. She has worked on issues such as the North Atlantic Oscillation, drought, climate response to volcanic eruptions, polar amplification, climate feedbacks, abrupt climate change and ice sheet vulnerability across different timescales. She is active in outreach for children and for the general public and has contributed to several books on climate change issues (e.g. Greenland, climate, ecology and society, CNRS editions, in press; in French). Her research was recognized by several prizes.

Prof. Peter Sköld

Director at the Arctic Research Centre at Umeå University, Sweden

Peter Sköld is professor in history, Saami culture and society development at Umeå University, Sweden. He is the director of the Centre for Arctic Research. His research profile includes historical demography, population statistics, Indigenous health transitions and northern cultures. Peter Sköld has an active engagement in Arctic research planning, in stakeholder cooperation, and international collaboration. Prof. Sköld is president of International Arctic Social Sciences Association (IASSA), vice-chair for Social and Human WG in the International Arctic Science Committee (IASC), and member of the Board of Governors of the University of the Arctic. In 2015 Peter Sköld was appointed Honorary Consul of Västerbotten to Latvia and this year he became official Climate Ambassador of Västerbotten.

Jannie Staffansson

Political Advisor at the Arctic Environmental Unit, Saami Council

Jannie Staffasson is working with international environmental policies, advocating for respecting the Indigenous peoples' rights and for the appropriate cooperation between Indigenous peoples' knowledge and modern science, primarily within the Arctic Council (AMAP) and UNFCCC, where she is the Arctic Focal Point in the International Indigenous Peoples Forum on Climate Change. Jannie Staffansson grew up in a reindeer herding family and at an early stage in life felt the disaster caused by climate change. She went to the university and studied environmental and organic chemistry to increase her understanding of climate change, and is now fighting for the rights of the reindeer and mother earth.

Tero Vauraste

President and CEO of Arctia Ltd and Vice-Chair of Arctic Economic Council (AEC)

Tero Vauraste is President and CEO of Arctia Ltd and Vice-Chair of Arctic Economic Council (AEC). His educational background includes M.Sc. in Risk, Crisis and Disaster Management from Leicester University and the Naval officer exam from the Finnish Naval Academy. He has served as a vessel master and in several other positions in the Finnish Coast Guard. His current military rank is Lieutenant-Commander. Prior to joining Arctia in 2009, he had long experience in senior executive positions within the traffic and logistics service clusters. Arctia provides ice-breaking, ice-management, oil combatting and polar research support services with eight icebreakers on the Baltic Sea and Polar waters.

Tero Vauraste holds several positions of trust, including Chairman of the Finnish Maritime Weather Advisory Group, member of the Board of Finnish Arctic Society and member of the Advisory Group of Finnish Lifeboat Institution, to name a few.

- ***Panel 2: "European priorities for polar research"***

Prof. Carlo Barbante

Director, Institute of the Dynamics of Environmental Processes – CNR,
Professor at the University of Venice, Italy

He is Full Professor of Analytical Chemistry and the current Director of the Institute for the Dynamics of Environmental Processes of CNR in Venice. He has a very high international profile and in the past twenty years he has made substantial contributions to the environmental and climate sciences in polar regions. He has mostly contributed in the fields of ice core geochemistry, analytical chemistry, paleoclimate, environmental contamination, atmospheric chemistry, and synthesizing findings from across these diverse fields. He is an ERC Senior Grant awardee and currently the Italian National Representative to EU Horizon 2020 for the Societal Challenge "Climate Action, Environment, Raw Material and Resource Efficiency". He is member of several national academies and he has been awarded with the "La Belgica Prize" of the Royal Academies for Science and the Arts of Belgium in 2014 for his research in Antarctica.

Dr. Marcus Carson

Research Fellow, Stockholm Environment Institute

Marcus Carson's research, currently at Stockholm Environment Institute, focuses on social change processes, with an emphasis on the social/political drivers and obstacles involved in developing policy responses to climate change. Key theoretical elements in his work include the roles of paradigmatic beliefs, institutional arrangements, and organizational networks in influencing policy-making and social change processes. Marcus brings a diverse background to his work, including hands-on experience with

community organizing, policy analysis, political and labour organization, and work as a professional musician. Prior to coming to Sweden with his family, Marcus was involved for nearly two decades in social change and policy advocacy at the national, state and local level in the U.S. He received his PhD in Sociology in 2004 from Stockholm University, where he also earned his Associate Professorship in 2009.

Prof. Jane Francis

Director of the British Antarctic Survey

Jane Francis is Director of the British Antarctic Survey, based in Cambridge. A geologist by training from the University of Southampton, she was a NERC Postdoctoral Fellow in London, palaeobotanist at the British Antarctic Survey, Australian Research Fellow at the University of Adelaide, a Royal Society Leverhulme Trust Senior Research Fellow and Professor of Palaeoclimatology at the University of Leeds, where she was also Dean of the Faculty of Environment. Her research interests include ancient climates and fossil plants from the Arctic and Antarctica, used to decipher ancient polar climates of the past. She was awarded the Polar Medal for her contribution to British polar research.

Dr. Attilio Gambardella

Policy Officer at the Climate Action and Earth Observations Unit in the DG Research & Innovation of the European Commission

Attilio Gambardella is responsible for the development of the EC Polar research policy and is the project officer of the EU-PolarNet project. Before taking his current position, he was working at the Joint Research Centre of the European Commission and previously in the academic sector field dealing mainly with Earth Observation research for the marine environment. Dr. Gambardella graduated in Nautical Sciences and later received a Ph.D. degree in electronic and computer science engineering.

Christine Valentin

Chief Operating Officer for the World Ocean Council (WOC)

Christine Valentin is Chief Operating Officer for the WOC. As such, she is leading the WOC efforts to develop and drive strategically focused action to ensure sustainable business value to members, grow the WOC membership and visibility among the ocean business community, and guide WOC budget development and financial management. She has almost 30 years of senior positions (international business development, strategy, CFO) in multicultural contexts in S&P 500 companies and smaller management-owned businesses. More specifically since 2002, she has worked in sustainability and environmental consulting, engineering and services firms designing environmentally friendly and climate change-adapted solutions. Christine Valentin has a degree in business from Harvard Business School, as

well as degrees in philosophy, literature, and political science from the Sorbonne and Sciences Po. She is also the treasurer and a board member of the Professional Women's Network in Paris and a member of the Women's International Shipping & Trading Association (WISTA).

Maaike Vancauwenberghe

Manager of the Antarctic research program at the Belgian Science Policy office (BELSPO)

A biologist by training, Maaike Vancauwenberghe is in charge of implementing the Belgian federal policy on Antarctic research at the national and international level and the coordination of Belgium's Antarctic research program. She is the national representative in international committees and organisations related to Antarctic policy and research and the Chair of the European Polar Board. Before taking her current position, she worked as an environmental consultant in the private sector of environmental engineering.

5. Art installation “in between”

The evening reception was accompanied by an Antarctic art installation by German artist Julia Schnittger.

Julia Schnittger studied scenography at University of the Arts Mozarteum Salzburg and at Danmark’s Designskole Copenhagen. After finishing her diploma in 2006 with honours, she worked as an assistant with the stage designer Heike Scheele and opera director Stefan Herheim at opera houses in Copenhagen, Oslo, Riga, Dresden, Berlin and at the Salzburg Festival. She has created stage and costume designs for productions with various directors for theatres and opera houses in Hamburg, Oldenburg, Karlsruhe, Baden-Baden, Bochum, Weimar und Luxembourg.

Her current focus is in music theatre. Julia was a fellow of "Academy Opera Today" of the German Bank Foundation 2009/11 and in 2010 award winner of the "Gudrun-Wassermann-Buschan"-Award for young stage and costume designers with an exhibition at the "Reiss-Engelhorn-Museen" in Mannheim.

In Autumn 2015 she received a fellowship as Artist in Residence at the Hanse-Wissenschaftskolleg in Delmenhorst in cooperation with the Alfred Wegener Institute for Polar- and Marine Research in Bremerhaven. Within this framework she travelled to the German scientific base "Neumayer Station III" in Antarctica in January 2016 in order to conduct studies for her art project on climate memory.

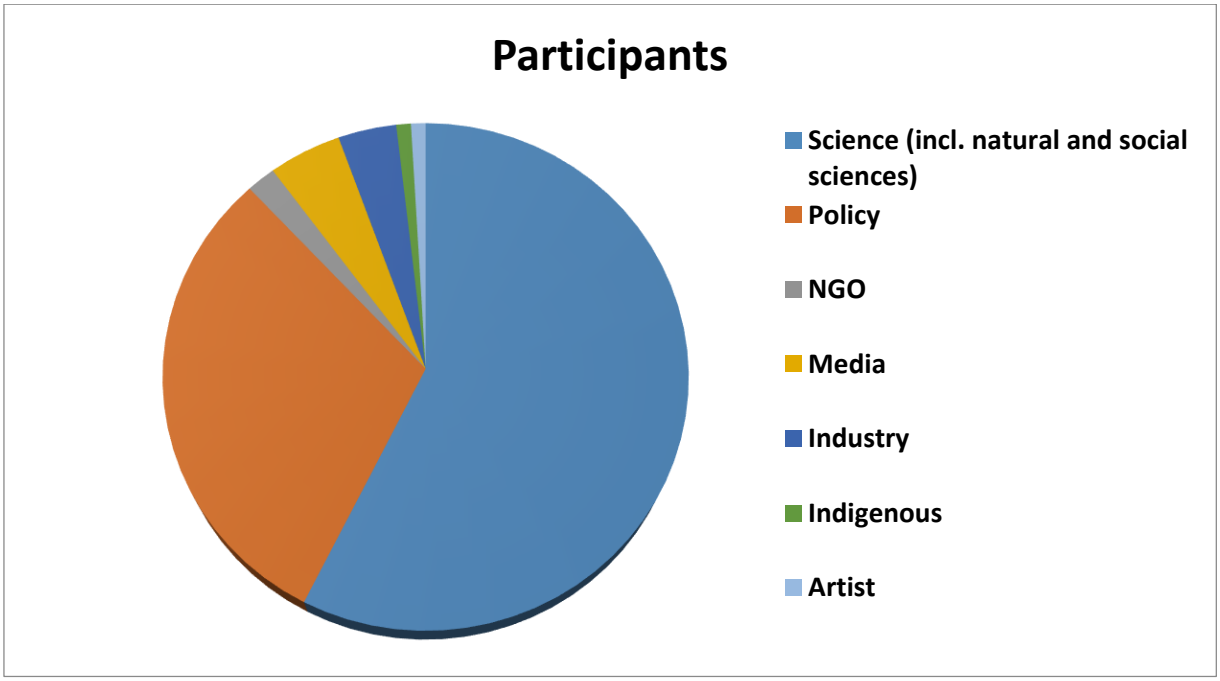
The installation "in between", which was presented at the Museum of Natural History, came into being as Artist in Residence at the Hanse-Wissenschaftskolleg in Delmenhorst in spring/summer 2016 and had its opening at the end of July. Being in contact during this time with many

scientists from different fields was not only inspiring in many ways, but also made her realize that the arts and science are more closely related than one may think, even if their language might be a different one.
She will continue developing a music theatre piece on the basis of her research on the theme of memory locked in the ice and the loss of it, if the ice is melting.

Photos by Julia Schnittger

6. Participation

In total, 108 participants from 18 countries and European and international organizations attended the Townhall event (see the final list of participants in Annex I). This number excludes people who watched the meeting on the EU-PolarNet YouTube Channel (see 10, Media and Communication).



7. Key presentations

Welcome

- **Nicole Biebow**

The EU-PolarNet project manager presented the main objectives of the EU-PolarNet project, its partners, programme and ambitions: The rapid changes occurring in the Polar Regions are significantly influencing global climate with consequences for global society. European polar research has contributed critical knowledge to identifying the processes behind these rapid changes but, in contrast to lower latitudes, datasets from the Polar Regions are still insufficient to fully understand and more effectively predict the effects of change on our climate and society. This situation can only be improved by a more holistic integrated scientific approach, a higher degree of coordination of polar research and closer cooperation with all relevant actors on an international level, as requested in the Horizon 2020 work programme. The objectives of EU-PolarNet are to establish an ongoing dialogue between policy-makers, business and industry leaders, local communities and scientists to increase mutual understanding and identify new ways of working that will deliver economic and societal benefits. The results of this dialogue will be brought together in a plan for an Integrated European Polar Research Programme that will be co-designed with all relevant stakeholders and coordinated with the activities of many other polar research nations beyond Europe, including in Canada and the United States, with which consortium partners already have productive links. This consortium brings together well-established, world-class, multi-disciplinary research institutions whose science programmes are internationally recognised for excellence. Alongside these scientific capabilities, the national programmes represented in this proposal possess a unique array of infrastructure and operational expertise to support science in both Polar Regions. The consortium is uniquely well-positioned to significantly enhance Europe's capabilities to undertake state-of-the-art science and to cost-efficiently operate infrastructure in the hostile polar environments. Nicole Biebow mentioned the Arctic Science Ministerial meeting at the White House, in Washington, DC, for which the EU-PolarNet consortium has contributed by providing concise documents summarizing the major themes treated within the European research community in line with the stakeholders. Before introducing the program of the event, she concluded her presentation by showing to the audience a short movie showing several European researchers located in both the Arctic and Antarctic regions greeting EU-PolarNet.

The movie can be found at the following link: https://www.youtube.com/watch?v=-XuJi_XnTAw.

Keynote addresses

- **João Aguiar Machado**

The Director-General for Maritime Affairs and Fisheries at the European Commission noted that the Arctic is undergoing severe climate change where the effects are occurring more rapidly than in any other region. With a winter sea-ice loss of 1 million km^2, the size of France and Germany together, it is imperative to fight climate change. For this, it is absolutely necessary to improve simulations and reduce their uncertainties (e.g. in IPCC estimations). Cooperation in research is of primary importance, especially in the framework of COP21, which was held in Paris, France. He encouraged European scientists to contribute to the preparation of the IPCC

Special Report on Climate Change and Oceans and the Cryosphere. For Europe, the Arctic is important for resources, especially fish stocks, and it is also of strategic importance, especially regarding geopolitical issues. The EC would like the Arctic to be a model for sustainable development; however, the extreme working conditions in the Arctic require sustainable innovations by developing cold climate technologies. Opportunities in the Arctic are of importance and we should all be concerned by the global impact of the climate-related changes in the Arctic. The dialogue established with Indigenous people and other Arctic residents, who are very strongly affected, has been very good, he stated. It remains important to maintain this dialogue especially since the industrial development is strongly impacting traditional activities. Traditional knowledge of the local communities is extremely important for tracking changes in the environmental conditions. It is strongly encouraged that the monitoring networks include the Indigenous peoples. Scientific and technological collaboration are powerful tools for science diplomacy. The Arctic presents an opportunity for elevating research to the policy level. Scientific dialogue can precede political dialogue, especially when it concerns geopolitical issues. H2020 offers a unique network especially because five of the eight Arctic nations are member states of the European Union or cooperation partners. The EU-PolarNet partnership is a concrete example of how H2020 and the EU can support fruitful research in the Arctic; EU-PolarNet is a new instrument that can enhance synergies within the scientific community within the EU and other Arctic countries (USA, Canada, Russia).

- **Paolo Ruti**

The chief of the World Weather Research Division at the WMO noted that the Polar Regions program of WMO is an international coordinated effort contributing to climate change issues. The status of the the sea ice extent in the Arctic in September 2016 is very low in comparison to the 1981-2010 period and the northern route along Russia is increasingly open. A similar picture of decreasing sea ice extent can be seen in the Antarctic. Accordingly, a major initiative was established, The Polar Prediction Project, which promotes cooperative international research enabling development of improved weather and environmental prediction services for the Polar Regions, on time scales from hourly to seasonal. This project draws on a long history of WMO monitoring and observation programs to improve the spatial and temporal scales of weather predictions. In the late 2000s, based on discussions of the legacy of the International Polar Year (2007-2008), discussions on the future of the World Weather Research Programme (WWRP) and the dramatic changes in Arctic climate, as well as the need for better Polar predictions, the WWRP decided to launch the Polar Prediction Project as a ten-year initiative. He noted that there is an increasing demand for reliable prediction capabilities in Polar Regions and beyond. The Arctic will likely attract substantial investment (100 billions of dollars) and environmental consequences of disasters in the Arctic will likely be worse than in any other regions. Therefore, why are there significant gaps still in the polar observing systems? Actually, very few stations are deployed in the central part of the Arctic and the same is the case in Antarctica. There is a need for coupled prediction systems which should run efficiently on a daily basis. Another example of polar prediction focuses on decadal, monthly, seasonal, and long-range time scales. There is still a strong potential for advanced predictions. The preparation phase of the Year of Polar Prediction (YOPP) started in 2013 and will continue to mid-2017, and will mostly be in an operational phase from mid-2017 to mid-2019 before its consolidation phase from mid-2019 to 2022. A special observing period will bring ships for extensive buoy coverage for the Southern and Northern Hemisphere and will include a social component (e.g. MOSAIC). The WMO Global

Cryosphere Watch (GCW) is an international mechanism for supporting all key cryospheric in-situ and remote sensing observations. There is stakeholder interest in sub-daily to seasonal sea ice forecasts. Data assimilation and high resolution are important for ice weather forecasting. Existing sea ice models have been built for climate-type modelling: a seamless approach through high spatial and temporal resolution. A special focus on seasonal predictability has pull-through to climate projections. A strong international convergence of interest (donors, stakeholders, research community) is absolutely crucial. The world is changing rapidly and public-private-partnerships are absolutely necessary, otherwise there will be very few chances of success. YOPP is considered as a key for data assimilation and to improve sea ice models, which is line with a strong international convergence. He pointed out that we cannot work only in science but we need to bring all these aspects together and to have a better integration of science and policy in Polar Regions.

- **Thomas Stocker**

The Co-Chair of the IPCC Working Group 1 presented a graph of the seasonal cycle of CO_2 concentrations at the Mauna Loa station in Hawaii, USA, showing a continuous increase since 1960. He noted that the poles matter because they are pillars of climate science and the hotspots of anthropogenic change. Studies of air bubbles in ice cores have shown how the concentrations of CO_2 have changed over the past 800,000 years (e.g. at Concordia station in the Antarctic); the present atmospheric concentration of CO_2 is 30% higher than the maximum concentration in this time series. Studies of different climatic events in Greenland and the Antarctic based on concentrations of CO_2 and methane in ice cores show that there is an interhemispheric coupling of dynamics between the poles. The poles are a hot spot of anthropogenic changes (IPCC 2013, Annex 1). For instance, there has been a massive loss of sea-ice cover, which has decreased by about 40% in September in the Arctic in recent decades, owing to Arctic amplification. There is a very large difference between the outcomes of the two extreme scenarios (RCP2.6 vs RCP8.5 from IPCC) in the Arctic and at a global scale. Most of the models predict a massive decrease of sea ice in the Arctic, which may possibly be ice free in September in 40 years. Further warming will increase the likelihood of severe, pervasive and irreversible impacts. The IPCC simulations project that sea ice will be strongly reduced, but will still be preserved in the Arctic under the RCP2.6 scenario, while it will disappear in the second scenario, the RCP8.5. This will lead to a decadal trend in mean sea-level rise and an acceleration of the rate. Sea-level rise has already been accelerating at least since 1992 and from 1997 and 2012 the acceleration has increased. Cumulative ice mass loss, including long-term constant loss from glaciers and rapid changes of ice loss from the Greenland and Antarctic ice sheets, has also accelerated since 1998. In addition, absorption of atmospheric CO_2 in surface water has caused the global ocean surface pH to decrease since 1950 and projections show acceleration. This increase in oceanic surface CO_2 concentration is beginning to affect the calcification of some marine organisms with shells. A large acidification in the northern hemisphere and coming in the Southern Hemisphere is occurring. The surface concentration of aragonite, one form of calcium needed for shell development, in the RCP8.5 scenario in both polar oceans will become too low to allow organisms to form shells owing to the acidification. There is a need to look beyond the boundaries of the Earth System by scrutinizing the polar areas during the 1.5 Million years of greenhouse gas history contained in the ancient ice. This is the purpose of the EU project "Beyond EPICA", which aims measure the oldest ice in the Antarctic. In conclusion, the polar areas contain unique Earth System information and they determine the Earth's energy balance

and the distribution of water masses in the world ocean. They are the regions most strongly impacted by anthropogenic climate change due to polar amplification. The impacts on physical systems and ecosystems are observed earlier in Polar Regions than anywhere else. The disappearance of summer sea ice will have dramatic impacts for humans and ecosystems. A possible Greenland ice sheet tipping point will have dangerous consequences worldwide. The ocean acidification starts in the polar areas and is imminent. Protection of this world heritage is urgent. Science gives the information on what is at stake.

Morning panel "The 1.5°C climate target – What does the European society need from polar research?" (*Chair*: *Björn Dahlbäck*)

- **Jannie Staffansson**

The representative of the Saami Council stated her main knowledge comes from her community of reindeer herders. She belongs to the generation brought up under climate change. She worries that no one will feel safe on the ice anymore due to climate change. She stated that we need serious and concrete actions now to leave fossil fuels behind and move to 100% renewable energy. Scientists, politicians, industry and other stakeholders need to develop strategic plans together for a sustainable development. We need to be strategic in the use of power and energy, otherwise it would not be possible to reach the Paris agreement goal, 1.5°C. Indigenous people are paying too much for sustainable energy (e.g. placing windmills in Indigenous lands far from southern population centres that use the energy). There is a need to work in close cooperation with Indigenous people. Respect and trust between researchers and the community are fundamental. Trust is valuable. Traditional knowledge should be a priority and should be included especially when applying for funding.

- **Peter Gibbs**

The BBC weather forecaster presented his documentary on the ice station Antarctica, a report on the BBC television news and radio. BBC uses social media like Facebook, newspapers, Twitter, BBC radio 4, and other media outlets. Twitter is particularly useful for communicating with the public. He told that he travelled for six weeks with scientists on the ship on his way to and from Antarctica with much discussion of space weather exploration, and mentioned 'Killer Electrons' or Alley electrons that can take out satellites as an example of why it is important to investigate space weather. A scientist on board was able to explain such complicated science in a way that the crew could understand, giving Peter Gibbs an important lesson in communication with ordinary people. Communications is a fantastic vehicle. The engagement of media is fundamental. Talking only about polar bears and penguins is not enough.

- **Valerie Masson-Delmotte**

The Co-Chair of the IPCC Working Group I stated that one outcome of the Paris COP21 is an invitation to the IPCC to prepare a special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways. She noted that this is a parallel report to the special report on climate change and oceans and the cryosphere. In 2015 the global average temperature was already >1°C higher than before the industrial period. The trend since 1900 is about 0.9 to 1°C. She presented curves for 1.5°C warming based on CMIP5 climate projections for the three RCPs used by the IPCC and noted the related

uncertainties. There are still a number of knowledge gaps. Major questions include how important is the rate of warming for the permafrost and associated carbon feedbacks, what will be the response of glaciers and sea level, what are the thresholds for Greenland/Antarctic deglaciation and what are the risks of abrupt changes. More knowledge from the past at different rates of change and improved models for better predictions are needed. The outline of the special report on 1.5°C warming prepared by the scoping meeting for this report includes a summary for policy makers followed by six chapters: 1) framing and context; 2) mitigation pathways compatible with 1.5°C in the context of sustainable development; 3) impacts of 1.5°C global warming on natural and human systems; 4) strengthening the global response to the threat of climate change; 5) approaches to implementing a strengthened global response to the threat of climate change; 6) sustainable development, poverty eradication and reducing inequalities.

- **Peter Sköld**

The president of IASSA (International Arctic Social Sciences Association) stated that the Arctic is the 'canary in the coal mine' of the world for evaluating the potential impact of global warming. In the context of global warming, consequences are important for local communities (release of methane gas, infectious diseases (e.g. Russia)…). A recent example is the Anthrax virus, which has been released from thawing permafrost and killed people and reindeer in Russia. Probably, other viruses are still trapped in the permafrost and ice and might affect populations if global warming continues. He notes the importance of listening to what the experts say. If he were prime minister, his climatic policies would focus on legislative climate demands, fossil-free energy solutions (vehicle fleet), digitalization, cost efficiency, lower emissions, urban opportunities, environmental technology corporations, merging local and global solutions, regional potential and the key role of the financial market. He felt that there are currently too many collaborative initiatives, too many organisations on the Arctic. There should be far greater collaboration among the Arctic Council, IASC and IASSA in order to increase efficiency and obtain concrete solutions and results. Sustainability and impacts are the keys.

- **Tero Varauste**

The president and CEO of Arctia Shipping started by noting that attaining the 1.5°C target depends mostly on activities and actions that are outside the Polar regions. EU Arctic policy concerns protecting and preserving the Arctic together with the peoples of the Arctic and promoting sustainable use of resources. He also noted several goals of the EU policy, including promoting sustainable growth, employment, building resilient infrastructure and sustainable development. Regarding the European society, climate change, energy and security, innovation and economic growth are of primary importance. With regard to economic developments in the Arctic, most lack economies of scale and thus need to link with activities outside the Arctic. Shipping and other maritime activities are anticipated to expand in the Arctic and will need to reduce emissions. Energy security brings forward the need for renewables, while local activities for oil and gas exploitation are not compatible with climate protection. The only EU Indigenous people are Saami, who need to be included in the dialogue. Energy and security can be only considered when we involve local communities in the process. Digitalization is an opportunity. Ten ice breakers are used in the world, and digitalization could help for a more efficient utilization. We need information on engineering, information on sustainable economic solutions in order to have added value. How can companies help on these issues? Collaboration is one of

the themes of the Arctic Council. Research and business have to work closely together and not only consider their own needs. There will be several opportunities for business when Finland will take on the chairmanship of the Arctic Council. Human resources and capacity building, better education systems, and collaboration are the keys.

- **Tom Armstrong**

After recalling the ambitions of the COP21 agreement and stressing that this is a major step forward, the president of the Madison River Group gave a short overview of the Arctic today, setting the policy issue context. He specified that the Arctic is a rapidly changing ecosystem in which both change and the rate of change are significantly increasing. In addition, it is one of the few ecosystems on the planet where the impacts and effects of human-induced climate change can readily be observed today and may be on the verge of (or already) displaying non-linear behaviour. Moreover, there are needs for an effective climate change-oriented policy strategy that includes sustained engagement between scientists and decision-makers as well as a multivariate response in order to be successful. Science to knowledge to action, a science decision-making process founded upon sustained observations and sound science. There is a clear need for sustained observations and sound science on processes such as sea-level rise, storm surges and related coastal inundation, sea-ice loss with the opening of the Arctic Seaway, ocean acidification and permafrost thaw and resultant climate feedbacks. Major policy options include successful and aggressive mitigation, adaptation, climate engineering, suffering (which means doing nothing) and developing a new paradigm related to an integrated policy approach. There should be a more bottom-up strategy instead of a top-down approach. Following the COP21 agreement, he stated that we need a more coordinated effort to go beyond 2100. Commitments must continue to 2100 to bring emissions down to zero, and there is also a need to go to a negative emissions technology zone. It will be a big challenge simply to keep to 2°C. Based on the National Academies Report on Climate Intervention, 2016, the challenges of climate change require a portfolio of actions with varying degrees of risk and efficacy. There is no substitute for mitigation and adaptation. Carbon dioxide removal strategies offer potential to decrease CO_2 concentrations in the atmosphere (biological or geological pathways). Albedo modification strategies are currently limited by unfamiliar and unquantifiable risks and governance issues. Any intervention in Earth's climate should be informed by a far more substantive body of scientific research than is available at present. Taking actions without science would lead to major issues. He then explained the current science and decision-making paradox by mentioning that historically, decision-makers have not participated in the scientific research planning, even though outcomes/outputs were intended to support decision-making. In addition, very few scientists have participated in activities aimed at better understanding decision-makers' issues and challenges. In fact, the combination of these two factors has commonly led to the development of research-based outcomes with limited direct decision-making benefit. There should a balance between scientists and decision-making.

Major conclusions

Panel members and participants engaged in a discussion of the issues presented by the keynote speakers and panel presentations. Among the points raised were the following:

Indigenous peoples of the Arctic hold long-term knowledge of environmental conditions, particularly for terrestrial areas. In contemplating research in their areas, it is crucial to establish a relationship with the local Indigenous people early in the planning stage rather than after

decisions for the work have been made. Their knowledge could help in both planning and decision-making.

One of the goals should be to communicate and educate local communities on the results of research conducted in their area and to build a bridge between science and decision-making. Indigenous cultures are much more robust than previously considered, and they have been able to adapt to many of the changes occurring so far.

An iterative process for adaptive management, such as for resource extraction, would be useful to establish. This would involve adaptive management – pause – reflection – reassessment; the problem with such a sustained process, however, is maintaining the resources, both financial and human, for a sustained level of engagement.

In considering polar research, we should not forget Antarctica and the effects of climate change there. EU citizens need to be careful about that. People know very little about Antarctica so there is a need to educate about it.

Many scientific assessments of conditions in the Arctic, such as those from AMAP, have been prepared over the past 25 years. A major problem, however, has been to convey them to the media and ensure that they are communicated to ordinary people including voters. Better communication is absolutely vital and must be considered at the outset of the next IPCC report and other assessments.

There is a need for a longer-term commitment from the Arctic Council, which has been difficult with the two-year cycle of chairmanship. The Arctic Council should look to the future, not only for one country but also bringing in all the stakeholders (maritime, oil industries…) around the table. This is a challenge, but an important one.

Finally, it was stated that Polar Regions should be inspiring by showing both the beauty and the risk, and the connection between all the paths in the world.

Afternoon panel "European priorities for polar research" *(Chair: Tom Armstrong)*

- **Jane Francis**

The director of BAS mostly focused on the Antarctic continent, stating that there are big sciences questions in the Antarctic with global impact. Presenting a map of Antarctica, she noted that the future of the large ice shelves and glaciers will have a strong impact on sea level rise if they were to become unstable. Furthermore, the Southern Ocean, the least well-known ocean, has a major role in that it takes in more carbon cycle and heat than any other ocean. She then presented one project, which aims at understanding how the Antarctic ice sheet has operated over the past 1.5 million years: "Beyond EPICA", which is studying the oldest ice. New innovative technologies are needed for use in Antarctica, including more remote systems to collect much more data. There is good cooperation between the SCAR and COMNAP initiatives. They are together running a large program to conduct horizon scanning for the next 20 years for science projects, and determining how logistics needs to respond to future scientific challenges. Using new technologies on remote stations on the Antarctic continent is expensive and dangerous. Data collection is increasing thanks to these new technologies. A lot of European nations are

present in Antarctica and develop even small projects. Collaboration is the key for understanding the impact of warm seas on melting ice shelves. One example is the collaboration between AWI and BAS trying to understand the ice shelf evolution and what is currently happening there. Increased funding is critical and, thanks to Europe, it is now possible to investigate further Antarctic climate changes. She also mentioned the INTERACT project sharing Antarctic facilities as well as the Dutch lab at the BAS Rothera Research Station. EU-PolarNet is helping to define the future science priorities at the European level. She concluded by saying that the future belongs to the younger people looking at climate change.

- **Marcus Carson**

As research fellow at the Stockholm Environment Institute, he started by noting that among the EU policy priorities, economic development and prosperity in a sustainable way are crucial to the Arctic region. The major questions are on how to proceed to balance them. He then presented a slide showing humans and nature living together in Greenland. Some of the key findings of the Arctic Resilience Assessment project are about the thresholds (sea ice, ice sheet). Nineteen Arctic regime shifts are believed to be underway (for example, sea ice and Greenland ice, peatlands, river channels, marine productivity and food webs, fisheries collapse, etc.); these changes are connected and influence each other with unknown consequences. These shifts are mostly driven by climate change. Interactions between regimes cover all ranges of changes. In this project, the aim was to understand how well communities are navigating changes. A total of 25 cases have been analysed to illustrate examples of a) the loss of resilience, b) resilience, and c) capacity to effectively adapt to change and engage in transformational change, while retaining their identities. The main keys for success concern the capacity for self-organization, knowledge integration and learning from communities, diversity, and change as the norm. The society is sustained by ecosystems, as social and biophysical systems are connected. It is important to look at the systems view of sustainable development and the Arctic changes that are driven from beyond the Arctic. It is also important to support, and learn from, close-to-nature, mixed economies and to bridge all the silos—science, policy and practice. Bridging and integrating remain key challenges.

- **Christine Valentin**

The Chief Operating Officer of the World Ocean Council (WOC) described how EU-PolarNet is engaged in Ocean Business Community, which is important. There is a growing multiple-use of the Polar Oceans (shipping, oil and gas, fisheries, aquaculture, cruises and coastal tourism, mining, dredging, port development, submarine cables, etc.) which lead to risks but also opportunities. Arctic industries require access and social license to use ocean space and resources. Many of the critical issues creating impacts and affecting access and social license are cross-cutting or cumulative. Sustaining ocean health and productivity requires responsible use and stewardship by all users. The best efforts by a single company, or an entire industry sector, are not enough to secure ocean health. There is therefore a need for a structure and process for leadership and collaboration. The role of the WOC aims to bring together leadership companies for cross-sectoral business leadership on responsible Polar Regions development from a wide range of coastal/marine industries. The priority issues in various regions include engaging inter-governmental bodies, reducing water pollution, preventing maritime accidents, avoiding the introduction of invasive species, reducing or cleaning up marine debris and improving marine

science and observations. The major goal is therefore to have a healthy, productive global ocean and its sustainable use and stewardship by a responsible ocean business community. The WOC aims to build an industry network and interaction with other key polar stakeholders, including the Arctic Council and its working groups. It also aims to foster and ensure business input in polar events and discussions that could benefit from industry involvement, and finally to address priority sustainability and science issues that would benefit from business collaboration. So far, the WOC polar priorities have initially identified three major issues: circumpolar best practices for sustainability, Bering Strait/Sea maritime traffic scenarios, and data collection and sharing in polar regions. The WOC and EU-PolarNet are collaborating through the Working Groups 3 Program in order to engage a wide range of industry vessels in: providing routine, sustained, standardized information on the ocean and atmosphere; contributing to describing the status, trends and variability of oceanographic and atmospheric conditions; and improving the understanding, modeling and forecasting of oceanic ecosystems , resources, weather, climate variability and climate change. The next meeting will take place in Rotterdam on Nov. 30-Dec 2.

- **Attilio Gambardella**

The policy officer at the Directorate-General for Research and Innovation at the European Commission presented the new integrated EU policy framework for the Arctic, adopted in April 2016, that will guide the actions of the European Union in the Arctic region, including 39 actions focussing on climate change, environmental protection, sustainable development and international cooperation. He then recalled the role of science in the COP21 decision and in the Paris Agreement, which requests the IPCC to provide several special reports (on the 1.5°C warming impacts and pathways, ocean and the cryosphere, agriculture, land use, land degradation..). The decision also requests the parties to accelerate mitigation and adaption efforts, calls for strengthening cooperation in research, systematic observation and early warning systems that inform climate services and support decision-making, and finally notes the importance of technology development and transfer and innovation for an effective global response to climate change. He finally insisted that international cooperation is a priority, especially in the hot-spots of climate change and through the Transatlantic Ocean Research Alliance with US and Canada (IASC, SAON, SCAR…).

- **Maaike Vancauwenberghe**

The Chair of the European Polar Board (EPB) stated that it is an independent organization with the role to be the voice of European polar research, representing polar issues within European research framework programmes. In addition, EPB aims to facilitate cooperation in polar science between members (European countries and the European Commission) and other organizations active in polar research and activities (e.g. SCAR, ESA), to support development of joint scientific programmes, and to optimise the use of European polar research infrastructures due to the high cost. The EPB aims to focus on the three major strengths: (i) bipolar vision (Arctic and Antarctic, 27 members), (ii) composite and comprehensive membership, including funding, international scientific and infrastructure organizations, a mix of scientific competence and management skill, and (iii) actions to support scientific cooperation, networking of polar facilities and field operations. There are three ongoing actions and working groups in EPB: an Action Group on Polar Infrastructure, to transfer and further maintain the legacy of the polar infrastructure information from EU-PolarNet; an Action Group on Polar Policy Advice, to give policy advice to

European or other governmental/international organisations when requested; and two internal EPB action groups to define future EPB strategy and on co-operation with Russia. EPB has strong ongoing involvement in activities such as Arctic-ECRA, EPB-SCAR-IASC through a Memorandum of Understanding (MoU), and EPB-ESA through a framework agreement. There is a strong interaction between EPB and EU-PolarNet. The legacy of EU-PolarNet will be sustained by the Board into the future. The outcomes from EU-PolarNet will add long-term value to EPB activities in providing strategic science policy advice to the European Commission and other international bodies. The operational management of the EU-PolarNet is supported by the Executive Secretary of EPB.

- **Carlo Barbante**

The director of the Institute for the Dynamics of Environmental CNR presented the key polar questions in polar research which have been established in Deliverable D2.1. The overall goal was to identify key polar research priorities for Europe which should serve as a basis for the upcoming research planning process in EU-PolarNet, the development of co-designed White Papers addressing urgent polar research questions, the optimization of existing monitoring and modelling programmes, and the development of an Integrated European Polar Research Programme. The process was to collect and harvest national and international strategic documents, prepare a matrix with existing priority topics and key questions identified from the strategic documents, and synthesize and prioritize all the identified topics and key questions of the matrix into a list of major European priorities. As part of this process, an online public consultation was launched and the overall results were reported to the 2nd EU-PolarNet General Assembly; the results will support the preparation of the White Papers. A word Cloud was made highlighting some words like “change”, “climate”, “polar”, “Ocean”, “Arctic”, “Antarctic”, etc. The key questions are not a shopping list, but societal challenge issues that are important for Polar Regions. The ten questions relate to: 1) polar climate systems, 2) cryosphere, 3) paleoclimate and paleoenvironment, 4) polar biology, ecology and biodiversity, 5) human impacts, 6) solid earth and its interactions, 7) sustainable management of resources, 8) people/societies/cultures, 9) human health and wellbeing, and 10) astronomy, astrophysics and space. There were also two major cross-cutting themes: international relations and the legal dimension, and new technologies. In conclusion, the comprehensiveness of the documents that have been taken into account, the expertise of partners and the outcomes of consultation with a very significant number of polar scientists and stakeholders will result in the most robust and comprehensive assessment of the European polar priorities.

Major conclusions

The Arctic scientific community is wide and diverse, with many different groups and initiatives. SAON and others are trying to bring the people together. A lot of national funding is available. In contrast, the Antarctic scientific community is more easily identified and the organizations are more limited (SCAR). Funding programs are important to keep people working together on polar research in a coordinated way. The EU is a crucial source of funding, which ensures that everybody is working together in a coherent plan. One example is the EU-funded INTERACT project, under which the EU is paying the user community so that they can work together on Arctic terrestrial issues; 500 scientists participated in the first INTERACT. The alternative is bilateral projects in which the objectives, funding and timing all need to match for both

countries; this requires much collaboration. Building synergies between international/European and national programs is fundamental for the future.

Polar regions are changing. There is a need to communicate more and better about the changes in the high latitudes. The world community does not know the real impact of such climate and environmental changes in the polar regions and how they will affect the conditions of people at lower latitudes. It is thus crucial to communicate why changes in the Arctic and Antarctic are relevant to people at all latitudes. Furthermore, this communication should be a two-way process to encourage public engagement. It is particularly important to engage the younger generation in this work, as they will be the most affected by climate change. If there is a wish to work on changing things for the future, there is a need to increase the emphasis on impacts on humans.

It is also important to bring in the business community to help drive innovation for climate mitigation and adaptation strategies and sustainable development proposals. WOC is a partner in EU-PolarNet, providing one area in which research and business can work together. This engagement is also needed to support sustainable development.

There is a need to build stronger bridges between science and policy/decision-making and practice.

As a final note, to bring the discussion back to the 1.5°C Paris Agreement goal, a belief was expressed in the spirit and intent of this goal, but also recognition of the challenges of simply achieving a 2°C goal. In the Arctic in particular, Arctic amplification will make it extremely difficult to limit the increase to 1.5°C, with the Arctic warming at twice the global average. It is furthermore already clear that the 1.5°C goal is unachievable with mitigation alone and, thus, there is a need for a trifold strategy covering adaptation, mitigation and intervention. There needs to be a realistic recognition of the current situation so that concrete plans can be developed and implemented to meet this challenge.

8. Conference Statement

As a result of the discussions, the participants of the EU-PolarNet Town Hall meeting summarized the key discussions of the day with the following key words:

- Youth, education, capacity building on all levels
- Meaningful communication
- Sustainable economic development and utilization
- Collaboration and cooperation with indigenous people
- Innovative technologies
- Coordination, sharing knowledge
- Trust building, stakeholder ownership, human dimension
- Public-private partnership
- Building stronger bridges between sciences, decision making and practice
- International co-funding and synchronisation of research plans

Each of those points highlights the urgent need for the European community to prioritize polar issues, face the associated challenges and better estimate the impact of climate and

environmental changes in the Polar Regions. The official conference statement, which elaborates on these points in more detail, is available on the EU-PolarNet website.

9. Stakeholder survey

All participants of the Town Hall meeting received a survey. The aim of this brief stakeholder survey was to identify, if the participants of the Town Hall Event were interested in engaging in polar research projects (what their motivation would be, to what extent they would like to be involved, how they would like to get engaged, etc.). The survey results were anonymous, but whoever was interested to get engaged, was able to write down his/her contact details, which we would then separate from the questions for the evaluation (see Annex 1).

Results

- The survey results fed into the deliverable D4.7 "Awareness sessions within the first Town hall meeting to set out aims and objectives and timeline for delivery".
- The survey results could further feed into a publication focussing on variables that influence stakeholder engagement in polar research programmes.
- The results will feed into future stakeholder engagement activities and build a baseline for establishing new science-stakeholder interactions.
- 14 people responded to the questionnaire and will be combined with those collected at the EU-PolarNet-ICE-ARC Session at the Arctic Circle 2016 on "*Future shipping under a IPCC Climate scenario*".

10. Media and dissemination

Both the morning and afternoon sessions were uploaded separately on the EU-PolarNet YouTube channel, and there were just under 250 views of both sessions. The videos are available on the EU-PolarNet YouTube channel here: https://www.youtube.com/channel/UCqEzHkh6Q-ucxOFtd7UWHDA. The conference video also includes the greetings from the Arctic and Antarctic from members of EU-PolarNet. To curate all social media for this event, a Storify was set up, and is available here: https://storify.com/renukabadhe/eupolarpriorities. As of 24th Oct 2016, there have been 293 views of the curated #EUPolarPriorities social media feed on Storify.

On Twitter, 60 individual tweets used #EUPolarPriorities, with each tweet getting retweeted/favorited between 1-8 times. Ten people, most of whom were present at the Town Hall, created original tweets using this hashtag, with many more interacting both from within the Town Hall audience, as well as outside. As an example of the amount of outreach achieved, for a single twitter account (@DrRenukaBadhe), the analytics for the period of the Town Hall:

- over 11,000 organic impressions (times tweets were viewed)
- 200 engagements (times someone clicked on links, hashtags, etc.)
- 33 retweets
- 37 likes

This is just an indicator of the amount of outreach that was achieved using one twitter account, and we can safely extrapolate these results to the other 10 twitter accounts that used #EUPolarPriorities.

ANNEX I

Final list of participants

Surname	Name	Affiliation	Location/country of representation	Stakeholder group
Abbasov	Faig	Transport & Environment	Brussels	NGO
Aguiar Machado	João	European Commission, DG Maritime Affairs and Fisheries	Brussels	policy
Armstrong	Tom	Madison River Group	USA	policy
Azzolini	Roberto	National Research Council Italy (CNR)	Italy	science
Badhe	Renuka	European Polar Board (EPB)	Netherlands	science (natural)
Bamber	Jonathan	University of Bristol	UK	science
Bär	Kristina	Alfred Wegener Institute (AWI)	Germany	science
Barbante	Carlo	National Research Council Italy (CNR)	Italy	science (natural)
Bech Andersen	Signe	Geological Survey of Denmark and Greenland (GEUS)	Denmark	science
Bellemere	Olivia	Ministry of Foreign Affairs	France	policy
Biebow	Nicole	Alfred Wegener Institute (AWI)	Germany	science
Busch Sevaldsen	Maja	North Norway European Office	Norway	policy
Cabrita	Maria Tereas	Portuguese Polar Programme (PROPOLAR)	Portugal	science
Carson	Marcus	Stockholm Environment Institute (SEI)	Sweden	science (social)
Christiansen	Henrik	Association of Polar Early Career Scientists (APECS)	Belgium	science
Clerinx	Robrecht	Dutch Ministry of Defence	Netherlands	policy
Dahlbäck	Björn	Swedish Polar Research Secretariat	Sweden	science
Damm	Volkmar	German Federal Institute for Geosciences and Natural Resources (BGR)	Germany	policy
Danobeitia	Juanjo	Spanish National Research Council (CSIC)/EU-PolarNet	Spain	science (natural)
Decleir	Hugo	Vrije Universiteit Brussel (VUB)	Brussels	science
Dinar	Athena	British Antarctic Survey (BAS)	UK	science
Downie	Rod	WWF	UK	NGO

Edelvang	Karen	Technical University of Denmark (DTU)	Denmark	Science
Etourneau	Johan	French National Center for Scientific Research (CNRS)	France	science (natural)
Fant	Aino	European Parliament	Finland	policy
Fernandes	Alexandre F.	JPI Climate	Brussels	science (natural)
Forsius	Martin	Finnish Environment Institute (SYKE)	Finland	science (natural)
Francis	Jane	British Antarctic Survey (BAS)	UK	science (natural)
Gambardella	Attilio	European Commission, DG Research & Innovation	Brussels	policy
Garces	Fernando	European External Action Service	Brussels	policy
Gibbs	Peter	BBC	UK	media
Gille	Johan	ECORYS	Belgium	Industry
Gillman	Stephen	Horizon	Belgium	media
Glamsø	Morten	Danish Shipowners Association	Denmark	industry
Guillou	Xavier	European Commission, DG Maritime Affairs and Fisheries	Belgium	policy
Heinze	Christoph	University of Bergen (UiB)	Norway	science
Herber	Andreas	Alfred Wegener Institute (AWI)	Germany	science
Immler	Franz	Executive Agency for Small and Medium-sized Enterprises (EASME)	Brussels	policy
Jacob	Christophe	World Meteorological Organization (WMO)	Switzerland	science
Johansson	Margareta	INTERACT	Sweden	science
Jonsell	Ulf	Swedish Polar Research Secretariat	Sweden	science
Kaergaard	Katrine	European Commission, DG International Cooperation and Development	Brussels	policy
Kaltoft Bendixen	Jytte	Danish EU Research Liaison Office (DANRO)	Brussels	policy
Kandal	Torjus Kleiven	North Norway European Office	Brussels	policy
Keski-Nirva	Kiira	North Norway European Office	Brussels	policy
Klarlund	Henning	Roskilde University (RUC)	Denmark	science

Knecht	Sebastian	Alfred Wegener Institute (AWI)	Germany	science
Krása	David	European Research Council Executive Agency	Brussels	policy
Latola	Kirsi	University of Oulu	Finland	science
Magnus	Tannerfeldt	Swedish Secretariat for Environmental Earth System Sciences (SSEESS)	SWEDEN	science
Malache	Jacques	International Press Agency	Brussels	media
Marlin	Christelle	French Ministry of National Education, Higher Education and Research	France	policy
Masson-Delmotte	Valérie	Intergovernmental Panel on Climate Change (IPCC)	France	science (natural)
Mattana	Paolo	European Bureau for Conservation and Development	Brussels	policy
Michel	Edouard	French National Center for Scientific Research (CNRS)	France	science
Mulvad Jessen	Uiloq	Greenland Representation to the EU		policy
Muñiz Piniella	Ángel	JPI Oceans	Brussels	policy
Nolan	Joseph	European Polar Board (EPB)	Netherlands	science
Noor	Liesbeth	Netherlands Organisation for Scientific Research (NWO)	Netherlands	policy
Nygaard	Klaus	Greenland Institute of Natural Resources (GINR)	Greenland	science (natural)
Nysten-Haarala	Soili	University of Lapland	Finland	science
Oksanen	Lauri	University of Turku (UTU)	Finland	science (natural)
Olsen	Steffen	Danish Meteorological Institute (DMI)	Denmark	science
Padurariu	Claudia-Amelia	European Parliament, DG External Policies	Brussels	policy
Pattyn	Frank	Université libre de Bruxelles (ULB)	Belgium	science
Pawlak	Janet	Arctic Monitoring and Assessment Programme (AMAP)	Denmark	science
Peeters	Tom	Markenfilm Crossing GmbH	Germany	media
Pelaudeix	Cécile	Aarhus University	Denmark	science
Petersen	Terkel	European External Action Service	Brussels	policy

Pimpirev	Christo	Bulgarian Antarctic Institute (BAI)	Bulgaria	science
Pisani	Camille	Royal Belgian Institute of Natural Sciences (RBINS)	Brussels	science (natural)
Poulsen	Helle	Danish Agency for Science, Technology and Innovation	Denmark	policy
Quesada	Antonio	Spanish Ministry of Economy and Competitiveness (MINECO)	Spain	science
Rebesco	Michele	National Institute of Oceanography and Experimental Geophysics (OGS)	Italy	science (natural)
Reiersen	Lars-Otto	Arctic Monitoring and Assessment Programme (AMAP)	Norway	science
Rex	Markus	Alfred Wegener Institute	Germany	science
Rosing Fleischer	Natuk	Greenland Representation to the EU	Belgium	policy
Ruti	Paolo	World Meteorological Organization (WMO)	Switzerland	science
Sandven	Stein	Nansen Environmental and Remote Sensing Center (NERSC)	Norway	science
Santos	Germana	Portuguese Ministry of Science, Technology and Higher Education	Portugal	policy
Scheepstra	Annette	University of Groningen (RUG)	Netherlands	policy
Schnittger	Julia	artist	Germany	artist
Schön	Isa	Royal Belgian Institute of Natural Sciences (RBINS)	Brussels	science (natural)
Scory	Serge	Royal Belgian Institute of Natural Sciences (RBINS)	Brussels	science (natural)
Sköld	Peter	International Arctic Social Sciences Association (IASSA)	Sweden	science (social)
St. John	Michael	Technical University of Denmark (DTU)	Denmark	science (natural)
Staffansson	Jannie	Saami Council	Norway	indigenous
Stelmach Pessi	Igor	Association of Polar Early Career Scientists (APECS)	Belgium	Science
Stocker	Thomas	University of Bern	Switzerland	science (natural)
Swierczynski	Tina	European Climate Research Alliance (ECRA)	Brussels	science

Sylte	Gudrun	Bjerknes Centre for Climate Research	Norway	science
Szontagh	Andrasne	European Parliament	Brussels	policy
Testard	Juliette	French National Center for Scientific Research (CNRS)	France	science
Thomasen	Hanne	Technical University of Denmark (DTU)	Denmark	science (natural)
Vaikmäe	Rein	Tallinn University of Technology (TUT)	Estonia	science (natural)
Valentin	Christine	World Ocean Council (WOC)	France	industry
Van de Putte	Anton	Royal Belgian Institute of Natural Sciences (RBINS)	Brussels	science (natural)
Van Lipzig	Nicole	Katholieke Universiteit Leuven (KU Leuven)	Belgium (Leuven)	science
Vancauwenberghe	Maaike	European Polar Board (EPB)	Brussels	policy
Vauraste	Tero	Arctia Shipping	Finland	industry
Vieira	Gonçalo	University of Lisbon (IGOT-UL)	Portugal	science
Vrignaud	Stephane	U.S. Mission to the EU	Brussels	policy
Willmott	Michael	Mission of Canada to the European Union	Brussels	policy
Wilmotte	Annick	Belgian National Committee on Antarctic Research	Belgium	policy
Wolff	Eric	Cambridge University	UK	science
Wood	Jacky	JPI Oceans	Brussels	science (natural)
Zemledeltsev	Sergey	Russian Mission to the EU	Brussels	policy
Zerbst	Juliane	Markenfilm Crossing GmbH	Germany	media

ANNEX II

Questionnaire for the stakeholder survey

Background information

1) Which of the following stakeholder groups do you associate with?
    - policy
    - business and industry
    - local and indigenous community
    - civil society
    - media
    - other, please specify:

2) On which level do you generally operate? (multiple answers possible)
    - local
    - national
    - regional
    - international

3) Which polar topic is of interest to you? (multiple answers possible)
    - effects of climate change in the Polar Regions on the global climate system
    - changes in the cryosphere (sea ice, ice sheets, permafrost)
    - human impacts on the Polar Regions
    - ecosystems and biodiversity
    - sustainable management of resources
    - people, societies and culture
    - human health and well-being
    - geopolitics and international relations
    - new technologies
    - other, please specify:

4) Which expertise do you hold with regard to the Polar Regions?
    - scientific expertise
    - technological expertise
    - business expertise
    - policy expertise
    - cultural expertise
    - social expertise
    - other, please specify:

Motivation and barriers

5) Would you have an interest in getting engaged in a polar research project?
    - yes *(please continue with question 6)*
    - no *(please continue with question 10)*
    - I'm already engaged in a scientific project *(please continue with question 6)*

6) What would your motivation be to get engaged in a polar research project?

- to stay informed about current research results
- to obtain up-to-date information for concrete decision-making
- to participate in scientific investigations
- to define future research questions
- to make research results available to a broader audience
- other, please specify:

7) At what stage of a research process would you be most interested to get involved? (multiple answers possible)
   - identification of research gaps
   - definition of research questions
   - development of the research plan
   - data collection
   - data analysis
   - interpretation of research results
   - dissemination of research results

8) Which role would you like to take in a research project?
   - observer
   - advisor
   - partner
   - other, please specify:

9) How would you best be involved in a research project? (multiple answers possible)
   - regular updates about the project (e.g. through a newsletter)
   - annual meetings
   - regular workshops
   - digital tools: video conferences, shared documents and folders, etc.
   - personal dialogues with project individuals
   - participating in field work
   - other, please specify:

10) Which barriers do you think you might encounter, if you engaged in a scientific project? (multiple answers possible)
   - time constrains
   - personnel limitations
   - financial limitations
   - organisational restrictions
   - other, please specify:

If you are interested in getting involved in polar research projects, please provide us with your contact details. We will be in touch with you shortly and discuss opportunities to get engaged.

Sur- and last name:
Affiliation:
City and Country:
E-mail address:
Phone number:

