

THE ARCTIC HUB – REGIONAL AND GLOBAL PERSPECTIVES (THE ARCTIC SCIENCE SUMMIT WEEK, ASSW – 2013)



About 400 participants from 25 countries attended the Arctic Science Summit Week (ASSW- 2013), which was held on April 13-19, 2013, in Krakow (Poland) in the auditoriums of Jagiellonian University. Most participants were from the Arctic countries: Norway – 37, United States – 33, Russian Federation – 29, Sweden – 23, Canada – 23, Germany – 20, Finland – 16, and Denmark – 10. However, non-arctic countries were also relatively well presented: Poland – 92, Czech Republic – 15, Japan – 13, France – 11, Republic of Korea – 11, Italy – 7, United Kingdom – 6, and Iceland – 5. The ASSW was established by the International Arctic Science Committee (IASC) in 1999 to provide opportunities for coordination, cooperation, and collaboration between various scientific organizations involved in Arctic research. Any organization engaged in supporting and facilitating Arctic research may participate and use the Summit to hold its business meetings. Since 2009, every second ASSW includes a three-day science symposium. The 2013 symposium focused on the interactions between the Arctic and the lower latitudes and the regional and global implications of changes in the Arctic. Five disciplinary and four crosscutting sessions, dealing with both environmental and socio-economic conditions and addressing multidimensional changes and linkages, were convened. For the first time in the history of the ASSW, the engagement of the Arctic Council Indigenous Peoples Secretariat (IPS) made it possible to fully integrate Arctic people in the scientific program of the symposium. Thanks to the efforts of the Association of Polar Early

Career Scientists (APECS), about 25% of the participants were early career scientists. A political panel “Arctic Dialogue, Science-Policy Interface,” organized by the Polish Ministry of Foreign Affairs, complemented the program of a very productive and highly interesting week in Poland.

The 2013 IASC Medal was awarded in recognition of Leif Anderson’s pioneering work on the functioning of the Arctic Ocean and his groundbreaking scientific contributions to understanding the chemistry and carbon cycle of this very special ocean system. The Medal Lecture entitled “Utilizing Chemical Signatures to Study the Arctic Ocean” was presented during the ASSW 2013 Science Symposium.

The IASC Working Groups (WGs). The IASC Action Group on Geosciences Data is central to the mission of the IASC. The IASC promotes cooperation in all aspects of Arctic research and seeks to act as a scientific and moral authority that promotes the freedom and ethical conduct of science. In this spirit of open collaboration, the IASC Council recently endorsed a new Statement of Principles and Practices for Arctic Data Management. The document asserts that all IASC-endorsed scientific results shall be verifiable and reproducible through ethically open access to all data necessary to produce those results. Data should be made fully and freely available with minimal delay and with only limited ethical, not proprietary, restrictions. According to the

IASC Data Policy Action Group, all data have to be professionally preserved and readily accessible as described in data management plans, which are required for all new IASC projects. It is also important to recognize the intellectual effort that goes into producing and maintaining good data. The IASC encourages fair attribution and use of data and strongly promotes the practice of data citation. The IASC Council has also established a new Standing Committee on Data Management to maintain the Principles document, to review and provide guidance on data management plans and archives, and to promote sound data stewardship.

The five WGs (re)elected their Steering Group members during the ASSW – 2013 and the current Steering Groups are: Atmosphere WG: Jim Overland (Chair), Hiroshi Tanaka (Vice Chair), Michael Tjernström (Vice Chair), Kathy Law (Vice Chair); Cryosphere WG: Martin Sharp (Chair), Julian Dowdeswell (Vice Chair), Walt Meier (Vice Chair), Jon Ove Hagen (Vice Chair); Marine WG: Bert Rudels (Chair), Rolf Gradinger (Vice Chair), Jinping Zhao (Vice Chair), Savithri Narayanan (Past Chair); Social and Human WG: Peter Schweitzer (Chair), Gail Fondahl (Vice Chair), Peter Sköld (Vice Chair), Louwrens Hacquebord (Past Chair); Terrestrial WG: Inga Svala Jonsdottir (Chair), Warwick Vincent (Vice Chair), Torben Christensen

(Vice Chair), Terry Callaghan (Vice Chair). The Working Group activities discussed during the ASSW – 2013 will be summarized in the upcoming IASC Progress Report shortly.

The WG on the International Science Initiative in the Russian Arctic (ISIRA, Chair – Arkadiy Tishkov) discussed the prospects of international scientific activities in the Russian Arctic after the International Polar Year 2007–2008. The majority of the participants were from the Arctic countries. The presenters included David Hik –IASC President, Rahold Volker –IASC Executive Secretary, V. Pavlenko – Russia’s representative in the IASC, heads of the Association of Polar Early Career Scientists (APECS) in Russia, and young Russian Arctic researchers (I. Sokolov, P. Glazov, A. Medvedev, V. Stepanenko, S. Lebedeva, and others). Young scientists made short presentations at the end of the meeting. The discussion focused on the need for the countries that conduct international research in the Russian Arctic to present national reports and to broader involve young scientist in research.

Social problems of the Arctic. Almost 4 million people live in the Arctic today and the interests, prospects, and insight of Arctic residents were an integral part of the ASSW, in particular of the crosscutting sessions of the Science Symposium, dealing with (1)



Applying Local and Traditional Knowledge to Better Understanding of the Changing Arctic; (2) Arctic People and Resources: Opportunities, Challenges & Risks; (3) Arctic System Science for Regional and Global Sustainability; and (4) Changing North: Predictions and Scenarios Preparing for the third International Conference on Arctic Research Planning (ICARP III). Over the past few months, the IASC Executive Committee developed a concept of the third ICARP to be held in conjunction with the IASC's 25th Anniversary at the ASSW – 2015. IASC's many partner organizations and IASC Working Groups were invited to contribute; at the ASSW – 2013, the IASC Council gave the go-ahead for the implementation of the plans.

The scientific symposium “The Arctic Hub – Regional and Global Perspectives” included 4 keynote lectures, 9 disciplinary and cross-cutting sessions, and 2 poster sessions.

Session I, “Atmosphere Processes and Global Climate Connections,” had several interesting presentations by Russian participants. Thus, **V. Sokolov** и **A. Makshtas** (Arctic and Antarctic Research Institute, St. Petersburg, Russia) in their presentation “Russian drifting stations in XXI century” discussed the main directions of field investigations executed on the drifting stations “North Pole – 32” – “North Pole – 40” in 2003–2012. They talked about new instruments for observations and some results in polar oceanography, sea ice studies, processes of energy – gas exchange between ocean and atmosphere in presence of sea ice cover. In 2007 – 2011, the boundary layer structure, including low-level jets and surface inversions were investigated in collaboration with scientists from Alfred Wegener Institute (AWI Potsdam, Germany). Four years of continuous measurements of low cloudiness were conducted in collaboration with ESRL NOAA. The observation data are used for examination of existing parameterizations of air – sea interaction processes in high latitudes.

A. Vinogradova with colleagues (A.M. Obukhov Institute of Atmospheric Physics,

RAS; P.P. Shirshov Institute of Oceanology, RAS), in report “Black carbon in the atmosphere of the Russian Arctic” talked about the Arctic ice covering decrease during the last 20 years reaching the minimal level in 2012. The Russian Arctic, including approximately half of the Arctic and its coasts, is likely to make an important contribution to this climatic effect. The experimental part presented the results of the air black carbon (BC) concentration measurements made during different expeditions to the Russian Arctic Seas, islands, and coasts from the early 1990s to 2011. In addition, they compared these data with the BC concentrations measured regularly in the Arctic – at the Barrow and Alert stations. The comparison of their estimates with measured data proved to be very valuable.

Klaus Dethloff with colleagues (Alfred Wegener Institute for Polar and Marine Research, Research Unit Potsdam, Germany) in the presentation “Interaction between Arctic sea ice and the atmospheric circulation,” talked about simulations coupled with the regional Arctic atmosphere-ocean-sea ice system model from 1948 to 2008. As the atmospheric circulation in winter is much stronger constrained by the lateral boundary forcing, the coupled regional model has higher degrees of freedom to develop internal circulation structures in summer. A significant sea ice loss during the summer months is either associated with a higher frequency of high reaching warm anticyclones or reduced cyclone frequency over the Arctic Ocean.

Several reports were made by scientists from the USA and Japan, who have been long engaged in research on atmospheric phenomena in the Arctic. **Jun Inoue** with colleagues, (Japan Agency for Marine-Earth Science and Technology, National Institute of Polar Research, Kyoto University, Japan) presented “The impact of radiosonde data over the ice-free Arctic Ocean on the atmospheric circulation in the Northern Hemisphere” on the results of investigations of the impact of radiosonde data from the ice-free Arctic Ocean, obtained by the Japanese

R/V Mirai during a cruise in the fall of 2010 and on the AFES-LETKF experimental ensemble reanalysis version 2 (ALERA2) dataset. The analysis used radiosonde data over the ice-free region. Coupled with observations, it better captured the Arctic cyclogenesis along the marginal ice zone, including a tropopause fold. A 5 K cold bias in air temperature was found, suggesting that radiosondes over the Arctic Ocean are vital for reproducing the change in tropopause variability.

Session II, “Cryospheric Changes: Drivers and Consequences,” had presentations by **Tetsuo Ohata** and **A. Fedorov** with colleagues (Japan Agency for Marine Earth Science and Technology; Kitami Institute of Technology; National Institute of Polar Research, Japan) and **P.I. Melnikov** (Permafrost Institute, Siberian branch of RAS, Russia) made a report on “Cryospheric Changes in Suntar-Khayata Mountains in North-East Siberia.” The glaciated area in the Sunta-Khayata Mountain Range, which exists between the large cities of Magadan in the Pacific Coast and Oimyakon, is known for its low air temperature and is said to be 156 km² in 1945 decreasing to 162 km² in 2002–2003. This change should have been accelerated during the recent ten years due to the strong warming occurring in the 2000s. In-situ research in this region was conducted in the IGY period (1957–1959) by Russian scientists and, after that, in 2000 and 2004–2005, by the joint Russian and Japanese teams. Since information related to the past exists in this region, it is a good area for studying cryospheric changes due to the recent strong warming. A new project has started; it targets observations and study of the glaciers’ basic parameters and their changes, the permafrost changes, and the future variability applying glacier models. This is the project between the Cold Region Program of JAMSTEC (Yokosuka, Japan), GRENE Project of NIPR (Tokyo, Japan), and P.I. Melnikov Permafrost Institute (Yakutsk, Russia) that started in 2011 (the in-situ observations were done in 2012 and continued in 2013). Another report by **I. Sokolov** (Institute of Geography, RAS, Russia) “Recent changes of glaciers on Franz Josef Land from remote sensing data” presented data of

the glaciological monitoring on the Franz Josef Land. According to the Glacier Inventory of the USSR (1965–1982), the glaciated area on the archipelago was $13,735 \pm 14 \text{ km}^2$ or 85% of the entire area. However, current estimates of the glaciers’ mass balance and monitoring of changes indicates their reduction. The aim of this research is the determination of the current conditions of the glaciers on the Franz Josef Land archipelago and identification of morphometric parameters. Hall Island, Wilczek Island, and Graham Bell Island were chosen for the modern glacier outline detection because the glaciers vary by type and because the data of satellite images ASTER, TM, ETM+ on board Terra and Landsat are available. Monitoring of glacier areas using remote sensing data, such as ASTER with a spatial resolution to 15 m, obtained within the framework of international project GLIMS (Global Land Ice Measurements from Space) and other types of sensors allows compiling databases of the glaciers. A series of reports of Polish scientists was devoted to the dynamics of glaciation and the cryosphere of Spitsbergen.

Session III, “Marine Processes and Variability,” was one of the largest scientific conferences – about 30 oral presentations. Among the guest speakers at the session, were **Paul Wassmann** and **Eddy Carmack** (University of Tromsø, Norway; Fisheries and Ocean, Canada) with the presentation “The contiguous domains of Arctic Ocean advection: trails of life and death.” The authors posed important questions of life of the Arctic Ocean and tried to answer them. Their presentation discussed the circulation in and transport to and from the Arctic Ocean and how advection supports contiguous and macroecological domains. In particular, the talk focused on the distribution and advection of mesozooplankton and addressed a set of related issues. One of them was the interaction between local versus advected “production” in the Arctic Ocean. They concluded that the mesozooplankton’s death march into the Arctic Ocean is part of the persistent invasion/withdrawal battle of subarctic versus arctic species where death is a “calculated” risk for potential progeny.

Several reports were on the results of the research in the Russian Arctic. For example, **I. Kryukova, Ye. Polyakova, and E. Abramova** with colleagues (Water Problems Institute RAS, Moscow; Lomonosov Moscow State University, Moscow; Lena Delta Reserve, Tiksi, Russia; Saint Petersburg State University, St. Petersburg; Arctic and Antarctic Research Institute, St. Petersburg; Helmholtz Centre for Ocean Research, Kiel; Alfred Wegener Institute for Polar and Marine Research, Germany) made a collective report “Phytoplankton in the Laptev Sea: distribution, dynamics and environmental forcing (comparison of two autumnal seasons 2008/2010).” This research is the part of the environmental monitoring of the Laptev Sea ecosystem under the multidisciplinary Russian–German Program “Laptev Sea System.” Analysis of the long-term data series leads to a better understanding of changes in the pelagic ecosystem and provides background for the further assessment of ecosystem changes connected with climate variability in the Arctic. In September 2008, a total of 82 taxa were identified: Bacillariophyceae (40 taxa), Dinophyceae (40 taxa), Chlorophyceae (1 taxon), and Dictyochophyceae (1 taxon). Maximal algal abundance was observed near the Lena Delta. The lowest values were found in the westernmost part of the study area. Microalgal communities had a high abundance of dinoflagellates, which exceeded the abundance of all other taxonomic groups. In the 2010 fall season, phytoplankton communities were composed of 80 taxa. Most of the species were diatoms (53 taxa), while dinoflagellates were represented by 26 taxa. Maximal values of algal abundance were observed in the central part of the Laptev shelf northwest of the Lena Delta.

Also, among the guests, was Professor **Jan Marcin Weslawski** with colleagues (Institute of Oceanology PAS, Sopot, Poland; Norsk Polar Institutt, Tromsø, Norway; University of Gdańsk, Poland) with the report “Tidal glaciers retreat – loss of specific marine habitat in Arctic?”. The well documented melting of tidal glaciers on Svalbard leads, in many cases, to the retreat of ice on land and loss of tidal waterfront (glacial bay). The glacial bay seabed is generally impoverished in terms of species and biomass;

yet, cold-water species may find a refugium and rich food resources there. Some of the specific physical functions of the glacial bay may be provided by river mouths (fresh and seawater mixing, estuarine circulation), while others (sedimentation regime, upwelling) are not likely to happen in small river deltas on Svalbard. The presentation showed possible scenarios for the evolution of marine biodiversity and top predators survival connected with glacial fronts on Svalbard.

Session IV, “Terrestrial Ecosystem Responses to Environmental Stressors,” had over 30 reports on: “Landscape change,” “Biodiversity,” “Cyanobacteria: from water to soil,” “Northern freshwaters,” and “From Biogeochemistry (lakes and soils) to Environmental Change.” An invited report by **Ingibjörg Svala Jónsdóttir** (University of Iceland; University Centre in Svalbard) “Shaping forces of biodiversity in the Arctic” addressed important theoretical positions. One reason for why this issue has not yet received full attention is the complexity of the Biodiversity term, encompassing all organisms and their diversity at various levels of organization (genetic diversity within and among populations, species diversity within and among communities, and community and ecosystem diversity within and among landscapes and regions). Different factors and processes may be responsible for shaping diversity for different organisms. In addition, for each organism group different factors may operate at different scales both in time and in space. Therefore, often, the key factors may be overlooked. Finally, it is a great challenge to address overarching biodiversity questions because different methodologies need to be applied for different organism groups.

A. Tishkov (Institute of Geography, RAS, Russia) in his report “The major factors affecting the modern condition terrestrial biota and landscapes in Russian Arctic” presented data on the current status and the factors of the dynamics of ecosystems of the Russian Arctic. The following main integrated parameters define the stability of Arctic landscapes: (1) Low-level biodiversity; (2) The exceptional vulnerability

and susceptibility of ecosystems to chemical pollution (prevalence of non-vascular plants – lichens, mosses); (3) The sharp seasonality of functioning, the brief vegetative period, and the prevalence of migrating species; (4) Low rates of biota and soil self-restoration following disturbances; (5) Presence of permafrost formations and their “mobility”; and (6) The vulnerability of broken landscapes and new anthropogenic habitats for alien species. All of the above integrated parameters of stability or instability of arctic landscapes can be quantified and can be used in simulating of their modern climatogenic dynamics.

The report by **P. Glazov** (Institute of Geography, RAS, Russia) “Island Ecosystems of the Pechora Sea (Vaigach and Kolguev Islands), as the Centers of Arctic Animals Biodiversity” demonstrated that both islands can be considered centers of Arctic biodiversity and have the highest density of nesting water birds, including geese. The protection of these areas not only does have the national, but also international value. These activities help preserving biodiversity of the Arctic.

Also, the problems of terrestrial ecosystems in the Russian Arctic were discussed in a report by **A. Chetverova, I. Fedorova** and **M. Makhotin** (Saint-Petersburg State University, Arctic and Antarctic Research Institute, St.- Petersburg, Russia) “Geochemical characteristic of the Lena river delta, East Siberia, Russia.” The report presented the results of the recent Russian-German expeditions to the delta. They showed different sources and role of different factors in formation of geochemical flow of the delta.

Session V, “Impact of Global Changes on Arctic Societies,” Session VI, “Arctic People and Resources: Opportunities, Challenges and Risks,” and Session VII, “Applying Local and Traditional Knowledge to Better Understanding of the Changing Arctic,” had only 6, 14, and 9 reports, respectively, related to the variability of life of local communities, their vulnerability, and adaptation to modern natural and anthropogenic factors, including globalization. The Russian theme was practically not represented in the session. The exception was the presentation

by **Natalia Malygina** and **Valter Snedzana** (Ural Federal University) “Rural tourism at Extreme North: examples and tendencies for development” and a collective report by **A. Oskal** with colleagues (incl. **M. Pogodaev**, Russia) “Traditional knowledge, adaptation to climate change and globalization in circumpolar reindeer husbandry: the voice and knowledge of reindeer herders”.

Session VIII, “Arctic System Science for Regional and Global Sustainability,” had 11 reports where discussed. Among them, were several reports of the IASC WGs, for example, by **M. Parson, R. Huber, P. Pulsife, A. Tishkov, H. Yabuki and R. Volker** “An open data policy for IASC” and by **D.A. Walker** with colleagues “An international arctic vegetation database for panarctic vegetation classification, ecosystem models, and biodiversity studies.”

Session IX, “Changing North: Predictions and Scenarios,” had 12 reports on results of international projects and programs (“Adaptation of actions for a changing Arctic,” “Multidisciplinary drifting observatory for the study of Arctic climate – MOSAIC,” “Simulating the effects of climate change on fire regimes in Arctic ecosystems: implications for conservation of tundra to scrubland and forest,” etc.). There were no participants or reports from Russia on results of research in the Russian Arctic.

The next Arctic Science Summit Week (ASSW – 2014), including the 2nd Arctic Observing Summit, will take place in Helsinki, Finland on April 5–11, 2014, on Helsinki Kumpula Campus, in the facilities of the Finnish Meteorological Institute and Physics Department of the University of Helsinki. For more Information see: www.assw2014.fi

The Arctic Science Summit Week – 2015 will be held in Japan on April 23–30, 2015, in conjunction with the ICARP III Symposium, planned on April 27–28, 2015, and the International Symposium on Arctic Research (ISAR-4) on April 29–30, 2015. Also in planning is the IASC 25th Anniversary Celebration during the ASSW.

Arkady A. Tishkov, Rachold Volker

INSTRUCTIONS FOR AUTHORS CONTRIBUTING TO “GEOGRAPHY, ENVIRONMENT, SUSTAINABILITY”

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