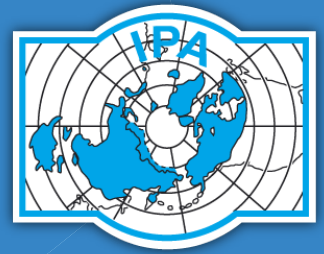




▶ ACTION GROUP REPORTS . 3



▶ ICOP 2016 6



▶ PYRN REPORT 10

Frozen Ground

THE NEWS BULLETIN OF THE INTERNATIONAL PERMAFROST ASSOCIATION
WWW.PERMAFROST.ORG

Message from the President

All of us involved in permafrost research know that interest in our field has grown by leaps and bounds over the past few years. The 2016 11th International Conference on Permafrost (ICOP) in Potsdam, Germany, is expected to attract more than 800 attendees, many of them early career researchers.

This past year (2015) saw the successful Seventh Canadian Permafrost Conference, held in conjunction with the GEOQuébec meeting of the Canadian Geotechnical Society with more than 125 presentations relating to permafrost (see the report on p. 2). And in 2018, the Fifth European Permafrost Conference will be the next Regional Conference on Permafrost (RCOP), to be held with the IPA Council meeting in Chamonix, France. Its highly successful predecessor took place in Évora in 2014.

Extended field excursions are one of the most important elements of every permafrost conference. The benefits of participating in such a trip cannot be over-

stated. A field trip to a new area, led by local experts, reveals part of the huge variety of permafrost landscapes and environments, and the adaptation of permafrost engineering to those conditions. Excursions provide a way to broaden one's personal understanding of geocryology, a domain that bridges geomorphology, hydrology, climatology, ecology, pedology, biogeochemistry, natural hazards research and foundation engineering. Next year's ICOP offers field trips to examine current permafrost conditions in Yakutia, Svalbard, southern Norway, and the Alps, and to study fossil periglacial phenomena in Poland. I have been fortunate during my career to have gone on many field trips associated with ICOPs, RCOPs and other conferences, including to Alaska, northern Canada, western Siberia, the Alps, Svalbard and the Tibet Plateau. These experiences have been immensely enriching to both my research and my university teaching, as well as helping develop a network of life-long contacts with colleagues in a less formal milieu than within a conference. I encourage all researchers, both those early in their career and those more advanced, to participate in one of the ICOP trips.

With all the meetings planned, do we really need more? The Executive Committee



(EC) thinks so. Up to now, proposals for RCOPs have arrived in an ad hoc fashion, and the probability of an ongoing four-year cycle of European Permafrost Conferences means that it may be difficult for the IPA Council to choose another continent for an RCOP mid-way between ICOPs in the future. To provide greater choice for researchers, the solution is to have additional RCOPs in the odd-numbered years. These may be smaller and will not involve IPA Council meetings but will give other groups the possibility of hosting important international meetings, and will give all IPA members the chance to participate in field excursions in new areas. These RCOPs will involve both permafrost science and engineering and a small proportion of the registration revenues will be funneled back to the IPA to help fund Action Groups and other activities. The Canadian Permafrost Conference in 2015 could have been designated as an RCOP under these new criteria given the size and scope of the meeting and the international participation. Increasing the frequency of

(continued from page 1)

permafrost conferences will require amendments to the IPA constitution and by-laws. In the interim, the EC has asked two adhering bodies to propose regional conferences (with associated field excursions). These are now planned for Sapporo, Japan in 2017 and New Zealand in 2019.

As usual, I want to thank my colleagues on the EC for their assistance and support over the past year. I particularly want to thank our Executive Director, Karina Schollaen and our IPA intern Stefanie Weege, for their dedication to the organization.

I look forward to seeing all of you in Potsdam in June 2016.



Antoni G. Lewkowicz
on behalf of the Executive Committee of the IPA

New IPA Action Groups

by Karina Schollaen

The IPA funds 3 new international Action Groups in 2015

1. The InterFrost Evaluation Platform
Contact: Christophe Grenier
(Christophe.grenier@lsce.ipsl.fr)
2. Arctic Coastal Web Implementation: Circum-Arctic Coastal Erosion Database Publication in Anticipation of the Coastal Permafrost in Transition Side Meeting at the ICOP 2016
Contact: Boris Radosavljevic
(Boris.Radosavljevic@awi.de)
3. A Frozen-Ground Cartoon: Explaining international permafrost research using comic strips
Contact: Frédéric Bouchard
(frederic.bouchard@cen.ulaval.ca)

**NEXT DEADLINE
FOR ACTION GROUP
PROPOSALS:
30 April 2016**

The Seventh Canadian Permafrost Conference

by Richard Fortier, Didier Perret, Jean Côté and Sharon Smith

The Seventh Canadian Permafrost Conference paid homage to Ross Mackay

The 7th Canadian Permafrost Conference was held in conjunction with the 68th Canadian Geotechnical Conference at GEOQuebec 2015 in Québec City, Québec, from 20 to 23 September 2015. The previous Canadian Permafrost Conference was held with the 63rd Canadian Geotechnical Conference in 2010 in Calgary, Alberta. The theme of GEOQuebec 2015, Challenges from North to South, reflects the major issues facing North American communities relating to climate change in northern regions and the need to develop adaptation strategies to the impacts of climate change. The 794 participants included 694 from Canada, with 27 other nations represented. The largest numbers came from the USA (20), China (13), Norway (12), Haiti (9), Russia (8), Germany (6), United Kingdom (5), Switzerland (4), Australia (3), France (3) and Mongolia (3). A total of 134 students attended the conference. Among the international attendees, more than 33 had interests in cold regions engineering and permafrost science (8 from China, 8 from Russia, 8 from USA, 3 from Mongolia, 3 from Norway, 1 from Germany, 1 from United Kingdom and 1 from Switzerland). Including the Canadian participants, more than 175 cold regions engineers and permafrost scientists attended the 7th Canadian Permafrost Conference.

The first keynote lecture, in honour of Professor Emeritus J. Ross Mackay (JRM) who passed away on 28 October 2014, was given by Dr. Steven V. Kokelj, Northwest Territories Geological Survey, on “Retrospective thaw slumps: from slope process to the landscape sensitivity of Northwestern Canada”. Dr. Lukas U. Arenson, BGC Engineering, and Professor Guy Doré, Université Laval, also gave keynote speeches, respectively on “Cold regions engineering in a changing climate” and “Adaptation of transportation infrastructure in Northern Québec and Canada: problem assessment and development of solutions”. A full day with 16 lectures in permafrost science from ice-wedge polygons to talik beneath arctic lakes was dedicated to the John Ross Mackay Symposium. Current IPA President, Senior Vice-President and Vice-President, Professors Antoni Lewkowicz, Hanne Christiansen and Vladimir

Romanovsky respectively, and past IPA presidents, Academician Cheng Guodong, Professor Hugh French and Dr. Jerry Brown, attended GEOQuebec 2015 and presented papers at the JRM Symposium (see the photograph). In addition to the JRM Symposium, 105 oral presentations were given in 19 sessions over the three-day conference program on different themes in cold regions engineering and permafrost science from characterization of permafrost state and variability to permafrost considerations in design. Eight posters were also presented on various themes related to cold regions engineering and permafrost science.

One hundred and thirty papers on cold regions engineering and permafrost science were among the 379 papers published in the conference proceedings following peer-review. The conference proceedings will be available soon on the web site of Canadian Geotechnical Society (<http://www.cgs.ca/>). A short course on permafrost science and engineering applied to transportation infrastructure was given by Professors Guy Doré and Chris Burn. A Global Terrestrial Network for Permafrost (GTN-P) meeting was also held prior to the conference. The social events included the Sunday night ice breaker before the conference opening, the gala and banquet on Monday night, with entertainment by the Painchaud family, and a boat cruise on the St. Lawrence River which offered breathtaking views of the UNESCO world heritage site of Québec city. GEOQuebec 2015 was a huge success and each participant left with very positive memories of the meeting.



Past, present and future IPA presidents: (from left to right) Antoni G. Lewkowicz, Hugh M. French, Hanne H. Christiansen, Jerry Brown and Cheng Guodong.

IPA Action Group Report: Permafrost and Culture (PaC)

by Mathias Ulrich and Joachim Otto Habeck

Integrating environmental, geo-, and social sciences to assess permafrost dynamics and indigenous land use

Few regions in the Northern hemisphere have received as much attention from permafrost scientists as central Yakutia. The reasons for this are obvious: permafrost extends to greater depths than elsewhere and the Yakutian lowlands are characterized by ice- and organic-rich Yedoma deposits. Furthermore, the specific conditions of permafrost degradation have created a landscape that provides local conditions suitable for cattle and horse breeding in an area that is generally too harsh for animal husbandry, except for reindeer herding. It is exactly this type of livelihood – cattle and horse breeding – that came to be the basis for Sakha (Yakut) pastoralists who immigrated into this region from more southerly areas several centuries ago. In short, Yakuts have learned to use this thermokarst landscape and the alas basins which are so characteristic of it, to make a living. This is a unique phenomenon in its own right, yet it also pertains to the more general question of indigenous peoples' livelihoods in permafrost areas.

Historians, ethnographers, and anthropologists have published a great deal on Sakha traditional land use, and there is also a substantial literature on geo-ecological aspects written mainly by scientists at permafrost research centres in Yakutsk. Few publications, however, integrate cultural and geo-ecological aspects, despite the need for such a synthesis to evaluate socio-economic development in this region in relation to the fast pace of environmental change in the North. To work towards filling this gap, members of the IPA's "Permafrost and Culture" Action Group organised a five-day workshop from 20-24 July 2015 in the city of Yakutsk, two days of which were spent on field visits to alas sites and local communities east of the Lena River. The organisers, representing the Institute for Biological Problems of the Cryolithozone (IBPC) and the Melnikov Permafrost Institute (MPI) in Yakutsk as well as the Universities of Hamburg and Leipzig, invited colleagues from

a range of social sciences and humanities, many of whom work at the North-Eastern Federal University of Yakutsk. Even though next-door neighbours, local academics do not have many occasions for knowledge exchange, and the workshop was welcomed as a forum for intensive interdisciplinary debate among more than 30 participants.

The first two days of the workshop were held at the IBPC and were organised into four sessions:



Farmers at Yukechi welcome workshop participants to their hay-making area. Photo: M. Ulrich, 2015

Session 1: What do we know about the history of land use in Central Yakutia, in particular about the land use in the alases? What land use problems require investigation at present and in the future? Is there any proof that the rural population has deliberately (artificially) triggered thermokarst?

Session 2: What do we know about the current social economic dynamics in the rural settlements of Central Yakutia (east of the Lena River) and livestock husbandry in particular? What are the most urgent research topics? What are the most pressing questions of the local population regarding environmental change?

Session 3: What do we know about permafrost degradation processes, in particular about the influence of global and

regional climate warming? What are the most obvious gaps in our knowledge?

Session 4: What do we know about permafrost dynamics under periglacial conditions, and in particular in regions with thick Pleistocene deposits (Yedoma)? Which processes are least understood?

These sessions were followed by a two-day excursion to assess thermokarst landscape development, permafrost dynamics and land use directly on the ground. The first day, led by Alexander N. Fedorov (MPI), involved on-site inspection of thermokarst (-lake) and alas ecosystem processes at the Yukechi study site, as well as knowledge exchanges with private farmers. The second day, under the guidance of Roman V. Desyatkin (IBPC), was devoted to visiting a collective farm and cooperatives that use the Tyungyulyu alas, one of the largest alas basins in the region. Permafrost researchers, social anthropologists, and historians from Russia, Japan, Germany and the Czech Republic received a hands-on understanding of diverse kinds

of hay-making and forage-crop production. They were led into horse stables and cattle sheds as well as office rooms of the agricultural enterprises that have replaced the former Soviet state farms. Of particular importance were the discussions on the future prospects of horse and cattle breeding and crop production in the context of landscape dynamics and ecosystem changes in Central Yakutia. This question was followed up in the summary discussion on the workshop's last day and fed into a list of goals that should be pursued in the near future:

1 Development of multi-disciplinary investigations in the Central Yakutian region (particularly on vulnerable ice-rich permafrost deposits) with the aims of: (i) understanding environmental changes and their interactions with climate change and social-economic

(continued from page 3)

dynamics at different temporal and spatial scales; (ii) predicting future ecosystem dynamics; and (iii) assessing future strategies regarding land use, permafrost degradation, and landscape change.

2 Updating previous maps on permafrost conditions, along with the compilation of new thematic multi-disciplinary maps (hard copy as well as digital) and the development of graphic visualizations of the shielding layer dynamics in cryogenic landscapes, which defines either their degradation or their self-preservation. These maps and materials should be made available to the public.

3 Communicating findings and ongoing work of all participating research institutes via different media to residents of Yakutia and to rural inhabitants in particular. Researchers should consult with local residents in order to include their immediate research needs into the agenda.

4 Extending the concept of transdisciplinarity in permafrost research to the northern part of Yakutia and other circumpolar regions where people (indigenous and non-indigenous) are engaged in renewable or non-renewable resource use.

On the basis of the successful workshop, the organisers will shortly submit a transdisciplinary paper of the current state of research on

alas landscapes in Central Yakutia. The multi-directional knowledge exchange will be taken further during the session “Home Base Permafrost” at ICOP 2016. Further research initiatives should reflect the growing interconnections of science and humanities in the study of permafrost landscapes, and promote more intense cooperation with local residents. In that respect, Central Yakutia is not just a unique case of indigenous land use in permafrost regions, but can serve as a good example for transdisciplinary and participatory research efforts elsewhere in the Circumpolar North.

The organizers wish to express their sincere gratitude to the IPA, without whose support this workshop would not have been possible.

IPA Action Group Report: Arctic Coastal Dynamics (ACD)

by Paul Overduin, Boris Radosavljevic and Louise Farquharson

Web implementation and side meeting at ICOP 2016



Project Overview

The Arctic Coastal Dynamics (ACD) project began in 1999 as an initiative of the IPA and IASC and quickly developed a vibrant international scientific community. ACD provided significant contributions to International Conferences on Arctic Research Planning, to the International Polar Year, Arctic Observing (SAON, AOS), and the recent transdisciplinary summary of changes in the arctic coastal zone published in 2012 (The State of the Arctic Coast). Since then, the Circumpolar Arctic Coastal Community Observatory network (CACCON) has initiated an international and transdisciplinary effort to link communities and scientists through knowledge hubs. In this context, the ACD project brings together researchers who focus on the physical aspects of arctic coasts and contributes to initiatives across disciplines and stakeholder groups.

The year 2016 marks the beginning of a new phase of activity, initiated by a group of young researchers and beginning with the meeting described below. We welcome the participation of new researchers and groups in the project.

ACD Website News

The ACD website has found a new home at <http://arcticcoast.info>. The re-designed website offers major improvements to both usability and available content. In addition to a new look, the site makes a number of ACD products available for online viewing and download. These include the State of the Arctic Coast 2010 report, past workshop proceedings, newsletters, and the ACD database (Lantuit et al. 2012), a classification of the Arctic Coast. A newsfeed provides updates on upcoming activities and events. The implementation of additional content and functionality for both specialists and the broader public is underway, including blogs, a discussion forum, FAQs, maps, and infographics. We envision an interactive website with extensive social media integration that will become the research forum for exchanging ideas and knowledge regarding arctic coasts.

Arctic Coastal Photos: An invitation to contribute!

ACD invites contributions to a publically available arctic coastal photo repository. These image libraries will be a valuable tool for polar coastal geomorphologists, enabling them to easily explore the diversity of physical pro-

cesses and landforms across different coastal systems. Contributions may be submitted to the Flickr group called Arctic Coasts Image Gallery. Contributions by email (acd@awi.de) are also encouraged and welcomed.

Coastal Permafrost in Transition: 1-day side meeting @ICOP2016

A one-day side meeting on Arctic Coastal Permafrost in Transition (CPiT) will be held on Sunday June 19, prior to ICOP 2016 in Potsdam, Germany. The CPiT meeting seeks to energize and connect the coastal scientific community through the legacy of the IPA-sponsored ACD group. Goals will be set for the next phase of ACD and international research efforts on polar coastal dynamics, with a focus on physical processes, will be coordinated. Specific objectives of the one-day meeting are to:

- unite researchers from diverse geographic backgrounds and career stages
- explore future research and data needs
- solicit suggestions from participants regarding next steps for ACD
- identify funding sources for future networking opportunities

All interested in attending the side meeting should register on the ACD home page by March 1, 2016. <http://acd.arcticportal.org/>.

IPA Action Group Report: The Yedoma Region

by Jens Strauss and the Yedoma Action Group Members

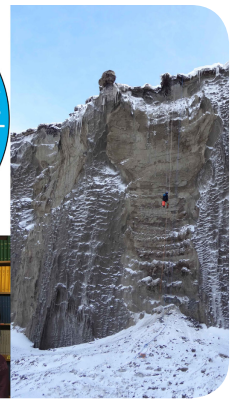
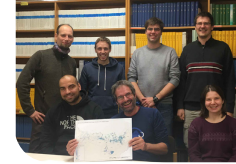
A Synthesis of Circum-Arctic Distribution and Thickness

This IPA Action Group was formed in February 2015 following a successful thematic session on “Yedoma origin, records and future projections in a changing Arctic” at the 4th European Conference on Permafrost. The Yedoma Action Group aims to synthesize existing information and generate new data on the circum-arctic distribution and thickness of Yedoma permafrost. Yedoma deposits, due to very high excess ice content, are especially prone to degradation under current climate scenarios in Siberia, Alaska and the Yukon Territory. Due to the very large frozen carbon pool in the permafrost deposits of this region, increased permafrost thaw could cause a positive carbon feedback loop to climate with global significance. Therefore, a detailed assessment of the Yedoma deposit volume (coverage and thickness) is of importance to estimate its potential response and relevance to future climate.

The quantification of the Yedoma coverage is based on the digitization of surface geological and Quaternary geological

maps and the analysis of remote sensing data. This information is merged with data on Yedoma thickness extracted from drilling records and outcrop observations reported in the scientific literature.

The Yedoma Action Group started its activities with a presentation of the Action Group’s goals at the Melnikov Permafrost Institute Yakutsk, Russia in March 2015. A side meeting of the Action Group was held during the Permafrost Carbon Network Working Group Lead meeting in Flagstaff, USA, in May 2015. A follow-up event for Action Group coordination and discussions of the first results was held in Potsdam, Germany, in November 2015. Side meetings and contributions were planned for the AGU Fall Meeting 2015 in San Francisco, USA and the results of the Action Group were presented and discussed at the 5th Annual Assembly of the Permafrost Carbon Network (December 2015) immediately prior to the AGU conference. The preliminary results of the Action Group, including a first new preliminary pan-Arctic Yedoma map, were presented at the



Top left: Logo of the Yedoma IPA Action Group. Bottom left: Action Group meeting in Potsdam, November 2015; Right: Itkillik Yedoma exposure, Alaska. Picture: J. Strauss, May 2012

AGU conference itself. Currently, the group is preparing a first Yedoma synthesis manuscript.

The Action Group is organising a workshop immediately prior to ICOP 2016 in Potsdam. Members then intend to compile a scientific paper on the Yedoma database as well as publish a comprehensive Yedoma map for educational and scientific use.

If you are interested in becoming involved in the Yedoma Action Group activities and in contributing data or sharing your ideas, please contact jens.strauss@awi.de.

IPA Action Group Report: A Frozen-Ground Cartoon

by Frédéric Bouchard

Explaining international permafrost research using comic strips

Apart from people in cold region communities and a limited – although steadily growing – scientific community, the general public knows very little about permafrost properties, its dynamics in response to climate change, and the research going on in the field. ‘A Frozen-Ground Cartoon’ is a scientific outreach project that aims at presenting and promoting international permafrost research via a series of comic strips and illustrated media products.

The project is officially supported by the International Permafrost Association as a targeted ‘Action Group’ (<http://ipa.arcticportal.org/activities/action-groups>) and will run from January 2016 to January 2018. The scientific aspects will be coordinated by a core group of permafrost early-career scientists from Canada

and Europe (Germany, Sweden, and Portugal). The final outcome of the project will be a series of comic strips showing the diversity of permafrost research activities at the international level, with a special emphasis on fieldwork. The target audience is the general public, focusing more specifically on teenagers and young students who have to choose career paths at the high school or college levels.

Comic strips will be released both electronically and on paper media through national and international research networks. Final products and selected portions of the strips will be disseminated as a web site, on social media, and in the form of posters and graphic novel magazines for schools and libraries. All generated material will be released under a creative



commons licence (CC) and made available to the public.

The Action Group is looking for one or two comic artists to build a narrative and to create characters and content within a framework of scientific context. The artist(s) will be working closely with the scientists, who will overview the scientific outreach content, but will be free to create the surrounding backstory and characters. An application call will be released in mid-January via international networks of permafrost researchers (IPA, PYRN). For more information: frozengroundcartoon@gmail.com.

IPA Action Group Report: The InterFrost Evaluation

by Christophe Grenier

Comparisons of physically-based numerical models

The purpose of this Action Group is to develop a common platform for testing and evaluating numerical models used within the rapidly evolving fields of cryohydrology and cryohydrogeology. Physically-based numerical models are essential for investigating coupled terrestrial cryotic water transport phenomena in complex, dynamic and highly variable permafrost environments. They are also important for their quantitative and predictive capabilities and play a major role in the integration of available knowledge. However, there is currently a lack of numerical model comparison and testing frameworks, including suitable code benchmark test cases and cryo-hydrological laboratory experiment set-ups appropriate for model evaluation. Such testing and evaluation platforms are necessary prerequisites for establishing the robustness and reliability of model application to field scale investigations and predictive analyses.

The primary focus of the Action Group is on hydrological and hydrogeological problems that require coupled thermo-

hydrological treatment under cryotic conditions. Such problems (e.g., interface evolution) are particularly complex from a numerical perspective.

While recently developed coupled thermo-hydrological codes provide qualitatively reasonable results, there is a pressing need to establish independent quantitative assessments. This cannot be fully achieved using classical analytical solutions which typically rely on overly restrictive assumptions, generally leading to trivial model comparison cases. Here model comparison through suitably designed benchmarks and laboratory experiments can serve to provide more robust and realistic testing frameworks.

The platform developed in this Action Group will serve as an open forum for the permafrost and cold regions scientific community (especially hydrology, hydrogeology, marine permafrost evolution, climate simulation) to test, validate and



Kick Off Meeting in Paris, November 2014

compare their codes, evaluate code robustness, reliability and efficiency, as well as to discuss further strategic development needs considering real world applications and field investigations. This will be achieved by developing a website with common test cases and experimental cryo-hydrological data, organizing workshops for inter-comparison and associated studies, including development of additional needed study cases, and disseminating and communicating outcomes to the broader scientific community through international meetings, conferences and journal publications.

Updated information concerning test cases, actions, milestones and participants can be found on the InterFrost web site (<https://wiki.lscce.ipsl.fr/interfrost>).

11th International Conference on Permafrost

by the ICOP 2016 Local Organizing Committee

More than 980 submitted abstracts - the Local Organizing Committee is delighted by the unprecedented response of the permafrost community.



The most important international conference concerning permafrost will take place from 20-24 June 2016 in Potsdam, Germany. The Eleventh International Conference on Permafrost (ICOP) is expected to attract more than 800 permafrost scientists and engineers

including 150-200 early career researchers. Almost a thousand abstracts have been submitted to the 40 topical sessions accepted for the conference. These include sessions focussed on some of the most pressing questions regarding permafrost, such as on climate change and permafrost carbon feedback, traditional sessions, such as on periglacial geomorphology, and infrastructure stability in permafrost terrain, and sessions that are innovative for ICOP, such as on permafrost in history, politics and culture.

The ICOP will include local excursions during the conference and five major excursions to Yakutia, Svalbard, the Alps, Poland and southern Norway that will take

place immediately following the conference. The IPA Lifetime Achievement Award and the Permafrost and Periglacial Processes Award will be given out at the ICOP, and two IPA Council Meetings will take place, during which a new Executive Committee will be elected and a new mission statement will be discussed. Side meetings during the conference will include meetings of the IPA actions groups on Arctic coasts and Yedoma region, and on communicating permafrost science through cartoons. A Young Researchers Workshop sponsored by the IPA will precede the conference. More details on the program, including important dates for registration, are given on the conference web-site at: <http://icop2016.org/>.

News from Global Terrestrial Network for Permafrost (GTN-P)

by Boris K. Biskaborn and Dmitry Streletskiy

[Link: www.gtnp.org](http://www.gtnp.org)

The Global Terrestrial Network for Permafrost (GTN-P) is part of the Global Climate Observing System (GCOS), a joint undertaking of WMO, IOC, UNESCO, UNEP, and ICSU. GTN-P was established in 1999 by the IPA with the goal of systematic and long-term documentation of the distribution, variability and trends of permafrost, based on a global network of field measurements. Permafrost temperature and active layer thickness have been identified as Essential Climate Variables (ECV) by GCOS. GTN-P has made great progress in the development of the Data Management System for these two variables. The official launch of the GTN-P Database in September of 2015 created significant interest in the media. The database currently includes 1233 permafrost temperature boreholes and 249 active layer sites from the terrestrial Arctic, Antarctic and mountain areas. The data are freely available in harmonized formats (CSV, XML, KML, GIS shapefiles) as well as in Network Common Data Form (NetCDF) to facilitate implementation in global models.

GTN-P held its Second GTN-P National Correspondents Workshop at Laval University, Québec, Canada, on September 19-20, 2015, prior to the GEOQuébec Conference. The workshop was sponsored by

the International Arctic Science Committee (IASC) and by the Cold and Arid Regions Environmental and Engineering Research Institute (Lanzhou). Vladimir Romanovsky (USA) stepped down as the Chair of GTN-P Steering Committee, Dmitry Streletskiy (USA) was selected as the new Chair, Sharon Smith (Canada) and Jeannette Noetzi (Switzerland) were chosen as Co-Chairs and Boris Biskaborn (Germany) was appointed as the Director of the GTN-P Secretariat.

The GTN-P workshop was attended by 28 National Correspondents (NC) from 25 Countries involved in GTN-P. NC's gave talks on permafrost temperature, active layer thickness data, metadata from their countries and the current state and availability of these data within the GTN-P database. While the needs and strategies to facilitate data upload were discussed, GTN-P Young National Correspondent (YNC) positions were established in order to assist Senior NC's in data collection, data management, education and outreach, and to increase long-term sustainability of the GTN-P. At the time this report for Frozen Ground was written, 12 YNC were already selected after they applied to



Participants in the Second GTN-P National Correspondents Workshop in Québec City, Canada. Photo: Josefine Lenz (AWI)

a call from GTN-P and PYRN. YNC will be officially appointed during the next GTN-P meeting to be held at the 11th International Conference on Permafrost in June 2016.

An important decision during the workshop was to work towards biennially updated citations for the two main datasets in GTN-P of permafrost temperature and active layer thickness, by acknowledging all data providers as co-authors. Currently GTN-P is coordinating an international data collection effort to update the GTN-P database. This update will provide the foundation for a snapshot of the current thermal state of permafrost and active layer thickness on a global scale to be presented in June 2016 at the ICOP 2016 in Potsdam. Preliminary results indicate that permafrost temperatures continue to increase in arctic areas where permafrost is relatively cold. In the sub-arctic areas, where permafrost is less cold, the warming trend is less pronounced. Active layer thickness has increased significantly in the last twenty years across majority of the Arctic regions, but in some locations no significant change has occurred due to an increase in vegetation over the same period.

LowPerm Project

by Hanne Christiansen

More than methane: quantifying melt-driven biogas production and nutrient export from Eurasian Arctic lowland permafrost

The LowPerm project, funded by the EU under the Joint Planning Initiative, was launched in 2015 with the aim of understanding nutrient transport within permafrost landscapes that may lead to changes in greenhouse gas production and fertilization of the Arctic Ocean. LowPerm is led by Andy Hodson (Sheffield, UNIS) with co-investigators Hanne Christiansen (UNIS), Kai Finster (Aarhus), Jacob Yde (Sogn of Fjordane), and Steve Thornton (Sheffield).

The main objects of LowPerm are to quantify microbial processes, changes in microbial populations and their functional potential, as well as to understand the physical process dynamics of permafrost soils at field observatories in West Spitsbergen. Seasonal microbial-driven greenhouse gas production and fjord fertilization, due to runoff export of nutrients and organic matter, are being quantified, and responses of microbial communities to different temperatures, water, oxygen, and nutrient substrate conditions

will be determined. Semi-empirical tuning parameters will be developed for integrating these biogeochemical processes into biophysical models, while taking sub-grid heterogeneity into account.

A successful first field season was carried out on Svalbard from May to September 2015, extracting permafrost cores from Adventdalen and monitoring catchment hydrology and the evolution of soil microbial communities throughout the summer. The samples are currently being analyzed.

High-speed railways on deep seasonally frozen ground in China

by Fujun Niu and Huijun Jin

State Key Laboratory of Frozen Soils Engineering (SKLFSE), Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences (CAREERI), Chinese Academy of Sciences (CAS), Lanzhou

China has built numerous high-speed railways (HSR) in the past decade. Recently, high-speed railways have been constructed across ground that freezes seasonally to a depth exceeding 1.5 m. The engineering challenge is to mitigate frost heave to keep railbed deflections within a very small range and allow the trains to operate at design speed.

The Harbin to Dalian High-Speed Railway (HDR) in northeast China winds across 909 km terrain affected by seasonally frozen ground, and about 25% of the line (231 km) is built on an embankment. The design speed is 350 km/h. The line crosses terrain with a maximum depth of frost penetration that decreases from 2.4 m in the north to 0.9 m in the south. The main challenge in the construction of the railway was how to mitigate frost heave of the railbed so that it stays within the acceptable vertical limit of ± 15 mm within a longitudinal distance of 200 m. This had to be achieved in spite of frequent and heavy



A high speed train operating in winter on the Harbin to Dalian railway.

dynamic loading due to the trains, the huge range of ambient air temperatures (-40°C to $+40^{\circ}\text{C}$; mean annual air temperature range from 3.5°C to 10°C), extensive frost susceptible soils and shallow ground water tables (1-3 m in many flat areas).

Field tests were carried out during construction to evaluate the effectiveness of various mitigative measures for frost heave of foundation soils. These measures included refilling of the railbed with non-frost-susceptible soils, application of thermal insulation as a construction material, surface waterproofing and drainage control. The main solution adopted was the use of highly select fill.

Since the HDR was put into service at the end of 2012, the deformation of

foundation soils along the whole line has been manually measured once a year. In addition, automatic monitoring devices were installed at 50 sections with complex geological conditions and prone to significant frost heave. Three years of monitoring shows that deformation resulting from frost heave of foundation soils is less than 12 mm at 97% of the 50 measured sections, i.e. less than the specified limit of 15 mm. The research results on the silt and clay contents suitable for high-speed railbeds will help modify future codes for designing high-speed railway and road foundations in cold regions in China and beyond.

Following the success of the HDR, the Harbin to Qiqihar high-speed railway was built on deep seasonally frozen ground and began operating on August 17, 2015. This 282-km-long railway traverses still colder terrain than the HDR, and the design speed is currently 250 km/h. In Northwest China, a new high-speed railway connecting Lanzhou and Urumqi, with a length of 1,776 km and a design speed of 250 km/h, was opened for service in December 2014. Currently it is being monitored by the SKLFSE.

Note: A more detailed version of this report is available on the IPA website under the Country report of China.

Soils of Cold Areas Conference celebrated the 100th Anniversary of Professor O.V. Makeev

by N.B. Badmaev and D.G. Fedorov-Davydov

Institute of General and Experimental Biology, Siberian Branch of the Russian Academy of Sciences, Russia and Institute of Physical-Chemical and Biological Problems of Soil Science RAS, Pushchino, Russia

A Russian conference with international participation entitled Soils of Cold Areas: Genesis, Geography, Ecology was held from August 31 to September 9, 2015 to celebrate the 100th anniversary of the birth of Professor Oleg Vladimirovich Makeev. The conference

took place in Ulan-Ude, the capital of the Republic of Buryatia, Russia, where he worked from 1958 to 1969.

Professor Makeev was an outstanding investigator of Siberian soils, a recipient of many national and international awards, the author of the theory of soil cryogenesis, and a member of the ISSS and IUSS for several decades. He revealed the singular nature of pedogenesis in the taiga zone of central Siberia, where podsolization plays a subordinate role to accumulative and



Professor O.V. Makeev

(continued from page 8)

metamorphic processes. Under his leadership, soil research stations were organized in Transbaikalia and Mongolia, where the hydrothermal regimes and the seasonal dynamics of chemical and biological soil parameters were studied. In 1969, Professor Makeev created the laboratory of cryogenic processes in soils at Pushchino, near Moscow. This was the first Russian scientific unit systematically studying problems of soil cryogenesis and soils of the cryolithozone.

A plenary session on the life and work of Professor Makeev opened the meeting. The remainder of the conference comprised sessions on many topics, most of which had been researched by Professor Makeev during his career. These included:

- Genesis, geography, and classification of soils in cold areas
- Diversity of soils and the spatial organization

of soil cover from the northwest of Russia to Central Yakutia and Transbaikalia

- Paleocryogenic epochs as stages of extreme pedogenesis in the evolution of the Earth's pedosphere
- Climate and hydrothermal regimes of cold soils
- Physical, chemical, and mineralogical properties of cold soils
- Microbiology, biogeochemistry, and ecology of soils and landscapes in cold areas
- Practical use and preservation of soils in cold areas

Three field excursions were held within the framework of the conference: (1) to the south of the Vitim Plateau, (2) to the east coast of Lake Baikal and the mountains of Cisbaikalia (Ulan-Burgasy Ridge), and (3) to near the Tunka Range (Eastern Sayan). Problems in the classification of permafrost-affected and seasonally frozen soils were discussed during the excursions and it was noted that the

quality and character of permafrost should be considered in soil taxonomy. An excursion focussed on paleosols was also organized to the Tologoi key section where Quaternary continental deposits and buried soils of the Western Transbaikalia with traces of paleocryogenesis were shown.

Note: a more detailed version of this report is available on-line on the IPA website under the Country report of Russia 2015.



Participants at the conference

Forward-looking thinking for the permafrost community

by Michael Fritz

Increased economic and environmental interests in permafrost-affected regions and accelerating climate change have resulted in a pressing need to identify the most important priorities for permafrost research. Over the past two decades, the International Arctic Science Committee (IASC) and the Scientific Committee on Antarctic Research (SCAR) have organized activities focused on advancing Arctic and Antarctic research cooperation and knowledge dissemination in many subject areas. However, no consensus document exists that identifies future permafrost research priorities from an international perspective. In June 2014, 88 early career researchers (ECRs) met to rectify this gap.

The conference workshop and online community input from ERCs led to a consensus report being formulated as a contribution to the 3rd International Conference on Arctic Research Planning 2015 (ICARP III). A



Early career researchers workshop at EUCOP4 in June 2014

recently published article in *The Cryosphere* lists the following five research questions as the top priorities for permafrost science:

- How does permafrost degradation affect landscape dynamics at different spatial and temporal scales?
- How can ground thermal models be improved to better reflect permafrost dynamics at high spatial resolution?
- How can traditional environmental knowledge be integrated in permafrost research?

- What is the spatial distribution of different ground-ice types and how susceptible is ice-rich permafrost to future environmental change?
- What is the influence of infrastructures on the thermal regime and stability of permafrost in different environmental settings?

As the next generation of permafrost researchers, we see the opportunity and the need to participate in framing future research priorities. Across the polar sciences ECRs have built powerful networks, such as the Association of Polar Early Career Scientists (APECS) and the Permafrost Young Researchers Network (PYRN), which have enabled us to consult widely within the community.

The IPA supported this activity by hosting the 4th European Conference on Permafrost, where the workshop took place and with travel stipends for some of the workshop organizers.

PYRN Report

by George Tanski, Josefine Lenz, Boris Radosavljevic and Jens Strauss

Permafrost Young Researchers Network Activities 2015



The Permafrost Young Researchers Network (PYRN), established under the patronage of the IPA, is a network of young and enthusiastic permafrost scientists and engineers from all around the world. PYRN works closely with the Association of Polar Early Career Scientists (APECS) and strives to apply its multi-disciplinary talents toward global awareness, knowledge and response to permafrost-related challenges in a changing global climate. PYRN has continuously expanded since its inception during the 4th International Polar Year, and now has more than 1,200 members. The organization supports capacity building through its website, newsletter and member listing, and most recently has developed its first printed flyer (http://pyrn.arcticportal.org/images/activities/PYRN_flyer.pdf).



PYRN presentation at the Arctic Science Summit Week 2015 in Toyama (Japan); from left to right: George Tanski, Josefine Lenz, Elena Kuznetsova, Aleksey Maslakov (all PYRN Executive Committee)

10th anniversary of PYRN- Wrap up and census

PYRN is celebrating its 10th anniversary during the 2014-2016 mandate of its executive. A report entitled “The Permafrost Young Researchers Network is getting older – a decade of PYRN: review, state and outlook is in preparation to summarize the development of the network since its establishment and its goals for the future.” The PYRN census, which was carried out in 2015, will be published as part of this document.

PYRN events and workshop

Three main PYRN events were organized in the first and second quarters of 2015. A short course for students and early career researchers entitled “The future of permafrost in a climate changing world” was hosted by the Soil System Sciences Division during the EGU General Assembly in Vienna and a social evening was also organized. During the Arctic Science Summit Week in Toyama (Japan) in April, PYRN promoted its network with a poster entitled “Permafrost Young Researchers Network (PYRN): Perspectives and Priorities of the next generation on permafrost research” and advertised itself to the Asian research community as part of its

outreach strategy. One month later, early career researchers were involved in the organization of the 3rd PAST Gateways conference and workshop in Potsdam (Germany), co-chairing sessions and giving speed presentations of their posters. Two poster awards were given



PYRN award presentation at GeoQuébec. The prize was shared by Brendan O'Neill and Marcus Phillips (Carleton University, Canada)

out and a social event for all young researchers attending the conference was organized.

PYRN organized five more events in the second half of 2015. A joint panel discussion with the title “The role of young researchers’ networks in shaping the future of geographical sciences” was organized during the International Geographical Union regional congress in August in Moscow (Russia), by APECS, PYRN Russia, European Geography Association for Students and Young Geographers (EGEA), and ArcticFROST. In September, the 33rd PYRN Russia meeting was organized in the framework of the International Conference “Permafrost in XXI Century: Basic and Applied Researches” in Pushchino (Russia). During the GeoQuébec 2015 meeting in Québec (Canada), PYRN gave awards for outstanding oral presentations by two Carleton University students. At the 11th Annual Scientific Meeting of ArcticNet on December 7-11 in Vancouver (Canada), PYRN supported the organization of the ArcticNet Student Association (ASA) student day by providing onsite and financial support for the icebreaker events. One week later, during the

(continued from page 10)

AGU Fall Meeting on December 14-18 in San Francisco (United States of America), the United States Permafrost Association (USPA) held its annual meeting and invited non-American PYRN members to join the USPA meeting and social event. In total, eight PYRN members were awarded with USPA travel grants at the social event.

Collaboration with partner organizations

PYRN is constantly in contact with its partner organizations and hosts. Currently, various members of the PYRN Executive Committee are involved in activities of the International Arctic Science Committee (IASC) and APECS as IASC Fellows and APECS

Council members, respectively. PYRN has started to collaborate with the Global Terrestrial Network on Permafrost (GTN-P) with PYRN providing members as national representatives for GTN-P and supporting the network by collecting ground temperature and active layer data. PYRN is currently negotiating with the ASA about a Memorandum of Understanding to strengthen its communications with the Canadian research community.

PYRN at ICOP 2016

PYRN is currently organizing the Permafrost Young Researchers Workshop together with APECS and young researcher representatives from USPA and ADAPT (Arctic Development and Adaptation to Permafrost in Transition). The “Young Researchers

Workshop” will take place at the 11th International Conference on Permafrost (ICOP 2016) and will provide opportunities to young researchers to learn and build interdisciplinary knowledge.



The logo of the joint young researcher workshop of PYRN, APECS, ADAPT, and USPA

PYRN members in IASC Fellowship Program

by Josefine Lenz, Louis-Philippe Roy, Elena Kuznetsova and Robert Way

The International Arctic Science Committee (IASC) initiated the IASC Fellowship Program during Arctic Science Summit Week (ASSW) 2014 in Helsinki to promote and involve the next generation of Arctic researchers. Those Early Career Researchers (ECR) selected actively participate in the IASC Working Groups, giving them a unique opportunity to become involved in leading-edge scientific activities, to start cooperative initiatives at a circum-arctic and international level, to build an international network of contacts and to develop management skills.

During the initial round of the IASC Fellowship Program, PYRN members Elena Kuznetsova (Norwegian University of Science and Technology; PYRN ExCom member) and Louis-Philippe Roy (Yukon Research Centre) were chosen for the Cryosphere Working Group. In early 2015, a second wave of IASC Fellows was selected from 96 applicants by collaboration between IASC and APECS. Two more PYRN members were designated: Josefine Lenz (Alfred Wegener Institute; PYRN ExCom member) as a part of the Terrestrial WG and Robert Way (University of Ottawa) for the Cryosphere Working Group. Each IASC Fellowship has a duration of 1+2 years. During the first year, selected Fellows receive financial support to attend two consecutive ASSWs when annual

WG meetings are held, provided that the Fellow helps to facilitate the meeting organization, including follow-up activities and reporting. In 2014, Elena Kuznetsova and Louis-Philippe Roy contributed to the Rapid Arctic Transitions Related to Infrastructure and Climate Change (RATIC) workshop, which was a joint effort between Cryosphere, Social & Human and Terrestrial Working Groups. In 2015, Josefine Lenz was invited to talk about her ECR perspective on the topic “From Science to Policy” within the Arctic Discussion Series held on June 29th in Potsdam. She was also involved in the organization of the 3rd conference and workshop of the IASC network PAST Gateways held on May 18-22 in Potsdam, Germany, as well as in the organization of the 2nd GTN-P workshop held in Québec City. As an outcome of this meeting, IASC Fellow Louis-Philippe Roy became a GTN-P National Correspondent for Canada and the involvement of PYRN members as Young National Correspondents in GTN-P was decided. Louis-Philippe Roy represented GTN-P at the ArcticNet Annual Scientific Meeting in Vancouver (Canada) in December 2015. IASC Fellow Elena Kuznetsova took part as an Early Career Scholar the Arctic-FROST Annual Meeting, 15-17 August 2015, St Petersburg, and Polar Data Forum II held in Waterloo in October 2015, and together with Robert Way she was invited to a thematic

committee of the Arctic Observing Summit at ASSW 2016.

In 2016, IASC approved a cross-cutting initiative led by these four scientists, to facilitate a workshop session on “Community-based Research” with participation of indigenous people during the Young Researcher Workshop at the International Conference on Permafrost in June in Potsdam.



IASC Fellows Josefine Lenz, Elena Kuznetsova, Robert Way and Louis-Philippe Roy presenting their permafrost research at the GEOQuébec 2015 conference in Canada

UPCOMING EVENTS

2016

Arctic Science Summit Week 2016

March 12-18, 2016
Fairbanks, Alaska, USA

European Geosciences Union - General Assembly 2016 - EGU

April 17-22, 2016
Vienna, Austria

European Space Agency (ESA) Living Planet Symposium 2016

May 9-13, 2016
Prague, Czech Republic

11th International Conference on Permafrost

June 20 - 24, 2016
Potsdam, Germany

35th International Geology Congress

August 27-September 4, 2016
Cape Town, South Africa

Scientific Committee on Antarctic Research (SCAR) 2016 Open Science Conference

August 20-30, 2016
Kuala Lumpur, Malaysia

Arctic Circle

October 7-9, 2016
Reykjavik, Iceland

American Geophysical Union Fall Meeting- AGU

December 12-16, 2016
San Francisco, USA

2017

International Symposium on Cryospheric in a Changing Climate

13-17 February, 2017
Wellington, New Zealand

INTERNATIONAL PERMAFROST ASSOCIATION

The mission of the International Permafrost Association is to promote research in permafrost and permafrost-related fields within the global scientific and engineering communities, to support the activities of researchers in these disciplines, and to disseminate findings concerning permafrost to the decision-makers, the general public and educators.

Officers

President

Prof. Antoni G. Lewkowicz
Department of Geography
University of Ottawa
Canada

Senior Vice-President

Prof. Hanne H. Christiansen
The University Centre in
Svalbard UNIS
Norway

Vice-President

Prof. Vladimir E. Romanovsky
Geophysical Institute
University of Alaska Fairbanks
USA

Members

Prof. Hugues Lantuit
Alfred Wegener Institute
Helmholtz Centre for Polar and
Marine Research
Germany

Prof. Lothar Schrott
Department of Geography
University of Bonn
Germany

Dr. Dmitry Sergeev
Sergeev Institute of Environmental
Geoscience RAS
Moscow State University
Russia

Prof. Ma Wei
CAREERI
Chinese Academy of Sciences
China

Secretariat

Executive Director

Dr. Karina Schollaen
Alfred Wegener Institute
Helmholtz Centre for Polar and
Marine Research
Germany

Council Members

Argentina

Dario Trombotto

Austria

Andreas Pirklbauer

Canada

Sharon Smith

China

Huijun Jin

Denmark

Thomas Ingeman-Nielsen

Finland

Miska Luoto

France

François Costard

Germany

Michael Krautblatter
Hans-Wolfgang Hubberten

Iceland

Halldor Johannsson

Italy

Adriano Ribolini

Japan

Mamoru Ishikawa

Kyrgyzstan

Ryskul Usabaliev

Mongolia

Yamkhin Jambaljav

The Netherlands

Ko van Huissteden

New Zealand

Megan Balks

Norway

Gisle Håland, Ole Humlum

Poland

Rajmund Przybylak

Portugal

Gonçalo Teles Vieira

Romania

Petru Urdea

Russia

Anna Kurchatova

South Korea

Yoo Kyung Lee

Spain

Enrique Serrano

Sweden

Jonas Åkerman

Switzerland

Reynald Delaloye

United Kingdom

Julian Murton

United States of America

Thomas Krzewinski
Frederick Nelson

Address:

International Permafrost Association
c/o Dr. Karina Schollaen
Alfred Wegener Institute Helmholtz Centre
for Polar and Marine Research
Telegrafenberg A43
14473 Potsdam
Germany

Web:

contact@ipa-permafrost.org
www.permafrost.org
www.facebook.com/ipapermafrost
https://twitter.com/ipapermafrost

ISSN 1021-8610

Past Presidents:

Prof. Hans-Wolfgang Hubberten (2008-2012)
Dr. Jerry Brown (2003-2008)
Prof. Hugh M. French (1998-2003)
Academician Cheng Guodong (1993-1998)
Prof. Troy L. Péwé (1988-1993)
Academician P. I. Melnikov (1983-1988)