IMPETUS 2007 – OSL-APECS-PYRN Training workshop on Permafrost Research Methods

30 November-2 December, Saint Petersburg, Russia

Sponsors

The help of the following sponsors is warmly acknowledged.

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Climate and Cryosphere (CliC)

Alfred Wegener Institute for Polar and Marine Research, Potsdam, Germany

The workshop is an official IPY activity organized by PYRN and APECS

International Polar Year

Permafrost Young Researchers Network
Association of Polar Early Career Scientists

Foreword

The Otto Schmidt Laboratory for Polar and Marine Research (OSL) at the State Research Center for Arctic and Antarctic Research (AARI) together with the Association of Polar Early Career Scientists (APECS) and the Permafrost Young Researchers Network (PYRN), are proud to present the first international training workshop on modern investigation techniques in the field of permafrost science. The workshop is intended to provide a learning and meeting ground for young permafrost researchers from Russia and the rest of the world.

The workshop is endorsed by the International Artic Science Committee (IASC) and the International Polar Year (IPY) International Programme Office through its subcommittee on education and outreach as an official IPY event.

The beginning of the IPY has led to a growing number of initiatives aiming at bringing together young researchers from around the world. PYRN and APECS are two projects working close together to achieve these goals. They provide communication platforms and organize events (small meetings and training workshops) aimed at young researchers.
The major challenge facing these organizations, and thereby the future polar community at large, is to involved in an equal manner all countries involved in research in the cryosphere, starting with Russia, the greatest polar country by size.
OSL, APECS and PYRN will organize an international workshop taking place at the OSL Saint Petersburg guaranteeing the large presence and involvement of Russian young researchers. We envisione this workshop, which could be endorsed by the IPY subcommittee on education and outreach as well as large institutional partners active in polar (IASC, SCAR) and cryospheric research (CliC, WCRP), as a major breakthrough in transnational collaboration amoun young researchers for the IPY and beyond.

Planning Committee

The planning committee is constituted of young researchers from APECS, PYRN and of senior researchers

Chair:
Heidi Kassens (Germany-Russia, OSL)

Members:
Jenny Baeseman (USA, APECS)
Grigory Fedorov (Russia, AARI)
Tim Haltigin (Canada, PYRN)
Margareta Johansson (Sweden, PYRN)
Hugues Lantuit (Germany, PYRN, APECS)
Pavel Rekant Russia, VNIIOkeangeologia, PYRN)

Senior advisor:
Volker Rachold (Sweden, IASC)

General Information on Saint-Petersburg

The workshop will take place at the Arctic and Antarctic Research Institute (AARI) in the Otto Schmidt Laboratory for Polar and Marine Research (OSL) in Saint-Petersburg, Russia. The AARI is located on the Vasilyevsky Island, 38 Bering street.

Transport
Bus transfer **for funded participants** from the airport to the hotel and back will be arranged. The driver will hold a sign with the OSL logo:

Please make sure you have informed Karen of your arrival.

Registration
Registration will be taking place during the icebreaker.

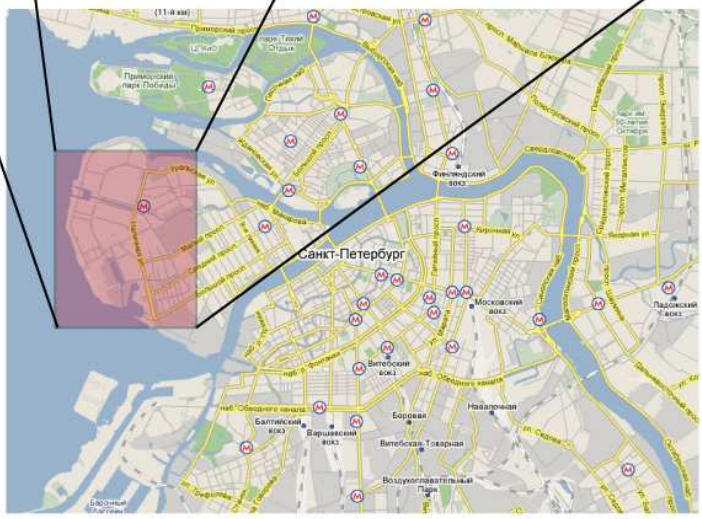
Accommodation
All participants will be accommodated in walking distance to the AARI. If you are staying at the hotel prebatiyskaya, take a look at the map below.

Meals
Lunch will be provided freely to all participants
The evening meals shall be covered by the participants.

Internet access
WLAN is available in the meeting facilities. In addition, at the OSL computers with internet access are available to all participants.

Meeting facilities
The meeting will be held in the small conference hall on the second floor of the AARI. You might need to be accompanied by a member of the local organizing committee (LOC) to get in the building. The LOC will check regularly at the entrance.

Arctic and Antarctic Research Institute
38 Bering street
St.Petersburg
Russia, 199397



St. Petersburg

Presentations
Presentations are poster only, due to the limited time available. There are no specific restrictions for poster dimensions; the posters will be displayed on the walls of the lecture hall. You are free to use landscape or portrait-shaped posters.

Clothing
At the beginning of December it can be very cold in St. Petersburg. You can find the weather forecast on http://petersburgcity.com/weather/

Money/ credit cards/ ATM

- The only legal currency is the Russian ruble. Other currencies are not accepted as means of payment.
- ATM machines are plentiful in Saint Petersburg and there is an ATM in the entrance hall of the AARI. Please follow all normal precautions about using ATMs.
- Credit card and EC card acceptance is wide spread in Saint Petersburg, also at the ATM in the entrance hall of the AARI.
- For currency exchange please go to a bank, a hotel or an official exchange point or use EC cards at the ATMs.

If you have any questions please don't hesitate to contact Torben Klagge (tklagge@ifm-geomar.de) or Karen Volkmann-Lark (kvolkmann-lark@ifm-geomar.de)

Program

29th of November

Throughout the day	Arrival of participants
16h00-18h30	PYRN meeting (closed meeting) *OSL library, 7th floor, AARI building*
19h00	Ice breaker at the Otto Schmidt Laboratory

30 November

Small conference hall

10h00-10h30	Opening words Dr Leonid A. Timokhov, OSL Director Dr. Heidi Kassens, IFM Geomar Hugues Lantuit PYRN coordinator	
10h30-11h30	Katey Walter I	
11h30-12h00	Coffee break	
12h00-13h00	Katey Walter II	
13h00-14h00	Lunch	
14h00-15h00	GROUP A Hanno Meyer Stable water isotopes	GROUP B Visit of the OSL Lab Geochemical investigations in permafrost research
15h00-16h00	Visit of the OSL Lab Geochemical investigations in permafrost research	Hanno Meyer Stable water isotopes
16h00-17h30	Coffee break and poster session	
19h00	Dinner in town	

1 December

Small conference hall

10h00-11h00	Lecture – Permafrost research history

	Lecturer Oleg Anisimov
11h00-11h30	Coffee break
11h30-12h30	Lecture – Permafrost modeling Lecturer Oleg Anisimov
12h30-14h00	Lunch
14h00-15h30	Lecture –modern permafrost investigations in montaineous regions Lecturer Stephan Gruber
15h30-16h00	Coffee break
16h30-17h30	Lecture –submarine permafrost investigations Lecturer Pavel Rekant
19h00	Dinner in town

2 December

Small conference hall

10h00-11h00	Lecture – Modern land-based drilling techniques in permafrost Lecturer Alexander Kholodov
11h00-11h30	Coffee break
11h30-11h45	Lecture - a perspective on young researcher involvement in research – The PYRN drilling project - M. Johansson
11h45-12h30	Roundtable – What did you get from this workshop? Wrap-up of the workshop
12h30-19h00	Free afternoon in St. Petersburg
19h00	Dinner in town

3 December

Departure of participants


List of Participants

	Name	Country	Institution
Lecturers			
	Oleg Anisimov	Russia	State Hydrological Institute of Roshydromet
	Stephan Gruber	Switzerland	University of Zürich
	Heidemarie Kassens	Germany	IFM-GEOMAR
	Alexander Kholodov	USA	University of Alaska Fairbanks
	Hanno Meyer	Germany	Alfred Wegener Institute for Polar and Marine Research
	Pavel Rekant	Russia	VNIIOkeangeologia
	Nikolaii Romanovskii	Russia	Moscow State University
	Katey Walter	USA	University of Alaska Fairbanks/International Arctic Research Centre
Organizers			
	Karen Volkmann-Lark	Germany	IFM-GEOMAR
	Nadezhda Kakhro	Germany	IFM-GEOMAR
	Grigory Fedorov	Russia	AARI
Attendees			
1	Michael Avian	Austria	Graz University of Technology
2	Joel Barker	USA	Byrd Polar Research Center
3	Natalyia Belova	Russia	Lomonosov Moscow State University
4	Christina Biasi	Finland	University of Kuopio
5	Daan Blok	Netherlands	Wageningen University and Research Centre
6	Dall'Amico, Matteo	Italy	University of Trento
7	Nadezhda Davy	Russia	Institute of Plant and Animal Ecology, Ural Branch of Russian Academy of Sciences
8	Greg De Pascale	USA	William Lettis Associates / McGill University
9	Marek Ewertowski	Poland	Adam Mickiewicz University
10	Daniel Fortier	USA	University of Alaska Fairbanks
11	Jens Hoelemann	Germany	Alfred Wegener Institute
12	Stanislav Iglovskyi	Russia	Institute of Plant and Animal Ecology, Ural Branch of Russian Academy of Sciences
13	Margareta Johansson	Sweden	Lund University
14	Simo Jokinen	Finland	University of Kuopio
15	Håvard Juliussen	Norway	The University Centre in Svalbard (UNIS)
16	Dmitry Kaverin	Russia	Institute of Biology Komi
17	Frida Keuper	Netherlands	Vrije Universiteit Amsterdam
18	Artem Khomutov	Russia	Earth Cryosphere Institute
19	Ivan Kopytov	Russia	Earth Cryosphere Institute
20	Christine Kroisleitner	Austria	Central Institute for Meteorology and Geodynamics
21	Hugues Lantuit	Germany	AWI Potsdam
22	Anna Liljedahl	USA	University of Alaska Fairbanks/International Arctic Research Centre
23	Karianne Lilleøren	Norway	University of Oslo
24	Saara Lind	Finland	University of Kuopio
25	Alexey Lupachev	Russia	Institute of Physico-Chemical and Biological Problems of Soil Science
26	Anne Morgenstern	Germany	AWI Potsdam
27	Frans-Jan Parmentier	Netherlands	Vrije Universiteit Amsterdam
28	Maija Repo	Finland	University of Kuopio
29	Torsten Sachs	Germany	AWI Potsdam
30	Roy Shirocov	Russia	Lomonosov Moscow State University
31	Yulia Stanilovskaya	Russia	Lomonosov Moscow State University
32	Ivan Sudakov	Russia	Nansen International Environmental and Remote Sensing Center

33	Marina Tishkova	Russia	Institute of Environmental Geoscience
34	David Tomé	Spain	Universidad de Alcalá de Henares
35	Pablo Wainstein	Canada	University of Calgary
36	Sebastian Wetterich	Germany	AWI Potsdam
37	Mingyi Zhang	China	State Key Laboratory of Frozen Soil Engineering, CAREERI, CAS
38	Nikita Zimov	Russia	Pacific Institute of Geography

Lectures

Katey Walter

Biography

Dr. Katey Walter, an aquatic ecologist, is an associate research professor in the Institute of Northern Engineering and the Water and Environmental Research Center. Her research focuses on methane emissions from arctic lakes with particular attention to thermokarst and permafrost degradation. Walter received her Ph.D. in Aquatic Biology in May 2006 from the University of Alaska, Fairbanks. On behalf of the Northeast Science Station in Cherskii, Katey works as project coordinator for Russian-U.S. collaborations for the International Polar Year as part of an effort to network arctic observatories in Alaska and Russia for long term monitoring of climate change in cold regions.

Estimating methane emissions from northern lakes

This presentation will introduce a simple, but useful technique for estimating methane emissions from northern lakes by surveying gas bubbles trapped in lake ice. Background information about sources of methane emissions from arctic lakes with particular attention to the importance of permafrost degradation will be provided as context. Invitation will be extended to join the Pan-Arctic Lake-Ice Methane Monitoring Network.

Hanno Meyer

Biography

Dr. Hanno Meyer is a research scientist and head of the Stable Isotope Laboratory at the Alfred Wegener Institute for Polar and Marine Research in Potsdam, Germany. Hanno received his phD in Geology in 2001 at the University of Potsdam dealing with the reconstruction of Late Quaternary climate conditions by means of stable water isotopes in permafrost ice. He is co-chair of the IPA working group "Isotope/Geochemistry of Permafrost" and involved in many periglacial, glaciological and hydrological projects world-wide using stable isotope techniques, with a research focus in Siberia.

Lecture
Water is everywhere.

Water is concentrated in the hydrosphere and in form of ice in the cryosphere. Both, water and ice are composed of hydrogen and oxygen isotopes. The method of stable water isotope analysis is an important tool in many environmental applications related to hydrology, but has been seldomly used in geocryology. .
The stable water isotopes (d18O and dD) in precipitation are the basis for palaeoclimate reconstruction due to a empirical linear relationship between air temperatures and isotopic composition. Water isotopes may be used to reconstruct climate variations of both hemispheres using different archives such as glacier ice and ground ice (e. g. ice wedges). Different types of ground ice (e. g. segregated ice, pore ice, ice wedges, pingo ice) are formed by different cryogenic processes and fed by different sources of meteoric water.

Hence, stable isotopes can be used on one hand as tracers for ground ice formation processes, on the other hand under certain circumstances as paleoclimate proxy.
In this paper, an introduction to a rapid and highly efficient method in geocryology is presented. Stable isotope research at AWI Potsdam is mainly carried out for the periglacial permafrost areas of eastern Siberia, Alaska and NW Canada.

Oleg Anisimov

Biography

Professor Oleg Anisimov is Head of the Climatology Department at the State Hydrological Institute of Roshydromet, located in St Petersburg, Russia. His main studies concern the impacts of Climate Change in high latitudes, with a special attention brought to Arctic permafrost regions. Dr. Anisimov is a coordinating lead author of the Intergovernmental Panel on Climate Change (IPCC) Chapter 15 on Polar Regions for Workgroup II.

Lecture

Permafrost Modelling

Models of different complexity have been constructed to predict areal distribution and properties of permafrost under changing climatic conditions. The simplest semi-empirical models have low data requirements and are often used to predict the location of permafrost boundaries and depth of seasonal thawing of the frozen ground over specific geographical locations. Dynamical models simulate the transient effects of climate-permafrost interactions and interannual variations of the freeze/thaw cycle. Most sophisticated stochastic models account for the spatial and temporal variability of permafrost properties and are fully compatible with the comprehensive climatic scenarios based on ensemble approach.

Stephan Gruber

Biography

Stephan Gruber is researcher and lecturer at the University of Zurich in the Physical Geography Division and firmly believes that topography makes happy. His main research interest is the quantitatve understanding of the mountain cryosphere (esp. permafrost). In his research he combines diverse methods such as spatial energy-balance and heat-transfer modelling, remote sensing, in-situ measurements, GIS analyses or geomorphometry. Stephan Gruber received his PhD from the University of Zurich, Switzerland and did his graduate and undergraduate studies in Germany (Uni Giessen, physical geography), the Netherlands (ITC, environmental monitoring and modelling) and Finland (Uni Lapland, Arctic Studies).

Lecture

Pavel Rekant

Biography

Pavel is a senior research scientist at the Russian institute for Geology and Mineral Resources of the Ocean in Saint-Petersburg. Pavel is a specialist of the quaternary geology and stratigraphy of northern Eurasia and more

specifically of the shelf environments of the Russian Arctic Seas.He has extensive experience in using and interpreting seismic acoustic data everywhere in the world (Gulf of Mexico, Bengal and Persian gulfs, off-shore of Brazil, India, Oman, and of course in the Arctic) and in drilling subsea permafrost. Pavel has participated in more than 20 international and Russian onshore and offshore expeditions and was the leader of the geological investigation team onboard the Russian nuclear icebreaker "Rossiya" in 2007. He is currently working on a large project investigating the offshore permafrost evolution in the Laptev Sea after the Holocene transgression.

Lecture

Alexander Kholodov

Biography

Dr. Alexander Kholodov is research scientist at the Permafrost Laboratory, Geophysical Institute at the University of Alaska Fairbanks. Alexander is a specialist in permafrost science and the quaternary geology of north-east Eurasia. His research focuses on the dynamic of thermal state of permafrost and organic matter stored in the frozen deposits. He has extensive experience in drilling different types of frozen deposits. Alexander has participated in more than 10 international and Russian onshore and offshore expeditions. During 2004-2006 he was the leader of the Paleoenvironmental Expedition "Beringia", Russian Academy of Sciences. He is currently working on several large projects investigating the permafrost in the frame of International Polar Year such as Thermal State of Permafrost (TSP) and Arctic Coastal Dynamics (ACD). On behalf of the GI UAF, Alexander works in the project of Russian-U.S. collaborations for the International Polar Year (TSP) as a part of an effort to network arctic observatories in Alaska and Russia for long term monitoring permafrost temperature in the cold regions.

Lecture
Modern land-based drilling technique in permafrost.

Drilling is a method universally involved in multidisciplinary permafrost research. There are several techniques of drilling. Most common are rotary auger and column drilling. The latter is preferable because it allows the retrieval of a core for description and sampling. Usually we use portable drilling equipment UKB-12/25, which allow the use of both auger and column drilling techniques. It allows the drilling of boreholes up to 50 m depth in fine grained frozen deposits. We have also experience of drilling solid rock (like slightly weathered basalt). Drilling is accompanied by core description which includes both lithology and cryogenic features (like a form of ice inclusions etc). Core is then available for sampling. Usually we take samples for lithological (water or ice content, density, soil grain size determination, composition of pore solution etc), biogeochemical (TOC, composition of organic matter, content of biogenic gases), isotopic (C14, C13, O16/O18, Cl36 etc) and microbiological analyses. Then borehole can be used for different types of logging (thermometry and radiation logging).

Heidi Kassens

Biography

Dr. Heidi Kassens is head of the Otto Schmidt Laboratory for Polar and Marine Research in St. Petersburg and PI of the projects Laptev Sea System, IMPETUS and the Master Program for Applied Polar and Marine Sciences at the St. Petersburg State University. She was chief scientist of many expeditions to the Siberian Arctic such as the famous Russian-Germany Expedition TRANSDRIFT VIII where subsea permafrost in the central Laptev Sea was drilled for the first time.

Abstracts

Joel Barker

The export of organic matter from a melting cryosphere

Cryospheric melting in response to climate warming causes the mobilization of organic matter previously sequestered in permafrost to be mobilized into the surrounding environment. Evidence of viable heterotrophic microbes in ground ice suggests that organic substrates in permafrost is altered by microbial metabolism and that organic material released upon melt may differ from the organic material which was originally entrained. Given the importance of organic matter to aquatic ecology, an understanding of quantity and characteristics of organic material released from cryospheric melting is important for prediction of future aquatic ecosystem processes under a climate warming scenario.

Natalya Belova

Isotopic and Chemical Analyses in Investigations of Massive Ground Ice on the Western Coast of Baydaratskaya Bay (Kara Sea).

Massive ground ice has been investigated in 2005-2007 on the Ural coast of Baydaratskaya Bay, Kara Sea, in the area of "Yamal-Europe" gas pipeline projected crossing.
The structure of ice and enclosing sediments, the influence of massive ice on coastal bluff rerteat rate was investigated; massive ice (chemical, isotopic analyses) and organics (C-14 dating) has been sampled.
By now some samples have been already analysed. Form the first data about icotopic and chemical composition of ice it can be infered that fresh massive ice was formed from the water of atmospheric genesis; however more detailed conclusions call for further investigations.

Christina Biasi

CO2 Dynamics of Northern Tundra

We studied net ecosystem carbon exchange, respiration rates and the age of CO2 respired in a North-Western Russian tundra during summer 2007. Chamber techniques were used, and CO2 was sampled with molecular sieves for radiocarbon dating.
The chosen measurement site was a peat plateau, strongly characterized by the presence of permafrost, and adjacent mineral tundra. Selected microsites were well representative of North-Russian tundra.
The results show large differences in CO2 dynamics between the different microsites. Plant cover and soil type seem to be the most important factors controlling carbon uptake and losses.

Daan Blok

Feedbacks of vegetation change to surface energy balance and seasonal thawing of permafrost.

Terrestrial ecosystems affect climate through fluxes of energy, water and greenhouse gases. Changes in community composition and vegetation structure alter these fluxes, thereby potentially altering the climate. Such vegetation feedback could contribute considerably to future regional climate warming in the Arctic. We expect that a shift from moss- to shrub-dominated vegetation will lead to a positive feedback, further increasing local warming and permafrost thawing. The effects of plant functional types, such as mosses, shrubs and grasses, on the surface energy balance and permafrost thawing will be determined.

Nadezda Davy

Changes of the forest-tundra ecotone in the polar Ural Mountains during the 20th Century

Our results indicate that the forest-tundra ecotone in the Polar Ural Mountains has significantly changed during the 20th century. The distribution of Siberian larch is shifting upwards. Nowadays young larch trees are growing in formerly treeless tundra. Since the 1920s, growth forms of larch have started to change from a creeping centennial growth to an upright growth as multistemmed trees. At the same time, single-stemmed tree emerged. The forest expansion and change in growth forms coincided with a significant warming in summer and a doubling in winter precipitation.

Greg Depascale

Synergistic benefits of ground penetrating radar and resistivity geophysical techniques for ground ice mapping in permafrost

The nature and distribution of ground ice is one of the most unpredictable variables in near-surface continuous permafrost. It is also the main reason permafrost is considered vulnerable to climate warming. Subsurface maps delineating ground ice are obtained either by destructive techniques like drilling or by non-invasive geophysical techniques. Using a combination of radar and resistivity, we can detect and map; massive and wedge ice, ice-rich sediments, the active layer, thermokarst and thaw unconformities, as well as basic stratigraphic relationships– all without disturbing pre-existing site conditions.

Marek Ewertowski

Ice-wedges as an indicators of climate condition during transgression and recession of the Vistulian ice-sheet in the Wielkopolska, west Poland

In the Wielkopolska (West Poland) ice-wedges was found in several outcrops of sediments related with Vistulian glaciation. One group of the wedges developed in the fluvioglacial sediments below the layer of vistulian basal till. The other wedges developed in the layer of vistulian basal till and in the overlaying ablation sediments. Two generation of ice-wedges may provide that climate during transgressions and recession of the Vistulian ice-sheet was row and cold. Presence of permafrost during ice-sheet transgression have further implication for ice-sheet dynamics and mechanism of movement.

Daniel Fortier

Identification key of basal glacier ice

The presence of basal glacier ice in the permafrost bears considerable implications for the reconstructions of paleoenvironments and paleoclimates. In Canada, Alaska and Russia, massive ice bodies have been interpreted as massive segregated ice or buried glacier ice. These two types of ground ice can only be distinguished if the properties and structure of contemporary glacier ice are well known. We conducted research at the Matanuska Glacier, Alaska to characterize the sedimentological properties and the cryofacies forming the basal ice. Three-dimensional models of micro-tomographic scans were used to develop an identification key of basal ice cryostructures.

Stanislav Iglovskyi

Geocryological conditions of north of Archangelsk region

Cryolithozone of Archangelsk region it is submitted island and rare spread by types of distribution of permafrost last Holocene age (temperature -0,5 - -1,0 ° C). Thikness - 25 m. Permafrost are dated for peat deposits. In Kanin peninsula permafrost are found out in flat-topped tundra bogs and in peat frost heave mound tundra. In north of Kanin permafrost also are dated to palsa bogs.
The features spatial - temporary distributions of ice caves are subordinated to dynamic parameters of carst systems.

Margareta Johansson

Deepening active layer and thawing permafrost in Sub-arctic Sweden
Margareta Johansson, H. Jonas Åkerman

Active layer measurements have been carried out annually in peat mires along an east-west transect in the Abisko area, northern Sweden since 1978. A trend towards deeper active layer is found at all the nine mires, ranging from 0.69 to 1.26 cm a-1. The trend has not been consistent throughout time, but has accelerated since 1997. At the westernmost site (with initial shallow permafrost), the permafrost has completely disappeared in more than 70% of the CALM grid. The deepening active layer is correlated with increases in summer air temperatures found in the area and also with increasing snow depths.

Simo Jokinen

CO2 Dynamics of Northern Tundra

See abstract by Christina Biasi

Håvard Juliussen

TSP Norway – Thermal State of Permafrost in Norway and Svalbard

The poster outlines the main aims of the IPY-project 'TSP Norway – Thermal State of Permafrost in Norway and Svalbard'

Dmitry Kaverin

Investigations of the transient layer developed in permafrost-affected soils of southern tundra (European North-East of Russia)

Transitive layer was determined in tundra loamy and peaty soils. It is revealed in the upper permafrost according to specific texture and relatively higher ice content (40-70% in loamy soils, 300-800% in peaty ones) at depths of 0,5 – 2 m.
The transitive layer represents the original buffer protecting permafrost from spasmodic thawing because of its high ice content. Thawing of this ice-saturated layer cause processes of surface subsidence and thermokarst development.
This layer periodically becomes a part of a soil profile. Organic substances penetrating from overlying soil horizons are under specific decomposition conditions. pH is often higher up to alkaline values comparing to upper soil horizons. Carbon content preserved in this permafrost layer should be also accounted while modeling climate change scenarios.

Artem Khomutov

Landscape controls of surface processes on Yugorsky Peninsula coast

Landscape studies are undertaken to reveal the correlation of environmental features and coastal dynamics on Yugorsky peninsula coast.
Prior to the field study main classes were subdivided on a satellite image Landsat 7 ETM+ with 15 m resolution in one panchromatic band using ERDAS software. Characteristics of landscape units related to twenty five identified classes were based on field studies during the three years (2005-2007). They included descriptions of landforms, vegetation, active layer deposits and depths.
Analysis of the bluff-edge landscapes gives some indirect retreat rate dependence on landscape controls. For example, gentle hummocky boggy/wet slopes with herbs-sedge-moss or herbs-shrub-moss complexes are the least persistent to the bluff edge retreat.

Ivan Kopytov

geoecological conditions Forming of low accumulative areas in Kara sea coast.

Low accumulative areas of the Kara are the area of recent permafrost forms. In 2006-2007 integrated studies were in Western Taimyr and Western Yamal, which include: drilling two boreholes with installed loggers on each area (oneyear term regime will be receipt next summer. Data is taking every four hours); characterization of differents soils and vegetation covers of that areas. In Western Yamal low accumulative areas are saline soil and vegetation covers in contrast to free-salined Western Taymyr landscapes.

Christine Kroisleitner

PERSON – Permafrost Monitoring Sonnblick (Austria)

W. Schöner, C. Kroisleitner

The installation of a Permafrost Monitoring on Sonnblick started in 2006. Its aim is to find permafrost-effective factors (characteristics of snow cover, exposition, shading effects) to get to know the spatial distribution of permafrost and further changes in permafrost extent caused by climate warming.
At the time there are two sites, where BOT and BTS are measured. First results showed a very heterogeneous permafrost-distribution on a small scale with distinctive varieties depending on their exposition. Additionally the network is supplemented by a close observation of the Sonnblick summit composed of three boreholes for temperature and geophysical measurements.

Anna Liljedahl

Active layer spatial distribution of thermal properties, soil type and moisture, Barrow, Alaska

In late September 2007, 140 soil thermistors and 37 soil moisture sensors were installed across a polygon and drained thaw lake basin. During the installation, thermal conductivity, diffusivity, and heat capacity was measured using a KD2Pro sensor in the different soil layers. Samples were collected for water content and bulk density analysis. The purpose of the project is to study the spatial and temporal distributions of the thermal and hydrological regime in the field, and the effect of their geographical representation on hydrolocal and thermal modeling.

Karianne Lilleøren

Little Ice Age and 20th century dynamics of the Omnsbreen glacier, southern central Norway.

“Omnsbreen” is a small (< 0.5 km2) glacier situated app. 100 m below the regional ELA in the central southern region of Norway. The local ELA depression is due to accumulation of wind redistributed snow. During the “Little Ice Age” the glacier covered an area of app. 6 km2 and had a different response to climate than today, as a consequence of the very different geometry it then possessed. Sporadic permafrost is found in the area, but is not thought to have an influence of the glacier’s existence and dynamics today.

Saara Lind

Spatial variations of methane fluxes in tundra landscape

We studied a peat plateau complex with active thermokarst and adjacent mineral tundra located in Northern Russia during the growth season 2007. We measured methane flux using closed chamber method from 10 dominant tundra vegetation types presenting large variation in productivity, water table level, peat depth and depth of the active layer. Methane fluxes were also measured from thermokarst lakes with floating chambers. The environmental factors controlling the fluxes were monitored throughout the season. First results show that methane flux varies largely from small uptake in dry surfaces to high fluxes from tundra wetlands.

Alexey Lupachev

Pedogenic features in the upper layers of permafrost.

The structure and genesis of so-called “transient” layer are closely connected with different processes of pedogenesis. The above-permafrost soil horizons and this layer form the most complex zone in vertical and horizontal extension. Thick fluxes of coarse organics were obtained within the above-permafrost horizons and transient layer. The topography of permafrost surface nanorelief directs on the existence of these stable streams of matter migration and accumulation. The concentration of organic carbon in this zone is frequently more, than in the surface horizons. So, in the conditions of possible climate warming it can be included into the carbon cycle again.

Anne Morgenstern

Structures of permafrost degradation as indicators for environmental variations – remote sensing studies on Earth and on Mars

Structures of permafrost degradation play a major role in investigating the processes and evolution of landscape changes in periglacial regions due to climatic variations. The north Siberian Lena Delta serves as a key region for studying terrestrial thermokarst. Although environmental conditions in the Siberian Arctic and on Mars are substantially different, e.g. with respect to the hydrological regime, process mechanisms studied in terrestrial periglacial regions can also reveal insides into the development of Marsian permafrost features.

Maija Repo

Spatial variations of methane fluxes in tundra landscape

See abstract by Saara Lind

Torsten Sachs

Methane Emission from Samoylov Island, Lena Delta

Arctic tundra has been a carbon sink throughout the Holocene. However, large uncertainties about the current and future contribution of these environments to the global carbon cycle remain especially with regard to methane emissions. Eddy covariance measurements of methane flux were carried out in northern Siberian wet polygonal tundra during 122 days covering the entire growing season in 2006. The study site was located in the zone of continuous permafrost in the southern part of the Lena River Delta. The landscape scale methane budget is presented along with environmental controls on methane emission.

Julia Stanilovskaya

Grounds for selection of representative permafrost monitoring sites in Northern Transbaykalia.

The territory of Northern Transbaykalia is characterized by mottled permafrost condition. The author proposed criteria to estimate the representativeness of each observed site. The author worked out the middle-scale landscape and geomorphological maps and also determined the altitudinal and spatial limits of prevailing landscapes. To assess the priority of each monitoring site, the accessibility of the site and the status of the borehole were also taken into account.

Roy Shirocov

GIS-oriented bathymetric and bottom temperature Maps

Mapping of the offshore and coastal permafrost probably is the main problem in planning studying process of shelf oil-and-gas deposits. To solve part of this problem, we tried to make bathymetric and temperature GIS of costal and offshore permafrost in Barents and Kara Seas. These data were combined within a database (or GIS-system). Oceanographic sources are the main for these maps. Bottom temperature data presented in this GIS-system were collected by ocean research organisations in Russia, the USA, the United Kingdom, Germany, Norway, and Poland for the Barents, Kara and White Seas region. Recently declassified naval data from Norway, the USA, and the UK are also included. More than 1 000 000 oceanographic stations containing temperature and/or seawater salinity data were originally selected. After correcting errors and eliminating duplicates, data from 206 300 checked stations were placed in the map database. In addition, temperature and salinity measurements were interpolated to the following standard horizons: 0, 25, 50, 100, 150, 200, 250, 300 m, and bottom. This atlas covers the 100-year period from 1898 to 1998 and is, to date, the most complete oceanographic data collection for these Arctic shelf seas. This data set is complemented by more than 9 000 measurements of sea surface temperature, which were recently digitized from ship logbooks. They cover the same geographical area within the time period 1867–2004. This data helped in the creation of maps of depth and bottom temperature of the Barents and Kara seas. These maps form only a part of the GIS project.

Marina Tishkova

Current changes in permafrost landscapes of middle taiga subzone.

It is important to identify types of permafrost landscapes in terms of their stability in conditions of unstable climate to be able to forecast future changes, elicit destabilizing conditions for human activities, and forecast natural cataclysms. We started from studying changes in elemetary landscapes. Responses to the climate change that are visible already and will be intensifying in the future include increasing rock instability, exhaustion of ground waters in stony rivers, and others, however solifluction is the most important and a large-scale response. It is a trigger for other natural processes.

David Tomé

Thermal behaviour of active layer of permafrost in Livingston and Deception Islands

During the last seven years, The project PERMAMODEL have installed and kept a set of experiences for the monitoring of active layer of permafrost in Livingston and Deception Island (South Shetland Islands, Maritime Antarctic).
Most important experiences are two 1-2 meters deep boreholes in Livingston at Incinerador and Sofia Hill and automatic weather station situated near of BAE (Spanish Antarctic Base) Gabriel de Castilla in Deception Island and Juan Carlos I in Livingston Island.
During the last two years, we have placed one CALM-S site in Deception. This CALM-S site is one hectare (100 x 100 m)has been installed in Crater Lake at 90 m asl, in flat terrain with volcanic debris and ashes on the surface and ground and air temperature monitoring complement the mechanical probing and snow layer monitoring. Other two CALM-site are in Livingston Island: Reina Sofia Hill at 275 m asl and Ramos Col at 150 m asl.
The data obtained after several years of monitoring will allow a characterization of the energy exchange mechanism between ground and atmosphere in the CALM-S site.

Pablo Wainstein

Importance of glacier – permafrost interactions in the preservation of a proglacial icing: Fountain Glacier, Bylot Island, Canada

Pablo A. Wainstein, Brian J. Moorman, Ken Whitehead

Fountain Glacier on Bylot Island, Canada is hydrologically unique for the large perennial icing that has formed in its proglacial valley. It is hypothesized that this icing holds information on the glacier hydrology and the role permafrost has on the hydrological system.
A spring first observed in 1991 down valley from Fountain Glacier is thought to be supplied by subglacial water. Since then the glacier has experienced retreat, the spring ceased its activity and the icing begun a slow thinning.
The hypothesis that pressurized subglacial storage is responsible of supplying water to the icing through a proglacial talik is tested.

Sebastian Wetterich

Studies on freshwater ostracods: A new proxy for the permafrost palaeo-archive

Numerous studies have already focused on Arctic permafrost deposits with well preserved remains of palaeo-indicative fossils. Freshwater ostracods were just recently introduced as a new proxy for the permafrost palaeo-archive. In order to apply modern data to the fossil record we studied the present-day relationships between the environmental setting and the geochemical properties (element ratios and stable isotopes) of host waters and ostracods from Arctic periglacial environments in the Lena River Delta (Laptev Sea). Our results strengthen the value of freshwater ostracods as palaeoindicators from permafrost deposits.

Mingyi Zhang

Laboratory study on cooling effect of crushed-rock embankment under impermeable boundary in cold regions

To investigate the cooling effect of the crushed-rock embankment on the underlying soil in cold regions when it is fully covered, a case of porous media was examined through the

laboratory test. The results show that the crushed-rock embankment with impermeable boundaries still has a good cooling effect on the underlying permafrost. Furthermore, by analyzing the changing correlation between the top temperature and the temperature difference through the top and bottom of the crushed-rock layer, taking consideration of the temperature fields in the crushed-rock embankments, we not only prove the existence of nature convection in the porous embankment but also find its convective law.