Summary of the Russian contribution to the LCLUC project

M.O. Leibman, A.A.Gubarkov, O.V.Khitun, A.V. Khomutov, N.G.Moskalenko, P.T.Orekhov

Dmitry Drozdov, Olga Ponomareva, Ksenia Ermokhina, Nataliya Ukraintseva, Ivan Gameev, Andrei Tarasov, Andrei Ermak, Damir Mullanurov

ECI's objective: correlate parameters of vegetation both descriptive and numerical to permafrost parameters, such as active-layer depth and ground temperature. Obtain whatever possible information in the remote areas of Eurasian Arctic.

Third Yamal Land-Cover Land-Use Change Workshop
Arctic Centre, Rovaniemi, Finland – 19-21 March 2012

ECI TASKS

1. General physiographical information for the Eurasian Transect.
2. Summarizing existing information on vegetation, soils and permafrost for the transect locations and Yamal as a whole.
3. Organizing field studies and assisting in fieldwork.
4. Performing permafrost studies and revisiting locations to download monitoring data.
5. Performing soil studies.
6. Performing geobotanical studies.
7. Organizing the First Yamal Land-Cover Land-Use Change Workshop in Moscow, Russia (January 2008).
8. Translating from Russian, publishing and presenting results at Russian and International level.

ECI TASKS

General physiographic information for the Eurasian transect was presented in Rovaniemi in 2009, and is updated now to cover latest location at Franz Joseph land. This will be reported by Pavel Orekhov later today.

Transect covers the distance of 1880 km from Nadym (65°18'51"N, 72°51'43"E) to FJL Hayes Island (80°35'56"N, 57°54‘20"E):

LOCATIONS	DISTANCE, km
Nadym - Laborovaya	340
Laborovaya – Vaskiny Dachi	290
Vaskiny Dachi – Kharasavey	125
Kharasavey – Bely Island	260
Bely Island – Hayes Island (Krenkel)	865

ECI TASKS

Summarizing existing information on vegetation, soils and permafrost for the transect locations and Yamal as a whole.

There are dozens of monographs and hundreds of papers only on permafrost and vegetation of Yamal due to the interest of the state and companies to the development of gas fields. There are practically no permafrost publications on the Arctic islands except for modeling results shown on the geocryological maps.

Entire list will be attached to the final report. Main monorgaphs are:

Trofimov V.T., ed. 1975. Yamal Peninsula. Moscow, Moscow University Press.

Natural conditions of the Baydarata Bay 1997. Moscow, GEOS publisher.

Baulin V.V. 1996. Engineering-geological monitoring of Yamal gas fields. Volume 2. Geocryological conditions of Bovanenkovo gas field. Tumen, IPOS SB RAS.

Ershov E.D. 1989. Geopcryology of the USSR. West Siberia. Moscow, Nedra publisher.

Baulin V.V. 1985. Perennially frozen ground of of the oil-gas provinces of the USSR. Moscow, Nedra Publisher.

Baulin V.V. Ed.-in-chief. 2003. Geocryological conditions of Kharasavei and Kruzenshtern gas condensate fields (Yamal Peninsula). Moscow, GEOS publisher.

Melnikov E.S., Kritsuk L.N., Pavlov A.V. 1990. Geocryological and engineering-geological problems of Yamal development. Moscow, VNIEMS publisher.

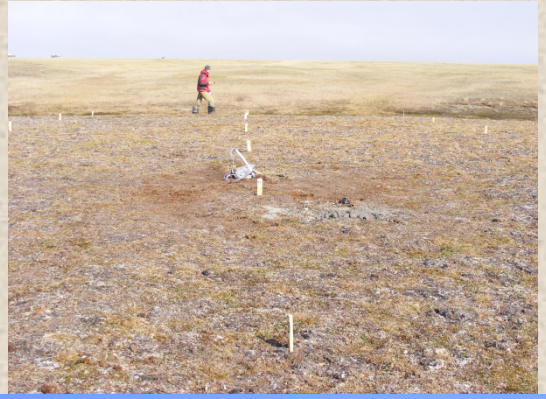
ECI TASKS

Organizing field studies and assisting in field work

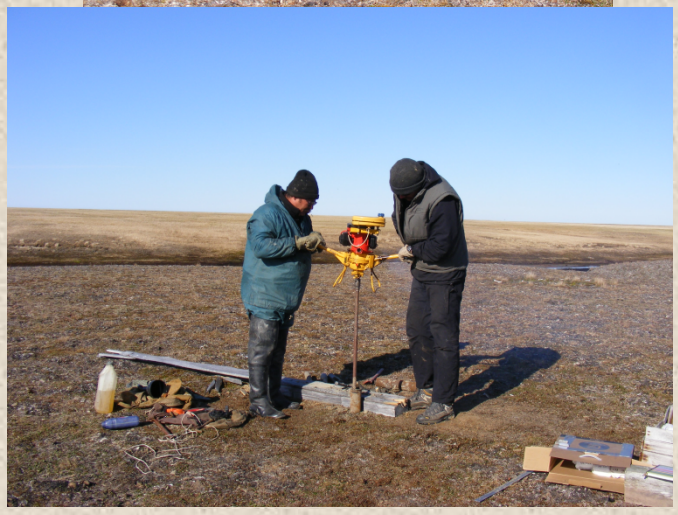
Third Yamal Land-Cover Land-Use Change Workshop
Arctic Centre, Rovaniemi, Finland – 19-21 March 2012

ECI TASKS

Performing permafrost studies and revisiting locations to collect data.



Expanding CALM and TSP



ECI TASKS

Performing soil studies

This set of data was obtained by a unique soil scientist Gosha Matyshak at all the sites. He is practically the only one in ECI who worked at all the locations and sites. He will present his data later today.

ECI TASKS

Performing geobotanical studies.

In addition to project's instrumental measurements, there were also regular descriptive studies by Nataliya Moskalenko at most sites, Olga Khitun at Bely island + previous experience at other sites, and Ksenia Ermokhina at Vaskiny Dachi and Kharp.

Result of this study is correlation of active-layer depth with the vegetation complex. Including morphological parameters, such as moss thickness and shrub height. Olga will probably cover this topic. Most detailed work was done in Nadym, Vaskiny Dachi and Bely island. This is something we are going to concentrate on in future.

ECI TASKS

Organizing a Workshop (First Yamal Land-Cover Land-Use Change Workshop Moscow, Russia – January 2008).

Total 21 participant directly involved in the project.
Seven participants from Russia directly involved in the project: Pavel Orekhov (1); George Matyshak (2); Olga Ponomaryova (5); Artem Khomutov (6); Nataliya Moskalenko (7); Anatoly Gubarkov (9); Marina Leibman (11).
Total about 20 participants from Russia – observers.

ECI TASKS

Translating from Russian (PhD dissertations).

At the time of project 3 candidate dissertations were defended partly covering the topic of the project.

Artem Khomutov included his study of active-layer depth/vegetation indices correlation, mainly based on Vaskiny Dachi CALM site which was described in most detail with NDVI-LAI-Geobotany description in addition to our long-term active-layer monitoring.

This will be presented at Artem's poster.

Ksenia Ermokhina included Vaskiny Dachi and other Yamal sites in her dissertation. Though it is not based on the project data, it is a useful contribution and will be presented today as well.

Anatoly Gubarkov is our main expert in gas-field development. His work is also not directly related to the project, but he collected information on the development of the area and shared it with the project.

All the texts provided by Russian participants and resulting from literature review of Russian publications were in one or the other way translated from Russian and thus familiarize foreign party with the results obtained in Russia for decades of Yamal development.

ECI TASKS

Publishing and presenting results at Russian and International level.

There are lists of publications directly resulting from the project, and those dealing with the same topic. Full list will be included in the final report. Most important are at the next 2 slides.

Mainly these are conference materials, there is a paper in Russian included in a volume of Russian IPY contributions.

Two papers are submitted to the TICOP 2012 in Salekhard.

LIST OF ECI PUBLICATIONS

LCLUC PUBLICATIONS

Khomutov A.V., Leibman M.O., Moskalenko N.G., Epstein H.E. Correlation between active layer depth and vegetation parameters at Vaskiny Dachi, Central Yamal, Russia // Thermal state of frozen ground in a changing climate during the IPY. Abstracts from the 3rd European Conference on Permafrost, 13 – 17 June 2010, The University Centre in Svalbard, 2010, P. 227.

Leibman M.O., Epstein H.E., Khomutov A.V., Moskalenko N.G., Walker D.A. Relation of active layer depth to vegetation on the Central Yamal Peninsula, Russia // Extended abstracts of the 9th International Conference on Permafrost, 29 June – 3 July 2008, University of Alaska Fairbanks, USA, 2008, P.177–178.

Leibman M.O., Khomutov A.V., Orekhov P.T., Gameev I.A., Gubarkov A.A., Walker D.A. Spatial distribution of the active layer depth along the Yamal transect // Thermal state of frozen ground in a changing climate during the IPY. Abstracts from the 3rd European Conference on Permafrost, 13 – 17 June 2010, The University Centre in Svalbard, 2010, P. 226.

Orekhov P.T., Khomutov A.V., Leibman M.O., Khitun O.V. Relation of vegetative cover and active layer depth in the arctic tundra of Bely island on new CALM grids // Thermal state of frozen ground in a changing climate during the IPY. Abstracts from the 3rd European Conference on Permafrost, 13 – 17 June 2010, The University Centre in Svalbard, 2010, P. 106.

Лейбман М.О., Москаленко Н.Г., Орехов П.Т., Хомутов А.В., Гамеев И.А., Хитун О.В., Уолкер Д., Эпштейн Х. Взаимодействие криогенных и биотических компонент геосистем в криолитозоне Западной Сибири на трансекте «Ямал». Полярная криосфера и воды суши. - М.: Paulsen, 2011. -С. 171-192.

Лейбман М.О., Хомутов А.В., Орехов П.Т., Хитун О.В., Эпштейн Х., Фрост Дж., Волкер Д.А. Зональность глубины сезонного протаивания вдоль Ямальской трансекты // 10-я Международная конференция по мерзлотоведению «Ресурсы и риски регионов с вечной мерзлотой в меняющемся мире», Салехард, 2012 (в печати)

Хитун О.В., Ермохина К.А., Лейбман М.О., Хомутов А.В. Растительные индикаторы мощности сезонно-талого слоя на о.Белом // Матер. Четвертой конференции геокриологов России. МГУ им. М.В. Ломоносова, 7-9 июня 2011 г, Т.3, М., Университетская книга, 2011, С. 350–356.

LIST OF ECI PUBLICATIONS

OTHER YAMAL PUBLICATIONS

Gubarkov A.A., Leibman M.O. Interrelation of Cryogenic and Hydrologic Processes on Small Streams and Catchments of Central Yamal // Proc. of the 9th International Conference on Permafrost, 29 June – 3 July 2008, University of Alaska Fairbanks, USA, 2008,

Khomutov A.V., Leibman M.O. Landscape pattern and cryogenic landsliding hazard analysis on Yamal peninsula, Russia // Thermal state of frozen ground in a changing climate during the IPY. Abstracts from the 3rd European Conference on Permafrost, 13 – 17 June 2010, The University Centre in Svalbard, 2010, P. 254.

Khomutov A.V., Leibman M.O., Moskalenko N.G., Epstein H.E. Correlation between active layer depth and vegetation parameters at Vaskiny Dachi, Central Yamal, Russia // Thermal state of frozen ground in a changing climate during the IPY. Abstracts from the 3rd European Conference on Permafrost, 13 – 17 June 2010, The University Centre in Svalbard, 2010, P. 227.

Leibman M.O., Epstein H.E., Khomutov A.V., Moskalenko N.G., Walker D.A. Relation of active layer depth to vegetation on the Central Yamal Peninsula, Russia // Extended abstracts of the 9th International Conference on Permafrost, 29 June – 3 July 2008, University of Alaska Fairbanks, USA, 2008, P.177–178.

Leibman M.O., Ukraintseva N.G. Mechanisms and geoecological consequences of cryogenic landslides in the area of marine sedimentation // Geophysical Research Abstracts, Vol. 11, EGU2009-3980, 2009, EGU General Assembly 2009

Leibman, M.O., Khomutov A.V. 2009. Environmental controls of the thaw depth and rate of thaw under climate fluctuations 2009 AAG Annual Meeting, March 22-27, Las Vegas, NV.

Vasiliev A.A, Leibman M.O., Moskalenko N.G. Active Layer Monitoring in West Siberia under the CALM II Program // Proc. of the 9th International Conference on Permafrost, 29 June – 3 July 2008, University of Alaska Fairbanks, USA, 2008, Vol. 2. P.1815-1820.

Губарьков А.А. Лейбман М.О., Хомутов А.В. Криогенные процессы в естественных и техногенных условиях на Харасавэйском месторождении // Известия высших учебных заведений. Нефть и газ. №3, 2012 (*в печати*)

Губарьков А.А. Экзогенные геологические процессы в зоне проектируемого газопровода "Бованенково - Ухта" на полуострове Ямал // Известия высших учебных заведений. Нефть и газ. 2011, №4, С. 30-35.

Губарьков А.А., Лейбман М.О. Влияние криогенных образований на типы стока в бассейнах малых рек Центрального Ямала (полигон "Васькины Дачи") // Криогенные ресурсы полярных и горных регионов. Состояние и перспективы инженерного мерзлотоведения: Матер. Межд. конф. (Тюмень, 21-24 апреля 2008), Тюмень, 2008, С. 390–393.

Губарьков А.А., Лейбман М.О. Чёткообразные русловые формы в долинах малых рек на Центральном Ямале - результат парагенеза криогенных и гидрологических процессов // Криосфера Земли. 2010. Т. XIV. № 1. С. 41-49.

Губарьков А.А., Лейбман М.О. Эрозионные процессы на поверхностях скольжения криогенных оползней (полигон "Васькины Дачи") // Криогенные ресурсы полярных регионов: Матер. Межд. конф. (Салехард, 17-21 июня 2007), Т.II, Пущино, ПНЦ РАН, 2007, С. 136–138.

Ермохина К.А. Фитоиндикация экзогенных процессов в тундрах Центрального Ямала: Автореф. дис. … канд. геогр. наук. М., МГУ, 2009, 24 с.

Ермохина К.А., Мяло Е.Г. Влияние дефляции на растительный покров Центрального Ямала // Вопросы географии, Изд.: РГО, в печати.

Лейбман М.О., Кизяков А.И. Криогенные оползни Ямала и Югорского полуострова. Типография Россельхозакадемии, М. - 2007. – 206 с.

Хомутов А.В. Оценка оползневой опасности в типичной тундре Центрального Ямала // 10-я Международная конференция по мерзлотоведению «Ресурсы и риски регионов с вечной мерзлотой в меняющемся мире», Салехард, 2012 (в печати)

Хомутов А.В. Связь естественных криогенных процессов с динамикой тундровых ландшафтов на примере подзоны типичных тундр Карского региона: Дис. … канд. геол.-мин. наук. Тюмень, ИКЗ СО РАН, 2010, 183 с.

Хомутов А.В., Лейбман М.О. Вероятность проявления криогенного оползания в типичной тундре Центрального Ямала // Тезисы конференции по созданию программы Международного полярного десятилетия (4 – 7 октября 2010, Сочи), 2010, С. 63–64. (http://www.onlinereg.ru/ipy2010/Abstracts_ipy2010.doc).

Хомутов А.В., Лейбман М.О. Оценка оползневой опасности в типичной тундре (центральный Ямал) // Матер. Четвертой конференции геокриологов России. МГУ им. М.В. Ломоносова, 7-9 июня 2011 г, Т.2, М., Университетская книга, 2011, С. 348–355.

IDEAS FOR FUTURE

We collected data which need more attention in several directions:

- It is time to apply modeling to permafrost data.
- We should give more attention to correlation of vegetation and permafrost parameters. Add to understanding of vegetation/ landscape indicators of permafrost. Also in respect of modeling: result should be parameterization of ground covers as boundary conditions for permafrost modeling.
- Add more effort to correlation of remote-sensing and field data.
- Synthesize all said above in mapping by visualizing permafrost field and digital data in the form of several local and a regional permafrost maps.

Thank you for your attention