Meeting of Consultative Scientific Council “Skolkovo”

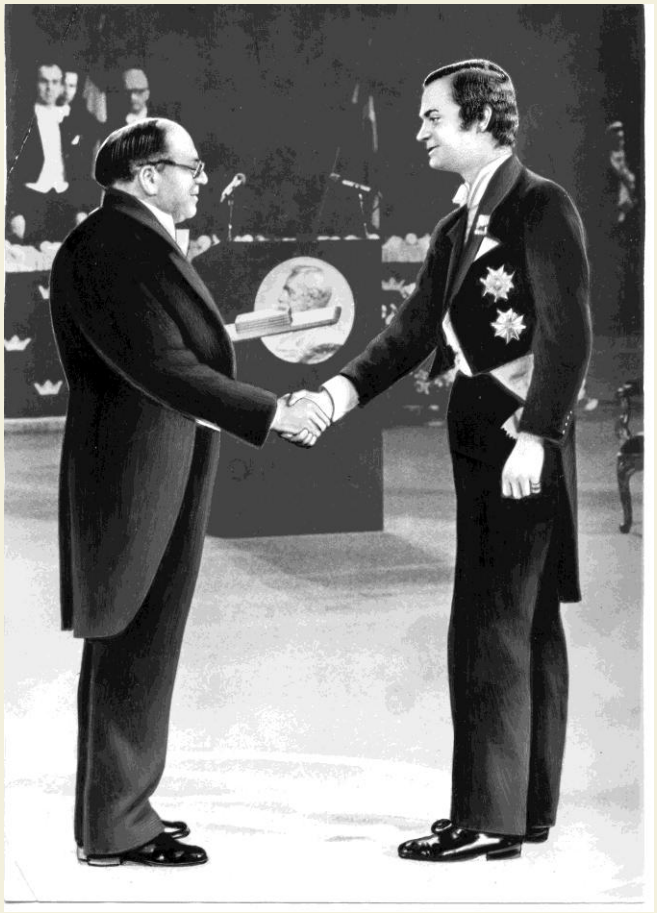
May 17-18, 2012 *Novosibirsk*

SIBERIAN BRANCH OF RUSSIAN ACADEMY OF SCIENCES: STATUS, RESEARCH AND DEVELOPMENT

Academician A.L. Aseev
Chair of Siberian Branch of RAS

RESEARH ACTIVITY OF SIBERIAN BRANCH OF RAS

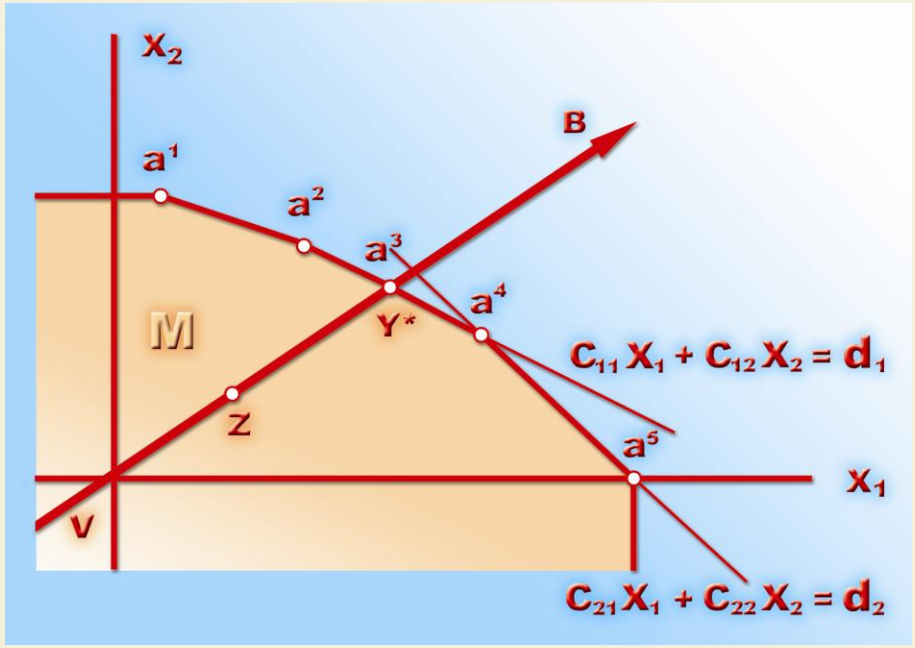
CREATING THE THEORY OF OPTIMAL RESOURCE ALLOCATION



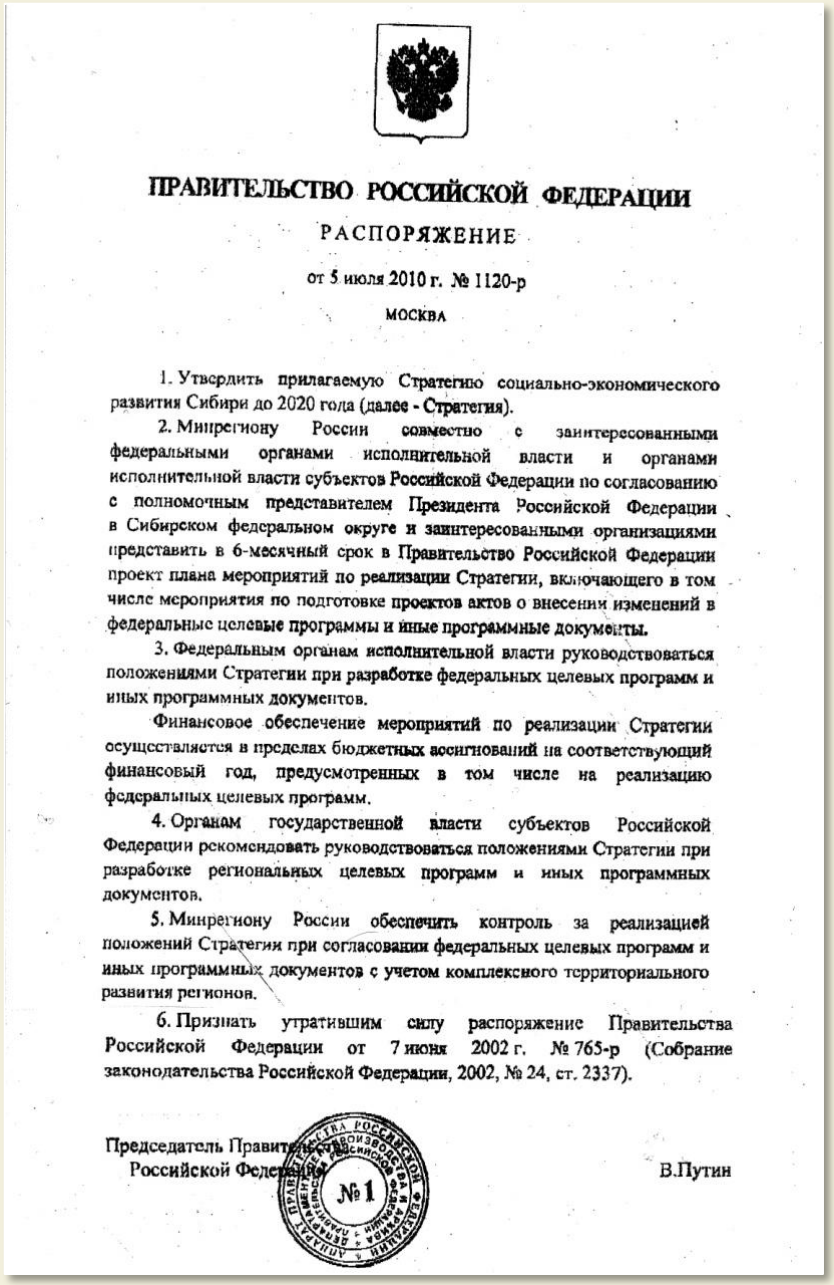
H.M. King Carl XVI Gustaf of Sweden awards the Nobel Prize in Economics to Professor L.V. Kantorovich, Member of the Russian Academy of Sciences, 1975

Professor L.V. Kantorovich has formulated a new class of problems – extremal optimization problems – and developed a method of solving such problems later called linear programming. Further development of this method and its application to macroeconomic problems produced the beginning of the theory of optimal planning.

Further results obtained by applying the theory of optimal planning and optimal use of non-renewable resources are based on Prof. Kantorovich's achievements.



Graphic interpretation for an optimal resource allocation problem



ПРАВИТЕЛЬСТВО РОССИЙСКОЙ ФЕДЕРАЦИИ

РАСПОРЯЖЕНИЕ

от 5 июля 2010 г. № 1120-р

МОСКВА

1. Утвердить прилагаемую Стратегию социально-экономического развития Сибири до 2020 года (далее - Стратегия).

2. Минрегиону России совместно с заинтересованными федеральными органами исполнительной власти и органами исполнительной власти субъектов Российской Федерации по согласованию с полномочным представителем Президента Российской Федерации в Сибирском федеральном округе и заинтересованными организациями представить в 6-месячный срок в Правительство Российской Федерации проект плана мероприятий по реализации Стратегии, включающего в том числе мероприятия по подготовке проектов актов о внесении изменений в федеральные целевые программы и иные программные документы.

3. Федеральным органам исполнительной власти руководствоваться положениями Стратегии при разработке федеральных целевых программ и иных программных документов.

Финансовое обеспечение мероприятий по реализации Стратегии осуществляется в пределах бюджетных ассигнований на соответствующий финансовый год, предусмотренных в том числе на реализацию федеральных целевых программ.

4. Органам государственной власти субъектов Российской Федерации рекомендовать руководствоваться положениями Стратегии при разработке региональных целевых программ и иных программных документов.

5. Минрегиону России обеспечить контроль за реализацией положений Стратегии при согласовании федеральных целевых программ и иных программных документов с учетом комплексного территориального развития регионов.

6. Признать утратившим силу распоряжение Правительства Российской Федерации от 7 июня 2002 г. № 765-р (Собрание законодательства Российской Федерации, 2002, № 24, ст. 2337).

Председатель Правительства Российской Федерации В.Путин

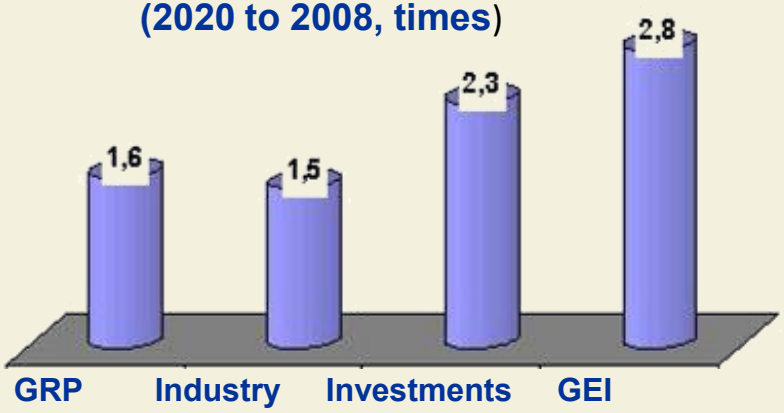
№ 1

Siberian Social and Economical Development Strategy for the Period to 2020. Approved by the Government of the Russian Federation, Directive No. 1120-p of July 5, 2010.

Siberian Social and Economical Development Strategy for the Period via 2020

The Siberian Social and Economical Development Strategy for the Period to 2020 includes the predictive estimates made by the Institute of Economics of SB RAS on the base of the project economy methodology and a set of the economic-mathematician models.

Dynamics of Key Development Indicators for Siberia
(2020 to 2008, times)



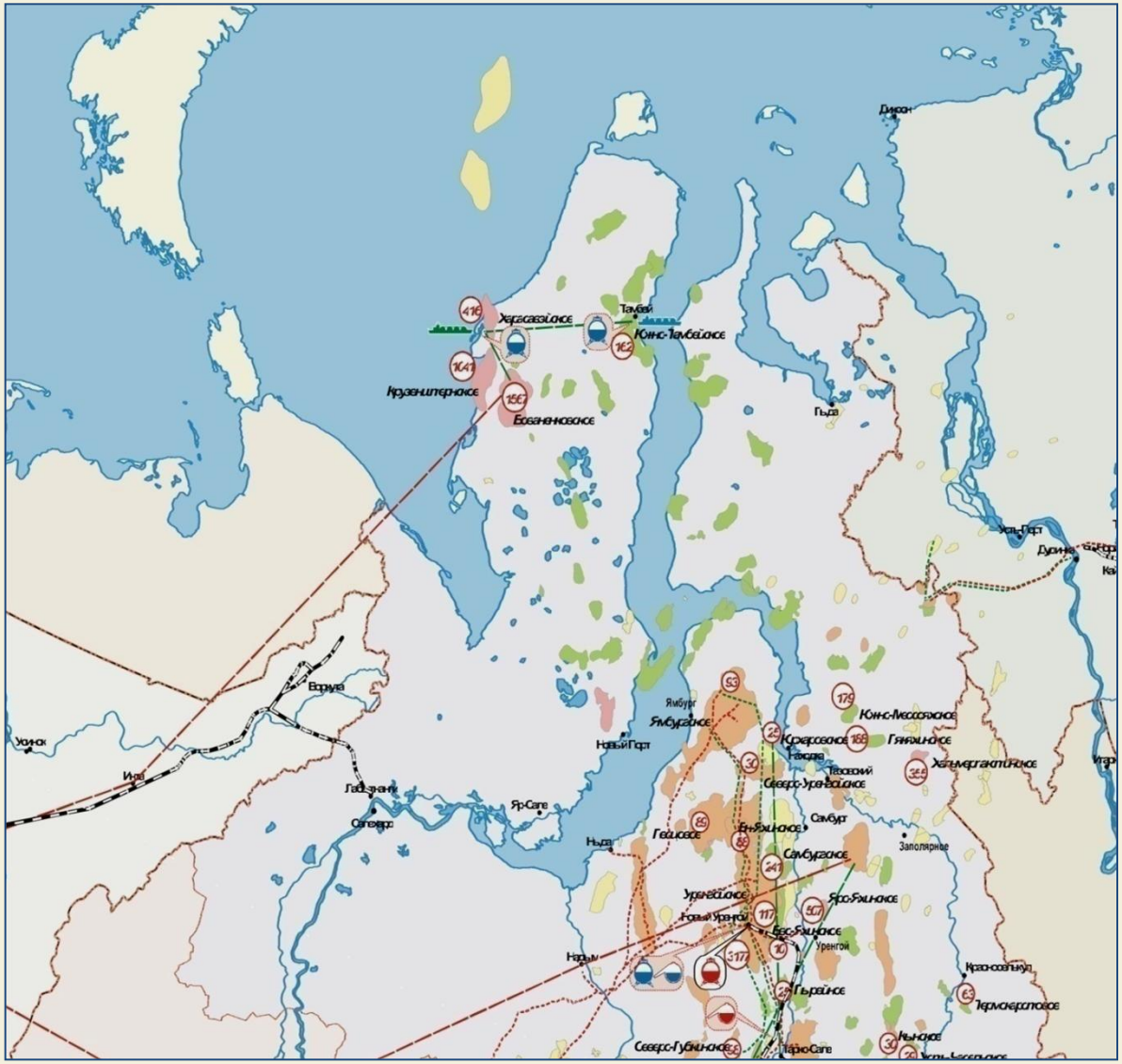
Growth of the Quality of Life and Living Standard (2020 to 2008, times)

Average wage	– 1,8
Incomes per capita	– 1,9
Human Development Index	– 1,2

Expected indicators of the Innovation System	2008	2020
High-tech sector in GRP, %	3	14 - 17
Number of international research centers	12	20 - 23
Number of advanced technologies created	93	340

Institute of petroleum and gas geology and geophysics SB RAS

Geological-economic evaluation was made for the area, and some proposals were presented for the oil and gas industry in the north of West Siberia, including the adjacent Arctic offshore areas.



It is expected that in 2015 total production of dry and wet in the northern areas of West Siberia will amount to 633.6 bln. м3; in year 2020 it will reach 692.3 bln. м3, and in 2030, 609.5 bln. м3.

Production output of methane homologs (ethane, propane, butane) will amount to 15 mln tons in 2015, 19 mln t, in 2020, and will be the same (19 mln t) in 2030.

All capital and operating costs in the period to 2030 will amount to over 41 trln Rubles (approximately 1.3 trln US Dollars).

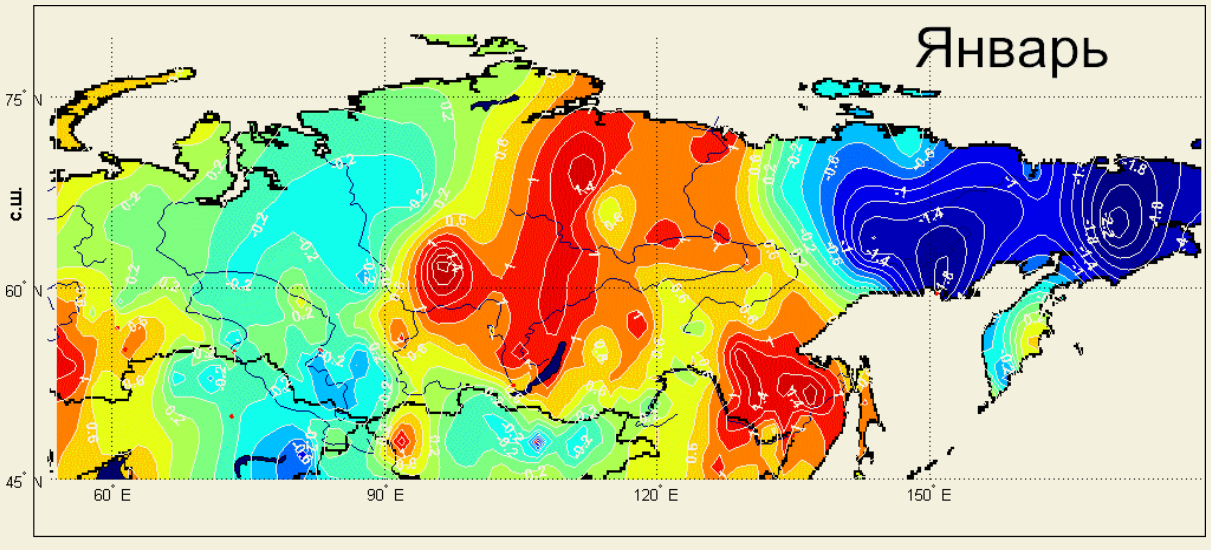
The budgets of all levels in the period to 2030 will be contributed to at least 46 trln Rb (approximately 1.5 trln US Dollars), including the federal budget - not less than 32 trln Rb, and the regional budget will increase by 6.8 trln Rb, whereas municipal budgets will gain at least 6.5 trln Rb

In March, 2010, and June, 2011, the offsite meetings of Presidium of SB RAS were held in Yamalo-Nenets Autonomous District, with participation of the administration of JSC "Gazprom" and "Gazpromdobycha Nadym" Ltd.

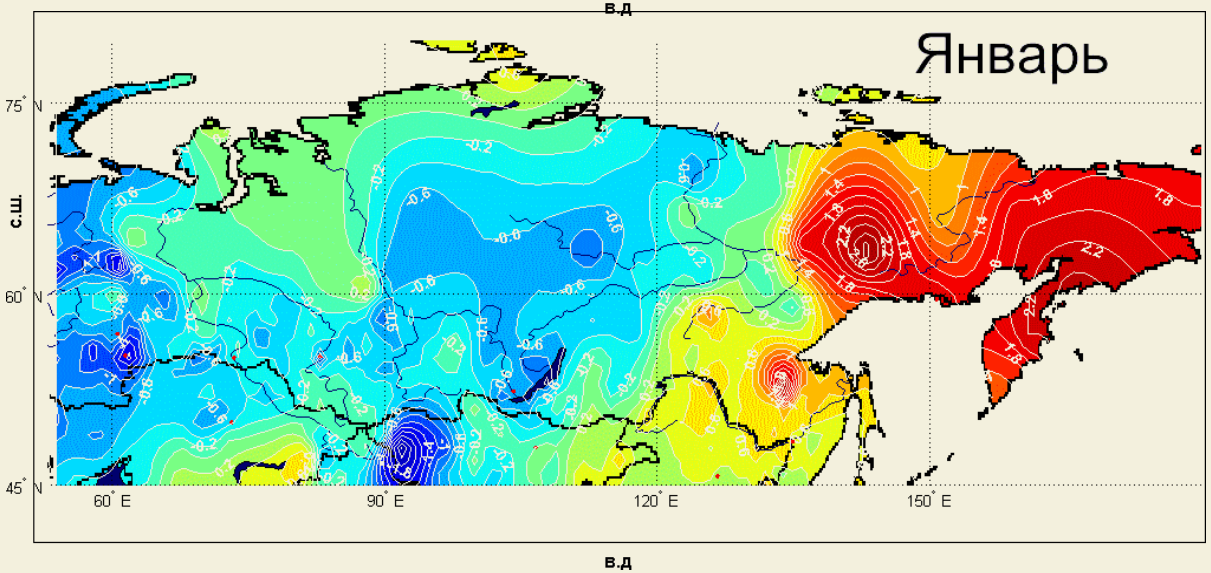
Research sessions and consultations were organized directly in the Engineering-Technical Center "Gazpromdobycha Nadym" and in Bovanenkovo, Kharasavei, Yamsovei, and Medvezhie gas fields.

Institute of Monitoring of Climatic and Ecological Systems SB RAS

The long-term observations show that *in the period of global warming of 1975-2005 the temperature in the Asian part of Russia grew for 1.05°C*, the mean annual pressure and precipitation decreased in both cold and warm seasons. The changes are related to the atmospheric circulation characterized by the increase in western transportation in the upper troposphere and decrease in the number of incoming cyclones, while their stay on the territory grows longer.



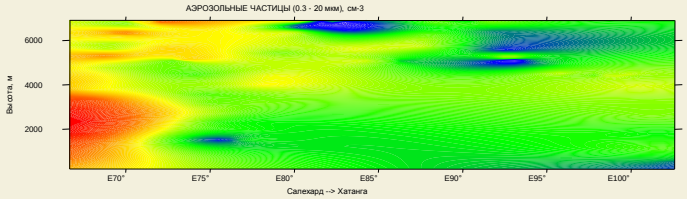
Seasonal course of linear trends of temperature
°C / 10 years

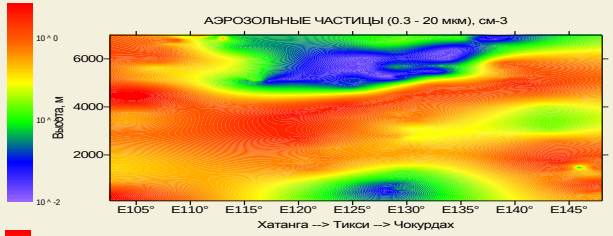


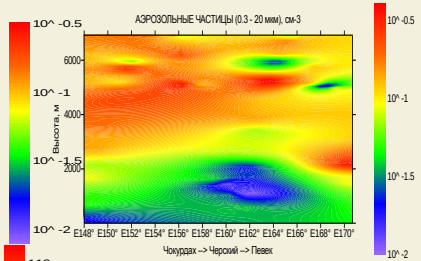
Seasonal course of linear trends of pressure
Hectopascal / 10 years

International project POLARCAT

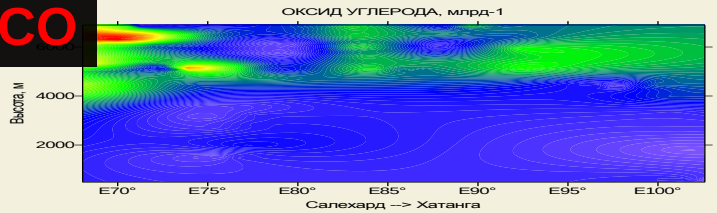
concentration of aerosol particles (0.3-20 mcm)

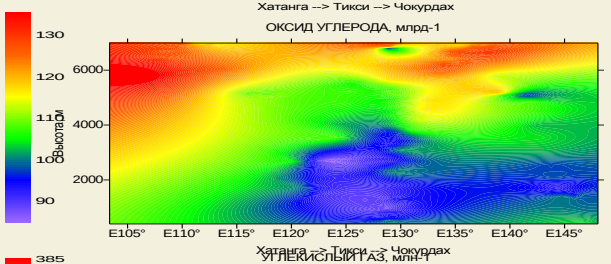


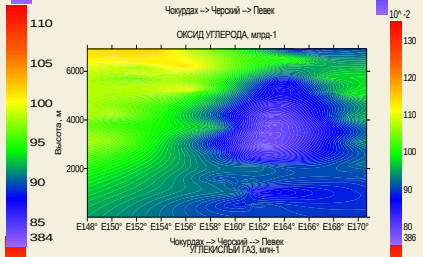




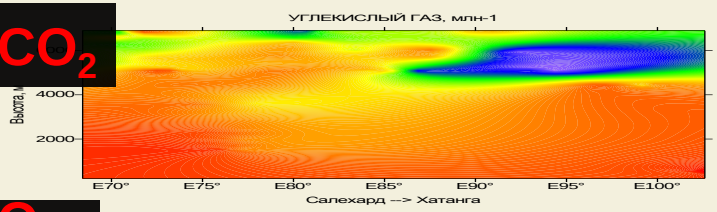
CO

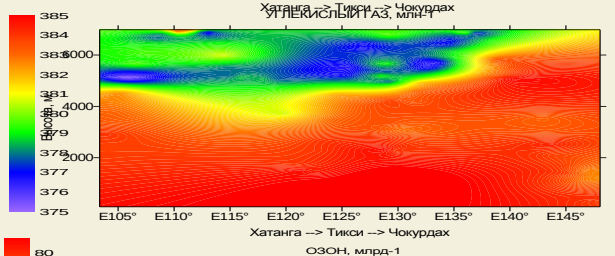


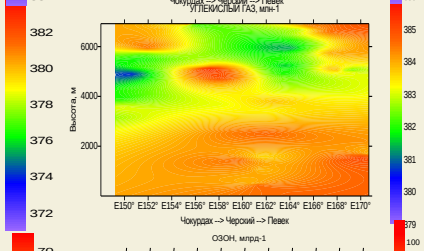




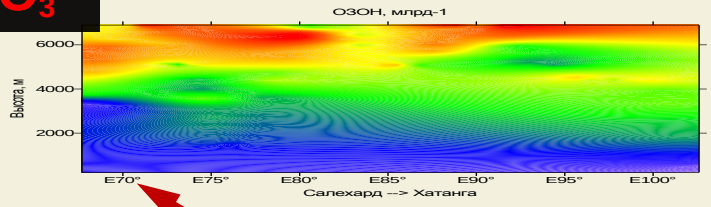
CO_2

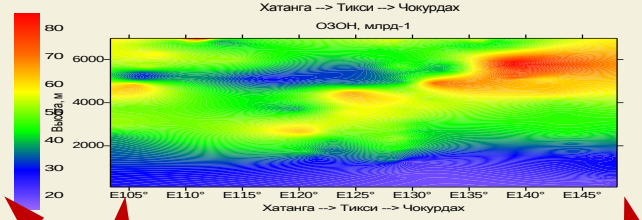


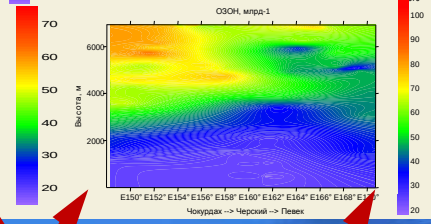


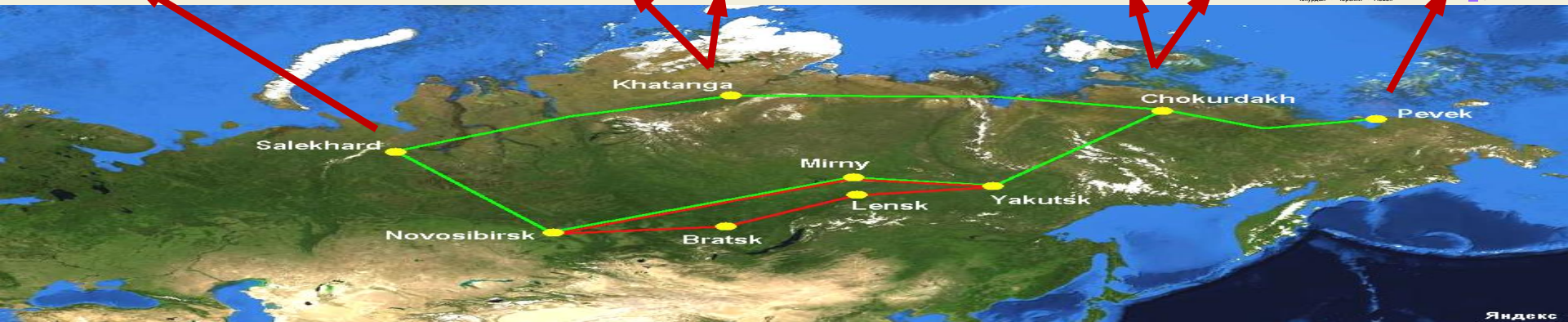


O_3

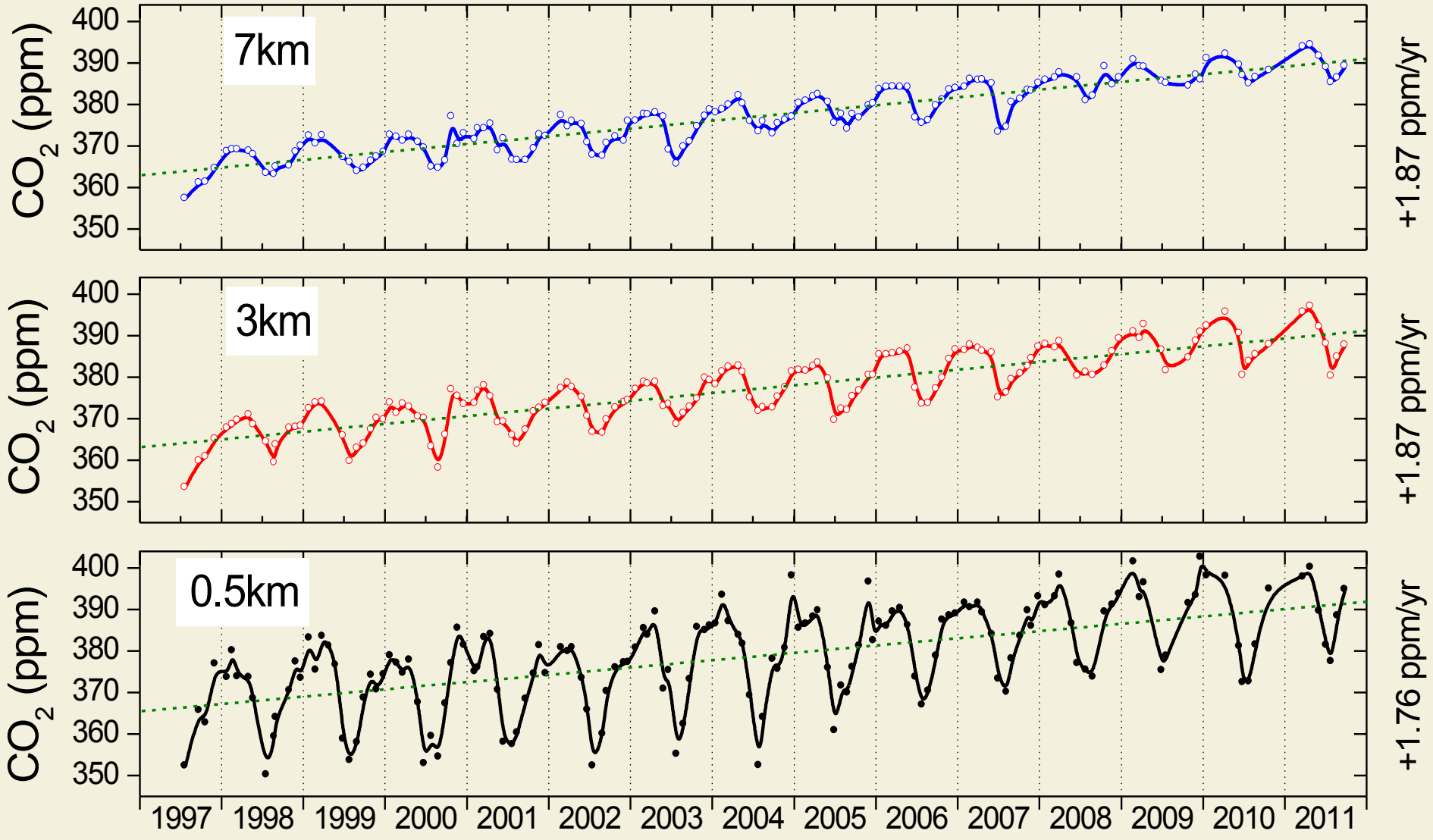








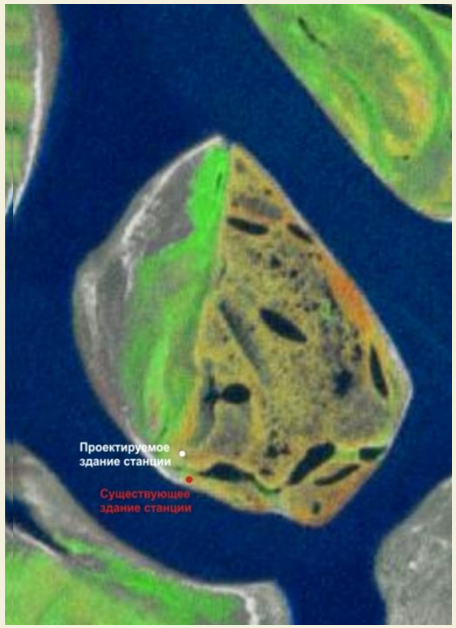
Long-term concentration of greenhouse gases: study of vertical distribution over Siberia



Prime Minister of Russian Federation V.V.Putin visiting the scientific station “Ostrov Samoilovskii” of the Russian-German “Lena” expedition

Mel’nikov Permafrost Institute SB RAS, Sakha Republic (Yakutia)

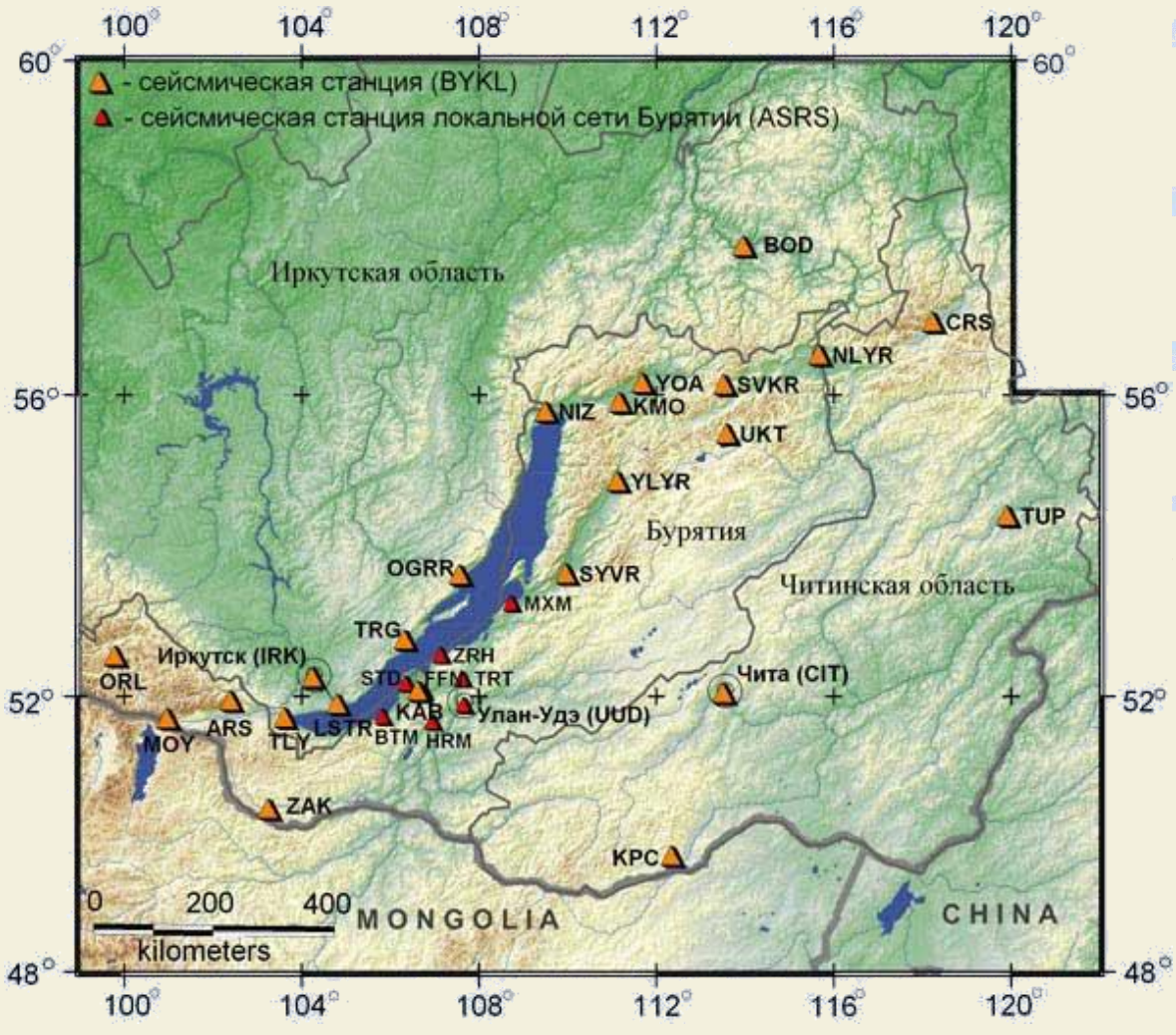
Existing scientific station and the work sites of the field groups



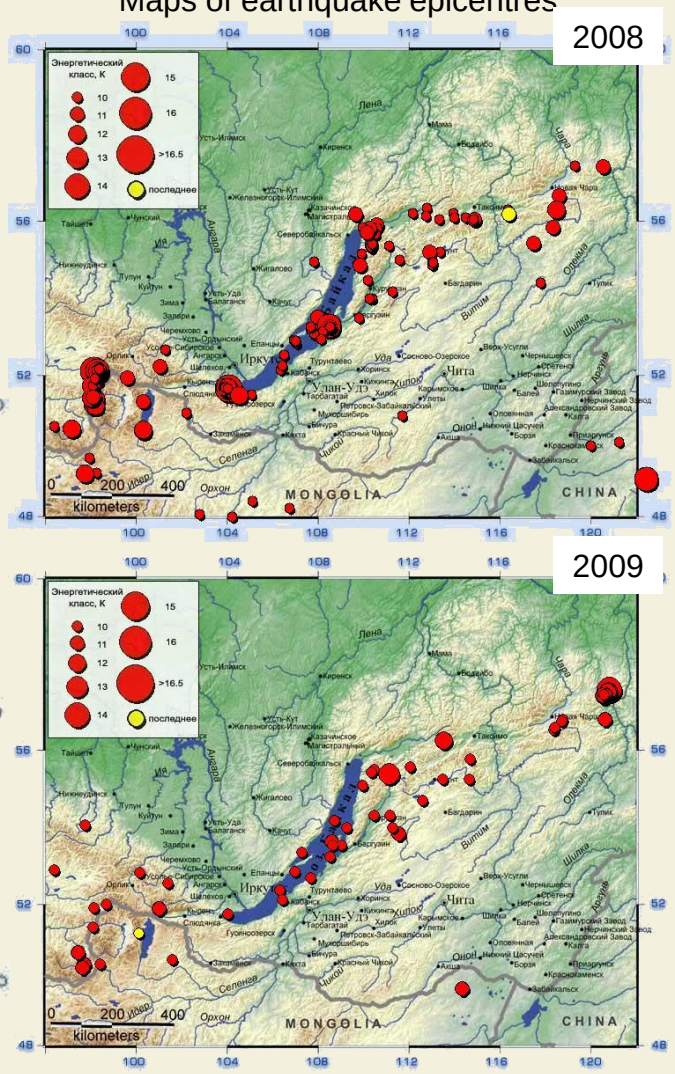
Fragment of space image. Samoilovsky Island, delta of the Lena River, 2000.

New scientific station

Network of seismic stations in Baikal region

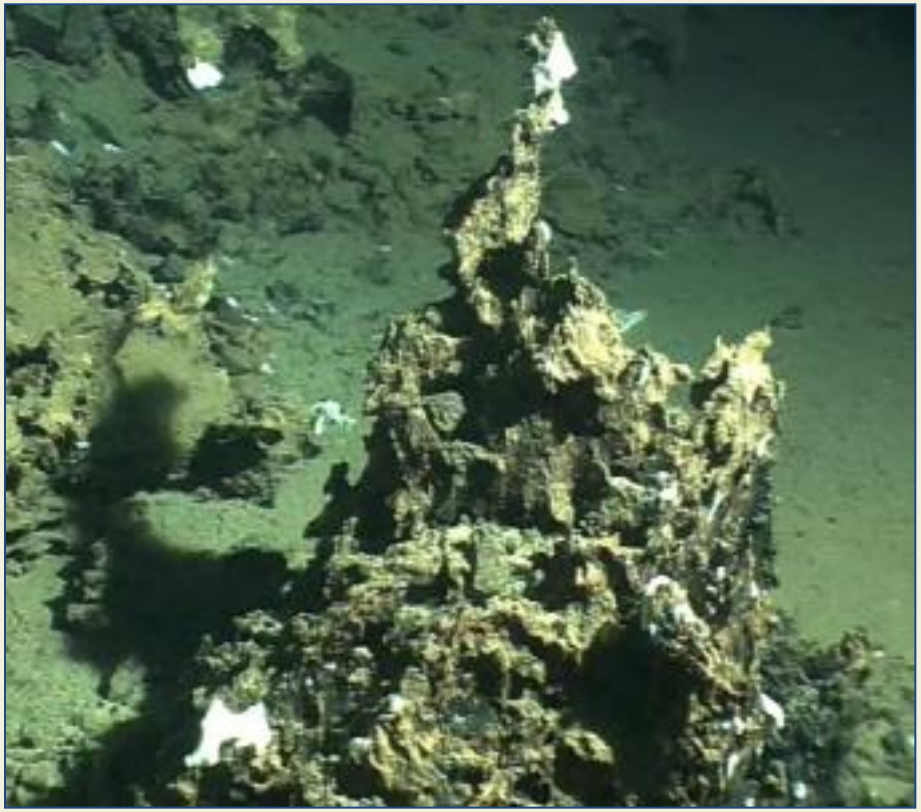


Maps of earthquake epicentres



Specialists of Geophysical Survey SB RAS accomplish the permanent **monitoring of seismicity in Baikal rift area** by unbroken observations on 30 stationary digital seismic stations (www.seis-bykl.ru). Network of seismic stations register about 700-800 earthquakes per month in the reviewed area.
The strongest earthquake of 2008 with Ms = 6.1 was registered on August, 27, 2008.

“MIR” SUBMARINES INVESTIGATIGATING BAIKAL LAKE



Oil seepage and bituminous deposits on the bottom of Baikal opposite the Gorevoy Utes Cape

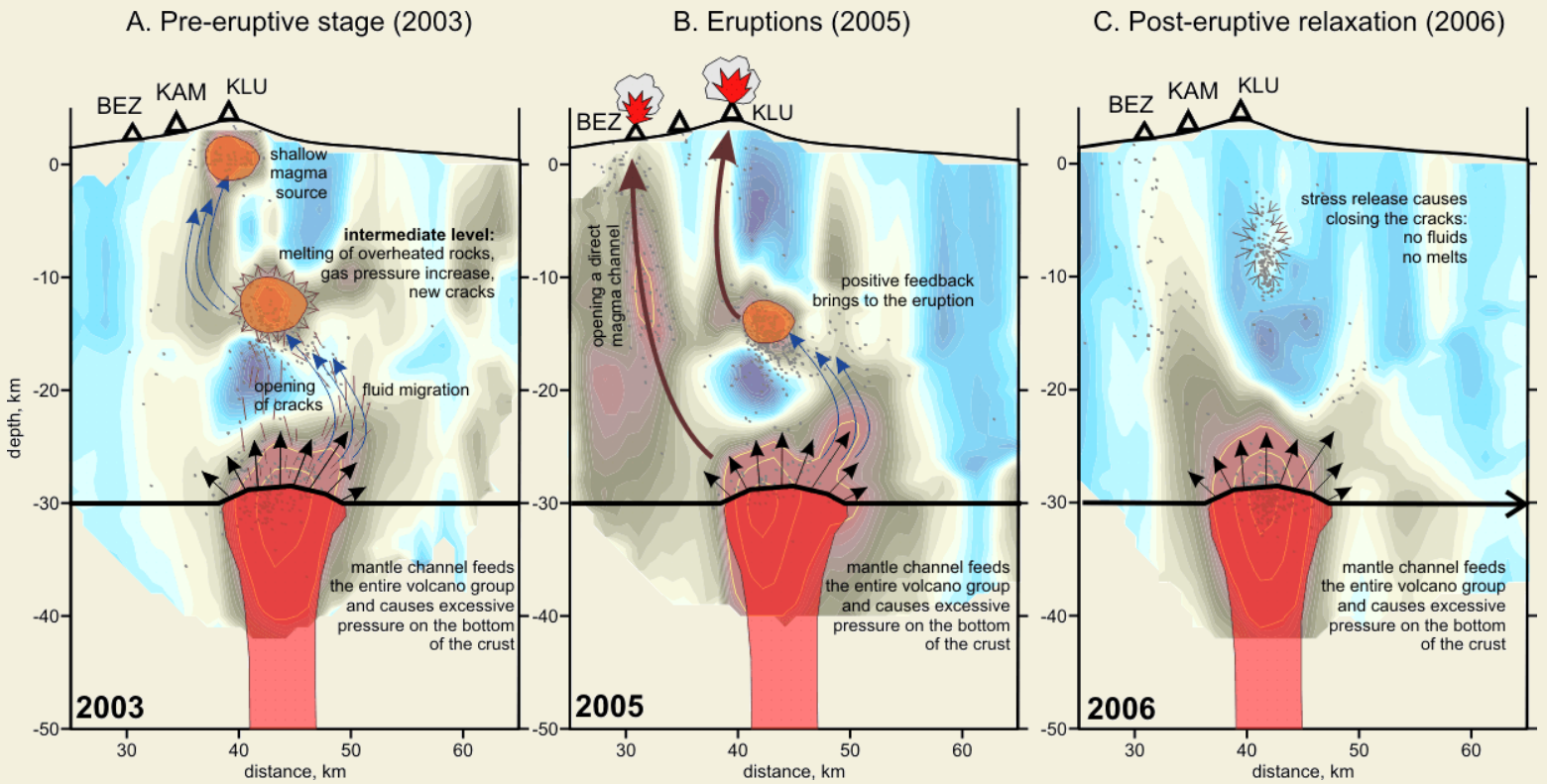
Gas-hydrates on the bottom of Baikal

The Baikal oil has been sampled from the surface, water column, and, for the first time, from the bottom of the lake, and studied using the up-to-date methods. The oil is shown to contain a unique set of carbohydrates – biomolecules, typical primarily of the lipids of organic matter of the higher land vegetation, including the angiosperms. These plants appeared on Earth less than 100 million years ago, and the geological data confirm that **the Baikal oil is of Cenozoic age, younger than 65 million years**.

Institute of Petroleum and Gas Geology and Geophysics of SB RAS

Structure and dynamics of magmatic sources beneath the Klyuchevskoy volcano group in Kamchatka have been investigated using the results of 4D seismic tomography

Processing of continuous data recorded in permanent seismic stations around the Kluchevskoy volcano group made it possible construction of 4D model of P and S seismic velocities in the crust and uppermost mantle beneath the volcanoes. The obtained time-dependent seismic model displays a clear link between the variations of seismic properties and activity phases of the volcanoes.



Background is Vp/Vs ratio

"brown" – high value of Vp/Vs – high fluid and melt content

"blue" – low Vp/Vs ratio: dry rock, no fluids

Black dots mark seismicity

Volcanoes:
KLU-Kluchevskoy
BEZ – Bezymyanny
KAM - Kamen

Three activation stages of the Kluchevskoy volcano group based on time dependent seismic tomography in 2003, 2005 and 2006

A.) Stage prior the eruption: high pressure in the crust bottom -> fractures -> migration of fluids and melts -> melting of overheated rocks at 10-13 km -> fluid boiling –> high-pressure gas -> new fractures, more active circulation >>>> (positive feedback = avalanche-like process) >>> **ERUPTION!!!**

B.) Eruptions of BEZ and KLU volcanoes in 2005. KLU is fed through a system of intermediate chambers, whereas BEZ is directly linked with the mantle through a short-lived channel.

C.) After eruptions, relaxation of strains results at closing the cracks. Most of fluids escaped with eruptions; their deficit in the crustal rocks increases the melting temperature and leads to fast crystallization of rocks in intermediate reservoirs.