DEVELOPMENT OF AN INTERACTIVE INTERFACE TO RAISE CLIMATE CHANGE AWARENESS OF PUBLIC, POLICY MAKERS, AND PRACTITIONERS

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PREDICTED CONSEQUENCES OF THE GLOBAL CLIMATE CHANGE (IPCC REPORTS)

- rise in sea level due to melting glaciers and polar ice
- changes in precipitation
- changes in the hydrological regime
- impact on ecosystems, agriculture and forestry

According to Hydrometeorological Center of Russian Federation

in Russia's vast territory

these effects will be

most dramatic.

Conifer — Meadow
Deciduous — Semi-desert
Mixed — Desert
Woody Tundra — Tundra
Steppe — Arctic Desert
Water

ADAPTATION TO CLIMATE CHANGE AND MITIGATION OF ITS CONSEQUENCES

Climate change is a process, so it's possible to adapt and minimize its negative impacts, organize measures to adapt to changing conditions.

To prepare affective adaptation strategy on a regional level decision-makers should understand climate change processes and consequences.

We provide them with tools, skills, thematic information for understanding climate processes occurring in the region and train them to work with the accumulated climatic data.

INFORMATION-COMPUTATIONAL WEB-GIS "CLIMATE"

Training of such specialists should be done not in an artificial learning environment, but based on actual operating instruments used in environment studies with a help of specially designed courses.

IN DETAILS

Web-GIS information-computational platform "Climate" (http://climate.climate.scert.ru/)

▸ developed by IMCES SB RAS and upgraded in the framework of a joint project of IMCES and UNH

▸ aimed at monitoring and analysis of ongoing and future regional climate changes

▸ gives an access to a large set of geophysical data, visualization and analytic tools. climate and weather models,

▸ used as a basis for elaboration of relevant Virtual Learning Laboratory (VLL) - a specially designed virtual research environment targeted to educational needs.

WEB-GIS "CLIMATE"

Provides:

- processing and analysis of distributed sets of geo-referenced climatic and meteorological data (reanalysis data, climate modeling and satellite observations);

- visualization of simulation results;

- support for different level of users (researchers, teachers, students, common public).

  User can manipulate results in the form of selected region cartographic layers and make additional processing of previously obtained data (e.g. comparison of data from different layers).
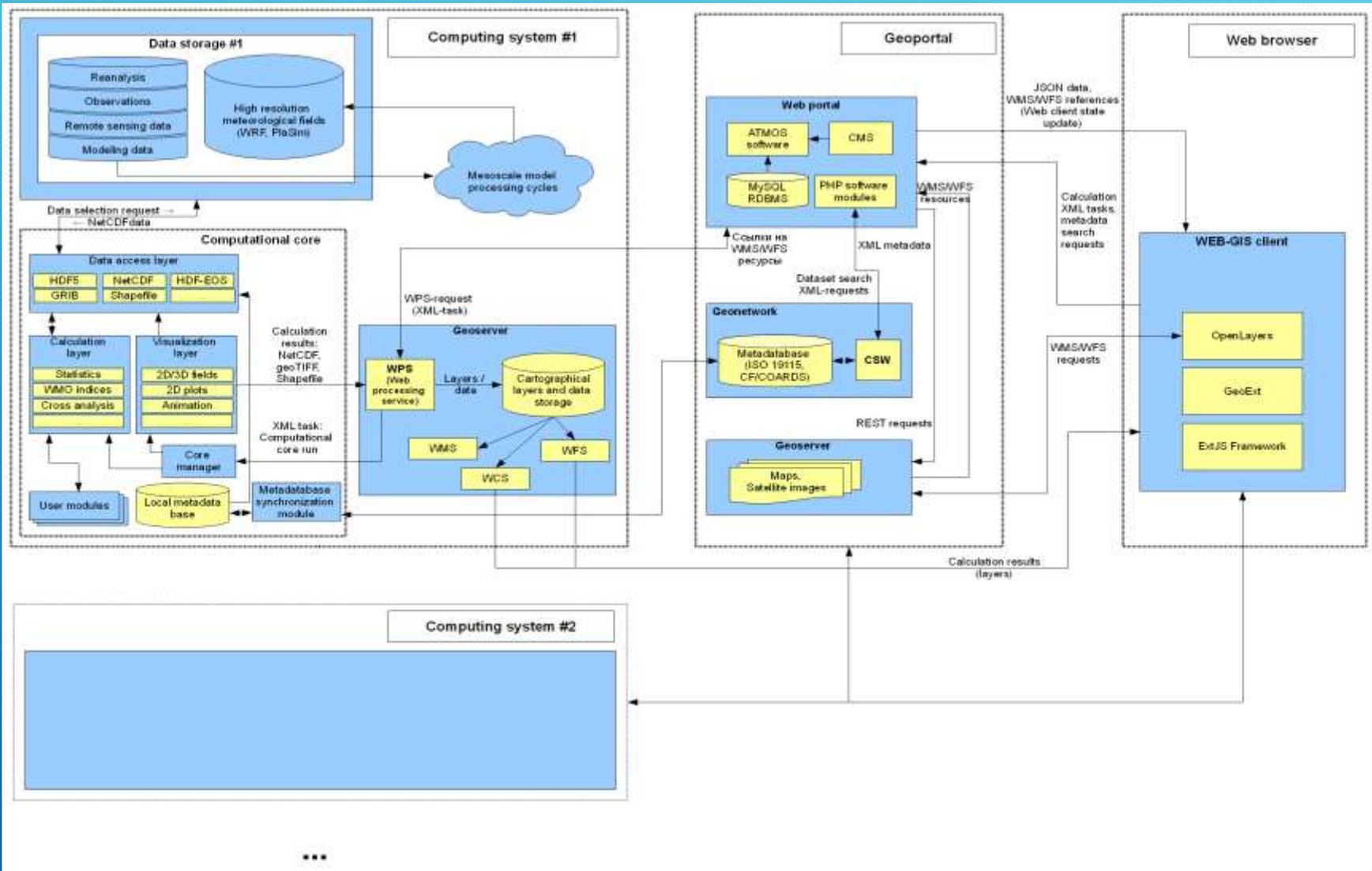
ALSO used for:

▶ undergraduate and graduate students training

To be used for:

▶ raising public awareness about climate change, its causes and consequences of decision-makers, stakeholders and general public

"CLIMATE" ARCHITECTURE

Data archive

Dataset	Organization	Time period	Resolution
NCEP/NCAR Reanalysis	NCEP/NCAR	1951 – 2001	2.5°×2.5°
NCEP/DOE AMIP II Reanalysis	NCEP/DOE	1979 – 2003	2.5°×2.5°
ERA-40 Reanalysis	ECMWF	1957 – 2004	2.5°×2.5°
JRA-25 Reanalysis	JMA/CRIEPI	1979 – 2009	2.5°×2.5°
NOAA-CIRES 20th Century Global Reanalysis	NOAA/OAR/ESRL PSD	1908 – 1958	2.0°×2.0°
APHRODITE Reanalysis	RIHN-MRI/JMA	1951 - 2007	0.25°×0.25°;
Merra Reanalysis	ECMWF	1979 - 2000	0.67°×0.5°;
GPCC Reanalysis	GPCC	1901 - 2009	0.5°×0.5°;
INM CM4 dataset	INM RAS	1950 - 2005	2.0°×1.5°;
PlaSim dataset	IMCES SB RAS	2000 - 2100	2.5°×2.5°
9092c Synoptic Network	RIHMI-WDC/ NOAA CNDC	~ 1900 – 2000	83 meteo stations
MACC Reanalysis		2003 - 2012	0.25°×0.25°;

VISUALIZATION OF RESULTS
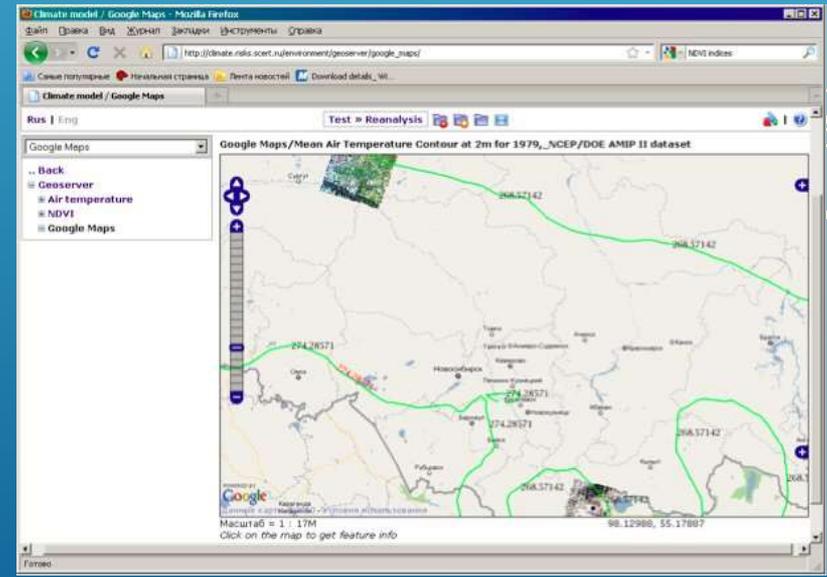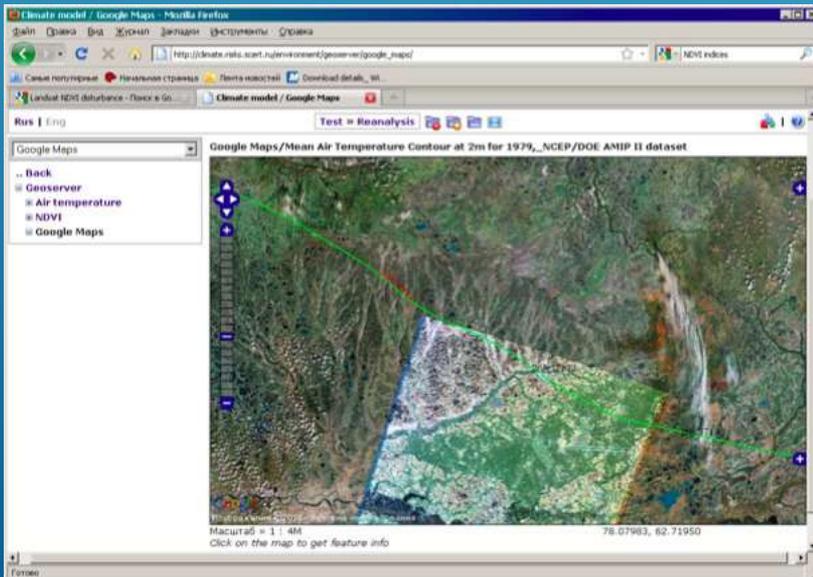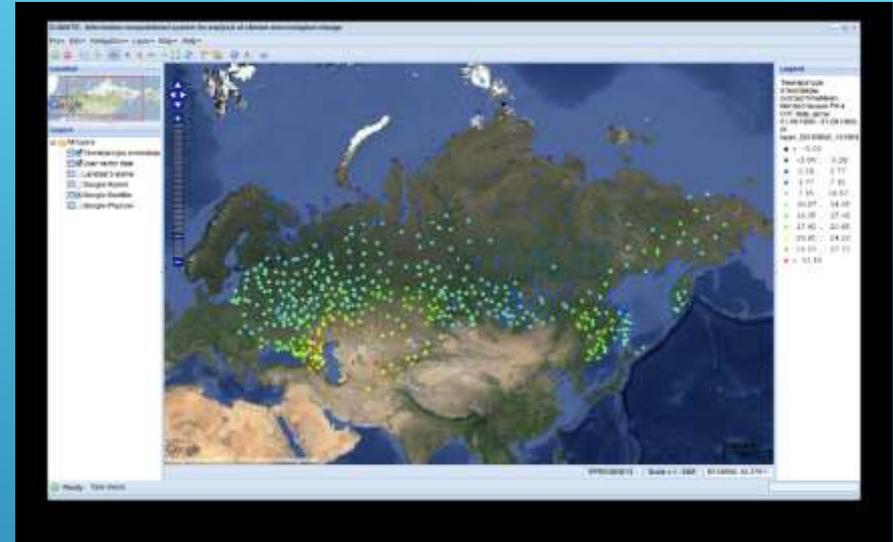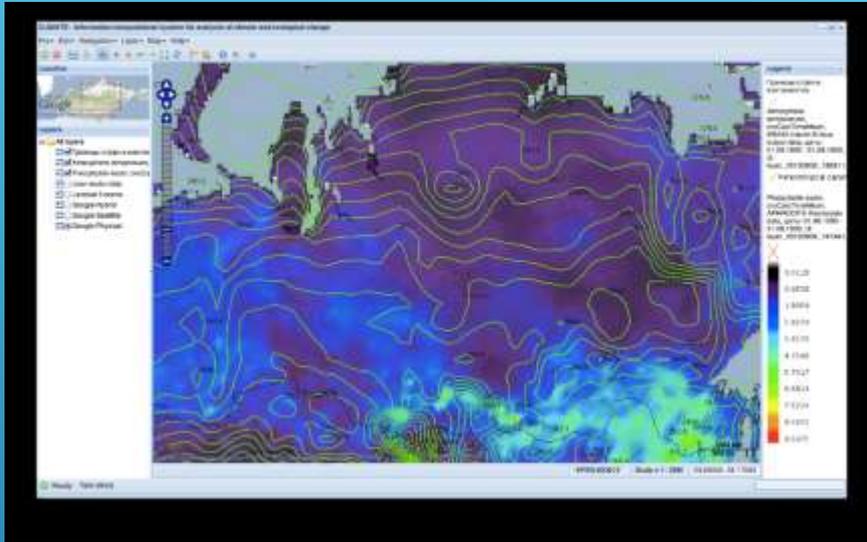
Interactive User Manual development

According to Hydrometeorological Center of Russian Federation Report (2017) there is an increase in the magnitude and frequency of extreme weather events, as well as in their damage to ecosystems and infrastructure.

Last year 988 dangerous hydrometeorological phenomena (including agrometeorological and hydrological) were noted on the territory of Russia, 380 of which caused significant damage to the economic and social sectors.

Specialists to develop adaptation strategies are needed both on national and regional levels.

House destruction due to permafrost melting. Chersky, Siberia. (Photo: V. Romanovsky)

Heat waves in Moscow, 2010.

Problems

- insufficient awareness among decision-makers
- lack of scientific background

Goal

To prepare a qualified user who will be able to determine the policy of adaptation of the region to the consequences of climate change in the future.

Task

Interactive System User Manual for decision-makers in the "Climate" system.

INTERACTIVE USER MANUAL CONTENT

Theoretical part

▶ Basic concepts and problems of modern climate change and its possible consequences in accessible language. Particular attention is paid to regional climate changes.

▶ Extreme events analytic providing maps of related risks to be developed

▶ Selection of links to popular science network resources on current issues in Earth Sciences.

▶ Thematic Glossary – embedded into the Manual text.

INTERACTIVE USER MANUAL CONTENT

Practice

▸ Practical tasks to consolidate the material. These tasks are performed for a particular territory.

▸ Within the tasks users need to analyze the prepared within the "Climate" system map layers.

▸ Conducting an independent analysis of the dynamics of climate change contributes to a better understanding of ongoing climate processes!!
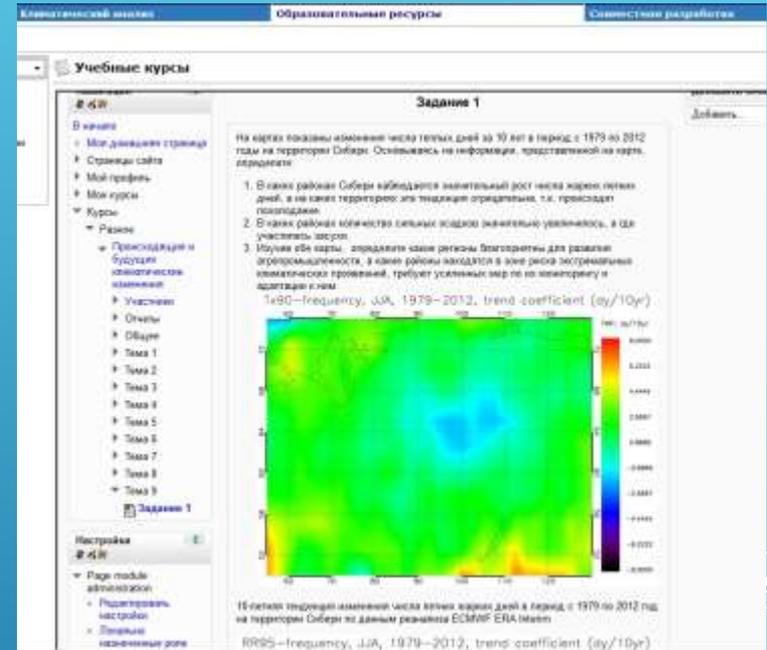
Example of a practical task
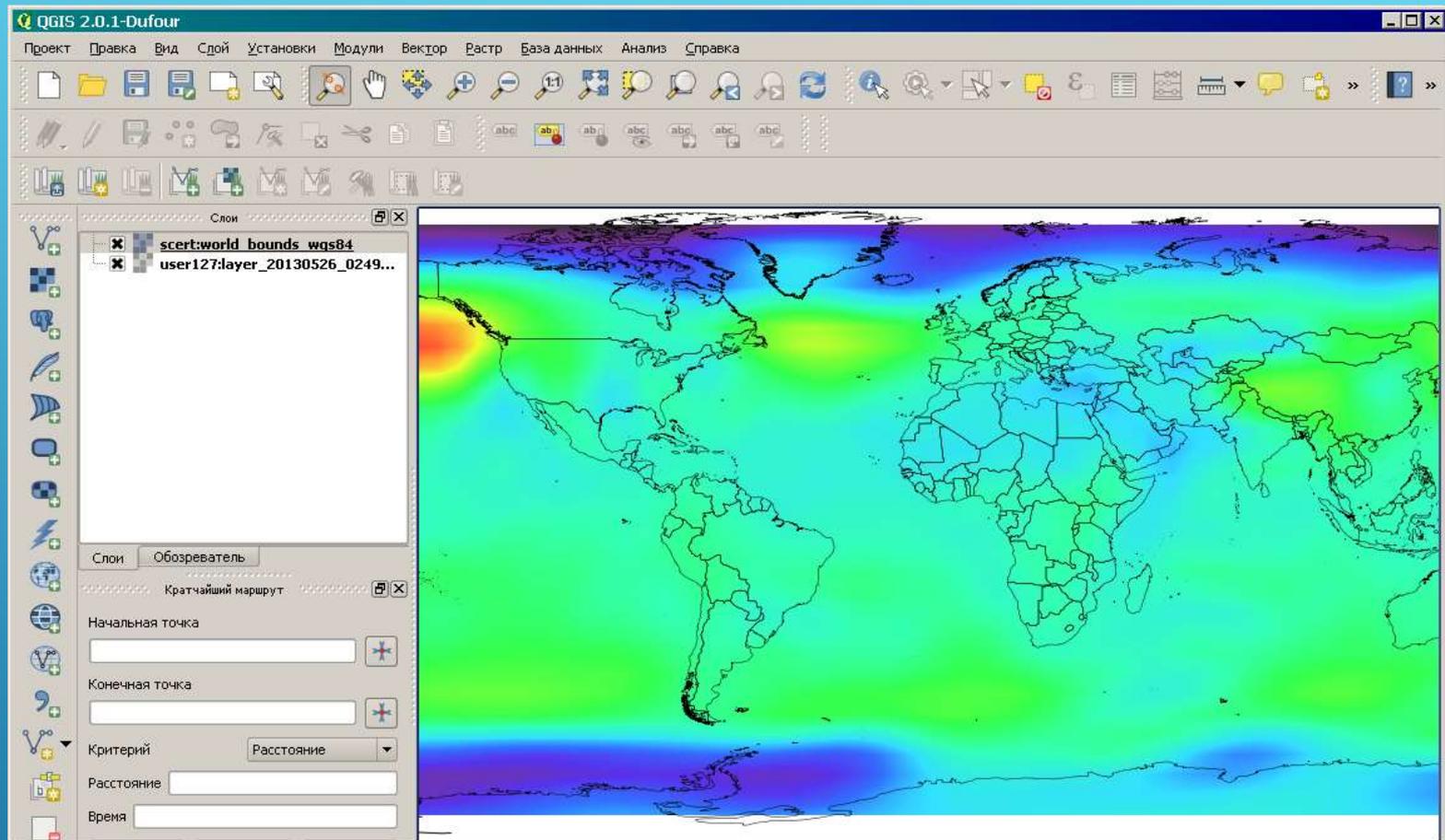
The results of implementation of practical tasks are available not only in the form of color surface maps, but also on the Internet and in the form of layers for most GIS. Thus these layers can be used in a usual desktop GIS which is a common software for most of decision-makers. (e.g. QuantumGIS)

Results of implementation

▸ Approach was tested at Tomsk State University (3-d year meteorology students formed a targeted group).

▸ Interactive User Manual promises to be an effective tool to raise awareness of public, policy makers, and practitioners about climate change and its regional consequences.

▸ Specially designed combination of basic information, analysis tasks and the thematic glossary should help to prepare a qualified user who will be able to determine the policy of adaptation of the region to the consequences of climate change.

▸ Test usage for regional decision makers is planned to polish manual features.

Thank you for attention!