

Siberia Integrated Regional Study: the state of the art and projections

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September 4, 2013

CITES/NEESPI– Petrozavodsk

Siberia Integrated Regional Study (SIRS, <http://sirs.scert.ru/en/>)

Siberia Integrated Regional Study (SIRS, <http://sirs.scert.ru/en/>) is a NEESPI megaproject coordinating national and international activity in the region in line with Future Earth Initiative (<http://www.icsu.org/future-earth>) approach whose overall objectives are to understand impact of Global change on on-going regional climate and ecosystems dynamics; to study future potential changes in both, and to estimate possible influence of those processes on the whole Earth System dynamics as well as on social and economic situation in the region.

Approach adopted

- **National and international projects clusterization (knowledge and data sharing)**
- **Development of information-computational infrastructure to support multidisciplinary studies**
- **YS Training&Education**

Organizationally SIRS is supervised by the Russian National Committee for IGBP and managed by its Siberian Branch

Major regional challenges:

- Permafrost fate, especially its border shift (serious threats to infrastructure and significant potential carbon source);**
- Desert - steppe- forest-tundra ecosystems borders shifts (change of region carbon cycle and serious socio-economical consequences for local population; and**
- Temperature/precipitation/hydrology regime change (increase risks of forest and peat fires leading to enormous carbon release from the region).**

The state of the art

Gone optimism

October 2010 SB RAS Presidium sitting
Report: E. Gordov and E. Vaganov “**Russian National Committee for IGPP and its Siberian Branch activity on development of the Siberia Integrated Regional Study**” (<http://www.scert.ru/ru/SB/materials/>)

As an outcome a contract SB RAS multidisciplinary integrated project “**Dynamics of on-going climatic processes in Siberia and elaboration of strategy for relevant mitigation/adaptation measures**” (2012-2015) was promised.
Nothing happens.

Currently SIRS oriented activity is supported by two SB RAS basic research multiyear Programs initiated and carried out by IMCES.

- VIII.77.1. “Environmental and climatic changes in Siberia and Arctic under impact of global and regional factors”,
- VIII.80.2. “Scientific and methodical basis for information-computational technologies and measuring complexes for climatic and ecosystem monitoring”; and
- by several thematic integrated projects in which researchers from different Institutes work jointly on one of SIRS specific problems.

Several SIRS backbone projects are funded by the RF Ministry of Education and Science and RFBR:

- Web-GIS platform “Climate” for monitoring and projections of regional climatic and ecological changes and support of continuous education (07.514.11.4044);
- Monitoring and projections of Siberia environment state under climatic and ecological changes in the region (8345);
- Study of regional climatic changes and their manifestation in environment dynamics on the base of geoinformation services of processing, analysis and integration of different origin data and thematic geoportal (13-05-12034).

Backbone projects outcomes

Web-GIS platform “Climate” as distributed system with geoportal functionality to analyze big arrays of geophysical data and to train students’ and YS is in test operation now.

- Gordov E.P., et al. Geo-information system for investigation of regional climatic changes and first results obtained / Atmospheric and Ocean Optics, vol. 25, 2012, No.02, pp.137-143.
- Gordov E.P., Lykosov V.N., Krupchatnikov V.N., Okladnikov I.G., Titov A.G., Bogomolov V.Yu., Shulgina T.M. Computational-informational technologies of monitoring and modeling of climatic changes and their consequences. 2013, Novosibirsk, Nauka, in press.
- Gordova et al. Support of educational process in modern climatology within the web-GIS platform “Climate”. Open and distant learning, 2013, No 1, pp. 14-19.

Climate model / Web mapping system - Mozilla Firefox

Файл Правка Вид Журнал Закладки Инструменты Справка

climate.climate.scert.ru/environment/CLEAR5/

Google

Часто посещаемые Начальная страница Лента новостей http://twitter.com/#!... Download details_Wi...

Climate model / Web mapping system

CLIMATE - Information-computational system for analysis of climate and ecological change

File Edit Navigation Layer Map Help

Location

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Layers

- All layers
 - User vector data
 - Landsat 5 scene
 - Google Hybrid
 - Google Satellite
 - Google Physical

Legend

Map showing continents: NORTH AMERICA, SOUTH AMERICA, AFRICA, EUROPE, ASIA, AUSTRALIA, ANTARCTICA. Oceans: Pacific Ocean, Atlantic Ocean, Indian Ocean. Scale: 5000 km, 5000 mi. Coordinates: EPSG:900913, Scale = 1 : 222M, 21.79688, 81.41393

Ready Task status



- All layers
- User vect
- Landsat 5
- Google Hy
- Google Sa
- Google PH

Available layers

WMS properties | WFS properties

ID	Title	Description	Base layer
tag:layer_20130617_145029_TIFF	Температура атмосферы, cvcCalcGSL, NCEP/DOE Rean...		<input type="checkbox"/>
tag:layer_20130617_152121_TIFF	Температура атмосферы, cvcCalcGSL, NCEP/DOE Rean...		<input type="checkbox"/>
tag:layer_20130620_162124_shp	Температура атмосферы, cvcCalcTimeMean, Метеоста...		<input type="checkbox"/>
tag:layer_20130620_185521_shp	Температура атмосферы, cvcCalcTimeMean, Метеоста...		<input type="checkbox"/>
tag:layer_20130702_170041_TIFF	Температура атмосферы, cvcCalcTimeMean, NCEP/DOE ...		<input type="checkbox"/>
tag:layer_20130702_170208_TIFF	Температура атмосферы, cvcCalcGSL, ECMWF ERA-40 ...		<input type="checkbox"/>
tag:layer_20130702_170512_TIFF	Температура атмосферы, cvcCalcTimeMean, ECMWF ER...		<input type="checkbox"/>
tag:layer_20130702_171654_TIFF	Температура атмосферы, cvcCalcTimeMean, NCEP/DOE ...		<input type="checkbox"/>
tag:layer_20130702_172101_TIFF	Температура атмосферы, cvcCalcTimeMean, cvcCalctre...		<input type="checkbox"/>
tag:layer_20130702_180008_TIFF	Температура атмосферы, cvcCalcTimeMean, cvcCalctre...		<input type="checkbox"/>
tag:layer_20130702_180944_TIFF	Температура атмосферы, cvcCalcSDDT, cvcCalctrendm...		<input type="checkbox"/>
tag:layer_20130708_155026_shp	Температура атмосферы, cvcCalcTimeMean, ECMWF ER...		<input type="checkbox"/>
tag:layer_20130708_155322_shp	Температура атмосферы, cvcCalcTimeMean, Метеоста...		<input type="checkbox"/>
tag:layer_20130708_193700_TIFF	Температура атмосферы, cvcCalcTimeMean, NCEP/DOE ...		<input type="checkbox"/>
tag:layer_20130710_164624_shp	Температура атмосферы, cvcCalcTimeMean, cvcCalctre...		<input type="checkbox"/>
tag:layer_20130710_184428_shp	Температура атмосферы, cvcCalcTimeMean, cvcCalctre...		<input type="checkbox"/>
tag:layer_20130711_150903_TIFF	Температура атмосферы, cvcCalcTimeMean, ECMWF ER...		<input type="checkbox"/>
tag:layer_20130712_130130_shp	Температура атмосферы, cvcCalcTimeMean, cvcCalctre...		<input type="checkbox"/>

Create new layer Add layer to the map Cancel



5000 km 5000 mi

EPSG:900913 Scale = 1 : 222M 42.18750, 63.23363

Cartographical layer creation wizard

Selection of meteorological parameter and processing type: step 1 of 3

Characteristic

Meteorological parameter: Atmosphere temperature

Dataset: ECMWF ERA-40 Reanalysis

Altitude level: 2m Time step: 6h

Data processing

Processing type: Average Threshold:

Climatological variable: Trend calculation:

Time period

Start date: 01.06.1958

End date: 31.08.1968

← Backward → Forward

Cartographical layer creation wizard

Geographical area selection: step 2 of 3



EPSG:900913 Scale = 1 : 55M 147.65625, 46.07323

Geographic area

Longitude range: -

Latitude range: -

← Backward → Forward

Climate model / Web mapping system - Mozilla Firefox

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climate.climate.scert.ru/environment/CLEAR5/

Google

Climate model / Web mapping system

CLIMATE - Information-computational system for analysis of climate and ecological change

File Edit Navigation Layer Map Help

Cartographical layer creation wizard

Parameters check and graphical output settings: step 3 of 3

Characteristic

Meteorological parameter: Atmosphere temperature

Dataset: ECMWF ERA-40 Reanalysis

Altitude level: 2m Time step: 6h

Data processing

Processing type: Average Climatological variable:

Trend calculation:

Time period

Start date: 01.06.1958

End date: 31.08.1968

Geographical area

Longitude range, °: 24.4336 - 161.543

Latitude range, °: 43.3891 - 74.8449

Graphical output settings

Image type: Field Graphic type: Raster

Base layer: Field
Contour

← Backward → Forward

Ready Task status

- 2 reference monitoring stations equipped with modern instrumentation for monitoring from the planned reference network for monitoring of climatic changes in Siberia planned for 2012-2017 are operating now.



Monitoring stations network

1. Tomsk (city)
2. Tomsk (Vasyuganie)
3. Buryatiya (Baikal)
4. Chita (Arakhley)
5. Krasnoyarsk (Zotino)
6. Barnaul (Aktru)
7. Novosibirsk (Chany)
8. Kyzyl (Dolinnaya)
9. Yakutsk (Spasskaya Pad')
10. Irkutsk (Mondy)
11. Khaty-Mansiisk (Shapsha)
12. Nadym (Polyarnaya)

Educational/capacity building (<http://scert.ru/en/conferences/>)

Threefold approach:

ENVIROMIS – biannual Multidisciplinary Conference with elements of YSS
(Invited lectures embedded as well as thematic Workshops);

CITES (Computational and Information Technologies for Environmental Sciences) biannual YSS and Conference
(Lecture courses, Training sessions as well as Invited lectures)

Thematic Web portals with embedded tools for distant professional education/training



Participants of the CITES 2007 YS School (life long learning)

Projections

Suggested SB RAS megascience facility to monitor and analyze on-going and possible in future natural and climatic processes and their consequences on Russia territory:

- the network of monitoring stations equipped with modern instrumentation for monitoring spread across Russia;
- the dedicated computing and data center providing an access to instrumental and modeling data; and
- information-computational infrastructure supporting knowledge generation on the basis of data available.

Crucial scientific questions for new projects:

- Regional geosphere-biosphere interactions (including the surface air layer, the vegetation layer, soil, and inland water bodies): role and feedbacks to the Earth System dynamics;
- Adaptation and mitigation strategy meeting challenges from on-going and projected processes:
 - permafrost, desert - steppe- forest-tundra ecosystems borders shifts,;
 - weather and climate extremes.

Thank you for attention!