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**CONTROL ID:** 1182918**TITLE:** Analysis of Climatic and Environmental Changes Using CLEARs Web-GIS Information-Computational System: Siberia Case Study**PRESENTATION TYPE:** Assigned by Committee (Oral or Poster)**CURRENT SECTION/FOCUS GROUP:** Global Environmental Change (GC)**CURRENT SESSION:** GC16. Regional Climate Impacts 7. Environmental, Socio-economic and Climatic Changes in Northern Eurasia and their Feedbacks to the Global Earth System: The Role of Remote Sensing and Integrative Studies**AUTHORS (FIRST NAME, LAST NAME):** Alexander G Titov<sup>1, 2</sup>, Evgeny P Gordov<sup>1, 2</sup>, Igor Okladnikov<sup>1, 2</sup>, Tamara M Shulgina<sup>1</sup>**INSTITUTIONS (ALL):** 1. SCERT, IMCES SB RAS, Tomsk, Tomsk, Russian Federation.  
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**ABSTRACT BODY:** Analysis of recent climatic and environmental changes in Siberia performed on the basis of the CLEARs (CLimate and Environment Analysis and Research System) information-computational system is presented. The system was developed using the specialized software framework for rapid development of thematic information-computational systems based on Web-GIS technologies. It comprises structured environmental datasets, computational kernel, specialized web portal implementing web mapping application logic, and graphical user interface. Functional capabilities of the system include a number of procedures for mathematical and statistical analysis, data processing and visualization. At present a number of georeferenced datasets is available for processing including two editions of NCEP/NCAR Reanalysis, JMA/CRIEPI JRA-25 Reanalysis, ECMWF ERA-40 and ERA Interim Reanalysis, meteorological observation data for the territory of the former USSR, and others.

Firstly, using functionality of the computational kernel employing approved statistical methods it was shown that the most reliable spatio-temporal characteristics of surface temperature and precipitation in Siberia in the second half of 20th and beginning of 21st centuries are provided by ERA-40/ERA Interim Reanalysis and APHRODITE JMA Reanalysis, respectively. Namely those Reanalyses are statistically consistent with reliable in situ meteorological observations.

Analysis of surface temperature and precipitation dynamics for the territory of Siberia performed on the base of the developed information-computational system reveals fine spatial and temporal details in heterogeneous patterns obtained for the region earlier.

Dynamics of bioclimatic indices determining climate change impact on structure and functioning of regional vegetation cover was investigated as well. Analysis shows significant positive trends of growing season length accompanied by statistically significant increase of sum of growing degree days and total annual precipitation over the south of Western Siberia. In particular, we conclude that analysis of trends of growing season length, sum of growing degree-days and total precipitation during the growing season reveals a tendency to an increase of vegetation ecosystems productivity across the south of Western Siberia (55°-60°N, 59°-84°E) in the past several decades.

The developed system functionality providing instruments for comparison of modeling and observational data and for reliable climatological analysis allowed us to obtain new results characterizing regional manifestations of global change. It should be added that each analysis performed using the system leads also to generation of the archive of spatio-temporal data fields ready for subsequent usage by other specialists. In particular, the archive of bioclimatic indices obtained will allow performing further detailed studies of interrelations between local climate and vegetation cover changes, including changes of carbon

uptake related to variations of types and amount of vegetation and spatial shift of vegetation zones. This work is partially supported by RFBR grants #10-07-00547 and #11-05-01190-a, SB RAS Basic Program Projects 4.31.1.5 and 4.31.2.7.

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**INDEX TERMS:** [1620] GLOBAL CHANGE / Climate dynamics, [1637] GLOBAL CHANGE / Regional climate change, [1694] GLOBAL CHANGE / Instruments and techniques, [1928] INFORMATICS / GIS science.

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