EMS Annual Meeting Abstracts
Vol. 11, EMS2014-177, 2014
14th EMS / 10th ECAC

IT-environment for supporting climate services

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Georeferenced datasets are currently actively used for modeling, interpretation and forecasting of climatic and ecosystem changes on different spatial and temporal scales [1]. Due to inherent heterogeneity of environmental datasets as well as their huge size (up to tens terabytes for a single dataset) a special software supporting studies in the climate and environmental change areas is required [2].
Dedicated information-computational environment for supporting climate services, including integrated analysis, visualization and dissemination of heterogeneous georeferenced climatological and meteorological data, is presented. It is based on combination of Web and GIS technologies according to Open Geospatial Consortium (OGC) standards, and involves many modern solutions such as object-oriented programming model, modular composition, and JavaScript libraries based on GeoExt library (http://www.geoext.org), ExtJS Framework (http://www.sencha.com/products/extjs) and OpenLayers software (http://openlayers.org).
The main advantage of the system lies in it's capability to perform integrated analysis of time series of georeferenced data obtained from different sources (in-situ observations, model results, remote sensing data) and to combine the results in a single map [3, 4] as WMS and WFS layers in a web-GIS environment. Also analysis results are available for downloading as binary files from the graphical user interface or can be directly accessed through web mapping (WMS) and web feature (WFS) services for a further processing by a user. Data processing is performed on distributed computational cluster comprising data storage systems and corresponding computational nodes.
Several geophysical datasets represented by NCEP/NCAR Reanalysis II, JMA/CRIEPI JRA-25 Reanalysis, ECMWF ERA-40 Reanalysis, ECMWF ERA Interim Reanalysis, MRI/JMA APHRODITE's Water Resources Project Reanalysis, DWD Global Precipitation Climatology Centre's data, GMAO Modern Era-Retrospective analysis for Research and Applications, reanalysis of Monitoring atmospheric composition and climate (MACC) Collaborated Project, NOAA-CIRES Twentieth Century Global Reanalysis Version II, NCEP Climate Forecast System Reanalysis (CFSR), meteorological observational data for the territory of the former USSR for the 20th century, results of modeling by global and regional climatological models, and others are available for processing by the system.
The Web-GIS information-computational environment presented provides specialists involved into multidisciplinary research projects with solid and practical tools for integrated research of climate and ecosystems changes on global and regional scales. With its help even an unskilled in programming user is able to process and visualize multidimensional observational and model data through unified web-interface using a common graphical web-browser.

This work is partially supported by SB RAS project VIII.80.2.1, RFBR grant #13-05-12034, grant #14-05-00502, and integrated project SB RAS #131.

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