Analysis of changes in water cycle across Northern Eurasia with Rapid Integrated Mapping and Analysis System (RIMS)

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Historical and contemporary changes in various components of the hydrological cycle across the Northern Eurasia have been investigated using multiple observational and modeled data compiled in Rapid Integrated Mapping and Analysis System (RIMS) for North Eurasian Earth Science Partnership Initiative (NEESPI). To evaluate potential future patterns of change in the Northern Eurasian water cycle we have used climate change projections simulated by several coupled Atmosphere-Ocean General Circulation Models (AO GCMs). Future changes in hydrological regime were assessed using the UNH Water Balance and Water Transport Models (WBM/WTM) which take into account water management including irrigation and reservoir regulation. We found significant shifts in the regional hydrology and quantified potential natural and anthropogenic causes of these changes. The results of our historical and future analysis have demonstrated an intensification of hydrological cycle in many regions of the Northern Eurasia observed over 50-60 year period with accelerated rate during the last decade. Based on climate projections we can expect that the current rate of changes to continue over the course of XXI century.

A significant part of the analysis and quantitative estimates of water cycle trends in Northern Eurasia has been done using RIMS online and offline data analysis tools. RIMS has been developed by the Water Systems Analysis Group at the University of New Hampshire, USA for the NEESPI program. Presently, the RIMS data pool is composed of a variety of themes including climate, hydrology, land cover, human dimension, and others. It comprises over five thousand single layer (e.g. soil type) and time series (e.g. daily runoff) raster GIS coverages, and a number of climate and hydrology station/point network datasets. The system streamlines data mining, management and model feeds in the computational environment of large and diverse data holdings. In this presentation we want to demonstrate both RIMS potential for scientific applications and provide new estimates and analysis for changes in regional hydro-climatology.