



Hydrologic Changes In Large Siberian Watersheds

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Observational records show significant climate change in the high latitude regions over the past several decades. Hydrologic response of the large northern watersheds to climate change and variation is one of the key issues in understanding atmosphere-land interactions in the northern regions. Examination and documentation of changes in the major northern rivers are also important to studies of global change, regional water resources, and distribution of ecosystems.

This presentation will provide a review of arctic hydrologic system changes with emphasizes on regional/basin-scale hydro-climatic characteristics and differences. In order to define the hydrologic regime, and to document its changes induced by human activities (particularly large reservoirs) and by climate variations/changes, we have analyzed long-term records of streamflow, river ice thickness, water temperature, and sediment records over the past 40-50 years for the largest northern watersheds, such as the Lena, Yenisei, Ob rivers. Our results demonstrate remarkable changes in northern hydrology system. These include changes in streamflow seasonal cycle (such as shifts of snowmelt timing and peak flow, decreases in summer discharge, and increases of winter discharge in the Siberian watersheds), thinning of river ice thickness, and warming of stream water temperatures over eastern Siberia. These changes identified indicate a hydrologic regime shift due to recent climate warming, changes in permafrost conditions, and influence of human activities over the northern regions. Our efforts continue to identify changes in the arctic hydrologic system, and to examine hydrologic responses to climatic change and human impact in the arctic regions as a whole.