Arctic hydro-climatic regimes and changes in a warming climate

Daqing Yang
Research Scientist, Water Science and Technology Directorate,
Environment and Climate Change Canada

Northern rivers transport large amounts of freshwater and thermal/geochemistry fluxes to the polar ocean system. Many recent studies document significant variations and changes in discharge, water temperature, and geochemistry characteristics in the large Arctic watersheds. Based on recent data analysis and literature review, this presentation synthesizes our knowledge of northern river water and heat fluxes into the Arctic Ocean. It will describe the seasonal cycles of discharge, water temperature, and heat flux from the northern rivers and compare their main features across the pan-Arctic domain. It will also discuss basin specific results, such as statistical analyses and model simulations of historical changes and future projections of freshwater and heat transport processes due to climate variation and human impact, particularly the effects of reservoir regulation. These topics and results are critical for a better understanding of climatic and hydrologic linkages and variations over the northern regions. They are also important for regional hydrology and climate change investigations, such as basin-scale energy balance calculations, and land-ocean interactions, particularly large-scale ocean water/heat budget and model analyses across the Arctic regions.