

Synthesis of Water Balance Data from Northern Experimental Watersheds

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A current goal of Northern Hydrologists is to develop a comprehensive understanding of circumpolar hydrology, a very challenging task. One tool for approaching this goal is the compilation of water balance studies in the North. Over the past three decades (longer in Russia), hydrologists of northern countries have been conducting field observation and modeling studies with the aim of better quantifying the water balance in widely dispersed arctic and sub-arctic watersheds. Preliminary results show considerable temporal and spatial variability of water balance over the high latitude regions. To better understand the spatial and temporal variability of the water balance in the northern regions, long-term observation and modeling efforts are needed at various spatial scales. Obviously we do not have enough resources to circumnavigate the arctic with research watersheds. However, we do believe that significant strides can be made economically through international collaborations.

This study will focus on reviewing our existing knowledge from arctic water balance studies. Our approaches are 1) data collection through a survey of individual sites, 2) integrated data set development, and 3) comparative analysis. This research will create a unique database of water balance elements for the high latitude basins. Based on this data set, we will compare and review the water balance results from high latitude watersheds, with special emphasis on inter-annual variability, regional variability, long-term averages of the various hydrologic components (annual and seasonal), methodology for computations and scientific framework. We will identify common issues, both strengths and weaknesses in northern hydrologic studies and recommend collaborative research efforts to address these common issues. The overall goal of this effort is to advance our understanding of circumpolar hydrologic processes through the synthesis of existing international data sets.