

DEVELOPMENT OF BIAS-CORRECTED PRECIPITATION DATABASE AND CLIMATOLOGY FOR THE ARCTIC REGIONS

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Precipitation is one of the key components in hydrological modeling and process studies. It is also the most important variable in global change analyses, as change of precipitation will have a major impact on hydrology, climate and ecosystems. It has been recognized that significant (up to 100%) systematic errors (biases) exist in the gauge-measured precipitation records and these biases must be documented and corrected in order to obtain a compatible, accurate data set for large-scale hydrological and climatic investigations.

The climate of the high latitudes is characterized by low temperature, generally low precipitation and high winds. Because of the special condition in the high latitudes, the biases in precipitation gauge observations are enhanced and need special attention. This proposed research will directly address the problem of biases of precipitation measurements in the high latitude regions. This work will be based on the extensive research experiments, particularly on the WMO Solid Precipitation Measurement Intercomparison Project. We will evaluate and define the accuracy of precipitation measurements, and implement the consistent bias-correction methodologies for the high latitude regions (Alaska, northern Canada, Siberia, northern Europe, Greenland, and the Arctic Ocean). The goal of this research is to develop the unbiased and compatible precipitation database (including grid products) and climatology for the pan-Arctic.

This proposal is particularly relevant to studies of climate change and fresh water cycle in arctic regions, such as the SEARCH and Arctic-CHAMP. It will collaborate with ongoing national and international efforts and develop value-added products. The results of this study will improve our understanding of the spatial and temporal variability of precipitation and its contribution to the freshwater balance of the high-latitude land and ocean systems. They will also be useful to analyses of global climate change and validation of the GCM/RCM simulations.