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Title: *Information relevance for scenarios of Arctic climate and water change*

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Relevant and accessible information about Arctic water and climate change is vital for scenario projection and adaptation in the rapidly changing region. We investigate the adequacy and relevance of hydrological monitoring systems, climate model data and hydro-climatic change understanding for formulation of change scenarios and adaptation to water system changes in the Arctic. Our results indicate a lack of harmonized water chemistry data for the pan-Arctic drainage basin, which may impede efforts at understanding transport and origin of key waterborne constituents and projecting their changes of relevance for water, climate and ecosystems. Furthermore, divergent distribution of observed and projected climate change severity poses challenges to prioritizing monitoring development. Climate model projections of drainage basin temperature and precipitation have improved between two successive model generations, but large inaccuracies remain for projected precipitation scenarios. Late 20th-century discharge changes in major Arctic rivers generally show excess of water relative to observed precipitation changes, indicating a possible contribution of stored water from permafrost or groundwater, even when considering data uncertainty on Arctic precipitation. To provide adequate information for research and policy, Arctic hydrological and hydrochemical monitoring needs to be extended, better integrated and more accessible, specifically regarding hydrochemistry with a more complete set of basins, and in general for the large unmonitored areas closer to the Arctic Ocean. Improvements in climate model parameterizations are needed in particular for precipitation projections, and further water-focused data and modeling efforts are required to resolve the source of excess discharge in Arctic rivers.