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INCREASES IN PAN-ARCTIC RIVER WATER TEMPERATURE AND HEAT FLUX TO THE ARCTIC OCEAN

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Increases in surface air temperatures in the Arctic have been exceptionally fast over recent decades. The increased temperature resulted in a number of changes in the Arctic system during the period, for example increases in river water temperature flowing higher amount of heat to Arctic Ocean. However, there are significant knowledge gaps in our understanding for changes in the river water temperature and its impact to Arctic Ocean. Therefore, we assessed changes in river water temperature in pan-Arctic rivers during the period 1979–2009, based on observations and a hydrological model (CHANGE). The model can estimate river water temperature using air temperature, snow depth, and river discharge. The model simulated increasing river discharge and water temperatures, consistent with the observations, which resulted in increasing trend in heat flux (167.7 PJ yr^{-1} , $p=0.23$) flowing into Arctic Ocean, suggesting influences on heat budget in the Arctic Ocean and thus sea ice. The increasing trend was mostly significant in Eurasian rivers, which indicates higher correlation sea surface temperature during the spring when it occurs the peak river discharge. This result provides an insight about the influence of pan-Arctic rivers on declining sea ice.