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TITLE: Title: Projected hydrologic changes in Northern Eurasia in the 21st century

ABSTRACT BODY: Northern Eurasia is experiencing significant changes under a warming climate, changes that are expected to increase over the next century based on climate model projections. Amongst the changes, the increasing streamflow and degrading permafrost are the foci of this study. These two changes have been observed and studied in the 20th century, but it remains a critical concern how these recent observed changes will advance towards the end of the 21st century. The Variable Infiltration Capacity land surface model (VIC) is used to simulate the water and energy cycle in the NEESPI region under the Special Report on Emission Scenarios (SRES) A2 scenario during the time period of 1980 to 2099. Controlled experiments utilizing VIC model were conducted to attribute these changes. Annual river runoff is subjected to increase 40 mm (half the annual precipitation increase); this increase is strongly influenced by projected increases in precipitation and tempered by increases in air temperature. Soil heat content is used as the indicator of soil heat gain/loss and it takes account of soil temperature, soil moisture and phase change. During 1980 to 2099 soil heat content will keep increasing to the end of 21st century, mainly due to increasing air temperature but in some regions increased snow insulates the surface and retains summer soil heat such that on an annual basis a net increase of soil heat is predicted. Moreover, it also shown in the results that permafrost across NESSPI is subjected to mild degradation.

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AUTHORS/INSTITUTIONS: R. Xu, E.F. Wood, Dept Civil & Environmental Engineering, Princeton University, Princeton, NJ;
T.J. Troy, The Earth Institute, Columbia University, New York, NY;

SPONSOR NAME: Ruolan Xu

CONTACT (E-MAIL ONLY): ruolanxu@princeton.edu