



## **Hydrological responses to landscape changes in Arctic river basins**

Johanna Mård (1), Fernando Jaramillo (2,3), Georgia Destouni (2,3)

(1) Dept. of Earth Sciences, Uppsala University, Sweden (johanna.maard@geo.uu.se), (2) Dept. of Physical Geography, Stockholm University, Sweden, (3) Bolin Centre for Climate Research, Stockholm University, Sweden

River discharge is an important catchment integrator of the impacts of climate-driven and other anthropogenic environmental changes across large landscape areas. Discharge changes may thus enable interpretation of which large-scale change drivers that may dominate resulting change effects on the terrestrial hydrological cycle. Changes in the latter include then precipitation, evapotranspiration and water storage changes in addition to and combination with the discharge changes over hydrological basins. Among water storage changes in the Arctic, thawing permafrost, glacier retreat, and changes in the distribution of lakes and wetlands are part of the total hydrological change, which in turn interacts with changes in Arctic ecosystems. We have investigated the patterns of lake-area and hydro-climatic changes in Arctic river basins (~11,000-50,000 km<sup>2</sup>) and the possible influence of permafrost change reflected in such patterns. A salient change pattern emerging across all investigated basins is an opposite direction of runoff change to that of precipitation change. This contrast is explainable by apparent evapotranspiration changes that may be due to observed changes in surface water (lake) area and associated water-storage changes. This work shows that patches of local lake-area change can add up to considerable large-scale effects on evapotranspiration, runoff and associated ecosystem changes.