



Climate and permafrost effects on the chemistry and ecosystems of High Arctic Lakes.

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Abstract: Permafrost exerts an important control over hydrological processes in Arctic landscapes and lakes. Recent warming and summer precipitation has the potential to alter water availability and quality in this environment through thermal perturbation of near surface permafrost and increased mobility of previously frozen solutes to Arctic freshwaters. We present a unique thirteen-year record (2003-16) of the physiochemical properties of two High Arctic lakes and show that the concentration of major ions, especially SO_4^{2-} , has rapidly increased up to 500% since 2008. This hydrochemical change has occurred synchronously in both lakes and ionic ratio changes in the lakes indicate that the source for the SO_4^{2-} is compositionally similar to terrestrial sources arising from permafrost thaw. Record summer temperatures during this period (2003-16) following over 100 years of warming and summer precipitation in this polar desert environment provide likely mechanisms for this rapid chemical change. An abrupt limnological change is also reflected in the otolith chemistry and improved relative condition of resident Arctic char (*Salvelinus alpinus*) and increased diatom diversity point to a positive ecosystem response during the same period.

Notes: Cites: Proc Natl Acad Sci U S A. 2015 Mar 24;112(12):3636-4025775530
Cites: Ambio. 2006 Jun;35(4):160-816944640
Cites: Proc Natl Acad Sci U S A. 2007 Jul 24;104(30):12395-717606917
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