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Nordic Hydrology **Vol 34 No 1-2 pp 51 - 70** © IWA Publishing 2003 doi:10.2166/nh.2003.004

Thermo-hydrological Responses to an Exceptionally Warm, Dry Summer in a High Arctic Environment

Paper presented at the 13th Northern Res. Basins/Workshop (Saariselkä, Finland and Murmansk, Russia-Aug. 19-24 2001)

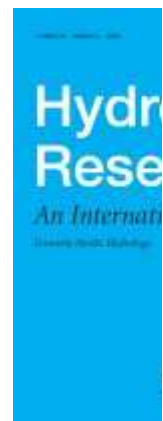
Kathy L. Young¹ and Ming-ko Woo²

¹York University, Toronto, Ont., Canada, M3J 1P3

²McMaster University, Hamilton, Ont., Canada L8S 4K1

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ABSTRACT

1998 was a very warm year for Canada and the High Arctic was no exception. A typical area was Resolute, Cornwallis Island, Nunavut, where the thaw season was extended and the thawing degree-days were larger than normal. The warm summer was accompanied by early spring melt and low rainfall. This study documents the thermo-hydrological responses including warming of the top soil, deepening of the active layer, alteration of the evaporation pattern, adjustment of the water table positions and runoff. The presence of semi-permanent snowbanks and patchy wetlands buffer some local sites from the warm and dry summer conditions. This and other studies show that the cryospheric and hydrologic systems may or may not recover quickly from the year to year variations in the climate, depending on how readily the storages (snow, ice and basin moisture) can be replenished. In view of the cumulative effects of storage depletion under climatic warming, short-term studies on thermo-hydrological behaviour in the Arctic provide a useful but insufficient analogue to capture the climatic change impacts.

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