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Controls on the fate and transport of methylmercury in a boreal headwater catchment, northwestern Ontario, Canada

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Abstract. The fate and transport of methylmercury (MeHg) were studied in a small boreal catchment. Hydrological processes largely govern the magnitude of the flux of MeHg. Seasonal and inter-annual variability in hydrology produce variable source strengths of MeHg throughout the catchment. The mass flux of MeHg within, and from the catchment is dependent on the mass flux of water and the relative placement of landscape units in the catchment hydrological cascade. Hydrology also governs the maintenance of the methylating environments in the catchment. Specifically, hydrological processes maintain zones of anoxia in both the catchment uplands and peatlands that support obligate anaerobic sulphate-reducing bacteria. In addition, groundwater flow paths are an essential control on the delivery of sulphate to these bacteria that facilitate *in situ* mercury methylation.

Keywords: methylmercury, methylation, hydrology, boreal catchment, peatland, Ontario, Canada

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