In situ sulphate stimulation of mercury methylation in a boreal peatland: Toward a link between acid rain and methylmercury contamination in remote environments

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Recent studies have found that “pristine” peatlands have high peat and pore water methylmercury (MeHg) concentrations and that peatlands may act as large sources of MeHg to the downstream aquatic system, depending upon the degree of hydrologie connectivity and catchment physiography. Sulphate-reducing bacteria have been implicated as principal methylators of inorganic mercury in many environments with previous research focused primarily on mercury methylation in aquatic sediments. Experiments in a poor fen in the Experimental Lakes Area, northwestern Ontario, Canada, demonstrated that the in situ addition of sulphate to peat and peat pore water resulted in a significant increase in pore water MeHg concentrations. As peatlands cover a large area of the Northern Hemisphere, this finding has potentially far ranging implications for the global mercury cycle, particularly in areas impacted by anthropogenically derived sulphate where the methylmercury fraction of total mercury species may be much larger than in nonimpacted environments.

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