DOWNSTREAM MERCURY REACTIVITY IN CONTRASTING CATCHMENT ENVIRONMENTS IN THE SWEDISH SUB-ARCTIC

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Mercury (Hg) is a pollutant of global concern that occurs naturally in different forms in the environment and can lead to severe health concerns in wildlife and humans in its methylated form (MeHg). MeHg levels in Arctic biota have shown an increasing trend, putting especially indigenous communities in the Arctic at risk. We expect differences in the reactivity of remobilized terrestrial Hg in downstream systems depending on catchment properties and DOM composition (terrestrial vs. aquatic characteristics). To understand the role of catchment properties for Hg and MeHg fluxes and their reactivity, we sampled different streams and lakes along a climate and vegetation gradient in the Swedish sub-arctic, encompassing tundra-, birch-, and coniferous catchments in August 2020. We analysed total Hg and MeHg, water chemistry, and DOM characteristics in lakes and streams across the different catchment types. We found that lake Hg and MeHg concentrations are significantly higher in the coniferous catchments as compared to birch and tundra ecosystems; $p=0.003$ (Hg) and <0.001 (MeHg) respectively. However, % MeHg of total Hg in the tundra lakes were slightly higher than in lakes in coniferous and birch ecosystems ($p=0.1$). We also observed significant differences in optical properties of the DOM determined by fluorescence among the catchments. E.g., the biological index, was significantly higher in tundra lakes compared to coniferous and birch lakes ($p<0.0001$). Overall, our study suggests that catchment properties may play an important role for not only the mobilization of Hg but also the availability of Hg for bioaccumulation.