

# **Mercury deposition and redox transformation processes in peatland constrained by mercury stable isotopes**

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Peatland vegetation takes up mercury (Hg) from the atmosphere [1], typically contributing to net production and export of neurotoxic methyl-Hg to downstream ecosystems [2]. Chemical reduction processes [3] can slow down methyl-Hg production by releasing Hg from peat back to the atmosphere. The extent of these processes remains, however, unclear. Here we present results from a comprehensive study covering concentrations and isotopic signatures of Hg in an open boreal peatland system to identify post-depositional Hg redox transformation processes [4]. Isotope mass balances suggest photoreduction of Hg<sup>II</sup> is the predominant process by which 30% of annually deposited Hg is emitted back to the atmosphere. Isotopic analyses indicate that above the water table, darkbiotic oxidation decreases peat soil gaseous Hg<sup>0</sup> concentrations. Below the water table, supersaturation of gaseous Hg is likely created more by direct photoreduction of rainfall rather than by reduction and release of Hg from the peat soil. Identification and quantification of these light-driven and dark redox processes advance our understanding of the fate of Hg in peatlands, including the potential for mobilization and methylation of Hg<sup>II</sup>.

## References:

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