MERCURY DYNAMICS IN A THAWING PEATLAND: STORDALEN MIRE, ABISKO

*Jacobson, Rebecca
Department of Environmental Science and Policy, rmjacobson@plymouth.edu
Faculty Advisors: Dr. Warren Tomkiewicz and Dr. Lisa Doner

Several recent studies have suggested that climate change in northern high latitudes plays a key role in enhancing export of mercury (Hg) from its sequestration in peatlands to the atmosphere and hydrosphere (1-3). To investigate Hg export during thawing, we measured exchangeable Hg in peat cores sampled across a thaw gradient in Stordalen Mire, in the Abisko Nature Reserve (68 ° 21' N latitude). Our sample suite includes cores sampled from the palsa (dry permafrost), a "semi-thawed" site dominated by Sphagnum, and a fully thawed and submerged site dominated by Eriophorum. Methane and CO2 flux measurements from the Sphagnum and Eriophorum sites indicate significant roles for different microbial communities along the thawing gradient. In nearly all cases, we found the most elevated Hg concentrations in the shallow parts of the peat cores, with a general decrease in Hg with increasing depth. The palsa cores, taken as a whole, had the highest Hg abundances, and the Sphagnum cores, taken as a whole, had the lowest Hg concentrations. Peat beneath the Eriophorum sites, by contrast, was the most variable in terms of its Hg content. We interpret these results as an indication that Hg is exported from the peat during the first stage of thawing and then Hg can be reintroduced during subsequent thawing, either by interactions with surface waters or due to microbial activity.