EGU24-1257, updated on 22 Jul 2024
https://doi.org/10.5194/egusphere-egu24-1257
EGU General Assembly 2024

On the contribution of boreal wetlands to the Northern Hemisphere carbonyl sulfide sink

Anna de Vries[1], Georg Wohlfahrt[1], Timo Vesala[2], and Kukka-Maaria Kohonen[3]
[1]Ecology, Universität Innsbruck, Innsbruck, Austria (anna.de-vries@uibk.ac.at)
[2]Atmospheric and Earth System Research, University of Helsinki, Helsinki, Finland (timo.vesala@helsinki.fi)
[3]Environmental Systems Science, ETH Zurich, Zurich, Switzerland (kukkamaaria.kohonen@usys.ethz.ch)

Previous studies inferred a missing sink of carbonyl sulfide (*COS*) in high Northern latitudes. Boreal *COS* budgets, however, typically account solely for the contribution by forests and ignore any uptake that widespread wetland ecosystems may contribute. Here we present the first direct measurements of the ecosystem-atmosphere *COS* exchange of a boreal wetland and compare this with a needleleaf forest ecosystems. We then use these data to up-scale to the boreal region.

We found that the investigated wetland was a stable sink for *COS* during the vegetation period, taking up on average of 10 pmol $m^{-2}s^{-1}$*COS*. While this was just 64% of the forest *COS* uptake, upscaling to the boreal region using the ORCHIDEE land surface model revealed that the Northern wetland sink, c. 20 GgS/y, was on the same order of magnitude compared to the forest *COS* sink. Our results thus indicate that northern *COS* should not neglect contributions by wetland ecosystems.