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Elevated Ozone Concentration and Ultraviolet Radiation may change Isoprene Emission from Northern Peatlands –First Observations

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Isoprene is a highly reactive hydrocarbon emitted in copious quantities by vegetation. It has a crucial role in atmospheric chemistry through the production-destruction processes of ozone. Isoprene can also alter the abundance of other greenhouse gases in the atmosphere and contribute to aerosol formation. Peatlands cover vast areas in the northern hemisphere and can be a significant source of isoprene to the northern atmosphere. This study presents preliminary results of altered isoprene emission rates from peatlands under elevated ozone concentration and UV-B radiation.

Emission measurements were conducted with chamber techniques on a natural arctic flark fen that had been exposed to elevated UV-B radiation simulating 20 % loss in the ozone layer. The effect of elevated ozone concentration was examined in an outdoor experiment with peatland microcosms representing a boreal *Sphagnum* fen. The microcosms had been exposed to a doubled ozone concentration for two growing seasons. Gas samples were collected into Tenax adsorbent and analyzed by gas-chromatography. Chamber temperature and photosynthetically active radiation were measured during sample collections and used as covariates in statistical analyses.

The mean isoprene emission rates were 63.0 μg $m^{-2}h^{-1}$ from the arctic fen and 110.3 μg $m^{-2}h^{-1}$ from the microcosms. Elevated ozone concentration significantly increased isoprene emission from the microcosms in measurements conducted before noon. The emission was remarkably larger in the afternoon, but there were no ozone effects. Elevated UV-B radiation slightly increased isoprene emission from the arctic

fen compared to the controls.

These preliminary results are in agreement with earlier observations which have indicated that peatlands are a notable source of isoprene. Our results also suggest that the emission is likely to be altered by various environmental stresses including ozone episodes and increased UV-B radiation. To better assess the influence of elevated ozone concentration and UV-B radiation on isoprene emissions, the experiments will continue with more intensive isoprene sampling in the coming field season.