



Biogenic volatile organic compound (BVOC) emissions from a subarctic heath ecosystem as affected by climatic warming

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Arctic ecosystems are exposed to rapidly advancing climatic warming. As emission of many BVOCs from plants is temperature-dependent, the estimated 3-5°C temperature increase within the next 100 years may lead to higher emissions from the Arctic.

We measured non-methane BVOC emissions at a wet subarctic heath using the dynamic chamber method with Tenax/Carbopack adsorbent tubes followed by GC-MS analyses. The heath had been exposed to warming by open-top greenhouses and to mountain birch litter addition for seven years prior to BVOC measurements. Litter addition simulated the expected increasing leaf litter fall resulting from the ongoing expansion of deciduous shrubs in the Arctic.

The heath with a vegetation composed of mixed shrubs, herbs and graminoids emitted approx. 100 µg/m²/h isoprene and low amounts of various monoterpenes, sesquiterpenes and other compounds. The experimental warming by 3-4°C increased the isoprene emission on average by 60%, while litter addition tended to decrease the emissions. The emission of other terpenoids was also significantly increased by warming. Principal component analysis of the BVOC emission profiles showed that the treatments altered the relative contributions of individual BVOCs to the total emissions.

Climatic warming is likely to increase BVOC emissions from the subarctic heath tundra. This together with the altered composition of the emitted BVOCs may have im-

plications on plant-insect interactions and regional atmospheric chemistry.