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Emissions of volatile organic compounds from mountain birch

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Mountain birch (*Betula pubescens ssp. czerepanovii*), a subspecies of downy birch, is a dominating tree species in large areas of Northern Scandinavia, Iceland, Southern Greenland and Kola Peninsula. To the author's knowledge, no measurements of VOC emissions from mountain birch have been published. In the recent emission inventories mountain birch forests are considered as silver/downy birch.

The measurements took place in Stordalen Nature Reserve, located in the northern Sweden (68˚20'N, 19˚03'E, 360 m A.S.L.). The measurements were performed using dynamic enclosure made of transparent Teflon-film. Frame of the enclosure was kept on the tree at least one day before measurements and whole enclosure closed at least one hour before measurements. The samples were trapped into cartridges, filled with Tenax-TA and Carbopack-B, using a constant flow of about 0.1 l min^{-1}. Duration of one sampling varied from 1 to 3 hours. The cartridges were analyzed later in the laboratory using GC-MS.

Mountain birch was found to emit significant amounts of VOCs. Average emissions of the dominating compounds and their relative proportions during the campaign were: linalool 0.6 μg g_{dw}^{-1} h^{-1} (14%), monoterpenes 0.8 μg g_{dw}^{-1} h^{-1} (18%), and sesquiterpenes 3.0 μg g_{dw}^{-1} h^{-1} (68%). Emission of isoprene was negligible. Both monoterpene and sesquiterpene emissions show strong dependence on temperature

Sesquiterpenes are likely to be precursors for aerosol formation and growth. Therefore we may assume the high emissions from mountain birch to partly explain observed aerosol events in the northern latitudes.