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BVOC fluxes in Eastern Siberian larch forest growing on permafrost soils

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Emissions of biogenic volatile organic compounds (BVOC) from the boreal forest biome contribute a large precursor source for formation and growth of secondary organic aerosol, with unknown but potentially substantial effects on atmosphere and climate. However, variation in the BVOC source distribution across the boreal forests and over the course of a growing season is poorly quantified, based on a very limited number of short-term studies in northern Europe and northern America.

In eastern Siberia, Larix gmelinni forests dominate an area of ca. 28 X 106ha, one quarter of the entire Eurasian boreal forest. So far, no observations of leaf or ecosystem BVOC fluxes have been reported although it has been argued that larch is a substantial emitter of monoterpenes and sesquiterpenes. We will present first results from a number of measurement campaigns performed at the Spasskaya Pad flux station (ca. 40km to the northeast of Yakutsk, 62o15'18.4"N, 129o37'07.9"E) from a larch forest growing on permafrost soils.

The forest was a substantial source of monoterpenes and of methanol with maximum rates observed during warm summer periods, when temperatures at this continental location could exceed 30oC. Leaf measurements also identified substantial sesquiterpene emissions; these compounds have a low atmospheric lifetime and could not be detected with the above-canopy flux measurements. Applying measured emission factors for the entire region suggest that the Siberian larch biome is a much larger source of monoterpenes than previously thought.