



## **Direct ecosystem scale measurements of volatile organic compound emissions from a boreal forest**

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Large quantities of terpenoid compounds are emitted into the atmosphere from boreal coniferous forests. In addition, boreal forests are estimated to emit significant amounts of non-terpenoid volatile organic compounds (VOCs). To quantify these emissions in the ecosystem scale and to assess their importance in comparison with terpenoid emissions, we carried out direct micrometeorological flux measurements above a boreal Scots pine forest in June–September 2006 and April–September 2007. The flux measurements were conducted using the disjunct eddy covariance method, which does not require any empirical parameterizations. The VOC analysis associated with the flux measurements was carried out using proton transfer reaction mass spectrometry, which is a novel technique for online measurements of atmospheric concentrations of numerous VOCs. The measurements showed that emissions of non-terpenoid VOCs were of the same order of magnitude as emissions of monoterpenes. The emissions of non-terpenoid VOCs consisted of acetaldehyde, acetone, and methanol. The compatibility of the measured monoterpene emissions with the traditional temperature dependent emission algorithm was reasonable. To find out the dependence of non-terpenoid VOC emissions on environmental variables, further micrometeorological flux measurements as well as leaf or branch scale experiments in a controlled environment are required.