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Disjunct eddy covariance measurements of volatile organic compound emissions from a boreal pine 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). In order to quantify these emissions in the canopy scale and to assess their relative importance in comparison with terpenoid emissions, we carried out micrometeorological flux measurements above a boreal Scots pine forest. The flux measurements were conducted using the disjunct eddy covariance technique and the associated VOC analysis was done using proton transfer reaction mass spectrometry, which allows online concentration measurement of numerous VOCs. The flux measurements were performed in July 2005 and during June–August 2006. The measured emissions of non-terpenoid VOCs consisted of acetaldehyde, acetone, and methanol. They were on the same order of magnitude as the monoterpene emissions. In order to include non-terpenoid VOCs in emission inventories, further studies aiming at emission algorithm development are required.