



Canopy scale emissions of terpenoid and non-terpenoid hydrocarbons from a boreal pine forest measured by disjunct eddy covariance and relaxed eddy accumulation techniques

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Boreal coniferous forests are known to emit large amounts of isoprene and monoterpene compounds into the atmosphere. In addition to these terpenoids, boreal forests are estimated to emit also non-terpenoid volatile organic compounds (VOC). In order to quantify these emissions in canopy scale and to assess their relative importance in comparison to the terpenoids we have conducted flux measurements of monoterpenes and non-terpenoid compounds above a boreal Scots pine forest. The measurements were conducted using disjunct eddy covariance (DEC) and relaxed eddy accumulation techniques (REA). In the DEC technique a proton transfer reaction - mass spectrometer was used as the on-line hydrocarbon analyzer, whereas in the REA technique the VOCs were trapped onto Tenax - Carbopack to be analyzed in laboratory by gas chromatography - mass spectrometry. The effect of chemical degradation of measured compounds between source and measurements heights was estimated by the use of a stochastic Lagrangian transport model with simplified chemistry. The measurements showed the forest to emit significant amounts of methanol, acetone and monoterpenes, of which the most abundantly emitted species were α -pinene and Δ^3 -carene.