



Eddy covariance flux of VOCs and their oxidation products measured with the novel PTR3-TOF on top of the Hyttiälä tower in Finland

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We report first eddy covariant flux results of reactive organic carbon ranging from volatile organic compounds (VOCs) to highly oxygenated molecules (HOMs) utilizing the novel PTR3-TOF. We deployed the instrument on top of a 35 m tall tower above the boreal forest canopy in Hyttiälä, Finland. With this new instrument we are able to quantitatively measure several generations of oxidation products in the lifecycle of reactive VOCs such as monoterpenes and sesquiterpenes down to volume mixing ratios of ~ 10 ppq (parts per quadrillion). A dedicated inlet was developed for this campaign that minimizes wall contact and the resulting losses of HOMs while still sampling from a distance long enough to avoid wind flow field disturbances by the tower. We acquired highly time resolved (10Hz) concentration data over a period of five weeks during spring 2016. Deriving flux information from synchronized vertical wind speed measurements, we can give insight into emission, conversion and deposition of a wide range of compounds. Together with the extensive dataset revealed by the stationary instrumentation present at the Hyttiälä tower observatory, we will be able to improve our understanding in new particle formation and growth, leading to biogenic aerosol and cloud condensation nuclei.