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Measurements of BVOC emissions from *Fagus sylvatica* L. in controlled environmental conditions: preliminary results

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It is now well-established that large amounts of non-methane volatile organic compounds (NMVOCs) are emitted by terrestrial ecosystems and that these biogenic VOCs (BVOCs) play an important role in atmospheric gas phase and aerosol chemistry. Leaf temperature and photosynthetic photon flux density (PPFD) are considered as the main driving variables behind BVOC emissions in the commonly used emission algorithms [1, 2]. In recent emission algorithms such as MEGAN [3], other variables such as temperature and light history, phenology and soil water potential are also taken into account to explain the variability in emissions for a given tree species.

With the aim to test these new algorithms, BVOC emission studies have been performed on young *Fagus sylvatica* L. trees in a growth chamber under controlled PPFD and temperature conditions using dynamic branch enclosure systems and a hs-PTR-MS BVOC analyzer.

Ion signals related to monoterpenes (m/z 81 and 137), isoprene (m/z 69) and acetone (m/z 59) have been measured continuously with the PTRMS during several experi-

mental periods. The data show that *Fagus sylvatica* L. is a low isoprene emitter and a rather strong monoterpene emitter, which is in agreement with recently published field measurements on this tree species [4, 5].

Most experiments were performed with a varying daily PPFD pattern, constant during the experimental period. Monoterpene emissions in the morning at a given PPFD were generally found to be lower than in the afternoon at the same PPFD, which results in a diurnal hysteresis behaviour of monoterpene emissions versus PPFD.

In order to study the response of monoterpene emissions on variations in temperature, air temperature in the growth chamber was varied stepwise, and data were fitted to the Guenther-97 algorithm. Strong temporal variations of the SEF are observed. An overall decrease of the emissions over time is also noticed and might be explained by phenology (senescence).

During the experiments important transient BVOC emissions from *Fagus sylvatica* L. have often been observed after light-dark transition, a phenomenon that recently also has been reported for poplar trees [6].

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