



Deposition of terpenes to vegetation – a paradigm shift towards bidirectional VOC exchange?

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Biogenic volatile organic compounds (BVOCs) are important precursors for secondary organic aerosol (SOA) formation (Hallquist et al., 2009). In addition reactive BVOCs play a crucial role in local tropospheric ozone production (Atkinson, 2000). According to the present scientific understanding vegetation is recognized as a major VOC emission source rather than a deposition sink. Our recent observations however demonstrate that an uptake of terpene compounds to mountain grassland can be significant - at least under certain atmospheric conditions.

After a severe hailstorm volume mixing ratios (VMR) of locally emitted terpene compounds originating from conifers located at the mountain slopes were strongly enhanced, even during daytime hours. Weeks after the hailstorm our PTR-MS and PTR-time-of-flight (PTR-TOF) instruments still measured deposition fluxes of monoterpenes (m/z 137.133), sesquiterpenes (m/z 205.195), and oxygenated terpenes (m/z 153.128) to the grassland. The total amount of terpenoids (on a carbon basis) deposited to the grassland during the weeks after the hailstorm is comparable to the total methanol emission of the entire growing season (Bamberger et al., 2011). These findings pose the question whether the terminology should be adjusted from VOC emission to VOC exchange.

References:

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