

How different stresses influence the emission of BVOC and consequent the biogenic SOA formation

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Biogenic volatile organic compounds (BVOC) emitted by vegetation are an important source of secondary organic aerosols (SOA), which are known to affect the climate. Pathogens, insect attacks, heat waves and droughts can induce stress to plants that may change their BVOC emission pattern and strength. In this study, the potential impact of such stress-induced BVOC emissions on photochemical SOA formation was analyzed for tree species typical for mixed deciduous and Boreal Eurasian forests [1,2]. The results show that such stress conditions have significant impacts on SOA formation. Stress-induced emissions of sesquiterpenes, methyl salicylate, and C₁₇-VOC increase SOA yields. Mixtures including these BVOC exhibit SOA mass yields between 17 and 33 %, significantly higher than mixtures containing mainly monoterpenes (4–6% yield). Green leaf volatiles suppress SOA formation, possibly by scavenging OH, similar to isoprene. By classifying emission types, stressors and SOA formation potential, we will discuss possible climatic feedbacks regarding aerosol effects.

In addition, we relate these findings to our recent observations of a new oxidation pathway that promptly produces extremely low-volatility vapors, providing a missing link between BVOC emission and SOA formation over forested regions [3,4].

[1] E.Kleist *et al Biogeosciences*, **9**, 5111–5123, 2012 [2] Th. F. Mentel *et al Atmos. Chem. Phys.*, **13**, 8755–8770, 2013 [3] M. Ehn *et al Nature*, **506** 476-479, 2014 [4] J. Wildt *et al, Atmos. Chem. Phys.*, **14**, 2789-2804, 2014