

Interactive comment on “The emission factor of volatile isoprenoids: caveats, model algorithms, response shapes and scaling” by Ü. Niinemets et al.

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In my previous comment I argued that the main challenge to improve uncertainties in bottom-up emission models is related to the up-scaling process of bottom-up emission factors (Es). The variability of individual Es determinations using enclosure techniques makes it notoriously difficult to define, model and aggregate Es representative for a given ecosystem. Inherent uncertainties of the scaling problem (leaf-canopy-region-globe) can only be reduced by an integrated approach. Ecosystem scale flux measurements can give realistic constraints on the canopy scale (e.g. by using an inverse model to infer Es). The concept of a canopy-scale emission factor in combination with a

C166

SVAT and based on a top-down approach can bypass significant uncertainties that add up in the traditional up-scaling process. The Achilles heel of this approach has always been that the uncertainty increases proportional to the number of variables/parameters (e.g. leaf level Es, biomass / LAI distribution, canopy structure etc.) according to general error propagation laws. I would argue that herein lies the main challenge for improving uncertainties in bottom-up emission models on scales that matter for atmospheric chemistry models. Without an integrated effort the evaluation and discussion of uncertainties in VOC emission models will remain ambiguous.

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C167