

Interactive comment on “The emission factor of volatile isoprenoids: stress, acclimation, and developmental responses” by Ü. Niinemets et al.

Anonymous Referee #1

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The authors reviewed some of the main issues that may affect the standardized emission rates (= the emission factors) of volatile isoprenoids. Mainly they focused on stresses but also considered a few developmental issues. It is an authoritative review that has been prepared by some of the most prominent scientists in the field. It is also a rather redundant piece of work, at least at the moment. It is unfortunate that there have been numerous recent reviews unraveling many facets of volatile isoprenoid emission. This review is focused on modeling aspects, but almost all information that are given in the ms can be found in the Trends in Plant Science special issue that has been released very recently, and to which some of the authors have contributed. There is also a Nature Chem Biol 2009 review focusing on a similar issue. Under this point view, this review is very untimely, and should be postponed to a moment in which enough novel information will be collected.

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A few specific issues:

1537 – 12: Acclimation and activation of alternative carbon sources do not explain enhancement of emissions when recovering from drought, and perhaps other stresses as well. The whole issue of acclimation is rather fussy and should be clearly outlined.

1538 – 8: Sometimes a rather sudden drop of isoprene emission occur under prolonged exposure to high temperatures. This is different than the “gradual” reduction of emission capacity to which the authors refer.

1539-13: It is not that difficult to separate the impact of biotic stresses on volatile emissions as they generally induce novel compounds. The impact of abiotic stressors is by far more difficult to disentangle as it is often reflected in changes of emissions of constitutive volatiles.

1540 – 12: There are key nutrients (other than N) that do not seem to have a positive impact on isoprenoid emission.

1540 – 18: It is difficult to say that there is an acclimation response to CO₂. Data of Fig. 2 are fitted by one best-fit line and therefore it seems that short and long term responses to CO₂ are not different, i.e. that acclimation is not an issue.

1541 – 7: “below” should be “above”?

1541 – 11: I often find this paper cited in the literature. It is time to say that the data obtained in the Tognetti’s paper are unreliable, and were never confirmed by more recent experiments.

1541-14: Observations at different CO₂ are not explained: even when looking at the intercellular CO₂ concentration?

1548 – entire section: Conceptually it is not possible to include a correction factor that accounts for the seasonality. Seasonality (or age) directly affects Es and this should be worked out by a new parameterization. Perhaps the authors could make a clear step

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forward toward improved parameterization with the currently available data? If not, I am afraid that the redundancy of this work is really a too heavy burden.

Interactive comment on Biogeosciences Discuss., 7, 1529, 2010.

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