

***Interactive comment on* “Emission of sunscreen salicylic esters from desert vegetation and their contribution to aerosol formation” by S. N. Matsunaga et al.**

S. N. Matsunaga et al.

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General comments: The work presented by Matsunaga et al. describes for the first time the emission of two salicylic esters by the leaves of a range of plants species. Surprisingly high amounts of these compounds are emitted from some common desert plants. The authors speculate that these VOC function as a UV protection on the leaf surface and are emitted as a response of high temperatures. The estimated contribution of the salicylic esters emitted to SOA formation makes up to 90% in landscapes dominated by some of the species. This figure indicates the significance of the paper presented. As information on atmospheric compounds involved in aerosol formation is still lacking, contributions such as that provided by Matsunaga et al. are of great importance for the understanding of atmospheric processes. Therefore, the paper is clearly within the

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scope of the journal.

Specific comments: To my opinion, there is however a strong discrepancy between the potentially important information provided by the paper and the details given on methodological issues. In order to evaluate the quality of the data presented and to estimate how representative the results are, more details on the experimental procedures should be provided. Therefore, the authors should indicate how many individuals per species and how many leaves/twigs per plant were studied. It should also be stated at what time of day the experiments were performed, and under what environmental conditions (light intensities, humidity in the enclosures) as these factors are involved in stomatal regulation.

— Some samples were collected from 2 branches (mondel pine, mesquite, populus and desert willow) in same individual using different enclosures (with and without temperature control). Table 1 has been modified to present number of the branches sampled. Light intensity and relative humidity (inside and outside of the cuvette) have also been added into the Table 1.

The authors mention the measurement of CO₂ concentrations but do not show any figures. What about assimilation rates? That would be a nice indicator for the physiological status of the plants investigated.

— The assimilation rate was determined only for leaf area; however, our emission measurements were based only on leaf weight. Because the conversion of leaf area into the weight can make another uncertainty, we avoided discuss about the assimilation rate. In addition, we assumed that the emission of the salicylic esters does not depend on photosynthesis because those are reserved on the plant surface for the UV protection.

Regarding SOA, I assume that this high contribution for SOA formation (90% in some cases) is a result of low emission rates of other terpenoids. A statement on this should be given in the discussion.

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— A sentence has been added into the section 3.2.

The authors assume that the biological role of the esters emitted is related to UV protection. As far as I understand, this is just a speculation as no data from literature is cited and no further studies elucidating their biological role have been undertaken. I therefore recommend not to refer to them as "sunscreens"; esters, at least not before this function in plants has been demonstrated.

— The esters are commonly used for ingredient of sunscreen lotion. But, as the referee mentioned, there is no evidence that the desert plant is also using the esters as sunscreen. A sentence has been added into the section 3.1 to avoid misunderstanding.

Technical corrections: Legend of Table 1: please replace Black Blush by Black Brush.

— The name has been corrected (also in text).

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 13619, 2008.

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