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Atmospheric Measurement Techniques Discussions

Interactive comment on "A tethered-balloon PTRMS sampling approach for rapid surveying of landscape-scale biogenic VOC fluxes" *by* J. P. Greenberg et al.

Anonymous Referee #2

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This covers a topic that is very relevant to AMT. The authors are certainly among the world's leading scientists in biosphere-atmosphere trace gas exchange, and have published collectively, thousands of papers in this field. This effort also discusses some field VOC data from ecosystems in Spain at spatial scales not previously studied. The uniqueness of the methods and data definitely warrant publishing in AMT. The component methods used here have been described previously, but I have a few questions regarding the system. How was power provided for the instruments, pumps, etc. If a generator was used, was there a tracer for exhaust that could have been sampled? Given a likely tendency for exhaust and the balloon to drift similarly, I'd guess this could

be an issue.

Were line losses of acetic acid and other compounds evaluated? It would seem this could be a possible factor affecting vertical chemical profiles. Were any cartridge or canister samples collected near the balloon inlet as a means of comparison, and also to speciate monoterpenes, or possibly examine VOC oxidation products? I seem to recall that high altitude tethered balloon and aircraft measurements were also conducted as part of MONTES. Is it possible that vertical chemical profiles of similar compounds could be compared from these platforms, especially since the balloon/PTRMS system had footprints that were probably smaller and affected by launch clearing and drift? I would expect that this may be another means of analyzing vertical profile shape, which seemed to vary a lot by site and compound. If planetary boundary layer height (PBL) estimates are available from balloon/aircraft observations, these could would be useful as a comparison to WRF-CHEM and in assessing flux estimates.

The authors seem to indicate that some of the uncertainties associated with the PTRMS-balloon technique would result in underestimates of the true BVOC fluxes, and then later in the paper suggest that MEGAN comparison with the fluxes would indicate that MEGAN terpene and isoprene estimates may need to be adjusted downward for some of these ecosystems. Is this discussion warranted at this point? Is this also suggested by local measurements at other scales?

All in all, the paper is interesting and useful. The MEGAN comparison with the MLV and SLG flux estimates are interesting. There is probably at least another paper in the details of vertical profile structure and source footprint analysis at these sites. The authors' point that towers and manned aircraft are prohibitively expensive (and require long lead-times and planning horizons) is well taken. The method they demonstrate here is portable and fast in response, and could generate a considerable amount of data for model characterization and parameterization at the critical canopy and landscape scales.

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