

Interactive comment on “Establishing the contribution of lawn mowing to atmospheric aerosol levels in American suburbs” by R. M. Harvey et al.

Anonymous Referee #1

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Establishing the contribution of lawn mowing to atmospheric aerosol levels in American suburbs. R. M. Harvey, J. Zahardis, and G. A. Petrucci

The paper focuses on the emissions of cis-3-hexenyl acetate (CHA) and cis-3-hexenol (HXL) which are classified as wound compounds and released by plants when damaged, in this case grass when a lawn is cut. Cis-3-hexenyl acetate is responsible for that freshly cut lawn smell.

The paper looks at the effect of ozonolysis of these compounds and resultant aerosol production. The experimental set up for studying the precursor and product gases and

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resultant aerosol does not sound idea with significant wall losses due to the low volume apparatus used. While this is corrected for it is far from ideal.

The experiment uses unrealistically high levels of ozone (800ppb) where are local concentrations are likely to be closer to 100ppb or lower. Surely once the production of secondary organic aerosol (SOA) had been identified in a high ozone mix experiment would it not have been better to rerun the experiment with more realistic concentrations.

The SOA yields from ozonolysis are calculated for individual components of CHA, HXL a mixture of the two and from headspace above cut grass. The aerosol yields found from the grass headspace gas is significantly higher than from the standards of CHA or HXL, perhaps one of the many other species released as a result of plant damage is a significant aerosol producer when reacting with ozone. There is no indication the authors looks into these other compounds.

While the authors have extrapolated their findings to suggest aerosol production on a national scale from lawn cutting activity they seem to have failed to consider that these same wound compounds are produced when other vegetation is damaged. Surely such a scheme could look at the SOA production from harvesting wheat and other crops which must be under considerably larger acreage.

Figure 1 of the sampling plot used to calculate the amount of lawn coverage is taken from a 2004 aerial photograph. Surely there is something more recent than a shot nearly a decade old which even looks dated next to a Google satellite shot.

In general the work appears to have been well conducted and is clearly present and written but I am not sure consideration has been given to the full range of wound compounds that are emitted during grass cutting and only considering lawn cutting appears to take a very narrow view so adding little to the knowledge of the subject.

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