Atmos. Chem. Phys. Discuss., 12, C1693–C1694, 2012
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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Gaseous VOCs rapidly modify particulate matter and its biological effects – Part 1: Simple VOCs and model PM" *by* S. Ebersviller et al.

Anonymous Referee #1

Received and published: 20 April 2012

Review comments for "Gaseous VOCs rapidly modify particulate matter and its biological effects – Part 1: Simple VOCs and model PM" by Ebersviller et al.

The manuscript describes an experimental set up to investigate the toxicological effects of particles, gases and mixtures of the two in in-vitro experiments. Especially results of experiments looking at the combined particle/gas effect is novel and interesting.

The concept of the experiment design is described repetitively. I suggest that the authors delete some of these paragraphs.

p. 5067/5077 (i): It is mentioned that in the GIVES system no particle effects are observed. It would be nice to see some evidence supporting this statement, e.g., particle

deposition characteristics, possibly from earlier publications. A detailed schematic of the GIVES instrument might be clarifying.

p. 5067/5077 (ii): Similarly, it is not clear why there should be no gas phase effects in the EAVES system. There seems no gas/particle separation in place for the EAVES. Thus the cell cultures in the EAVES are constantly exposed to the gas phase as well. Aerosol (gas and particles) is constantly pumped through the EAVES and it seems a similar gas response as in the GIVES should be observed. Exposure times in the EAVES are shorter than in the GIVES but effects in the GIVES are quite pronounced suggesting that also for the shorter exposure time in the EAVES gas phase effects should be observed.

p. 5079, line 21: No VOCs are observed in the clean air experiments. What was the detection limit for the VOC analysis method?

p. 5083. Line 17-22: How is the pronounced LDH release effect explained considering that tolualdehyde is not toxic, as mentioned on line 17? The authors mention that the effects of the particle addition to the system with respect to the GIVES and EAVES results are unexpected. What could have caused this unexpected and very pronounced result, especially the essential disappearance of the gas phase toxicity of tolualdehyde and partly also of acrolein?

The authors emphasize repetitively in the manuscript that the addition of tolualdehyde and acrolein to the mineral oil aerosol changes the composition of the mineral oil particles and consequently their toxicity. From an atmospheric chemistry point of view it seems obvious that a change in the organic gas phase composition also changes the composition of the particle phase. The surprising result of this manuscript is that the very small overall amount of tolualdehyde and acrolein aborbed by the mineral oil particles causes such a pronounced effect. As mentioned above this would deserve more discussion, also considering the instrumental questions raised above.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 5065, 2012.