

Interactive comment on “The role of VOC oxidation products in continental new particleformation” by A. Laaksonen et al.

Anonymous Referee #2

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The manuscript by Laaksonen et al. describes the role of organic vapors for new particle formation. The manuscript summarizes the results and findings which were published before in several papers. It adds as new information about growth measurements with an ethanol Tandem DMA and height resolved number concentration measurements made at an airplane. The manuscript is well written, but it summarizes too a large degree previously published results. This is the weakest point of the manuscript. I suggest that the reviewing part should be strongly reduced, it is clear from the previously published evidence that at least in later stage of particle growth OVOC contribute significantly. The added value by the new data and observations should then be stronger highlighted, e.g. the assessability of 10nm particles by the e-Tandem DMA measurements. I suggest publication after the major changes proposed

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above. In any case the authors should consider the major comments and correct the minor points.

Major comments and questions

p. 7825, line 17f

The formulation that "the growth factor depends on the relative size difference of the molecules in the particle and ethanol" is misleading: do you refer to the "usual" that for a given dry volume, the "number of soluble entities" depends on the density and the molecular mass of the solutes or do you refer to the finding of Petters et al. 2006 (Tellus, 58, 196-205) that dissolution of macromolecules leads to specific deviations from ideality? The latter could be indeed understood a effect of relative size of solute and solvent.

p. 7826, line 20 ff

This section is difficult to understand. What is a more southerly sector. What is a continental outbreak, how is it related to the southerly sector. Is there a northerly sector, is that related to arctic outbreaks ? Please specify.

p. 7827, line 20 ff

Doesn't the appearance of unusual organic signatures in AMS indicate that growth is not driven by MTOP and sesquiterpene oxidation products ?

p. 7828, line 18, Table 1

Were such high particulate concentrations of pinonaldehyde commensurable with the pinonaldehyde mixing ratios in the gas phase? Or was the particulate phase supersaturated with respect to the gas phase ?

p. 7829 line 22, and 7831 line 1

Were the altitude distributions of VOC and SO₂ measured during the flights ? Is there

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more experimental evidence than the height profile of the particle concentration for the contribution of VOC oxidation products to particle growth? Every ground near source could explain the simple fact of height dependence.

Minor points:

p. 7825, line 2

normal AMS do not use thermal desorption, but flash evaporation. Which technique was applied ?

p. 7824, line 1 ff

Sellegrì et al. 2005a, and 2005b is quoted in the text, but only one Sellegrì et al. 2005 appears in the reference list.

p. 7827 line 13

misplaced "(13,14)"; ?

Figure1 and 2

Is the deviation of the intercepts from 1 significant ? Does it mean anything ? Errors margins are missing.

Figure 5

What is shown in Figure 5, number concentrations of all particles or number concentrations between 3-10 nm?

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