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Interactive comment on “Chemical and microphysical properties of the aerosol during foggy and nonfoggy episodes: a relationship between organic and inorganic content of the aerosol” by D. S. Kaul et al.

Anonymous Referee #3

Received and published: 9 August 2012

This MS suffers from many faults and should be completely rewritten. Part of the material has already been published in EST and should not be repeated here. The new results (PMF) is given here only in the supplement. As the MS has to be rewritten anyway if the authors wish to publish it, I give here only the most problematic points. The quality of writing is quite uneven, and may lead to misunderstandings of the scientific content.

The introduction is much too long on the one hand and - if a review of aerosol/fog chemistry was intended - not comprehensive enough on the other. It contains sev-

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eral contradictory statements and errors, e. g. there seem to be misunderstandings about the meaning of "aerosols" (the term is used here synonymously for "particles", but aerosols are two-phase systems consisting of particles _and_ carrier gas) and "interstitial particles" - these are the particles _not_ taken up by cloud droplets, and not particles inside cloud droplets (dissolved or not). Aerosol particles need not be toxic to cause negative health effects. The whole introduction should be deleted and a new one should be written focussing on the PMF part and containing only information relevant to this part.

In the interpretation of the measured data, two points must be considered / discussed. At this time, many conclusions are based on handwaving arguments (changes in concentration are always explained by formation processes and other factors are neglected). Correlation analyses cannot determine causal links between the correlated variables.

1) what is the lower size cut of the fog sampler? If it is larger than 1 micrometer, all the discussion of changes in PM1 and its composition with the onset of fog is irrelevant, as humidity growth of accumulation mode particles will move part of this mode to the size range beyond 1 micrometer, so it will not be sampled by either the fog sampler or the PM1 sampler, and the partitioning of material between interstitial particles and fog droplets cannot be determined.

2) mixing height and its change is often mentioned, but the arguments always are in terms of changes of concentration. If mixing height changes, concentrations will change, too, so only changes in the relative contribution of the different substances to total mass concentration should be considered in the arguments.

There are numerous other points (e.g.: it is not surprising that the smallest fog droplets have the highest concentration of solutes - they contain the smallest amount of water), inconsistencies and contradictions (e.g. the formation or not of organosulfates in fog droplets), but as the MS has to be rewritten with a firm focus on the new material, a

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comprehensive list of points does not make sense here. I also strongly suggest that the English of the new MS is checked by a native speaker so that the scientific content is not compromised by problems with language.

The new paper should focus on new results, and be written

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 14483, 2012.

ACPD

12, C5552–C5554, 2012

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