

Interactive comment on “The importance of aerosol mixing state and size-resolved composition on CCN concentration and the variation of the importance with atmospheric aging of aerosols” by J. Wang et al.

Anonymous Referee #2

Received and published: 3 June 2010

The study presents results from a detailed CCN study where different assumptions of CCN compositions and mixing states for a data set acquired during the MILAGRO experiment in Mexico City are evaluated and compared. The authors make five assumptions of different complexity and try to reproduce measured CCN number concentrations. They show that the assumption of an external mixture often leads to good results although it may not represent the true composition/mixing state of the aerosol but rather opposing effects cancel. The findings are useful and promise that relatively simple assumptions can be made to predict CCN number concentrations, even in pol-

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luted regions with freshly emitted aerosol. The paper is well written and it is appropriate for publication in Atmospheric Chemistry and Physics after consideration of my comments below.

Specific comments

p. 11752, l. 24-27: Revise this sentence. Either add verb or remove ‘that’ in l. 24

p. 11755, l. 13 and l. 18: These sentences seem somewhat redundant and could be combined.

p. 11758, l. 12, 13: ‘5 values every 36 min’ and ‘all 5 supersaturations every 36 min’ seem redundant

p. 11760 Section3: The multiple addition of ‘in MILAGRO’ in several sentences in this section seems redundant as all discussion is about this data set.

p. 11761, l. 24: ‘disappearance’ might be misleading here as the particles do not actually disappear but only their concentration decreases.

p. 11763/4: An additional figure might be highly useful that shows graphically the different compositions/mixing states. If you keep the text in the section, I suggest highlighting only the differences between the cases and not repeating all common properties.

p. 11771 ff (Section 5.2): This section should be split into (at least) two subsections as it is quite hard to follow. Possible subsections could be ‘effect of $\kappa(\text{org})$ ’, ‘effect of ageing’, ‘comparison to previously assumed mixing time scales’

Table 1: For clarity, it would be useful to add another head line of the table that specifies the property that is compared in the respective column. E.g., Differences due to ‘mixing state’, ‘bulk vs. size-resolved’, ...

Figure 1: What is the color-coding in Figure 1c) ? Figure 2: For clarity, add (I-S), (E-S) etc to the legend (and refer to the new figure I suggested above)

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Figure 3: Complete the caption by ‘...as a function of local time and assumption on mixing state/composition’

Figure 5: the abbreviation ‘fxn’ for ‘fraction’ seems odd.

Technical comments p. 11756, l. 6: ...evaluation of its effect (add ‘of’)

p. 11756, l. 25-27: Either ‘...implication...is dicussed’ or ‘...implications ...are discussed’

p. 11776, l. 25: ‘particle sizes’ (not ‘particles size’)

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 11751, 2010.