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Interactive comment on “Atmospheric new particle formation as source of CCN in the Eastern Mediterranean marine boundary layer” by N. Kalivitis et al.

Anonymous Referee #1

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The paper by Kalivitis et al. presents CCN measurements as well as aerosol chemical composition data from the Eastern Mediterranean marine boundary layer. It leads to the conclusion that the condensation of gaseous sulfuric acid and organic substances onto newly formed particles induces their growth to particle sizes that are relevant for the activation into cloud droplets.

The information given in this manuscript is relevant for the readers of ACP and of interest for the community in general. However, there are a few issues as detailed below that have to be addressed by the authors before I can recommend the paper for publication in ACP.

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I have basically problems with the presentation of results in the figures. The authors draw a lot of conclusions from their measurements but they are not nicely represented in the figures. Improving the figures could make it much easier for the reader to spot the points that are made in the text. At the moment, I am not able to follow every conclusion because the figures not necessarily illustrate them.

Therefore, in the following, I raise several questions and suggest improvements (including technical corrections) for a revised version of the figures:

Fig. 1: unit of the flow rate is “ $\text{cm}^3 \text{min}^{-1}$ ”

Fig. 2: Please indicate in the caption what the arrows in the figure mean.

Fig. 4: Here it would be good to make two panels out of it, one showing the data for 25 – 28 August and the other for the period after the NPF event. At the moment no clear distinction between the two data sets is possible. You should show the regression lines for both periods as well as the fit parameters and correlation coefficients. Alternatively, they could also be listed in a table for easy comparison. Btw, the color of the equation for the N130 data set shown in the legend does not match the color of the symbols.

Fig. 6: Please mention that the mass concentrations in panel a are PM1 masses.

Fig. 7: As in all other time series and diurnal cycle plots the x-axis label is missing. Is it local time? Also in this figure one panel showing the mass fractions rather than concentrations would certainly make sense. I am not sure if Fig. 7a (diurnal cycle as an average over the whole August to September period) is telling you anything if you want to explain the chemical composition during the NPF event and possible implication on cloud droplet activation during NPF events.

Fig. 8: In this figure the diurnal cycle of kappa is averaged over a different time period than the chemical composition in Fig. 6. How are you able to find a link between these parameters, if you compare apples and oranges? What do you mean with “normalized into the range [0, 1]”? I do not understand how you get from the values in panel a

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to b. I would have expected that you divide each data point of the diurnal cycle by the average kappa value measured at this diameter. This at least should give you the relative diurnal variation, but in this case the data points would be also larger than one. So, I simply do not understand the calculation of kappa(normalized).

Fig. 9: What exactly is plotted here? The individual organic components as fractions of the total organic mass? Please clarify in the caption and/or y-axis label.

Fig. 10: Here the legend is missing! Again, the plotted time period is different from the periods shown in the other plots (Figs. 5-9). For better comparison the x-axis range should be extended. I guess it would also make sense to present the diurnal cycle of the maximum activation fraction.

Fig. 11: This is just another time period you concentrate on. Why not showing an average over all days?

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 11143, 2015.

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