

## ***Interactive comment on “Size-resolved CCN distributions and activation kinetics of aged continental and marine aerosol” by A. Bougiatioti et al.***

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*The authors would like to thank the reviewer for the valuable comments that have improved the manuscript. Please find below a point by point answer to the comments. The answers are displayed in italics.*

- While sections 2.3 and 3.2 report on the chemical composition, it is difficult from the text alone to determine the particle makeup. Some figures or tables would be helpful to summarize the chemistry.

*This is a good point. A table summarizing the average concentrations for the sampled aerosols is now introduced in the manuscript.*

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- The use of superscript and subscript “\*” marks on kappa, S, E and C is somewhat confusing and may be inconsistent in places – please double check these terms for accuracy and consider adding a short table defining these and other terms all in one place.

*All terms are now checked and consistent. There is now only the use of superscript “\*” in order to differentiate between the fitted values.*

- Page 12623 Line 8 mentions vertical error bars in Figure 9a which do not actually appear in the Figure.

*We thank the reviewer for noting this. Issue is now corrected.*

- Page 12623 Lines 22-23 mention  $R_a(S)$  substantially increasing after 14:00 H local time but this is not clear in Figure 9 which only plots  $E^*$  and  $k^*$ . Also, what is “substantially” if it is not obvious in the plots?

*Parameters  $R_a(S)$  and  $E^*$  are now both consistent, in the Figure and in the text. Lines representing the average values before and after 14:00 H local are also given to show the mentioned increase and the text is amended accordingly.*

- It is unclear what the difference is between Figure 10a and 10b – both report  $S_c \sim S_{ins}$  but it seems to contradict the text on Page 12625 Lines 18-19.

*The difference of the graphs given at Figure 10 is that figure 10a refers to droplet sizes for large particle sizes (100 nm) and 10b refers to droplet sizes when particles are at  $dp_{50}$  and all sizes are measured at the exit of the growth chamber. Clarifications are made in the text.*

- Page 12627 Line 7 is missing a word after “oxidized”.

*Indeed, the word “organics” is added after the word “oxidized”.*

- Figure 1 – The text from page 12614 does not seem to match the HYSPLIT trajectories in terms of air masses source location and altitude – please clarify. Why was the

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trajectory done for 1 km altitude when samples were at ground level? This seems like an error.

*HYSPLIT trajectories were obtained for each day of the measurement campaign. Figure 1 shows some of the observed case, which are further on analyzed more specifically. As already mentioned, 850hPa (i.e 1000m) are used as reference for boundary layer. Note that BL measurements performed at the station showed mean BL values above 1000m (1200-1400). The HYSPLIT trajectories are now shown only for 1km.*

- Figure 6 – for 6(d), it appears that the 60 nm particles were more active than 80 nm particles which does not make sense or agree with other data presented – is this an erroneous data point?

*We thank the reviewer for noticing this. Indeed it was a miscalculation and is now corrected.*

- Figure 8 – The figures are labeled a-e however the text says a-c and then uses terms “left” and “right” – please be consistent with figure referencing.

*In the text referring to Figure 8 (p. 12622-12623) all figures are cited as 8a-8e, the terms “left” and “right” were in the Figure legend (p.12646) which is now amended.*

- Figure 9 – Why are the times in 4 hour labeled increments in plots b and d but in the awkward 4:48 increments in c and e? Please redo axis labels for consistency.

*We thank the reviewer for noticing the inconsistency. All axis labels are now correct with 4 hour increments.*

- Figure 10 – The range of values in Figure 10(b) seems to be much larger than the described in the text. From the figure, it looks like there may be growth kinetic limitations for many individual samples even if they balance out in the aggregate. Please clarify in the text.

*As mentioned in the text (p.12626, line 12-14,, the percentage of the droplets of ambient*

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*CCN that are smaller than the droplets from NaCl calibration aerosol does not exceed 8% for all supersaturations (7.8% for the lower and 6.5% for the higher). Therefore individual cases were not investigated.*

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Interactive comment on Atmos. Chem. Phys. Discuss., 11, 12607, 2011.

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