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Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Formation and growth of atmospheric nanoparticles in the eastern Mediterranean: Results from long-term measurements and process simulations" *by* Nikos Kalivitis et al.

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-The authors would like to thank the reviewer for the comments that helped to improve this manuscript. Please find below a point-by-point reply to all of the issues raised and the corresponding changes.

"Formation and growth of atmospheric nanoparticles in the eastern Mediterranean: Results from long-term measurements and process simulations" reports long term data from a Station in South Europe. Whilst the data are of good quality and worth publi-



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cation (long term smps data are scarce) the analysis is fair and does not add any new result. The increasing trend (and decreasing trend) or NPF and GR (respectively) may suffer from lack of data at the beginning of the period (2008-2012) relative to the last part of the period (2012-2015) - the trend may be a simple artifact.

-In order to address this issue we chose to expand our analysis until 2018 in order to have ten years of data. As you can see in the Picture 1 at the end of this response, indeed there were less data available at the beginning of period under study. Nevertheless, there was always at least 70% coverage of each year and total coverage 82%.

line 8 abstract : biogenic - marine or land or both? specify

-The terrestrial biogenic activity is expected to contribute more efficiently to NPF and this is now stated in the text.

line 11-13 Do not understand what the sentence means. please reprhase and specify simply you see NPF during night time (seen elasewhere too).

-The sentence was changed to “Throughout the period under study, nucleation was observed also during the night.”

sentence 18-22 not very clear - maybe concomitant ion size distributions suggests

-We have rephrased the sentence to “Classification of NPF events based on ion spectrometer measurements differed from the corresponding classification based on a mobility spectrometer,..”

pg 3 perhaps report the study of Dall Osto et al (2018, Sci. Rep.) reported by same co-authors showing south Europe is different from Central and North Europe.

-We have added the sentence” It has been shown that the processes responsible for particle formation and growth differ substantially across the European continent (Dall’ Osto et al., 2018).”





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pg 8 line 16-20 I think this is not correct, likely the longest SMPS size distrubutions are likely in Barcelona and regional areas of Montsein (Dr. Querol s group).

-We changed the sentence to “one of the longest time series”.

Increase NPF events and decreased GR - this is interesting, it makes sense if the CS is lower over time, there is likely more NPF events, and they likely grow less cause likely you have less condensing material.

-As explained at the following comment this trend is not observed in the updated ten year analysis. However, we consider the observation for the period 2008-2015 important given the measurements availability.

Figure 8a. I think the whole conclusion may simply be noise. If looking at figure 8a, you see 2008-2010 you have less datapoints (perhaps in spring - summer) that causes the trend you may have. It looks if you remove the 2008-2009, the trend to me is not existing. I would be careful to say there is a trend (and so I would remove and change all abstract) - it is visually clear that years 2008-2010 have smaller data coverage that 2013-2015.

-The trends actually disappeared while including the additional years so that the time series covers form 2008 to 2018. If we remove the first two years as suggested, an opposite trend is revealed that it statistically significant and it is described in the manuscript, a clear decreasing trend in the period 2010-2018. The additional years added in the analysis showed that 1) we had a period of increased NPF frequency in 2010-2014, 2) there is a decreasing trend since 2010 until today 3) the decreasing trend of GR did not continue, however for the period 2008 -2015 it was statistically significant. These are all now stated in the manuscript. Since however they cannot be expanded for the whole timeseries they are removed from the abstract and the concluding marks as recommended.

Considering the above, I see this study does not add much additional novel results,

although it is worth publication cause you clearly see a long SMPS time trend showing spring nucleations (different from typical summer ones).

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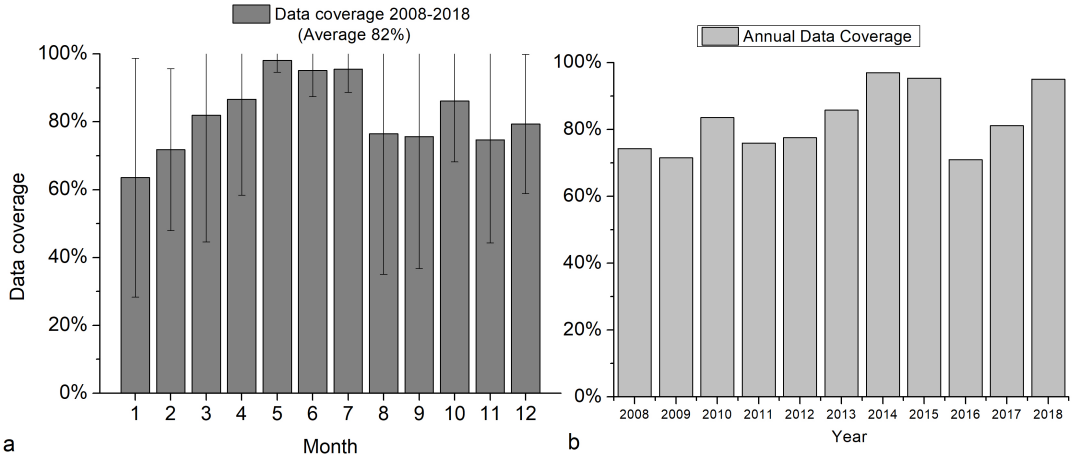


**Fig. 1.** Picture 1: Size distribution data availability at Finokalia, Greece during the period June 2008-June2018 on (a) monthly basis and (b) interannualy



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