

Interactive comment on “Shipborne observations reveal contrasting Arctic marine, Arctic terrestrial and Pacific marine aerosol properties” by Jiyeon Park et al.

Anonymous Referee #1

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The manuscript deals with marine aerosol physical properties retrieved during a late summer vessel cruise in Arctic and Pacific Ocean, and it's really interesting, finding out different and peculiar aerosol properties, allegedly due to origin/sources, with a clear distinction between well defined region (Arctic Marine, Arctic Terrestrial and Ocean Pacific). The main result is the relevance of terrestrial ecosystem in affecting the aerosol physical properties, at least for late summer period.

going directly to the paper:

the title and the abstract are clear and reflect the paper's content, the text is precise, fluent and well written there is only a simple error when authors describe relationship

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between NPF event and photochemistry: figures 4d, 5d and 6d refers to graph with SZA vs time, but the figure (and the text) indeed show $\cos(\text{SZA})$: please modify text and figure caption.

by the way, the figure show the "geometric solar configuration", indicating $\cos(\text{SZA})$ as a proxy for the solar energy reaching the surface. Clouds usually affect the real solar radiation reaching the surface, while the figures show a modeled clear sky condition. could authors add any comment about eventual cloud presence and their influence on NPF event?

some comment about the text:

line 84: figure 2 shows data analysis between August 31 and September 24: please change data in line 84

line 122-123: for each instrument is indicated the data frequency sampling, except the OPS(TSI3330): could the authors supply this information?

line 233: maybe a ";" should replace "," between observed and however

line 248: could authors add a definition of Geometric Mean Diameter?

line 285-286: maybe a verb is missing?

line 350: i would add the word "late summer" before terrestrial line 365 : the same here

line 426: could authors add a definition of Critical Diameter?

simple typos: line 306: masses instead of messes

line 440 and 441 , in these lines the authors use a "," to indicate number greater than 1000, while in manuscript generally no comma is used. please adjust the numbers line 270-271 : please adjust references: this format (Vehkamäki et al., 2004) or this format? Suni et al. (2008)

several lines: when indicating multiple references, please add a space after ","

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about figure: I suggest to add the aerosol origin classification , as showed in figure 3, also in figure 2.

in figure 7 the averaged size distribution are showed, starting from more than 7 nm to 300 nm. Could the author describe how the 2 smps dataset (nano and standard) are combined? The nano measures from 3 nm to 80 nm, while the standard collect data from 10 nm to 300 nm.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2019-1076>, 2019.

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