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Atmospheric Chemistry and Physics Discussions

Interactive comment on "New particle formation events observed at the King Sejong Station, Antarctic Peninsula – Part 2: Link with the oceanic biological activities" *by* Eunho Jang et al.

Anonymous Referee #2

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This is a very compact manuscript dealing with a very important topic. The paper appears original, but the authors need to demonstrate it more clearly in the paper. I have also a few other scientific issues to be answered and revised before the paper can be accepted for publication.

Scientific issues

The authors state that they aim to find a link between atmospheric new particle formation (NPF) and marine biota. I think that this paper succeeds in doing that. However, I would like to see more comprehensive discussion on how this result build upon earlier findings by other researchers and what exactly is the new scientific message that this

paper brings into this important topic.

The discussion about atmospheric NPF mechanisms in the Introduction is based on studies published more than 10 years ago. Much new has been learned on this topic since then. The paper would benefit from updating this discussion in line with most recent published work.

The authors use sub-10 nm particles to identify recent atmospheric NPF and bulk aerosol samples to get idea on how much particulate MSA has been formed in measured air masses. Then, 2-day air mass back trajectories are used to identify the origin of measured air. This is fine when looking at NPF, but how about bulk aerosol samples? Typical lifetime of PM mass is a few days in the lower troposphere, so 2-day trajectories may not tell the whole story about the origin of this MSA. The authors should mention this and perhaps comment it in the paper.

Minor scientific and technical issues

Please be careful with the term "aerosols" – in many cases "aerosol particles" would be more appropriate. Also, naming particles formed by NPF via pathways involving organic compounds as secondary organic aerosols is a bit confusing. This is because the term "secondary organic aerosol" is generally used for describing particulate matter (in terms of mass) formed in the atmosphere, not just newly-formed particles.

page 5, line 7: this submitted?

page 6, lines 31-33 and Fig. 4a: Why there are only 6 measurement points in the figure, although the measurements cover 8 years?

Figure 2c and the text: I am a bit confused on the meaning of DMSP to chlorophyll ratio. If DMSP concentration is the relevant quantity to look at, then why to scale it with chlorophyll? Or is there any scaling? The unit in Fig. 2c refers to concentration, not to any ratio between air and sea-water concentrations.

Fig. 3: in x-axis there should be DEC, not DEB

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