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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Primary marine aerosol physical and chemical emissions during a nutriment enrichment experiment in mesocosms in the Mediterranean Sea" *by* Allison N. Schwier et al.

Anonymous Referee #1

Received and published: 1 August 2017

The paper of Schwier et al. reports on mesocosm experiments performed in Mediterranean sea. The study is a valuable effort considering the difficulties conducting such experiments and it is unfortunate that no striking results have been found. However, considering scarcity of similar experiments, especially in a natural setting outside the laboratory, the results are worth publishing as they provide useful insights and findings, for example chloride depletion phenomenon or lack of correlation with certain biological parameters. The paper can be accepted after addressing some minor although rather important issues.

Comments:

The title has a typo "nutrient" and awkwardly worded. It should read more like "Primary marine aerosol physical flux and chemical composition during a nutrient enrichment experiment in mesocosms in the Mediterranean Sea".

Abstract is very much like a report of correlations observed or not-observed. More scientific conclusions should be drawn in terms of relationships with biology (looks there was weak, but maybe due to oligotrophic nature) or physics/chemistry. Please summarise conclusions not correlations. Also specify the range of PMA in the abstract.

Page 3, line 25. Ovadnevaite et al., 2011 found dichotomy of HGF and CCN.

Page 4, line 8. Please refer to O'Dowd et al. 2015 on virus mesocosm.

Page 4, line 17. Long et al. 2014 could be an informing study as it was performed in oligotrophic waters.

Page 5, lien 20. ...were directly subsampled into precombusted glass bottles.

Page 6, line 5. Typo 2.5.

Page 6, line 19. ". . .two square glass tanks".

Page 7, line 9. "impacted onto" to "sampled by".

Page 9, equation 1. The relationship implies zero flux at 11.5C? Something is wrong here.

Page 10, equation 2. Same problem of zero CCN flux at 12.5C.

Page 11. Can authors look into size fraction related chloride depletion? Was it the same in PM10 relative to PM1? Clearly, volatilisation can only occur by chemical reaction which is difficult to reconcile during chamber experiment. The finding calls into question validity of the Na/Cl ratio during aerosol generation. Could it be that due to the smallest particles born from film drops where larger chloride ions are "drained" from

film while in jet drops this does not happen? Calcium enrichment can occur due to entirely different reason, namely being involved in the formation of colloids and gels (with references aplenty).

Page 15, line 22. It is misleading to use nucleation term with respect to sea spray. Possibly "ultra-small mode".

Page 16, line 4. Many of those (non)correlations can be due to chl lag as introduced by Rinaldi et al., 2013 and further explored by O'Dowd et al., 2015.

Table 4. Number of observations is a useful parameter, but P significance takes into account the number of measurements. It can be noted under the Table.

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