

## ***Interactive comment on “New particle formation in marine atmosphere during seven cruise campaigns” by Yujiao Zhu et al.***

### **Anonymous Referee #1**

Received and published: 15 August 2018

This manuscript combines measurements conducted over several marine cruises to investigate atmospheric new particle formation (NPF) and growth in the marine atmosphere. The paper appears scientifically sound and original enough to merit publications. In its current form, the paper requires, however, important revisions, especially what it comes to the technical quality of the paper.

#### Scientific issues

The second paragraph of Introduction gives a background on NPF in the marine atmosphere. It contains a sentences discussing the role of amines in NPF (lines 22-23 on page 2) which is no way related to marine NPF. I recommend this sentence to be removed from here. The discussion on role of ions in coastal NPF does not include the paper by Sipila et al (2016, Nature) that gives the most detailed molecular view on this

C1

process published so far.

Page 6, line 9: the numbers appear too accurate. I suggest writing: . . .event to be at least 50-500 km.

Page 6, line 26: the selected border between the Aitken and accumulation mode (50 nm) is very untypical. Normally in a scientific literature, it is assumed to be between 80 and 100 nm. Please correct or give a reason for this choice.

Page 11, lines 7-8: this statement requires a couple of more, and more recent, references.

Page 13, lines 12-13: I am confused about this assumption. Do you mean that there should be no sulfate in nm sized particles?

Page 14, line 12: dozens of minutes to one hours sounds a very strange range because dozens corresponds to several tens of minutes and one hour is the same (60 min). Please correct or modify.

The paper has several sentences that are either difficult to understand or written in bad style, so they need to be rewritten. They are in the following places: page 4, lines 1-2; page 5, lines 30-31; page 7, lines 20-22; page 7, lines 27-31; page 8, lines 23-29; page 9, lines 2-3; page 9, lines 24-26; page 9, lines 29-30; page 10, lines 1-5; page 11, line 4-5; page 11, lines 12-15; page 12, lines 11-13; page 14, lines 10-11; page 10, line 14-15; page 14, lines 22-28.

#### Technical issues

The paper refers to figures and tables marked as S1, S2 etc. They are in Appendix, so A1, A2 etc would be more logical way to refer to them.

The following grammatical corrections are needed (the text below give the correct way to write them):

page 3, line 32: . . .monsoon prevails. . .

C2

page 6, line 10: ...sinks are two...  
page 6, line 20: ...first classified...  
page 6, line 26: We first discuss category I data over the marginal...  
page 7, line 1: ...lower than that over the marginal...  
page 7, line 2 ...as over the marginal seas (20%), indicating ...  
page 7, line 5: ...altitudes  
page 7, line 9: ...with diameters lower than 20 nm  
page 7, line 11: ...higher than that reported in previous...  
page 7, line 16: a comparable  
page 7, line 27: over the...during the three...  
page 8, line 1: ...with a high..  
page 8, lines 2-4: ...intermittent occurrence of nucleation...here were much higher than those observed in previous... Altogether, considering both...  
page 8, line 6: we next compare...  
page 8, line 8: ...larger mean values  
page 8, line 9: ...whereas comparable...  
page 8, line 10: over the marginal...  
page 8, lines 12-13: precursors, such as...vapors, were...  
page 8, line 17: ...no obvious  
page 9, line 1: ...24 NPF days, except on one day when it was 77 nm. ...could be identified

### C3

page 9, line 5: ...were able to grow...  
page 9, line 18: ...event occur in regional  
page 9, lines 19-20: ...event are mostly local phenomena reported in a few studies made over...  
page 9, line 21: ...in an urban...  
page 10, line 11: ...were accompanied  
page 10, line 16: ...zoomed in (Fig. 6a).  
page 10, line 17: ..high relative humidity of 74% and low wind speed of ..  
page 10, line 18: ...characterized by a low  
page 10, line 19: during the first hour  
page 10, line 21-22: ...during the first 30 minutes...fluctuated...during the following 3 hours...  
page 10, line 28: ...suggests a strong  
page 11, line 3: and it lasted...the total particle  
page 11, line 16: ..compounds may be involved in  
page 11, line 17: day was analyzed  
page 11, line 18: particles smaller than 10  
page 11, line 19: ...(derived...respectively, higher than in other  
page 11, line 22: ...involved in... moderately high  
page 11, line 31: lower than  
page 12, line 6: ...at an initially high relative humidity of

### C4

page 12, line 17: we found that the

page 12, line 25-26: implying that the majority of . . . particle were able to grow to CCN at

page 12, line 28: to act as CCN

page 13, line 5: to play

page 13, line 12: errors in

page 14, line 18: Moderately good. . . were obtained

Finally, please check out carefully the language of the abstract.

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