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Biogeosciences Discussions

Interactive comment on "Effect of wind speed on the size distribution of biogenic gel particles in the sea surface microlayer: Insights from a wind wave channel experiment" *by* Cui-Ci Sun et al.

Anonymous Referee #2

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This paper presents results from wind-wave channel experiments on how wind-driven water mixing affects dynamics of marine gels (TEP and CSP) in the sea surface microlayer (SML). The authors conducted detailed analysis of TEP and CSP concentration and size distribution. They concluded that wind speed controlled gel accumulation and size distribution in the SML under their experimental conditions.

It is very difficult for me to evaluate the results and the conclusions in the present version of the manuscript because the description of the experiments as well as the presentation of some of the results are lacking important information (see details below). The manuscript would also benefit from shortening some of descriptive text in the

Intro and in the Discussion. See below for some suggestions on that as well. I strongly recommend that the authors edit the text so that it is more focused and less wordy.

Detailed comments:

Abstract: - In L. 9 use SML instead of surface microlayer. - Starting at L. 11: be more specific about the results on TEP and CSP; does this description refer to PSD of gels in the SML or bulk water? I suggest the following abbreviations for TEP and CSP in the SML (TEP-SML – CSP-SML) and in bulk water (TEP-bulk – CSP-bulk). Otherwise it is hard to distinguish between the two phases. - L. 17-18: You talk about the effects of TEP on aggregation and export. Since the focus of this paper is on TEP and CSP in the SML and the potential effects of gas exchange etc. you should focus/discuss potential effects on processes between the water and the atmosphere. In other words: if TEP settles out of the SML what could that mean for gas exchange processes between the water and the atmosphere.

Intro: Page 3 - L. 6: I don't think you need the abbreviation ULW. - L. 9: do you have a reference for this statement? - L. 14 -l. 2 on page 3 : In general, this text can be shortened as the focus is on SML sea-air exchange and not aggregation and particle export. Page 4 - L. 3: to me, your intro starts here. - L. 25 – l. 4 on page 5: In the first sentence you are saying that "TEP enrichment . . . is inversely related to wind speed . . .". You don't have to repeat this statement in the following sentence; the first part of that sentence can be shortened: "One explanation for this is that . . .". - L. what are the "other mechanisms"

Methods: Page 7 - L. 4: change to "November 3-24, 2014." - L. 5: I am confused about the total volume of water collected for this study: Is it 20000 L with 14000 L of high sal water (what does high sal water mean??) + 8000 L at 5 m near Sylt? That does not add up, so remove "In total" in line 4, because your total is 42000 L. - L. 5: change to "were collected onboard FS Poseidon". How did you collect the water? Pumping or niskins? - L. 11-12: Info about something that you haven't used in your study like Uref

is not important, so delete this sentence. - L. 16: This is the part where I am getting confused about the experiments: 7 experiments were conducted, and you refer to fig. 1 and table 1 for explanation. Figure 1 shows the step wise increase of U which lets me believe that the 7 experiments were conducted under the same conditions of U. Table 1 leads me with a different impression as the values of U were quite different throughout the experiments (the table is lacking the unit for U; you also need to describe what 'NaN' means. Why are there no values for U at some days during experiment 7?). This needs to be explained in the methods. - L. 22-24: does this apply to all the 7 experiments? Page 8 - L.1-4: why was the light switched on in these two periods? Does that mean it was dark (0 umol m-2 s-1) throughout the rest of the incubation time? Why is this important? - L. 6: I could not find the Engel et al. 2017 reference in the list? Do you mean the Engel et al. (subm) reference? There is no way that we can get any information from this paper at this point. So you need delete this reference and give as many information of the methods as needed for this manuscript. - L. 7-8: This statement is too general, and I don't see why this would be important to know at this point. - L. 9-11: why was E. hux added to the water? I suggest adding some explanation in the intro. Also, what do you mean by "adding a biogenic SML from a previous experiment"? That is too vague, I have no idea what a biogenic SML could be/look like, and how can this be added without disruption etc. - L. 19: It would help to show the collection volumes or give a range because it is hard to imagine how much water you collected from the SML. Page 10: - L.2: what are the wind conditions 1 and 2?

Results: As mentioned above, I cannot evaluate the quality of the results before the authors improve the description of the experimental set-up. For example, I really cannot tell if the TEP and CSP results described on page 11 and shown in figure 2 are average values of all 7 experiments. Figure 2 also lacks error bars. You also need to add more detail to the figure legends (e.g. figs 4 and 5 show error bars, this needs to be mentioned in the legends). l. 16: this is the first time that chl a is mentioned. This needs to be described in the methods section. l. 20: what do you mean by "at the start

of each wind experiment"?? Does that mean that you varied the wind speed over a course of a day from 0 - 20 or so (see also figures 4 and 5). You lost me at this point . . ..

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