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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 #1

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Comment on bg-2017-419

This is an impressive experimental study that looks at the effect of increasing wind speeds on the accumulation of gel particles (transparent exopolymer particles and coomassie stained particles) and their size distributions in the surface microlayer (SML). Their main results point to an effect of high wind speed (>8 ms-1) altering the particle size distributions towards smaller gels, particularly for TEP, and to the disruption of the SML showing no enrichments in gels at those high wind speeds. The results deserve publication in BG; but in my opinion the way the results are presented and discussed can be improved. Specially the discussion section could be abbreviated and

focused better in their actual results. I provide some specific comments below.

Abstract:

Lines 2-9 I think this information can be abbreviated Line 15... and CSP? Complete the sentence

Introduction:

I think it is too long and repetitive. Maybe the intro could be abbreviated and reorganized as follows: (1) introduce the SML and its properties. (2) introduce gels, their PSD, their biochemical relevance, and their accumulation and role in the SML (3) role of wind speed in SML formation and in gel dynamics, particularly in PSD

Page 3 lines 6-7 can be enriched

Page 3 line 9: Start new line, since you talk about something different

Pages 3 line 6-8 and 4 lines 6-8 These sentences are repeating the same information.

M&M:

Page 7 lines 7-9, how long did it take from sampling to start the experiment?

Page 9 lines 22-23 I do not think the calculation of TEP-C is necessary in this study that does not focus on carbon fluxes

Page 10 line 17 include space between 'distribution' and 'after'

Results:

Page 11 lines 3-10 include average changes in TEP in the SML

Figure 2. Is this the average of the different wind speed conditions? Clarify. Include SD bars. I would use the same symbols for the same parameters; e.g., if columns are for total area (as they are in SML and bulk CSP), then use also columns for TEP total area. Anyway, I do not think it is necessary to show the TEP-C; as your paper is not

focused on these measurements. Include panel letters ABCD

Figure 3 and 4 say if this is SML or bulk water.

Figure 6. Day 22 panel: Use the same color and symbol code as in Figure 5 and in the rest of panels.

Page 11 lines 11-16. Here include average changes in CSP in bulk water

Page 11 lines 14-15 in bulk or in SML?

Section 3.3 Authors do not say whether they are describing PSD's in the SML or in bulk water at any moment. Assuming that this is only SML, some wording about changes in PSD in the bulk water could help understand these differences and to infer gel dynamics in the whole system through time

Page 12 lines 16-12 include some wording about enrichment factors in the high wind speed treatments

Page 12 lines 23-24 and page 13: Where, in the SML or in bulk? This differentiation should be clearly stated across the whole MS.

Page 13 lines 1-19 Maybe include the different slope values in a Table, as in the Figure it is hard to see if the difference is in slope or in the intercept

Discussion:

Page 14 lines 8-12 I don't think this sentence is necessary since you are not discussing any results.

Page 14 line 24 remain enriched

Page 15 line 7 gel aggregates

Page 15 line 4-page 16 line 2. This paragraph is very long and it is not clear how it is connected to the results obtained, which I think should be more carefully introduced in the discussion: For instance, do you refer to your measurements in the SML, in bulk

water, or in both? And, according to Kepkay 1994, shear is a dominant mechanism for particle aggregation; so how do you link this with the trend towards smaller gel particles at high wind speeds?

Page 16 lines 18-23. I do not see why. Average PSD are similar for TEP and CSP, and even lower for CSP at high wind speeds (page 13 lines 4-11). Or you said that because the change in PSD between high and low wind speeds was higher for TEP? Please clarify; and please refer to the results. To support this conclusion, maybe authors could look at the change in PSD of TEP and CSP through time; so check if these gel particles had been actually aggregated in the SML or not.

Section 4.3. I think it would be nice to comment about the changes in EF's through time. They apparently decrease until the phytoplankton culture is added (Table 2), even though you say that "a strong accumulation occurred in the SML (e.g. abstract line 13). How do you explain these decreases at low wind speeds?

I would appreciate some comments about your day 15; any explanation to this exceptional behavior?

End of review

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