Biogeosciences
Discussions

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Interactive comment on "Particulate trace metal dynamics in response to increased CO_2 and iron availability in a coastal mesocosm experiment" *by* M. Rosario Lorenzo et al.

M. Rosario Lorenzo et al.

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Referee #2

I found it very hard to follow the description of the data in the Results, as most of them have been presented in tables, which is especially not good for presenting the time dependent changes in for example trace metal concentrations. I also found that the Discussion for the most part was on trace metal chemistry and physiology in general, but not specifically relative to the key objective of the study, i.e., the effects of CO2 and Fe availability on particulate trace metal dynamics. See point 1, 21 and others to Referee #1 Specific comments. Line 91. "(Hutchings, 2011)", which was not

included in the References. Now included Line 108. 10 uM nitrate: 0.3 uM PO4 = 33:1 - was there a particular reason to use such a P limited nutrient condition? How may this affect the observed particulate trace metal concentration? Yes, we used this specific ratio because we aimed at an Emiliania huxleyi bloom. This has been clarified as follows, Lns 117-119: At the beginning of the experiment, nitrate (10 μM final concentration) and phosphate (0.3 μM final concentration) were added to induce a bloom of the coccolithophore Emiliania huxleyi, as recommended by Egge & Heimdal (1994). Results: I would strongly suggest that the data should be presented as figures instead of tables. In addition, albeit statistical analyses were conducted and presented together in Table 5, I would suggest they should also be presented in each individual table (or figure, if the authors decide to follow my suggestion above in revising the manuscript). Done Lines 170-181. "days 1-10, phase I", "day 7" and "After day 10" were mentioned when describing the data, but none of them can be found in Table 2. Line 221. "(Figure 5)" should be Table 5. This has now changed with the new Ms organisation. Discussion: Again the Discussion mostly did not center around the influence of acidification and/or Fe availability on trace metal dynamics, except for the last, very short section 4.4. I thus encourage the authors to considerably revise the Discussion, focusing on how the chemistry and utilization of trace metals were affected by changes in CO2/pH and Fe levels and how these may be related to the proliferation of Ehux in the mesocosm. This has now changed with the new Ms organisation. See comment to Referee 1. We thank the reviewers for their comments and their time, and hope that our responses are satisfactory Yours sincerely, Maria Segovia & Maite Maldonado

Please also note the supplement to this comment:
https://www.biogeosciences-discuss.net/bg-2018-448/bg-2018-448-AC2-supplement.pdf

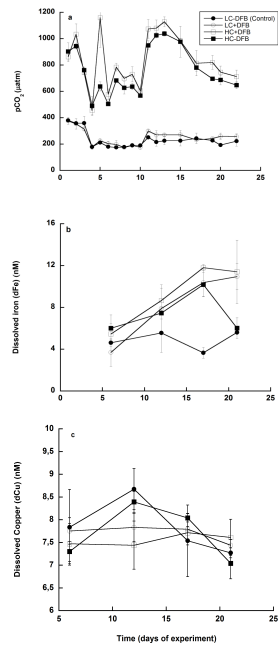**Fig. 1.** Temporal development of (a) CO2 partial pressure (pCO2) and (b) pH within the mesocosms. Ambient pCO2 and ambient dFe (LC–DFB, grey); ambient pCO2 and increased dFe (LC+DFB, red filled circle); increased pCO2 and increased dFe (HC+DFB, red open circle), increased pCO2 and ambient dFe (HC–DFB, black open circle). Symbols indicate means of measurements in 3 independent mesocosms (n = 3) except for LC–DFB where n = 2. Error bars indicate SD. Figure reproduced with permission from Segovia et al. Mar. Ecol. Prog. Ser. 2017

Fig. 1. Figures

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527 **Table 1.** Statistical analyses (Split-plot ANOVA) of the effects of high CO_2, the addition of DFB, and their interaction, as well as the effect of
528 time, on the concentrations of particulate metals (mmol L^{-1}, data in Table S2, and Figure 3) in particles collected from the different mesocosms
529 treatments.

Factor	Al	Ti	P	Fe	Cu	Co	Zn	Cd	Mn	Mo	Pb
CO_2	ns	ns	**	*	ns	**	***	***	**	***	ns
DFB	ns	ns	*	ns	ns	*	**	ns	*	*	ns
CO_2 x DFB	ns	*	**	ns	ns	*	**	*	**	**	ns
Time	ns	ns	ns	***	*	***	***	***	***	***	**

530 *ns: not significant; * p <0.05; ** p <0.01; *** p<0.001*

Fig. 2. Tables

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