

## ***Interactive comment on “CO<sub>2</sub> effects on diatoms: A Synthesis of more than a decade of ocean acidification experiments with natural communities” by L. Bach and J. Taucher***

**Anonymous Referee #2**

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General comment: I have reviewed this manuscript previously and I see there are many changes relative to its earlier version. I really like this idea to summarize the responses of the natural diatom assemblage from Ocean Acidification experiments and this kind of review will help to improve our current understanding and hence will be definitely helpful in modifying future experimental plans.

However, I am only afraid that the number of studies that are considered here (69) are too small with quite large variability in the protocol used for different experiments. This may lead to wrong interpretation of the results. For example, the authors identified *Pseudo-Nitzschia* as a loser which is highly contradictory to the existing literature on

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monospecific culture. Moreover, we have conducted some onboard incubation experiments (manuscript under preparation) in the tropical waters and noticed the opposite trend. We found that *Nitzschia* and *Pseudo-Nitzschia* are dominating species under increasing CO<sub>2</sub> levels. In the paper cited here by the authors (Biswas et al. 2017), the plots for community composition showed that *Pseudo-Nitzschia* abundance increased and there was no sign of decrease under high CO<sub>2</sub> levels. Therefore, I feel that drawing a conclusion based on a limited number of studies could be largely misleading. And most importantly, the community shift in relation to increasing/decreasing CO<sub>2</sub> levels can be largely dependent on the initial community that is used for the experiment. The paper by Eggers et al (Global change biology, 20(3), 713-723) very clearly demonstrated that the initial community is a key driving force rather than CO<sub>2</sub> in the incubations experiments with natural community. Further, “different experimental volume” can be a major factor that finally controls the community shift. I am not sure if it would be logical to generalize the responses of the community under very different experimental exposure which would definitely neglect the bottle effect. Moreover, the total number of experiments considered here are only 69 including open ocean (28%), coastal (46%), estuarine (16%) and benthic (6%). My question is, can we compare the responses of the diatoms from open ocean and estuarine region, since they have quite different physiology. The former group is never exposed to high CO<sub>2</sub> and the later is well acclimatized to a large range of pH variability. I am not sure if this would be really logical to put them in the same scale for a comparison. *Pseudo-Nitzschia* from open ocean region can be CO<sub>2</sub> sensitive, whereas, the same genera from a coastal or estuarine region can be highly resilient. If we do such comparison, then the responses need to be discussed considering their background.

Considering the above points, I feel that the manuscript need major revision with a better focus and hence cannot be recommended for publication in its current form.

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