

Interactive comment on “Effects of increased atmospheric CO₂ on small and intermediate sized osmotrophs during a nutrient induced phytoplankton bloom” by A. I. Paulino et al.

Anonymous Referee #2

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The paper presents interesting and valuable data from a complex and well conducted experiment. However, I have reservations concerning data presentation and analysis which cause me to doubt the validity of the conclusions.

Many details of the experimental procedure are missing and this makes it difficult to judge the data. According to the cited Schultz et al. BGD ms, a halocline was created in each mesocosm. Based on figure 1 of Schultz et al., the 5 m "surface layer" sampled every 2 days included variable portions of non-surface water depending on the day and the mesocosm. Indeed, it is a real shame that the treatments given each mesocosm are not revealed in the Schulz et al. manuscript. I would wager that mesocosm #3 or #6

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was given "3X CO₂" and differed considerably from the other "3X CO₂" mesocosms- Mesocosms 3 and 6 appear to have had odd salinity structures compared to the other mesocosms. The 3X CO₂ treatment seems to have had the largest differences between mesocosms.

The possible differences between mesocosms, unrelated to the treatments applied, are at the heart of my major objection to the presentation and analysis of the data. Each of the time series are presented as means of the 3 mesocosms subjected to a given treatment. The means carry large SD suggesting that each mesocosm, not surprisingly, differed- likely in temporal changes. The data for each treatment could easily be presented as three sets of time series. Thus, one could tell at a glance if the treatments had, or not, an effect or alternatively that each mesocosms followed its own path obscuring any interpretation of treatment effect. This view is supported my impression that the SD increase with time for most of the parameters. Treatment effects may be undetectable because lags in temporal changes between similar mesocosms (with the same treatment) increased with time over the course of the experiment. While such dynamics may indeed be unavoidable in mesocosm experiments that does mean that we can simply ignore them and pretend we have answered the questions posed in the experiment when in reality we still do not know.

I urge the authors to present not means of three mini-ecosystems but 3 sets of data for each treatment. Furthermore, the identities of the mesocosms, relative to the data shown in the Schultz et al. Discussion paper, should be given.

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