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Comment

***Interactive comment on “Effects of CO<sub>2</sub> on particle size distribution and phytoplankton abundance during a mesocosm bloom experiment (PeECE II)” by A. Engel et al.***

**A. Engel et al.**

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The mesocosm set-up was designed to simulate a natural water column, with an upper mixed surface layer and a lower part, in which settling particles were collected. In fact, we missed to describe in the method section that the upper water column was mixed by aquarium water pumps. To prevent particles entering from the lower part, a halocline at about 5m depth was furthermore established by the addition of fresh water in the surface prior to the experiment. The set-up during this study was similar to the set-up during PeECE III, which will be described in more detail in the paper by Schulz et al. (to be published soon in BGD; we will add the reference). Salinity and temperature profiles were measured daily using a CTD. Sampling was performed with one tube of 4m length for each mesocosm, integrating the upper 4m of the mesocosm.

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Certainly, interpretation of the data is restricted to the upper water column. Because the set-up was the same for all mesocosms, changes in particle size distribution and phytoplankton abundance within the upper mixed water-column can be attributed to the CO<sub>2</sub> treatment, and could potentially include differential settlement of particles. However, the size range of the majority of particles considered here was between 2 and 10  $\mu\text{m}$ , with major differences between populations of  $< 3$  and 4-6  $\mu\text{m}$ . Differences in the settling velocity of particles at that size range are quite small, and unlikely to cause differential sedimentation in a mixed water column. Aggregates of particles/ cells are larger than the size range considered here. Moreover, the size distribution in the future CO<sub>2</sub> treatment differed from the past treatment by both, a significant reduction of small particles and a higher abundance of certain larger populations, such as *E. huxleyi* and *Micromonas* spp.. TEP concentration during the study (data not shown), showed a typical temporal pattern with an increase after nutrient depletion, i.e. after the peak of the bloom. By this time differences in the particle size distributions had already been established.

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