

## ***Interactive comment on “Short-term response of the coccolithophore *Emiliana huxleyi* to abrupt changes in seawater carbon dioxide concentrations” by J. Barcelos e Ramos et al.***

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Reviewer # 2

Specific comments/suggestions

(1) “... known that short time intervals for  $^{14}\text{C}$  fixation reflect gross photosynthesis whereas longer-term incubations tend to indicate rates of net fixation.” Response: We have now included reference to this in the discussion section (Sub-section Organic carbon fixation and Fv / Fm, 5 paragraph).

(2) “... liked to have seen some statistical analysis...” Response: we added statistical

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analysis in the results section according to the reviewer suggestion.

(3) “... division rates decreased... (...error bars...) diameter increased so the net impact on carbon assimilation is presumably little...” Response: No error bars are presented because the two calculations for each  $\text{pCO}_2$  correspond to different bottles (each time had one cell counts bottle per  $\text{pCO}_2$ ). If we understand correctly the reviewer refers to the carbon fixation measurements and cell diameter of the 24 and 26 h data points. As the reviewer points out the decrease in cell division rate and increase in cell diameter with increasing  $\text{CO}_2$  levels is more a consequence of a higher number of cells that had not yet undergone division than related to potential accumulation of both organic and inorganic carbon. The organic, inorganic and total carbon fixation rates on the next day still show a similar trend to that found on the day before but not visible in the graph, because the fixation rates are lower at the beginning of the day.

(4) “... with Fig 4b, no error bars are given... changes... throughout the daily cycle...” Response: The Fig 5b there are no vertical error bars representing the range of the data, because there was one bottle for each sampling time. We added statistical significance in the results section according to the reviewer suggestion. We do agree that changes throughout the day are superior to those found between the various  $\text{CO}_2$  concentrations. However, in this study we wanted to analyse differences induced by changes on the  $\text{CO}_2$  concentrations. Moreover, daily variations have been already reported for *Emiliana huxleyi* (Zondervan et al., 2002; Müller et al., 2008). Nevertheless, we added some additional information in the results section according to the suggestion. (5) “... electron micrographs in Fig 3...” Response: The photographs were included to show that changes in the calcification rates are directly reflected on undercalcified coccoliths (coccolith formation takes about one hour), which could be already detected after 8 h at higher  $\text{CO}_2$  concentrations. Even though we did not perform any quantitative analysis, the photos are representative of the trend observed.