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Interactive comment on "Strain-specific responses of *Emiliania huxleyi* to changing seawater carbonate chemistry" *by* G. Langer et al.

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The authors address an urgent question in the scientific community, which is currently under debate, and is of interest not only to the scientific community, but has major implications on modeling ecosystem response of future greenhouse gas scenarios. In their approach the authors for the first time have looked at different strains of Emiliania huxleyi, a coccolithophore species which in the semminal paper of Riebesell et al. (2000) was reported to react on increasing pCO2 levels with reduced PIC production, whereas recently the opposite was reported from Iglesias-Rodriguez et al. (2008). It has been argued, that the discrepancy in the two mentioned studies might stem from the different experimental protocols applied to cultures in the two studies. The present manuscript therefore addresses intraspecific variability in response to elevated pCO2

levels within Emiliania huxleyi, which has not been done before. The authors of the present manuscript discuss this problem, but conclude that: "it is highly unlikely that the methods used" are the reason for the conflicting results. The only proof of this statement comes from the fact that in one other publication (Feng et al. 2008) calcification in an E. huxleyi strain decreases, although the same protocol as in Iglesias-Rodriguez et al. (2008) has been used. Thus it would have been useful if the authors would have clarified this issue by treating at least one of the strains with different methods. There is ample evidence from the literature, that indeed cosmopolitan plankton species do not represent one single species, but rather are made up by a large number of different subspecies, morphospecies, cryptic or pseudocryptic species. Within such a cluster, each has a very narrow ecological range and is adapted to specific conditions. Thus it appears likely that the reaction of different strains to the changes in the environment they grow in differs especially, if the conditions are different to the narrow optimum growth conditions. The authors should show the optimum growth curves for the chosen strains, to support this statement. The strains belong to different morphotypes, and the main difference in Emiliania huxleyi morphotypes is their degree of calcification, which should be explained in more detail. It is especially intersting, that the strains of morphotype B, which is the more delicate form, show a stronger response to CO2 increase, than morphotype A, which is more heavily calcified.

The authors emphasize that the reaction in calcification rate to CO2 in all strains is different. In line 127/8 the authors state, that the PIC production in strains RC1212 and RC1216 slightly decreases. However the overall decrease in these strains is about 30- and 40 % respectively. In my few, this is a significant decrease. For strain RCC 1256 they report an optimum growth with a maximum at 600 μatm CO2. However, in this case the increase (14%) could be called slight, moreover it is within the errorbars of the experiments at lower CO2 conditions, so it is not significant.

Concluding, I agree with the authors, that there is a significant intraspecific variability in Emiliania huxleyi strains to changing CO2 concentrations. However, there is no

evidence for increasing calcification rates as proposed by Iglesias-Rodriguez et al. (2008).

Technical comments: The labeling of the strains is slightly confusing and should be the same in the figures and the table. The errorbars (seems to be the standard deviation) should be explained in the figure captions.

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