

## ***Interactive comment on “Co-variation of metabolic rates and cell-size in coccolithophores” by G. Aloisi***

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Reviewer 1 makes useful comments that improve the manuscript. I have included his suggestions in the revised manuscript.

- The reviewer points out that natural assemblages of coccolithophores in marine sediments contain organisms from different stages of the cell cycle, and that this natural “sampling” makes sedimentary assemblages similar to laboratory cultures conducted in continuous light, where the cell cycle is de-synchronized. This is an interesting point. I added the following text at the end of section 2.2:

“Interestingly, fossil coccolithophores represent an integrated sample over the whole light:dark cycle and thus should be more comparable to laboratory samples from

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desynchronizes cultures – something to keep in mind as the amount of morphological data of coccolithophores from marine sediments is growing (Beaufort et al., 2011; Grelaud et al., 2009).”

- The reviewer suggests I cite a recent paper by Bach et al. (2015) presenting a simplified equation modeling how the calcification rate responds to changes in DIC system parameters. I was not aware of this publication that is in fact very relevant. I added the reference and the following sentence in section 4.1:

“This complex reaction of calcification to changes in the DIC system has been elegantly captured in a recent model equation developed by (Bach et al., 2015).”

- page 6216, L.14: the corresponding sentence in the abstract has been changed to :

“An increase in phosphate or temperature (below the optimum temperature for growth) produces the opposite effect”.

- page 6217, L.7: I have checked in the coccolithophore literature and found that the coccosphere is often referred to as an “exoskeleton” e.g. (de Vargas et al., 2007). I thus left this term in the paper.

### References

Bach, L.T., Riebesell, U., Gutowska, M.A., Federwisch, L., Schulz, K.G., 2015. A unifying concept of coccolithophore sensitivity to changing carbonate chemistry embedded in an ecological framework. *Progress in Oceanography*, 135: 125-138.

Beaufort, L. et al., 2011. Sensitivity of coccolithophores to carbonate chemistry and ocean acidification. *Nature*, 476(7358): 80-83.

de Vargas, C., Aubry, M.P., Probert, I., Young, J., 2007. Origin and evolution of coccolithophores: from coastal hunters to oceanic farmers. In: Falkowski, P.G.a.K., A.H. (Ed.), *Evolution of primary producers in the sea*, pp. 251-285.

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