

Interactive comment on “The role of coccoliths in protecting *Emiliana huxleyi* against stressful light and UV radiation” by Juntian Xu et al.

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The authors tested the growth and photophysiological responses of *Emiliana huxleyi* to PAR and UV in the presence of coccoliths, after removal of coccoliths and in a strain that lacks coccoliths. The data show that presence of coccoliths renders the cells less susceptible to inhibition by UV, and increases their capacity for non-photochemical quenching. The manuscript presents a tidy study on an important question, and is appropriate for BioGeoScience. I offer a few minor wording and reference comments for the author's consideration. best regards, Doug Campbell

Abstract: Fine. "...since decades..." is not incorrect, but is idiomatically odd. I suggest "...for decades..."

Response: corrected as suggested.

C1

Introduction: "This notion is supported by the exceptionally high light tolerance of the surface layer dwelling species *Emiliana huxleyi* (Nanninga and Tyrell 1996; Gao et al., 2009)" Geider's group had a paper: Ragni M, Airs RL, Leonardos N, Geider RJ. 2008. PHOTOINHIBITION OF PSII IN EMILIANIA HUXLEYI (HAPTOPHYTA) UNDER HIGH LIGHT STRESS: THE ROLES OF PHOTOACCLIMATION, PHOTOPROTECTION, AND PHOTOREPAIR. *Journal of Phycology* 44: 670–683. and we had a paper: Loebel M, Cockshutt AM, Campbell DA, Finkel ZV. 2010. Physiological basis for high resistance to photoinhibition under nitrogen depletion in *Emiliana huxleyi*. *Limnology and Oceanography* 55: 2150–2160. both showing that the high PAR tolerance of *E. hux* related to very strong repair capacities, rather than intrinsic resistance to photoinactivation, per se. It would be worth noting that UV is a strong inhibitor of PSII repair, as well as acting through direct inhibition of PSII. So it could be that the coccoliths protect PSII repair from UV inhibition. I now read you briefly make this point in the discussion, citing Gao 2007.

Response: We thank the reviewer for this constructive comments. We added a sentence in the last paragraph of introduction and cited extra references. The mentioned references above were cited in the introduction and discussion at lines 63 and 279.

Materials & Methods: Fine Results: "Photochemical performance was measured for dark-adapted (15 min) cells in calcified, de-calcified or non-calcifying naked cells" The table and figure abbreviation Cal-R does not obviously suggest 'de-calcified'. Why not 'D-Cal' or 'Cal-D'? More generally, why erect abbreviations? Why not just write out 'Calcified', 'De-calcified', and 'Naked'? In the text the naked strain is sometimes called naked, or sometimes 'non-calcifying'. Unify the terminology; pick a single name for each cell condition and use it throughout.

Response: As you suggested, we corrected them as 'Calcified', 'De-calcified', and 'Naked'