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Biogeosciences Discussions

Interactive comment on "Physiology regulates the relationship between coccosphere geometry and growth-phase in coccolithophores" *by* Rosie M. Sheward et al.

Anonymous Referee #2

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The manuscript 'Physiology regulates the relationship between coccosphere geometry and growth-phase in coccolithophores' authored by Sheward and co-workers presents novel results, is very well written, has a well reasoned rationale and an overall well structured text, and clear figures. The study addresses an interesting topic, namely the relationship between coccosphere architecture and coccolithopores' (exponential versus stationary) growth phases in four species of extant coccolithophores. The data presented are new and of good quality and do support the conclusions drawn by the authors. In addition, the manuscript is presented in a way that will be also accessible to non-specialists, which is an added value for publication in a multidisciplinary journal such as Biogeosciences. I therefore recommend this manuscript for publication in

Biogeosciences provided that the specific points listed below are addressed.

Specific points:

(1) Much emphasis is put on the relevance of this study for the investigation/interpretation of coccolithophore geometries in the fossil record as a proxy for coccolithophore growth phase. However, in the introduction the authors state that intact fossil coccospheres can be found in '. . .exceptionally well-preserved sedimentary deposits. . .'. I would therefore suspect that the application of this growth phase proxy is perhaps useful only in a very limited number of settings and of a few geologic periods where/when intact fossil coccospheres are found. That being the case, the statements about the relevance of this study for the interpretation of the palaeorecords (also in the conclusions) should be toned down, at least in the terms used by the authors. Given that this is not the main reason why this is a valuable piece of work, these statements could be toned down without affecting the relevance and novelty of the study. (2) Often times in the manuscript it is stated that results are statistically significant, but a section in the methods that specifically presents the statistical approaches used in this study is missing and should be added. Also, data analysis could benefit from some (bootstrap?) outlier analysis, specifically when different properties of the coccolithophore geometry are regressed against one another (e.g., Fig. 2e-h). This would certainly improve the analysis of the high quality (and rich) dataset presented in this study.

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