

Interactive comment on “A refinement of coccolith separation methods: Measuring the sinking characters of coccoliths” by Hongrui Zhang et al.

Anonymous Referee #3

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Dear Editor,

I have reviewed the manuscript entitled “A refinement of coccolith separation methods: Measuring the sinking characters of coccoliths” by Zhang et al. The repeat settling/decanting method of separating coccoliths from natural sediment is widely used in routine laboratory analyses. To improve this method is very important to promote the nannofossil based geochemical analyses and paleoceanographic research. The authors have selected a good point to calibrate the coccolith sinking velocity and discussed the different influencing factors. The experimental design is reasonable, the dataset and results are elaborative and informative. In my opinion, this manuscript is worth publishing in such high ranking journal as Biogeosciences. However, this paper still needs some revisions before it could be accepted for publication. My comments

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are below:

1. The authors took most of the paragraphs to describe and calculate the sinking velocities of different coccolith species. However, what is the application of this parameter in future research? This is not very clear to me. I think the purpose of this paper is to give the audience “a refinement of coccolith separation method”. So I suggest adding some paragraph to introduce how to use your SV data in routine work or to give the audience some suggestions how to improve the efficiency or precision of the separation method after your work.
2. In this manuscript, the authors used several technique and methods in the experiments, such as “sinking method or filtering method” in L83 or “drop technique” in L99. This would be difficult to follow for the audience who are not very familiar with coccolith separation. I suggest adding some brief explanations of these techniques.
3. The authors selected eight raw sediment samples from different cores in global oceans. As I know, these cores have different geographic settings like different water depths, mineral composition and nannofossil preservation. Do these factors influence the separation process or the sinking velocity?
4. The section of “Conclusions”, this part is more or less like a part of discussion and not so constructive to me. I suggest improving this part.
5. In L86-87, “except the *Pseudoemiliana lacunosa* and *Umbilicosphaera sibogae*, which cannot be separated from each other”. Why? Should give some explanations.
6. In L188-189, “If we use data for all species except *Helicosphaera carteri*. . .” why don’t include *H. carteri* in the calibration?
7. L66, change “two Neogene samples” to “two Neogene/Paleogene samples”

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