

Dear Dr. Paul Halloran,

The authors are grateful to the editors and reviewers for their constructive comments on our manuscript. According to the editor's suggestion, we revised the manuscript with changing the title, correction of unclear text and typos, and other minor modifications. Below, please find our responses (black) shown after the topical editor's comments (blue).

Non-public comments to the Author:

For clarity I suggest making the following change to the title:

The global simulation of dissolved ^{231}Pa and ^{230}Th in the ocean and the sedimentary $^{231}\text{Pa}/^{230}\text{Th}$ ratios by using an ocean general circulation model COCO ver4.0

To

Global simulation of dissolved ^{231}Pa and ^{230}Th in the ocean and the sedimentary $^{231}\text{Pa}/^{230}\text{Th}$ ratios within the ocean general circulation model COCO ver4.0

Thank you for this suggestion. We changed the title as follows:

“Global simulation of dissolved ^{231}Pa and ^{230}Th in the ocean and the sedimentary $^{231}\text{Pa}/^{230}\text{Th}$ ratios with the ocean general circulation model COCO ver4.0”

This is almost the same as your suggested title (except within→with) and we hope this title is also fine.

I suggest changing:

“Therefore, our result should be viewed as a confirmation of these previous results in this meaning.”

To

“Therefore, our result should be viewed as a confirmation of these previous results”

Thank you for this suggestion. We modified the sentence as you suggested.

Regarding the sentence:

“However, it is emphasized that this study provides a new estimate of this contribution...”. Please state what “this contribution” is referring to. Dependence of the scavenging efficiency on particle concentration?

This contribution refers to the contribution from bottom scavenging. To make the sentence clearer, we modified it as follows in the revised manuscript.

“However, we emphasize that this study provides a new estimate of the contribution of bottom scavenging to the distribution of...”

Please correct this sentence. It presently does not make sense:

"As another remaining problem, as pointed out in previous studies (Rempfer et al., 2017; Lerner et al., 2020), it is not easy to reproduce the distribution of particle phase of these two radioisotopes than the dissolved phase.."

Thank you for pointing it out. To make the sentence clearer, we modified this sentence as follows in the revised manuscript.

"As pointed out in previous studies (Rempfer et al., 2017; Lerner et al., 2020), the distributions of particle phases of ^{231}Pa and ^{230}Th are difficult to be reproduced in the model compared with the dissolved phases."

We also made change about the text around this sentence in the revised manuscript.

I would also strongly suggest that you quote p-values where you present correlations.

In the general meaning, we agree with the editor's suggestion about the importance of a significance test about the correlation. However, in our case, the correlation coefficient was used for the aim of quantifying the model-data agreement rather than judging whether two parameters (i.e. model and data, in our case) are correlated or uncorrelated. Therefore, we feel that showing information about significant test (p-values) becomes somewhat misleading. In addition, not only the correlation but also other metrics such as “slope” and “RMSE” were used for quantifying the model-data agreement in our manuscript (e.g. Table S1); we are afraid that increasing the amount of information may make our analysis more difficult to understand. Therefore, we believe that showing the value of the correlation without p-values is enough and appropriate for our purpose.