

Dear Editor,

We finished the revision of the manuscript according to the questions and advices of the four reviewers. The following are the details of our responses (in blue color) to questions and advices of every reviewer.

The work of reviewers help improve the quality of the manuscript. We thank the thoughtful advice of the reviewers and hope the revision successfully answered the questions.

Best wishes

Wuchang Zhang

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Reviewers' comments:

Reviewer #1 (RC1):

The paper “Decoding Pelagic Ciliate (Protozoa, Ciliophora) Community Divergences in Size Spectrum, Biodiversity, and Driving Factors Spanning Five Global Temperature Zones” (Egusphere-2024-3888) studies pelagic ciliates across five temperature zones. Ciliates play a crucial role in the planktonic food web, and expanding our knowledge—especially through studies like this—is essential for understanding their future in the context of climate change.

The ciliate counting work is impressive. The paper is well-written, and the data analysis is highly appropriate. The discussion is engaging; however, some results should be explored in greater depth. Additionally, the discussion contains overly general ideas from the bibliography.

The main revisions should focus on the figures. In the paper, the figures are too small, and some are difficult to interpret. Some figures in the supplementary materials are more effective than those included in the main text. Please select the most appropriate figures to illustrate the results clearly.

For these reasons, I recommend this paper for publication with minor revisions.

Some mistakes:

1) Line 80: field

Response: We revised this previuos wrong word into “field” accordingly in lines 79–80 in revised manuscript.

Lines 79–80: By optimizing field observational data and available methods, this study aims to:...

2) Line 73, 87: ciliates

Response: We revised “ciliate” into “ciliates” accordingly in lines 72–75 and lines 86–87 in revised manuscript.

Lines 72–75: As grazer of pelagic phytoplankton, response of microzooplanktonic ciliates to ocean warming in the bipolar and adjacent seas is substantial (Li et al. 2022; Wang et al. 2022a, 2023a, 2023b, 2024b), yet comparative assessments amid their trait structure (e.g., size spectra, biodiversity and biotic-abiotic interplay) remain unexplored to date.

Lines 86–87: Based on their latitudinal locations, field samplings of microzooplanktonic ciliates were conducted in five temperature zones (Trewartha et al. 1967).

3) Line 108: no space after (Utermöhl 1958)

Response: **We revised accordingly in lines 105–106 in revised manuscript.**

Lines 105–106: After two rounds of siphon process, a final of 25 mL highly concentrated sample was obtained, and then settled in a Utermöhl counting chamber (Utermöhl 1958).

4) Line 141: we used

Response: **We revised accordingly in lines 141–143 in revised manuscript.**

Lines 141–143: In the following, based on the slope condition, we used the decreasing rate (Δ_D) or increasing rate (Δ_I) according to ciliate abundance or species richness and environmental variables to quantize their interplay in the global seas.

5) Figure 5 and figure 6: legend for a, b, and c

Response: **We added legend for previous Figure 5 and Figure 6, and moved these two figures into present Figure S8 and Figure S9 in revised supplementary material in revised manuscript.**

Figure S8 (previous Figure 5): Variations in slopes between ciliate abundance and temperature (a)/salinity (b)/Chl *a* (c) at discrete depth in each temperature zone.

Figure S9 (previous Figure 6): Variations in slopes between tintinnid species richness and temperature (a)/salinity (b)/Chl *a* (c) at discrete depth in each temperature zone.

6) Line 368: indirect

Response: **We revised this previous wrong word into “indirect” accordingly in lines 360–361 in revised manuscript.**

Lines 360–361: Under current foreseeable rapid global warming process, we conjecture that bottom-up control (resource limitation) playing a more primary role through an indirect way in the global marine ecosystem.

7) The ciliate counting work is impressive. The paper is well-written, and the data analysis is highly appropriate. The discussion is engaging; however, some results should be explored in greater depth. Additionally, the discussion contains overly general ideas from the bibliography.

Response: **Thank you for your appreciation. We realized that some results indeed should be explored in greater depth, and the discussion contains overly general ideas from the bibliography, thus we revised the whole discussion part to fit the scope of**

this manuscript accordingly **in revised manuscript**.

8) The main revisions should focus on the figures. In the paper, the figures are too small, and some are difficult to interpret. Some figures in the supplementary materials are more effective than those included in the main text. Please select the most appropriate figures to illustrate the results clearly.

Response: We realized that the figures are too small in the manuscript. After careful consideration, we revised previous “Figure 3” into present “Figure 3 and Figure 4”. In addition, we moved previous “Figures 5–6” into present “Figures S8–S9” (Supplementary material) accordingly **in revised manuscript**.