

Dear editor and Reviewers:

May 17, 2024

On behalf of my co-authors and myself, I am submitting the revision of the manuscript titled “Spatial distribution patterns of phytoplankton and their relationship with environmental factors in the Jinjiang River, China” to be considered for publication as a research article in the *water*. We greatly appreciate the valuable comments and suggestions provided by the reviewers. The manuscript has been revised in response to these comments. The details of the changes we have made are described in the “Reply to reviewer comments” below.

We look forward to hearing from you soon.

Yours sincerely,

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The black font represents the comments and suggestions of the reviewer.

The blue font is our reply.

The red font represents the revised manuscript.

Reviewer: 1

Comments:

Our study aims to investigate the water quality and distribution patterns of phytoplankton communities in the Jinjiang River Basin in Quanzhou, as well as their relationship with environmental factors. Redundancy analysis indicated that temperature, pH, and nutrient concentrations were important factors influencing the phytoplankton communities. With increasing temperature and nutrient nutrients, the abundance of Chlorophyta and Dinophyta significantly increased. This study provides a robust foundation for regular "health diagnosis" of crucial rivers and lakes in Quanzhou and supports the establishment of a healthy guarantee system for rivers and lakes.

Response: Thank you very much for your valuable comments and suggestions. We have reorganized the manuscript accordingly, and the text has been further polished. Specifically, in the Introduction section, we have revised the second and fourth paragraphs. (See lines 65-69, 78-81, 84-86, 118-127, 129-132)

Some of major comments are shown below:

1. Improve the title to "Spatial distribution patterns of phytoplankton and their relation to environmental factors in Jinjiang River, China".

Response: Thank you very much for your comments and suggestions. We have revised the title accordingly, and the revised title is "Spatial distribution patterns of phytoplankton and their relationship with environmental factors in the Jinjiang River, China".

2. Despite this, the authors failed to address in the Introduction why they chose to study phytoplankton abundance variation in February-March 2023. What is the purpose of conducting this study at this time of year?

Response: Thank you for your valuable comments and suggestions. We have incorporated the relevant content into our study. Numerous studies have demonstrated the propensity for algal blooms to occur in river ecosystems during the spring season. For instance, studies have shown that the Hanjiang River is at a high risk of algal blooms from mid-February to early-March (Chen et al., 2019). In addition, dinoflagellate and diatoms blooms have been observed in the tributaries of the Three Gorges reservoir during early spring, coinciding with increasing temperatures and sufficient sunlight (Zhang et al., 2019). Furthermore, algal blooms of *Peridiniopsis penardii* have been documented in the Jiulong River (Zhong et al., 2022; Li et al., 2011). Despite these findings, it remains uncertain whether algal blooms will occur in the Jinjiang River Basin during early spring as water temperatures rise. Moreover, the distribution patterns of phytoplankton abundance, community structure, and their relationship with environmental factors have not been thoroughly investigated. Therefore, we have chosen to conduct a study on the abundance and composition of phytoplankton in the Jinjiang River Basin in February-March 2023.

3. It would be helpful if you rewrote paragraphs 2nd and 4th, as similar topics have been discussed in these paragraphs. These paragraphs could be combined, focusing just on phytoplankton communities in rivers in summer or other seasons according to environmental factors.

Response: Thank you very much for your comments and suggestions. We have revised the manuscript by removing redundant content. In the 2nd paragraph, we have emphasized the community structure of phytoplankton in river basins and their influenced factors. In the 4th paragraph, we aim to provide an overview of previous

studies conducted in the Jinjiang River, which can help to understand the current state of the Jinjiang River. (See lines 65-69, 78-81, 84-86, 118-127, 129-132)

4. Which hypothesis do you propose in your study?

Response: Thank you very much for your comments and suggestions. In our study, , we proposed a hypothesis that the water quality and distribution patterns of phytoplankton abundance and communities vary between the East and West Jinjiang River due to the differing pollution levels in the two main tributaries of the Jinjiang River. Furthermore, we conducted an analysis on the relationships between phytoplankton compositions with environmental factors to elucidate the differences in phytoplankton compositions between the two tributaries.

5. In the Results section:. I think it is not necessary to show the data of environmental factors from December 2020 to November 2023. Because the data of phytoplankton just collected from February 23 to March 2022.

Response: We appreciate your valuable comments and suggestions. The data collected from December 2020 to November 2023 were utilized to provide a more comprehensive description of the variations and disparities in environmental factors between the two primary tributaries of the Jinjiang River. Through the analysis of a substantial dataset, our results are expected to be more precise compared to those obtained from several individual voyages. As a result, we have retained this dataset while also conducting further reorganization. (See lines 283-298)

6. Is there any information on Chl *a* concentrations? It would be helpful if the authors provided different sizes of Chl *a* concentrations, e.g. 0.2 μm , 2-10 μm ...

Response: Thank you very much for your comments and suggestions. We have only conducted measurements of Chl *a* concentrations in the East Jinjiang River, ranging of

0.88 $\mu\text{g L}^{-1}$ to 4.04 $\mu\text{g L}^{-1}$. Our study primarily focuses on phytoplankton abundance, which was closely related with Chl *a* concentrations. Meanwhile, we have identified prevalent phytoplankton groups in freshwater, including the information of phytoplankton sizes, for example, Dinophyta, Diatoms, and Euglenophyta as macro-phytoplankton, and the group of Cyanophyta, Chlorophyta, and Cryptophyta belongs to nano-phytoplankton. Investigating the distributions of different sizes of Chl *a* concentrations in the Jinjiang River is also an intriguing prospect, and we intend to enhance this aspect in our future research endeavors.

7. To me, I think this paper has not been well characterized as of yet, so I strongly encourage the authors to reanalyze their data and make the appropriate modifications to the manuscript. This manuscript needs to be addressed and the results and discussion rewritten to focus on the new analysis.

Response: Thank you very much for your comments and suggestions. We have restructured the manuscript accordingly and further refined the text. The title has been revised to "Spatial distribution patterns of phytoplankton and their relationship with environmental factors in the Jinjiang River, China." Specifically, in the Introduction section, we have made revisions to the second and fourth paragraphs (lines 34-36, 65-70, 74, 78-81, 84-86, 94-95, 118-127, 129-132). We have also rewritten the discussion. Please see the detailed description (lines 283-298, 301-311, 318-329, 349-371).