

General.

We would like to appreciate the referee for providing the valuable comments to improve the manuscript. We have revised our manuscript by fully taking the editor's comments into account. Responses to specific comments are described below. All the changes made and appeared in the revised text are shown in red. All detailed answers to comments are displayed in blue.

Comments of Referee #1 and our responses to them

This manuscript by Xu et al. presents one-year ambient measurements on organosulfates and nitrogen-containing organic compounds in PM_{2.5} collected from an isolated Sansha island in the South China Sea. To my knowledge, this work represents the first concurrent field observation resolving molecular signatures of organic sulfur and organic nitrogen aerosols in Sansha Island. The authors found that the proportion of aliphatic and aromatic organosulfates in the total organosulfates was significantly higher in Sansha than in other Chinese cities investigated. This is a very interesting finding. Furthermore, the authors demonstrated that marine biogenic sources may play an important role for the production of aliphatic/aromatic organosulfur compounds and nitrogen-containing organic compounds, with relatively little from long-range transport and shipping-derived emissions. I believe this may be a special observation case to demonstrate that marine organisms can provide important aliphatic or aromatic precursors for the formation of aliphatic and aromatic organosulfates and nitrogen-containing organic compounds in the tropical ocean atmosphere.

In general, the manuscript is well-written and logically structured, and it presents a

wealth of valuable observational data. I have only a few minor suggestions, and I believe it would be suitable for publication in ACP once these suggestions are addressed.

Response: We deeply appreciate your valuable suggestions and time spent reviewing our manuscript.

Specific comments:

1. I can understand directly comparing the quantitative organosulfate concentrations between Sansha and other Chinese cities. However, I also found that the authors made a comparison between the signal intensity of various nitrogen-containing organic compounds in Sansha and the results from previous field studies. Due to different instruments or methods used in the determination of nitrogen containing organic compounds in different studies, there may be differences in the types and ionization efficiencies of nitrogen containing organic compound measured. Therefore, how did the author correct or explain these issues.

Response: The NOC data used for comparison were derived from our research group (Ma et al., 2025), and all NOC data showing in Figure 1 were obtained with the same instruments, methodology, and operators.

Lines 164–166: ...an intercomparison of the relative abundance of compounds identified with the same analytical approach and instrument by the same person was performed in the present study (Ma et al., 2025)...

Lines 239–240: ...The NOC data were identified using the identical analysis methodology (Ma et al., 2025)...

2. The authors present a large amount of satellite-based data. I understand that conducting year-long observations on such data in field sites with underdeveloped infrastructure is quite challenging. Therefore, I suggest that the authors incorporate more literature on observational studies carried out in the South China Sea to validate the reliability of the trends in chlorophyll-a or sea surface temperature calculated using satellite data. Since the various analytical results of this study were closely linked to the trends of the parameters, it would suffice to demonstrate the reliability of the trend changes in the key parameters.

Response: We greatly appreciate your suggestions. The variation patterns among sea surface temperatures and Chlorophyll-a obtained from satellite data presented here are consistent with actual observation results in the South China Sea (Zhai et al., 2018).

Lines 326–329: The variation patterns among SST, seawater isoprene levels, and Chlorophyll-a obtained from empirical formulas or satellite data presented here are consistent with actual observation results in the South China Sea (Zhai et al., 2018).

3. This study quantified up to 92 types of organosulfates. However, the authors utilized surrogate standards. I recognize that reference standards for many organic sulfur compounds are difficult to obtain or prepare, which is why numerous studies rely on surrogate standards for quantifying organosulfates. Therefore, I suggest the authors clarify the limitations of this methodology.

Response: We have added more descriptions in the SI to clarify the limitations of OS quantification methodology.

Text S2:

Due to the absence of authentic standards, the majority of the identified OSs were quantified using surrogate standards (Hettiyadura et al., 2019; Bryant et al., 2021; Wang et al., 2018; Kanellopoulos et al., 2022; Yang et al., 2023)...

...It is imperative to acknowledge the limitations of the OS species quantified in this study. While the quantified OS concentration value should not be regarded as an accurate measurement of OS compounds, it is a best solution in the absence of authentic OS standards...

4. Lines 285-286: '*...aromatic-derived CHON⁺ type Re NOCs...*' I suggest changing it to '*For Re NOCs, the mean signal intensity proportion of aromatic-derived CHON⁺ in the total signal intensity of CHON⁺ compounds ...*'

Response: We have updated the relevant content in the revised manuscript.

Lines 281–283: ...For Re-NOCs, the mean signal intensity proportion of aromatic-derived CHON⁺ in the total signal intensity of CHON⁺ compounds was also lower in Sansha (30%) than in Beijing (48%), Haerbin (88%), and Hangzhou (35%)...

5. Lines 295-297: Please reorganize this sentence to enhance the logical coherence of the context.

Response: The relevant content has been rephrased in the revised manuscript (Lines

287–292).

6. Line 302: This should be ‘The subsequent discussions...’

Response: The revision has been made (Line 312).

7. Line 305: ...Temporal variations of OSs and NOCs...

Response: The revision has been made (Line 314).

8. Line 329: Please delete ‘very’..

Response: The revision has been made (Line 338).

9. Line 350: Please delete ‘from different sources’.

Response: The revision has been made (Line 356).

10. Has the structure of the two important organosulfate markers in Figure 6 been verified?

Response: The structure of those two important organosulfate markers in Figure 6 been verified in our previous publication (Yang et al., 2023) (Lines 141–144).

Once again, we deeply appreciate the time and effort you've spent in reviewing our manuscript.

References

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