Point-by-Point Response to Reviewer 1

We acknowledged the referee's comments. In this point-by-point response, we reproduced the comments (black font), gave our responses (blue font), and highlighted the revisions in new version of the paper in *Italics*. The point-by point responses are below.

Main Comments: The authors present a 9-year dataset (2014-2022) collected by autonomous underwater platforms to observe mesoscale eddies (MEs) in the South China Sea (SCS). Due to their design, the submesoscale instabilities associated with MEs and the life stages of the MEs are trackable. Marginal seas are important but undersampled regions and this dataset may go a long way to increasing our understanding of ME evolution in these areas. However, despite the potential plethora of uses for this dataset, I have major concerns as I was not able to conduct a thorough review in alignment with the submission guidelines of ESSD.

Reply: Thank you for your valuable comments. Based on the subsequent comments, we have revised the entire manuscript:

(1) Based on comments 1 and 3, we have updated and re-uploaded the dataset to the Science Data Bank, ensuring that it is fully accessible without any registration or personal information requirements, in compliance with ESSD's guidelines for anonymous review. And we separate the datasets into two files of "Grid_data" and "Observation_data". In the "Observation_data", the raw data, spike cleaning data, three standard deviation, quality controlled data are in terms of "*_RAW", "*_RO", "*_TSD", and "*_QC", respectively. The dataset is freely available at the following link: https://doi.org/10.57760/sciencedb.11996.

(2) Based on comment 2, we have thoroughly revised the manuscript to address all language-related issues, including but not limited to the specific examples highlighted by the reviewer.

1. Comment: First and foremost, the authors did not follow the submission guidelines of ESSD: "upon submission, authors must certify some form of fully anonymous

review access, directly at the chosen repository (i.e. no registration, name, email or other information is required of reviewers as they access the data)". I was required to register with my official email to request access to the data. Upon submitting this review, my access still has not been granted. I do not think this repository (Science Data Bank) is an appropriate fit for this journal. Most importantly, I was unable to check the formatting of the data and corresponding metadata. Therefore, I cannot attest to the quality of this dataset.

Reply: We sincerely apologize for the inconvenience during the initial submission. We have now re-uploaded the dataset to the Science Data Bank, ensuring that it is fully accessible without any registration or personal information requirements, in compliance with ESSD's guidelines for anonymous review. The dataset is freely available at the following link: https://doi.org/10.57760/sciencedb.11996. We have also carefully reviewed the data formatting and metadata to ensure they meet ESSD standards.

2. Comment: In addition, there are many grammatical errors, phrasing mismatches, and misspelled words throughout this manuscript in its current form, including in the title itself. While, for the most part, the presented data may be sound and worthy of publication in ESSD, the accompanying writing is very often difficult to parse and distracts from the likely high-quality dataset. I highly encourage the authors to work with the editor to find an appropriate copy-editing pathway for this manuscript. I have highlighted a few exceptionally confusing examples below that led to significant confusion, but these are not the full list.

Reply: We sincerely appreciate the reviewer's detailed feedback regarding the grammatical errors, phrasing mismatches, and misspellings in the manuscript. We have thoroughly revised the manuscript to address all language-related issues, including but not limited to the specific examples highlighted by the reviewer. In the subsequent response, we have provided point-by-point revisions for the examples mentioned. Thank you for your constructive suggestions, which will significantly improve the quality of our work.

3. Comment: The figures enclosed within the manuscript are compelling and I believe

this dataset is important. However, to be aligned with the goals of this journal, the authors must be explicit about the QC steps taken within the dataset itself (as requested by an original reviewer) and provide easy, free access to the dataset.

Reply: We sincerely appreciate the reviewer's positive feedback on the figures and the importance of the dataset. In response to the comments, we have explicitly detailed the quality control (QC) steps taken within the manuscript, as requested. We separate the datasets into "Grid_data" and "Observation_data". In the "Observation_data", the raw data, spike cleaning data, three standard deviation, quality controlled data are in terms of "*_RAW", "*_RO", "*_TSD", and "*_QC", respectively. The dataset is freely and easily accessible, and we have ensured compliance with the journal's requirements for open access. Thank you for your valuable suggestions, which have significantly improved the clarity and accessibility of our work.

Minor comments

1. Comment: In the title, "Eddies" should be capitalized. Also the phrase "High Dense Temperature-Salinity Dataset" does not make sense. Perhaps "High-resolution Temperature-Salinity Dataset"?

   Reply: We have revised the title to address the issues raised. "Eddies" is now capitalized, and the phrase "High Dense Temperature-Salinity Dataset" has been replaced with "High-Resolution Temperature-Salinity Dataset" for clarity and accuracy.

   Line 1: "A High-Resolution Temperature-Salinity Dataset Observed by Autonomous Underwater Vehicles for the Evolution of Mesoscale Eddies and Associated Submesoscale Processes in South China Sea"

2. Comment: Line 59: "Observation plats" - I am not sure what is meant here.

   Reply: This was a typographical error, and we have corrected it to "Observation platforms" to accurately reflect the intended meaning.

   Line 58: "Observation platforms for MEs include ship-cruise, satellite, Argo float,

mooring, drifters, autonomous underwater vehicles (AUVs), and underwater gliders (UGs), etc. These platforms have been utilized to detect variations of MEs in SCS (Table 1).”

3. Comment: Line 78: “Attributed to the positively track” does not make sense.

   Reply: We have rephrased this sentence to improve clarity and grammatical correctness. The revised text now reads: " *Attributed to the active tracking* "

   Line 77: “Attributed to the active tracking, AUVs and UGs become more and more important tools in exploring marine environment over last two decades. They have the advantages in low cost, long-duration, controllability and reusability.. Our group has collected high-resolutions of UGs and AUVs observations across MEs.”

4. Comment: Line 91: Hyperlinking to a webpage will not work in an official publication. Please use a citable source and reference appropriately. Same with Table 2. Same with line 158.

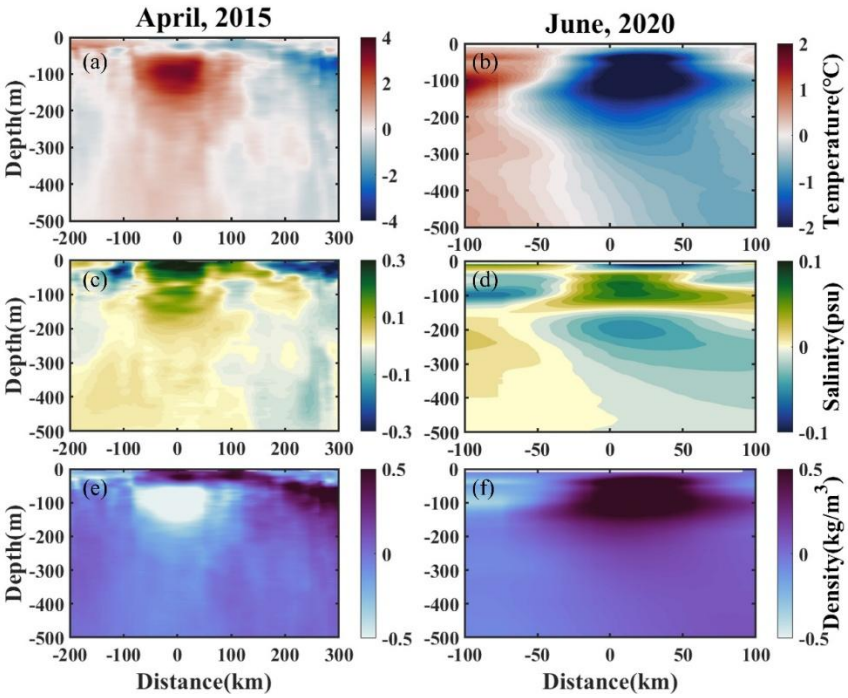
   Reply: Thanks for your reminding. We have checked the hyperlinking and can open theses links:

   (https://repository.oceanbestpractices.org/handle/11329/289?show=full
   https://unesdoc.unesco.org/ark:/48223/pf0000188170
   https://spray.ucsd.edu/pub/rel/info/spray_description.php
   https://www.marinetechnologynews.com/news/seaexplorer-underwater-glider-record-487228
   https://baike.baidu.com/item/%E2%80%9C%E6%B5%B7%E7%87%95%E2%80%9D%E5%8F%B7%E6%B0%B4%E4%B8%8B%E6%BB%91%E7%BF%94%E6%9C%BA/13977071)

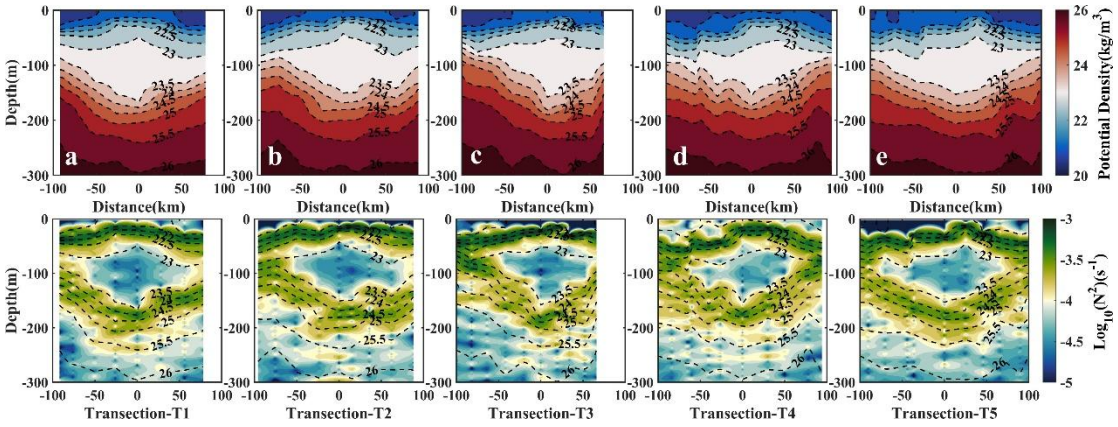
   However, reviewer 2 suggests to delete this table 2. So we deleted these links in this new version.

5. Comment: Line 91: Figure 5, 6 : Using the same colorbar for temperature, salinity, and density makes interpretation of this figure difficult. Consider using the appropriate colorbars from the cmocean package.

   Reply: We have reproduced Figures 5&6 using the appropriate color schemes from the cmocean package (cmocean_delta and cmocean_dense), as suggested. This change improves the interpretability of the figures.



Line 230: "Figure 5. Contour of (a) and (b) temperature anomaly, (c) and (d) salinity anomaly, (e) and (f) density anomaly in April, 2015(left panels) and June, 2020(right panels). The contours were generated using interpolation of the original data points."



Line 253: "Figure 6. The profiles of density (upper panel) and Brunt frequency (lower panel) during (a,f)T1, (b,g)T2, (c,h)T3, (d, i)T4, (e, j)T5 period, which was 06/08-06/11,06/19-06/23,06/29-07/04,07/10-07/15,07/21-07/26, respectively. The contours were generated using interpolation of the original data points."

6. Comment: The original reviewer 2's comment #9 was not addressed. While the authors do list the QC steps, they do not make each step accessible within the dataset itself. This is necessary so other users can adapt the processing later if needed.

   Reply: As in comment 3, we separate the datasets into "Grid_data" and

"Observation_data". In the "Observation_data", the raw data, spike cleaning data, three standard deviations, quality-controlled data are in terms of "*_RAW", "*_RO", "*_TSD", and "*_QC", respectively. This ensures that other users can access and adapt the processing steps as needed.

7. Comment: The original reviewer 2's comment #10 was not addressed. The authors provide a reply but do not address the concerns over spatio-temporal mismatch within the manuscript itself, where it would be useful for other potential users.

   Reply: Thanks for your valuable suggestions. To investigate the evolution of mesoscale eddies, we have made the UGs' network observations be 0.01 º x0.01º spatial resolution (i.e., Figure 7). This dataset has been uploaded to the data link as "Grid_data". It will be useful for other users.

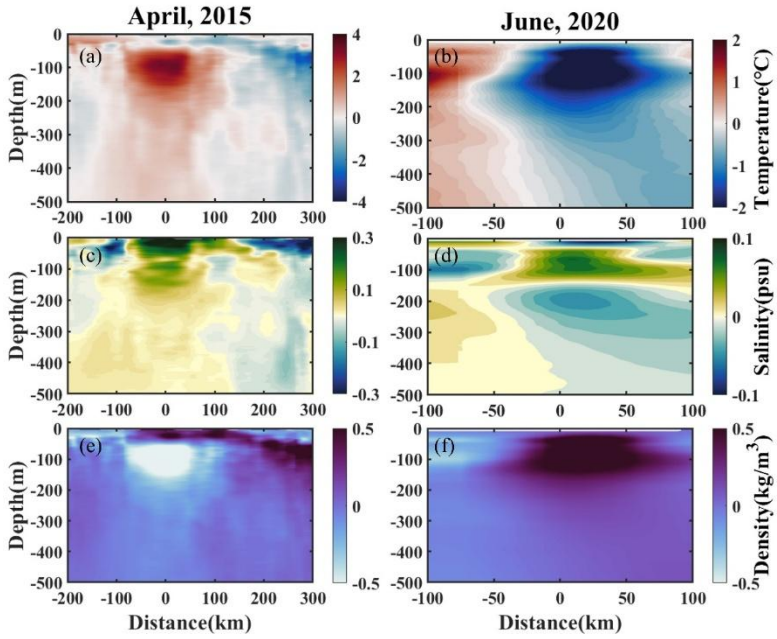
8. Comment: Section 2.1: The authors list many types of underwater gliders but do not specify what kind of glider they themselves used for the data collection.

   Reply: We have specified the type of underwater glider used for data collection in this study in section 2.1. The revised text now clearly identifies the glider model and its configuration.

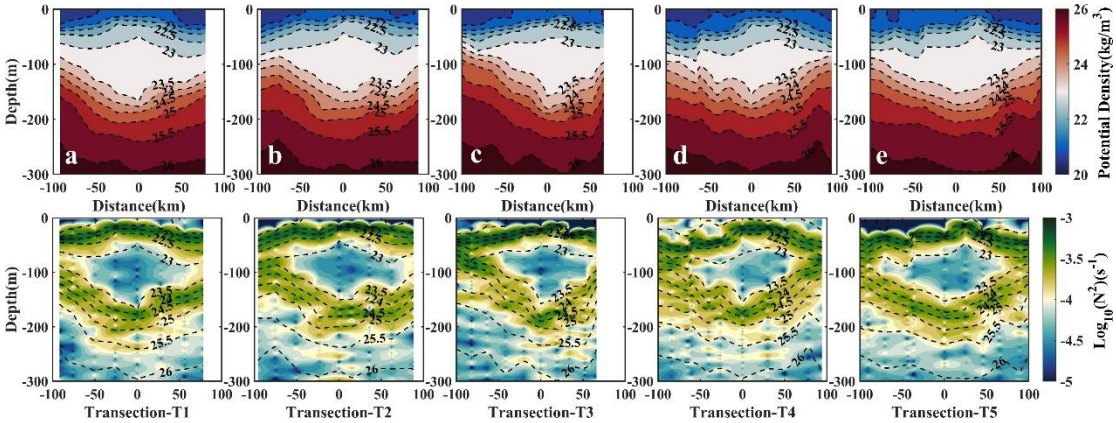
   Line 99: "Different with Rainville et al (2022) and Todd and Ren (2023), most of our experiments aimed to detect the evolution of MEs or submesoscale processes. Two products of Chinese UGs named "Sea Wing" (Yu et al., 2011) and "Petrel" (Wu et al., 2011) are utilized in revealing the development of MEs in this study."

9. Comment: All figures: If interpolation is used, this must be explicitly mentioned in the caption. This was brought up by the original reviewer 2.

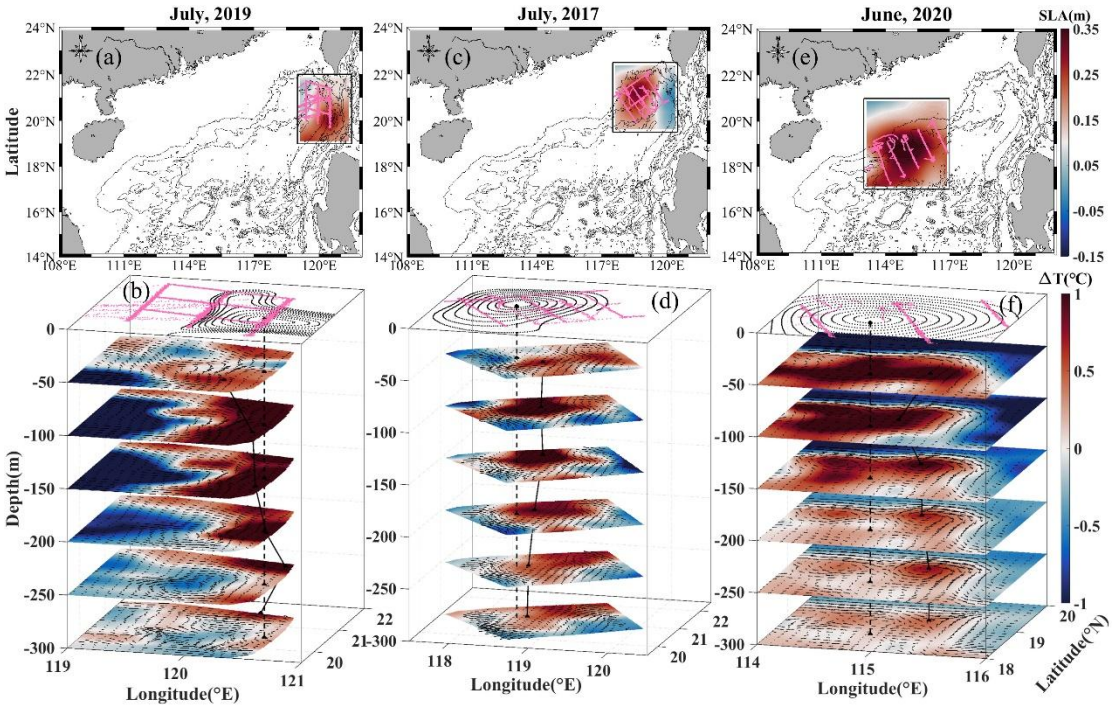
   Reply: We have explicitly mentioned the use of interpolation in the captions of all relevant figures, as requested. This ensures transparency and aligns with the journal's standards.



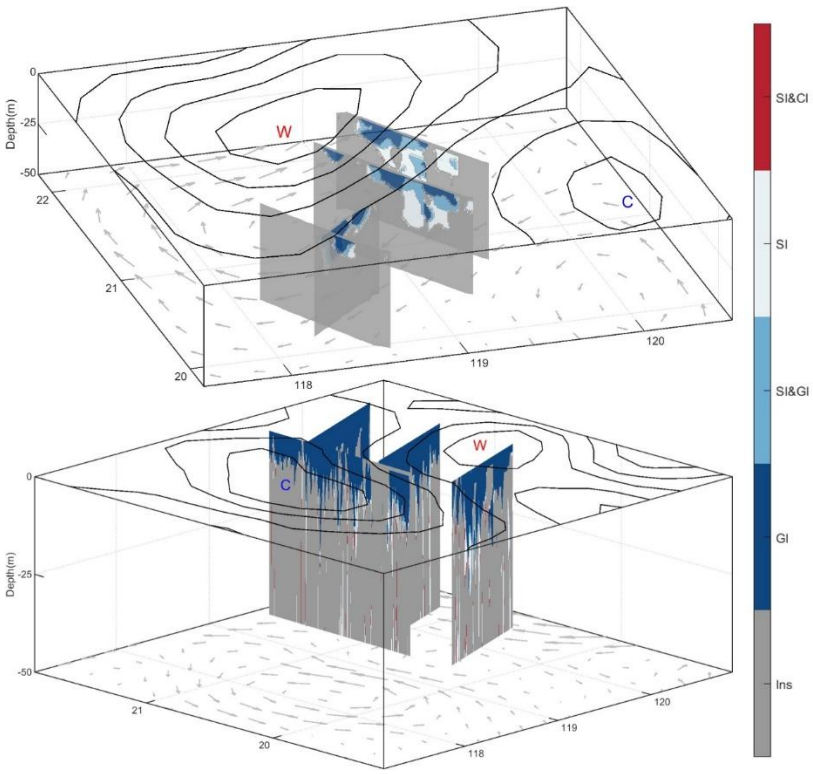
Line 230: "Figure 5. Contour of (a) and (b) temperature anomaly (c) and (d) salinity anomaly, (e) and (f) density anomaly in April, 2015(left panels) and June, 2020(right panels). The contours were generated using interpolation of the original data points."



Line 253: "Figure 6. The profiles of density (upper panel) and Brunt frequency (lower panel) during (a,f)T1, (b,g)T2, (c,h)T3, (d, i)T4, (e, j)T5 period, which was 06/08-06/11,06/19-06/23,06/29-07/04,07/10-07/15,07/21-07/26, respectively. The contours were generated using interpolation of the original data points."



Line 302: "Figure 7. Eddy structures during periods of (a-b) eddy birth, (c-d) westward movement, and (e-f) dissipation along slope movements. Sea level anomaly (SLA) and UGs' positions are superimposed in upper panels (a, c, e), isobaths are represented by solid lines. The UG observed temperature and derived geostrophic velocities are in the 3D plots (b, d, f). Pink lines are the tracks of UGs. Dashed lines denote the centers of mesoscale eddies from SLA fields, and solid dot lines are the centers from warm cores. UG: Underwater Glider. The contours were generated using interpolation of the original data points."



Line 349: "Figure 8. Analyzed submesoscale instabilities at the edge of mesoscale eddies. (a)in 2017, and (b) in 2019. SI: symmetric instability; CI: centrifugal instability; GI: gravity instability. W: anticyclonic eddy; C: cyclonic eddy. Isolines are the sea level anomaly. The contours were generated using interpolation of the original data points."

Point-by-Point Response to Reviewer 2

We acknowledged the referee's comments. In this point-by-point response, we reproduced the comments (black font), gave our responses (blue font), and highlighted the revisions in new version of the paper in in *Italics*. The point-by point responses are below.

Main Comments: I thank the authors for the collection of this extensive dataset. The manuscript presents a dataset collected by 50 underwater gliders and 2 autonomous underwater vehicles during 2014-2022 in the South China Sea to observe mesoscale eddies. It is an invaluable dataset of high-resolution observations (<7 km, <6 hours) from autonomous platforms, which can be used to study meso- and submesoscale dynamics in the South China Sea. The manuscript is detailed, all underwater gliders and autonomous underwater vehicle deployments and data QC (as per IOOS) are well described, some data applications from previous studies are explained, and figures are useful and well presented. The dataset seems complete, and the metadata and QC flags are provided in the data file. However, some grammar and vocabulary corrections are needed before publication. This is why this manuscript should be accepted subject to the following minor revisions.

Reply: Thank you for your valuable comments. Based on the subsequent comments, we have improved the written English throughout the manuscript:

1. Comment: Line 1: Title: "A High-Resolution Temperature-Salinity Dataset Observed…". The community uses the term high-resolution to describe high density of observations.

   Reply: We have revised the title to address the issues raised. The phrase "High Dense Temperature-Salinity Dataset" has been replaced with "High-Resolution Temperature-Salinity Dataset" for clarity and accuracy.

   Line 1: "A High-Resolution Temperature-Salinity Dataset Observed by Autonomous Underwater Vehicles for the Evolution of Mesoscale Eddies and Associated Submesoscale Processes in South China Sea"

2. Comment: Line 2: Title: “Vehicles of Mesocale Eddies Evolution and…” (toward for of and eddies’ to eddies)

   Reply: We appreciate the suggestion. The title has been revised to: “Vehicles for the Evolution of Mesoscale Eddies and…” to improve grammatical accuracy and clarity.

   Line 1: “A High-Resolution Temperature-Salinity Dataset Observed by Autonomous Underwater Vehicles for the Evolution of Mesoscale Eddies and Associated Submesoscale Processes in South China Sea”

3. Comment: Line 23: Change fulfilled for filled

   Reply: We have changed fulfilled for filled.

   Line 22: “Abstract. Marginal seas are usually filled with strongly varying mesoscale eddies (MEs),”.

4. Comment: Line 25: Typo: submemesoscale to Submeososcale

   Reply: The typo has been corrected to “submesoscale” as suggested.

   Line 24: “, triggering submesoscale processes with strong vertical velocity,”

5. Comment: Line 29:”.. (UGs) and autonomous underwater vehicles (AUVs)..” In line 60 AUV is defined as an autonomous unmanned vehicle. The international community uses autonomous underwater vehicles. Please change in the manuscript when necessary.

   Reply: Thank you for pointing this out. We have updated the manuscript to consistently use “autonomous underwater vehicles (AUVs)” throughout the text, aligning with international community standards.

   Line 58: “Observation platforms for MEs include ship-cruise, satellite, Argo float, mooring, drifters, autonomous underwater vehicles (AUVs), and underwater gliders (UGs), etc.”

   Line 148: “Figure 3. Illustration of (a) original, and (b) interpolated data after quality control. The AUV duration is in July 2021. AUV: autonomous underwater

vehicle."

6. Comment: Line 31: "…9-year high-resolution dataset..."

   Reply: We have revised this to clarify the context.

   Line 30: "Here, we present a 9-year high-resolution dataset of AUVs/UGs observations in 2014-2022 in the South China Sea (SCS) that can be downloaded from https://doi.org/10.57760/sciencedb.11996 (Qiu et al., 2024b)."

7. Comment: Line 32: " …(SCS) that can be .."

   Reply: We have added the word "that".

   Line 30: "Here, we present a 9-year high-resolution dataset of AUVs/UGs observations in 2014-2022 in the South China Sea (SCS) that can be downloaded from https://doi.org/10.57760/sciencedb.11996 (Qiu et al., 2024b)."

8. Comment: Line 33-35: The sentence is confusing because at the beginning you say 9UGs and 2AUVs and then 50 UGs and 2 AUVs. We suggest changing the sentence to: " In total, 11 cruise experiments were conducted, deploying 50UGs and 2 AUVs with spatial and temporal resolutions of <7km and <6 hours"

   Reply: We appreciate the suggestion. The sentence has been rephrased for clarity:

   Line 32: "In total, 11 cruise experiments were conducted, deploying 50 UGs and 2 AUVs with spatial and temporal resolutions of <7 km and <6 hours."

9. Comment: Line 37: What does "them" refer to? Is it "40% of the data"? If so clarify.

   Reply: The reference to "them" has been clarified to explicitly state "40% of the data" to avoid ambiguity.

   Line 36: "40% of the data reach resolutions < 1 km and < 1 hour, which provides us the dynamic characteristics of submesoscale instabilities across and along front at the eddy edge."

10. Comment: Line 47: Evolution (in singular)

    Reply: The term has been corrected to "Evolution" in singular form

Line 46: "Evolution of mesoscale eddies (MEs), with high geostrophic straining, favors the generation of submesoscale processes with several kilometers' spatial resolution (McWilliam, 2016), and requires high-accuracy, spatiotemporal synchronization and high-resolution observations."

11. Comment: Change dense observations to high-resolution observations

    Reply: The phrase has been updated to "high-resolution observations" as suggested.

    Line 46: "Evolution of mesoscale eddies (MEs), with high geostrophic straining, favors the generation of submesoscale processes with several kilometers' spatial resolution (McWilliam, 2016), and requires high-accuracy, spatiotemporal synchronization and high-resolution observations."

12. Comment: Line 59: plats to platforms

    Reply: The typo has been corrected to "platforms".

    Line 58: "Observation platforms for MEs include ship-cruise, satellite, Argo float, mooring, drifters, autonomous underwater vehicles (AUVs), and underwater gliders (UGs), etc. These platforms have been utilized to detect variations of MEs in SCS (Table 1)."

13. Comment: Line 60: Change unmanned to underwater.

    Reply: The term has been updated to "underwater" to align with standard terminology.

    Line 58: "Observation platforms for MEs include ship-cruise, satellite, Argo float, mooring, drifters, autonomous underwater vehicles (AUVs), and underwater gliders (UGs), etc."

14. Comment: Line 61: delete plats

    Reply: The typo has been corrected to "platforms".

    Line 60: "These platforms have been utilized to detect variations of MEs in SCS (Table 1)."

15. Comment: Line 78: What do you mean by "Attributed to the positively track"? We

recommend deleting.

Reply: We have rephrased this sentence to improve clarity and grammatical correctness. The revised text now reads:

Line 77: "Attributed to the active tracking, AUVs and UGs become more and more important tools in exploring marine environment over last two decades. They have the advantages in low cost, long-duration, controllability and reusability. Our group has collected high-resolution UGs and AUVs observations across MEs."

16. Comment: Line 81: Change dense to high-resolution

    Reply: The term has been updated to "high-resolution" for consistency.

    Line 79: "Our group has collected high-resolution UGs and AUVs observations across MEs."

17. Comment: Line 81-82: "UGs adjust their buoyancy and generate gliding motion through the water column using a pair of wings. UGs have been deployed since 2004 (citations..)"

    Reply: The sentence has been revised to: "UGs adjust their buoyancy and generate gliding motion through the water column using a pair of wings. UGs have been deployed since 2004."

    Line 80: "UGs adjust their buoyancy and generate gliding motion through the water column using a pair of wings. UGs have been deployed since 2004 (Bachmayer et al., 2004; Caffaz et al., 2010)."

18. Comment: Line 84: Delete "Many international products of UGs were operated, such as "Seaglider" 84 (Eriksen et al., 2001), "Spray" (Sherman et al., 2001), "Slocum" (Webb et al., 2001), 85 "Deepglider" (Osse and Eriksen, 2007), "SeaExplorer". UGs' product companies and 86 related information are listed in Table 2." The manuscript does not use any of the previous cited gliders. There is no need to present them.

    Reply: The section listing UG products has been removed, as it was not relevant to the manuscript.

19. Comment: Line 86 and Table 2. I don't think that Table 2 adds much to the manuscript as per previous comment. Thus, I would delete Table 2. Add the citation

of the “petrel” and “sea wing” UGs in the text on line 106.

Reply: Table 2 has been deleted, and the citations for “Petrel” and “Sea Wing” UGs have been added to the text on line 106.

Line 100: “Two products of Chinese UGs named “Sea Wing” (Yu et al., 2011) and “Petrel” (Wu et al., 2011) are utilized in revealing the development of MEs in this study.”

20. Comment: Line 91: Delete “Kinds of” and “GPS”, resulting in: “Sensors, such as, conductivity-temperature-depth-CTD, are installed on the UGs…”.

    Reply: We thank the reviewer for their suggestion to delete “Kinds of” and “GPS” from the sentence. In response, we have revised the sentence to improve clarity and conciseness. This revision removes unnecessary wording while maintaining the technical accuracy and focus of the statement. We believe this version better aligns with the manuscript’s overall tone and purpose.

    Line 86: “Conductivity-temperature-depth (CTD) are installed on the UGs and AUVs to measure marine temperature and salinity environment.”

21. Comment: Line 94: “2023), or the water mass…”

    Reply: The text has been updated to include the correct year: “2023), or the water mass…”

    Line 88: “Hence, UGs and AUVs have been successfully used in detecting strongly varying features in some marginal seas, such as estimation of trends of Gulf Stream (Todd and Ren, 2023), or the water mass exchanges between Bay of Bengal and Arabian Sea (Rainville et al., 2022).”

22. Comment: Line 122: The legend of the figure should mention whether the SLA was averaged over the entire duration of the campaign or are snapshots of the different dates.

    Reply: We appreciate the reviewer’s comment regarding the legend of the figure. The SLA values shown in the figure represent averages over the entire duration of the campaign, not snapshots of different dates. The legend has been updated to explicitly state: “SLA averaged over the entire duration of the campaign.”

    Line 116: “Figure 1. Underwater glider (UG) and autonomous underwater vehicle

(AUV) observation sites. (A) observation area for subplots (a)-(e); (B) area for subplots (f)-(j). The grey lines in (A) and (B) are the water depth. (a)-(j) Observation stations (pink dots) with sea level anomaly (SLA averaged over the entire duration of the campaign., shading colors). The observation times are (a) September, 2014; (b) April, 2015; (c) July, 2017; (d) April, 2018; (e) July, 2019; (f) September, 2019; (g) June, 2020; (h) May, 2021; (i) July, 2021; (j) August, 2021; and (k) June, 2022."

23. Comment: Line 141: Term usually used is altimeter instead of "obstacle avoidance sonar". Change if you think is appropriate.

    Reply: We appreciate the reviewer's suggestion regarding the use of the term "altimeter". However, in this context, the term "obstacle avoidance sonar" is more accurate and appropriate because it specifically describes the functionality of the sensor used in the study. The device in question is designed for detecting and avoiding obstacles rather than measuring altitude or sea surface height, which is typically the role of an altimeter. Therefore, we have retained the term "obstacle avoidance sonar" to ensure technical precision.

24. Comment: Line 214: Change "related to" to "as per". We suggest changing the link by a citation.

    Reply: The phrase has been revised to "as per" . And the link has been changed by a citation.

    Line 209: "This formula accounts for the haline and thermal contraction of seawater. The detailed method is as per Fofonoff and Millard (1983)."

25. Comment: Line 242: "In Figure 6, we show an anti-cyclone eddy…"

    Reply: The sentence has been updated to:

    Line 241: "In Figure 6, we show an anticyclonic eddy located in the subsurface layer at a depth of 50-200 m, characterized by a low Brunt-Väisälä frequency squared value ($N^2 = \frac{1}{\rho}\frac{d\rho}{dz} < 10^{-4}$*), existing as an intra-thermocline anticyclonic eddy."*

26. Comment: Line 256: Change "networks" to "campaigns".

    Reply: The term has been updated to "campaigns" for accuracy.

Line 259: "Several systematic UG campaigns were conducted in 2015, 2017, 2019, and 2020. A whole life cycle of ME usually experiences birth, developing, mature and dissipate stages (Zhang and Qiu, 2018; Yang et al., 2019), and the eddy's age has suggested to influence on the kinetic energy of MEs."

27. Comment: Line 262: "MEs"

    Reply: The term has been updated to "MEs" for accuracy.

    Line 259: "Several systematic UG campaigns were conducted in 2015, 2017, 2019, and 2020. A whole life cycle of ME usually experiences birth, developing, mature and dissipate stages (Zhang and Qiu, 2018; Yang et al., 2019), and the eddy's age has suggested to influence on the kinetic energy of MEs."

28. Comment: Line 270: "The ME follows geostrophic balance, thus the geostrophic velocity could be..".

    Reply: The sentence has been revised to:

    Line 270: "The ME follows geostrophic balance, thus the geostrophic velocity could be derived under the force balances between pressure gradient and Coriolis force."

29. Comment: Line 272: Delete "Finally"

    Reply: The redundant term has been removed.

    Line 272: "We derived the geostrophic velocity, vg, by using thermal-wind relationships,"

30. Comment: Line 275: "and geostrophic velocity structures..."

    Reply: The phrase has been updated to "and geostrophic velocity structures…"

    Line 277: "Figure 7a-b depicts the three-dimensional temperature and geostrophic velocity structures of a ME (120 °E) at birth stage, as observed by 12 UGs in July 2019 (Figure 1e&6a-b)."

31. Comment: Line 328: Delete "diving".

    Reply: The word "diving" has been removed.

    Line 329: "As shown in Figure 8a, 4 UGs were deployed at the eddy's edge (front) in 2017. 3 UGs cross the front and 1 UG tracks along the front. All of them successfully observed the submesoscale instabilities."

32. Comment: Line 348: change "in Euler field" to "in Eulerarian view"

Reply: The term has been corrected to “in Eulerian view”.

Line 345: “These two cases provide us enough information to detect frontal genesis processes in Eulerian view, while Navis or Argos provide frontal information in Lagrange view.”

33. Comment: Line 370: Change “supports us” to “allow us”

    Reply: The phrase has been updated to “allows us” for better readability.

    Line 371: “The dataset allows us to investigate the subsurface MEs, revealing eddy-current and eddy-topography interactions successfully.”

34. Comment: Line 375: Change turbulences to turbulence

    Reply: The term has been corrected to “turbulence”.

    Line 375: “Besides tracking MEs, UGs and AUVs have been proved to positively capture more smaller scale oceanic process, such as internal tide (Gao et al., 2024), turbulence by using turbulent parameterization schemes (Qi et al, 2020).”

35. Comment: Line 376: Change “And UGs…” to “Moreover, UGs/AUVs equipped with more…”

    Reply: The sentence has been revised to: “Moreover, UGs/AUVs equipped with more…”

    Line 377: “Moreover, UGs/AUV equipped with more sensors could also provide us geochemical parameters (e.g., Yi et al., 2022), presenting the potential ability in improving the forecast accuracy in physical and biogeochemical numerical model.”

36. Comment: Line 383: change “the it’s difficult…” to “makes it difficult for piloting…”

    Reply: The sentence has been corrected to: “makes it difficult for piloting…”

    Line 383: “(2) bad weather makes it difficult for piloting team to deploy and recovery UGs and AUVs;”