

We thank the reviewer for the careful evaluation of our revised manuscript and for the detailed and constructive comments. We apologize for the inconsistencies between our previous point-by-point response and the revised manuscript. In this revision, we have carefully cross-checked the response letter against the manuscript and further revised the text, particularly regarding the interpretation of seasonal variability. Individual data points have also been added to Figures 5–7, together with the means and standard deviations, to better illustrate the variability within each sampling period. We have also standardized the seasonal order as spring, summer, and autumn in Tables 1–2 and Figures 5–8.

We believe these revisions have significantly strengthened the manuscript and addressed the reviewer's concerns. We are grateful for the reviewer's valuable comments, which have greatly improved the clarity, balance, and scientific rigor of our work. Detailed responses to each comment are provided below.

Hsiao-Chun Tseng on behalf of all the co-authors

Please find below our point-by-point responses to the comments raised by the reviewer.

General comments:

I appreciate the effort invested in revising the manuscript. However, I found the evaluation of the revision unnecessarily difficult because the response letter frequently quotes revised text that does not correspond to the revised manuscript. In several instances, the response states "the text now reads...", but the quoted text is either absent or substantially different from the text in the revised manuscript. This made it time-consuming to verify whether my comments had actually been addressed. I encourage the authors to ensure that the response letter accurately reflects the final submitted version of the manuscript.

I still find several instances in which seasonal variability is overinterpreted (using wording like "consistently", "clear" or "markedly") given the limited number of shown data. To better support these interpretations, I suggest displaying the individual data points (e.g., in a lighter colour) in Figures 5 and 6 in addition to the averages and standard deviations. This would allow readers to assess the variability within each sampling period rather than relying solely on summary statistics.

The source of the freshwater influence also remains unexplained. Does it originate from a river, rainfall, groundwater? Another source? My comment regarding the interpretation of lower coastal methane concentrations has also not been addressed.

Moreover, the origin of the methane measured in the adjacent coastal waters remains unclear. In my previous review, I suggested that lateral transport from the seagrass meadow should be considered as one possible explanation. The response focused on the benthic chamber measurements, but this does not address the origin of the methane measured in the ambient coastal waters. This point should therefore be discussed more explicitly.

Finally, the distinction between ambient surface-water measurement, benthic chamber measurements, and the derived sediment-to-water methane fluxes should be made clearer throughout the text to avoid confusion.

I will use the line numbers in the new document without track changes for my comments, since the document with track changes is not easily readable.

Reply: We thank reviewer for these detailed comments and suggestions. We apologize for the inconsistencies between the previous response letter and the revised manuscript, which made it difficult to verify the revisions. In preparing the current revision, we have carefully cross-checked the response letter against the final revised manuscript to ensure that the descriptions of the changes accurately correspond to the submitted version.

We have reconsidered the wording used to describe seasonal variability. In particular, expressions such as “consistently,” “clear,” and “markedly” have been removed if they were not sufficiently supported by the available observations. Individual data points have also been added to Figures 5, 6 and 7, together with the averages and standard deviations, to better show the variability within each sampling period. We also revised the seasonal order to spring, summer, and autumn in Table 1 and 2 as well as Figure 5, 6, 7 and 8. Regarding the freshwater influence, there are no riverine inputs directly entering the study area. Rainfall occurs frequently in this region, with monthly total precipitation during the study period ranging from 156 to 261 mm, and therefore represents a possible source of freshwater influence. However, groundwater discharge has not been investigated at this site, and no relevant information is currently available. We have revised the manuscript to indicate that rainfall may have contributed to freshwater input.

We have also revised our interpretation of CH₄ concentrations in the adjacent coastal waters. Although surface-water CH₄ concentrations at the coastal site were lower than those measured in surface water within the seagrass meadow, they were comparable to the average surface-water CH₄ concentrations previously reported for the South China Sea (Tseng et al., 2017). Therefore, rather than interpreting the coastal concentrations as unusually low, we now describe them as lower relative to the seagrass meadow but comparable to regional marine waters.

We agree that the origin of CH₄ measured in the ambient coastal waters requires more explicit discussion. Lateral transport from the seagrass meadow has already been considered and estimated in Section 4.4 based on our mass-balance calculation. The estimated sediment-to-water CH₄ inputs within the seagrass meadow were substantially greater than the corresponding sea-to-air emissions. Given the shallow water depth and active tidal exchange and coastal circulation at the site, lateral transport represents a plausible pathway for redistributing a portion of this sediment-derived CH₄ from the seagrass meadow to adjacent coastal waters. However, our measurements cannot determine what proportion of the CH₄ observed in the adjacent coastal waters originated from the seagrass meadow. Other sources and processes may also contribute to ambient coastal CH₄, including water-column CH₄ production associated with zooplankton and organic particles, as well as oxic CH₄ production through pathways such as methylphosphonate and dimethylsulfide cycling.

Finally, we have carefully revised the terminology throughout the manuscript to more clearly distinguish among ambient coastal surface-water CH₄ concentrations, benthic chamber water CH₄ concentrations, and derived sediment-to-water CH₄ fluxes, thereby reducing potential confusion among these different measurements.

For consistency and ease of evaluation, all line numbers provided in our responses to the comments below refer to the revised manuscript without track changes.

Specific comments:

Methods:

Lines 82-83: This new information is unclear. Reporting a percentage cover implies a comparison with a defined reference area or true coverage, but this is not explained. Moreover, the reported range (45-90%) is very broad and requires further explanation (e.g., whether it reflects spatial or temporal variability, or differences among sampling sites). As currently written, this statement reads more like a result, indicating that seagrass cover varied substantially during the study period, rather than providing background information.

Reply: Thank you for pointing this out. We agree that the previous description did not clearly define the seagrass cover or explain the broad range reported. The reported cover refers to the seagrass coverage within the approximately 4.38-ha meadow. The mean seagrass cover during the study period was approximately 66%, while the range of approximately 45%–90% reflects seasonal variability in seagrass cover rather than spatial differences among sampling sites. We have revised the text to clarify this point and to present these values as characteristics of the seagrass meadow during the study period.

Now the text reads (Line 80-83): The study was conducted in a natural subtidal seagrass meadow covering approximately 4.38 ha and dominated by *Thalassia hemprichii* and *Halophila pinifolia*. According to the seagrass survey reported by Lin et al. (2023), the meadow had a mean seagrass cover of approximately 66%, with seasonal estimates ranging from approximately 45% to 90%.

Thank you for improving the description of the experiment in section 2.2. However, the section is still difficult to follow and would benefit from further clarification.

1) Please define the time ranges corresponding to the day and night periods used in the analyses (lines 105 and 111).

Reply: Thank you for this comment. We have clarified the incubation durations in the revised manuscript.

Now the text reads (line 106-111): The in situ benthic incubation experiments were conducted during both day and night, with incubation durations adjusted according to seasonal weather and sea conditions. In spring, nighttime incubations were conducted for 5 hours, whereas daytime incubations were limited to 3 hours due to unfavorable conditions during the rainy season. In summer, both daytime and nighttime incubations were conducted for 5 hours. In autumn, unstable storm conditions restricted the incubation period to 2 hours. A magnetic agitator was placed inside each chamber to maintain continuous water circulation during incubation (Figure 4d).

2) Line 109, since these measurements seem to concern methane concentration in the chamber, indicate that water was sampled at the beginning and the end of the experiment for flux calculation.

Reply: Thank you for this suggestion. We have modified the sentences.

Now the text reads (line 113-114): Incubation water was collected through a three-way valve installed on each chamber at the beginning and end of each incubation for benthic flux calculations.

3) Temperature, salinity, and DO were measured continuously using a sensor, whereas methane was measured from discrete water samples. However, Figure 6 only presents discrete data points. Please clarify the sampling frequency for each variable and explain why the figure only shows discrete observations (lines 109–110 and 123–126).

Reply: Thank you for pointing this out. We apologize that our previous description was unclear and may have given the impression that temperature, salinity, and DO were measured continuously.

The YSI ProDSS used in this study is a portable multiparameter water quality meter and cannot be deployed as a continuously recording sensor. Therefore, water temperature, salinity, and DO were measured in situ using the YSI ProDSS at each water-sampling time, coinciding with the collection of discrete water samples for CH₄ analysis. Consequently, all variables presented in Figure 6 represent discrete observations at the corresponding sampling times, rather than continuous time-series measurements. We have revised the Methods section to clarify the measurement approach and sampling frequency.

Now the text reads (line 128-130): At each water-sampling, water temperature, salinity, and dissolved oxygen (DO) were measured on-site using a portable multiparameter water quality meter (YSI ProDSS, USA), concurrently with the collection of discrete water samples for CH₄ analysis.

4) Line 110 refers to surface water samples. My question was answered in the response letter but not incorporated into the manuscript. Where were these samples collected relative to the chambers? Were T, S and DO measured at the surface using the same instrument used in the chambers?

Reply: Thank you for pointing this out. We apologize that this clarification was included in our previous response letter but was not incorporated into the manuscript. And yse, T, S and DO at the surface were measured using the same instrument as that used for the incubation samples.

Now the text reads (line 114-130): Ambient surface seawater surrounding the incubation setups in the seagrass bed was collected seven times a day at 06:00, 09:00, 12:00, 15:00, 18:00, 21:00, and 24:00. Surface seawater samples were also collected from the coastal water site outside the reef platform at the same times, except at 21:00 and 24:00 due to safety concerns.

Surface and chamber water samples for CH₄ analysis were collected in duplicate using 120 mL brown serum bottles. Bottles were rinsed twice with sample water, filled to slight overflow, and preserved with 200 µL of saturated mercuric chloride (HgCl₂) to inhibit microbial activity. After sealing with a butyl rubber stopper and aluminum cap, the bottles were shaken to mix, placed in an ice-filled cooler, transported to the laboratory, and stored at 4 °C in the dark.

Porewater samples were collected using porewater wells and a Luer-Lok syringe at sediment depths of 0, 2, 4, 6, 8, 12, 16, and 20 cm following the method of Falter and Sansone (2000). Samples were immediately transferred into 30 mL brown serum bottles, preserved with 50 µL HgCl₂, sealed with butyl rubber stoppers and aluminum caps, placed on ice in a dark cooler during transport, and stored at 4 °C in dark until analysis. Porewater samples were collected from both the seagrass meadow and bare sand sediments at locations separate from the chamber incubation sites to avoid disturbing the ongoing benthic chamber incubations. All seawater and porewater samples were analyzed within two months of collection.

At each water-sampling, water temperature, salinity, and dissolved oxygen (DO) were measured on-site using a portable multiparameter water quality meter (YSI ProDSS, USA), concurrently with the collection of discrete water samples for CH₄ analysis.

5) Line 120: please indicate the locations of the porewater sampling relative to the benthic chambers, and add them to figure 1.

Reply: Thank you for the suggestion. We have modified the Figure 1.

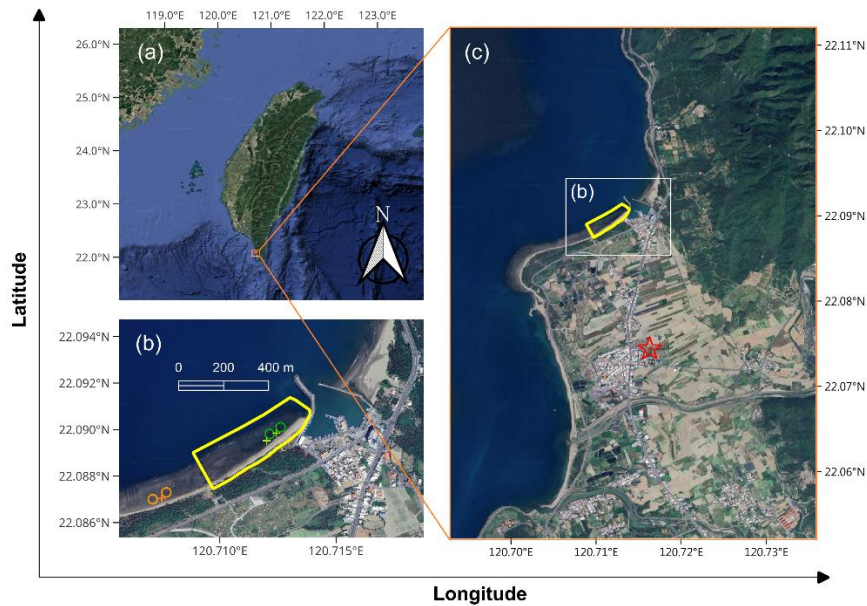


Figure 1. Study area. (a) Regional map showing the location of the study area. (b) Close-up view of the benthic chamber incubation sites. The yellow rectangle outlines the Haikou seagrass meadow and the red star indicates the location of the Checheng Weather Station. (c) Zoomed-in map of the study area. Green circles (○) indicate chamber incubation sites in the seagrass area, while orange circles (○) indicate chamber incubation sites in the bare sand area. Green crosses (+) indicate porewater sampling sites in the seagrass area, while orange cross (+) indicates porewater sampling sites in the bare-sand area.

6) The description alternates between surface sampling, continuous sensor measurements (temperature, salinity, and DO), and the instrumentation used, making the experimental design difficult to follow. Consider restructuring this section so that the sampling strategy, measurements, and instrumentation are described in a more logical order. For example, the authors could describe separately i) ambient surface-water sampling, ii) benthic-chamber sampling, iii) porewater sampling and iv) laboratory analysis. In addition, the description would benefit from adding “surface” and “chamber” when referring to methane concentrations. For example line 113, it should read “Surface and chamber water samples for CH₄ analysis [...]”.

Reply: Thank you for the suggestion. We have divided the original Section 2.2, “In situ chamber incubation system, sample collection, and chemical analysis,” into two separate sections: Section 2.2, “In situ chamber incubation system,” and Section 2.3, “Sample collection and chemical analysis.” Because water samples from the incubation chambers, ambient surface waters surrounding the incubation setups in the seagrass bed, and coastal waters outside the reef platform were collected and analyzed using the same procedures, we describe these methods together to avoid unnecessary repetition. Porewater sampling, which involved a different sampling procedure, is described separately in the following paragraph.

Now the text reads (line 97-132):

2.2 In situ chamber incubation system

In situ benthic incubation experiments were conducted at four sites, including two seagrass meadow sites and two bare sand sites (Figure 1b), to quantify changes in seawater chemical parameters influenced by sediments and benthic organisms in areas with and without seagrass. The closed chambers prevented interference from water exchange and water-air interactions. Designed to preserve the natural structure of aquatic plants and sediment surfaces, the chambers also ensured proper fluid dynamics without altering flow patterns when the lid was closed (Webb and Eyre, 2004). Each benthic chamber measured 40 cm in height and 32 cm in diameter (Figure 4c). Its transparent structure allowed sunlight to penetrate, ensuring that the organisms and plants inside were not affected by shading. Before incubation, all chambers were left open for at least two hours to facilitate water exchange.

The in situ benthic incubation experiments were conducted during both day and night, with incubation durations adjusted according to seasonal weather and sea conditions. In spring, nighttime incubations were conducted for 5 hours, whereas daytime incubations were limited to 3 hours due to unfavorable conditions during the rainy season. In summer, both daytime and nighttime incubations were conducted for 5 hours. In autumn, unstable storm conditions restricted the incubation period to 2 hours. A magnetic agitator was placed inside each chamber to maintain continuous water circulation during incubation (Figure 4d).

2.3 Samples collection and chemical analysis

Incubation water was collected through a three-way valve installed on each chamber at the beginning and end of each incubation for benthic flux calculations. Ambient surface seawater surrounding the incubation setups in the seagrass bed was collected seven times a day at 06:00, 09:00, 12:00, 15:00, 18:00, 21:00, and 24:00. Surface seawater samples were also collected from the coastal water site outside the reef platform at the same times, except at 21:00 and 24:00 due to safety concerns.

Surface and chamber water samples for CH₄ analysis were collected in duplicate using 120 mL brown serum bottles. Bottles were rinsed twice with sample water, filled to slight overflow, and preserved with 200 µL of saturated mercuric chloride (HgCl₂) to inhibit microbial activity. After sealing with a butyl rubber stopper and aluminum cap, the bottles were shaken to mix, placed in an ice-filled cooler, transported to the laboratory, and stored at 4 °C in the dark.

Porewater samples were collected using porewater wells and a Luer-Lok syringe at sediment depths of 0, 2, 4, 6, 8, 12, 16, and 20 cm following the method of Falter and Sansone (2000). Samples were immediately transferred into 30 mL brown serum bottles, preserved with 50 µL HgCl₂, sealed with butyl rubber stoppers and aluminum caps, placed on ice in a dark cooler during transport, and stored at 4 °C in dark until analysis. Porewater samples were collected from both the seagrass meadow and bare sand sediments at locations separate from the chamber incubation sites to avoid disturbing the ongoing benthic chamber incubations. All seawater and porewater samples were analyzed within two months of collection.

At each water-sampling, water temperature, salinity, and dissolved oxygen (DO) were measured on-site using a portable multiparameter water quality meter (YSI ProDSS, USA), concurrently with the collection of discrete water samples for CH₄ analysis. Dissolved CH₄ concentrations were determined in the laboratory using the headspace technique (Weiss, 1981) and analyzed with a gas chromatograph (GC; Agilent 7890, USA) equipped with a flame ionization detector (FID). Detailed information on column configurations and calibration procedures can be found in Tseng et al. (2022).

Section 2.3: The CH₄ saturation ratio is not used in the manuscript, so its calculation should be removed.

Reply: Thank you for the suggestion. We removed it.

Section 2.5: The term “CH₄ production rate” may be inappropriate because $\Delta C/\Delta t$ within the chamber represents net methane accumulation in the overlying water within the chamber rather than gross methane production within the sediment. Please clarify the terminology and consider using “net chamber-water CH₄ accumulation rate” or another more precise term.

Reply: Thank you for the suggestion. We agree that the change in CH₄ concentration ($\Delta C/\Delta t$) within the chamber represents the net accumulation of CH₄ in the overlying chamber water rather than the gross production of CH₄ within the sediment. However, this chamber-based measurement is commonly referred to as the benthic production rate in benthic incubation studies (e.g., Roth et al., 2019 and Bijak et al., 2024). To maintain consistency with the terminology used in previous studies, we have therefore retained the term “benthic CH₄ production rate” rather than changing it to “net chamber-water CH₄ accumulation rate.” We have, however, clarified in Section 2.5 that the calculated rate represents the net change in CH₄ concentration in the overlying chamber water during the incubation period and should not be interpreted as gross sedimentary CH₄ production.

Now the text reads (line 154-155): Here, benthic CH₄ production rate refers to the net accumulation rate of CH₄ concentration in the overlying chamber water during incubation and does not represent gross CH₄ production within the sediment.

I may have misunderstood something, but from the method section, it seems that the production rate and fluxes are calculated using the methane concentration at the start and the end of the experiment in each chamber, and at a maximum of 7 times per day at the surface. Yet, figures 6 and 7 mentioned n of 226 and 284. Could you please detail where and when the measurements are taken?

Reply: Thank you for the question. Surface seawater was sampled up to 7 times per day, with duplicate samples collected at each sampling time from two sampling sites (the seagrass and coastal water sites) over 3 sampling days in each season (spring, summer, and autumn). Thus, the ‘n’ values reported in Figures 6a and 7a represent the total number of individual measurements included in the analyses rather than the number of sampling times. In total, 226 water samples were used for the calculation of sea-to-air CH₄ fluxes.

For the sediment-to-water CH₄ flux calculations, water samples were collected from the incubation chambers at the beginning and end of each incubation. Incubations were conducted at 4 sites, 2 in seagrass and 2 in adjacent unvegetated bare sand sites, with duplicate water samples from each chamber collected for CH₄ analysis. Across all incubation experiments conducted in spring, summer, and autumn, a total of 284 water samples were collected and used for the sediment-to-water flux calculations.

Results:

The revised Results section does not correspond consistently to the text quoted in the response to reviewers document.

Table 1: add surface CH₄ concentration for clarity.

Reply: Thank you for the suggestion. We modified it.

Line 155: “Daytime surface water temperatures were consistently higher than nighttime temperatures, [...] (Figure 5a)”: the authors switched the grey boxes compared to the first submission, and the revised figure now shows the opposite. Please check the day/night shading and labels carefully. Also, the statement “with a more pronounced diurnal difference in the seagrass meadow than in the coastal water” appears to be supported mainly in autumn 2022 rather than consistently across all seasons. I am therefore not sure this statement is necessary.

Reply: Thank you for pointing this out. We apologize for the errors introduced while revising Figure 5. We have carefully checked the day/night shading and labels, and Figure 5 has now been corrected accordingly. We also agree that the difference between the seagrass meadow and coastal water was not consistently observed across all seasons. Therefore, we have removed this unnecessary statement.

Regarding Section 3.3, please also see my comment in the Methods section regarding the number of samples collected during each surface and benthic chamber incubation and the calculation of the water-air and sediment-to-water methane fluxes. Clarifying this methodology is essential for interpreting the results presented in this section.

Reply: Thank you for this important comment. We agree that clarifying the sampling design and flux calculations is important for interpreting the results presented in Section 3.3. We have therefore added further information on the benthic chamber incubations and sample numbers to this section.

The revised text now reads (line 185-189): For the sediment-to-water CH₄ flux measurements, incubations were conducted at four sites, including two seagrass sites and two adjacent unvegetated bare sand sites. Incubation chambers were deployed at each site, and duplicate water samples were collected from each chamber at the beginning and end of each incubation for CH₄ analysis. Across the incubation experiments conducted in spring, summer, and autumn, a total of 284 water samples were collected and used to calculate sediment-to-water CH₄ fluxes.

Section 3.4: As noted in my previous review, and although the authors indicated that this issue had been corrected, the values reported in the text still do not correspond to those shown in Figure 8. To improve consistency between the text and the figure, please report the average values in the text rather than the ranges or individual observations.

Reply: Thank you for pointing this out again, and we apologize that this issue was not fully corrected in the previous revision. We agree that reporting the average values in the text will provide better consistency with Figure 8. We have therefore revised Section 3.4 to report the average porewater CH₄ concentrations shown in Figure 8, rather than the ranges or individual observations. We have also carefully cross-checked the values reported in the revised text against Figure 8 to ensure consistency.

The revised text now reads (line 204-205): In seagrass sediments, mean porewater CH₄ concentrations ranged from 8.1–92.0 nM in spring 2022, 11.8–364.8 nM in summer 2023 and 6.7–262.1 nM in autumn 2022 (Figure 8).

Discussion:

Although the manuscript reads better with two distinct parts Results and Discussion, all parts of the Discussion repeat results and overinterpret the data based on what is shown. Sections 4.2 and 4.3 contain substantial overlap. Both sections discuss the roles of organic matter accumulation, oxygen availability, and microbial methanogenesis in explaining higher methane production in seagrass sediments. Consider reducing this repetition by focusing Section 4.2 on seasonal controls and Section 4.3 on the contrast between vegetated and unvegetated sediments.

Reply: Thank you for this helpful comment. We agree that Sections 4.2 and 4.3 contained some overlap, particularly regarding the roles of organic matter accumulation, oxygen availability, and microbial methanogenesis in regulating benthic CH₄ production. We have therefore revised these sections to reduce repetition and clarify their distinct purposes. Section 4.2 now focuses specifically on the seasonal controls on benthic CH₄ production and sediment-to-water fluxes in the tropical seagrass meadow, whereas Section 4.3 focuses on the contrasting benthic CH₄ dynamics between seagrass and unvegetated sandy sediments. Repetitive discussion in Section 4.2 has been removed. We believe these revisions provide a clearer distinction between the seasonal and habitat-related controls on benthic CH₄ dynamics and improve the overall focus of the Discussion.

Section 4.1: As mentioned in my previous review, Figure 5 does not fully support the second part of the statement: “Dissolved CH₄ concentrations in the seagrass meadow exhibited pronounced diurnal variability, with surface waters generally peaking at night. This consistent pattern [...]”, followed by “The only exception occurred during autumn 2022”. Only two of the three sampling seasons show this pattern. Please also see my general comment regarding the limited number of data points shown in Figures 5 and 6. In addition, please indicate the figure you are referring to in the text, and note the confusion of shaded areas in Figure 5. There is still some confusion between surface water and chamber methane concentrations. The expressions “in the seagrass meadow” and “in the sand” could be interpreted as referring to sediment rather than surface water. Please use more precise terminology throughout this section.

Reply: Thank you for pointing this out. We apologize for the errors introduced during the previous revision of Figure 5. We have carefully rechecked the day/night shading, labels, and corresponding CH₄ concentration data, and Figure 5 has now been corrected accordingly.

We also agree that the previous wording overstated the consistency of the observed diurnal pattern, as the nighttime increase in surface-water CH₄ concentrations was not observed in all three sampling seasons. We have therefore revised this part of Section 4.1 and removed wording that could overinterpret the limited number of observations shown in Figures 5 and 6.

Section 4.2: Figure 7b does not fully support the first statement. Bubbles are only mentioned as a potential transport pathway, but they are easily seen from the naked eye. Were they observed by the divers?

Reply: Thank you for raising this point. At our shallow seagrass site (water depth approximately 0.5–1.5 m), underwater visibility is often limited by high turbidity due to strong tidal and wave influences. Therefore, it was generally difficult for divers to identify the source of bubbles in the water column. Although bubbles were occasionally visible around the seagrass during calm summer conditions, we could not determine their source or quantify their CH₄ concentration. The observed bubbles may have contained CH₄, but they were not collected for gas composition

analysis. In addition, dissolved CH₄ concentrations in the seawater were generally in the nM range, whereas dissolved O₂ concentrations were more than three orders of magnitude higher. Therefore, visual observations of bubbles alone cannot be used to quantify CH₄ ebullition.

Figures:

Figure 1: In panels (a) and (c), add “(b)” next to the white rectangles to indicate that these areas are zoomed in panel (b). Add a legend for the circles in panel (b). Please also add the location of the porewater samples, since the text indicates that they were collected “at sites separate from the benthic chambers”. The approximate distances between the seagrass and sand chamber sites should also be reported, either in the figure or in the text.

Reply: Thank you for the suggestion. We have modified the Figure 1.

Figure 2: add “(see Figure 1 for location)” at the end of the caption to remind the reader where the weather station is located. Consider adding the monthly data points to the graph to show the interannual variability and how representative the plotted means are.

Reply: Thank you for the suggestion. We have modified the figure caption accordingly. Figure 2 presents the monthly mean air temperature, total precipitation, and mean wind speed over a two-year period. If all monthly data points were included in the figure, substantial overlap would occur, making the data difficult to distinguish, particularly for air temperature and total precipitation. Therefore, we have retained the current presentation for clarity and readability.

Figure 3: although this figure is a nice addition to the manuscript, the overlap “coastal water” with the shaded blue area is difficult to understand. The caption needs more information explaining what the blue area represents. Please also indicate the benthic chamber locations and refer to Figure 4 since Figure 3 is presented before the chamber system is described in Figure 4.

Reply: Thank you for this helpful comment. Figure 3 was designed as a three-dimensional schematic to illustrate the spatial configuration and differences in water depth among the sampling areas. We have revised the figure and caption to clarify the meaning of the blue shading. The dark blue shaded area represents the adjacent coastal waters, where the water depth was approximately 10 m, whereas the light blue shaded area represents the shallow seagrass and bare-sand areas, where the water depth was approximately 0.5–1.5 m.

Figure 5: add in the caption that those are surface water measurements.

Reply: Thank you for pointing this out. We modified it.

Technical correction:

Line 116: typo (“using porewater wells” instead of “use porewater wells”)

Reply: Thank you for pointing this out. We modified it.

The revised text now reads (line 122-123): Porewater samples were collected using porewater wells and a Luer-Lok syringe at sediment depths of 0, 2, 4, 6, 8, 12, 16, and 20 cm following the method of Falter and Sansone (2000).