Dear Editorial Team of Biogeosciences

Please find below our replies to the referee's comments, as requested. For your convenience, you will find the replies in blue in the corresponding lines below the respective comment. We thank you for considering our manuscript for publication in Biogeosciences. We particularly thank the Associate Editor, Andrew Thurber, for handling our manuscript with so much care.

Authors Comments

Responses to comments by Reviewer #1 (Fabien Roquet)

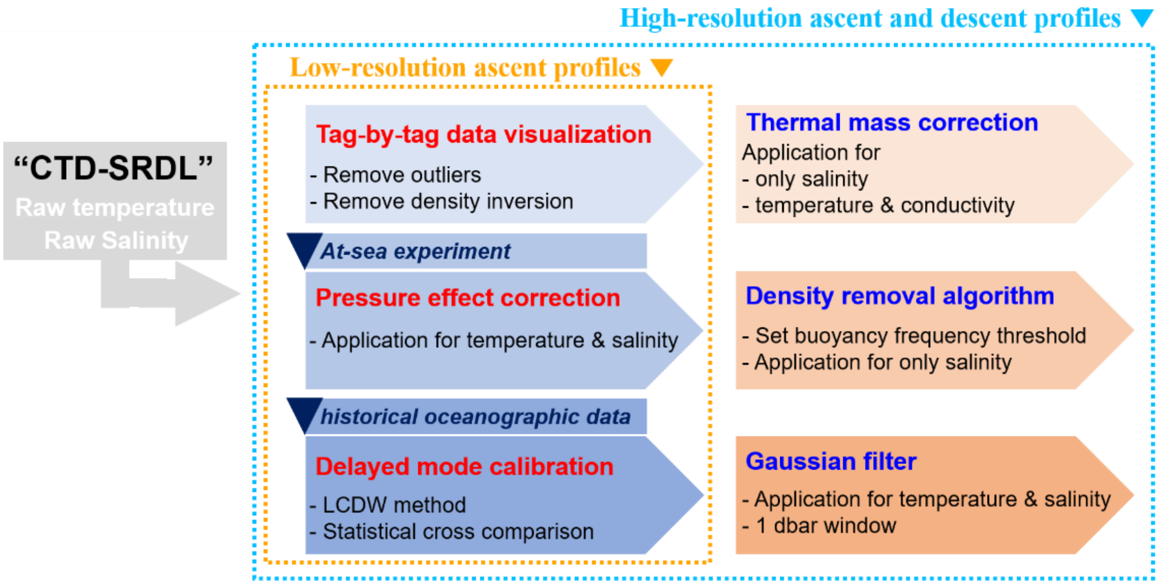
This manuscript describes the foraging behaviour of Weddell seals in the Ross Sea, using oceanographic and behavioural data logged using miniaturized loggers attached to the seals. While no ground-breaking result is obtained in this study, the data is of value and the analysis deserves its own publication conditional to major revisions.

I have in particular one major concern about the quality control of data. The authors cite in many places the publication of Yoon and Lee 2021. This publication is written in Korean in what appears to be a corean journal. This does not follow international standards and I am unable to follow what is written there. I believe the authors should treat this publication as a technical report, and assume the reader is unable to utilize it. For this reason, the current work should provide more extensive information about the different corrections that have been estimated and applied (Step 1 to Step 3 in section 2.2). The authors do not seem to be aware of the work of Siegelman et al 2019 either, which provides several recommandations for quality-control including density removal and thermal cell effect corrections.

⇒ We thank the reviewer for the valuable comments and for taking the time to review our work carefully. A point-by-point reply to all your comments can be found in blue. In addition, we have reinforced our research by adding 2023 seal data. Therefore, the revised manuscript included a total of three-year seal-CTD data.

We understand your major concern about data QC. However, seal-data were quality controlled following the international standards recommended mainly by Roquet et al. (2011) (Figure 2 of Yoon and Lee 2021). The figure below is based on Roquet et al. (2011) and

Siegelman et al. (2019). In this study, we applied the international standard QC method for low-resolution ascent profiles.



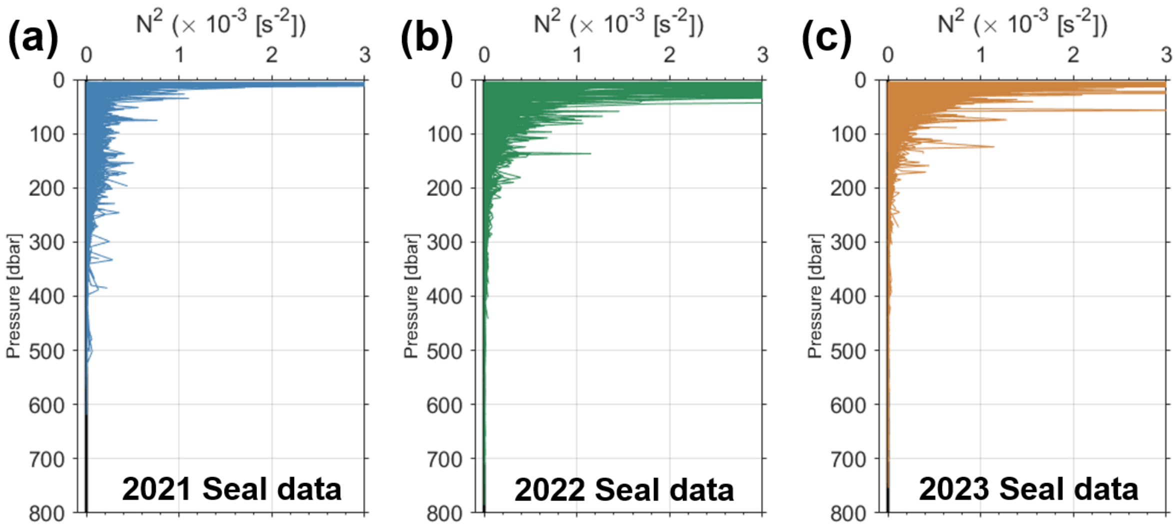
▲ Figure 2 of Yoon and Lee 2021

(Schematic procedures for quality control of two cases' CTD-SRDL data)

The only difference is HSSW (High Salinity Shelf Water) method as written in the original manuscript (L152–157). In the continental shelf region of the Ross Sea, the LCDW (Lower Circumpolar Deep Water) method (Roquet et al. 2011) could not be applied to seal data QC because LCDW is hardly found in this region. Instead of the LCDW, HSSW is a very stable feature in the deep layer of the western Ross Sea, including Terra Nova Bay. Therefore, we adjusted offsets of salinity and temperature data from each tag using HSSW properties observed from IBRV Araon survey during the austral summer of the corresponding year. Absolute values from ship-based CTD can be regarded as actual values because all CTD sensors of IBRV Araon were sent to SeaBird Electronics (SBE; Manufacturer) for sensor calibration one year before the observation period.

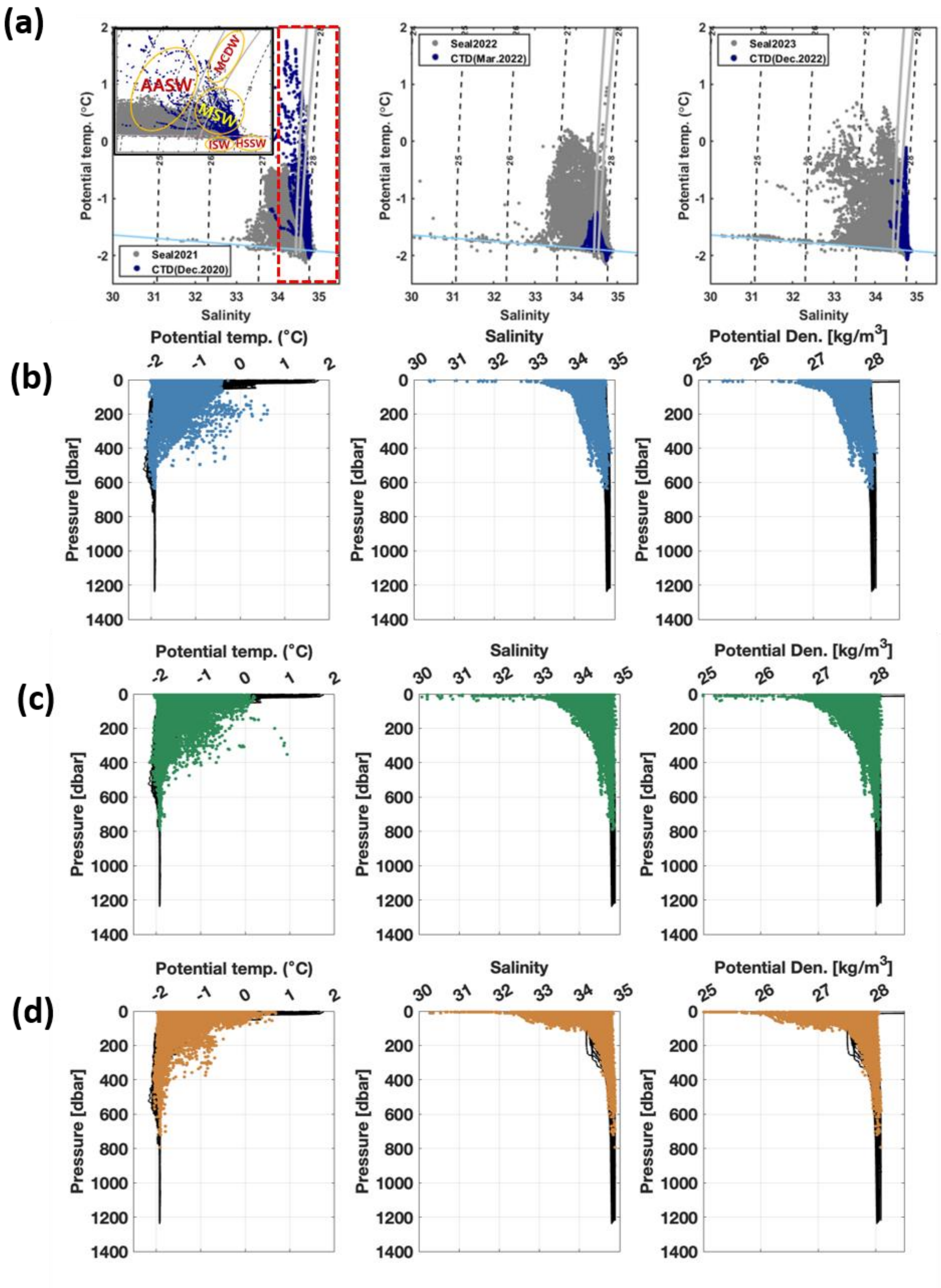
The salinity offset range for the 2021 seal data was from -0.16 to -0.03, and the temperature was not adjusted because the temperature of HSSW from the 2021 seal data was consistent with those from the ship-based CTD data. Temperature and salinity offsets for 2022 seal data were estimated as -0.03–0.23°C, and -0.38–-0.01, respectively. 2023 seal data were also quality controlled following the same method, and temperature and salinity offsets for 2023 seal data were estimated as -0.01–0.27°C, and -0.41–-0.01, respectively.

Moreover, Siegelman et al. (2019) suggested QC methods for thermal cell effect corrections, however, as you know, thermal mass correction could be only applied to high-resolution ascent and decent profiles. In this study, we only used low-resolution ascent profiles transmitted from CTD-SRDLs (profiles with 16 depths); thus, among several recommendations of Siegelman et al. (2019), we only applied the density removal algorithm (including Tag-by-tag data visualization in the figure above) regarding minimum N^2 (N is the Brunt-Väisälä frequency) threshold as $1 \times 10^{-9} s^{-2}$. The figure below indicates vertical profiles of N^2 estimated from 2021, 2022, and 2023 QC completed seal data, respectively. All N^2 values are positive, which indicates that the density removal algorithm was successfully applied to the 2023 seal data.

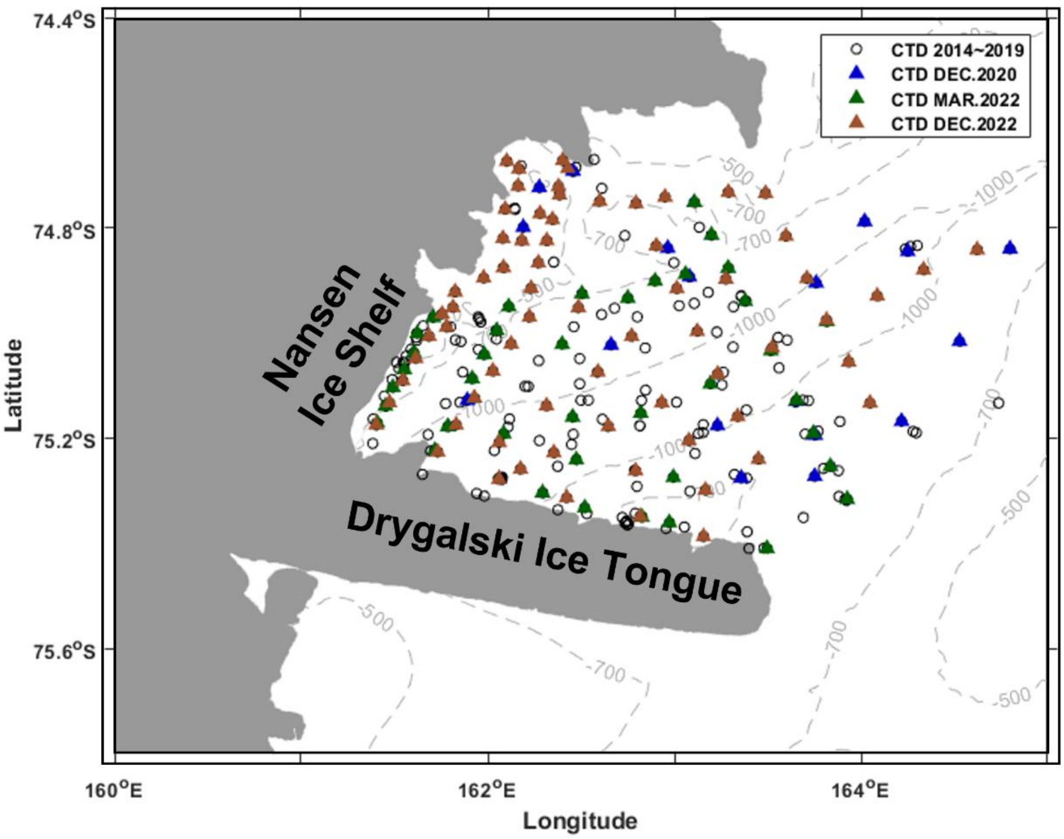


▲ Vertical profiles of buoyancy frequency estimated from (a) 2021, (b) 2022, and (c) 2023 seal data

By the comment, we have added the information above on the seal data QC to the revised manuscript. In addition, we have added Supplementary Figure 1 by reproducing Figure 2 of Yoon and Lee 2021. Therefore, we referred to Supplementary Figure 1 instead of Yoon and Lee 2021 in the main manuscript. The figures below show a comparison of seawater properties between ship-based CTD data and QC-completed seal data for each year, and they captured well the characteristics of seawater in the western Ross Sea.



▲ (a) Comparison of T-S diagram between ship-based CTD data (blue) and QC-completed seal data for each year (gray; 2021, 2022, 2023) (b) Comparison of vertical profiles between ship-based CTD data during 2014-2022 (black) and QC completed seal data of 2021 (blue) (c) The same as (b), but for QC completed seal data of 2022 (green) (d) for 2023 (brown)

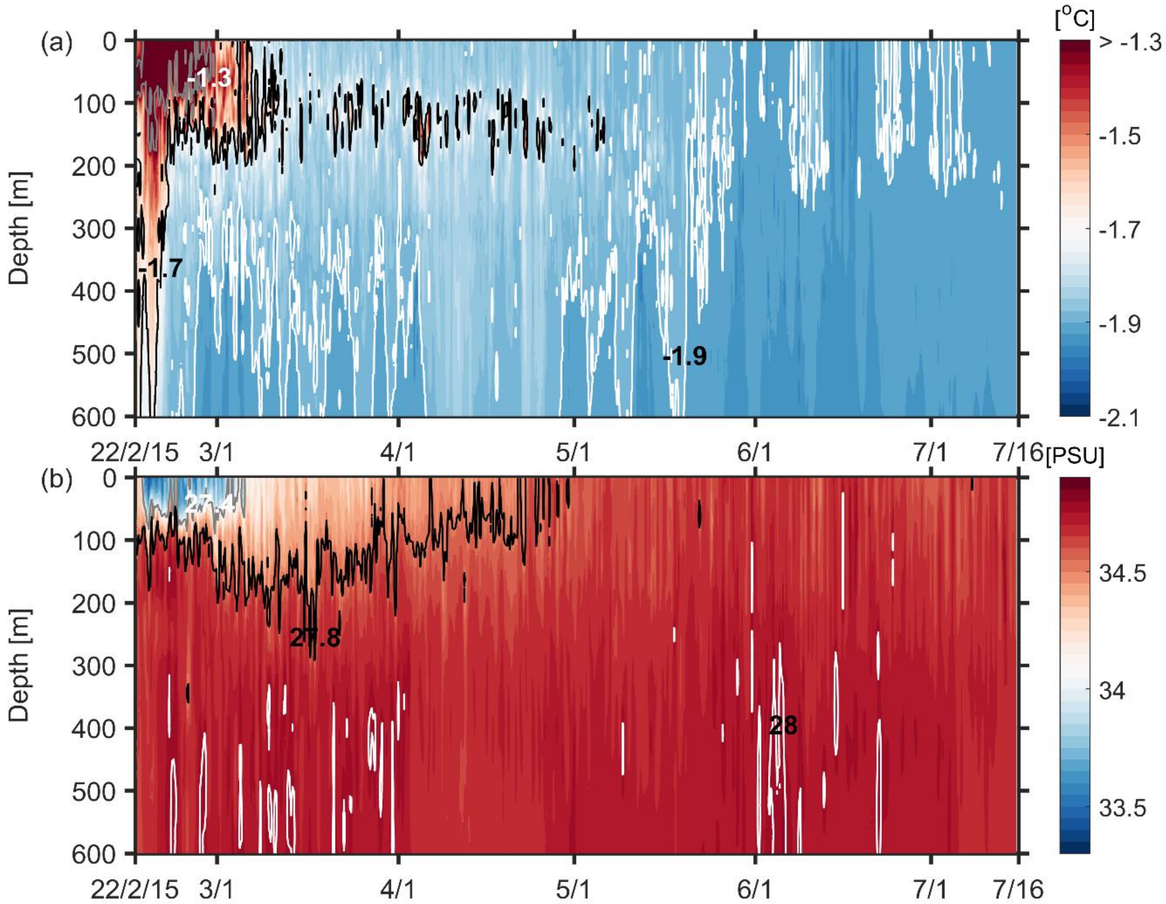


▲ Locations of ship-based CTD observations from 2014 to 2019 (circle) and ship-based CTD observations from 2020 to 2022 (Colored triangles; blue (Dec. 2020), green (Mar. 2022), brown (Dec. 2022)) in Terra Nova Bay. CTD data observed from 2020 to 2023 were mainly used for seal data QC.

If our paper is published in Biogeosciences, we plan to provide our raw data in the repository of the Korea Polar Data Center to an international consortium (MEOP, Marine Mammals Exploring the Oceans Pole to Pole) for sharing our data with seal-CTD researchers. We hope that the data can contribute to international collaborative research.

The analysis of water masses appears very rough. Figure 3 is very hard to read, and it has some strange features such as the MSW being “stuck” at 300m for most of the period. It would be nice to show some profiles and/or sections to get a better sense of what you are trying to show.
⇒ When we rechecked the boundary depth of MSW, the strange feature (“stuck”) in the lower boundary depth of MSW was due to low-resolution profiles, not data QC problems. The low-resolution profiles have only data at 16 depths, so they cannot detect variations of the lower

boundary depth of MSW in the range of several tens of meters. By the comment, we have modified Fig. 3 because it may be misleading to readers. We remove the variations of boundary depths in Fig. 3 and add the figure below showing the vertical-temporal variations of seawater properties.



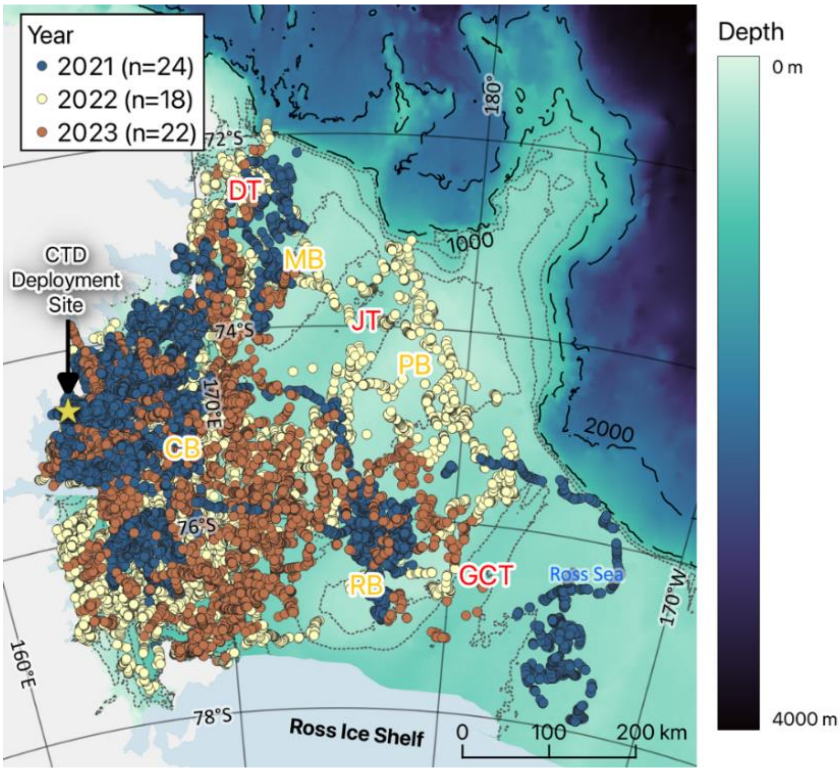
▲ (a) Hovmöller diagram of potential temperature around Terra Nova Bay. Gray, black and white solid lines represent -1.3, -1.7, and -1.9 ℃ isotherms, respectively. (b) Hovmöller diagram of salinity around Terra Nova Bay. Gray, black, and white solid lines represent 27.4, 27.8, and 28 kg/m^3 isopycnals (σ_θ), respectively.

To create the Hovmöller diagram, we used seal-tagging profiles around Terra Nova Bay within the longitude range between 160 and 170˚E and latitude range between 76 and 74˚S. Salinity and temperature from 1 to 600 m depth between February 15 and July 15 in 2022 were calculated using kriging. These variables were considered in the two-dimensional space of depth and time. To account for the spatiotemporal anisotropy, we scaled the values between 0 and 1 based on their maximum and minimum values, and multiplied the time values by 50.

According to the Hovmöller diagram, stratification weakens and the density difference between surface water and shelf water diminishes as winter advances. This is consistent with the seasonal variations of water masses suggested in the Results and Discussion Section of the original manuscript (L295–310 & L454–462).

One wonder also how much of your results depend on the different spatial sampling between the two years. I suggest the authors refine their analysis of hydrographic data to produce more specific results.

⇒ According to the map below, more seal data were obtained in 2021 and 2022 near the shelf-break and the eastern part of continental shelf regions compared to 2023. Due to this difference in spatial sampling, mCDW was identified more clearly in 2021 and 2022 compared to 2023. By the comment, we have added this result to the revised manuscript and refined the analysis of hydrographic data. However, this study primarily focuses on identifying changes in the foraging behaviors of Weddell seals. Therefore, we do not expand the analysis to include hydrographic changes, as these are beyond the scope of this study and warrant a separate investigation for further details with ship-based CTD data.

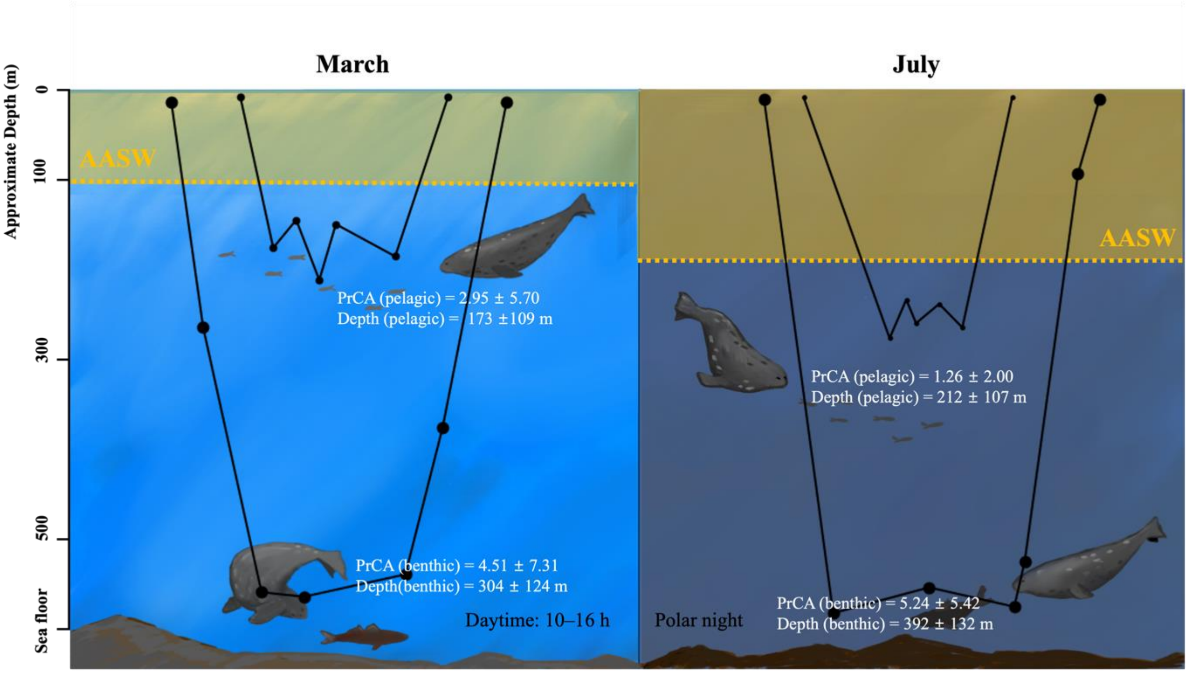


▲ Dive locations of seals tagged at Terra Nova Bay in the Ross Sea (blue, yellow, and brown dots indicated seal ARGOS locations in 2021, 2022, and 2023, respectively). The abbreviations CB, MB, PB, RB, DB, DT, JT, GCT mean Crary Bank, Mawson Bank, Pannell

Bank, Ross Bank, Drygalski Trough, Joides Trough, Glomar Challenger Trough, respectively. The dashed line represents the shelf break (at depths of 1000 and 2000 m), while the dotted line represents bathymetry at 200 m intervals (200-800 m).

Figure 6 is amongst the less informative I have every seen. That the mixed layer is deeper in winter than in summer shouldn't come as a surprise for anyone even remotely interested in oceanography. This cannot reflect the main novelty of this work. The authors need to clarify what is the main novelty of this study.

⇒ By the comment, we have added PrCA counts, dive depth, and photic condition information (day length) to Figure 6 and included a dive that can serve as an example. This figure visualizes our results that seals change their foraging attempts and depth in relation to the factors we considered (water mass, daylight hours, and benthic/pelagic dives).



▲ **Figure 1. Schematic summary of seasonal variation in oceanographic conditions and foraging behaviors.** The area shaded in yellow represents the AASW, and the dashed line indicates the lower boundaries. In March, AASW is positioned at shallower depths, whereas in July, the AASW shifts to deeper locations. AASW is a water mass less preferred by Weddell seals, possibly due to reduced prey availability, which in turn appears to result in deeper dive depths during pelagic dives for Weddell seals. The black line graph in the figure represents typical examples of benthic and pelagic dives in March and July. The size of the dots is proportional to the PrCA values. PrCA and Depth values are presented as mean ± standard deviation.

Minor comment:

l. 35: this sentence seems to imply you are talking about "climate" change, because that's what you are describing earlier on, and maybe also because you use the word "adapt". Yet, the changes you describe in the text are related to diurnal/seasonal variability only. The abstract needs to be clarified.

⇒ By the comment, we have changed the word "adapt" to "respond". Also, we clarified that this study is on seasonal and diurnal variability. Accordingly, abstract's first and second sentences was modified as follows: "Understanding the foraging behavior of marine animals in Antarctica is crucial for assessing their ecological significance and responses to environmental changes, such as seasonal changes in seawater or diurnal light hours.".

l. 109-110: this accuracy numbers seem overly optimistic. See Siegelman et al. 2019 for recent estimates of accuracies.

⇒ We have modified this sentence as follows: "According to the specifications of the sensors of CTD-SRDL, the accuracy of temperature, pressure, and conductivity are ±0.005 °C, 2 bBar, and ±0.01 mS cm^{-1} (SMRU Instrumentation, 2024). However, low-resolution vertical profiles used in this study have a relatively lower accuracy for temperature (±0.04 °C) and salinity (±0.03 g kg^{-1}) (Siegelman et al., 2019)."

Responses to comments by Reviewer #2

This manuscript describes environmental attributes that Weddell seals appear to favor for foraging within the Ross Sea, using satellite-linked relay loggers and accelerometers to document prey capture attempts. I think the authors have looked at the animals' foraging ecology from multiple different aspects for a comprehensive view of activities. I hope to see this published after some issues are addressed. There were many areas (identified in below comments) where there was insufficient detail to thoroughly understand methodology and how the authors had performed data processing. Overall, it was also difficult to discern the novelty of this study relative to other work that is referenced throughout the text where Weddell seals were tagged over the winter in the Ross Sea to determine important water masses they associate with. I think one very cool thing about this study that could be emphasized quite a bit more, is that these authors actually have prey capture events to compare between daytime/nighttime, season, and water masses. Prey capture and foraging success if often implied in these foraging ecology studies; however, to my knowledge this has not actually been measured before in Weddell seals overwinter. I also think the results here could be better into broader context with other Weddell seal foraging studies that have been conducted.

⇒ We thank the reviewer for valuable comments and for taking the time to review our work carefully. Based on the general comments on our manuscript about our methodology and data processing, we reflect on all the comments. Firstly, we added more detailed information about our methods to clarify the issues the reviewer raised. We have made clear that: 1) our data were obtained from the ARGOS satellite only, 2) the sample sizes of male and female, and 3) we used an SMRU accelerometer rather than a separate accelerometer. Secondly, we have clarified our data processing about prey capture estimation, dive threshold, and benthic diving determination. We have provided 1) detailed information about the prey capture attempts processing, 2) the dive threshold (6 m depth), 3) the benthic diving determination when seal diving was deeper than the bathymetric values, and 4) vertical travel speeds exceeding 5.1 m s^{-1} were excluded. Thirdly, we have provided information on how we validated the models. Fourthly, we have emphasized the novelty and implications of our study in the discussion section. We provided that a) this is the first time that we have measured the prey capture attempts of Weddell seals in winter season using accelerometers, and b) the head acceleration data allows us to correlate foraging activities with the recorded environmental conditions, providing a clearer understanding of how these animals interact with their habitats. Lastly, we have reinforced our research by adding 2023 seal data. Therefore, the revised manuscript included a total of three-year seal-CTD data. (Please check our responses to Reviewer 1's comments on the data QC). A point-by-point reply to all your comments can be found below and in blue.

Line 84-85: Would rephrase as 'Weddell seals are the deepest diving phocid with the exception of the elephant seals' (both southern and northern elephant seals dive deeper than Weddells)
⇒ By the comment, we have rephrased the sentence as follows: "They are ranked as the deepest diving phocid species except the southern (*Mirounga leonine*) and northern elephant seals (*Mirounga angustirostris*). "

Line 110: Should make clear whether all records were transmitted via ARGOS satellite, or whether some of these instruments were recovered.
⇒ By the comment, we have clarified that all data were obtained from Argos satellites, and no devices were recovered. A new sentence was added as follows: "All data obtained from CTD-SRDLs were received via Argos satellites and no instruments were recovered ."

Line 110: Since sex is used as a cofactor in model building (as authors state later in the Methods section) the sample sizes of male to female should be put somewhere in this paragraph.
⇒ By the comment, here we have mentioned our sample size and the number of sex. Also, we have clarified that two individuals with no sex determination in the field were excluded from the model analysis. The detailed individual information is presented in Supplementary Table 1. It has been added as follows: "Among the 64 seals, 27 were identified as females, and 35 were males based on their morphological feature. Two were not clearly distinguished in the field; hence, these were excluded from the model analysis for comparing the sexes (see Supplementary Table 1)."

Line 116-118: It is unclear whether this is a SMRU accelerometer. Or, whether this was a separate accelerometer that was attached alongside the SMRU tag. In either case, it needs to also be made clear what make and model the accelerometer was.
⇒ It was a SMRU accelerometer. By the comment, we have clarified that the source of the acceleration data is the accelerometer within the SMRU tag as follows: "Prey capture attempts were estimated from the transmitted head acceleration data obtained from the accelerometer

embedded in the CTD tags (referred to as “accelerometer processing,” as detailed in the SMRU Instrumentation manual 2023).”

Line 124: Which logger divided the dive into 3 segments? Are the authors back to talking about the SMRU tag? The rest of this paragraph is confusing and should be clarified. Did the SMRU tags really divide each dive into 3 segments, as these instruments typically provide 4 inflection points within each dive. It sounds like that is the case here and the authors then did further processing by interpolating X number of midpoints and then the authors divided the dive into 3 segments: descent, bottom, and ascent. The ‘dive threshold’ also needs to be defined: is it that only dives >X m were retained in the dataset?

⇒ This paragraph was to explain our procedures, “summarizing the information on prey capture attempts”, not about “summarizing the dives”. We assumed that it was not clearly presented. To make it clearer, we have added a sentence about our PrCA estimation as follows: “Due to bandwidth limitations, summarized information was transmitted by dividing dives into three phases (descent, bottom, and ascent) and indicating the phase in which PrCA occurred, instead of transmitting the exact time and depth.”

Also, the dive threshold (6 m depth) was added when we mention broken-stick points as follows: “Each dive was fitted to 12 broken-stick points (i.e., the depth at the first point below the dive threshold (6 m), 10 internal points, and the final point before the dive threshold (6 m)).”

Line 195: How were dives that exceeded the IBCSO bathymetry (seals diving deeper than the ‘bottom’) treated?

⇒ When seal diving was deeper than the bathymetric values, the dives were regarded as benthic dives. We think that it is mostly due to the uncertain bathymetric data of the IBSCO or the slight difference between the exact diving location and the interpolated diving location of our results. To make it clear in the text, we have added a sentence in this paragraph as follows: “When seal diving was deeper than the bathymetric values, the dives were regarded as benthic dives”

Lines 199-200: change ‘<’ to ‘>’ for dives durations > 5760 and dive depths > 906 being excluded.

⇒ Thank you for pointing out this error. We have made the correction as suggested. Specifically, we have changed ‘<’ to ‘>’ to correctly indicate that dive durations greater than 5760 seconds and dive depths greater than 906 meters are excluded. The revised sentence is as follows: "Furthermore, dives with durations that were too short or long and depths that were too great (dive duration = 0 s, dive duration > 5760 s, dive depth > 906 m; Heerah et al., 2013), and those characterized by vertical travel speeds exceeding 5.1 m s^{-1} were excluded (Davis et al., 2003)."

Line 200: Would clarify that this is 'vertical travel speeds exceeding 5.1' (unless authors have also put a filter on horizontal distance traveled)

⇒ By the comment, we have clarified that the filter applies to 'vertical travel speeds exceeding 5.1'. We have not applied a filter on the horizontal distance traveled. The revised sentence is as follows: "Furthermore, dives with durations that were too short or long and depths that were too great (dive duration = 0 s, dive duration > 5760 s, dive depth > 906 m; Heerah et al., 2013), and those characterized by vertical travel speeds exceeding 5.1 m s^{-1} were excluded (Davis et al., 2003)."

Line 219: Were these models run with REML or ML?

⇒ In our study, the model was fitted using REML. To make it clear in the text, this information has been added to the manuscript as follows: "The models were estimated using restricted maximum likelihood. ".

Line 219: There is no statement of model validation (checking for homoscedasticity etc).

⇒ By the comment, we calculated the R-squared values and performed Monte Carlo Cross Validation (CV) with a 4:1 train-test split and 100 iterations to validate the models. The R-squared value for the model with PrCA as the response variable and Dive type, Water Mass, and Season as explanatory variables was 0.139, with a Monte Carlo CV mean of 0.165 and a standard deviation of 0.007. For the model with Dive depth as the response variable and Sex, Year, and Season as explanatory variables, the R-squared value was 0.076, with a Monte Carlo CV mean of 0.078 and a standard deviation of 0.005. The model with PrCA as the response variable and Time of Day (Day or Night) as the explanatory variable had an R-squared value of 0.119, with a Monte Carlo CV mean of 0.118 and a standard deviation of 0.005. For the model with Dive depth as the response variable and Time of Day (Day or Night) as the explanatory variable, the R-squared value was 0.206, with a Monte Carlo CV mean of 0.204 and a standard deviation of 0.006. The model with Number of Dives as the response variable and Time of Day (Day or Night) as the explanatory variable had an R-squared value of 0.065, with a Monte Carlo CV mean of 0.055 and a standard deviation of 0.018. Finally, for the model with Dive Type as the response variable and Time of Day (Day or Night) as the explanatory variable, the R-squared value was 0.175, with a Monte Carlo CV mean of 0.173 and a standard deviation of 0.007. We have added sentences in the method section as follows: "To ensure the robustness of our models, we performed Monte Carlo Cross Validation (CV) with a 4:1 train-test split and 100 iterations for each model. This approach allowed us to assess the stability and generalizability of the models. The standard deviations of the R-squared values were all below 0.02, further confirming the consistency and reliability of our models.".

Line 240: This whole paragraph incorporates a lot of discussion points into the Results section. These sentences especially that reference other works would be more appropriate in the Discussion section

⇒ We have modified this sentence as follows: "Moreover, the presence of MCDW was more discernable in the seal-tagging profiles compared to the ship-based CTD data obtained from the TNB, despite its limited occurrence (only 125 depths of 13,058 profiles) (Figs. 1 and 2; Supplementary Fig. 3). This prominence arises because of seals diving into the Drygalski and Joides troughs near the continental shelf break region (Fig. 1). Among seal data, more profiles were obtained near the shelf break and the eastern part of continental shelf regions in 2021 and 2022 than those in 2023 (Fig. 1). Due to this difference in spatial sampling, MCDW was identified more clearly in 2021 and 2022 compared to 2023 (Fig. 2; Supplementary Fig. 3). Furthermore, the ISW observed across the continental shelf region of the Ross Sea demonstrates a wider salinity range than the ISW observed in the TNB (Fig. 2), consistent with previous studies (ex) Budillon et al., 2011). In 2021, 2022, and 2023, properties of HSSW were well detected (Fig. 2) and it was mainly observed in the western part of the continental shelf region of the Ross Sea where polynyas exist (Fig. 2; Supplementary Fig. 3)."

Line 257: Percentage of dives made in MSW ?

⇒ The percentage of dives made in MSW was 76.76%. By the comment, we have added this value in the sentence as follow: " Based on our water mass definition, Weddell Seals performed many dives (76.76%) and high frequent observations of PrCAs in MSW."

Figure 2. Could the points be color coded by water mass? It is difficult to interpret.

⇒ We have added the inset below to the Fig. 2a, which shows the approximate TS range of each water mass.

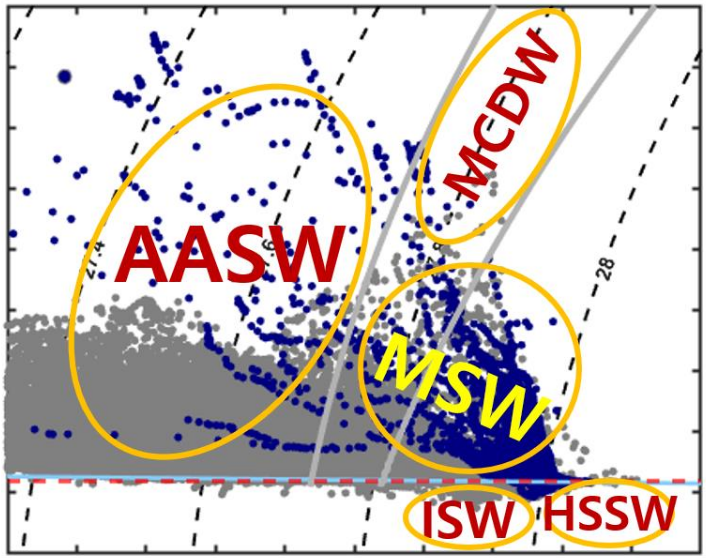
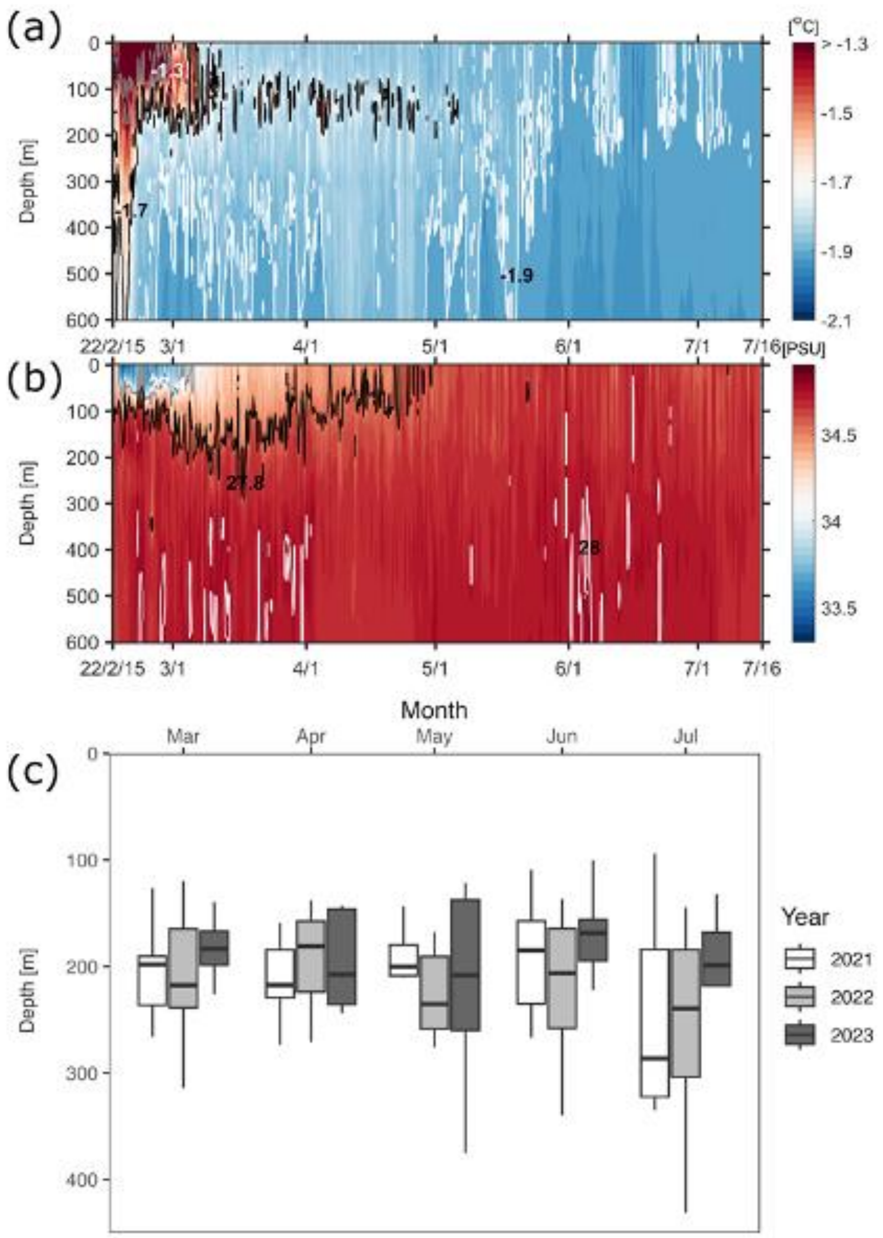


Figure 3. I like seeing the depths of the seals and the depths of the water masses together; and the x-axis being categorical (month) for the boxplots makes sense. It is unclear how to make sense of the depth of the water masses with this x-axis. Is 'Mar' equivalent to March 1 for the continuous variable plotted for water mass? This should be made more clear.

⇒ By the comment, we have clarified the representation of the x-axis in Figure 3.



▲ **Figure 2. Temporal variation in dive depths of Weddell seals for 2021, 2022 and 2023 with Hovmöller diagram of seawater properties around Terra Nova Bay in 2022.** (a) Hovmöller diagram of potential temperature around Terra Nova Bay. Gray, black, and white solid lines represent -1.3, -1.7, and -1.9 ℃ isotherms, respectively. (b) Hovmöller diagram of salinity around Terra Nova Bay. Gray, black, and white solid lines represent 27.4, 27.8, and 28 kg m^{-3} isopycnals (σ_θ), respectively. (c) White and grey boxes indicate diving behaviors in 2021 and 2022, respectively, showing a tendency for deeper dives as austral winter approaches.

Figure 6 seems very general without a lot of information given that the AASW deepening is well known. I wonder if this might be better portrayed if the dive record of one seal is overlain on top of the schematic to show dive depth profiles (&with prey capture attempts marked) across a few days in March relative to the AASW; and dive depth of that same seal for a few days in July relative to AASW to show a representative example of the seal avoiding AASW if it is less preferred. Otherwise, this figure could probably be omitted.

⇒ By the comment, we have added PrCA counts, dive depth, and photic condition information (day length) to Figure 6 and included a dive that can serve as an example.

Tables: It seems odd that some of the variables stated to have a large impact on behaviors had very high p-values in the models (for example Table 1. Sex has a p value of 0.23 and year had a P value of 0.893 – did it really improve model fit enough to stay in the best fit model?). This is generally considered to be one of the drawbacks of stepwise approaches to model selection; or it can result from differences in ML versus REML methods.

⇒ Thank you for your comments regarding the model selection process and the inclusion of variables with high p-values. We appreciate the opportunity to clarify our methodology and results.

In our study, the model was fit using Restricted Maximum Likelihood (REML). We compared the models using both AIC and BIC values:

- **AIC Comparison**: When comparing models using the AIC value, the best model included the variables sex, year, and season.
- **BIC Comparison**: When comparing models using the BIC value, the best model included the variable only season.

Given these findings, the AIC value indicated that the model including sex, year, and season provided the best fit, whereas the BIC value suggested a simpler model excluding sex and year.

Line 277-278: Instead of 'variations in' would clarify which direction these shifts in behavior went in daytime versus night (greater proportion benthic dives, depths etc).

I also thought the Results said there was no difference in number of dives (i.e., foraging frequencies)?

⇒ By the comment, we have clarified the direction of the shifts in behavior between daytime and nighttime in the revised manuscript as follows: "Finally, a diel diving pattern among the seals was observed, with an increase in the proportion of benthic dives, foraging frequency, diving depths, and the number of dives during the day compared to night."

In general, there were two things missing (for me) from the Discussion section. First, I think the most novel aspect of this paper is – that while there have been other Weddell seal tagging studies within the Ross Sea also looking at water masses that the animals associate with --- to my knowledge, this has never been paired with the addition of the accelerometers for prey capture events. This validates a lot of the ecological theories that have always been applied given the assumption that the animals are foraging a lot more in certain areas. It also highlights that even with a similar number of dives during the nighttime, animals are capturing less prey even though the animals (& prey) are likely shallower in the water column and it should be potentially less costly for the animals. That's pretty interesting! I am also aware of studies using accelerometry to document prey capture events in Weddell seals in the summer, but I am not aware of any such studies in the winter. I think some summer studies could be referenced for comparison between the breeding season, summer, and winter. I think more emphasis could be put on how the prey capture attempts validates important aspects of daily and seasonal foraging ecology.

⇒ Thank you for your insightful review. Based on your feedback, we have added the following paragraph to the Discussion section after the first paragraph to emphasize the novelty of our methods and implications of our study:

"To best our knowledge, this is the first to measure the prey capture attempts of Weddell seals in winter season directly using head acceleration with CTD. Previous studies have estimated foraging behaviors from indirect information, including horizontal location, vertical swim speed, dive time, and dive depth rather than being directly measured (Nachtsheim et al., 2019; Kokubun et al., 2021; Goetz et al., 2023). While these proxies are indirect indices and should be interpreted cautiously, acceleration data is particularly beneficial as it can directly detect PrCA, providing a more accurate measure of foraging activity (Heerah et al., 2019; Allegue et al. 2023). By directly measuring 3D head acceleration with CTD, we could obtain more reliable data on the foraging activities of the seals. This allows us to correlate foraging activities with the recorded environmental conditions, providing a clearer understanding of how these animals interact with their habitats. We presume that the combination of CTD and acceleration data offers a comprehensive view of both the physical environment and the behavioral responses of the seals, leading to more accurate and insightful conclusions.."

The other is I think that this would benefit for some discussion comparing the findings from this study with others that have tagged Weddell seals in the Ross Sea (were findings the same? – implying consistency across longer timespans? Or were some aspects different?). And also beyond the Ross Sea to put into context.

⇒ By the comment, we have compared the previous study in the Ross Sea on Weddell seals (Goetz et al.'s study in 2023). Goetz et al.'s finding was inconsistent with ours in foraging estimation. Thus, we specifically addressed such differences and discussed possible reasons as follows: "A previous study on Weddell seals in the Ross Sea showed that seasonal changes in foraging behavior were observed, with dive depth increasing and foraging activity intensifying from summer to winter (Goetz et al., 2023). The seasonal increase of dive depth agreed with our findings; however, their foraging results showed the contrary of our results. Goetz et al. (2023) observed that foraging of seals was the highest in winter of 2010 to 2012. However, we do not have supporting evidence to explain the difference. This could be due to the different seasonal prey availability in the Ross Sea between the two studies. In the Ross Sea ecosystem, the diet composition of Weddell seals exhibits considerable interannual variability (Goetz et al., 2017). The sea ice extent and the food availability in the Ross Sea for top predators can vary annually (Ainley et al., 2020). Such variations in sea ice extent can possibly influence plankton blooms and the seasonal prey abundance for seals between the two studies (Arrigo et al., 2004; Lorrain et al., 2009). Otherwise, the differences could result from the different measurements to infer foraging efforts. The results in winter foraging could be overestimated because the previous study used an indirect estimation (a track-driven metric) for foraging. The track-driven metric estimation is based on the assumption that all behaviors involving movement within a certain radius are associated with area-restricted search (ARS). However, behaviors other than foraging or movement (e.g., sleeping, resting) could also be regarded as ARS. Goetz et al. excluded haul-out periods from the FPT analysis to address this possibility. Nevertheless, haul-out times significantly decrease in winter while dive times increase (Boehme et al., 2016). This increase in dives during winter might suggest that the dives could be for purposes other than foraging, such as resting or sleeping."