

## Responses to Reviewer #1's comments

The authors would like to thank the reviewer for the comments. We have revised our manuscript based upon all your comments. Below are our responses:

Response to minor comments:

*P9, l252-l253, I suggest you this revision below.*

*“In Hinase, Pacific oysters were estimated to have stopped spawning between October 24 and November 4, 2020, and between October 25 and November 7, 2021 and to have begun spawning between June 8 and 19 in 2021, judging from the water temperature thresholds based on Oizumi et al. (1971)”?*

→ We have added the phrase “judging from the water temperature thresholds based on Oizumi et al. (1971)” in the revised manuscript (in Line 257).

*P9, l252-253, Please add the Figure number we should see.*

→ There is no specific figure to see, but instead, the authors have added the table number (Table 2) to see (in Line 255 in the revised manuscript).

*P12 eq.(4) please check the location of the comma(,).*

→ We have confirmed the location of the comma is appropriate and is not subscript, either.

*P12, l345-l359, Fig14, please write which location you used when you draw Fig. 14.*

→ Thank you for the comment. We have added the information of location we used in the caption for Fig. 14 (in Hinase (at H-4) and in Shizugawa (at S-4), respectively) (in Line 891 in the revised manuscript).

*P12, l361-l362, I wonder if you need the consideration from the effect of air-sea exchange as well as biological production?*

→ Based on the reviewer's comment, the authors checked previous papers that use Equations (3) though (6) (e.g. Hauri et al., 2013), but could not find any description of the effect of air-sea exchange on the term of  $\partial\text{pH}/\partial\text{DIC} * \Delta\text{DIC}$ . We suppose the effect is rather reflected in the term of  $\partial\text{pH}/\partial\text{T} * \Delta\text{T}$  as a result of the change in the solubility of  $\text{CO}_2$  due to a change in temperature. Therefore, we have retained the description here.

## Responses to Reviewer #2's comments

The authors would like to thank the reviewer for the comments. We have revised our manuscript based upon all your comments. Below are our responses:

Response to comments:

*There are frequent mentions to a longer spawning period leading to a shorter shipping period, but the relationship between these two is not clear. I kindly request an explanation of this relationship to be added where it is first mentioned in the text (around line 230).*

→ To clarify the relation, the sentence has been modified as: “Therefore, there is a concern that a rise in water temperatures in the future may cause earlier or longer spawning and maturation times. The earlier spawning and maturation times may result in a mismatch with existing oyster-farming approaches. The prolonged spawning period may shorten the oyster shipping period and lower their quality (Akashige and Fushimi, 1992), potentially damaging the oyster-processing industry.” (in Lines 229-232 in the revised manuscript).

*While you cite previous reports on oxygen thresholds, please consider mentioning the possibility that these thresholds could be higher in the future due to increased acidification; I recommend referring to \*Steckbauer et al. (2020).*

\*<https://onlinelibrary.wiley.com/doi/10.1111/gcb.15252>

→ Thank you for the useful comment. Based on the comment, the authors have added the following sentences in Section 4.2 (in Lines 433-436) in the revised manuscript:

“Also, previous studies imply that impacts on marine organisms appear more severely under the co-occurrence of ocean acidification and deoxygenation than the occurrence of each stressor alone (Steckbauer et al., 2020; Yorifuji et al., 2023). In other words, the threshold for deoxygenation alone ( $203 \mu\text{mol kg}^{-1}$ ) could be higher in the future when ocean acidification progresses.”