Responds to the reviewer's comments:

To Reviewer #2:

Based on the reviewers' comments, the main revisions of the new manuscript are as follows:

(1) The redundant description of the manuscript is compressed, especially for the Section 3 (such as seasonal spatial distribution of eddies and seasonal variation of vertical structure are simplified, and Figure 4 and 6 in the old manuscript are removed). Furthermore, the new results and findings are highlighted in the manuscript, such as the seasonal variations of eddy movements (Section 3.1), the seasonal thermohaline properties in north and south bay and their regional variations (Section 3.2).

(2) We have removed the analysis of eddy-induced heat/salt transport in different sub-regions (Figure 11 and 14 in the old manuscript) in Section 4, by introducing the divergence of heat/salt transport to estimate the impact of eddy movements. New additions are marked in green in Section 4.

(3) Some details about 3D eddy reconstruction have been added in Section 2.2.2.

(4) In order to be consistent with other studies (Gonaduwage et al., 2019; Gulakaram et al., 2020; George et al., 2019, JPO), eddy-induced salt transport (Section 4.2) is represented by salt transport Q_s itself (Figure 12 and 13), discarding the freshwater transport F_w. In the analysis of the divergence of eddy salt transport, the equivalent freshwater flux is used for comparison with net freshwater flux at surface (Figure 11).

Below are the point-to-point responses.

1 **Response to comment #1:** *The results presented are too lengthy and often over-descriptive. Several features of the eddy structure and variability in the Bay of Bengal have been presented is several papers by Cheng et al. and Cui et al. The new results that have emerged consequent to the separation of the analysis into a seasonal cycle need to be highlighted and repletion be avoided.*

The redundant description of the manuscript is compressed, especially for the Section 3. Furthermore, the new results and findings are highlighted in the manuscript, such as the seasonal variations of eddy movements (Section 3.1), the seasonal thermohaline properties in north and south bay and their regional variations (Section 3.2).

The basic logic of this research is to combine seasonal eddy activities (Section 3.1) and seasonal vertical thermohaline structures (Section 3.2) within eddies to estimate seasonal eddy-induced heat/salt transport (Section 4) in the Bay of Bengal.

Section 4 presents the spatial distribution of eddy-induced heat/salt transport, the zonal and meridional heat/salt transports (e.g., *ZHT*, *ZST*, *MHT*, *MST*), and the divergence of eddy heat/salt transport. We have removed the analysis of eddy-induced heat/salt transport in different sub-regions, by introducing the divergence of heat/salt transport to compare it with the Air-Sea heat flux and net freshwater flux, the impact of eddy movements is estimated. New additions are marked in green in Section 4.

2 **Response to comment #2:** *Significant new contribution from this study is the estimation of heat and salt transports. These transports, however, appear as patches of relatively short spatial extent. What are implications of these transport? Do they affect the SST distribution? Do they affect the heat budget of the Bay of Bengal? The authors may also consider separating the heat and salt fluxes into individual contributions due to cyclonic and anticyclonic eddies.*

To estimate the impact of heat/salt transports by eddy movements in the Bay of Bengal, the divergence of eddy

heat/freshwater transports were calcualted. The 10−20 $W \cdot m^{-2}$ value of the eddy-induced heat flux is comparable in magnitude with the annual mean Air-Sea net heat flux, implying that the mesoscale eddies can exert a strong impact on the oceanic heat transport and redistribution in the Bay of Bengal. Notable, the high eddy-induced ocean heat gain in the eastern seas of Sri Lanka in summer suggests that eddy activities would somewhat balance the heat loss due to the intrusion of cold water carried by the Southwest Monsoon Current. In addition, compared with the north-south variation of the annual mean net freshwater flux at surface, the spatial distribution of eddy-induced freshwater flux (the magnitude is generally $0-20\times10^{-6}$ $kg \cdot m^{-2} \cdot s^{-1}$, seasonal variation is higher, up to 50×10^{-6} $kg \cdot m^{-2} \cdot s^{-1}$ regionally) shows an east-west variation, which indicates that mesoscale eddies plays an important role in maintaining the east-west freshwater or salt balance in the Bay of Bengal.

In the analysis of the spatial distribution of eddy-induced heat/salt transport (Figure 9 and 12), the zonal and meridional heat/salt transports (e.g., *ZHT*, *ZST*, *MHT*, *MST*, Figure 10 and 13), we given the individual contributions due to CEs and AEs separately.

The new contents are marked in green in Section 4.

3 **Response to comment #3:** *'Sri Lanka eddy' described in this paper is well known as Sri Lanka Dome (Vinayachandran and Yamagata, JPO, 1998). See the recent paper by Cullen and Shroyer (2022) for additional references. It is suggested that the terminology that is in practice be used.*

"Sri Lanka eddy" has been replaced by "Sri Lanka Dome" in the new manuscript, and the references have also been added.

4 **Response to comment #4:** *Justify why the removal of seasonal cycle give the mesoscale structure. Past studies have removed 3 or more harmonic or applied appropriate filters to extract mesoscale variations.*

Because in Argo and reanalysis data, the thermohaline data contains obviously seasonal variations, especially for the upper ocean. Therefore, in order to obtain the temperature and salt changes caused by mesoscale eddies, these large-scale seasonal changes should be removed from the temperature and salt data. Otherwise, the seasonal signal will be included in the eddy-induced temperature and salinity anomalies.

5 **Response to comment #5:** *What are stable eddies?*

Here, stable eddies are relative to small-scale turbulent signals. Because the messy eddy trajectories obscure the distribution characteristics of eddy activities (Figure S1). In order to understand the seasonal distribution characteristics of eddies in the Bay of Bengal more intuitively, we used monthly averaged SLA fields to identify eddies that occur frequently in certain regions (here we call them "the monthly eddies").

The stable eddies have been removed to avoid ambiguity.

6 **Response to comment #6:** *Is this a schematic? Or is this data for a selected day? Description of line legends A to F is missing.*

Figure 2 is a case of matching identified eddies with Argo profiles and 3D thermohaline field on 20th May 2017. Corresponding date have been added to the text. The description of legend A to F has also been added to the text.

7 **Response to comment #7:** *This sentence is not clearly written. Replace 'choosed' with 'chosen'.*

Modified as suggested.

8 **Response to comment #8:** *The primed quantities have not been defined appropriately.*

We have defined all primed quantities in Equations 1 and 2.

9 **Response to comment #9:** *Please replace 'changeable' with variable and correct the sentence.*

Modified as suggested.

10 **Response to comment #10:** *Replace Sri Lanka cold eddy to Sri Lanka Dome.*

Modified as suggested.

11 **Response to comment #11:** *"However, eddies will exchange heat and salt …". This is not apparent. Please justify with appropriate references.*

We have simplified the text at the beginning of Section 4.

Other minor grammar and expression errors modified in the paper are not listed here.
Special thanks to you for your good comments.