AE:

Dear Authors,

Thank you for submitting your revised manuscript. I have now received the reviews, and I am pleased that both reviewers are positive about the improvements made. Several additional comments remain that need to be addressed.

The main issue requiring your attention is the inclusion of 2016 data. As the reviewer notes, the 12-year gap between 2004 and 2016 makes the "trend" in Figure 8 difficult to justify. In addition, the initial release positions for 2016 appear to extend beyond the 40 m isobath, creating a potential methodological inconsistency with the 1987-2004 simulations. We ask you to carefully consider whether the 2016 data add sufficient value to justify inclusion. If you choose to retain them, please provide a rigorous justification addressing both concerns.

The reviewer also notes that the discussion on regional circulation and PLD-dispersal distance relationships is not sufficiently rigorous. Please revise both sections accordingly.

Please provide a point-by-point response explaining how you have addressed each comment. I look forward to receiving your revised manuscript.

Sincerely,

Liuqian

<u>Response:</u> We sincerely thank the AE for handling our manuscript. We have carefully revised the manuscript and addressed all comments point by point.

Reviewer #3rd

The manuscript has improved considerably after revision, particularly in the extension of the discussion section. However, I still have concerns regarding the data source. There is a considerable time gap between the 1987–2004 period and the year 2016, which makes the trend in Fig. 8 (1987–2016) less convincing. Actually, it would be sufficient to analyze the seasonal and interannual variations using the 1987–2004 data alone, as the 2016 results do not appear to add significant value to the conclusions. Furthermore, the initial positions in 2016 were located within the 40 m depth according to Xing et al. (2020), yet some of the selected positions in Fig. 3 seem to extend beyond the 40 m isobath. I would therefore advise removing the 2016 results from the manuscript.

<u>Response:</u> We sincerely thank the reviewer for the suggestion; we have removed 2016 data from the whole manuscript and replotted the figures.

Specific comments:

Line 102: "throughout the Yellow Sea and the Bohai Sea" should be used here.

Response: We have revised this based on the comment.

Line 260: If the abbreviations for the Yellow Sea (YS) and other regions (e.g., the Bohai Sea) have been defined earlier in the text, they should be used consistently thereafter.

Response: We have revised this based on the comment and ensured that the abbreviations for the Yellow Sea (YS) and Bohai Sea (BS) are used consistently throughout the text after their first definition.

Lines 346–355: The discussion on dispersal and currents is not rigorous enough. Specifically, at Lines 346–347, it should be noted that the CDW is transported eastward by currents, influenced by coastal currents, the Taiwan Warm Current, the Kuroshio, and winds. The effects of spawning ground, month, and year are largely governed by the circulation pattern, including its spatial (geographic) characteristics and seasonal/interannual variations. The China seas are generally highly dynamic and feature a complicated circulation pattern. It is expected that spawning grounds have a more prominent effect than other factors. Of course, the circulation exhibits seasonal variations driven by the monsoon and so on, but during months involved in this study, the circulation would mainly present the summer circulation pattern. Therefore, I recommend reorganizing this section based on the knowledge of the regional circulation. It would also be helpful to include a schematic of the main currents (e.g., in Fig. 1) to provide background on the physical environment.

Response: We have revised the section as suggested as follows and included the major currents in Figure 1.

Spawning grounds played a critical role in shaping larval dispersal patterns in this study because they were located within three distinct marine systems, including the Bohai Sea (BS), Yellow Sea (YS), and East China Sea (ECS), spanning approximately 8° of latitude and experiencing contrasting circulation regimes. The spatial variability in larval dispersal among spawning grounds primarily reflects differences in the surrounding hydrodynamic environments and geographic settings. For example, the Changjiang Estuary (CJ) spawning ground in the ECS is influenced by a complex circulation system involving the Changjiang Diluted Water (CDW), coastal currents, the Taiwan Warm Current, the Kuroshio, and wind-driven circulation. The eastward transport of larvae from this region is therefore associated with the combined effects of these circulation processes rather than the CDW alone (Xing et al., 2020). In contrast, spawning grounds in the BS, such as the Bohai Bay (BHB) and Laizhou Bay (LZB), are located within semi-enclosed coastal systems dominated by basin-scale circulation and coastal currents, which constrain larval transport and enhance local retention (Liang and Sun, 2003). Therefore, the location of spawning grounds determines the initial hydrodynamic conditions experienced by larvae, thereby exerting a stronger influence on dispersal pathways, distances, and connectivity patterns than other factors.

Although travel duration, spawning month, and spawning year also affected larval dispersal, their effects were largely mediated by seasonal and interannual variations in circulation. The settlement center shifted eastward and northward from April to June but shifted westward and southward after July (Fig. 5, bottom right panel), consistent with seasonal transitions in regional circulation. During the spawning period considered in this study, the circulation system of the China seas was primarily characterized by the summer monsoon-driven circulation pattern, although local and interannual variability remained. These circulation variations altered larval transport pathways and consequently contributed to differences in settlement distributions among spawning months and years.

Lines 420–422: The PLD (30–60 days in this study) is much longer than the tidal periods, so the low correlation is unlikely to be significantly affected by tides. Instead, the current pattern likely plays a dominant role. For example, if the streamlines are relatively straight, the correlation would be high; if they are strongly curved, the correlation would be low. Please reconsider and reorganize the discussion accordingly.

Response: We have revised this section as:

In this study, mean orthodromic distance from release location center to settlement center (d_m) increased with increasing PLD (Fig. 7), indicating that PLD captures average dispersal trends. However, the correlation between individual dispersal distance and PLD was weak (Pearson correlation = 0.243, Spearman correlation = 0.238; Fig. S3). These suggest that, PLD captures broad, average trends in dispersal potential, but it is not a reliable predictor of dispersal distance at the individual level. This discrepancy arises because individual trajectories are strongly modulated by the spatial structure of the circulation field. When currents exhibit relatively persistent and unidirectional pathways, longer PLD may translate into greater displacement. In contrast, in regions characterized by curved streamlines, recirculation, or retention zones, larvae may remain within confined areas despite prolonged transport durations. Therefore, increasing PLD does not necessarily result in longer dispersal distances for individual larvae, because dispersal outcomes depend not only on the duration of transport but also on the connectivity and geometry of the underlying flow pathways.