

## **Responses to comments**

**1 The abstract can be improved. A brief description about the background or contribution of the study may be given in the abstract. Particularly it may include the main findings about the environmental flow assessments in Yellow River estuary.**

The Abstract has been reorganized, and the background and calculated results were added in the modified “Abstract”.

**2 As mentioned in the paper, the salinity was identified as the critical environmental factors that influence diagnostic pigments. But there is no mention about the simulated results of salinity in critical months. Also the empirical relationship between salinity and diagnostic pigments are not clear. Please explain it briefly, either in figure or text.**

Variations of salinity in critical habitats was calculated under different level of river discharges based on verified model. And the relationship between salinity, diagnostic pigments, and Fish Biomass was established based on equation (1) and empirical relationship. Figure 2 shows the relationship between diagnostic pigments and environmental factors (Spring and Autumn). The following sentence were modified in the manuscript:

“On the basis of the validated numerical model, the relationships between different levels of freshwater inflow and distribution of salinity for the critical habitats were established in the Yellow River Estuary. Based on the ecological objectives of the diagnostic pigments and salinity (Table 1), the threshold value of environmental flows can be determined for critical seasons in the estuary (Figure 3).”

**3 Fig.2 is confusing to me. What do the horizontal and vertical axes represent? Please clarify how Fig.2 was obtained?**

In the modified manuscript, we added the following sentence after Figure 2. “In order to identify the critical factors that influence diagnostic pigments, Canonical

Correspondence Analysis (CCA) was used to illustrate relationship between diagnostic pigments and different environmental variables in different seasons based on field data. In biplots of CCA analysis, environmental factors are exhibited by lines with arrow (Figure 2). Length of each line indicates the relationship between environmental variables and diagnostic pigments. Angles between lines and axes indicate degree of correlations; with small angles indicating higher degree of correlations. According to CCA analysis, salinity was identified as the critical environmental factors influence diagnostic pigments and empirical relationship between salinity and diagnostic pigments can be determined.”

**4 Please further improve the figure quality of Fig.7.**

Figure 7 has been changed to Figure 6 in the modified manuscript.

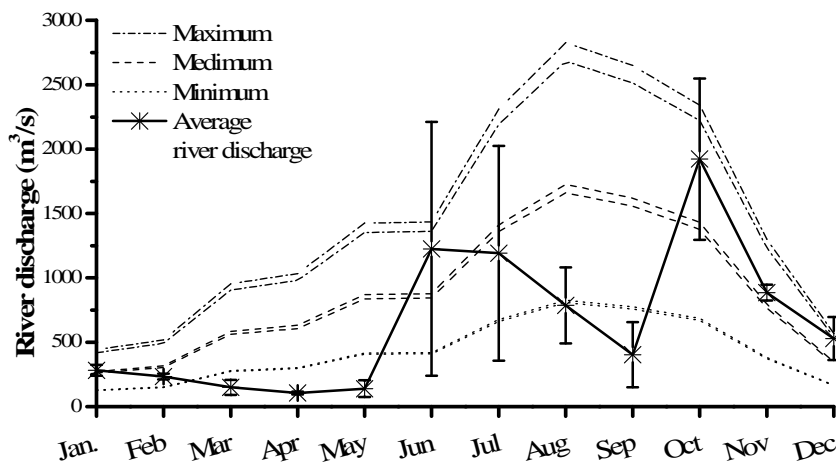


Fig.6. Variation on actual river discharges (2005) and environmental flows in the Yellow River Estuary

Figure 4, Figure 5, and Figure 7 were also modified.

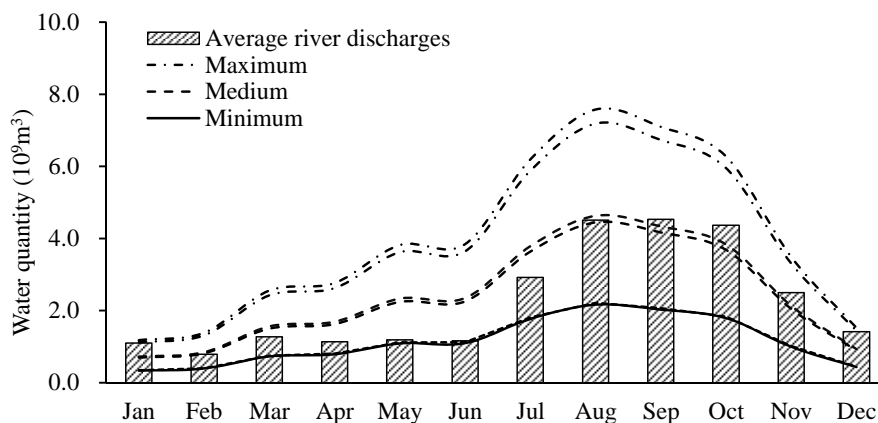


Fig.4. Temporal variation of environmental flows and average river discharges.

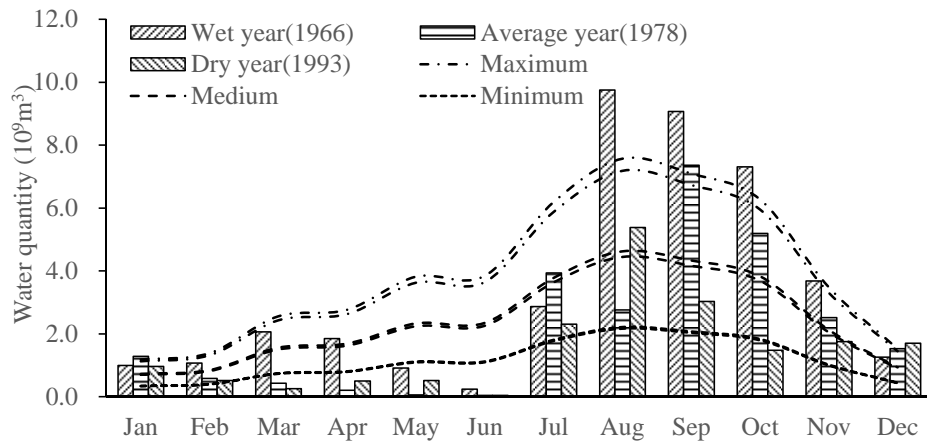


Fig.5. Monthly environmental flows and river discharges in wet, average and dry years.

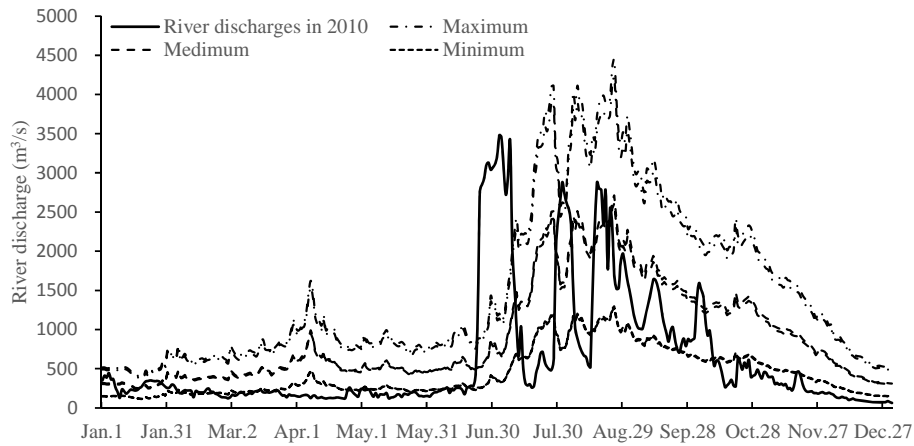


Fig.7. Comparison of the daily discharges during water-sediment regulation and the daily environmental flows in the Yellow River estuary.

**5 No legend marks in Fig. 3. What does ‘5 10 15’ in Fig. 3 indicate? It is recommended to combine Fig.3 with Fig.1.**

Figure 3 has been combined with Figure 1. “5,10,15” shown in the Figure 1 indicate position of the water depth contour in the estuary. Figure 1 in the modified manuscript is shown as follow.

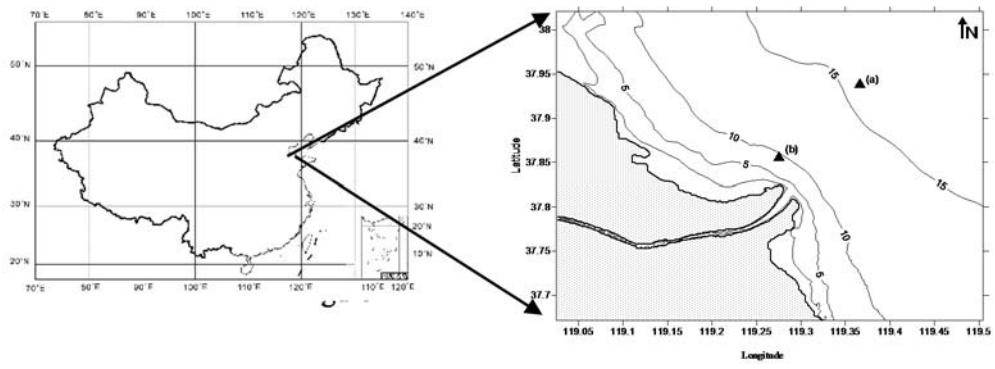


Fig.1. Yellow River Estuary in China