HESS-2013-602

<mark>(1) The paper said that "various empirical relationships have been established ecosystem biomass and river discharge", there is no comparison of the method with previously known work.</mark>

In the modified manuscript, we have a further analysis on researches about environmental flow assessments based on empirical relationships between river discharges and biomass. The following sentence were added in the introduction section.

"Powell et al. (2002) described a series of relationships between historic monthly inflow, and various fish species catch, which were utilized in the TxEMP model to arrive at an optimized inflow/harvest relationship. Three sea grass species sensitive to salinity changes were selected as indicators to determine the minimum required freshwater inflow for the Caloosahatchee Estuary (Doering et al., 2002). Arhonditsis et al. (2007) examined spatial and temporal patterns in phytoplankton communities to report ecosystem variation influenced by river flow fluctuations in the Neuse River Estuary."

<mark>(2) Language and grammar mistake:</mark>

Page2, the second line of introduction: The gradients of salinity and other environmental parameters provide critical habitats of (for) migratory species.

Done.

Page4, the fourth line of 2.1: the nutrition lever for (of) primary organism biomass is calculated by the energy flows.

Done.

The manuscript has been checked carefully with the assistance of professional manuscript editing services.

<mark>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.</mark>

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

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:

  "Relationships among varied freshwater inflow levels and salinity distribution in critical habitats were established in the Yellow River Estuary based on the validated numerical model. Furthermore, diagnostic pigment attributes were applied as ecological determinants (Table 1), and the threshold value of environmental flow rate can be determined for critical estuarine seasons (Fig. 3)."

In the modified manuscript, we added the following sentence after Figure 2. "Canonical Correspondence Analysis (CCA) was used to illustrate the relationships between diagnostic pigments and different environmental variables under different seasons based on field data. The results served to identify the most important environmental factors that influenced phytoplankton community diagnostic pigments. CCA analysis plots show environmental factors identified by lines with arrows (Fig. 2). Line length indicates the relationship between environmental variable and diagnostic pigment. Angles between lines and axes indicate the degree of correlation; with small angles indicating a higher correlation. CCA analysis identified salinity as the most influential environmental factor effecting diagnostic pigments; and empirical relationships between salinity and diagnostic pigments were determined based on these observed results."

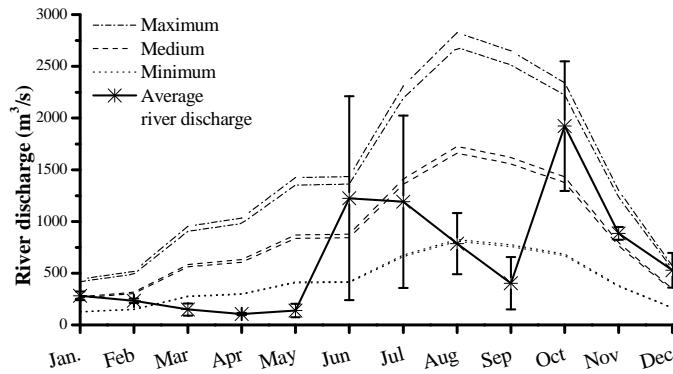   Figure 7 has been changed to Figure 6 in the modified manuscript.

Fig.6. Variation in natural river discharge (2005) and environmental flow in the Yellow River Estuary.

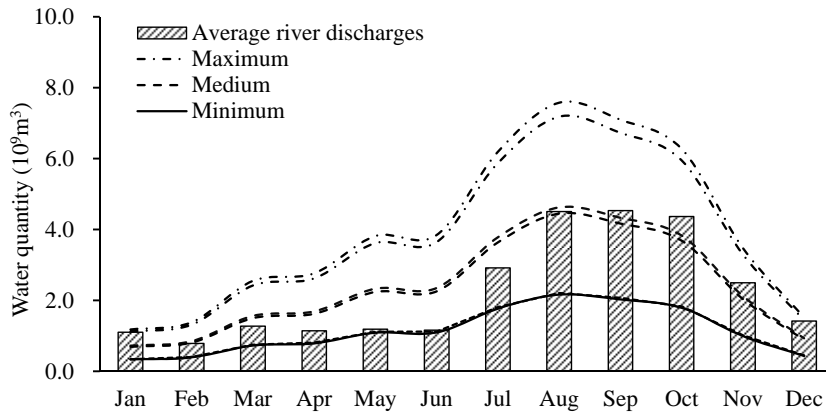Figure 4, Figure 5, and Figure 7 were also modified.

Figure 4.

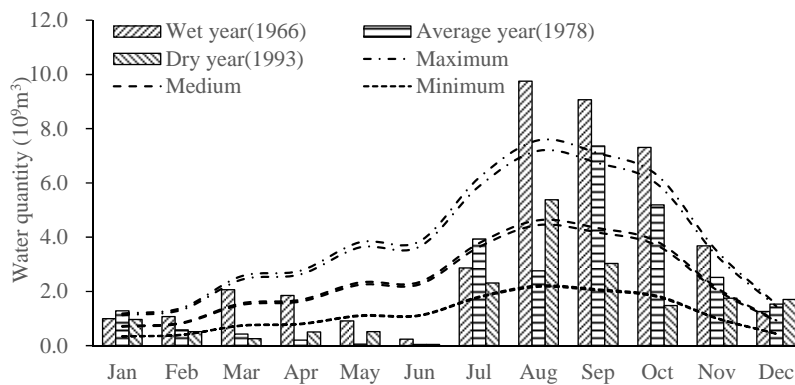Fig. 4. Temporal variation in environmental flow and average natural river discharge.

Fig. 5. Monthly environmental flow and natural river discharge in wet (1966), average (1978), and dry years (1993).
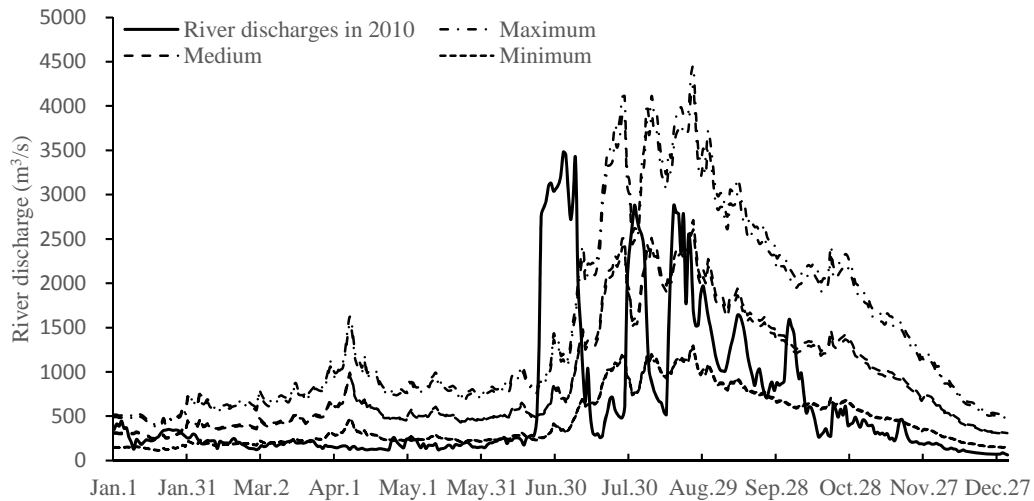
Fig. 7. Daily discharge comparisons during water-sediment regulation, and daily environmental flow in the Yellow River Estuary.

<mark>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.</mark>

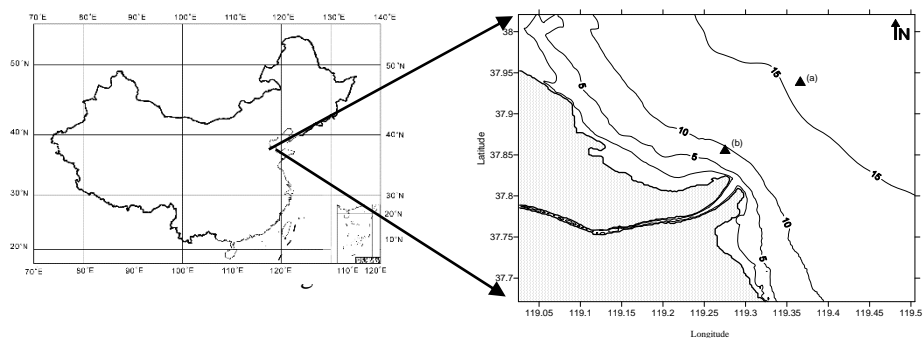Figure 3 has been combined with Figure 1. "5,10,15" shown in the Figure 1 indicate position of the water depth contour in the estuary. Figure 1 in the modified manuscript is shown as follow.

Fig.1. Yellow River Estuary in China