

Reply to anonymous referee #2

Dear reviewer,

We appreciate your valuable questions and comments on our manuscript. The manuscript has been carefully revised according to your advices, and the revisions are marked with blue (with red and green for the other two reviewers). The point-by-point answers to the questions and comments are listed as follows.

Your sincerely,

Jianrong Zhu, on behalves of the co-authors

Comment 1: According to Figure 5b, the realistic wind can be a cause. However, what is the role of the spring tide (The period from 10 Feb to 18 Feb 2014 according to the lunar calendar) for the intrusion during this issue?

Reply: As we can see from Figure 5b, the strongest saltwater intrusion occurred from February 11 to 14, 2014 in the middle tide, corresponding to lunar calendar 12 to 15. The tidal pattern of the middle tide was indicted by the measured tidal level at Baozhen hydrologic station in Figure 5a. The highest tidal level is in lunar calendar 18, not in 15 in the Changjiang Estuary. There are four tidal patterns in one neap-spring tide, neap tide, middle tide after neap tide, spring tide, and middle tide after spring tide. Each tidal pattern has approximately 4 days. Our study indicated that the saltwater intrusion event was caused by the persistent and strong northerly wind, which played a more important role on the saltwater intrusion event during neap tide

than spring tide.

Comment 2: Had some issues also happened in the near Hangzhou Bay? Since the wind also causes a rise of residual water level there (Figures 4, 7, 8). If yes please add some details; if no what caused the different issues between the Changjiang Estuary (saltwater intrusion) and Hangzhou Bay (no issue) since the wind would be equal for these two.

Reply: Thanks for your good comment. Hangzhou Bay is adjacent to the Changjiang Estuary, and is occupied by sea water all year round. The salinity is greatly higher than 0.45 (the standard salinity for drinking water) and there is no freshwater in the Hangzhou Bay. Therefore, there is no such wording of saltwater intrusion there. It's true that the strong northerly wind also caused a rise of residual water level, and caused rise of salinity in the Hangzhou Bay.

The Qiantang River connects the Hangzhou Bay, and saltwater intrusion often occurs in dry season. There is the most downstream water plant, Nanxing water plant, in the Qiantang River for water supply in Hangzhou (Figure R2-1). Because the water intake of the water plant is far away from the river mouth and the river depth is only 1-2 m, there is no same issue (severe saltwater intrusion in the Changjiang Estuary in February 2014) occurred there. There was no some issue in the North Branch of the Changjiang Estuary because its water depth is very shallow there. The reason is same for the Qiantang River. In the North Branch of the Changjiang Estuary, the landward wind-driven Ekman water transport was weaker, flowing along the north side and

flowing out along the south side only near the river mouth (Fig. 7c in the revised manuscript). However, the North Channel is deeper and wider and located on the north side of the South Branch, which is in favor of producing strong landward Ekman water transport in the North Channel, resulting in severe saltwater intrusion.

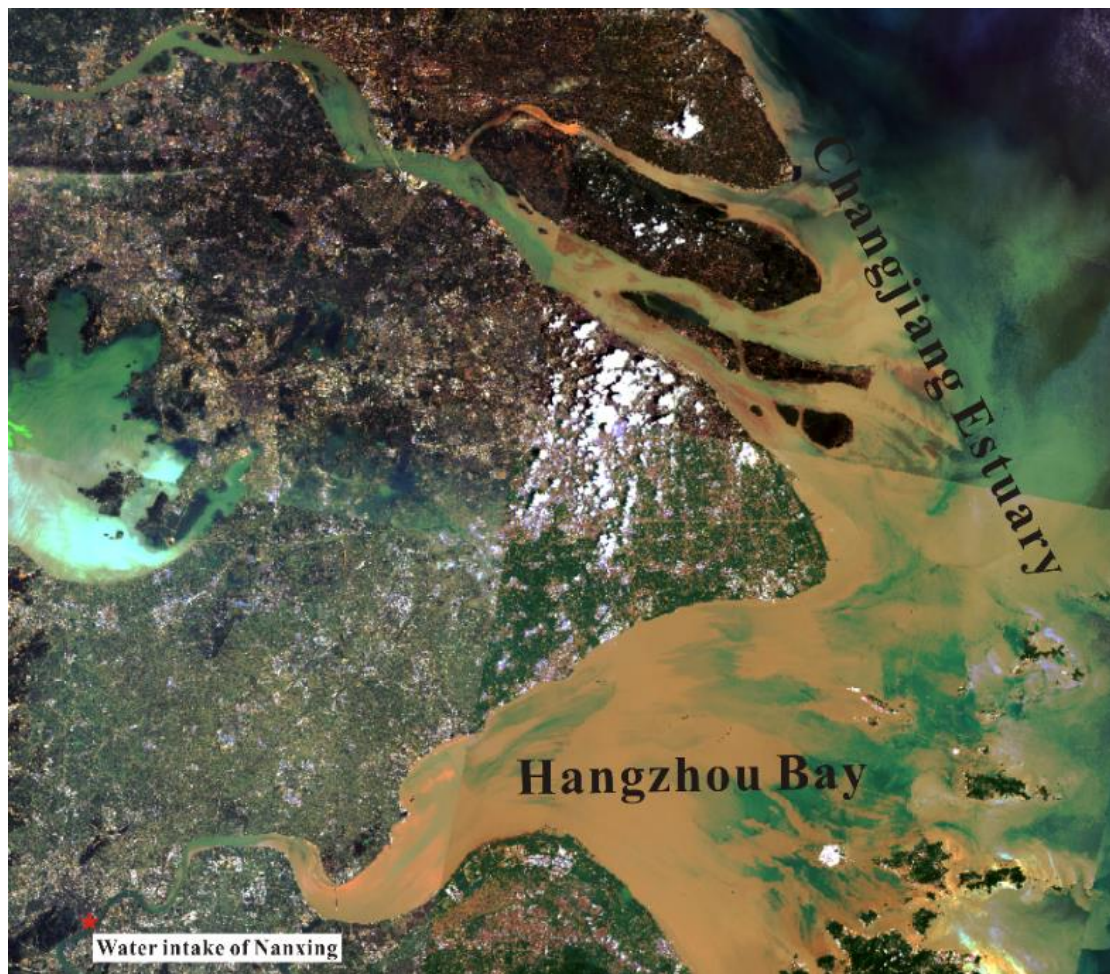


Figure R2-1 Satellite image of the Changjiang Estuary, Changjiang Bay and Qiantang River

Minor issue

1, Line 239, Page 14, Check the name.

Reply: Thanks. The name “Lijinag” has been changed to “Linjiang”.