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Comment on hess-2021-246

Anonymous Referee #1

Referee comment on "Saline groundwater evolution in the Luanhe River delta (China) during the Holocene: hydrochemical, isotopic, and sedimentary evidence" by Xianzhang Dang et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-246-RC1, 2021

The authors focus on observed saline groundwater that extends far inland in the coastal zones, and investigate the origin of groundwater salinity and elucidate the major processes controlling salinized groundwater evolution in Luanhe River Delta using hydrochemical and isotopic methods and sedimentary characteristics. The method for interpreting the data is relatively standard. The text is well structured and well supported by the figures. The evolutionary pattern of saline groundwater is innovative, and can be used to better understand groundwater evolution in coastal zone. I would like to recommend the acceptance of the manuscript for publication after **minor revisions**. Below are my comments that may help with this process.

- The introduction provides a comprehensive summary of the groundwater salinization in coastal zones due to Quaternary transgression. The relevant study of similar coastal zones could be expended a little as it is contributed to more valuable scientific significance in International Journals.
- 1 Hydrogeology: this paper is aimed to saline groundwater in coastal aquifer of Luanhe River Delta. However, I cannot find more information about water quality in this section. And how about the hydraulic connection between shallow and deep aquifers? The authors should introduce more details here.
- Page 9, line 6, “MIS5”. The first abbreviations need to be explained in detail.
- Page 9, lines 19-21. How much is the depth of interface of salt-fresh groundwater? And I cannot find any reference to support “salt groundwater primarily occurring in the first aquifer of the delta area” in this part.
- Page 10, line 2, remove“Holocene sea-land transition facies”and write “Holocene delta facies” .
- Page 10, Line 1-3, the sedimetary phases in Fig. 2 should correspond to description of stratigraphic architecture.
- Page 10, line 12, “7 ka BP”. Abbreviations need to be checked, please check throughout

the paper.

- Page 12, line 5, “Daqingher”. Do you mean Daqinghe?
- Page 12, line 19, and Table 1, which water samples does “P18” represent? “CSW”? Please explain in the text.
- Try to report Table 1 and 2 as online supplementary material.
- 1a: The figure shows there are river samples “L01...” or “S01...”, but I cannot find these samples in Table 1, please check.
- Some figure labels / legends are rather small and hard to read, e.g., figures 4, 6.
- Page 26, Line 9-11, changing “palaeo-coast zone” to “palaeo-coast line” maybe more appropriate. In addition, there need more international references to support “100 m depth below present sea level”.
- Page 26, Line 2-7, there are summary of coastal brine groundwater formation, I agree with most of the interpretations. However, how about brine groundwater in other coastal aquifer? Whether these brines have similar formation processes? Appropriate extended discussion could further convey some new understanding that ideally is applicable to other study areas.
- Page 33, Line 18-19, “Laizhou Bay” is not covered in any part of the article, please delete.