

## ***Interactive comment on “Predicting the salt water intrusion in the Shatt al Arab estuary using an analytical approach” by A. D. Abdullah et al.***

### **Anonymous Referee #1**

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The authors constructed a predictive model by analytical approach to predict the length of salt water intrusion in the Shatt al-Arab River estuary. Comparison with in-situ observation shows that model prediction would be improved by considering and estimating water abstractions through anthropogenic usage along the estuary. The overall presentation of the MS is clear, while revisions are needed to improve the scientific value of the MS, before it could be accepted by HESS.

Specifics:

1. In section 3 Theory of the analytical model, the analytical model equations are not newly derived by this MS, thus the derivation process should be put in the Appendix. The applications of the analytical model and new modifications to the equations should be clearly presented in section 3.

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2. Results show that the seawater intrusion is controlled by the fresh water discharge and tide, how about other physical factors, such as the variation of sea level, wind direction, width and depth of the estuary? Considering adding discussion of these factors might improve the understanding to the scientific issue on salt water intrusion.

3. The applicability of the predictive model. Considering adding discussion on the model could be used to predict the salt water intrusion in what kind of estuary (wide, narrow, stratified or vertically mixed)?

4. Some sentence and words need to be modified. For example, in page 2 line 27, “Liu et al. (2004)” should be “Liu et al. (2004)”; in page 3 line 11, “This is by applying . . .” should be changed into “ This is carried out by . . .”; in page 5 line 9, “combing (1) with (2), and (3) with (4) describes the . . .”, seems should be “(1) with (3), and (2) with (4)”, should not simply use “combing”, but use more specific words like “ multiply, subtract, etc.” in deriving the equations.

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