

## ***Interactive comment on “Salt intrusion in multi-channel estuaries: a case study in the Mekong Delta, Vietnam” by A. D. Nguyen and H. H. G. Savenije***

### **Anonymous Referee #2**

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Salt Intrusion in multi-channel estuaries: A case study in the Mekong Delta Vietnam.  
A. D. Nguyen and H. H. G. Savenije.

General comments: The topic of this paper is relevant to Hydrology and Earth System Sciences Discussions however it provides only a slight modification of a predictive analytical method for computing the salt intrusion length in an estuary. The authors conclude that their minor modification of the equation for the dispersion coefficient more accurately predicts the measured salt intrusion length in multi-channel estuaries (although only two estuaries are sampled). The title is appropriate. There is a lot of detail missing from the paper, I feel considerable clarification is needed.

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Specific comments: My main comments relate to the lack of details in the methodology and the description of the data sets. I would have no idea how to carry out this experiment or how to make the measurements for the predictive formulae. As far as I can gather the methods are described in the doctoral thesis of one of the authors? If details of the methodology (measurements) do not appear in the peer reviewed literature than I would strongly encourage the authors to include them in this paper or as supplementary material (I am hampered in verifying this as my institution does not have access to the Journal of Hydrology so I cannot check the content of the various related Savenije papers). For instance what are the width convergence length and the area convergence length? How are these measured or defined? How are the values of  $K$ , Van der Burgh's coefficient and the dispersion coefficient "obtained through calibration" calibration against what? How are the tide averaged cross section area and the salinity values obtained or estimated? More details on the "moving boat" method (how fast do you have to travel and sample to keep up with the tide?) and the sampling equipment, locations and sampling strategy. I would quite like to conduct a similar experiment myself!

On page 6 why not write out the full equation including the substitution for the term on the right hand side?

Page 6. What is  $C$  in equation 8?

Page 6. What is  $\delta$  in equation 8?

Page 6. What is the tidal excursion  $E$  and tidal velocity amplitude  $\nu$ ; for each estuary (branch?) how are these determined?

Page 6. In equation 9 what are  $S$ ,  $L$  and  $A$ ?

On page 10, if  $\alpha$  has units of  $m^{-1} (L^2 T^{-1}) / (L^3 T^{-1})$ ,  $(-Di_0/Qf)$  why is this a mixing coefficient? Or this a different  $\alpha$ ? Confusingly the text mentions tidal range and river discharge?

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Page 11. You talk about tidal excursion here. There are no numbers, results or figures showing us any of this? Let alone how  $E$ ,  $E_0$  and  $e$  are estimated or measured. I need more information here, or delete this section?

Page 11. Figure 6. What do you mean by calibrated results?

Figures 5 to 8, How is the value of  $K$  calculated if not from equation 8? How is  $\alpha$  determined? From measurements? From curve fitting?

Page 12. What do you mean by validated results? Surely this is just fitting the model to a different data set (the fixed station data)?

Page 13. How do you calculate DOHWS from the data?

Page 13. Is 18 days really a fast adjustment time?

Page 16. The discharge ratio between the Hau and Tien Rivers. Why is this significant? Is it because you are using only one data source to infer the discharge of the other river? Why don't you explain all this in the methods?

There are a lot of references to Savenije (2005) which is a book. In the book I often don't find the information that is quoted as being contained by the authors. Either add the relevant page number to the citation, or cite a journal article instead?

I would like to see more discussion or explanation of this key parameter the Van der Burgh,  $K$ .

Some key comments on assumptions, methods and data don't appear until the discussion. I would like to see much more of this in the methodology and data sets sections.

Technical corrections: I am pleased that the authors addressed most of the minor comments I had on my initial feedback for this paper. There are still some slight quirks with the English (from the journal website I infer that this is the responsibility of the authors).

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Table 1, add a description of what each parameter is rather than just having the symbol e.g. Width at the mouth, B0

Figure 1) Do you need a reference and http address for Google Earth.

Figure 2)Ë expand the figure caption to be more informative. This figure is very faint and hard to read, it may not reproduce well in the journal or online.

Figure 3 and 4, why are there so many more points on figure 3 compared with figure 4?

Figures 3 to 8 - the text on the axis labels and in the inset panels on figures 5 to 8 is much too small and very hard to read.

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