

Interactive comment on “A method for calculating the duration and intensity of salt intrusions: the Yangtze River estuary” by M. Webber et al.

Anonymous Referee #2

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General comments

Estuarine saline intrusions are modelled using either a simple empirical relationship, deterministic numerical/theoretical model of estuary dynamics, or a statistical model. A deterministic model is preferable where it is to be used for scenario testing, but without high quality input data and suitable calibration data the predictive capacity of such a model might be no better than a simpler relationship that costs much less to develop. Hydrodynamic models are well-refined and in routine use. Alternative approaches for application to situations of few salinity observations, or where technical and financial resources are not abundant, could be worthy of publication, as this could provide a tool with potential for widespread application. The modelling approach presented in this paper falls into this category. It does not attempt to explain the physical processes,

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or identify a simple threshold discharge of concern (both of which have been done previously), but rather aims to identify the conditions under which the risk of problematic saline intrusion is high enough that management attention/action is warranted. The authors have created a valuable tool that can be adapted to other rivers, and presented it in a clear and convincing way. The authors have highlighted that the relationship between discharge and the intensity and duration of salinity intrusions is probabilistic and continuous, which is a valuable insight for water resource managers. The authors comprehensively comment on model weaknesses and the need to consider changing factors that in the future will likely alter the probabilities estimated in the paper.

Specific comments

The use of $Qt-7$ in the statistical model is quite important. This relies on the assumption that travel time from Datong to Gaoqia is 7 days, which was from Zhang et al (2012). In reality the travel time is likely to be a function of discharge, although the travel time might not vary much over the range of discharge of interest. A comment on this could be provided.

Technical corrections

Page 4920, line 16-17, “The method shows that [the] relationship between discharge and the intensity and duration of salinity intrusions” Edit is in brackets.

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