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Discussions

Interactive comment on "Effect of winds and waves on salt intrusion in the Pearl River Estuary" *by* Wenping Gong et al.

Anonymous Referee #2

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This is a very interesting and well written paper that examines the response of the Pearl River Estuary (velocity, salinity and salt intrusion) to freshwater inputs, winds and waves. The figures are of a high quality and the tables helpful to the overall study. The approach used was to apply well established models with actual environmental forcing variables to 'with-and-without' simulations. The COAWST system of models was used. The results demonstrate some very interesting (if sometimes intuitively obvious) phenomena that are worthy of publication. However, it is very difficult to quantitatively review an article of this nature, which is so far from 'first principles' and which relies so heavily on the interpretation of model results. The paper is also complicated in that numerous scenarios are explored and quite a lot is expected of the reader. A further complication is that actual environmental conditions are used. It is not easy to compare

e.g. the tidally-induced effects of neap and spring tides when runoff, wind and wave conditions are different for the chosen tides.

I have two important 'issues':

First, the authors refer to the 'skill' of the model (from Eq. 3 on p. 6) as being good or excellent - whereas a simple visual appraisal of Fig. 2 shows that the description (except for Fig. 2 (s,t,u)) should be 'satisfactory for the present exploratory purposes' Second, I am surprised that a major conclusion of the paper for the spring-neap behavior is apparently based on an error (p. 13, 35-40) – neap tides (days 40-42) are plotted to have much smaller freshwater runoff than spring tides (days 47-49) unless the plot (Fig. 3) is wrong or the intrusion depends only on the East River inflow.

I have four small issues

1. Eq. 1 and 2, p. 5 - the paper by Lerczak et al. (2006) does not use this decomposition as I recall – either use the correct citation or give more details of the derivation please 2. Eq. 3 on p. 6 uses an over-bar to denote e.g. an ensemble average, whereas the over-bar on velocity, U, on Line 8, refers to a depth-averaged quantity (also Lines 9 etc.) – please be consistent 3. Line 35 on p. 9 has 'T3' whereas the Fig. 10 caption has 'T4' (and is wrong) 4. Line 40 on p. 12 should have 'continuous increases'

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