

Interactive comment on “Comparison of empirical models with intensively observed data for prediction salt intrusion in the Sumjin River estuary, Korea” by D. C. Shaha and Y.-K. Cho

Anonymous Referee #1

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General comments

This paper examines the relative merits of five empirical models in order to test their applicability to the Sumjin estuary, Korea. The selection of one of the models over the others is determined by the success of the model to accurately predict the ingress of salt inland. The need to measure the maximum extent of salt intrusion is stated in terms of protecting potential drinking water supplies from becoming adversely affected by local increases in salt concentration. Although a useful context for the study, this topic is not returned to in the discussion nor is it made clear in the introduction what mechanism is most likely to be causing contamination of drinking water supplies in this

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region. Mention of ground water abstraction further confuses the story as it is surface water chemistry which is being tested and reported upon. The authors may wish to revisit the context of their paper in order to clarify the significance of the wider study. There is no attempt to offer any mitigation measures.

Specific comments

Page 1880

Abstract – the significance of the study of salt intrusion is missing from the abstract.

Line 14 and line 16 – the terms ‘most satisfactory results’ and ‘reasonable results’ are used. The question that remains unanswered here is, satisfactory in terms of what? This simply needs a line of further explanation and perhaps an indication of the degrees of error measured between the model and the env. data collected.

Line 26 – is water withdrawn from the River Sumjin for drinking?

Page 1881

Lines 6 to 8 – which of these mechanisms is dominant?

Line 23 – add a reference after the words salt intrusion.

Page 1882

Line 17 – please be specific – how deep is the upper estuary at its deepest point?

Line 28 – can you please add the duration of the seasons in months. Plus, when using a term such as high river discharge, please state the rate in cumecs. This also applies to the mention of discharge rates on page 1886.

Page 1883

Line 20 – please give a reference for ‘easy-to-use’ or delete mention of this.

Results - page 1885

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Line 5. Please explain the potential issues connected to extrapolating field data.

Page 1886

Line 25 'related to the river discharge and tide' – this seems obvious – could anything else be controlling salt intrusion?

Page 1887

Line 1 – 'The intrusion length was a little bit high' – imprecise – please give exact measurement

Page 1888

Section 4.3 Lines 21 to 28 - It is unclear as to why this is important – needs a rethink i.e. the authors do not say why it is important to examine which external force is dominant.

Summary

The summary does not tie-in with the introduction. How useful is this modelling to water management? No mitigation techniques are offered as a solution to the salinization of drinking water supplies.

Technical corrections

Minor typos:

Title - Comparison of empirical models with intensively observed data for prediction of salt intrusion in the Sumjin River Estuary, Korea

Page 1800 line 5, change 'condition' to 'conditions'

Page 1882 line 2, delete 'reported' and add 'rely on'

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 1879, 2009.