

## ***Interactive comment on “Transient flow between aquifers and surface water: analytically derived field-scale hydraulic heads and fluxes” by G. H. de Rooij***

**Anonymous Referee #3**

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### **1 Description**

The author presents analytical transient solutions for different scenarios in aquifers with parallel and radial flow. A meticulous derivation of the formulas is also presented. Although I did not go through all the derivations, the few I randomly checked were correct and I have no reason to doubt the correctness of all the rest. If the Journal audience can cope with the amount of mathematical detail presented, I recommend the publication of the article. However, I have the remarks indicated below:

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### **2 General Remarks**

1. The symbols  $\mu$  and  $D$  are conventionally used to represent viscosity and diffusion/dispersion respectively but mean different things in the manuscript. I suggest to have a list of all the symbols along with their description and units where applicable at the beginning of the manuscript so that readers are informed of the adopted formalism beforehand.
2. The word *then* in lines 11 and 25 (on pages 2 and 23 respectively) should in my opinion be *than*.
3. It is stated on p.23 that five terms cannot guarantee accuracy for recharge-driven fluxes. It would be nice if the author suggested how many have to be taken in such cases and the additional computational effort.
4. There is usually a possibility for the dissolution of e.g. fertilisers from agricultural farmland and leachate from waste dumps into groundwater. Shortened travel times are documented in such scenarios where groundwater flow becomes coupled with solute transport. Are the solutions presented in the manuscript capable of predicting those shorter times (if such coupling were taken into consideration)?

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