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Interactive comment on "Analysis of groundwater flow and stream depletion in the L-shaped fluvial aquifer" *by* Chao-Chih Lin et al.

Anonymous Referee #2

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The paper provides an analytical solution for transient groundwater flow in an L-shaped aquifer, with strong connection to a stream. The so called analytical solution is not completely analytical, as numerical tools as the Stehfest algorithm are included to obtain the final result. When the results are compared with a MODFLOW solution, in fact two quite different numerical approaches are compared. Both of these approaches have their limitations and deliver approximate solutions only. The possible size of the errors is difficult to discuss and is not addressed in the manuscript.

Usually analytical solutions are utilized for benchmarking numerical codes, because they are a more accurate representation of the exact solution. Obviously this property is not expected by the authors, when they present their approach. In contrary they use a numerical solution for benchmarking their method, not taking into account that the

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numerical solution is definitely only an approximation.

Concerning the model region, the L-shaped domain is surely a big deviation form the real aquifer geometry, especially along boundary AG, but even more along boundaries FE and ED. Thus deviances, as shown in Fig. 3 could be expected. The problem with the manuscript is that it cannot trace back the differences to its causes: it could be the different numerical approach (MODFLOW, FEM, 'analytical') or the different model region. Were the results of the numerical models obtained with sufficient mesh refinement?

The production well is located quite near to the boundary AB. It can be expected that the strong head gradients that appear due to this constellation can only be reproduced numerically if strong mesh refinement is used in the direct vicinity of the well. Concerning the real world situation, it could be doubted that a numerical approach with a constant head boundary can address the physically relevant processes in that case. I would expect that strong or weak connection between aquifer and surface water body play a role in reality in addition.

If the paper could be re-written in a way to address the points made, I could deliver a more positive comment.

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