

Responses to comments by Prof. Marc Walther.

Dear Prof. Marc Walther, we thank you for the time devoted to this manuscript that has led to a significant improvement of the manuscript. We have implemented some of the suggested information and changes to the new document.

R2.5 and fig. 1: Thank you for clarification.

- Concerning the blue small arrows for text reference: please use them consistently, either pointing from the text to the object or vice versa (compare arrows for "Recharge Basin" and "Quaternary Terrace"); also, not all arrows are clear: on the right, does the arrow show the location of "Aluvial Fan" or the direction of "Lateral Inflow"?

- Concerning the stratigraphical log: I understand your intention to add some more, but not too much, background information for the reader. I think, however, that with the current state of the log figure, it is too less explanation to be valuable: I see a legend for a figure as compulsory, and additionally, the figure is in very low resolution so I cannot identify the texture to guess the character of the layers. I really think it would be better to add more details here. Maybe, you can add text to the layers (as you did with "Clay" at 17m)?

R2.5 You are welcome. The small arrows of Fig 1 has been changed to be consistent. The stratigraphical log has been removed as the arrows showing the lateral inflow directions.

R2.26 Concerning your answer "We used abbreviation "Ly" because it is the same nomenclature displayed in Figure 4." - I could not find an explanation of this abbreviation (although it is clear to me, it may not be for all readers). Maybe, you can simply add this to the caption of figure 4?

R2.26 We have been added the abbreviation in the caption of the figure.

R2.34 I still cannot find information about which model setup you show in figure 2 (homogeneous, het1 or het2)? Can you please add this?

R2.34 The model of Figure 2 corresponds with the large scale flow model, the fit are those obtained after the recalibration of the flow parameters. Afterwards we estimated the transport parameters under the two hypotheses, so the model of figure 2 is the base for the Hom, Het-1 and Het-2.

R2.35 You write "horizontal and vertical diffusion coefficients" - do you mean dispersion coefficients? I can find information on the dispersivity (P6L6). Can you please add information on the diffusion coefficient?

R2.35 Yes, I mean dispersion coefficients, sorry. The diffusion coefficients remains equal for the three models, $10^{-9}m^2/d$ for the whole domain with the exception of the 1D elements linking the local and the large scale domains for which the diffusion is $10^3m^2/d$ and the 1D elements representing wells where it was fir to $10m^2/d$. This information has been added to the manuscript.

R2.36 Thank you for the detailed answer! I suggest that you add your description of the RMSWE value to the manuscript, as it is relatively uncommon how you calculate this (also considering the high value of it). Is there a unit for RMSWE or is it unitless through

normalization of the parameters/values? Frankly speaking, an equation or reference would be nice for the RMSWE (to better understand and interpret the value you show in table 1).

R2.36 Yes it is dimensionless, in the cited bibliography it is possible to find detailed description of the RMSWE.

R2.38 Your answer "Yes, the white area was colored to grey to make it easier to identify the different layers, but corresponds to value 0mg/l." - so why don't you change the legend to show a grey value for 0mg/l?

R2.38 We have changed the legend in Figure 4.

R2.40 The phrasing of "because the aquifer transmissivity in the local domain was ultimately the same." is still used. I understand your answer in the reply, but am in doubt that readers may misinterpret this in the first place.

R2.40 We have changed the sentence as it appeared in the response to comments.

R2.41 Is it right, that you set a molecular diffusion coefficient of $10e-10$, 10, and 10000 m²/d, for the domain, 1D near the wells, and at the edge of the local domain??? That would be about $1e-15$, $1e-4$, and $1e-1$ m²/s, which is in any case far from what is reported to be a common value for diffusion of a solute in water $\sim 2e-9$ m²/s (not even speaking of an effective diffusion coefficient in porous media (but this is probably not important))! Please, explain your choice of diffusion values here.

R2.41 It is right they are a very small values , around $10e-13$ m²/s. The actual value of the diffusion coefficient is only important for the wells and the 1D elements connecting the layers because where the mixing of solutes in the thickness of the layer (or along the well) has to be accounted for. In the rest of the domain the model is not sensitive to diffusion because dispersion is the dominant mechanism.

P7 L29: "mean weighted residual for head observations" should have a unit (meter?).

P7 L29 It is dimensionless.

P15 L24: "ACWAPUR (XXXXX)" - is there a number/reference missing?

P15L24 The reference was missing, it has been added in the new manuscript.

Responses to comments by reviewer 2.

the new manuscript looks very good and I still want to highlight the importance of the work done here.

The authors thank reviewer 2 for the help improving the manuscript.

I only have some very minor comments the author may check before publication:

page 2, line 24: Maybe "feasible" is not the right wording, please add "often" or change wording to "cumbersome".

[It has been changed](#)

page 4, line: 10: "cause" instead of "causes"

[Done](#)

page 7, line 12: "risk 'of' overparameterization"

[We have corrected it](#)

page 7, line 29: Are there units missing?

[No, RMSWE is dimensionless](#)

Figure 2: What are the numbers in the right hand side? Did I miss something?

[I apologize, I attached the wrong figure, it has been corrected in the new manuscript.](#)

Figure 3 caption: "monitoring 'of' the amino-G acid"

[Done](#)

page 12, line 33: "did" instead of "dis"

[It has been corrected](#)

page 15, line 16: What is "much"?

[Efficiency](#)

page 15, line 18: please change "direct-push" to "direct-push based exploration"

[It has been changed](#)