

Responses to reviewer's comments

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We are very grateful to the Editor Mauro Giudici and the reviewers for their constructive comments on the manuscript. Please find below our responses and the detailed modification (in blue) to the comments (in black) of Editor and the two reviewers. All modifications in the text are highlighted in yellow in the new version of the manuscript.

Editor report

The paper requires a minor revision, mostly related to some linguistic aspects and with the proper use of scientific terms.

I expect that the paper can be revised to improve the English language and to have a more appropriate use of terms like "forward and inverse problem", "inverse modelling", etc.

All recommendations made by the Referee 2 about the use of appropriate terms concerning models and inverse approaches were considered in the new version of the manuscript.

Author comment to Referee #2

I would like to find out that practically all my critical remarks presented previously were taken into account and respective comments and corrections were introduced by the Authors into the revised version of submitted manuscript.

However, although in the same review I tried to pay the Authors' attention that the subject of their manuscript in fact deals with solution of the inverse problem, in many places of the considered text, including even its title, they use still the term "inverse model". To my mind the term "model" simply means the equation or the system of equations describing the analyzed phenomenon. In the considered case both models are constituted by the partial differential equations of parabolic type: the advection – diffusion equations. If in assumed region of solution and for the auxiliary conditions imposed at its limits these equations are solved then it is said that their direct solutions was performed. In the case when knowing the solution we are looking for some auxiliary conditions or for the parameters describing the considered process then it is said that the inverse problem is solved. In my opinion this is the case considered by the Authors because they consider lateral inflow/outflow as unknown. Therefore, instead of the term "inverse model" they should rather use the term "inverse problem for the advection - diffusion equations" as in the mathematical physics the terms "direct models" and "inverse models" do not exist. The Authors should not introduce new nomenclature if it is not necessary (page 3, lines 15-20).

We thank you for your advice about the more appropriate terminology. In order to clarify the formulations all along the manuscript, the nomenclature was modified by deleting the terminology "direct model" and by substituting the term "inverse model" by "inverse problem (for advection-diffusion equations)".

My second remark is dealing with Eq. (4). In explanation given below this equation it is stated that dT is “the time step of integration”. In definition of integral “the step of integration” does not exist and dT has another interpretation (please see definition of integral in any book). The time step of integration will occur when the convolution integral (4) is replaced using the respective approximating formula.

Ok. We understand the remark about the formulation used for dT and we prefer thus to remove it in the submitted version of the manuscript.

Author comment to Referee #3

I am totally satisfied with this version of the paper.

Thanks.