

## ***Interactive comment on “A general real-time formulation for multi-rate mass transfer problems” by O. Silva et al.***

**O. Silva et al.**

orlando.silva@idaea.csic.es

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Major concern

The reviewer thinks that our article do not strictly meet the standards of the journal HESS. After looking at a few (most recently published) HESS papers, the reviewer states that each contribution is a balance between theory and real data. He thinks that this balance is not accomplished by our article, and this could be much more suitable for a journal such as Computational Geosciences. For all these reasons the reviewer suggests us to retire the manuscript, and submit it to a different Journal. He also says that there are many typos in the manuscript.

Reply

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The reviewer suggests that the paper may be better suited for "Computational Geosciences" than for HESS. We assume that this reflects the fact that we are presenting a code and making it available to the scientific community. Indeed, we recognize this is much in the style of "Computers and Geosciences" journal. However, we feel that the main contribution is not the code itself, but rather.

1) The unified formulation of all non-local in time approaches. These formulations are used by many authors, but it appears that each of us has got his/her own way to represent them. This is confusing and hinders scientific developments in this field because it is not easy to compare parameters obtained by different authors. We contend that this is well within the spirit of HESS, although it is true that, as stated by the reviewer, many papers in HESS are more applied.

2) A subsidiary contribution is to present an algorithm that is very efficient and accurate. By using the MRMT formulation, the algorithm becomes localized, which facilitates (a) physical interpretation of parameters and (b) incorporation of other phenomena, such as chemical reactions, that require local variables. As an algorithmic contribution, this could go in many journals.

In re-reading the paper, under the light of the comments by the referees, we realize that these contributions may not be sufficiently clear. In view of this, we suggest:

- (1) Expand the introduction to better motivate the above contributions.
- (2) Provide a table, as suggested by reviewer Albert Valocchi, with an explicit comparison of methods.
- (3) Drop Section 5 (although still directing readers to a web page for free downloading of the code).
- (4) Expand Section 6 with a few examples comparing the parameters obtained with different formulations (we are hesitant about this).

Finally, we would be very grateful if the reviewer could provide us with a list of the main

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typos he has found, in order to improve the manuscript.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 2415, 2009.