Answer to anonymous reviewer

I have two main concerns about the paper as it stands now. First, it heavily overlaps with Cherubini et al.,HESS, 2013. The authors should make an effort to emphasize the original contribution in the present paper, both in terms of tests conducted in the lab and their theoretical interpretation……. ….The Introduction should be reviewed and summarized illustrating succinctly the relevant state-of-the-art and clarifying the authors' contribution.

The Introduction has been totally restructured in order to better clear the state-of-art of the research as far as nonlinear flow and non fickian transport in fractured formations, the poor understanding of transport behavior in fracture networks under non-Darcian flow, in order to emphasize the original contribution of the paper.

It has been arranged in the following way:

First part: evidence of non-linearity of flow in fractured aquifers and experiments related

Second part: modeling tracer test and non fickian behavior in fractured aquifers. ADE and MIM and relative performances. Experiments related

Third part: introducing the problem of poor understanding of transport behavior in fracture networks under non-Darcian flow. Few studies present up to now. Study of Qian et al (2011) about a single fracture

Fourth part: as requested, summary of the previous studies of Cherubini et al (2012, 2013) about the influence of non Darcian flow on solute transport in a fracture network

Fifth part: introducing the new study about analyzing the performances of MIM and ENM.

Secondly, the comparison drawn by the authors between MIM and ENM does not touch upon the important issue of scale, most often governing the choice between continuum and discrete models; this should be appropriately discussed.

In the conclusion a long part has been added in which the issue of the scale is discussed, as far as the validity and reliability of continuum and discrete models in relation to the study scale.

2. The concentration in Eq. (8) is the solution of Eq. (7), please check consistency of symbols.

The consistency of symbols has been controlled. c_1 represents the concentration in the mobile domain

3. Please rephrase the sentence on p. 14914, lines 18-20. Are the equations dimensional or dimensionless?

The sentence has been reformulated as follows: 'In order to fit the BTCs curves with the MIM model the assumption of representative 1d length (L) of the fracture network should be made. However this matter can be solved by the introduction of the normalized velocity (v/L) and normalized dispersion (D/L^2). The MIM model is defined by four parameters regarding the whole fracture network (v/L, D/L^2, α, β). '

4. Please explain/rephrase the sentence on p. 14915, line 13; Kirchhoff first rule should be "The algebraic sum of the currents flowing through a junction is zero".

The sentence has been reformulated as follows: '*the algebraic sum of flow in a network meeting at a point is zero'*

5. Check line 21 p. 14916 for completeness.

'Fractu' should be a typeset error. In was not present the original manuscript submitted to HESSD, in which there is 'fracture'

6. Check equation numbering on p.14921 line 13.

The right equation numbering is 'Substituting Equation (27) into Equation (28) ..'

7. On p. 14923 lines 8-9 the equivalent area parameter is not defined.

The equivalent area parameter ω_{eq} has been defined where requested.

8. On p. 14923 line 11 Eq. (15) should be cited in place of Eq. (16); same for line 15 with Eq. (18)-(19).

The equation numbering has been corrected as suggested.

9. The difference between ENM2 and ENM3 needs to be better elucidated, I suggest to avoid usage of "estimated" for both the flow test and the BTC.

The difference has been better clarified. 'Determined' instead of 'evaluated' has been used for the flow tests: '*(As showed in figure 10 and 11 P_Q as function of Q_0 evaluated by means the fitting of BTCs by ENM3 and ENM4 models presents a different trend respect to P_Q determined by means of flow tests. P_Q evaluated by transport tests decreases more rapidly than P_Q determined by flow tests (Figure 10).'*

Explanation for the difference between ENM2 and ENM3:

For the ENM model three assumptions for the configuration parameters have been made. The configurations are distinguished on the basis of the number of fitting parameters and assumptions

made on P_C and P_Q parameters. The first configuration named ENM2 has only two fitting parameters ω_{eq} and α_L. In this configuration P_C is imposed equal to P_Q and is derived as the square brackets term in Equation (29).

The second configuration named ENM3 has three fitting parameters ω_{eq}, α_L and P_C (P_Q). P_C is still equal to P_Q but they are not evaluated by the equation (29) but through the interpretation of BTC curves.
In the third configuration named ENM4 all four parameters (ω_{eq}, α_L, P_Q, P_C) ($Pc \neq Pq$) are determined through the fitting of BTCs.

10. Three different parameter configurations were tested for the ENM model; clearly the model with a larger number of parameters yields a better fit. One could compare the different models on the basis of model selection criteria. This is not requested but could be a valuable addition to this paper or to the authors' future work.

In the text it is said that: 'All models prove a satisfactory fitting. The ENM4 model provides the best fit which is expectable because it has more fitting parameters than ENM2 and ENM3, thus it is more flexible.' The authors appreciate the reviewer suggestion of comparing the different models on the basis of model selection criteria and will consider it for a future work.