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Discussions
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Interactive comment on "Experimental study of forced convection heat transport in porous media" *by* Nicola Pastore et al.

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1) Please check Eqs (4) and (16). The advection term should be multiplied further by the porosity in Eq (4). α should be divided further by the porosity in Eq (16). The equation (4) and (16) has been corrected. 2) How do the authors obtain the specific surface area in the present work? This was not introduced. The expression to determine the specific surface area has been introduced (equation 10). 3) In Fig 3, why the inlet temperature was first higher then lower than the downstream temperature? It seems that some information is missing in the introduction of the experiment procedure. The experimental setup is realized in the way that the inlet has a non-continuous injection (10 litres), so when the injection terminates the temperature registered by the first thermocouple becomes lower than the one registered by the last

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thermocouple. 4) To validate the present results, it is recommended to compare the results of the convectional heat transfer coefficient and effective thermal conductivity with the current. Regarding the Nusselt number and the heat transfer coefficient, the experimental results have been compared with Wakao correlation (1979) and the experimental correlation between volumetric Nusselt number and Reynolds number found in Fu et al. (1998), Kamiut and Yee (2005), Ando et al. (2013). The relationship between the keff/kf and Pe has been compared with the experimental results found by Levec and Carbonell (1985), Gunn and Price (1969), Pfancuch (1963), Ebach and White (1958). 5) In my opinion, the expression of v=q/n is obtained rigidly from the volume averaging theory. Thus, v should be taken as a known constant in the data processing, as well as β. Of course, the RMSE will be larger if so, but I think the experiment results are allowed to have larger errors. Please comment on this We have preferred not to constrain the thermal convective velocity v to values v=q/n. Because, first of all n represents the value of total porosity and therefore the convective velocity for a conservative solute should be equal to v = q/ne where ne represents the effective porosity; second the thermal convective velocity should be less than conservative solute velocity as reported in Bodvarssoon (1972), Oldenburg and Pruess (1998), Geiger et al. (2006). The first consideration is more relevant for M2, whereas the second consideration is more relevant for M1.

Please also note the supplement to this comment:
https://www.nonlin-processes-geophys-discuss.net/npg-2017-53/npg-2017-53-AC1-supplement.pdf

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