First of all, we would like to thank the reviewer for his help improving the paper.

Reviewer' comments are in italic, our answers are in bold.

S. Barontini (Referee)

stefano.barontini@unibs.it

Received and published: 4 July 2016

1. **My major concerns are about the parametric approach to PTFs.**

In lines 106 to 113 it is said that the RETC code was used to fit the van Genuchten SWRC to the experimental data, but at line 102 it is reported that the experimental data were determined at two tensiometer–pressure potentials, that are -33 and -1500 kPa. Therefore it seems that the four parameters of the SWRCs (θs, θr, α, n, while m is constrained to m = 1-1/n) are fitted by means of two experimetal points only for, each curve.
If this is the case, and no other constraints were introduced, the set of parameters is not univocally identified for each soil, and the further analyses on the parametric approach lose their significance.
I therefore recommend that either (1) the Authors better detail the followed procedure for this approach, so that it is clear how main experimental points the procedure is based on or whether there were other constraints to univocally identify the fitted parameter set; or (2) they remove the part about the parametric approach and better develop that about the point approach.: **The text in the lines 106 to 113 was not clear, actually we used the Rosetta model including in RETC code. This sentence will be modified as follows: The van Genuchten's parameters are indirectly estimated for each soil sample from four levels of measured data inputs as: sand, silt and clay percentages and bulk density using H3 Rosetta model (Schaap et al., 2001). The "m" parameter was calculated as follows: m = 1 -1 / n.**
Moreover (3) I encourage the Authors to explicitly present the PTFs they obtained for the investigated sample of soils. In the following lines, detailed comments and some technical notes will be provided: **The revised paper will explicitly present the PTF we developed.**

2. **Detailed comments and technical notes**

ll.37—38 explain whether it refers to the hydrological state of the soil or to the characterization of the hydrological properties: **It will be Removed**
l.47 _ ! _ ((in all the paper): **It will be modified.**
l.*51 Uniform all the paper to the version "van Genuchten" (or to "Van Genuchten"):* **It will be modified.**
l.59 "different environments from which they were derived for": **It will be modified.**
l.63 "and hydraulic conductivity as well": **It will be modified.**
ll.93—96 Check the percentages, or probably better explain the consistency of the whole database: **It will be modified.**
l.103 "moisture" -> "water content". Field capacity or soil saturation? Samples in Richards apparatus are usually saturated. Moreover field capacity (regarded to as the soil water content which remains in the soil after abundand imbibition and when percolation is materially decreased) can be quite a small water content, even smaller than the water content at 33 kPa: **Your comments are right. This will be addressed with text modifications.**
l.106 "defended"->"defined": **It will be modified.**
l.119 Add something like "the following measures of the errors", or something else, to

make the article more readable: **As suggested by the reviewer it will be addressed as: "To discuss the validity of PTF developed, we used the following measures of the errors: the mean prediction error (ME) to inform the bias of the estimate; the mean square error (RMSE)".**

l.131 Check equation (4), I think that there should not be 1/ n:

The index of agreement (Willmott and Wicks, 1980; Willmott, 1981):

$$d = 1 - \frac{\frac{1}{n}\sum_{i=1}^{n}(\theta_p - \theta_m)^2}{\sum_{i=1}^{n}\left[\left|(\theta_p - \bar{\theta}_m)\right| + \left|(\theta_m - \bar{\theta}_m)\right|\right]^2}$$

The index of agreement varies from 0 to 1 with higher index values indicating that the modeled values θ_p have better agreement with the observationsθ_m.

l.145 Title not necessary: **Indeed. It will be removed.**

l.161 Explicit what does the constraint Xi? stand for: **It will be modified as follows:**

In order to quantify the variation of sensitivity index (VSi), of an input factor Xi, we can fix it at its"true" value, Xi = Xi ∗ (Xi ∗:the average when the variable follows the normal distribution, the median when the variable follows the lognormal distribution). To calculate how much this assumption change the variance of Y we propose:

$$V_{Si} = \left(\frac{V[E(Y/X)]}{V(Y)} - \frac{V[E(Y/Xi=Xi*)]}{V(Y)}\right) * 100$$

V_{Si} > 0 and Si close to 1 indicate increasing accuracy of PTFs
V_{Si} < 0 and Si close to 1 indicate increasing accuracy of PTFs
V_{Si} > 0 and Si close to 0 indicate decreasing accuracy of PTFs
V_{Si} < 0 and Si close to 0 indicate decreasing accuracy of PTFs.

l.177 Table 2 is not cited before Table 3. This is a good point to explicitly provide the formulae of the obtained PTFs: **As suggested by the reviewer, It will be modified as follows: We chose to use the Rosetta PTFs in this study because it is one of the latest PTFs and gave reasonable predictions in several evaluation studies (Nemes et al., 2003). The quality prediction of point and parametric PTF developed in this study will be compared with the three Rosetta PTFs (H1, H2, and H3). Three Rosetta models (H1, H2, and H3) were selected because they require the texture and bulk density as inputs as well as the PTF developed (Table 2).**

ll.199—203 I agree with this sentence, but in this case it can also be due to the undetermination of the interpolated parameters (see the General Comments): **The discussion will be improved to take this suggestion into account.**

l.233 Avoid referring to the conductivity as the framework of the article seems to be based on Mualem's predictive approach to the relative conductivity function (as it follows from the constraint on m): **It will be removed**

l.244 and followings Consider the idea of collecting all the analyses regarding the texture in one paragraph only, thus restructuring the paragraphs regarding sand, sil and clay. This can strongly help the readability of the discussion. Many analyses of previous Authors are reported: I suggest to explicitly detail whether your results are according or discording to previous ones: **the reviewer is right. This will be addressed in the revised manuscript.**

l.291 "They increase in organic matter" with. . . ?. **It will be removed.**

l.306 and followings Typically clay is very important at characterising the water retention, even if it can lose sensitivity for great values of clay content: in which sense does it sound the statement of line 317?: **Indeed, this part will be removed.**

l.353 I agree with the conclusion but it seems to be quite in contrast to what observed after the reported analyses and the last conclusion: I suggest to better detail this point or remove it. **As suggested by the reviewer, this part will be removed.**

Further minor comments: (i) correct some typos, (ii) check the consistency of the references list and alphabetically order it, (iii) change the colour of histograms and bar– graphs to ensure the readibility also in B&W printing: **All these comments will be addressed in the revised manuscript.**