General comments

This paper presents an interesting and useful numerical analysis for the evaporation method. Since it is importance to develop a simple and accurate method to estimate hydraulic properties, this approach has meaningful contribution. In general, I found the manuscript to be well written. Although this paper is worth to be accepted, there are several points that need to be addressed. Since this manuscript has a lot of information and some of them are written too simply, the authors have to make them clear.

Specific comments

p. 7393, *l*.7-9: For my first reading, it was hard to understand this sentence. Please make it clearer corresponding with the relative value of parameters shown in Fig.12-14 (also for the subscript "0"). "parameter *i*" should be "parameter *j*" according to Eq.(7).

p. 7395, *l*.23-: Why don't you mention about the general interpretation of relative sensitivity coefficient? Not everyone is familiar with it. Is there any meaning for positive or negative value? Larger absolute value means higher sensitivity. And the meaning of "zero crossing" is not clear.

p. 7402, *l*.7-: Same as relative sensitivity coefficients, not everyone is familiar with response surface, general interpretation is needed. Which shape is good for inverse fitting and how is correlation between two parameters.

Technical comments

1. p7389, Eq.(2): Define θ, θ_s, and θ_r. τ is equal to 0.5? It's not used as a fitting parameter in following of this article.
2. p7389, Eqs.(3) and (4): Define K_l, g, z, and t. Use the same variable for liquid water content, θ_l or θ.
3. p7390, Eq.(6): Define variables.
4. p7390, *l*.18-24: Show the reference of this inverse procedure.
5. p7391, *l*.9: Give the length of soil column and initial condition.
6. p7391, *l*.17: matrix potential→ matric potential. Can be found in several sentences.
7. p7391, *l*.22-24, *l*.1: Give the equation converting permittivity to water content.
8. p7392, Eq.(7) middle term: $(t,z,p_j) \rightarrow m_i(t,z,p_j)$
9. p7393, *l*.5: You have to make clear which parameters to be fitted before here.
10. p7395, *l*.16: saturated hydraulic resistance → hydraulic resistance (reciprocal of hydraulic conductivity) It is not only for saturated case.
11. p7395, *l*.17: Give the actual value of Ks. Is it 0.005cm/h?
12. p7396, *l*.12: "shape of the soil water capacity curve" →"shape of the soil water retention curve". Is there any special reason to use "water capacity curve"?
13. p7398, *l*.15: Fig.8 seems to be showing for the three steps boundary condition. Are you mentioning about the 1st step at 70 hr? It makes readers confuse.
14. p7401, *l*.1: Define Δh.
15. p7402, *l*.14: Since relative values are used for axes, you should mention n/n0=1.

16. Table 2: $p_w \rightarrow p^w$
17. Figure 3: $p_w \rightarrow p^w$
18. Figure 5 Legend: “high” alpha
19. Figure 6 middle: Although you’re explaining about the regime I, it is hard to see. Upsize this reason.

20. Units are needed for all variables.
21. Use the same term for j^w. “Water flux at the upper boundary”, “outflux”, or “evaporation flux”