

Hydrology and Earth System Sciences (HESS) paper number hess-2015-544  
**A Bayesian Consistent Dual Ensemble Kalman Filter for State-Parameter  
Estimation in Subsurface Hydrology**  
by B. Ait-El-Fquih, M.E. Gharamti and I. Hoteit

- Reply to Editor -

Dear Professor Mauro Giudici,

We would like to thank you for your decision of accepting our work for publication as well as for your careful reading of our manuscript. We have addressed all your comments and detailed replies are given below.

We thank you again for all your editorial efforts.

Sincerely yours,  
B. Ait-El-Fquih, M.E. Gharamti and I. Hoteit

## Technical comments

C1. *Line 55: Modify “some forms of model errors”, as this expression is not informative.*

R1. We have made this expression more informative as suggested. Thank you.

C2. *Line 384: The saturated thickness is given by  $b = h - z_{bot}$ , where  $z_{bot}$  is the height of the impermeable aquifer bottom. Details about  $z_{bot}$  must be given: is it constant (horizontal aquifer bottom) or variable? If variable, please, specify how.*

R2. We agree with the editor. The height of the impermeable aquifer bottom,  $z_{bot}$ , is assumed constant in this case study and this is now mentioned in the text. Thank you.

C3. *Lines 393 & 394: The correction can be further improved. My (TeX) suggestion is: “with a geometric mean of  $10^{-13}$  m/s, a variance of  $Y = \log K$  equal to 1.5”. The same holds for the caption of Figure 1.*

R3. Done, thank you.

C4. *Line 476: Substitute “frequency” with “period”.*

R4. Done, thank you.

- C5. *Line 495: I think it is preferable the expression “time-averaged AESP”.*
- R5. We have used “time-averaged AESP” as suggested. Thank you.
- C6. *Line 541: Check the expression “as the frequency of observations in time decreases”.*
- R6. Thank you for pointing this out. We now use the expression “as observations are sampled less frequently in time”.
- C7. *Line 622: Substitute “observations sampling frequency” with “sampling period”.*
- R7. Done, thank you.
- C8. *Table 2: Erase parentheses around the measurement units.*
- R8. Done, thank you.
- C9. *Figure 1: Substitute the heading of the colour scale with “ $Y = \log K$ , for  $K$  in  $m/s$ ”. The same correction in Figure 8.*
- R9. Done, thank you.
- C10. *Figure 2: Modify the heading of the colour scale in analogy to what has been described here above for Figure 1. Also, check the values and maps, because recharge  $q$  should be given in  $m/s$ , since the dimension of  $q$  are  $[L/T]$  (see line 391).*
- R10. Done, thank you.
- C11. *Figure 3: The change to the labels are not sufficient to make them clearly visible and readable. Please, improve the label formats.*
- R11. Done, thank you.
- C12. *Figure 4: Erase “-water” from the y-axis title of the upper plot. Use “ $\log K$  ( $K$  in  $m/s$ )” for the y-axis titles of the lower plot.*
- R12. Done, thank you.
- C13. *Figure 5: Substitute x-axis title with “Observation sampling period (days)”.*
- R13. Done, thank you.
- C14. *Figure 7: Substitute the x-axes titles with “Time (months)”.*

R14. Done, thank you.