

**HESS**

## **Comments to**

**Development and evaluation in bare soil conditions of an efficient soil-atmosphere model (FHAVeT) based on the Ross fast solution of the Richards equation**

**by: Tinet et al.**

### **General Comments:**

The title should be changes to e.g.;

**Development and evaluation of an efficient soil-atmosphere model (FHAVeT) based on the Ross fast solution of the Richards equation for bare soil conditions**

Still I do not agree to the problem that the code cannot be validated against analytical solutions. For sure not the coupled code under atmospheric conditions but the implementation of the Ross approach can easily be validated against analytical solutions as well as the energy balance model using appropriate BC and initializations.

### **Specific Comments:**

P1 L16: should be: ...model based on...

P1 L20: ... better performance in regard to mass balance... This is already an indicator that the TEC model is either not a good model or that something went wrong with the model (shit in - shit out). To overcome this problem I would still suggest working on analytical solutions.

P1 L21: wrong unit? See definition in figure caption Fig. 3.

P1 L32: yielding is not a management practice. Management practice would be harvesting.

P2 L88: It is based on.... Not the equation is based on but solving the equation is based on.

P2 L101: I would speculate that it is the same for upward flow but less intense studied.

P3 L205: how does it compute rainfall? I would expect that rainfall is only an input. Evaporation will be computed – at least actual evaporation.

P3 L221: units missing for RaH and Rav.

P3 L230: should be Table. 2

P4 L240: should be soil depth not elevation.

P4 L254: there is also a reference for the Mualem van Genuchten approach. Even if it is a little bit older Rien still deserves some citations for it!

P4 L265: should be: is shown in Table 1.

P4 L274: Units missing for bulk density

P4 L280: parameters of Eq. 6 not introduced but listed in line 372 page 5

P4 L305: But this depends on the user. Theoretically, both can be run with same discretization

P5 L332: Figure 5. Do you mean Tab. 3? I can also see the periods in Fig. 5 but than Fig. 5 should be labelled Fig.3 to be consistent in order.

P5 L358: shape parameter. Which is classically denoted as tortuosity lambda.

P8 L409: Fig. 3. Either Figure 3 or Fig. 3. Be consistent within the manuscript

P9 L444: ...for the surface layer and in one particular simulation is shown in Figure 5.

P10 L485: should be. Therefore, ....

### **Tables:**

Table 1: you should provide references for the models.

Table 2: delete points between units.

Table 3: delete points between units.

### **Figures:**

Fig. 4. The tolerance cannot be detected in a print.