**Hydrology and
Earth System
Sciences
Discussions**

Interactive comment on "An eco-hydrologic model of malaria outbreaks" by E. Montosi et al.

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The manuscript presents an innovative development of an eco-hydrological model which aims at facing a public health problem, i.e., malaria incidence. The authors show how soil moisture is an efficient predictor of the temporal variability of malaria cases, improving previous results which simply used single relations with temperature and/or rainfall. After reading the paper, I have absolutely no doubt to support its final publication in HESS provided that the paper presents a very original application of a hydrological model, linking hydrology to a discipline that is not usually dealt in hydrological forums. This is, in my opinion, a high added value of the paper. Moreover, the paper shows how simple models are very often able to reproduce accurately very complex natural behaviours. I think this is also remarkable as it highlights the importance of the parsimony principle in hydrology. Methodologically, the paper is well presented and structured. Hypothesis, results and conclusions are well addressed. Finally, from

the linguistic point of view, the paper is well written and so, easy to read.

The only special concern that I would like to comment has also been reported by referee A. Viglione in its review (comment 2) and refers to the spatial dimension of the problem. Maybe in the conclusion section a comment on it could be added, opening the way for further research.

Minor comments / Typographic errors

1. P2837 L5-16. Some parameters are not defined in the text and also some units are missing. In detail, parameters Mu, gamma, eta-0, and nu are not defined and units of parameters alpha ant tau-1 are missing.

2. P2837 L17-21. The m parameter is also undefined.

3. P2838 L12-14. In do not clearly understand why Eq. (7) turns into Eq. (9) when assumption 3.a is done. Maybe an additional explanation (or a reference?) could be added.

4. P2838 L15-18. Parameters r and K are not defined. As in the previous comment, should the authors consider that an additional explanation is needed for a better comprehension?

5. P.2839 L1. The total mosquito density, M(t) [with circumflex symbol] defined in Eqs. (11) and (12) is not defined in the text of assumption 4. Maybe (L1) can be rewritten as: "... we assume that the total mosquito density, M(t) [with circumflex symbol], is approximately..."

6. P2840 L23-24. Please add units to values provided for standard deviations: 0.84 °C and 4.19 °C.

7. P2842 L2. Subscripts of the second part of Eq. (20) should be lower case (i), shouldn't they?

8. P2842 L2. Subscripts of Eq. (21) should also be lower case (i), shouldn't they?

9. P2842 L18. In my opinion, the last sentence of this paragraph is not in the right place and closes this paragraph in a strange way (besides "nevertheless" could be more appropriate than "on the other hand"). In fact, the idea is well addressed in the results section, P2843 L10-11. So my suggestion (it's only a suggestion) is to remove this last sentence in P2842 L18.

10. P2844 L8-9. I suggest "...in the three times series..." instead of "...in all three of the times series..."

11. P2845 L1. I suggest "...with available climate and malaria data." instead of "...with the climate data and malaria data that were available."

12. Figure 2. I suppose that "the legend" is implicit in the black/grey colours used in both Y-axis. Nevertheless, I suggest adding a graphical legend (to be clearer).

13. Figure 2. This is absolutely a suggestion to improve quality; Insets are quite small and so easy to misinterpret. Maybe authors should consider splitting Figure 2 into 2 figures. In any case, units in insets axis should be added (at least, indicated in the figure caption).

14. Figure 3. Units in insets axis should be added (at least, indicated in the figure caption).