

## ***Interactive comment on “Monitoring temporary ponds dynamics in arid areas with remote sensing and spatial modelling” by V. Soti et al.***

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**GENERAL COMMENTS** The manuscript by Soti et al. presents hydrological modelling of ponds in the Ferlo Valley (Senegal). I found the paper interesting as it investigates the potentiality of remote sensing data to support hydrological modelling in data poor areas. However, the presentation of the work should be improved and some additional work is required. I report a list of specific comments that should be addressed.

### **SPECIFIC COMMENTS**

1) **Abstract & Title:** Abstract and title did not provide a clear indication of the main research questions or the original/innovative contribution of this paper. I recommend the authors to make these essential points more understandable. In my opinion, the paper

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is more on modelling and testing the utility of remote sensing data than monitoring.

2) Page 105 Lines 10-16: It might be worth mentioning the strong inverse relationship between spatial resolution and revisit time. Also, the authors might add some reference to ESA (European Space Agency) products such as ERS-2 SAR and ENVISAT-ASAR WSM imagery that have been recently proved to be very useful in flood monitoring (e.g. Schumann et al., Reviews of Geophysics, 2009).

3) Page 105 Lines 16-19: This sentence should be reformulated. It sounds as a general statement, but then a specific result, obtained for a specific region, is reported.

4) Page 109 Lines 5-7: It is not clear why this image is used for evaluating the maximum surface area. The paper should state here what is reported in page 114 line 9.

5) Page 109 Line 14: The authors should explain what they exactly mean by "usual events".

6) Page 110 Line 9: The balance equation is not entirely clear to me. This is partly due to the notation (see other comments below).

7) Pages 111-113: This part should be revised. Surely, it is not clear why the description of trivial volume-depth relationships is longer than the description of the hydrological model.

8) Page 114 Lines 11-20: I could not understand how the model was calibrated. Did the authors use the volume, the area or the water depths? Is Vobs the observed pond volume? Are there observations of pond volume? Why does Figure 5 plot the area? And why figure's caption states water heights?

9) Page 114 Line 6-7: Is this arbitrary (and rather questionable) assumption plausible? And is it actually necessary?

10) Pages 113-116: Perhaps, I have missed something, I could not understand exactly how the parameters were estimated, calibrated, evaluated, validated and then used for

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different ponds.

11) Equation 10: I think that the formula is not needed.

12) Page 117 Lines 16-18: The paper should state how the QuickBird image was processed to derive lake extent areas. Please note that different results can be obtained using different procedures (e.g. Di Baldassarre et al., Journal of Hydrology, 2009).

13) Page 117 Lines 18-20: It is not clear to me what type of correlation measure was used by the authors. The scientific literature provides many performance measures to compare observed areas to simulated areas (e.g. Horritt et al., Hydrological Processes, 2007), none of them seem to be used here.

14) Discussion & Conclusions: Given the way how good or poor outcomes are presented, they seem to be the result of fortunate or unfortunate coincidences. This is mainly due to the lack of a sensitivity analysis, as pointed out by the Anonymous Reviewer. Also, why the 2001 results are not showed? I do not understand the tendency to present only good results. In fact, I do not believe that nowadays the hydrological community reads HESS only to see how well a model developed 35 years ago fits observed data in a specific test site. I would recommend focussing more on the poor results. For instance, it might be interesting to know why the use of TRMM data for the 2001 event led to poor results.

15) I do believe that this paper should say more about the added value of remote sensing data in data scarce areas.

16) The English should be improved as well; I would recommend double checking the text before re-submission and ask a native speaker to proof read the manuscript.

17) In my opinion, the use of the personal form ("we" and "our") is redundant. Personally, I do not like the expressions as "in our study area" or the rather informal "as we can see".

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