The paper will be reconsidered after major revisions based on the reviewer comments and recommendations and the additional evaluation of the editor.

The paper has been reviewed by three experts in the field:

Reviewer 1 has major concerns regarding the synthetic nature of the study. Adding a real case study would elevate the impact of the study which is now quite weak. Reviewer 1 has also concerns about the the experimental design of this study ("Apparently, EnKF and PF differ from each other in concept. Comparing the performance of two approaches is hardly fair. I would be cautious about this kind of comparison.") Reviewer 1 would like to see a "more detailed explanation on the DA CLM setting up". Reviewer 1 also expressed concerns about the results shown ("I have some further concerns on the results presented").

Reviewer 2 has also doubts about the experimental setup and analysis of the results ("The experimental setup and analysis of the results contain a major flaw.").

Reviewer 3 also expressed similar concerns as reviewer 1 ("My first concern is related to the methodology. The EnKF and SIR particle filter described in this paper represent, in some sense, an inappropriate use of the two techniques; hence, all discussion on the improvement obtained by the SIR+PR filter relative to the first two techniques is not meaningful"). The second concern of reviewer 3 is "related to the overall presentation and clarification of the experimental design, result interpretation" as was also expressed by reviewer 1 and 2.

Editor comments:

The importance of parameter resampling for soil moisture data assimilation into hydrological models using the particle filter

By Plaza et al. HESS SI

General

In general I agree with the comments expressed by all the reviewers. I suggest that the authors leave out the comparison with EnKF or either make the comparison really meaningful. I also agree with the reviewers that the experimental design is not well described and unclear (see also my specific comments). It is very important to get a clear understanding of the experiment. At the moment, the justification of the error models is insufficient and needs more attention. Also Material & methods and the Results are interwoven together (see Reviewer 3 and specific comments below). The results must presented more clearly leaving no room for confusion as expressed by Reviewer 1, 2 and 3. Finally, if a real case is not possible the authors should at least discuss the limitations and promises of the method in relation to operational applications.

Specific

Page 3: I prefer putting 2+3+4+5+6 into material and methods section with subheadings site description, model description, experimental setup, assimilation algorithms
1 Introduction
2+3+4+5+6->
2 Materials and Methods
- 2.1 Site Description
- 2.2 Model description
- 2.3 Experimental Setup
- 2.4 Assimilation algorithms
  - 2.4.1-2.4.5 (move to Appendix ?)
  - 2.4.6 Sir filter with parameter resampling

7 ->
3 Results and Discussion section (with subheadings)
8 ->
4 Summary and Conclusions

Page3 line79-80: please clarify CLM2.0 model structure in more detail (coupling between land surface scheme and routing) and coupling with Hyd Model. It is necessary to understand the relation between parameters mentioned in table 1 and effects on soil moisture and discharge simulations.

Page 3 line 86-87: how realistic is this assumption <-> see also comment on justification of error model

Page 4 line 106: references (or/and) discussions is missing
Sequential assimilation of ERS-1 SAR data into a conceptual land surface-hydrological model using an extended kalman filter Francois et al JHM (2003)
Sequential assimilation of soil moisture and streamflow data in a conceptual rainfall-runoff model Aubert et al 2003 JH
Assimilation of soil moisture into hydrological models: the sequential method Aubert Can.J.Remote Sensing 2003

Page 4 line 121- … One of the most important steps is the definition of the stochastic model (error models). I think the justification of the error models is insufficient and needs more attention.
Page 4 where is the stochastic observation defined? Error model observation?
Page 5 line 139 -> Figure 5 is for which soil layer?
Page 5 line 143-150: model description is continued please move to right paragraph
Page 5 line 150-152: Results are presented under Materials and Methods -> Results and Discussion

Page 6: Not sure it is necessary to repeat the derivation of the EnKF and SIR in detail -> I suggest to move this to an appendix and only discuss Sir with parameter resampling

under Material and Methods section (or better leave out EnKF completely as suggested under the general section).

Page 9 Why use SIR and not RR which is more efficient (Chen and Liu + hydrological application in Weerts and El Serafy)

Page 11 line 338-340 / line 346-348: I know other approaches have been applied/developed combining state estimation and pf no references or justification is given for the chosen approach.

Page 12 Line 364-372 -> move to Material and Methods section under experimental setup

Page 12 line 375 what is meant by unsophisticated implementation?
Page 12 line 375-376 -> move to experimental setup

Formal Manuscript Rating and Recommendation

1) Scientific Significance
Does the manuscript represent a substantial contribution to scientific progress within the scope of this journal (substantial new concepts, ideas, methods, or data)?
0X Excellent 2X Good 1X Fair 0X Poor

2) Scientific Quality
Are the scientific approach and applied methods valid? Are the results discussed in an appropriate and balanced way (consideration of related work, including appropriate references)?
0X Excellent 1X Good 2X Fair 0X Poor

3) Presentation Quality
Are the scientific results and conclusions presented in a clear, concise, and well structured way (number and quality of figures/tables, appropriate use of English language)?
0X Excellent 2X Good 1X Fair 0X Poor

For final publication, the manuscript should be
0X accepted as is
0X accepted subject to technical corrections
0X accepted subject to minor revisions
3X reconsidered after major revisions
0X rejected

Albrecht Weerts