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Hydrology and Earth System Sciences
Discussions

Interactive comment on "ERA-Interim/Land: a global land water resources dataset" *by* G. Balsamo et al.

Anonymous Referee #1

Received and published: 13 December 2013

This manuscript is trying to demonstrate the advantage of the latest global land-surface dataset in representing different components of water cycle over land. This effort is highly applauded by the hydrology community. The manuscript generally makes the point clear that the ERA-Interim/land's products do over-perform the ERA-Interim's land surface products. However, in terms of the statement made in the abstract about the preservation of the closure of water balance, the manuscript doesn't present it out in a good way. Apart from that, a lot of inconsistencies and too-brief statements without supports can be seen throughout the manuscript. Therefore, it is suggested to have a major revision based on the current version. The major comments are listed as below:

1. The methodology and the datasets are not presented in details. In many places (as will be seen from the minor comments), the description of technical details is very

vague and not easy for readers to understand without relevant backgrounds. For example, what does it mean "09-21 h forecast intervals" or "03-12 forecast-range"? Such kind of inconsistency can be seen throughout the manuscript. It is suggested to check closely and to avoid such inconsistency, for a better demonstration of this particular study.

2. For the results, although many figures are presented, they are not explained enough in the text. Even though they are show cases, it is still important to analyze it in details for reader to understand why the result is demonstrating the advantage/disadvantage of using the new products. It is understood that intensive studies have been done for different components of water cycle separately. However, it is not wise to just mention the result very briefly by citing the references. More detailed explanation and analysis are highly suggested to give readers better hints why ERA-Interim/land is performing better. In this regard, the discussion on the comparison for snow cover did a good job.

3. Many acronyms are given without full expression for the first time usage. And, the inconsistency in Figures and abbreviations can be seen. For example, ERA-Interim/Land sometime is expressed as ERA-I/L, but not everywhere. In figure 6, the CDF is expressed as frequency while in figure11 it is expressed as CDF. Please check carefully and make sure the consistency throughout the manuscript.

Minor Comments: 1. Line 9 Page 5: It would be much clear to indicate which data set belongs to supporting and which to validation.

2. Line 24-25 Page 5: For readers not familiar with IFS, it'd be better to explain the forecast intervals a little bit more. For example, what is the difference among analyses, forecasts and accumulated forecasts? How 3 hourly surface fluxes are generated from the 09-21h forecast intervals? why 3 hourly surface fluxes can help avoiding possible spin-up effect?

3. Line 1 Page 6: Again, this part needs some more description for readers not familiar with ECMWF data.

4. Line 18 Page 6: OPI, the first time occurrence requires the full expression.

5. Line 26 Page 6: FLUXNET, the first time occurrence requires the full expression.

6. Line 2 Page 8: OZNET

7. Line 8 Page 8: SYNOP

8. Line 19 Page 9: 11yrs -> From which year to which year is 11 yrs?

9. Line 20-22, Page 9: I don't understand this sentence. Don't know how this is connected with the previous and the followed sentences.

10. Line 24 Page 11: Please check and explain, in Fig.1, how to distinguish the differences for mid-winter and mid-summer.

11. Line 4 Page 12: what does the label mean on the x-axis of both Figure 3 & 4?

12. Line 7-9 Page 12: Could you explain a bit more what kind of snow changes in Fig.4? Another point is that if you check the color bar, some color are the same for the reduction and the increase. This will confuse readers. Could you revise it?

13. Line9-10 Page 12: Why is this statement? Please detail.

14. Line 21 Page 12: It is clear that the skill of ERA-Interim/Land has been improved when compared to ERA-Interim. However, it is beneficial for readers/users to know why this improvement is, by explaining its physical mechanism, for example through mass balance or energy balance point of views. Although such kind of details can be inferred from previous publication by the author, it'd be much better to express them explicitly here to make the pare more readable.

15. Line 15-17 Page 13: Are you saying that for the same correlation coefficient (cc) the portion of ERA-Interim/Land river discharge at this cc level are much higher than that of ERA-Interim. If it is in this case, i found the statement here is confusing. Please rephrase.

Again, another point is that a detailed explanation may be needed to explain why the ERA-Interim/land is over-performing ERA-Interim all over the globe. Or even in more details, why over certain continent the skill of ERA-Interim/Land is higher than the other continents.

16. Line 19 Page 13: 'such as this (Pappenberger)...' please rephrase...

17. Line 26 Page 13: responding to variations of what?

18. Line 1 Page 14: Can we say slower soil layers?

19. Line 4 Page 15: Fig8. There is no explanation for Fig.8 in this paragraph. The caption only is not enough to see why is there an improvement, and how this can be used to interpret the capacity of reproducing soil moisture. For example, the difference between the ERA-I/L and ERA-I are increasing with the fraction of bare soil. Does it mean ERA-I/L has a higher RMSE over ERA-I always, and such difference increases with the increasing fraction of bare soil. Does it mean both schemes are working not properly over bare soil? Please clarify with more details.

20. Line 19 Page 15: USSR is the first time usage.

21. Line 5-7 Page 16: Could you expand/detail this statement?

22. Line 11 Page 16: (SDR=1 being the best) should not be repeated.

23. Line 20 Page 16: Please make sure the consistency between Figure 6 and Figure 11. The Figure 11 is much clearer than Figure 6 in presenting the better performance of ERA-I/L than that of ERA-I. Another point is that, sometime you use ERA-Interim/Land, sometime you use ERA-I/L. please make sure the consistency.

24. Line 26 Page 16: Why finally is needed here?

25. Line 1 Page 17: "... is more resilient...", 'more' compared to what?; "... in case snow abundance the SDR may favour a biased snow scheme...", Could you expand a bit on this? "... in forest areas", Is it specifically for forest areas only?

26. “. . . reduced albedo bias . . .”, Here, you assume MODIS land surface albedo is the "ground truth", Why is that? A bit more explanation would be appreciated.

27. Line 4-8 Page 18: This is too brief. It is encouraged to describe more on this part, as this is in the discussion section not the section of summary.

28. Line 5 Page 19: The comparison of the river discharge only is not enough to assess the water balance per se.

29. Line 8-11 Page 19: I didn’t see detailed or corresponding part of discussion on this point.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 14705, 2013.