

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

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The Authors wish to thank the Reviewer for the positive comments that state the contribution deserves to be published in HESS. We have addressed in the following the 8 minor points and the 4 editorial improvements identified in the review. A point by point response to Reviewer numbered comments and remarks follows (using Page number reference as proposed by the Reviewer, P. XXXXX) and our Reply (R:), which is reported after each comment:

1) P. 14712 (top): As far as I know, the French SMOSMANIA network has 21 stations. Why using 12 stations only?

R: This is true, however the period considered for the verification of soil moisture un-
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fortunately does not allow the use of the extended SMOSMANIA network.

2) P. 14712 (Sect. 2.1.6): The MODIS surface albedo is used for verification but nothing is said about the albedo calculation in the model. What are the drivers of the snow-free albedo in the model? I assume that in the real world, the seasonal and interannual variability of LAI and vegetation coverage are the main drivers of the snow-free albedo together with (probably) soil moisture.

R: Yes that is correct and it is the reason why in snow covered areas the Albedo can be used to extract information on the snow presence and to some extent on the snow-pack state (since snow metamorphism processes influence the snow albedo). The snow-free albedo is provided by the MODIS surface albedo product monthly climatology and is therefore appropriate for such a verification.

3) P. 14714 (Sect. 2.2.3): What about the interannual variability of LAI ?

R: The Interannual variability of Leaf-Area-Index is currently studied at ECMWF and not yet implemented in ERA-Interim/Land. This is added to the text as future development in the conclusive remarks.

4) P. 14715 (end of Sect. 2.2): While river discharge data are used to validate the model simulations, nothing is said about the river discharge calculation in the model.

R: The river discharge is obtained coupling the runoff generation to a river routing scheme used to obtain the river discharge on the outlet. A reference is added.

5) P. 14717, L. 13 (Fig. 6): Using the cc at a monthly time scale is not very demanding. Why not using the Nash skill score ?

R: The intent of the river discharge verification is to show continental scale indices and diagnostics. We agree that the Nash–Sutcliffe (NS) model efficiency coefficient is appropriate to assess the predictive power-skill of river model but this is outside the scope of the present paper. Here the aim is a water balance evaluation to assess the outflows from the ERA-Interim/Land. In such water balance evaluations the NS

may not in fact be the most appropriate tool, as we are considering continental scale runoff response, and not peak and low flow capture for individual rivers per se. The perspectives make reference to relevant work in which river-discharge verification is a central research theme.

6) P. 14718, L. 4: An average global volumetric soil moisture is given. It is unclear which quantity is represented, e.g. at which soil depth. Is the 0.23-0.24 m³m⁻³ value a key scientific result or a mere technical artefact? I tend to think that this is not a scientific result and this value should be removed.

R: The soil moisture mean value is provided to appreciate the spatial and temporal variability in the figure 1 and 3 respectively; this quantity has been calculated as the mean-global average soil moisture in the top 1-m of soil. Clarification added to the text.

7) P. 14719 (Fig. 10): From this Taylor diagram, I am not able to see any improvement related to the new dataset. If there is really an improvement, please use an appropriate method (clearer than a Taylor diagram) to show it.

R: The dynamical range is closer to the 1 SDV circle and the red symbols are generally indicating neutral to slightly improved soil moisture correlations depending on the networks.

8) P. 14721, L. 14: What about the interannual variability of LAI?

R: This is added as ongoing research is supporting the representation of Interannual LAI variability. The forecast impact coming from interannual variability of Leaf-Area-Index is currently studied at ECMWF and not yet implemented. The added sentence in the conclusions is: "Interannual variability of vegetation state (Leaf-Area-Index) is currently studied at ECMWF in the framework of the EU-FP7 project IMAGINES (<http://fp7-imagines.eu>) and it is not yet implemented in ERA-Interim/Land."

Minor/Editorial comments:

1) P. 14706 (abstract): The spatial resolution of the dataset should be mentioned here.

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R: The information on the horizontal resolution of about 80km and the 3-hourly frequency is added to the abstract.

2) P. 14721 (bottom): The works cited in this paragraph (Balsamo et al. 2007, Mahfouf et al. 2008, Drusch et al. 2012, Reichle et al. 2013) are missing in the reference list.

R: References added and corrected. Drusch et al. 2012 was Drusch et al. 2009 (GRL), and Reichle et al. 2014 (not 2013).

3) P. 14733 (Table 3, last column): "E" is undefined.

R: E is the mean unbiased Error, added on the table legend.

4) P. 14736 (Fig. 3): Little or no interannual variability can be seen, please adapt the color scale. The X-title is unreadable/unclear.

R: The color scale is chosen to have the same range for soil moisture and snow water equivalent. Since soil moisture is typically in the range 100-300 kg m⁻² it is true that the interannual variability cannot be fully appreciated. The Howmüller plots are well adapted to highlight the time dimension (related here to a 32-year global reanalysis available at high temporal frequency), but this kind of plot has intrinsic limitations for geographical attribution and interannual variability. The X-axis is the time dimension with dates at regular pace between 1979 and 2010.

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