

***Interactive comment on “Global runoff over  
1993–2009 estimated from coupled  
land-ocean-atmosphere water budgets and its  
relation with climate variability” by S. Munier et al.***

**Anonymous Referee #1**

Received and published: 5 June 2012

**General comments:**

Trends in river runoff are still uncertain. The authors calculate these trends from water budgets, which is a typical approach for global hydrological problems - but interestingly, the results from both the ocean water budget and the land water budget correspond well. The authors have correlated the time series of the estimated runoff with different climate indices. In the intertropical and in the northern regions, the runoff is most strongly correlated with ENSO and AMO.

The authors seem to have focussed strongly on the analysis of the input datasets and

C2061

the methods, but this is not adequately reflected in the title, abstract nor conclusion of the manuscript. In line with this, only 3 Figures out of 10 are considered as results in the current form of the manuscript. For these reasons, I recommend major revisions.

**Specific comments:**

A large part of the results section deals with thermal expansion. However, this aspect is missing in the introduction. In the conclusion, it is said "we used.... to propose an innovative method for providing a new estimate for TE". This needs to be addressed in the introduction.

In general, I think the manuscript could be improved very much if the introduction was more focussed on the topics addressed in this study - this needs major changes in the introduction part.

In the present manuscript, the implications of the results is not clear from the Conclusion section. Please add a paragraph on the implications for a broader scientific community or the society from your results.

The results from Section 4.1. and 4.2. are interesting and worth a publication. Unfortunately, the weighting of these results within the whole manuscript does not reflect the title - or the other way round. There are two ways of changing this:

Option 1): Reduce Section 3. Shorten it, and elaborate on the section called Results. More analyses and interpretation of the runoff time series would be needed.

Option 2): Change the title as well as the focus of the abstract. In this case, title and abstract should be focussing more on the approach than on the results. Example "Land-ocean-atmosphere water budget approach to estimate global runoff"

C2062

or something like that. I further suggest to put 3.2, 3.3, 3.4 and 3.5 under the Section "Results and Discussion". 3.1 goes to Section 2, which means also a change in the title of Sec.2, should now include "...and methods". I assume several minor text changes will be necessary to ensure the coherence and logic of the text.

These major changes in the structure of the manuscript would be much appreciated. If the authors decide not to do so, please justify your decision.

Page 4643, line14: The relation to El-Nino pops up rather unexpectedly here. Can you discuss this elsewhere? Can we see also the effect of other El Ninos? If not, why? Same on Page 4645, line9. Maybe, this deserves an own subsection or longer paragraph?

I do not see the point of having Figure 2b) and c) in the manuscript. Saying there is no significant contribution would be enough (maybe keep the figure in a Supplementary info).

**Technical corrections:**

Page 4634, line25: At the very end of the abstract, did you really mean "relevance" or rather "accuracy"?

Page 4637, line11: ...measurements...were available....

Page 4638, line8: ....study expands....

Page 4638, line19: "two methods (eq. 4 and eq. 5)" instead of RI and Ro only.

Page 4639, line1: Please write  $0.25^{\circ} \times 0.25^{\circ}$  instead of  $1/4$  to be consistent with how you wrote it on page 4641 ( $1.5^{\circ} \times 1.5^{\circ}$ )

Page 4641, line3: Please add 'Weather' to the long form of the acronym ECMWF, should read: European Centre for Medium-Range Weather Forecasts

C2063

Page 4641, line3: I suggest to cite Dee, D. et al. (2011): The ERA-Interim reanalysis: configuration and performance of the data assimilation system. Q.J.R. Meteorol. Soc., doi:10.1002/qj.828.

Page 4642, line25: "The mean standard deviation (RMS)..". Please correct.

Page 4643, line7 and 8: Delete "Eq."

Page 4653, line15: Reference Levitus 2009: Delete RID F-3211-2011 behind the title.

**Figures:**

Page 4657: If figure 2 is kept, please add 'ocean' to the figure legend ('mid latitude ocean' etc.). It can be understood faster.

Page 4658: Mean RMS over which years?

Page 4664: The axis in Figure 9 is quite unclear (Runoff in southern midlatitudes varying around -780 km<sup>3</sup>/month). Could you please set all 4 axis to zero, so that the variations can be read from the axis directly.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 4633, 2012.

C2064