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Hydrology and Earth System Sciences Discussions

Interactive comment on "Evaluation of satellite rainfall estimates over Ethiopian river basins" *by* T. G. Romilly and M. Gebremichael

Anonymous Referee #4

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This paper makes a useful contribution to comparing the performance of 3 satellite rainfall products over Ethiopia for the five year period 2003-2007. It is generally clear and well written, and the diagrams are relevant. A good overview is given on the topographical and landscape properties of the country. Unfortunately, this study seems to be the repetition of a previous study by Hirpa et al., 2009 with the only difference of extending the study area but not extending the reader's knowledge on important drivers and triggers that cause the herewith found results. Besides a stronger discussion of the results and extended interpretation, a clear recommendation in the end is missing, as to which product should be applied by the hydrological modeller (since this was apparently the motivation in the beginning according to Line 23 in the text), or even the development of a new -combined?- product. Also completely missing is a discussion

of the in-situ measurements, especially of their performances and discrepancies. With a little effort for error detection and correction, a lot more use could be made from that data. Overall, I am a little concerned about the chosen time unit: the analysis of five years of data on a monthly basis, and excluding the months October- February might not give a strong statistical significance. In general, I am convinced of the relevance of this topic and applicability of results to further studies and therefore support the publication of this paper after major revision.

Specific comments:

P7670 L2+L4 what is the difference between the basins and the regions / do they overlap / are they the same?

P7670 L16 "...the performance of the three SREs were found to be season independent" - how can this be assessd if the 'Bega' season (October - February) was not considered?

P7670 L22: I find the first sentence too general with regards to SREs being an alternative source for hydrological modeling, because many hydrological applications require longterm time series (30-100 years or more), which are not available from satellites. SREs can at most be a complimentary source (very valuable, no question).

P7672 L17 longterm is here misleading because I don't find 5 years to be longterm. At least the years 2003-2007 should then be stated in brackets.

P7673 L5 maybe a reference to section 2.3 could be included here

P7674 L 26 Fig 3 does not support the choice of the authors to exclude the Bega season in all catchments. This might have been a good choice in the Hirpa et al. 2009 study with the Awash basin, but the remaining basins show similar precipitation amounts as in the Belg or Kiremt season.

P7675 L 19 a stronger discussion of the rain gauge is necessary, e.g length of series for the different stations, performance, diagrams, trend-detection, ... Why was there

no effort made to fill gaps in the data? Especially since the 5 years x 12 months = 60months do not give many samples for a statistical analysis. Maybe an overview on discarded months could be given – do they cluster around specific dates?

P7676 L3 using a 5-year average seems to reduce the available data unnecessarily. Time lags in measured and satellite data could be discovered by other methods. Also the study of Hirpa et al, 2009, which is cited here does not give a reason for this methodology.

P7676 L21 how does time averaging minimize spatial errors?

P7677 L 6 "... when available, ground based data to update the ANNs" - was ground based data available? Was the rain gauge data set used here possibly part of it? Or was none available and is this one of the reasons for the relatively bad performance of PERSIANN over Ethiopia?

P7677 L16 especially for hydrological modeling, the annual cycle is very important. Why is this completely neglected here?

P7679 L2 please give the formula for the bias ratio, or at least explain how this metric is to be read.

P7680 L9 does the bias ratio as a function of elevation also have an indication on the rain gauge data? Especially since in river basins with less complex topography, this impact decreases? Does it rather explain biases in measurements than in satellite data?

P7681 extend conclusions.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 7669, 2010.