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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Spatial evapotranspiration, rainfall and land use data in water accounting – Part 2: Reliability of water accounting results for policy decisions in the Awash basin" *by* P. Karimi et al.

Anonymous Referee #1

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This is an interesting paper shows the application of the WA+ to the Awash basin in Ethiopia. The paper attempted to assess the uncertainty involved to support decision making for water resources management at a river basin scale. My main comments on the paper, it still lacks giving accurate assessment of the uncertainty for the decision making. While emphasizing advantages of satellite measurements, the paper misses to discuss accuracy of ground measurements, at least for runoff as the most viable method for checking a closure of water balance in a river basin. Detailed comments:

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-P 1126, 18, 19: low reliability of utilized flow, and basin closure fraction? This conclusion of the abstract needs to be clarified further. In fact basin closure is a measure to the water balance closure, if it has high uncertainty it indicates large error of the runoff (blue water). The error seems small for other fractions and water balance components, e.g., rainfall and ET, because typically these are much higher than runoff in river basins such as Awash.

- P1127, l 7: " . . .. and the data quality from field observatories is questionable", this general statement may not be correct, e.g., runoff measurements can be accurate, and vital term to check the accuracy of the water balance.

- P1127, l 19: " . . .. the average error in land use, precipitation and ET is was 14.5, 18.5, and 5.4% respectively? For which time step. Discuss high accuracy of P, and ET.

- P1127, l 19: " . . .. Such errors are not worse than classical ground based observations? Too general statement, and may not be accurate.

- P 1128, l4: " . . .. river and canal discharge is often based on water levels or the sound of water flow, rather than direct measurements? This statement is not accurate – a discharge derived from discharge rating curve can be considered as measured flow.

- P 1129, first and 2nd paragraph: too detailed description on groundwater, while also missing other important features, e.g., land use land cover.

- P 1130, l 8: do you mean GDP of Ethiopia? Please mention in the text.

- P 1134, l 23: define "agricultural production" and give examples.

- P1135, l18, why number of MC runs is specifically 1000, explain.

- P1136, l2, on what bases is the "constant correction factor", will it not affect the error analysis then?

- P1136, l9: does standard deviation for rainfall or ET, derived from 3 values, give any

HESSD
11, C510–C512, 2014

meaningful information?

- P1137, l20: “The only possible outlet is underground basin discharge”. This assumes no error in P, or ET, so that the closure of the water balance minus runoff must be groundwater recharge. This is not an accurate conclusion, and need to be supported by first confirming accuracy of both P and ET.

- P1138, l4: the assumption of 50% change needs to be supported.

- P1138, l14 such assumptions “If we assume that one-third of rainfall surplus ...”, cannot lead to the conclusion given earlier that satellite measurements can be more accurate than ground measurements, see related comments given above.

- P1140, l10: would be good to briefly describe the method of error analysis here for reference.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 1125, 2014.