



## ***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 #2**

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The paper is basically a study of how uncertainties in remote sensing data translate to uncertainties in a number of hydrological variables and indicators. This is interesting in itself; it is not clear what the outcomes say about the proposed water accounting sheets. The usefulness of many of the proposed indicators should follow from the relevance they have for decision making. The fact that there are uncertainties is problematic and should be dealt with, but the absence (presence) of uncertainties does not add to (subtract from) the usefulness of the proposed accounting framework.

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I have three major comments:

1. What is the value of annual data on all the indicators presented and estimates of the inaccuracy in the annual data given that water scarcity manifests itself within the year, in specific months?
2. As for me there are a lot of questions on definitions of terms and indicators used in Tables 2-3 and Figs. 5-7. I will detail those questions below.
3. I am puzzled by the conclusion that it is recommended not to use the estimated “utilized flow” and “basin closure fraction” in policy decisions because of the low reliability of the estimates. These indicators are among the most important indicators, more relevant than the underlying variables such as P, ET etc. I can well imagine that uncertainties accrue in top-level indicators, but is the presence of uncertainties a reason not to base decisions on these indicators? In the end they may be more inaccurate, but they are most relevant.

Detailed comments:

p.1127 line 1-4: Why speak about WA and WA Plus? Simply based on the chosen term it is suggested that WA+ is better than WA, while it seems to me that in many cases WA Plus is complementary to WA, rather than an alternative. The two accounting systems are based on different sources (field measurements versus remote sensing images); I guess that these sources enrich each other in terms of the information they provide.

Section 2.2: Nothing is said on the required temporal and spatial resolution level of the data on the four sheets. Later on it appears to me that all data are presented on annual basis. This is a poor basis for decision making, since water use, availability and scarcity strongly vary within the year.

p.1140 line 14 & Fig. 8: I don’t understand the two lower graphs in the figure. What is on the x-axes of these two figures? I understand that there is a normal distribution of P and ET (the two upper graphs), but I don’t see what is meant by the “distribution of the

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area of irrigated crops”, let alone that I understand that this is a bi-modal distribution.

Table 1: it would be useful to specify the period considered when providing numbers for “long-term” P and ET.

Comments on terms in Table 2:

- I find the term “exploitable water” a dubious term. From Fig.5 I see that it is simply defined as “runoff”, so why not call it runoff then? It’s a dubious term, because in practice one cannot exploit all runoff, there will always be flows that are difficult or impossible to capture, e.g. flood flows or deep underground runoff flows. In the proposed terminology, they make the difference between “exploitable” and “available” water, but I don’t think this terminology is clear. To me it seems that “available” encompasses more than “exploitable”, but it appears to be just the opposite.

- What is the temporal unit for dS? Is that daily, monthly, annual?

- The definition of “available water” is rather unclear. Fig.5 gives some more info, but what are “reserved outflows” and “non-utilizable flow”? Without clear definitions on how to calculate those variables, the terms remain empty. Reserved by law, by policy...? Environmental flows are generally not well protected, so in practice this means that they are not “reserved” in any formal sense and thus “available”. It is necessary to clearly define non-utilizable outflow.

- The reserved outflow fraction (=reserved outflow/outflow) doesn’t indicate the degree of meeting the flows set aside for interbasin transfer etc., it measures the fraction of outflow reserved for interbasin transfer etc.

Comments on Table 3:

- The term “managed ET” is unclear. According to the explanation a better term would be “manageable ET”, but then still it’s unclear what is understood under ET that can be managed (manipulated). ET can decrease and increase as a result of a great variety of human factors, some of which are likely to occur, others less likely.

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- The irrigated ET fraction equals (ET in irrigated agriculture) / (ET in total agriculture). Is this what is meant indeed? Or is it more useful to look at the ratio: (ET of blue water in agriculture) / (total ET in agriculture)?

Comments on terms in Fig.5:

- I assume that “managed water use” refers to net water withdrawal (consumptive water use, blue water footprint). Would be useful to refer to the other, more commonly used terms.

Comments on terms in Fig.6:

- What is beneficial E?

- What is non-beneficial T?

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