General comments:

With delight I read through this paper. The authors made great efforts to summarize the current situation of reliability and errors of remote sensing data in ET, rainfall and land use. This study will benefit the science community and will be appreciated by the peers. The subject is within the scope of HESS, the paper is clearly structured and the story line is straight forward, and the tables are well designed and informative. At the same time, to make this paper more ambitious and more profitable for the community, further concerns need to be addressed before consideration of publication at HESS. I recommend **acceptance after moderate revision**.

Specific comments:

1. There is a lack of section presenting the directions or recommendations of future work in this field. This section is a necessary part of a review paper, to guide the peers or young generation to better advance science.

2. To further enrich the merits of this study, a summary of recommended remote sensing data and methods on ET, rainfall and land use for different regions (e.g. continental scale or small region) and different research tasks (e.g. focus on hydrological processes or on human-land-atmosphere interactions) is desirable. Although it is apparent that there is huge heterogeneity across the globe, it is still possible to give some recommendations or directions. Sometimes the researchers are overwhelmed by a long list of data and methods, and might struggle for choosing the appropriate one, and there is a big space for the authors to fill. I leave this to the authors on how to benefit a broader range of readers.

3. Interpretation of PDF is problematic. The distribution of figure 1 and figure 2 tends to be an exponential distribution rather than a skewed normal distribution, but the authors imposed a skewed normal distribution to fit the histogram. Do you have sufficient evidences to support this imposition? You should be very cautious to make that kind of imposition, as it would be very easily complained by statisticians. Consequently, the interpretation of the PDF should also be careful.

4. The measure variables of errors or accuracy should be widely-accepted, or specifically defined, and consistent throughout the paper. The term “error”, “absolute error”, “deviation” show up multiple times in the paper, it is not very clear for their statistical meaning as they are kind of vague, please define these

terms clearly in the paper or use widely-accepted statistical terms such as mean percentage error (MPE), mean absolute percentage error (MAPE), standard error (SE), and keep these terms consistent throughout the paper.

5. There are a bunch of studies using triangle method for estimating ET (e.g. review paper by Toby Carlson (2007, Sensors)), the authors might want to lump it with trapezoid method.

6. The uncertainties of measurements should be taken into consideration when you summarize the accuracy of different methods and RS products. For example, the uncertainties of ET measurements at eddy covariance flux tower are up to 30%, and the wind-induced precipitation under-catch for precipitation measurements in the Northern High Latitudes is prevalent.

7. Page 1085, line 2, what does "seasonal ET" exactly mean here? For each record of Table A1, do you calculate mean percentage error (MPE) for monthly ET or ET during growing season or annual ET? What does "Deviation (%)" in Table A1 exactly stand for (link to aforementioned comment 4)? In statistics, "deviation" stands for the difference between the value of an observation and the mean of the population, it is a measure variable having unit rather than a percentage in a normal case. It is not clear for the calculation process, please specify explicitly. Besides, adding information of time step of measured ET for each record in Table A1 might be helpful.

Technical corrections:

1. Page 1074, line 21, Vörösmarty et al (2010, Nature) is a good paper to cite.

2. Clear definition of the term "water accounting" for a broad range of readers is necessary.

3. Page 1075, line 21, "land use" is not a commonly accepted hydrological variable, although it is an input variable for WA+, please be careful when you phrase it.

4. Page 1086, line 5, it is not clear what does the "spatial layers of ET maps" exactly refer to, please specify or rephrase it.

5. Page 1086, line 7, the reference Muthuwatte et al. (2013) is not included in the reference list.

6. Page 1086, line 23, it is better to use “2%, 8%, 12%” than “2, 8, 12” here, similar case for page 1087 line 23.

7. Page 1116 and page 1117, Table B1, the field “Deviation” is not clear. Or you can use an alternative term, and the term should be explicitly defined or be widely accepted statistical term.