

1. Water budget method is actually not water budget, it is actually a water balance method. Budget term often means storage, but in your method only soil moisture is a budget term, other terms (evaporation, percolation, irrigation) are all flux terms. So it is suitable to name it as water balance method.
2. The paragraph starting from L62: the author should pay attention to the following work, which has utilized measurement of soil moisture and ET (by Eddy Covariance) to estimate deep percolation. Zhang, Z., Hu, H., Tian, F., Yao, X., and Sivapalan, M.: Groundwater dynamics under water-saving irrigation and implications for sustainable water management in an oasis: Tarim River basin of western China, *Hydrol. Earth Syst. Sci.*, 18, 3951-3967, doi:10.5194/hess-18-3951-2014, 2014.
3. The paragraph starting from L121, it is redundant to describe the field experiment in terms of cropping effect on soil property, because the main target of this study is to explore the flux estimation by using water budget methods.
4. The paragraph from L139, more details on irrigation should be given because of its importance, e.g., irrigation method, timing, irrigation quota, during, etc. Table is preferred.
5. Section 2.3 1), it is unclear how to decide percolation. It is confusing to say deep percolation begins after soil moisture storage reaches its maximum (I assume it is  $S_{max}$ ) but to say for a specific case percolation occurs after  $S_{max}$  occurs. It is unclear in Fig2(b) how to determine the timing when percolation starts.
6. When the authors adopt Richards Equation to calculate slow drainage term, a lot of uncertainty related with soil hydraulic parameters are introduced. How do the authors deal with this uncertainty?
7. The title should be something like: quantification of soil water balance components based on continuous soil moisture measurement and Richards equation
8. In 4.3, I don't think it is necessary to discuss the impact of cropping system on soil property. It is irrelevant to the topic.
9. Line 485 - 487, the statement is true. For the extreme case, irrigation lasts throughout the growing season with very small irrigation intensity, which should mean water can only wet surface thin soil layer and it cannot support water to crop root. Also, you should consider the salinity issue. See the discussion in Gao Long, Tian Fuqiang, Ni Guangheng, Hu Heping. Experimental study on soil water and salt movement and irrigation scheduling for cotton under mulched drip irrigation condition. *Journal of Hydraulic Engineering*, 2010, 41(12):1158-1165. (in Chinese)
10. P16: it is hard to understanding the statement 'irrigation is challenge to measure'.
11. P25, published SWBCs values at nearly sites: how accuracy are the published SWBCs? How are these values obtained?
12. P54, in this region. The authors should not be specific to Heihe River basin. If you argue the method to be applicable to arid areas, you should discuss the issue in wider areas especially other similar regions like Tarim River Basin in China and Aral Sea Basin in Central Asia as examples. See the following for reference. Fuqiang Tian, You Lu, Hongchang Hu, Wolfgang Kinzelbach & Murugesu Sivapalan (2019): Dynamics and driving mechanisms of asymmetric human water consumption during alternating wet and dry periods, *Hydrological Sciences Journal*, DOI: 10.1080/02626667.2019.1588972