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Discussions

Interactive comment on "Vegetation dynamics and climate seasonality jointly control the interannual catchment water balance in the Loess Plateau under the Budyko framework" *by* Tingting Ning et al.

Anonymous Referee #1

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Budyko hypothesis, as an important tool to study water and energy balance in catchments, has been developed and enriched in the past few decades. In recent years, it regains researchers' attention as a necessary to examine the changes in catchment landscapes and hydrological conditions given the impacts from climate change and intensified anthropogenic activities. Based on the previous researches - interpreting basin water balance by relating either to vegetation dynamics or to climate seasonality, this article considers both as key factors to drive water balance variations, and comes up with a new two-factors-coupled parameterization scheme for the index 'oumiga' in the Fu's equation under Budyko framework. The innovation of this work lying at provid-

ing an integrated angle to estimate regional water balance.

General comments: 1. Usually, the Budyko framework is used in long-term scale so that the water storage change can be ignored. It is a big challenge to apply this framework in interannual catchment water balance. The hydrological year is better than the calendar year, but it is not enough. In present researches, the parameter, such as oumiga, was determined for each catchments then the relation between this parameter and other factors, such vegetation, landscape and climate characteristics were discussed. For example, Li et al. published in WRR in 2013. Therefore, my advice is to set up the relation between oumiga and M and S based on the long-term water balance for the 13 catchments then to discuss the contribution of different part to the runoff change. 2. For the contribution analysis, it is better to divide the whole period into two periods, for example, before 1980 and after 1980. A, B and C in Equation 5 can be estimated by the P, ET0 and oumiga of the whole period. Then deltaP=P2-P1, deltaET0=ET02-ET01, delta oumiga = oumiga 2- oumiga 1. After that, the contribution of P, ET0 and oumiga can be estimated. 3. It is better to analyze the trend of runoff and climate factors with MK test.

Special comments: 1. Please give more detail about the climate seasonality index (S). 2. L225, "out of phase", "out phase", which one is right? 3. L237, just from 0.45 to 0.51, it is not a significant improvement. 4. L242, crossing-validation is not a good choice here because each catchments has its own characteristics, so it can not be validated by other catchments. 5. keep all the panels (including the label, range and scale of x/y-axis) within a figure be consistent. Have a close look at the Fig 2-4. 6. It may be better to replace Fig 3 and 4 by a table show R2 with a certain category. The original figures could be provided as supplementary documents. 7. Table 4, "Relative contributions of vegetation change and climate seasonality to ET trends for each basin", which miss out the contributors from "ET0 and P". 8. For reading convenience, better to insert the ordering number according to the ordering system given in Fig1 and Table1 in the text when mentioning a particular basin in Results.

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