

## ***Interactive comment on “Separating the effects of changes in land cover and climate: a hydro-meteorological analysis of the past 60 yr in Saxony, Germany” by M. Renner et al.***

**Anonymous Referee #1**

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In this study, a new approach is proposed to separate climate change and land surface change related evapotranspiration in the  $E/E_0 \sim E/P$  space, and applied to case study watersheds with land use changes. The paper is well written except the assumption of the method. “The orthogonality assumption states that the climate change direction is perpendicular to the aridity index line on  $(q_0, f_0)$ .” This is the foundation of the developed method. More discussion or reasoning needs to be added for this assumption. For example, what is the basis that the climate change direction is perpendicular to the aridity index line on  $(q_0, f_0)$ ? Why not perpendicular to the aridity index line on  $(q_1, f_1)$ ? If the Budyko-type equation is plotted in the  $f$ - $q$  space, will it be perpendicular to

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the equal  $E_0/P$  lines?

The assumption is based on the “symmetry of water or energy limitation” (such as lines 13-15 on page 8542; lines 19-20 on page 8543). The “symmetry” is not clear and needs to be explained explicitly.

1. Line 27 on page 8542:  $E_0/P=1$ ? 2. Caption of Fig 1: change “ $P_0=1400$  mm” to “ $P_1=1400$  mm”? 3. Line 25 on page 8543: absolute value in numerator? 4. Line 16 on page 8544: “observations are outside physical limits, . . .” not clear 5. Lines 17-18 on page 8544: “Also note that the methods uncertainty with respect to climatic changes increases with hydro-climatic states close to the water or energy limits.” Why? Is it due to the larger estimated climate related changed ET? 6. Lines 21-22 on page 8544: “. . .outside the limits.” Do you mean  $E>E_0$  or  $E>P$ ? Theoretically  $E>E_0$  won’t happen (it can happen due to uncertainty of the data of  $E$  and  $E_0$ ). If  $E>P$  happens, precipitation is not the only water supply (i.e., the water supply is not accurately quantified). 7. Delete lines 7-8 on pages 8549. 8. Line 7 on page 8556: delete “approximately”?

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