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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Land-use changes reinforce the impacts of climate change on annual runoff dynamics in a southeast China coastal watershed" *by* A. Ervinia et al.

Anonymous Referee #1

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This study tries to quantify relative contributions of land change to runoff changes over two watersheds in southeastern China. I found that the methodology has some problems and the conclusion and explanation over some of the results are not right. The following please find my detailed comments.

Fig. 3: left panels: what are the columns in GRAY? Since the time along the x-axis is not continuous, it'd better not linking the data points between neighboring period with lines (i.e. precipitation and runoff curves).

p6313, L10: what is the number "0.430"? p6314, L2-L6: I cannot see the linkage

between evaporation and runoff response to precipitation neither from Fig. 3 nor from equation 15. Authors need further explain this claim. Actually, lower "a" and lower "b" means lower runoff and higher ET according to this equation. p6314: L 7-8: is the difference in parameter "a" between these two watersheds statically significant (i.e. the t-test result)? p6314: L18-19: I think the opposite is right: i.e. higher "a" and "b" indicate decreasing ET.

p6315: L3-5: This conclusion seems not right. According to equations 8-11, we can get the following equation: delta(L/P) = -delta(R/P) + delta(exp(-alfa/P). If the second term do not change (i.e. equals zero), the delta(L/P) is exactly the same as delta(R/P) but with an opposite sign. According to equation 5, alfa is E0/P which will be related with P, T, and Ra; according to equation 15, alfa might be b*alfa of which "b" is estimated from regression. So from figure 4 we can only get the conclusion that the term "b*alfa" (i.e. climate factor) has minor effects. Authors need explain with more details about the linkages between "deforestation" with "increasing annual river runoff". Authors also need to clarify in equation 10 if the alfa is adjusted/regressed (equation 15) or not.

Fig. 4 is confusing. In this figure L is evaporation from land change, while R is actual run off change (climate + land change). It's better to use the same variable such as delta(R) from land change and delta(R) from all change, etc.

Fig. 5 and P6315: L6-9: the naming of "dry" and "wet" years in this manuscript is not consistent with common sense. Authors may need a special term for this concept. Here, I think authors is using "dry year" and "wet year" as the period with decreasing and increasing trend in runoff, respectively. While in each period, authors calculate the relative contribution with equations 12-14 & 7. This paragraph may need rephrase.

Fig. 3 indicates that the relationship between runoff and precipitation and aridity index has large variations during different time period; while the authors use more simpler equation (i.e. equation 10) to count for the climate-induced ET (so to runoff), which may introduce much uncertainties to explain all the remnant changes (i.e. actual runoff

minus. climate-induced runoff) to land-caused change.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 6305, 2015.