Dear S. Liu,

We are very grateful receiving the positive comments and constructive questions from you in order to improve the quality of our manuscript. In the following pages are point-by-point responses to each of the comments and questions.

2.3. Temporal trend of hydro-climatic variables could be simplified.

Part 2.3 has been simplified. It was written as: Regression analysis was used to examine the annual trend of hydro-climatic variability during 1961–2013. Increasing or decreasing tendency of hydro-climatic variability was identified from b value Eq. (1). Positive b value indicated hydro-climatic parameter has been increased over time. In contrast, negative b value demonstrated hydro-climatic has been decreased over time. The change is significant when p value< 0.05 (confidence level of 95 %). We modified it into: *The annual trend of hydro-climatic variability is evaluated using regression analysis. The sign in b value explain the trend, either increasing or decreasing. The trend is statistically significant when p-value of b less than the significance level of 5%.*

2.4 Some equations could be merged

Equation (2) and (3) are merged into equation (a).

$$P = E + R + \frac{\Delta S}{\Delta t} \tag{2}$$

$$R = P - E \tag{3}$$

$$R = P - E - \frac{\Delta S}{\Delta t} \tag{a}$$

And also equation (4) and (5) are combined to get equation (b).

$$\alpha = \frac{E_o}{P} \tag{5}$$

$$E_o = 0.0023 \times R_a \times \left(T_m + 17.8\right) \times \sqrt{T_{\max} - T_{\min}} \tag{6}$$

$$\alpha = \frac{E_o}{P} = \frac{0.0023 \times R_a \times \left(T_m + 17.8\right) \times \sqrt{T_{\max} - T_{\min}}}{P} \tag{b}$$

In the methods part, how to get the land use data?

Land use data of Jiulong River Watershed is obtained from Huang et al. (2012) and Zhou et al. (2014) of which both used Landsat Thematic Mapper satellite images of 1986, 1996, 2002, 2007, and 2010. The Landsat TM maps were classified into three categories namely Agriculture, Natural, and Built. The changes in land-cover maps derived from satellite images acquired on different dates were calculated using post-classification comparison method.

P 6314, Line 22-27 could be put in the methods part.

Thanks for the suggestion. We will put the explanation of the L-R diagram written in P 6314: L22-27 in the method part 2.5.

How do the land use change distributions affect the runoff? Some discussions could be put forward.

Each type of land-use has a varying effect on the hydrological process in a catchment. In area occupied by forest and dense vegetation, much of water is likely to saturate on the ground rather than drain directly into the river. Vegetation tends to hold and allow water to infiltrate and evaporate for a longer duration before reaching the downstream. Changes in natural landscape of watershed may bring profound effects on hydrological process (i.e. water quantity and quality). Many watersheds have experienced the increase in annual runoff due to deforestation, leading to complex environmental problem such as flooding and water erosion. Cutting out the forest area converted to other uses such as agriculture land or built up area has reduced watershed ability of holding the water especially during period of intense precipitation. Land-use transition into built up area recently become more intensive in the coastal area, following the rapid economic development in this region. Increase in impervious surfaces attributed to expansion of built up area will prevent water to seep into the soil, thereby generating higher runoff.

References

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