Reviewers' comments (Anonymous Referee #1)	My reply	Implementation process
Reviewer #1:		
1. Threshold Selection. Please provide information on threshold selection. Why the authors select a fixed threshold (Mean Monthly Flow, MMF if I understood correctly). Why a variable threshold method is not selected for this study (e.g. Van Loon, 2015)? I would expect from the authors to use a monthly varying threshold for this type of presented analysis. Please justify this issue on the revised manuscript.	I'm so sorry! Maybe my expression is not clear enough. This threshold is both fixed and variable. (1) The purpose of this study is to explore the temporal and spatial distribution, and the driving mechanism of hydrologic droughts in 2000-2010. (2) Hydrological data is an annual minimum monthly average runoff from January 2000 to December 2010. (3) The Formulas 1 and 2 are modified as follows: $RDSI_{ij} = LD \times DI_{ij}$ $DI_{ij} = \frac{X_{ij} - \overline{X}_j}{\overline{X}_j}$ Where $RDSI_{ij}$ is the Relative Drought Severity Index of the ith year, jth research area (i=1,2,…,11;j=1,2,…,40). *LD* is the relative drought duration within a year; (valued as 1/12 in this paper). DI_{ij} is the relative water deficit of the ith year, jth research area. X_{ij} is the minimum monthly flow of the ith year,	The Formulas 1 and 2 are modified as follows: $RDSI_{ij} = LD \times DI_{ij}$ $DI_{ij} = \frac{X_{ij} - \overline{X}_j}{\overline{X}_j}$ Where $RDSI_{ij}$ is the Relative Drought Severity Index of the ith year, jth research area (i=1,2,…,11;j=1,2,…,40). *LD* is the relative drought duration within a year; (valued as 1/12 in this paper). DI_{ij} is the relative water deficit of the ith year, jth research area. X_{ij} is the minimum monthly flow of the ith year, jth research area. $\overline{X}_j$ is the minimum monthly mean flow of the jth research area from 2000 to 2010. Viz., the

	jth research area. $\overline{X}_j$ is the minimum monthly mean flow of the jth research area from 2000 to 2010. Viz., the truncation level (threshold value). (4)It can be concluded from the formulas 1 and 2 that the threshold ($\overline{X}_j$) is the same in different years of the same research area, while the $\overline{X}_j$ and $\overline{X}_{j+1}$ in different research areas are variable. Therefore, it can be said that the threshold ($\overline{X}_j$) is both fixed and variable.	truncation level (threshold value).
2. Regional Analysis (Page 5 and 6 of the manuscript). Please explain how the regional analysis is performed? The authors use the MMMF index? "And taking the MMMF of sampling sites as Y axis and the series of sampling sites as X axis". Is MMMF a regional index and how is derived? Is it the mean? Do you think that the mean index is representative considering the small dataset of 10 years? I would suggest to use an unbiased index if of course is it possible (maybe the median of the sites?). Please address this issue on the revised manuscript.	I'm so sorry. My expression is still not clear enough. (1) The MMMF is not a regional index but a minimum monthly mean flow. (2) This study is to explore the characteristics of hydrological droughts from 2000 to 2010, while hydrological drought often occurs in the low-flow season. For the minimum monthly runoff from 2000 to 2010, used as a drought identification standard or indicator is only the mean flow of the 11 years. (3)Therefore, I think that it is feasible to identify the hydrological droughts using the minimum monthly mean flow of the 11 years.	
3. Standardization procedure of runoff index. (Equation 2 application). Please explain in detail	(1)Sorry, the expert may have misunderstood the expression of formula 2.	

the standardization procedure of the DI (the relative water deficit). Equation 2 is valid only when the variables are close to nornal distribution. This should be addressed in the revised manuscript. For example several theoretical distributions could be tested on DI values or if the data do not follow nornal distribution normalization techniques could be followed (i.e. Box-Cox transformation in Vasiliades et al., 2011). Furthermore, please take into account in your analysis the small temporal dataset in your analysis. Usually >30 years are needed to derive drought indices. Therefore, I am quite skeptical with the use of the term with the mean in Equation 2. I would recommend to the authors to use a non-parametric approach in their study due to small dataset in the derivation of the standardized index or to use a Box-Cox transformation to resemble the normal distribution. Please address this issue in the revised manuscript.	(2)The formula 2 is the relative water deficit of minimum month in the ith year, jth research area. (3) The commonly used standardized processing formula is $X^* = \frac{X - E(X)}{\sigma(X)}$ .Where X^* is a standardized random variable; $E(X)$ is a mathematical expectation of the random variable X; $\sigma(X)$ is a standard deviation of the random variable X. (4) Therefore, through the above analysis, I think that the selected data does not need to consider whether or not it obeys the normal distribution. For questions raised by experts: " Usually >30 years are needed to derive drought indices ". I think that: (1) In terms of data volume, the amount of data is a little less if we only selected the rainfall and runoff data from 2000 to 2010. But this study selected the 40 research areas, and each of which selected the 11 years' rainfall and runoff data of the minimum month. So the total data: 40 × 11 = 440, it is enough for the amount of data from this point of view.(2)The purpose of the study is to explore the characteristics of temporal and spatial distribution of hydrological droughts from 2000 to 2010, and to reveal the mechanism of hydrological droughts from the point of view of the geomorphology. Therefore, the selected	

	data in this paper is both acceptable and sufficient.	
4. Correlation analysis between standardized runoff index and geomorphologic indices. Please provide evidence that the employed indices follow the normal distribution.This must be demonstrated in the revised manuscript (a correlation matrix could be useful on this). If this is not the case different evaluation techniques could be followed (e.g. nonlinear techniques based on the mutual information and/or partial mutual information, non-parametric statistical tests (Kendall's tau and Spearman's rho rank correlation coefficients could be used as alternatives of the Pearson coefficient).	I don't quite understand the questions raised by the expert "the employed indices follow the normal distribution ". (1) Purely from a mathematical point of view, any two sets of data can be to make the correlation analysis. Only the correlation is linear or non-linear. (2) Before carrying out correlation analysis for the two sets of data, we must first analyze whether there is an intrinsic relationship between the two sets of data. If there is not the intrinsic relationship for the two sets of data, even if the correlation coefficient is high, it does not make sense. (3) This paper first selected 40 typical research areas in Guizhou Province, China. We counted the monthly runoff and rainfall data for each study area, at the same time, extracted the geomorphological index. (4)Therefore, there is an intrinsic relationship from the geographic point of view between rainfall, landform type, and runoff. the correlation analysis can be carried out, and the magnitude of the correlation coefficient reflects the level of intrinsic relationships between factors.	
5. since several frameworks have been developed to account nonstationarity (like the Generalized Additive Models for Location, Scale and Shape parameters, GAMLSS) could be included in the revised manuscript for comparison purposes. I would suggest to the authors to use their models	I'm so sorry. I don't quite understand why the expert proposes to consider "nonstationarity". (1) This paper only selected data for a total of 11 years from 2000 to 2010. The time span of the data is not too long and the data should be relatively stable. (2) The 40 research areas selected in this paper are mainly	

with linear, quadratic and cubic terms in time to demonstrate that the employed models are appropriate and could be used subsequently in the simulation experiments.	affected by natural factors. Or the 40 research areas in these 11 years, their underlying surface medium factors have not changed or changed little. (3) In summary, I think that there is no need to use other models for analysis.	
Minor Comments		
6. Line 95 - Previous works of the authors. The authors should explain in detail the novelty of this study in comparison with the previous works of the authors. A paragraph explaining the differences from these previous works should be included in the manuscript.	The novelty of this study is to reveal the driving mechanism of hydrologic droughts from the point of view of secondary distribution of precipitation by landform combination. Our previous works mainly focused on the study of hydrologic drought mechanisms from the point of view of land use types, soil cover types, and lithologic combination types.	
7. Lines 97-98. Correct the reference in the manuscript “Feng, 1997 & 1997”.	Thanks.	I have revised the paper according to the Reviewers’ comments. For more, please see "the Blue Font Sections" on the revised manuscript.
8. Line 169. Correct the reference “Feng et al., 1997” in the text or in the bibliography list. There is not Feng et al., 1997 in the reference list.	Thanks.	I have revised the paper according to the Reviewers’ comments. For more, please see "the Blue Font Sections" on the revised manuscript.