

## ***Interactive comment on “Spatial and Temporal Pattern of Drought Hazard under Different RCP Scenarios for China in the 21<sup>st</sup> century” by Tao Pan et al.***

**Tao Pan et al.**

chenj.16s@igsnrr.ac.cn

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Dear Editors and Reviewers: Thank you for your letter and for the reviewer's comments concerning our manuscript entitled “Spatial and Temporal Pattern of Drought Hazard under Different RCP Scenarios for China in the 21st century” (ID: NHESS-2018-242). Those comments are all valuable and very helpful for revising and improving our manuscript. We studied comments carefully and made corrections in the manuscript. The response to the reviewer's comments are as follow:

1. Page1, line 13: “...to evaluate drought” should be “...to evaluate drought hazard”

C1

Authors' response: Thanks for your suggestion. The statement was rephrased to “...to evaluate drought hazard”.

2. Page1, line 14: “(RCP) 4.5 and 8.5 climate data” should be “(RCP) 4.5 and 8.5 scenarios climate data”

Authors' response: Thanks for your advice. The expression was rephrased to “(RCP) 4.5 and 8.5 scenarios climate data”.

3. Page1, line 29: change “are” to “were”

Authors' response: Thanks for your suggestion. The statement was rephrased to “were”.

4. Page1, line 31: suggest add “for disasters” after “Therefore, risk assessment”

Authors' response: Thanks for your suggestions. The statement was rephrased to “Therefore, risk assessment for disasters...”

5. Page1, line 32: “Risk is often represented...” could be “Risk of disaster is often represented...”

Authors' response: Thanks for your advice. The expression was rephrased to “Risk of disaster is often represented...”

6. Page2, line 3: it's better to revise “Evaluating hazards is the most important aspect...” to “Evaluating hazards for disasters is the most important aspect...”

Authors' response: Thanks for your advice. The statement was modified to “Evaluating hazards for disasters is the most important aspect...”

7. Page2, line 5: “extensive research has been conducted...” should be “extensive researches have been conducted...”

Authors' response: Thanks for your suggestions. The statement was rephrased to “extensive researches have been conducted...”

C2

8. Page2, line 7: "...in drought in semi-arid areas in the western United States...", too many same prepositions "in" in one sentence

Authors' response: Thanks for your advice. The expression was rephrased to "Gutzler and Robbins (2011) focused on drought changes in semi-arid areas of the western United States based on the Palmer Drought Severity Index (PDSI)..."

9. Page2, line 8: "...the drought situation", here the word "situation" is not very good

Authors' response: Thanks for your suggestion. The word "situation" was modified to "hazard".

10. Page2, line 10: "Similar research", it's better to use plural

Authors' response: Thanks for your suggestion. The statement was rephrased to "Similar researches in China have..."

11. Page2, line 11: is "Xing-Guo" a family name?

Authors' response: Thanks for your comment. Sorry for our incorrect citation. We have modified it to "Hu et al., 2015" and updated the citation in Section References.

#### Reference

Hu, S., Mo, S., and Lin, Z.: Projections of spatial-temporal variation of drought in north China, Arid. Land. Geogr., 2015.

12. Page2, line 13: You could use "In addition,..." instead of "Finally, ..."

Authors' response: Thanks for your suggestion. The statement was rephrased to "In addition,..."

13. Page 2, line 23: "Drought indexes..." could be "The main drought indexes..."

Authors' response: Thanks for your advice. The expression was modified to "The main drought indexes..."

#### C3

14. Page 2, line 24: add "et al." after "...Rhee et al., 2010)"

Authors' response: Thanks for your advice. "et al." was added after "...Rhee et al., 2010)".

15. Page 2, line 31: "The primary objective of this study was to..." should be "The primary objective of this study is to..."

Authors' response: Thanks for your suggestion. The statement was rephrased to "The primary objective of this study is to..."

16. Page 3: for section 2.1, you'd better to use 1-2 sentences to describe what is "Eco-geographical regionalization"

Authors' response: Thanks for your advice. We have supplemented what is "Eco-geographical regionalization" and rewrote contents in Section 2.1 to make it clearer and easier to understand. The expression is "Eco-geographical regionalization for China adopts the principle of adapting to the laws of natural geographical differentiation, and divides the country into 11 temperature zones according to differences in surface topographic features and geomorphic structure, combinations of temperature and water conditions, and zonal vegetation and soil type (Fig. 1) (Zheng, 2008). To reveal regional differences in drought hazard, eco-geographical regionalization for China was used for analysis in this study. The equatorial tropical zone was not included for lacking in data."

17. Page 3, line 11: "included" should be "includes"

Authors' response: Thanks for your suggestion. The statement was rephrased to "includes".

18. Page 4, line 14: "indices", you use "indexes" in page2 line 22, should be consistent throughout the context

Authors' response: Thanks for your advice. We have modified "indices" to "indexes" in

#### C4

Page 4, line 14, Page 4, line 15 and Page 2, line 20 to make the statement consistent throughout the context.

19. Page5, line2: the title of section 3.1 “Determining SPEI over different timescales”, what do you want to determine in this section, SPEI or time scale?

Authors' response: Thanks for your comment. Sorry for our inappropriate expression. The main objective of Section 3.1 is determining the most suitable timescale of SPEI for the M-K test, and to calculate the frequencies and durations of droughts. We have changed the title of Section 3.1 to “Determining timescale of SPEI for analysis” to make it clearer to understand.

20. Page5, line23-24: rewrite this sentence to make it more clear

Authors' response: Thanks for your advice. This sentence was rewritten to “In RCP4.5, most of north China shows downward (drying) trends, among which middle and western of MT, western of WT and northwest of PT present significant downward trends at the 0.05 significance level.”

21. Page 6, line 9: This sentence is a little bit redundant

Authors' response: Thanks for your suggestion. We have deleted this sentence and added “As for moderate drought frequency (Fig 5)” at the beginning of this paragraph.

22. Page 7 line 18: change “continuing” to “continuous”

Authors' response: Thanks for your suggestions. The statement was change to “continuous”.

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