

Historical droughts in the Qing dynasty (1644–1911) of China

Overall reply

We sincerely thank for editor's and reviewers' positive comments and careful review of the manuscript. Below are the point by point response. Please note that all modification in the revision is highlighted in blue color.

Comments and responses

Note: Review comments are shown in black color and our responses in blue.

1) Please read carefully and follow instruction of *Climate of the Past* for the formal preparation of your manuscript – many points and parts of your manuscript does not follow them. The manuscript has to be carefully formally revised.

Response: Thanks for this. We have carefully remedied the format of the manuscript following the manuscript preparation guidelines.

2) Since authors claim that the meteorological drought, agricultural drought, hydrological drought and socioeconomic drought are the key innovative findings, I did not see the series of each category in the manuscript. The authors should list them and compare them with your adopted indicators to dig out the linkage in between. How four kinds of drought fluctuated in historical China? How four kinds of drought are connected with other disasters as mentioned?

Response: We thank for this valuable comment. In our manuscript, the operational definition of the four types of drought have been precisely defined in the Sect. 2.1 and 3.1, where we address that 'dried waterbody (representing hydrological drought), crop failure (representing agricultural drought), famine and socioeconomic turmoil (along with famine to represent socioeconomic drought).' (lines 134-136). The fluctuations of the series are shown in Figure 1, 2 &4, and the correlation coefficient can be found in Table 2. All the text related to this comment is highlighted in yellow color for editor and referee to check. We hope this can substantially increase the clarity.

Importantly, our purpose in this paper is to stress that careful deciphering of the records is very helpful to identify different processes related to drought phenomena, and the method is imperative for cross checking and identifying the correlations among them. Meanwhile, we do not want to over-emphasize the correlation coefficients discovered in this study since, as we mentioned in the lines 171-176 'some socioeconomic events that are not explicitly linked to climate conditions may not be included in the *Compendium*... This means that care must be taken when using and analyzing the socioeconomic variables in the REACHES because of the potentially biased sampling.' Therefore, there is a need in future study to use independent data series to further elaborate on the research subject.

3) It is suggested to the authors to share the data series as an attachment for free download. The attachment should be a computer-readable file. It will also increase the paper publicity.

Response: Yes, our idea is also to publicize the data series. We can provide them as attachment or supplementary to the manuscript (seemingly not suggested according to the guidelines), and deposit it at a FAIR-aligned data repository.

4) In Introduction you mention potential of reconstruction of drought indices (PDSI) from tree-ring data (Old World Drought Atlas). It would be correct to say somewhere, that similar high-quality quantitative drought-indices series (SPI, SPEI, Z index, PDSI) can be reconstructed from documentary data as shown, for example for the Czech Lands (Brázdil et al. 2016, Možný et al.

2016) with monthly, seasonal, half-year or annual resolution. Moreover, some other special drought indices series were developed in Europe like Drought Rogation Index in Spain (Barriendos 1997) or Drought Index in Italy (Diodato and Belocchi 2011). Brázdil et al. 2016
<https://doi.org/10.3354/cr01380> Možný et al. 2016 <https://doi.org/10.3354/cr01423> Barriendos 1997
<https://doi.org/10.1177/095968369700700110> Diodato and Belocchi 2011
<https://doi.org/10.3354/cr01020>

Response: We highly appreciate the very informative comments from the editor, and have added those in the text as shown in lines 59-65. References related to this point are also added in the reference section.

5) Lines 118-171: Please include Section 2 as logic continuation of Introduction – you characterised situation with drought generally and now you are giving the Chinese results. Then Section 2 Data should follow etc. Lines 128-143: I recommend you to include this description of Grades 1-5 into simple table.

Response: We thank for the constructive suggestion and have made the corresponding modifications.

6) Section 6: Please try to separate this section to two separate sections Discussion and Conclusions. Conclusions in a few several point should shortly summarise your main results, which should be clearly communicated in the context of existing Chinese papers (what is new) and also as a contribution to drought studies in historical climatology in the international scale (e.g. with respect to the context of Brázdil et al. 2018 paper and recommended future research directions mentioned there).

Response: We thank for this suggestion. We have separated them into section 6 and section 7.

7) Please add also other requested points into manuscript (Data availability, Author contributions etc.) – see instructions for authors.

Response: This has been added in the revision. Thanks.

8) Authors in quotations in the text should be listed according to the year of publication, not according to their alphabet.

Response: Thanks. This has been also carefully corrected.

9) Please check your References if everything is quoted in the requested style – there are several quoted differently.

Response: Thank you. All references have been carefully checked for the format.

10) Examples of needed formal corrections:

Lines 75, 89 etc. - please use instead of documented “documentary” Line 144: Why not only “REACHES database” Figure 1: if you have in caption 1a and 1b, please put (a) and (b) directly into figures and delete “upper panel” and “lower panel” from figure caption. Figs. 2, 3 and further: Please use in description of y-axes “Number of ...” not only N Line 385: please add to http when it was accessed Line 411: famers or farmers? Line 454: 2019p? Line 460: Frank et al. (2010). Lines 563-564 and further figures: is it correct ... drought 7(a) and ... 7(b) ... 7(c)?

Response: Thank you so much for correcting the errors. These have all been modified and careful checks have also been performed throughout the manuscript.