Earth Syst. Dynam. Discuss.,
https://doi.org/10.5194/esd-2017-100-AC2, 2018

Earth System Dynamics
Discussions

Interactive comment on "Population exposure to droughts in China under 1.5 °C global warming target" *by* Jie Chen et al.

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Received and published: 28 February 2018

Dear Editors and Reviewers: Thank you for your letter and for the reviewer's comments concerning our manuscript entitled "Population exposure to droughts in China under 1.5°C global warming target" (ID: esd-2017-100). 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. While I believe the study is very well conceived and the paper is very well written, I have to object to one of the author's primary conclusions. I do not believe an increase in exposure of 6.97 million persons constitutes a "substantial" increase. If anything

I would argue that it is quite the opposite. In 2030 6.97 million persons represent roughly 0.5% of the projected Chinese population under SSP1 (1.359 billion). In short, as currently contextualized, the results/projections are a bit misleading as the increase in exposure is rather unremarkable. I would suggest two possible pathways to remedy this issue. First, the authors might reframe this result to highlight the importance of achieving the goals of the Paris Accord within the context of Chinese droughts. This study finds that doing so will limit the potential damage incurred by climate change. Second, this finding might be supported by adding an additional scenario, such as an SSP2/RCP4.5, SSP3/RCP4.5, or SSP5/RCP8.5 combination to illustrate the avoided impacts of achieving Paris. The second suggestion entails significantly more work, and may be better thought of as future work, but at the very least I would like to see the paper reframed to better fit with the results.

Authors' response: Thanks for your suggestions. The statement was rephrased in Section 4 and 5. The modifications are as follow:

P7 Line 16-18, We have added the statement "(The results indicated that average annual population exposure to droughts in the 1.5 °C global warming scenario would increase by 6.97 million compared to the reference period,) roughly 0.51 % of the projected Chinese population under the SSP1 scenario in 2030. The increase in exposure is rather unremarkable, suggesting that achieving the 1.5 °C target may limit the potential damage incurred by climate change."

P8 Line 3-5, We have added the statement "In future studies, we would like to evaluate population exposure for high GHG emission pathways, i.e., RCP4.5/SSP2 and RCP8.5/SSP3, and compare with the results from RCP2.6/SSP1 to illustrate the impacts of achieving the 1.5 °C target."

P8 Line 24 We have revised the statement "a substantial increase" to "a slight increase".

2. Page 3 lines 27-29: I would suggest rewriting as "The impact of population was

calculated by holding climate constant, that is, the frequency of mild, moderate, and extreme droughts in the reference period multiplied by the population in the SSP1 scenario" (as opposed to ..."the population in the 1.5C global warming scenario). You want to convey to the reader that you are holding climate constant and allowing population to vary, so use the SSP as opposed to the temperature target.

Authors' response: Thanks for your advice. The statement was rewritten to "The impact of population was calculated by holding climate constant, that is, the frequency of mild, moderate, and extreme droughts in the reference period multiplied by the population in the SSP1 scenario. Similarly, when calculating impact of climate, the population was held constant, that is, the frequency of mild, moderate, and extreme droughts in the RCP2.6 scenario was multiplied by the population in the reference period."

3. Page 4 line 4: I am assuming exposure is expressed in "average annual" population counts. I would suggest adding this terminology up front in Section 3.2 (e.g., "The average annual aggregate exposure.....)

Authors' response: Thanks for your suggestions. We have added the express "average annual (aggregate exposure) " in Page 6 line 2(Section 3.2) as well as Page 7 line 15(Section 4).

Interactive comment on Earth Syst. Dynam. Discuss., https://doi.org/10.5194/esd-2017-100, 2017.