

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

Anonymous Referee #2

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First, thank-you for the opportunity to review this paper. I found it interesting and thought-provoking. Second, my apologies for the slow review on my part.

In general I think this is a timely, well organized, and well-written study that addresses a significant consequence of climate change in human terms, but within the bounds of the stated goal of the Paris Accord, limiting global temperature rise to 1.5C above per-industrial. The piece adds to the small but rapidly growing literature that considers demographic and socioeconomic change alongside the physical consequences of climate change. Of particular interest is the disaggregation of the total increase in exposure into the climate, population, and interaction components.

While I believe the study is very well conceived and the paper is very well written, I have to object to one of the authors 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.

I have only two other minor comments:

Two Minor points:

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.

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.....")

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