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Hydrology and Earth System Sciences
Discussions

Interactive comment on "High-Resolution Regional Climate Modeling and Projection over Western Canada using a Weather Research Forecasting Model with a Pseudo-Global Warming Approach" *by* Yanping Li et al.

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We thank the reviewer for reviewing our manuscript. By addressing the points raised by the reviewer, we have revised the manuscript to make it more concise and focused. We hereby sincerely thank the reviewer for the time and effort conducting a thorough review of the draft.

1 Answers to each comment:

1. The writing is too wordy and also there are too many figures. Here are a few examples:

In general, we have reduced the figure numbers to 15 from 21 by removing and combining figures. We have also revised the abstract to make it more concise.

/1) The description of the CMIP5-derived perturbation on page 5 is too detailed. I think the authors only need to present the major features of the dynamical and thermodynamical changes./

We have greatly reduced the description of PGW perturbation from CMIP5. Please see lines 202-215.

2) Figures 3-5: I don't see the need for presenting both the daily mean and the daily maximum/minimum temperature because the mean is just an average of the maximum and minimum.

We have moved the daily minimum and maximum temperature to the supplementary. Please see the daily minimum and maximum temperature in the supplementary Figs. S1, S2.

3) Figures 6-7 can be merged into one. Alternatively, just remove Figure 6 if the authors don't trust ANUSPLIN data.

We have put the ANUSPLIN precipitation comparison in the supplementary. Please see Fig. S4.

4) Figures 20-21: Because of the great similarity in warming pattern between the three percentiles, there is no need to show all of the corresponding plots.

We have opted to show only the 95th percentile for summer and 5th percentile for winter due to the similarities in warming patterns among the percentiles. Please

see Fig. 15.

2. There are many inaccurate statements, as well as some grammatical errors and typos. Here are just a few examples in the abstract (page 1). 1) L18-19: explicitly resolving cumulus plumes. This is not true. To resolve individual convective elements a sub-kilometer grid spacing is necessary. 2) L19-21: How can you conclude that the simulation agrees with observations in terms of the geographical distribution of cold bias? Logically, this is wrong. 3) L24: "the PGW simulation shows more warming than CTL". The authors may want to say "the PGW simulation shows significant warming relative to CTL".

We thank the reviewer to point out these ill-written phrases that slipped through during our editing process. We have revised the sentences mentioned by the reviewer and scrutinized the manuscript to avoid such mistakes. Please see the revision in the abstract.

3. Section 4.1. For a fair comparison between WRF downscaling and CMIP5 projection, the temperature and precipitation changes for CMIP5 should be computed as the difference between the 1976-2005 average and the 2071-2100 average, consistent with the climate perturbation used for PGW (i.e., Eq.1).

We have calculated and plotted the change from CMIP5 ensemble (2071-2100 - 1976-2005) as the reviewer advised. Please see Fig. 8-9 and Figs. S5-S6.

4. I'd like to suggest presenting the temperature and precipitation changes over the whole domain (i.e., Figure13-14) first, followed by describing the sub-domain results (Figs. 11-12).

We have made adjustments accordingly and move the paragraphs about the sub-domains behind the whole domain comparison.

5. Add CMIP5 projected changes in Figures 13-14.

We have added CMIP5 projected changes. Please see the plots in Figs. 8-9 and

Figs. S5-6

6. Page 5, L8: add "the change of cloud population (Rasmussen et al. 2018)".

We have added this reference. Please see line 189.

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