

Interactive comment on “Assessment and Projection of Water Budget over Western Canada using Convection Permitting WRF Simulations” by Sopan Kurkute et al.

Anonymous Referee #1

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Kurkute et al. produced high-resolution WRF simulation of RCP8.5 over two large watersheds in Canada. They evaluated the model performance and projected the future water budget. The topic of the study is interesting and timely, considering the local/regional assessment of climate change impacts. However, some issues within the manuscript require substantial improvement and further work. 1. The introduction is not well-designed and consistent with arguments. I could not find any clear research gap and authors did not talk about the novelty of this study. Each paragraph of this section stands alone, and there is no flow of information. Above all, this section is wordy and in the end, I lost my mind to extract what they tried to do. I understand (after reading section 2) that dynamical downscaling was one of the important tasks

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they did; however, it is hard to get this message. Describing only evapotranspiration and precipitation as a water budget component is not enough in the introduction. Most importantly, how do you connect this paragraph with the previous and later paragraph? I feel like this information here is redundant. Please maintain a continuous flow of information to tell a clear story. Please clearly mention what research gap you are trying to fill up. Is it only high-resolution data? Producing P, ET, Soil moisture and moisture flux spatial maps cannot be a significant contribution to science. 2. There are many ways available to evaluate the climate model performance (please see IPCC working group 1, Chapter 9, 2013). The quantitative assessment is important; however, it is not convincing enough to draw a conclusion. The authors presented results (e.g., Figs. 2 & 3) at the temporal scale for the entire study area of 2560 km * 2800 km. I would say this is oversimplified. Then what is the point of doing high-resolution modeling, if you plot a single graph for the entire study area? Assessment at the spatial scale is imperative here. The authors need to support the assessment statistically. There are many performance metrics available in the literature. 3. The results section is also wordy. I would recommend reducing the length of the paper. For example, what is the necessity of writing the first sentence of Section 3 ('Figure 2 presents the surface water budget in MRB')? This manuscript can be shortened to half of its current length without destroying the quality. 4. Please, use different notation instead of 'Q' in the equation (4) as it creates confusion with the runoff of equation (3). 5. Please use the same y-limit for all figures so that readers can easily compare results. Fonts are not readable in Figures 9-12. These figure titles need more description (e.g., what temporal scale you covered for these figures?). Thank you.

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