

# Updates for Resubmission

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Please see the supplements accompanying “Response to Referee 1 Comments” and “Response to Referee 2 Comments” for point-by-point response to reviewers comments.

Overall, we thoroughly looked through the document to eliminate poor constructions and grammar issues. Below, we highlight the major updates made within each section of the document.

- Section 1:** Addition to the literature review and organization changes have been made in this section. We made a concerted effort to explain more of our findings as well as where our method adds to the tools for climate analysis.
- Section 2:** We added details surrounding the exponential family and adjusted notation to be straightforward and better defined within the text.
- Section 3:** We clarified and added information in descriptions of each of the estimation methods being careful to address the issues brought up by Referee 2. We also added specific details surrounding the Laplace approximation and made similar notation updates as in Section 2.
- Section 4:** Again, we added clarification to notation and more specifically defined the model used for simulations. We reduced the number of tables reported for the simulation timing experiment since they were all similar. We also clarified the simulation conclusions in 4.4 to aid in understanding which methods we chose to use in the application.
- Section 5:** This section has many significant updates. First, we fit new models with additional covariates per the request of Referee 1. The data sources for each of the new covariates have been added to the discussion in 5.1. We also added further references for data and covariate inclusions. The exact model we are using has been more carefully specified and the large data table included in the previous version has been removed. Results are discussed in subsections dedicated to describing significance testing, rainfall models coefficients, and methodology performance.
- Section 6:** We have worked to clarify the central thesis of our paper as well as to provide more specific outcomes and recommendations of the exercise. The future work portion has remained similar to the previous version of the article.