

Interactive comment on “TIER Version 1.0: An open-source Topographically InformEd Regression (TIER) model to estimate spatial meteorological fields” by Andrew J. Newman and Martyn P. Clark

Anonymous Referee #2

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This is an excellent technical manuscript on a rather comprehensive rainfall and temperature interpolation procedure that can benefit many scientific users, especially with the freely available code.

I recommend publication, subject to the following improvements:

Major: 1. Pg 1 line 24: The review of methods are limited and should include more recent literature (last 5-10 years). Furthermore, the authors could be more critical of their proposed method, in consideration of many other evolving interpolation approaches.

C1

2. Page 8, line 19-24: "In TIERv1.0 we have chosen to use the base grid point estimate, ub as the intercept value in the variable-elevation regressionTherefore, we fully disassociate the intercept and slope estimates. This methodological choice should be examined in future work". I believe it is justified that this methodological choice be examined as part of the current manuscript, considering that it is the first time it is introduced.

3. The scientific contribution of this paper can be improved with a more integrative look at the parameter uncertainty across the different experiments. The authors should consider combining Figures 8-15 into 2-3 more summative figures and highlighting the relative uncertainty contributed by the different parameter assumptions. Furthermore, although there are brief mentions of complex terrain and dry areas in the discussion of the results, these are few. Spatial features of the interpolation results and uncertainty can be better discussed.

Minor:

Section 2.1 and 2.2.3 are unclear in the definition of the topographic position concept, what it signifies, how it affects inversion, and how it is being calculated. The authors refer to D94 D02 and D08, but I suggest an explicit introduction be included for completeness. A very brief explanation is given later in 2.3.1.4; this should be brought earlier in the text.

Page 6, line 12: "downweigh" instead of "down weight"

Page 7, line 30: "could impact the final interpolation in unexpected ways" is vague. Please include specifics.

Page 7, line 9: "weigh" instead of "weight"

Page 12, line 20: "Finally, note the total uncertainty is nearly unchanged (not shown)". Show or remove statement.

Page 13, line 15: Remove "Interestingly".

C2

Page 14, line 15: "including true out of sample station networks" - please clarify.

Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2019-162>, 2019.