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Interactive comment on “Inconsistency in precipitation measurements across Alaska and Yukon border” by L. Scaff et al.

Anonymous Referee #1

Received and published: 14 August 2015

General Comments

This study compared precipitation observations along international borders to investigate the impact of gauge type biases on the distribution of precipitation. The use of observed and corrected precipitation, in my opinion, is an interesting topic worthy of exploring. This is particularly true for the documented gradient difference, which I found to be the most novel part of the manuscript. However, these results are limited by the very small sample size; a set of two groups. In addition, I found the manuscript lacking details in some locations, which may be helpful to prospective readers. For instance, the authors never comment on whether precipitation gradients across the U.S.-Canada border should resemble the corrected or uncorrected gauge data results. Also missing was a brief description of how the Yang et al. (2005) corrections were applied. This

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is of interest since U.S. National Weather Service (NWS) stations do monitor surface winds, which may be necessary to evaluate wind related biases. Moreover, I recommend the manuscript be considered for publication pending minor revisions; however, I'm concerned about the impact of the study considering the small sample size.

Specific Comments

1). The most interesting aspect of this study is the gradient differences between corrected and uncorrected gauge data. Unfortunately, this analysis is limited by the selection of a study area, which in my opinion is too narrowly focused on the Alaska and Yukon border. It is not clear in the manuscript why the southern region along the U.S. and Canada border was excluded. Do the authors expect differences along southern border to differ from the AK and Yukon comparison? Does the Yang et al. (2005) dataset not include stations along this border? Please explain.

2). If known, could the authors consider providing some context to the reader as to what direction the precipitation gradient should be along the border. In other words, should we expect more to less, less to more, or the same amount of precipitation as you move across the border from the U.S. to Canadian?

3). I recommend the authors provide some additional details on how U.S. and Canadian gauge data were corrected at the daily scale. For instance, what surface wind speed data was used to correct National Weather Service (NWS) station gauge data if they are not equipped with sensors to monitor surface winds. Is it from nearby stations? If so, how far apart are the two sensors (anemometer and precipitation gauge)? Do the Canadian stations monitor surface winds? If not how far are those nearby measurements?

Technical Comments

1). On page 3711 line 10, the acronym "P" has not been defined yet; please do so here.

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- 2). On page 3712 line 23, replace “in” with “into”
- 3). On page 3713, the sentence beginning on line 2 with “The observations have . . .” is confusing. Please describe exactly what the researchers’ have done to the gauge data that follows U.S. and Canadian national standards. I suspect this sentence may not be necessary?
- 4). On page 3713 line 7, the National Climatic Data Center (NCDC) has just recently changed its name to the National Centers for Environmental Information (NCEI). While urls are in the process of being updated, the old links will be preserved into the future. Recommend referring to the new name: National Centers for Environmental Information (formally National Climatic Data Center).
- 5). On page 3713 line 21, suggest revising sentence from “yearly precipitation data across the border station pairs” to “yearly precipitation data from the selected border station pairs”.
- 6). On page 3713 line 23, drop the “s” on periods.
- 7). On page 3713 line 23, may want to consider briefly explaining what is meant by double mass curves. Such a description could be pulled from the summary and conclusion section where it is currently described in better detail.
- 8). The use of three acronyms for precipitation throughout the results section was slightly confusing: P, Pm and Pc. Perhaps P is not really necessary. To me, P was synonymous with Pm?
- 9). On page 3714 line 17, add an “s” to “word”; “In other words, . . .”
- 10). On page 3715 line 21, use the Pm acronym for “measured P” Pc for “the corrected values”.
- 11). On page 3716 line 23, you may want to consider replacing the second use of the term “correction” with “bias”?

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12). On the same sentence as earlier (comment 11), consider replacing “besides” with “apart from”.

13). On page 3716 line 29, the sentence may read better as “Eagle and Dawson regions with border station mean temperature and wind speed within a degree Celsius and meter per second respectively”.

14). On page 3717 line 27, please invert “respectively” and “for Pm and Pc” so the sentence reads “. . . 347 mm for Pm and Pc respectively.”

15). On page 3718 line 2, I believe the numbers 88 and 139 should also be inverted?

16). On page 3720 line 21, please provide a bit more information on how the instrument has changed. For instance, was a new Niper gauge installed?

17). On page 3720 line 22, the sentence beginning as “Both stations. . .” seems a bit odd. For instance, what is the cumulative precipitation increase of 3% in reference to; Pc compared to Pm? You may also want to identify on figure 11 where exactly 1204 and 1352 mm are on the x-axis (i.e. add a line to the graph)?

18). On page 3711 line 11, the reference for Leeper et al. 2014 should be 2015?

19). On pages 3714 line 27, 3716 line 10, and 3723 line 29 there are references to Yang et al. 1998, which according to the cited references should be identified with either an “a” or “b”.

20). On page 3722 line 27, should the Searcy and Hardison Clayton, 1960 inline reference be Searcy and Clayton, 1960?

21). On page 3722 line 20, replace “the” with “a”? “It is very clear from this study that a. . .”.

22). On page 3722 line 23, you could omit “and cold” since the sentence is already talking about snowfall; cold conditions are already implied.

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23). On page 3726 line 21, I could not seem to find an inline reference for Yang 2014.

24). On page 3724 line 10, since “national networks” is not referring to a specific network so you may want to remove word “the”? So the sentence reads: "...precipitation measurements at national networks.

25). Figure caption 1 should read “Study area and locations of selected. . .”?

Interactive comment on The Cryosphere Discuss., 9, 3709, 2015.

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