

Interactive comment on “On the assessment of the moisture transport by the Great Plains low-level jet” by Iago Algarra et al.

Anonymous Referee #1

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This study focuses on the Great Plains low level jet (GPLLJ) and the associated moisture during the month of July. Overall, I believe that this journal represents a good venue for this work, and that this study will be a nice contribution to the literature after some additional analyses and clarifications.

- In the abstract, you mention atmospheric rivers but then there is no further mention of them in the text. Is it really needed to mention them there?
- There have been studies looking at atmospheric rivers and precipitation focusing on specific events across the central United States. The papers by Moore et al. (2012) and Nayak et al. (2016) are likely worth mentioning.
- More broadly, there have been a growing body of work related to moisture transport

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over the central United States (e.g., Nakamura et al. 2013; Lavers and Villarini 2015; Steinschneider and Lall 2015, 2016; Nayak and Villarini 2017).

- Pg. 2, line 17: “Higgins et al. (1996)”
- Page 2, line 34: “which modulate a”
- Page 3, lines 17-18: “total amount of total precipitable water” seems a bit redundant. What about “amount of total precipitable water”? The same applies to other places in the text.
- Page 3, line 20: “as follows: in”
- Section 2.1: why is the focus only on July and not on June and August as well? Please clarify.
- Page 3, line 24: “Rife et al. (2010)”
- Page 3, line 29: is there an impact on setting a threshold in terms of these differences? As of now, the only requirement is that the wind speed is higher at midnight compared to midday. What happens if you set a threshold, say 10% higher at midnight compared to midday? Would it be possible to have information related to the distribution of the differences between them?
- Page 3, line 30: “than above it (~4km)”? I still don't think it is the right wording but it sounds a bit better than what is there.
- Page 3, line 32: “Because of the jet”
- Page 4, line 9: “variation of 5 the wind” is not clear.
- Page 4, line 17: “possible to calculate”
- Page 4, line 30: “followed for 10”
- Page 5, line 12: “above the 75th percentile”

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- Page 5, line 16: "is used to quantify the"
- Is it possible to show some results related to the validation of the WRF model with respect to observations?
- Page 6, line 1: the symbol phi for the instant flux of moisture was already used in equation 3.
- Page 6, line 16: the use of the correlation coefficient is not appropriate. Please use the Lilliefors test to test whether the data can be described by a Gaussian distribution. Another option is the Jarque-Bera test.
- Page 6, line 19: "spans 11 days"
- I would remove the equation from the caption of Figure 1.
- Pg. 7, line 5: shouldn't this be Figure 2 instead of Figure 1?
- Page 7, line 27: why not computing the climatology using all the days, rather than based on just a handful?

References:

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Moore, B.J., P.J. Neiman, F.M. Ralph, and F.E. Barthold, Physical processes associated with heavy flooding rainfall in Nashville, Tennessee, and vicinity during 1–2 May 2010: The role of an atmospheric river and mesoscale convective systems, *Monthly Weather Review*, 140, 358–378, 2012.

Nakamura, J., U. Lall, Y. Kushnir, A.W. Robertson, and R. Seager, Dynamical structure of extreme floods in the U.S. Midwest and the United Kingdom, *Journal of Hydrometeorology*, 14, 485–504, 2013.

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Nayak, M.A, and G. Villarini, A long-term perspective of the hydroclimatological impacts of atmospheric rivers over the central United States, *Water Resources Research*, 53, 1144-1166, 2017.

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