

# ***Interactive comment on “Atmospheric River Tracking Method Intercomparison Project (ARTMIP): Project Goals and Experimental Design” by Christine A. Shields et al.***

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Response to GMDD Interactive comment from Referee #2

We would like to thank the reviewer for these constructive comments. We will address each point below:

Q: Concerning the “Threshold Requirements” in Table 1, it would be very important to know whether the relative thresholds (normally percentiles) have been calculated separately for each month or season, for the winter half-year or for the entire year and I would suggest to include this information at this point.

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A: This is a great suggestion. Although not all “relative” methods are the same in terms of relying on climatology, for the methods that do, we will amend the Table, or add supplementary material, to include this information.

Q: Section 3.2, page 17, lines: 9-13, “...but future climate research may be better served by relative methodologies, partly because of the model biases in the moisture and/or wind fields...”: To circumvent the problem of using absolute thresholds in climate model output, you could calculate the percentile corresponding to a given absolute threshold (e.g. an IVT of 250 kg m<sup>-2</sup> s<sup>-1</sup>) in observations/ reanalysis data and find the absolute value corresponding to this percentile in the historical run of the model. This absolute value would then also be used in the RCP run or this model.

A: Yes, this method of identifying which threshold to use for future runs would work well. Algorithmic choices are left up to the developers themselves, depending on the science question of interest. Comparing and contrasting the different algorithm choices is a priority for ARTMIP.

Q: Section 4.2.1: You could also consider to use the NOAA-CIRES 20th Century Reanalysis and/or ECMWF’s ERA-20C to have AR presence-absence time series for the entire 20th century, but this is of course just a suggestion. Doing so, you could e.g. assess aspects of low frequency variability associated with the PDO or AMO.

A: We will consider and discuss these datasets our upcoming workshop, where we will discuss the reanalysis Tier 2 catalogues.

Q: Section 5.1, page 24, lines 19-20: Here you state that “a moisture threshold of [...], as in the human control, is potentially too permissive”. However, from my point of view, the human control should be always better than any automated method so it is the methods having a problem at this point, not the human eye. Since several persons observing the same IVT field could come to distinct conclusions on whether an AR is present or not, the rough AR definition you cite on page 6 (the AMS one) should be still improved to come to a better consensus on what an AR actually is. Anyway, from

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my point of view, it is wrong to claim that the human eye is worse than the automated methods.

A: This is certainly a subject for debate within the community as well as ARTMIP. We do not want to imply that automated methods are better than human controls, or vice versa, and did not intend to give this message. We will amend the language to be more neutral.

Q: Section 5.4 on page 27 and Figure 8: I would recommend to use an independent “purely observational” precipitation dataset other than MERRA.

A: This is a good recommendation. We intend to use several different datasets for Tier 1 and Tier 2 analysis. For this paper, and the proof-of-concept analysis, we used the MERRA-2 as a first look, only given this is only one month of data. The intent for this analysis is to show that our design functions properly and to display the types of metrics we will delve into more deeply for full ARTMIP catalogues.

Q: Figure 4: I would suggest to use a discrete instead of continuous colorbar for this figure.

A: We will adjust the colorbar.

Q: Figures 5 to 6: Adding “IVT” below or next-to the colorbar would be helpful in these figures.

A: Thank you for catching this omission. We will correct it.

Q: Caption of Figure 6a: A space is missing after “kg” in the parenthesis.

A: Thank you for catching this syntax problem. We will correct it.

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Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2017-295>, 2018.