Earth Syst. Sci. Data Discuss., referee comment RC2
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Comment on essd-2020-397

Anonymous Referee #2

Referee comment on "ERA5-based database of Atmospheric Rivers over Himalayas" by Munir Ahmad Nayak et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2020-397-RC2, 2021

General Comments

The manuscript is well written and the concept for this paper is well thought out. The length and structure of the article are appropriate. High Mountain Asia could certainly benefit from more AR analysis due to its unique topography. However, I do not think that this manuscript is ready for publication in its current form. I have several suggestions for improvement of this paper (see below).

Specific Comments

It is unclear how this AR detection algorithm is unique compared to other AR detection algorithms available for Southern Asia. I agree with Reviewer 1 that spatio-temporal availability of ERA5 data could be leveraged for an improved detection algorithm (i.e. 1-hourly, 0.1° horizontal resolution) in this region. At the very least, the authors could comment on why they chose 6-hourly and 0.25° horizontal resolution.

The authors do note that there are many algorithms available that identify ARs (lines 207-208) but do not employ any comparison with their algorithm and others that are available. For example, other AR detection algorithms on a global, 6-hourly basis (e.g. Guan and Waliser, 2015; Guan et al, 2018; Guan and Waliser, 2019; Sellars et al, 2017) are freely available to the public and could be used for statistical evaluation. This would also give the authors the chance to give error estimates for their data set. Table 1 in Rutz et al (2019) would be a good place to look for available AR detection algorithms in HMA. This would improve the article greatly as it would give the authors a chance to show how

novel their algorithm is and why the AR community needs yet another AR detection algorithm. Unless the authors can show that this detection algorithm is better suited for HMA compared to other available AR detection algorithms, this study does not significantly contribute to the current body of work.

I would also recommend the author review the ARTMIP articles that complete an in-depth comparison of most of the available AR detection algorithms (Shields et al, 2018; Rutz et al, 2019; Lora et al, 2020) and elaborate on why they chose to emulate the Lavers et al (2012) method over others. For example, why is this method more appropriate for HMA?

The author briefly mentions the AR study over the Bay of Bengal (Yang et al, 2018) in the results section, but it is not mentioned in the introduction paragraph where the author discusses other studies that examine ARs in Southern Asia (lines 102-118).

The readme for the AR track data seems incomplete. I'm not sure the data set would be able to be easily understood and re-used in the future. For example, what do all the columns mean in each of the files? Is there a unique ID for each of the AR tracks, or would a potential user have to join the tables on multiple columns? I would suggest clarification in the readme that describes the columns to prevent misuse of this database in the future.

Technical Corrections

Line 345-346: The sentence beginning with "The minimum" is confusing to read and should be rewritten for clarity.

Line 287 (and others) The formatting of ð□□□ð□□□ ð□□□−1 ð□□ −1 is off. For example, there does not appear to be a space between kg and m. This occurs in the supplemental material as well.

The folder containing the Supplemental materials is misspelled as "Sumplimetary_Information".

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