Comment on essd-2020-397

Anonymous Referee #1

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-RC1, 2021

Review on 'ERA5-based database of Atmospheric Rivers over Himalayas' by Nayak et al.,

General comments:

The manuscript is well written and provides an interesting topic of detecting atmospheric rivers (ARs) over Himalayas. However, I think the manuscript is more suitable for a climate research journal (e.g. Journal of climate, International journal of climatology) rather than a data journal. Because Atmospheric river is a character of water vapor transport in the atmosphere, like an index, can be calculated from different data (reanalysis, simulations) and difficult to evaluate the accuracy. And data quality is one of the key standard of the current journal.

This work calculates the ARs only based on ERA5, i would like to know how it differs if calculated based on other reanalysis data, e.g. MERRA, NCEP, JRA. Do they got the similar results? Which is the best? Such questions need to be answered if the data aims to practical use.

Further, ERA5 has hourly resolution, why you use six hourly data? This has disadvantages: 1, it will reduce the accuracy of detecting durations of ARs. 2, if you use instantaneous wind speed to calculate $u*q$, four times a day could largely differs from 24 times a day, because the atmospheric vapor transport has strong diurnal cycle, especially during monsoon season.

There are many methods to calculate ARs, which will lead to multiple different results when calculating ARs. The method in your manuscripts itself also has some empirical treatments. For example, line 222, why you use 15 days moving average instead of 10 or 20? Is it physical mechanism dependent? The methods and the based data source selected could lead to large uncertainties in the ARs data.

Why is the threshold of IVT set to different values for different seasons? This will has disadvantages for practical application during disaster research. In such circumstance, for example, you will likely exclude some ARs that will leads to flood in wet season but include some ARs that may not leads to flood in dry season.

typing error

Line 31:

Driver-like => should it be 'river-like'