The study produced a globally complete dataset of atmospheric moisture flows from evaporation to precipitation based on ERA5 data. The paper is generally well-written and the data are useful. I have a few comments, mostly on the discussion of the results in the background of previous studies.

Thank you for the constructive feedback.

1. Please note the paper below. It also discussed nonlocal moisture contribution to precipitation. Therefore, the introduction around Line 35 and some other places should be careful.
Wei, J., & Dirmeyer, P. A. (2019). Sensitivity of Land Precipitation to Surface Evapotranspiration:
A Nonlocal Perspective Based on Water Vapor Transport. Geophysical Research Letters, 46, 12,588–12,597. https://doi.org/10.1029/2019GL085613
The above paper also calculates the travelled distance of the moisture for precipitation but uses moisture content as weight (their Fig.3c,d). In this way, the very remote moisture, if in very tiny amounts, will have little effect on the average travelled distance. Is it more reasonable to use weights?

Thank you for pointing us to this relevant paper. We now acknowledge this work in the introduction (line 30). We also rephrased lines 34-35 from “remain surprisingly poorly understood” to “are not fully understood”.

We agree that the average travelled distance of moisture needs to be weighted by moisture content, and this is already the case in our calculations, as stated in line 163.

2. Section 2.1. It seems that you used a recently developed new moisture tracking method. In addition to the reference paper, can you summarize the advantages or differences of this method compared to other Lagrangian methods? According to your description, the method is similar to the QIBT back-trajectory method (Dirmeyer et al.) but is forward-trajectory.

The main difference with previous Lagrangian models is that UTrack uses the new ERA5 reanalysis data. The model settings are based on a sensitivity analysis given these forcing data. We made the novelty of the model more clear in Section 2.1 (line 75): “the first to be based on ERA5 atmospheric reanalysis data”. For details on the model settings, we refer to Tuinenburg & Staal (2020).

Indeed, the simulations are based on forward tracking, but the model is also capable of backward tracking (see also lines 55-57).

3. About the evaporation recycling ratio and precipitation recycling ratio, I believe there are some previous studies. There should be some comparisons between your results and their results. To list a few:
Dirmeyer, P. A., J. Wei, M. G. Bosilovich, and D. M. Mocko, 2014: Comparing Evaporative Sources of Terrestrial Precipitation and Their Extremes in MERRA Using Relative Entropy, J. Hydrometeorology, 15, 102–116.
Van der Ent, R. J., Savenije, H. H. G., Schaefli, B. and Steele-Dunne, S. C.: Origin and fate of atmospheric moisture over continents, Water Resources Research, 46, W09525, doi:10.1029/2010WR009127, 2010.

Thank you for these suggestions. We compare our evaporation and precipitation recycling ratios with the literature in lines 282-299. We added reference to the ratios found by Dirmeyer et al. (2014) in lines 287-289: “Furthermore, Dirmeyer et al. (2014) found similar variability in the patterns and values of precipitation recycling throughout the year. However,

their results show some differences, including lower precipitation recycling in parts of South America." Rather than comparing our results with those from Van der Ent et al. (2010), we compare them with Van der Ent et al. (2014), which uses a more recent version of the WAM Eulerian tracking model.

4. Line 217-220. About the low recycling ratio in some basins, the explanation is not convincing. Actually, there have been studies on this. Generally, if the the remote moisture transfer is strong, such as in monsoon regions, the precipitation will be high and the recycling ratio will be low because the contribution from local evaporation is relatively small. For example, in Yangtze River basin, recycling ratio is higher (lower) in dry (wet) period. Refer to:
Wei, J., P. A. Dirmeyer, M. G. Bosilovich, and R. Wu, 2012: Water vapor sources for the Yangtze River Valley rainfall: Climatology, variability, and implications for rainfall forecasting, Journal of Geophysical Research - Atmospheres, 117, D05126, doi: 10.1029/2011JD016902.

Thank you for pointing this out. We added this as an additional explanation for the low recycling ratios in the mid-latitudes in lines 220-222: "Furthermore, differences in precipitation recycling can be expected due to regional and temporal differences in the strength of transport from moisture evaporated from the ocean, such as in monsoon regions (Wei et al., 2012)." Also, we now start line 217 with "In general, lowest recycling ratios are found…"

5. Line 137. Data stored in NetCDF4 format will be less precise? Or because you stored data into unsigned integers?

It is because we stored the data as unsigned integers that some imprecision was introduced (lines 139-140).