

Hydrol. Earth Syst. Sci. Discuss., referee comment RC3
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Comment on hess-2021-269

Anonymous Referee #3

Referee comment on "Water vapor isotopes indicating rapid shift among multiple moisture sources for the 2018/2019 winter extreme precipitation events in Southeast China" by Tao Xu et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-269-RC3>, 2021

The authors presented an continuous observation of near surface vapor isotope ($\delta^{18}\text{O}$ and d-excess) for 5 winter raining events in Nanjing, China. Although precipitation isotopes have been used to diagnose different moisture sources, the vapor isotopes are less observed and more rare for moisture source identification of winter precipitation. This manuscript presented the vapor isotopes abrupt shifts during the 5 raining events and related them to the moisture transportation and moisture shifts.

My concern about this work is that the measurement is the near surface vapor, not the free atmosphere vapor that formed the precipitation observed. In fact, the vapor isotope shifts are caused by the re-evaporation of precipitation, which is much lower than the normal vapor isotope without precipitation events. Even slight precipitation can produce the lower $\delta^{18}\text{O}$ and d-excess in the observed near surface vapor. Therefore, to trace the vapor source, we usually remove the period apparently influenced by rainfall events. This have been found by previous publications in comparing the concurrent vapor and rainfall $\delta^{18}\text{O}$ and d-excess.

I suggested the author to compare the vapor isotopes data with parallel precipitation isotopes and you can find the trick. I also suggest the authors to refer more references for similar observations.