Hydrology and Earth System Sciences Discussions

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
https://doi.org/10.5194/hess-2021-269-RC2, 2021

Comment on hess-2021-269

Anonymous Referee #2

Referee comment on "Water vapor isotopes indicating rapid shift among multiple moisture sources for the 2018–2019 winter extreme precipitation events in southeastern China" by Tao Xu et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-269-RC2, 2021

Extreme precipitation events can lead to great disasters to society. It is very essential to study the mechanism of extreme precipitation events with multiple approaches. With the development of continuous measurements of water vapor isotopes with high temporal resolution, tracing moisture source and water vapor transport through water vapor isotopes becomes an important tool for studying precipitation process (especially the extreme precipitation events). However, the complex variation patterns of water vapor isotopes and the atmospheric processes behind extreme precipitation events are unclear due to the lacking of observation studies. This study successfully reveals the complex variation patterns of water vapor isotopes and their controlling factors during the winter extreme precipitation events in Nanjing, which is important for further understanding the complex variation patterns of water vapor isotopes and the underlying mechanism. However, some issues listed below need to be addressed to improve the paper.

Lines 44-59: In this paragraph, I suggest adding some case studies on precipitation process (especially the extreme events) through water vapor isotopes observations, aiming to demonstrate the effectiveness of the water vapor isotope approach for studying the extreme precipitation.

Lines 99-100: What’s the basis for choosing 8 days and 1500 m for the HYSPLIT simulations?

Lines 115-171: In the Results section, you combined the results of isotopic variations during precipitation events and the discussion of controlling factors for isotopic variations. It is difficult for readers to follow. I suggest separating the results and the discussion and adding a new subsection for discussing the influencing factors of isotopic variations.

Fig.2: Array the sub-figures in the same way as Figs. 3-5.

Line 101: Why the resolution of the CWT field is 0.5°×0.5°? But the resolution of the GDAS dataset you used is 1°×1°.

Line 111: What kind of reanalysis data do you useï¼□ERA5 or ERA-Interim?