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# *Interactive comment on* "Lagrangian process attribution of isotopic variations in near-surface water vapour in a 30-year regional climate simulation over Europe" *by* Marina Dütsch et al.

**Anonymous Referee #2**

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## Comments on Dütsch et al

October 17, 2017

The paper presents a new method to diagnose the contribution from different processes to the isotopic composition of water vapor from model simulations. This method is applied here to a regional model simulation with COSMOiso and to understand the mean and variability of $\delta D$ and d-excess. However, the scope of this paper is actually much broader. The method could be readily applied to any model simulations and in any region of the world. This kind of method is extremely welcome to fill the long-standing gap between the complex numerical simulations (GCM or RCM) and the simple lagrangian models. It can pave the way to improved understanding of isotopic signals in water vapor.

The paper is very well written, the figures are of good quality, the method and associated equations are well explained so that anyone could easily reproduce it with their own model simulations. The method bears limitations, especially the "binary distinction between processes based on thresholds", but these are well identified by the authors and extensively discussed in the discussion section.

Therefore, I recommend acceptation of this paper. I only have very few very minor comments:

- p 4 l 11: add “-” in “terrain-following”?
- p 10 l 13: for daily anomalies, did you subtract the monthly climatological mean? Or does it mix up both day-to-day and seasonal variations?
- p 11 l 15: “deuterium excess from evaporation inside the domain is typically larger than outside the domain”: it looks like this rationale would apply to the interpretation of the mean deuterium excess, but not necessarily for it variability. Doesn’t it mean that variations in deuterium excess from evaporation inside the domain typically are of opposite sign compared to those outside the domain?
- p 17 fig 3: “seasonal”: do you mean monthly?