AUTHORS COMMENT: ANSWER TO REFEREE 3
'Drivers of the variability of the isotopic composition of water vapor in the surface boundary layer'

Referree comments: black,
Authors response: blue
Changes to the manuscript: green

This manuscript deserves final publication in BG after a few minor corrections and editorial adjustments. The authors present their analysis in a clear and logical fashion. The dataset was obtained with a well-tested instrumental system. A key strength of this analysis is the measurement of the vapor isotopic flux to inform interpretation of physical drivers of the observed vapor isotopic variability.

Authors response: We thank the anonymous referee for the motivating, positive and constructive feedback to our manuscript, below we answer the referee's comments in detail.

Line 150: Unlike other independent variables, here the PBH height is model-derived. Can you comment on efforts (by you or others) to evaluate the ERA h against observed h for your geographic region?
Authors response: Thanks for pointing this out. As a reanalysis product, PBLH is model-derived, however not without significant measurement data assimilation. We have added a description of a comparative study (Seidel et al. 2012) including our geographic region, assessing PBL height from reanalysis relative to radiosonde measurements. This study assesses the same Bulk-Richardson approach for estimation of PBLH, which is used in ERA5. We have now included some of their most important findings in the revised text. We had also worked on comparing ERA5 with alternative estimates of PBLH, such as the work by McNaughton and Springgs (1986) using data from Cabauw, however the currently available ERA5 data do not extend back to the same time. We added the following to the manuscript: 'Regarding the uncertainty of the boundary layer height of the ERA5 reanalysis product relative to radiosonde observations, (Seidel2012) found good agreement between the two measures with a relative uncertainty of ERA5 of generally less than 20% for sufficiently deep boundary layers with a height of more than 1 km, and up to 50% uncertainty for more shallow boundary layers. ERA5 estimates of h tended to be larger than radiosonde measurements due to the difficulty of accurately modelling h under stable conditions.'

Line 190: The message here is quite clear. Can you comment on the implication for Keeling mixing line analysis?
Authors response: Thanks a lot for this suggestion, we added the following sentence to our manuscript: 'Based on this observation, we conclude that measuring the isotopic composition of ET with Keeling mixing line applications would not be justified at our measurement site, because these applications assume a single source mixing with background air. When entrainment is occurring as in our case, we have two sources thus violating the Keeling plot assumption resulting in a bias. In a Large eddy simulation study, it was shown that such biases are particularly pronounced for water vapor isotopes reaching several permille (Lee et al. 2012).'

Line 207: typo "betreen"
Authors response: Thanks for finding this. We changed it.

Line 215: you mean ": : : when we expect NO transpiration: : :"?
Authors response: We expect transpiration through the leaves in the period 'green leaves'. Maybe this sentence is a bit long, so we rephrased it to be more clear.
'[...]we expect transpiration when green leaves are present. The period with green leaves (refered to in Fig. 5 started with leaf unfolding on 19. April and lasted until leaf senescence on 6. October 2016. During this period, there are significant ($p<10^{-5}$) but weak (R^2 app. 0.17)

correlations between δ_v and the corresponding isoforcing values IF as well as the isoforcing related change [...].

Line 233: Some people consider the lack of correlation between vapor delta and concentration as indicative of Rayleigh distillation associated with atmospheric convection.
(When an air parcel movement span a large vertical distance, condensation occurs over a large range of temperature.)

Authors response: This is an interesting point. We added the following discussion of deviations from Rayleigh distillation to our manuscript:

'This deviation from Rayleigh distillation in summer might be related to other relevant fluxes. Further, derivations from Rayleigh distillation have also been found as a result of deep convection (Tharamal2017) based on modelling. However, it is worth to point out, that this discussion of Rayleigh distillation is based on the assupmtion of one single destillation model. Thus, some of the additional variability in the relationship between δ_v and $\log(C_{H2O})$ in Fig. 6 might also be explained by multiple distillation processes.'

Figure 1: ET unit is incorrect. The unit carried by IF is different from that shown in Figure 4

Authors response: Thanks for pointing this out, this was a typo. We changed the units accordingly.

Figure 7 left panel: I don't see rain data

Authors response: We removed 'rain data' in the legend. We do not show it here, because we focus on the LMWL which is based on rain data.

Figure 7 right panels: These basically reveal seasonal pattern of vapor d-excess. Can you comment on diurnal pattern of vapor d-excess and its implications?

Authors response: Thanks for this suggestion, we plotted the diurnal cycle of d-excess, but we found it not straightforward to interpret and thought the discussion would be beyond the scope of our manuscript. Thus decided to not show it in the revised manuscript. However: Here we show the diurnal cycle of local d excess:

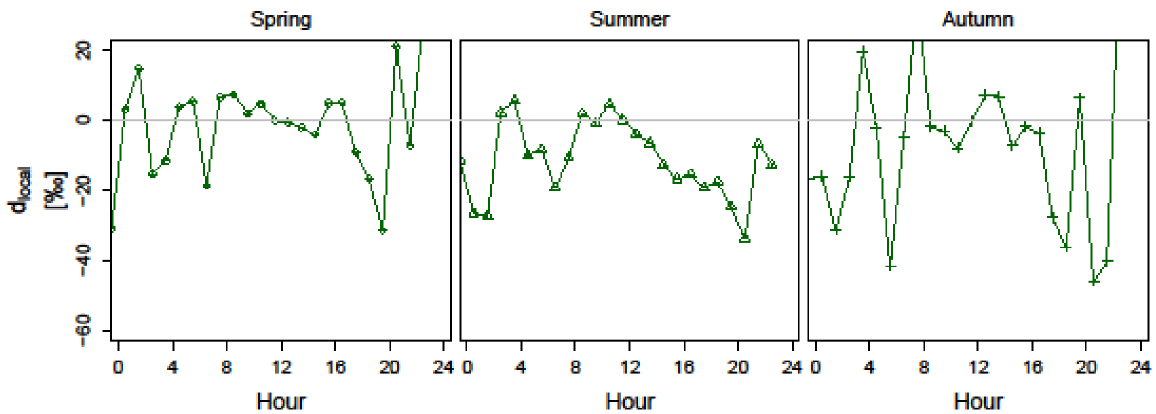

Figure 2 & Table 3: How did you obtain TKE?

Authors response: This was based on our EC measurements. However, in the review process, we decided zo remove TKE from the analysis because of … (cf. Referee 1)