Review of the revised version of

"Deuterium excess in atmospheric water vapour of a Mediterranean coastal wetland: regional versus local signatures"

by Delattre et al.

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1 General Comments

In the revised version of their paper, the authors have substantially improved the structure as well as the introduction and use of the two end-member mixing model. However, in my opinion, two important contradictory points remain to be clarified before final publication.

1. **Simple isotopic mass balance to explain the diurnal amplitude of δ_v:** I am not sure that I understand Equation 7. I am not convinced that this is a valid approach to compute the contribution of local evaporation to the "background vapour". The diurnal amplitude of δ_v is also stronly influenced by entrainment as discussed by the authors in L. 372-393 and L.478-487. What does W_{E} represent? What is the timescale over which this mass balance is computed? Is this a mass balance for the boundary layer? The mass balance should be introduced more carefully, otherwise it should be removed.

2. **Local vs "regional" moisture sources:** With their methodological approach, the authors can only characterise the local evaporation conditions. I think the discussion about the differences in local evaporation conditions depending on the large scale meteorological situation is interesting and the focus of the paper should be kept there. There are still several instances, where the reader gets confused in terms of what the authors argue to be the driving factor(s) behind the observed isotope signals ("local or regional signature"). Particularly the abstract and the conclusions should be improved in this sense.

2 Specific comments

1. p. 2, L. 11: "Stable isotopes of water vapour", remove "the".

2. p. 2, L. 17: Replace evapotranspiration by evaporation.

3. p. 2, L. 17-18: "A calibration protocol..." this sentence should be removed. This technical aspect is not the main topic of the paper.

4. p. 2, L. 38: Replace "local vapour" by "local evaporation" or else more clearly differentiate what is meant by "local vapour" and "ambient moisture".

5. p. 4, L. 74: Kurita et al. 2012 can be cited elsewhere (for example at L.80 or/and L. 96). Here citing the review by Kerstel and Gianfrani, 2008 would be more adequate.

6. p. 7, L. 175: Say "specific to the individual analyser" to avoid the repetition of "dependence"/ "dependent". Here more than one study should be cited to give credit to this statement. Johnson et al., 2011 and Aemisegger et al., 2012 provide an in-depth discussion of this aspect for Picarro instruments. Furthermore since many recent studies discuss this aspect please write (e.g. Tremoy et al., 2011,...).

7. p. 9, L. 247 What is D?

8. p. 10, L. 268 Say "plant transpiration".

9. p. 9, L. 244 The precipitation deuterium excess data should also be shown in Figure 3.

10. p. 9, L. 255 The daily cycle of air and surface temperature should be added in Figure 5.

11. p. 10, L. 295 Is it the $\delta_{\mathrm{v}} - T$ correlation that is meant?

12. p. 13, L. 374 Lai and Ehleringer do not attribute the diurnal increase in d_v solely to entrainment of free atmospheric air. They use an explicit isotope mass balance to determine the importance of soil evaporation, plant transpiration and entrainment for the observed daily cycle in the water vapour isotopes.

13. p. 13, L. 385 It should be Lai et al., 2006.

14. p. 14, L. 396 I am not convinced that there is no evaporation from the lagoon during nighttime.

15. p. 15, L. 428 I find the use of W_1 confusing here as well as in Equation 7 the use of W_E and W.

16. p. 15, L. 447 It should be Noone et al., 2011, Noone, 2012.

17. p. 18, L. 525-528. This is confusing. You say "Cold, dry and strong winds coming from the North bring an isotopically depleted vapour... from the South bring an isotopically enriched vapour". This is not what I understood from the main text, in which you analyse the influence of local conditions on the isotope signals. Later on, on L. 536-538 you say that it is local evaporation that mainly drives the daily isotope signals. This is contradictory (see also my general comment 2).

18. p. 18, L. 534 replace second "either" by "or". I don't agree with the "either... or..." statement. The relative importance of the two processes is different depending on daytime but both processes are equally relevant in shaping the typical daily cycle of water vapour isotope signals.

References

Aemisegger, F., Sturm, P., Graf, P., Sodemann, H., Pfahl, S., Knohl, A., and Wernli, H.: Measuring variations of $\delta^{18}O$ and $\delta^{2}H$ in atmospheric water vapour using two commercial laser-based spectrometers: an instrument characterisation study, *Atmos. Meas. Tech.*, **5**, 1491-1511, doi:10.5194/amt-5-1491-2012, 2012.

Johnson, L. R., Sharp, Z. D., Galewsky, J., Strong, M., Van Pelt, A. D., Dong, F., and Noone, D.: Hydrogen isotope correction for laser instrument measurement bias at low water vapour concentration using conventional isotope analyses: application to measurements from Mauna Loa Observatory, Hawaii, *Rapid Commun. Mass Sp.*, **25**, 608–616, 2011.

Kerstel, E. R. T. and Gianfrani, L.: Advances in laser-based isotope ratio measurements: selected applications, *Appl. Phys. B-Lasers O.*, **92**, 439–449, 2008.