

This paper uses observations from the 2020 EUREC⁴A field campaign in combination with a one-dimensional model that simulates the change in drop size and isotope composition of the drops for given initial conditions that are constrained by aircraft observations (raindrop size distribution, isotope composition of the drops). I very much enjoyed reading this nicely written paper. Below cloud evaporation is a strongly under-researched topic. Since it is one of the two components of precipitation efficiency (together with conversion efficiency in clouds), the lack of constraints on below cloud evaporation from observations has important consequences for our ability to correctly predict precipitation at the weather event as well as the climate timescale.

I have four major comments, listed below, as well as a short list of minor/technical comments below:

Major comments:

- A) It would be very valuable to point out the more general implications of this work already in the introduction (as well as at the end of the conclusion) e.g. trying to constrain precipitation efficiency with isotope observations would be one aspect to add to the now rather narrowly focused introduction. Of course, there are other aspects such as the impact of moisture recycling on mesoscale organization, which might be what the authors are more interested in. Right now the introduction reads like a nice summary of reference values of subcloud layer rain evaporation F_e in terms of energy input into the subcloud layer, but these values would be much more interesting to compare with the author's results later on in the discussion.
- B) Given the motivation of the authors to investigate below cloud evaporation, because it represents a substantial energy and humidity input into the subcloud layer, I think that the results from Section 3.6 are very disappointing. Can this aspect be discussed in more details? It seems unlikely that such an important process would leave no distinguishable isotope signal in ambient vapour. Do these results imply that, even though below cloud evaporation strongly impacts the amount of precipitation that reaches the surface, for the subcloud layer moisture budget, it is a negligible process? Or is it only important, when integrated over larger spatio-temporal scales than a single precipitating cell? How much does the authors' finding depend on the uncertainties of the aircraft and ship-based observations? Also can this aspect really be assessed with the model at hand given the assumption that vapour contributed by rain evaporation is neglected (L. 125).
- C) There is very limited literature about below cloud evaporation effects, I agree, but I think there are a few studies from different settings with which the results in this paper can be compared to. For example, Aemisegger et al. 2015 GRL used a combination of numerical experiments and isotope observations to assess the importance of below cloud evaporation for a cold front passage. They found that over the whole frontal precipitation event neglecting below cloud evaporation leads to depletion biases of 20–40‰ in d2Hp and 5–10‰ in d18Op as well as to an increase of 74% in rainfall amount. This impact on total rainfall amount is very close to what the authors find in their study over the tropical North Atlantic. Also, in this paper, a substantial impact of below cloud evaporation on ambient vapour was found. How comes that in the winter trades the impact is so small? (Different region, different dynamics).

- D) The discussion of the impact of F_e on stability is interesting but confusing. The statements at L. 274ff and in the conclusions (L. 432) are contradicting. Please clarify. I don't understand, based on which of their findings they draw these conclusions on stability. If F_e has limited to no impact on subcloud layer temperature and specific humidity (see also major comment B) then how can stability be impacted?

Technical comments:

- 1) I think ACP titles are usually not capitalized and I would strongly encourage the authors to mention more specifically the type of precipitation events they are looking at: "Sub-cloud rain evaporation from shallow convection in the North Atlantic winter trades"
- 2) The variables should be in italics except for abbreviations such as RH.
- 3) L. 5 not sure I immediately understand, in which phase dD and $d18O$ were measured and used in the model
- 4) L. 9: 65% of what? mass, volume, event duration, number of events?
- 5) L. 17: is precipitation in shallow convection regimes really "ubiquitous"? I would have said it is rather sparse with low precipitation efficiencies compared to other cloud systems?
- 6) L. 48: "facilitate or hinder boundary layer stability" sounds a bit strange, how about "Does F_e reinforce or weaken the subcloud layer stability?"
- 7) L. 58-60: "This is because as rain evaporates...". I am not sure I can follow the implication that is formulated in this sentence. Vapour isotopes can be used independently to assess rain evaporation because rain evaporation leads to an enrichment of rain? This also joins my major point B above.
- 8) L. 114: degree W formatting
- 9) L. 124: what is the implication of ignoring collision-coalescence for your results?
- 10) L. 125: This last sentence leads to confusion about how you can assess the impact of below cloud rain-vapour interaction with the chosen 1D modelling approach.
- 11) L. 134: could the variables be described one after the other, instead of the long list of variables and then a long list of descriptions? (would be easier for a reader like me to grasp).
- 12) L. 150: "." Formatting, should go to L. 149.
- 13) L. 161: all parameters from Graf 2017: this is a bit vague. Which exactly and is this a good choice given the large contrasts between a cold front in the midlatitudes and shallow convection in the tropics? Maybe a summarizing table in the Appendix would help.
- 14) P. 5: what is the impact of RWC estimates from P3 observations on the modelling? How do they compare to the ATR observations from which large statistics are available at the cloud base level. See Bony et al. 2022 ESSD.
- 15) L. 184: this seems to contradict the statement at L. 125. Wouldn't an integration over longer time intervals (precipitation events of 10-30 min) be necessary to assess this aspect?
- 16) L. 274ff: is this speculative, or based on some specific results? And what dominates for changing stability: the evaporative cooling or the moistening effect (which are counteracting each other)?
- 17) L. 285-294: I like this finding a lot. Very clearly explained!

- 18) L. 357: Also this finding is very interesting! Maybe: “Consequently, the amount effect may not be appropriate for describing the impact of rain evaporation on the isotope composition of rain”? Did the authors’ consider using the Graf et al. 2019 ACP δ - δ D vs. δ - δ excess phase space for assessing the impact of different NO, cloud base RWC, RHsf etc.?
- 19) L. 415: this suggests as a consequence that the impact of sub-cloud evaporation on stability is negligible too (see again my major point B).
- 20) L. 418: **North Atlantic**
- 21) Conclusions: could the authors point towards bigger implications and open up on further research that could be done e.g. for better constraining below cloud evaporation in models?