

Second review, acp-2021-391, Zheng et al.

Overall, the addition of the PCA results greatly strengthens the results of the manuscript and I find the significant revisions by the authors have ameliorated the gravest of my earlier concerns. Despite these greatly improved state of the study, I have several minor technical comments and suggested typographical edits that I would like to see addressed to clarify language in the paper before it is accepted. Many of the extended new passages seem rather hastily worded. I recommend the authors have a native English speaker or editing service review newly incorporated text.

MINOR COMMENTS (L refers to line number)

L31-32: What do you mean by the phrase “underneath CCN and moisture sources?” Do you mean surface sources? Or sources underneath the cloud that aren’t the surface?

L53-55: You need to rephrase the sentence beginning “The enhance Nc conversion...” as it is very difficult to understand. When you say “Nc conversion” do you mean activation of CCN or autoconversion? In addition, what do you mean by “intrusions of CCN?” Intrusions from where? Advected aerosol, stronger sources, from the free troposphere?

L180: Do you mean northeast Atlantic instead of southeast?

Section 3.5.1: Can you spell out the implications of the moderate negative correlations between cloud properties and PC1? In my mind, greater TKE should lead to a more adiabatic PBL cloud so it is worth explicitly pointing out that adiabaticity (probably) depends more on decoupling state than turbulence. This is a somewhat counter-intuitive argument, maybe a weakness of your use of sub-cloud TKE vs. full PBL mean including the cloud layer. In addition, I think the low correlations you find between PC2 and cloud properties are likely a consequence of subsetting for single-layer stratocumulus. If you looked at *all* boundary layer clouds at ENA, you would naturally be sorting by LTS and wind direction.

General comment on sections 3.4-3.5: I wonder if the missing factor that could explain the D – TKE negative correlation is surface fluxes? There is likely a diurnal cycle factor as well, perhaps obtainable through examining net cloud top longwave cooling rate

TYPOGRAPHICAL COMMENTS

L129: Instead of “where sits in,” try “which sits in”

L130-132: This sentence is rather colloquial in tone. I suggest removing “So that” at the beginning.

L184: singular, “buoyancy generation and shear”

L186: “growth process” instead of “growing process”

L972-977: this is a mega-long sentence and is rather awkwardly worded. Please revisit to simplify and clarify wording.

L1061: "to have" instead of "to has"