Review of *"Why Is Height-Dependent Mixing Observed in Stratocumulus?"*

This manuscript investigates entrainment–mixing processes in stratocumulus using the Explicit Mixing Parcel Model (EMPM). By emulating virtual aircraft measurements, the authors argue that the frequently observed transition from inhomogeneous mixing (IM) near cloud top to homogeneous mixing (HM) within cloud depth is essentially a collective behavior of multiple parcels sampled at the same height, experiencing distinct entrainment–mixing–evaporation histories, rather than reflecting the true local mixing mechanism. The study compares bulk versus local perspectives, introduces isobaric mixing simulations, and provides a discussion on the implications for interpreting both aircraft and LES data. The topic is highly relevant to the cloud physics community, and the work provides some insight into entrainment–mixing interpretation. However, the revisions are needed to clarify assumptions, better explain contradictory perspectives, and explicitly define terms such as "near cloud top." With these improvements, the paper will be a valuable contribution to the literature.

Major comments:

1. CCN concentration in entrained air: The manuscript assumes that the entrained dry air is CCN-free. This is a strong simplification, since in reality entrained air frequently contains at least some aerosols that can serve as CCN. I strongly encourage the authors to either (a) perform additional sensitivity experiments with non-zero CCN concentration, or (b) explicitly discuss how this assumption may bias their results and conclusions. Without such treatment, the applicability of the EMPM findings to real stratocumulus environments remains limited.

2. Descending velocity after entrainment: A uniform descent rate of -1 m s^{-1} is imposed. However, the actual descent speed is likely to vary with entrainment fraction (EF), local turbulence intensity, and thermodynamic structure. The authors should justify this choice more thoroughly and, ideally, include sensitivity tests with varying descent rates. A clear discussion of this limitation is necessary to describe how robust the reported IM–HM transition is under different dynamical conditions.

3. The local perspective suggests HM near cloud top transitioning to IM deeper in cloud, whereas the bulk view shows the opposite. This apparent contradiction is central to the study but is not explained clearly enough. A related issue is that in several analyses (e.g., Figs. 4-6), the term "near cloud top" is used without a quantitative definition. Since the results depend sensitively on how close the sampling is to the inversion, the lack of a clear threshold (e.g., within 5 m or 10 m below cloud top) makes the interpretation appear ambiguous.

Minor comments:

1. Ensure that Sc is always defined as stratocumulus upon first use and then used consistently.

2. Lines 17 and 78: “IH” seems to be a typographical error and should be corrected to ‘IM’.

3. Line 187: What is the accommodation length 2μm? Please explain it.

4. Figures 4–6: Clear annotations (e.g., “IM-like” vs. “HM-like”) on the fitted lines might be helpful to understand these diagrams.