

Review of “Impact of high and low vorticity turbulence on cloud environment mixing and cloud microphysics processes” by Kumar et al. (acp-2021-101)

The authors have addressed most of my comments with care. While I have some very minor comments below, the manuscript is generally ready for publication. I do not need to see it again.

Line numbers refer to the tracked-changes version of the manuscript.

Dear Reviewer,

Thank you very much for giving time to review our manuscript and recommending for publication with minor revisions. Our responses the provided below in blue color.

Minor Comments

Ll. 91 – 94, 294, 331: Since the mono-disperse case is not discussed in the revised version, I suggest removing all remaining references. (Alternatively, one should state clearly in the conclusions section that the mono-disperse case is not discussed in the paper.)

Response: We have modified the sentence in line 91-94, see the red color in modified manuscript file with track change. Also removed the discussion on mono-disperse case from conclusion section.

Ll. 143 – 145: I fully agree that the volume fraction of 50 % is unrealistic. However, assessing the volume fraction of high vorticity regions has never been an objective of Squires and Eaton (1991) and Shaw et al. (1998). Therefore, I suggest writing “assumed high volume fraction” instead of “finding of high volume fraction”.

Response: Done. See the red color text.

L. 171: Writing about a (singular) instability feels odd. I suggest using the plural (“instabilities”).

Response: Changed. See line 173 in the tracked changed version.

Ll. 218 – 220: By showing the relative dispersion in Fig. 6, one could strengthen the argument here: Broadening is always stronger in the high vorticity regions.

Response: Added this information (line 222) in the modified manuscript.

Ll. 263 – 269: Technically speaking, the number density should be constant in the homogeneous mixing regime. Accordingly, the statement “a turn toward the homogeneous mixing regime where both the number density and the mean volume radius decrease rapidly” is slightly misleading.

Response: The statement has been revised.

Technical Corrections

L. 6: Replace “DNS” with “direct numerical simulation”.

Response: Done

L. 137: “the required cuboid” or “a cuboid”

Response: Done

Caption of Fig. 3: “KE”, not “K.E.”

Response: Done

L. 264: “till” is informal.

Response: Changed with ‘up to’.

Ll. 263 – 264: Please rewrite this sentence. (Maybe: “In the LV case, mixing is inactive for the first 1.2 s, and for 1.4 s in the HV case.”)

Response: Done. The sentence has been modified.