

## **Review of “Opposing entrainment effects of cloud droplet sedimentation during the pre-breakup stage of the stratocumulus to cumulus transition” by Schnelke et al. (egusphere-2026-479)**

This study analyzes aerosol-cloud interactions during stratocumulus-to-cumulus transitions over the northeast Pacific using high-resolution numerical simulations. The authors show that adjustments in cloud water can be negative or positive, with clouds containing higher amounts of cloud water showing the former behavior and those containing lower amounts the latter. Overall, the addressed topic is important, the simulation results align with the current understanding of the topic, and the writing is good. However, the most important finding is not new, as I lay out in more detail below. Thus, I cannot recommend publishing this work.

### **Major Comment**

Glassmeier et al. (2021) and Hoffmann et al. (2020) also showed that there are two types of liquid water adjustments: clouds with low amounts of cloud water tend to experience positive cloud water adjustments due to longwave radiative cooling exceeding losses in cloud water by entrainment, while clouds with high amounts of cloud water tend to experience negative cloud water adjustments due to entrainment exceeding cooling. These previous findings are in strong agreement with the schematic shown in Fig. 11. Thus, the current study does not provide substantially new insights. Since Glassmeier et al. (2021) and Hoffmann et al. (2020) did not focus on stratocumulus-to-cumulus transitions, one could extend the current study to provide substantial new insights.

### **Minor Comments**

Ll. 48 – 51: Is the increase in precipitation just caused by enabling cloud droplet sedimentation and the subsequent vertical redistribution of cloud water?

Eq. 5: What does the  $\omega'$  indicate?

Ll. 166 – 167: What is the “original” vertical velocity?

Ll. 242 – 257: I recommend referring to Bohren (1987) here.

Ll. 428 – 429: How does evaporative cooling add to longwave cooling? Or do the authors refer to the overall cooling?

### **Technical Comments**

Ll. 42 ff.: Citation style is incorrect.

### **References**

Bohren, C.F., 1987. Multiple scattering of light and some of its observable consequences. *Am. J. Phys.*, 55(6), pp.524-533.

Glassmeier, F., Hoffmann, F., Johnson, J. S., Yamaguchi, T., Carslaw, K. S., & Feingold, G. (2021). Aerosol-cloud-climate cooling overestimated by ship-track data. *Science*, 371(6528), 485-489.

Hoffmann, F., Glassmeier, F., Yamaguchi, T., & Feingold, G. (2020). Liquid water path steady states in stratocumulus: Insights from process-level emulation and mixed-layer theory. *Journal of the Atmospheric Sciences*, 77(6), 2203-2215.