Reviewer 2 Final Comments

The statement "This study was built upon the assumption that an increase in entrainment rate (w_e) due to an increase in N is exactly offset by a commensurate decrease in L, resulting in the same w_e irrespective of N" has the following implication:

$$\frac{dw_e}{dN} = 0, \tag{1}$$

with the chain rule expansion resulting in

$$\frac{dw_e}{dN} = \frac{\partial w_e}{\partial N} + \frac{\partial w_e}{\partial L}\frac{dL}{dN} = 0. \tag{2}$$

Rearranging the above equation gives

$$\frac{dL}{dN} = -\left(\frac{\partial w_e}{\partial N} / \frac{\partial w_e}{\partial L}\right). \tag{3}$$

Eq. 3 then imposes the following behavior on the slope parameter (m),

$$m = \frac{dln(L)}{dln(N)} = \frac{N}{L}\frac{dL}{dN} < 0. \tag{4}$$

This assumption results in a strong constraint on the slope parameter that vastly decreases the utility of the analysis. Entrainment rate would be expected to change as a function of N, and the assumption that L exactly and immediately compensates any N-related entrainment changes is questionable, given that the companion study required nearly 18 hours to equilibrate, which is far more than a single nighttime period. Clouds in nature would likely never have time to fully equilibrate overnight before diurnally varying solar insolation muddies the picture. The dependence of Eq. 1 on there being a perpetual night calls the entire study into question. Additionally, neglecting cloud deepening/thinning, fixed surface fluxes, and restricting the analysis to nighttime conditions are fundamental weaknesses of the study that results in decreased relevance to any real world scenario. While the authors mention that adding complexity would complicate the analysis, there are many ways to account for these processes within the MLM framework using moisture, energy, and mass budgets. One of the three main results pertains to the evaporation of precipitation, which introduces an internal inconsistency into the study. Virga decreasing w_e is not compatible with Eq. (1), since this complicates the direct relationship between N, L, and w_e and would allow for Eq. 4 to be positive in precipitating cases. It is not clear from Fig. 1 and 2 which cases have virga and which ones don't. This would be a helpful addition to the plot and help determine just how big of an issue the virga-mediated entrainment feedback may be.

Overall, the extent of constraining assumptions does not allow for realistic responses and the results are only applicable in an extremely narrow set of (unlikely/unnatural) circumstances. I don't believe the results significantly advance our previous understanding of sedimentation-entrainment feedbacks and I believe that the virga results contradict the assumption in Eq. 1 and could theoretically result in positive m.