“This indicates that the increase in the average LWPc in sprayed clouds is not due to the spraying creating deeper clouds but due to the sprayed aerosol interacting preferentially with deeper clouds.” The sprayed aerosol could also be interacting preferentially with brighter clouds and clouds with higher liquid water. To that end, the authors should include simulations with passive tracers released, to further separate correlation and causation. Since the passive tracers do not affect subcloud boundary layer or cloud properties, three different passive tracers could be released at the three different altitudes in the same simulation for efficiency.

This is an interesting idea. However, it is not necessary to conduct extra simulations to address this. As shown in (3), high LWPc clouds are brighter clouds because Ac is proportional to LWPc5/6, and the LWPc is approximately proportional to the squared cloud depth. Thus, the observed effect is just caused by geometry: clouds grow from their base, which is approximately the same for all clouds analyzed here. If aerosol is released at higher levels, it will only interact with clouds that extend to higher levels, and therefore exhibit a larger cloud depth, and hence a higher LWPc and Ac. To assess whether the spraying results in different cloud behavior, we evaluated the ensemble spread of Ac, LWPc, Nc, and fc in the revised Fig. 3. Changes in cloud behavior should be visible in LWPc. However, the domain-mean LWPc (gray lines in Fig. 3) changes only by 2.94 g m-2 when the sprayer height is changed, which is significantly less than the ensemble spread (8.20 to 8.06 g m-2). Accordingly, the cloud behavior is not significantly affected by the spraying. At least for the first 50 minutes after the sprayer was activated, which is the focus of this study. We outline this further in the manuscript: “This is to be expected because adjustments to changes in the entrainment rate [and hence the LWPc] in response to an increase in aerosol tend to require much more time to be effective (e.g., Glassmeier et al., 2021; Chen et al., 2024).”

The reviewer is still convinced that the authors need to include a simulation with passive tracers released at the three altitudes, to distinguish between correlation (preferential lofting) and causation (brightening due to aerosol). For all three sprayer heights, the aerosol lofts preferentially to clouds with more water content (LWP_c), thereby slightly increased droplets and higher albedo, and the aerosols in the plume further increase brightness. With passive tracers, the corresponding cloud fraction $f^*_{c,p}$ (‘p’ representing passive) would be about the same as f_c^*, the $A^*_{c,p}$ would be higher than $A^0_{c,p}$, but not as high as A^*_c. If there is no preferential lofting to already bright clouds, $A^*_{c,p}$ would be the same as $A^0_{c,p}$.

Therefore, the $d(rCRE) = f_c^*(A_c^* - A_c^0)$ reported includes the preferential lofting and the brightening effect and hence overpredicts the brightening effect.

$d(rCRE)_{,mcb}$ [brightening effect] = $f_c^*(A_c^* - A_c^0)$ [overpredicted brightening] – $f^*_{c,p}$ $(A^*_{c,p} - A^0_{c,p})$ [preferential lofting effect]

Specific comment:

1. Line 131: ‘spayed’ should be changed to ‘sprayed’