We thank the reviewer for his thoughts, with which we generally agree.

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).

As stated in our manuscript, the preferential lofting by deeper clouds is caused by the placement of the sprayer (ll. 122 – 125): "In contrast, higher sprayers primarily impact deeper, high-LWPc clouds, while the LWPc of all clouds is similar to the lower sprayer heights. 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." Aerosol emitted at altitudes higher than the lifting condensation level (LCL) can only interact with clouds that reach that altitude, i.e., have a cloud top that is located at or above the height of the aerosol. Since clouds grow from the LCL, and the LWPc is proportional to the squared cloud depth, the altitude of the aerosol plume results in the observed shift toward higher LWPc for sprayed clouds (LWPc*). This is causation and not mere correlation.

For all three sprayer heights, the aerosol lofts preferentially to clouds with more water content (LWPc), 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 fc*, the A*c,p would be higher than A0 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 A0c,p.

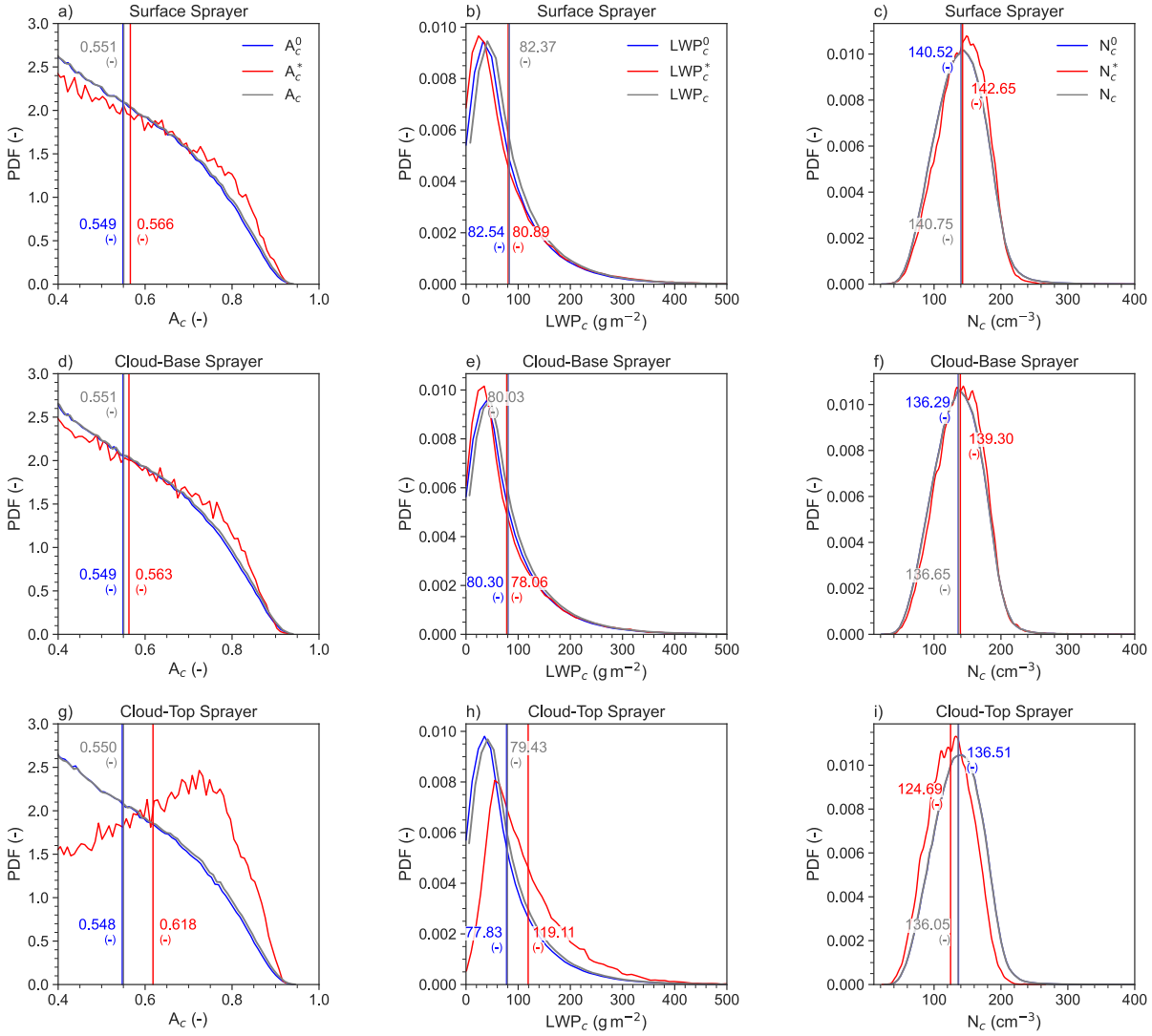
This is what we see for the surface sprayer (cf. Fig. 3). The PDF of LWPc* is almost identical to LWPc for all clouds. (The difference in the mean values of LWPc* and LWPc is not significant when the ensemble spread is considered.) Only for higher sprayers, a significant increase in the mean LWPc* over the LWPc for all clouds is observed. As outlined above, this is due to higher aerosol plumes interacting with deeper clouds.

Therefore, the d(rCRE) = fc*(Ac* −Ac0) reported includes the preferential lofting and the brightening effect and hence overpredicts the brightening effect. d(rCRE),mcb [brightening effect] = fc*(Ac*−Ac0) [overpredicted brightening] – f*c,p (A*c,p –A0c,p) [preferential lofting effect]

As stated in ll. 126 – 130 of our manuscript, the brightening due to increased cloud droplet concentrations is negligible for higher sprayers, because the cloud droplet concentrations do not increase or might even decrease in the sprayed high LWPc* clouds. Thus, there is no "brightening effect" for higher clouds, what has been already concluded in our manuscript (ll. 131 – 133): "The increase in Ac for higher sprayers, however, is due to the sprayed aerosol primarily interacting with deeper and hence higher LWPc clouds, and is therefore not a result of MCB."

Nonetheless, we re-analyzed our simulations by shifting the aerosol plume by 2.5 km to the north (see below). This is done by moving the aerosol plume in the previously conducted simulations. Accordingly, there is no interaction of the aerosol and the clouds in this part of the domain. Then, we analyzed the clouds as sprayed clouds when they overlap with the virtually shifted aerosol plume. As shown below, there is still an increase in LWPc* and hence Ac* for the highest sprayer, indicating that higher sprayers will

primarily interact with deeper clouds, even if there is no interaction between aerosol and cloud. This supports our original claim that the increase in LWPc* is due to the height of the sprayer.



Specific comment:

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

Done.