

## Responses to editor

Sorry, maybe I overlooked it in the first version, but in eq 1 and 2 you are using different names for  $\beta_{app}$  : (range-corrected) lidar signal in eq2, which I like more, and “total apparent backscatter coefficient” in eq 1 (which I think is confusing, it should be the range-corrected lidar signal). Can you please check at the end the equations 1 to 12 for consistency? Maybe introduce the  $1/z^2$  in eq 1 and 2 and keep a consistent wording.

**It is not exactly the range-corrected lidar signal, as we also correct for atmospheric transmission. That is why we call it "apparent". The solid angle is also corrected (range-corrected lidar signal in  $1/z^2$ ). We have specified this point in p4128:**

***“After the molecular transmission, background radiance and solid angle are corrected, ...”***

Can you please (once again? – sorry maybe my fault) explain, why the apparent backscatter ratio drops below 1, such that the reader understands the values in fig 3.a quicker.

The ABR drops below 1 because the apparent backscatter coefficient (equation 1) is attenuated by the atmospheric transmission due to aerosols and clouds. We have added this point in p14124:

***“The apparent backscatter ratio ( $\beta_{app}/(C \cdot \beta_m)$ ), including the attenuation due to aerosols and clouds, ...”***

The flow chart as response to reviewer No 2 is helpful. I support showing this in the final version. Yes,

**Yes, it's a good idea and we have kept it in the final version.**

Otherwise: good work!

**Thank you.**