Comment on essd-2022-59
Anonymous Referee #2

Referee comment on "Attenuated atmospheric backscatter profiles measured by the CO2 Sounder lidar in the 2017 ASCENDS/ABoVE airborne campaign" by Xiaoli Sun et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2022-59-RC2, 2022

This paper describes a valuable data set of atmospheric backscattering profiles observed with the NASA multi-wavelength airborne CO2 sounder lidar at around the CO2 absorption line at 1572.335 nm. The paper is well written and is recommended for publication after minor corrections.

One thing that is difficult to understand is the second half of the sentence in lines 189-191 "The range bin size is first multiplied by the cosine of the combined off-nadir pointing angle and the waveform is divided by the cosine of the off-nadir angle to compensate for the extra signal attenuation by the slant path length." What is the "extra signal attenuation"? The attenuation cannot be corrected by simply divided by the cosine. If it is about the range square factor, it seems that it should be square of the cosine. ..?