

Atmos. Meas. Tech. Discuss., author comment AC3
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Reply on RC3

Alessandro Battaglia

Author comment on "Impact of second-trip echoes for space-borne high-pulse-repetition-frequency nadir-looking W-band cloud radars" by Alessandro Battaglia, Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-219-AC3>, 2021

Comment 1: As someone who would like to repeat these simulations so that I understand the math better, can the constants used to generate Figs. 1 and 2b be added to the figure caption or in the text? If I can repeat Fig. 2b, then I could repeat the EarthCare simulations.

Reply:

H_{sat} = 705 and 400 km for CloudSat and EarthCare, respectively

Θ_{3dB} = 0.108 and 0.095 degrees for Cloudsat and EarthHCARE, respectively

Γ = 0.6077

H_t and σ_0 are changed as in Figure 1.

I will include this in the legend of Fig.1 for clarity

Question 2: I may not understand how profiles with MS scattering are being counted (page 10 line 12). Should a frequency of $10^{-3.7}$ be one on 5000 profiles (not one in 50 profiles)? Maybe $10^{-3.7}$ is relative to all profiles in 2008.

Reply 2:

$10^{-3.7}$ is an absolute frequency to all CloudSat profiles. So 1 profile out of 5000 profiles present this MS tail in the tropical belt. Since convective profiles are roughly 1% of the profiles this correspond roughly to one profile out of 50 convective profiles. So there is a 2% of the convective profiles which produce some second trip echoes.