Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., author comment AC2
https://doi.org/10.5194/amt-2021-219-AC2, 2021

Reply on RC2

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-AC2, 2021

Thanks for the comment and for the nice summary of the results you provided.

Concerning your questions:

Q1: Could the Autor explain why only CloudSat profiles over the ocean considered for the statistical analysis?

The statistical analysis is restricted to ocean surfaces only for the mirror echoes and this is because mirror images are strongly suppressed over land surfaces, which are rougher and therefore do not behave as Fresnel surfaces. Therefore we do not expect second trip echoes generated by mirror images over land.

Q2: And is it also possible to do such detection and analysis for profiles overland?

The statistical analysis for the multiple scattering tails on the other hand has not been restricted to the ocean only but it has been applied to any surface (and indeed convection is generally stronger over land than over ocean). In presence of strong multiple scattering the surface is not playing any role because the radar transmitted signal is actually not reaching it!