

# ***Interactive comment on “(GO)<sup>2</sup>-SIM: A GCM-Oriented Ground-Observation Forward-Simulator Framework for Objective Evaluation of Cloud and Precipitation Phase” by Katia Lamer et al.***

## **Anonymous Referee #2**

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The manuscript describes a forward simulator to convert hydrometer fields in lidar and radar properties. The approach to convert modeled hydrometer fields in lidar and radar measurements (also taking measurement restrictions into account) is very valuable. The paper is well written and suitable for publication after addressing the following points:

Although it is frequently stressed in the manuscript that the radar is very sensible to particle size none of the empirical equations takes the particle size into account.

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The motivation for the ice lidar ratio of 25.7 sr (Eq. 7) is not motivated. Additionally the lidar ratio is often dependent on the particle size which is not addressed in the manuscript. No multiple scattering is simulated even for water clouds or thick ice clouds.

Please give a reference for radar attenuation (Eq. 24b).

The meaning of the terms in Eq. 29 is not completely clear to me. Please give the derivation of Eq. 29.

A number of empirical equations are used to estimate the uncertainties. Although each formula is valuable for specific situations I am not sure if their ensemble covers the whole range of variability of ModelE output. A forward model using the modelled effective radius might help.

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Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2018-99>, 2018.

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