Reviewer 2:

Thank you, reviewer, for your comments and suggestions on our manuscript. Together with the suggestions of the other rewiewers we implemented them to the best of our knowledge into the text.

The paper presents the open-source instrument simulator Orbital-Radar. The manuscript is well written. I only have few minor comments.
Comments:

Line 74: “the same dielectric constant (k = 0.75)” Do you mean |K|^2 ?

Thanks for the comment. This was a mistake now in the manuscript should be written $|k|^2$

Line 84: “If the input data are from a ground-based radar system, they should be restricted to cases with limited attenuation such as ice clouds and shallow systems.” Embedded liquid layers could cause significant attenuation of W-band radar observations. Do you recommend to use MWR or lidar observations to diagnose mixed-phase conditions? Would you recommend a LWP threshold that would define where your tool should or should not be used?

First, we edited the manuscript and provided some recommendations on how to handle attenuation. Correcting liquid attenuation in radar data isn’t straightforward and usually requires additional data, such as a microwave radiometer and the retrieved liquid water path. In this code, we decided not to tackle this topic and left it up to the user to filter the data using their own post-processing, thresholds, etc.
Nevertheless, the problem of data filtering and the definition of attenuation in the ground and the CPR data are not present in the level 1 data for EarthCARE, which the orbital radar tool tries to mimic. Therefore, we should have included it in the tool. In addition, for some data sets, no additional parallel measurements or data sets are present, which would limit the possible input data set to the tool.
See the edited text below or in the updated manuscript.

“… Since the tool only has the Ze and V m fields as input and uses no additional data or retrievals a flagging of cases with high attenuation due to liquid droplets or precipitation is not provided. Such filtering has to be done using additional information, such as Cloudnet target classification or the liquid water path (LWP) by a parallel measuring microwave radiometer. If the input data are from a ground-based radar system, they should be restricted to cases with limited attenuation, such as ice clouds and shallow systems. Nevertheless, the filtering of the data depends on the user of the data sets and might be individual and has to be specified when using the data further.”

Line 90 “the introduction of the Earth’s surface radar reflectivity” Radar reflectivty characterizes a volume target. I am not sure how surface radar reflectivity is defined.

The surface reflectivity value we use in the simulation is based on the simulation studies and the parametrisation from (Li et al., 2005). It reflects the Ze value of the point target response

of the mean sea surface. Since EarthCARE and CloudSat are oversampling their received signals and the surface echo is usually a substantial reflecting target, the echo is affected by the weighting function, which leads to a so-called blind zone near the surface in the CPR data. This means that the surface echo present in the lowest range bins of the CPR overlays all atmospheric targets, if any are present.

Eq. 3: Do you have a reference for the EarthCARE's CPR pulse shape?
Table 1. You assume PRF of 5000 Hz. What are the actual PRF values used by EarthCARE CPR?

The PFR used for the predefined EarthCARE configuration is 6000 Hz; the 5000 Hz was a typo. However, the PRF of EarthCARE varies from 6100 to 7500 Hz depending on the latitude over which the satellite is flying.
For the paper, we fixed the Nyquist velocity to 5.7 ms-1 and did not calculate the velocity range via the PRF relation. Nevertheless, the description was incorrect, and the table's value was changed.

Eq. 5. Is the reference (Kollias et al., 2022) correct? I was not able to find justification for using normally distributed reflectivity noise. As far as I remember i,q data follows normal distribution. The reflectivity factor should follow chi^2, if I am not mistaken. What are the units of Eq 5?

The noise we modelled follows a Gaußian distribution because it can be approximated as such a distribution in dB space and considering a large sample size. However, you are right; usually, it follows a Chi^2 distribution. We think the differences between the Gaußian and the Chi^2 distribution and, therefore, simply used the straightforward representation.
In the future, we could also consider upgrading the representation of the noise.

The reference in dead needed to be corrected. Thanks for the hint.