Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2018-278-RC2, 2018

Atmospheric Measurement Techniques Discussions

Interactive comment on "Simulating precipitation radar observations from a geostationary satellite" *by* Atsushi Okazaki et al.

Anonymous Referee #1

Received and published: 28 December 2018

The manuscript presents the usefulness of a "feasible" Ku-band precipitation radar for a geostationary satellite (GeoSat/PR). It is an effort ongoing at JAXA to overcome two limitations of orbiting radar-based systems such as TRMM or GPM, namely, the limited swath and revisit time. A geostationary satellite needs a larger antenna than TRMM PR and GPM KuPR. A 20-m antenna for a 20 km footprint is considered in the study for its feasibility. The scan of the radar is within 6° that makes measurements available for a circular disk with a diameter of 8400 km.

Effects of Non Uniform Beam Filling (NUBF) and clutter are presented usng an extremely simple cloud model. The impact of coarse resolutions of the GeoSat/PR is quantified on 3-D Typhoon observations obtained with realistic simulations.

The subject of is important and the manuscript is, in general, well written. Therefore

it can be recommended for publication. I have some comments and suggestions that should result in a minor revision work for the authors.

1. What is the need of the approximation of equation 4? (moreover, tetab is not defined in the text).

2. The model of NRCS of ocean surface does not take into account the modification due to impinging rain. Authors should provide evidence of the fact that this contribution can be neglected.

3. Lines 233-234: I guess that the case of a 5 km beamwidth is given provided to make something similar to TRMM PR as reference. The text should better explain why the authors choose the different spatial resolutions. Also the "feasibility" of a 20x20 m antenna should better justified.

4. Lines 350-351: Authors guess that Ku attenuation can be corrected. Do they think that SRT method can be applied with this configuration ? (maybe some references are needed; the same is for sidelobe correction)

5. Figure 6: please report in the caption that "distance" in the panel is referred to the nadir.

6. Figure 8, 9, 11, 12: The captions report "Note that the areas where reflectivity form precipitation larger than 0 dBZ are shaded". It is not clear. In figure 9 and 12, close to ground we can see some darker grey that maybe are due to the resolution of the manuscript available to reviewers.

7. Figure 8: I suggest to remove wind from panel (a) because it just clutters the "true" reflectivity image.

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