Atmospheric
Measurement
Techniques

Open Access

Discussions

EGU

Interactive comment on "Evaluation of microwave radiances of GPM/GMI for the all-sky assimilation in RTTOV framework" *by* Rohit Mangla and Indu Jayaluxmi

Anonymous Referee #2

Received and published: 18 January 2019

This study faithfully follows ECMWF's methodology (Geer et al , 2009, 2011,2013, 2014) on microwave radiance simulation affected by precipitation, specifically in frozen phase. The specific contribution to this research subject is to investigate one high frequency channel from GMI in one meteorological condition i.e. tropical storms in Bay of Bangal.

The following are specific comments to this very specific study:

(1) The model inputs to RTTOV are from WRF simulation of storms. It is not clear how WRF forecasts are conducted, e.g. are they straight many hours of simulation initialized by ERA from certain moment during the storm lifetime? Judging from the storm figures,

the model simulated precipitation spatial distributions are not good comparing to the observed, that in turn would have negative impact to sampling of Tb departures.

(2) The RTTOV simulation uses Field's PSD and particle density(Field 2007). However, the WRF simulation here uses one-moment 6-class microphysics (Hong and Lim 2006) that has different assumptions on PSD and density. This inconsistency can introduce model errors to the Tb departure statistics. As previous studies have shown, the simulated Tb in presence of frozen particles is sensitive to PSD and density assumption as much as to the non-spherical shape assumption.

(3) the WRF serves dynamic downscaling of ERA and introduces microphysics hydrometeors, However at the model resolution chosen for this study, microphysics is not as relevant and effective as the cumulus convective parameterization scheme. As a specific regional study a finer model resolution should be more appropriate to resolve what microphysics is designed to resolve, and avoid averaging Tb observations.

(4) The three storms presented are in the same region, same season, with similar meteorological characteristics. It would be a stretch to state that the study applies to "all meteorological conditions". Therefore the presentation of statistics should combine the samples from three storms, which can increase the sample size for each of the statistical parameters evaluated, and improve readable quality of the graphics presentation.

(5) With all respect to model simulations, I wish something could be done independent of ERA or WRF, i.e. find locally observed inputs to radiative transfer model to obtain Tb departures that do not contain model background errors. It is difficult to get that in general global study. It would be a much more meaningful contribution if a regional study like this one makes effort in that direction.