Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2019-223-RC1, 2019

Atmospheric Measurement Techniques Discussions

Interactive comment on "Assessment of cloud properties from the reanalysis with satellite observations over East Asia" *by* B. Yao et al.

Anonymous Referee #2

Received and published: 30 October 2019

This paper by Yao et al., evaluates qualities of cloud properties in three reanalysis datasets, namely, China Meteorological Administration Reanalysis data (CRA), ECMWF's Fifth-generation Reanalysis (ERA5), and Modern-Era Retrospective Analysis for Applications version 2 (MERRA-2). A radiance-based evaluation approach is utilized with reflectance and brightness temperature observations from the Advanced Himawari Imager (AHI) onboard the Himawari-8 satellite. A radiative transfer model (CRTM) is used to link cloud related variables from reanalysis to satellite observations.

Overall, I believe this work is very valuable, which enhances our understanding of cloud representation in those reanalysis products. However, I have some concerns about the structure and some details of this paper.

Several major concerns I have about this paper include: 1. This paper uses observa-

tions from AHI/Himawari-8 to evaluate reanalysis. It is very important to mention that which satellite products (in particular cloud related datasets) are used as input in the three reanalysis products.

2. The advantages of a radiance-based evaluation approach are discussed in the abstract and introduction. I don't understand why the authors still use a lot of space describing AHI cloud products in Section 4?

3. This paper uses almost 4-pages to describe a case (a snapshot on a particular day) assessment, which I think is not necessary. In my point of view, the authors should pay more attention on long term cloud representation (e.g., cloud monthly mean, seasonal/annual variability).

Some minor suggestions include:

1. Page 2, large advantages of spatial distributions –> large advantages of spatial coverages

2. Page 6, CTT from two satellite retrieved cloud datasets (i.e., from solar and thermal infrared) How to use AHI solar bands to get CTT, can you give more details on this?

3. Figures 3, 5, and 7 The plots in Figures 5 and 7 use all pixels (i.e., clear + cloudy) in Figure 3? If yes, I suggest remove clear pixels or only focus on the regions of interest. I noticed that a large number of pixels in Australia are clear and reflectances from models are much higher (brighter) than AHI observations. This can significantly bias your plots in Figs. 5 and 7, and statistics.

4. Figures 11 and 12 and corresponding text: The authors use BT 11um as a proxy to differentiate clouds on low, mid, and high levels. This is problematic since high and thin cirrus may be attributed to low clouds.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-223, 2019.