

Atmos. Meas. Tech. Discuss., referee comment RC1
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Comment on amt-2022-45

Anonymous Referee #1

Referee comment on "Segmentation-Based Multi-Pixel Cloud Optical Thickness Retrieval Using a Convolutional Neural Network" by Vikas Nataraja et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2022-45-RC1>, 2022

Comment to "Segmentation-Based Multi-Pixel Cloud Optical Thickness Retrieval Using a Convolutional Neural Network" by Nataraja et al.

This study develops a new machine learning approach to retrieve cloud optical thickness (COT) fields from visible passive imagery. It takes the spatial context of a pixel into account, and thereby reduces artifacts arising from net horizontal photon transfer, commonly known as independent pixel (IP) bias. It demonstrates the different performance of CNN in retrieving cloud properties over various locations. This study provides a baseline for future implementations of the CNN in COT retrievals for different regions. In addition, the paper is well written. It is worthy for publication after necessary modifications.

Line 17-18, a few references regarding the importance of COT might be helpful, with Zhao and Garrett (2015, doi: 10.1002/2014GL062015) suggested.

Line 23, the inhomogeneity issue exists in both spatial and temporal.

Line 46, IP bias is not defined yet in the main text, while defined in the abstract.

Line 51-53, I appreciate the information here. However, I wonder if the satellite spatial resolution is high enough to make us ensure that the optimum occurs at a scale of about 1 km.

Line 63, "distinguished"

Figure 2, It seems to me that the difference (IPA COT) has a very good linear relationship with true COT, making me think that the IPA COT could be highly improved by simply corrected with this linear relationship. If this is true, why do not we use this simple method?

Line 207, what are the three aerosol number concentrations?

Line 214-217, why do the authors only use two daytime periods?

Equation(5), In my understanding, this equation calculates the water vapor amount instead of liquid water content. Could the authors help explain?

Line 393-394, It seems to me that this sentence need modify to make it clearer.

Line 444-446, could this selection introduce some uncertainties to the results?

Line 536, "50%"?

Figure 11 and 13, unit of CF should be "%" or should be with value less than 1.