Interactive comment on “Leveraging spatial textures, through machine learning, to identify aerosol and distinct cloud types from multispectral observations” by Willem J. Marais et al.

Willem Marais
willem.marais@ssec.wisc.edu

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Thank you for your interest in the paper. In regards to your first question, are you referring to Table 4 of the paper? If yes; I attached confusion matrices for each method from which you can get an idea of the true positive and false positive rates. In regards to your second question; we left it for future work to do a sensitivity study with more patch sizes.

In regards to Figures 11 and 12; we will update the captions to make it clearer how to interpret the figures. To help with clarification on how to interpret the figures, let me share with you how we created Figure 11.a and b: We took all the patches that were colocated with CALIOP and selected the patches where CALIOP only detected cirrus/high-altitude clouds over all CALIOP observations that cover the patches. In other words, the patches that were selected exclude patches that had aerosols or just “clear-air” columns or had water clouds present. From the selected patches, we computed how much of each patch that intersects with CALIOP observations were labeled as cirrus/high-altitude cloud by the methods. We then we ranked the fraction results according to cloud optical depth.

The interpretation of Figure 11.a is as follows: For cirrus cloud optical depth of 2, where CALIOP detected only ice clouds in all its observations in the patch, on average the F-CNN method says that $\sim87\%$ of the patch (that intersects with CALIOP) is covered by ice clouds. We are avoid using the word accuracy in this case, because 1) for a patch the CALIOP observations only covers a line over the patch since CALIOP has a narrow field of view, 2) it is unclear what the CALIOP’s absolute accuracy is at detecting ice clouds.

Figure 12 was created in a similar way compared to Figure 11, though with CALIOP aerosol measurements instead of cirrus/high-altitude clouds.

In regards to the description of CNNs; we will add text to clarify what is our research vs. what has already being built in the CNN packages.

Please also note the supplement to this comment:
https://www.atmos-meas-tech-discuss.net/amt-2020-74/amt-2020-74-SC2-supplement.pdf