

# ***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.***

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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

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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  $\sim 87\%$  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>

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