Atmospheric
Measurement
Techniques
Discussions

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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.

Anonymous Referee #2

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Marais et al use a machine learning technique together with a new methodology to create a training data set with which they can show that improvements in the discrimination between clouds and aerosols can be achieved. Additionally, these method allows an enhanced capability to classify cloud types.

Before publication in AMT the following minor to major comments should be considered:

General comments:

- The introduction is somewhat confusing. It's a mixture between an introduction and a method section and thus needs some restructuring, See my specific comments below.

- Figures captions are quite lengthy and already include an interpretation of the figures which however rather belongs to the main text.

- Several sentences are beginning with "E.g" which in my opinion is not a good writing style.

- Data from several satellite instruments are used in this study. However, these instruments are nowhere in the manuscript described. A short description should be added for each instrument used in this study.

Specific comments:

P1, L20: Change "Introduction & Problem Solving" to "Introduction".

P2, L53: References? Who has developed the CNN method?

P3, Fig. 1 and P4, Fig. 2: Both figures should be moved to the method section.

P3, L64: Skip Sub-header "1.1. Objectives".

P5, Section 1.2: Skip section header and move most parts of the text to the method sections. In the introduction it is sufficient to just write in a few sentences what

has been done without going into detail.

P5, L1.3: Skip sub header "1.3 Outline".

P6, Section 1.4: This section should be either included in the method section (extra subsection for this is not necessary). Even better would it be to have this Table in an appendix.

P6, L114: Add a reference for the FE method?

P7, L134: "………...with which rank the different methods…….....". Sentence not correct, something is missing here. Did you mean …." with which "we" rank the different methods"?

P12, L202: The listing is obsolete and mentioning the person to do it is a bit weird here. Therefore, I would suggest to rewrite the sentence as follows "…....MODIS/VIIRS images that are chosen are divided into overlapping patches….…."

P12, L205: "one co-author" obsolete. Simply write "In order to ensure consistent labels for the study, a labeled data set was created….…..."

P12, L207: Why are quotation marks used for clear air?

P12, Section 2.2.2: This section sounds like a user manual. Avoid writing the atmospheric scientist/user. Just describe the process itself.

P13, Figure 4 caption: Rephrase sentence to " The web-interface through which a labeled data set of aerosols and cloud types can be created."

P13, Figure 4 caption: Skip the sentence "The user has the option….…..."

P13, L225: "…..the following guidelines were followed:" Rephrase sentence to avoid repetition of "follow".

P15, L267: Use a full stop after proposed and add the references here. Continue then with "Thereby, each CNN configuration has e. g. different convolution dimension sizes, different number of feature maps, different depths, different sequence of convolution and different pooling/aggregation.

P17, L292: Delete furthermore or move it at the begin of the sentence.

P19, L334: Delete the first "and" in the Section header so that it reads "Training, test datasets, and test errors".

P22, L416: Sentence on Fig13 not clear. Please rephrase.

P23, L428: Are studies existing that compare these instruments and/or document these differences? If yes, please add these references.

P23, L447: By design of what? The CNN?

P33, Figure 11 caption: Some text here belongs rather to the main text since it is describing what conclusions can be drawn from the figures and not what actually is shown.

P34, Figure 12 caption: Same here. Shorten the caption text and just write what is shown.

Technical corrections:

P15, L269: optimum choice → best choice

P19, L338: the some → some or the same?

P20, L351: methods or cases?

P19, L346: to method → to a method

P21, L360: aerosols → aerosols

P21, L365: aerosols → aerosols

P21, L369: K[elvin] → K

P21, L372: delete "the" before "how"

P21, L374: Through for → For

P22, L3399: compared → compared to

P22, L418: show → shows

P23, L433: add "that" or "the following" at the end of the sentence.

P23, L443: most the → most of the

P30, Figure 8 caption, L3,4,6,7: show → shows

P30, Figure 8 caption: K[elvin] → K

P30, Figure 8 caption: range → "in the range" or "ranging"