

We would like to thank the reviewers for their suggestions, edits and questions which contributed to a hopefully improved revised manuscript. In the following, please find our point by point response to both reviewers' comments.

Anonymous Referee #1

Received and published: 30 April 2020

Yuan et al. present a method to identify marine low-level cloud regimes. Using MODIS reflectances, and creating a training dataset by human visual inspection, they apply a Deep convolutional neural network to objectively assign each scene to one of six pre-defined types. The method is well described and carefully evaluated. The authors aim to make their product publicly available which is potentially of great usefulness to studies of clouds. The paper is very well written and of interest to the readership of Atmos. Meas. Tech. I only have a few minor remarks which the authors should consider in a revision.

127 “shows”

Changed from ‘show’ to ‘shows’.

128 “suggests”

Added ‘s’ after suggest.

139 “histograms”; however aren’t pixel-level retrievals and joint histograms redundant? the latter is just a way to statistically retain the pixel-level information at level 3 aggregation.

Correct. It depends on how the pixel-level retrievals are used. But ultimately, they both use the pixel level retrievals. Some methods use a one-dimensional PDF and others may use joint-histograms.

141 only since then? Or not rather since ever / since the first cloud observations (such as Howard,

The reference we used is the best example we are aware of. Could the reviewer provide us with a complete reference?

162 “a plan” or “plans”

Changed to ‘plans’.

170 The Platnick reference should be updated (actual author list is longer, and it appeared 2017 (vol 55)).

Changed to Platnick et al., 2017.

171 Please specify the horizontal resolution for reflectances and retrieval products.

Added a sentence. “The spatial resolution of these parameters is 1km at nadir.”

177 Provide the unit here. I assume it is 128 x 128 pixels of 1x1 km² size each?

Changed. Since the pixel size changes slightly with view angle we now simply quote scene size in terms of pixels rather than physical area.

184 It is a nice idea to include this a bit technical detail. This illustrated well what is actually done.

187 And this is a good idea!

Thanks!

194 Omit “keep the task manageable” once.

Changed.

1119 Are the PDFs exactly the retrievals from the scenes provided in Fig. 3? It would be good if it was such, and should be clarified in the text.

The PDFs are mean distributions of samples belonging to a particular type. We randomly selected 1000 scenes for each cloud type.

1141 I don’t understand what “flipping” means if not rotating by 180°. The authors should clarify this.

Now clarified: “The flipping operation is achieved by mirroring the original image across a horizontal axis.”

1154 It would be useful to explain in one sentence to the non-specialized readership what the confusion matrix is.

Added : “The confusion matrix summarizes the classification prediction results. For each cloud type, or row, it shows the percentage of correct predictions on the diagonal and percentages of incorrect predictions off the diagonal.”

1161 It would be interesting to know how often this occurs for the different cloud types. E.g. a fraction of disagreement for each type?

With the added explanation about the confusion matrix, readers should be able to read how often misclassifications occur for each type and how they distribute across different types.

1165 This mostly looks quite reasonable. However, some results seem rather strange to the naked eye. E.g. where the solid stratus diagnosed at 14°S/78°W I don’t see any cloud, let alone a stratus.

The dot represents the center location of a scene. The right half of this scene is indeed occupied by stratus clouds. A scene does not have to be mostly cloudy to be classified as stratus. The algorithm examines the textual information of the clouds.

1186 drop “the”

Changed.

1338 “indicates”. And what is the difference between the light pink and red lines?
Changed. The solid lines are running means of the light pink lines.

1365 Help from which other authors?
Clarified. It’s ‘all’ co-authors.