Egusphere-2023-2392-v1

General Comments:

The revised version addresses the major comments raised by the reviewers. I can recommend acceptance of the manuscript after minor revisions to address the remaining points discussed below and other technical comments.

Specific Comments:

The conclusions lack a summary of the quantitative results of the paper and also lack a recommendation about the types of clouds that this technique should be applied to by a potential user.
The results presented on accuracy by extent/altitude should be combined with studies from the literature on cloud types and their sizes (e.g., Wood & Field, 2011) to come to such a recommendation.

Wood, R., and P. R. Field, 2011: The Distribution of Cloud Horizontal Sizes. *J. Climate*, **24**, 4800–4816, https://doi.org/10.1175/2011JCLI4056.1.

Figure 8: Is there a joint dependence of the dice score on the Top-of-cloud-distance/Cumuluative Depth on the total thickness of the cloud object (highest-top to lowest base)? In other words, is there a difference between the accuracy at the top of a thick cloud and the top of a thin cloud? Alternatively, is there a difference between the top of a high-topped cloud and the top of a low-topped cloud?

Line 13: The abstract says “we draw conclusions” but doesn’t state the conclusions. The abstract is most helpful when it summarizes these conclusions. I would recommend trying to trim words from the first half of the abstract and adding some more quantitative results to the abstract.

Technical Comments:

Line 21: References for the feedback cycles should be added here.

Line 27: Three satellite missions. There should be a transition sentence introducing satellite remote sensing as a means of acquiring semi-global observations to reduce these uncertainties.

Line 49: Some references to instruments like MISR/ATSR here would be good.

Line 60: I suggest changing this to something along the lines of “This work is the first to utilize POLDER measurements for the estimation of full vertical cloud profiles.” So that readers also learn about what you are doing at the same time as you mention its novelty.
This is important as the introduction currently lacks a clear “we are going to do X” statement.

Line 62: The way the pinhole vs rational polynomial comparison is made in the text makes it seem like this is an algorithmic choice, rather than something that I would believe would originate from differences in optical hardware.

Line 332: I suggest adding “To evaluate the predictions of the models we use the Dice score.” Or something to this effect at the beginning of Section 4.1.

Line 341: Here I suggest simply stating: we report the dice scores in %.

Line 358-359: Dice scores need percentage symbol.

Table 3/Section 4.4. which model architecture is used to produce these results? This should be in the caption of Table 3 and Figure 4.

Figure 9: I believe the color label should show something like “cloud length” rather than “color scale (km)”. The color map for the clouds should be switched to something that doesn’t end in black (e.g. red, yellow, blue) so that all the clouds can still be seen regardless of whether they are small.