Response Letter

Dear referee:

Thank you for your comments and advices on our manuscript. We have carefully studied comments and made related revisions. Our response is as follows:

Page 1:
1. Line 29-31, one more reference could be added, Yang et al. (2017, doi: 10.1002/2016JD025954), which shows the application of ground-based cloud observation for evaluating satellite-based observations.

Reply: Thanks for your comment. The related reference has been added in Line 28.

2. Line 32-34, "are used to detect clouds". Also, one more references could be added, Yang et al. (2018, doi:10.1016/j.atmosres.2017.11.021).

Reply: Thanks for your comment. The sentence has been corrected to "are used to detect clouds", and the reference also has been added.

Page 2
3. Line 3-5, "... for recent years".

Reply: Thank you for pointing it out. The word "in recent years" has been corrected to "for recent years".

4. Line 7-9, I am a little confused with this sentence. I understand that the aerosol particles along with some small cloud droplets follows Mie scattering. However, for air molecules, they generally follow Rayleigh scattering.

Reply: Thank you for pointing it out. Now, the sentence has been corrected as "This is because that cloud particles have similar scattering intensity in blue and red bands because of the Mie scattering effort, while the air molecules have more scattering intensity in blue band than that in red band due to the Rayleigh scattering theory"

5. Line 13, "treated" Line 14-15, this seems not a complete sentence.

Reply: Thank you for your comment. The related content all have been changed to the past tense.

6. Line 21-23, "technology" -> "technologies". Also, this sentence seems with grammar error.

Reply: Thank you for pointing it out. The word "technology" has been corrected into

"technologies". The relative sentence has been corrected as "CNNs are outstanding and powerful object recognition technologies, which have been widely applied to many fields, such as computer vision and pattern recognition"

7. Line 26-27, "is" -> "was"

Reply: Thanks for your careful check. The word "is" has been corrected into "was".

Page 3
8. Line 31, where is description for Fig. 1(a)?

Reply: Thanks for your reminder. In Line 26, "The appearance and functional specifications of ASC are shown in Fig. 1", Fig. 1 actually means Fig. 1(a) and (c). Now, we has corrected the expression.

Page 4:
9. Line 4-5, where is description for Fig. 2 (a) and (b)?

Reply: Thanks for your reminder. We has added the description about Fig. 2(a) and (b) in Line 26-27.

Page5
10. Line 7, "accepts"

Reply: Thank you for pointing it out. The word "accept" has been corrected into "accepts".

11. Line 9, "are" ->"is"

Reply: Thank you for pointing it out. The word "are" has been corrected into "is".

12. Line 27-29, "are the locations",

Reply: Thank you for pointing it out. The word "is the location" has been corrected into "are the location".

13. Line 30, "ensure effectively to restore ..."

Reply: Thank you for pointing it out. The sentence has been corrected.

14. Line 32, "achieve ... cost ..." ?

Reply: Thanks for your comment. The sentence has been changed as "Although pooling indices have advantage in computational time, they may lead to a slight loss of cloud

boundary details".

Page 6
15. Line 13, "is"->"are"

Reply: Thank you for pointing it out. The word "is" has been corrected into "are".

16. Line 14, the last sentence seems not a complete sentence.

Reply: Thank you for pointing it out. The sentence has been corrected as "Thus, the final segment results are outputted".

17. Line 17-20, please modify the description to make them more concise.

Reply: Thanks for your suggestion. The related description has been modified as "Thereafter, SegCloud is trained on an NVIDIA GeForce GTX1080 hardware and the machine learning software package named TensorFlow. Mini-batch gradient descent is used as optimization algorithm to find the appropriate model weights. During the training process, the number of whole sky images fed to the SegCloud model per batch is 10 and momentum parameter with a decay of 0.9 is used (Sutskever et al., 2013). SegCloud is trained in 26,000 epochs with learning rate 0.006". We hope these expression would be more concise.

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18. Lines 23-27, the performances are great. However, if you could provide some explanations or discussions regarding those that are not accurately classified, it would be more useful.

Reply: Thanks for your suggestion. Although SegCloud model achieves great performance in whole sky image segmentation, it still has less recognition for very thin clouds. The related content has been added in Line 8-9, Page 8.

Page 8
19. Line 7, why do you only provide "some representative segmentation results"? How do you make the choice of "some", subjectively or objectively?

Reply: Thanks for your comment. In this work, we test 60 images, we cannot show all segmented results in the manuscript. So we randomly choose four whole sky images and their segmentation results under the precondition of including different cloud cover. Therefore, these four images separately show clear sky, partial cloudy sky and overcast sky.

20. Line 7, "poorly" -> "poor"

Reply: Thank you for pointing it out. The word “poorly” has been corrected into “poor”.

21. Line 13-14, do you mean “more excellent”/”more accurate”?

Reply: Yes, the sentence has been corrected as “The R/B threshold method has more accurate segmenting results compared with Otsu algorithm”.