"Efficient multi-angle polarimetric inversion of aerosols and ocean color powered by a deep neural network forward model" uses a deep neural network (NN) to replace traditional forward model with radiative transfer code as part of the aerosol and ocean color algorithm for multi-angle polarimetric sensor HARP2 and future sensors such as PACE. As more and more machine learning techniques have been implemented in Earth science field, this research is inspiring and informative to the community. The research is well conducted, and the article is nicely organized and written. I have some comments regarding clarification of the procedures and readability of the article.

1. Page 2Line 10 delete "the" before "top-of-atmosphere"
2. Page 4 Line 32 delete "both"
3. Page 5 Line 3 here says "20 viewing angles" but page 3 line 1 says "10 viewing angles"
4. Page 6 Line 1 is there any reference for this "0.01"?
5. Page 7 Line 16, why is imaginary reflective assumed flat among wavelengths? There are many studies show changing absorption as function of AOD, especially over smoke plume. What is the uncertainty related to this assumption?
6. Table 1 It is very confusing, as all parameters are calculated from the forward model, but the description says reflectance measured at BOA/TOO. Are they calculated or measured? Also are these reflectances upwards or downwards?
7. Page 9 line 20. I am not in the field of ocean color, thus, it is confusing for me to read "represented by the spectral remote sensing reflectance" and given Rrs equals to radiance/irradiance. Because reflectance has no unit and Rrs has a unit of sr^{-1}, which I learnt later in the paper in Figure 5.
8. Page 10 Line 3, is the transmittance $t_u^{f,+}$ the same between ρ_t^f and $\rho_t^{f,+}$ vs. $\rho_{t,a+s}^f$ and $\rho_{t,a+s}^{f,+}$? Is $t_u^{f,+} = \frac{\rho_t^f}{\rho_t^{f,+}} = \frac{\rho_{t,a+s}^f}{\rho_{t,a+s}^{f,+}} = \frac{\rho_t^f - \rho_{t,a+s}^f}{\rho_t^{f,+} - \rho_{t,a+s}^{f,+}}$ correct? I assume reflectance at BOA is upward, due to $t_u^{f,+}$ is upward.
9. Page 11 paragraph one, is the height of the aerosol considered? How will NN response when AOD is greater than 0.5, which is often during fire/dust events?
10. Page 12 Line 1 how are these 1000 testing data selected?
11. Figure 4 The y axis labeling is confusing, if the lines are shifted the y axis tick values should be shifted as well to give a right number. Use minor ticks to show the magnitude.
12. Page 16 paragraph one, the percentage error is clearly as a function of reflectance. It can be larger than 3% when reflectance at near-IR is low. Giving one value of percentage error might be misleading, especially when compared with measurement error.
13. Page 17 line 14. "the water leaving signals are represented by the remote sensing reflectance". Again, this sentence is misleading.
14. Page 18 Line 8. The global mean AOD is around 0.2, which means error of AOD is around 14% and it will be even larger when applied to real data due to aerosol assumptions and surface models.
15. Figure 7 and 8, Please add percentage error plots similar to relative error plots shown in the lower panel.
16. Page 22 Line 11, "value magnitude", delete "value" or "magnitude".

17. Page 22 Line 20-24. After I read the next paragraph, I understand better that R_{rs} is the main goal of this procedure, even though AOD and Chla are usually final products.
18. Section 5, HSRL and AERONET data need to be introduced in the beginning of this session especially regarding their accuracies.
19. Figure 14-16, What are the dots on AOD panels? Also please include RGB images for visualization purpose.