<u>A Response to Reviewer 1 comments:</u>

Dear Michael, thank you for your comments and valuable suggestions which are clearly improving the manuscript. All suggested editorial changes were implemented in the revised version, including:

1. The title was changed as suggested.

P 1567, L19-20: Changed to "near-global".

Below are the answer to your other questions:

P 1578, L1-2: MAIAC uses MODIS bands B1-B8 (for CM, aerosol and atmospheric correction algorithms), B17-B19 (for water vapor retrieval), and B31 (for CM). These channels have different "native" nadir resolution of 250m (B1-B2), 500m (B3-B7), and 1km (B8, B17-B19, B31). All of these bands are gridded to a 1km regular grid using an area weighted method, which sums contributions from all detectors overlapping given grid cell weighted according to their respective overlap area.

P 1580, L5-7: The same question was asked by Reviewer 2. This is our answer we provided to Reviewer 2:

"L112: Indeed, we used a different droplet size (10mkm) in these simulations than previously (5 mkm), and this is some inconsistency on our part which was overlooked. This change will have little effect on visible wavelengths where the optical thickness can be re-scaled to get quite similar results for the two cases. The difference will show up at wavelengths where water has a noticeable absorption, in our case at 2.1 mkm. However, the 10mkm droplets represent the valid and typical range of cloud droplet sizes such that the results of presented simulations are not incorrect."

To add to this answer, it's worth to mention that the exact model of the cloud used in simulations does not matter as MAIAC thresholds for spectral residuals are selected to be sufficiently large to accommodate variability in cloud properties.

P 1580, L9-24: We agree with all your suggestions. The symbol "tau_cl" was removed and replaced by COT. The respective sentence was changed as follows:

"To understand its capabilities and assess sensitivity to thin clouds over different surfaces, numerical simulations were conducted."

P 1585, L11, 14, 15: Thank you for noticing this inaccuracy. The respective sentence was changed as follows:

"... and applied a standard validation approach which filters high MAIAC AOT data above 70th percentile (Lyapustin et al., 2011b) ..."

The added reference provides the details of MAIAC AOT validation. For example, AERONET observations are averaged within time interval of +- 30min from the overpass time. The AERONET AOT is interpolated to wavelength of 470nm using quadratic polynomial.

Figure 5: The color code of the cloud mask was described earlier. We added a new sentence in Caption of Figure 5:

" The cloud mask color coding is described in caption of Figure 4."

We chose not to add arrows or circles in Figure 5 as according to our experience the viewers (readers) have no problems identifying fire smoke plumes in both TOA RGB and AOT images.