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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The regional distribution characteristics of aerosol optical depth over the Tibetan Plateau" *by* C. Xu et al.

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The paper deals with the quantification of aerosol properties over the Tibetan plateau, using satellite measurements from MISR and CALIPSO. The authors report a climatology of the aerosol optical depth (AOD) at 558 nm from MISR and of the aerosol type, according to the CALIPSO classification. The MISR dataset used ranges from March 2000 to December 2014, while the CALIPSO data are from March 2007 to February 2015. The authors produced a series of climatological averages, providing height-resolved transects with significant seasonal variations. The Qaidan basin results to have the highest aerosol AOD throughout the year. Figure 7 should be moved before any other map, highlighting the regions mentioned in the text: the Qaidam basin, the Gobi and Taklamakan deserts, the Tarim basin. As mentioned, the authors find that the highest AOD is found over the Qaidam basin. As far as I know, this region is rather

populated and many industries and caves are here located. However, some important aspects are not faced in the discussion: 1. Which are the estimated uncertainties and errors on the MISR retrieval in such high altitude regions? 2. How heavy is the possibility of cloud contamination on level 3 MISR data? 3. A rather trivial observation leads to the thought that the total AOD is anti-correlated with the ground elevation. This would indicate that, since the tropopause is almost constant even over high mountains, less atmosphere means less aerosol. 4. Higher aerosol loads come from the most populated regions These points should be better discussed and highlighted before the publication. An interesting topic that is just sketched is the possibility of aerosol intrusion in stratosphere, since spring observation often show aerosol layers up to 11-12 km ASL. I encourage the authors to better develop this part. Furthermore, the conclusions look very shy and generic.

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