Atmos. Chem. Phys. Discuss., 15, C3754–C3755, 2015
www.atmos-chem-phys-discuss.net/15/C3754/2015/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Detection of anthropogenic dust using CALIPSO lidar measurements" *by* J. Huang et al.

Anonymous Referee #1

Received and published: 17 June 2015

General: A clear understanding of anthropogenic dust emission is critical for predicting how changes in land usage (and thus changes in land use policies) will influence dust emission, loading, and deposition in the future. However, the assessment of the role of anthropogenic activity in the atmospheric dust cycle is limited by the accuracy of the available data sets. CALIPSO can provide new insight into the detection of global anthropogenic dust emission due to its measurement of vertical resolution and depolarization ratio. The authors of this manuscript developed a new technique for detection of anthropogenic dust emissions by using CALIPSO lidar measurements and used this algorithm to analyze its global distribution. In general, I found the paper well written and appropriate for ACP audience. I recommend accepted this paper for publication in ACP with addressing those comments listed below:

1. Page 10167, line 10: It will be much better if authors can provide more detail explanation about meaning of the sentence: "The larger the magnitude of the CAD score, 10 the higher our confidence that the classification is correct. Liu et al. (2010) revealed that the confidence in the classification is high with $|CAD| \geq 70$ in Version 3. Based on this, we only include features with absolute values of CAD score greater than 70 in this study."

2. Page 10173, Line 20 to page 10174 line 10: Author should move section 4 before section3 and change the title as "Calculation of dust column burden (DCB)"

3. Page 10176 line 15 to 19 line 3: Authors need to provide more discussions about Fig. 7.

4. Page 10178, line 16 to 23: Authors need to provide more discussions about Fig. 10.

5. Page 10179, line 4-24: Authors should discuss some uncertainty of this method in discussion section.

6. JQSRT published a paper about the depolarization of linearly polarized light (Sun, W., Z. Liu, G. Videen, Q. Fu, K. Muinonen, et al., 2013: For the depolarization of linearly polarized light by smake particles, Journal of Quantitative Spectroscopy & Radiative Transfer, 122, 233-237). Please reference this paper to increase reader understanding of the method.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 10163, 2015.