

Review 2

The manuscript proposes a new technique for distinguishing anthropogenic dust from natural dust is by using the CALIPSO dust and PBL height retrievals along with a land use dataset. By using this developed technique, the paper also presents the global distribution of anthropogenic dust and estimates the relative contribution of anthropogenic and natural dust sources to regional and global emissions. This is an interesting and important study, because anthropogenic dust has been poorly characterized in climate and environment issues. This topic fits very well into the scope of ACP. Generally, the manuscript is written in understandable English but needs to be improved for better clarity and coherence. The paper should be considered for publication only after making minor revisions as follows:

We really appreciate for the reviewer #2 very carefully reviewing our manuscript again. We are grateful for and agree with all of the proposed suggestions. In accordance with these suggestions, we have checked the manuscript carefully to avoid misunderstanding of reviewer's original comments, and we have clarified some issues in context.

The revised version has been professionally language edited by Nature Publishing Group Language Editing (<http://languageediting.nature.com>).

1. The abstract could be shortened, because the descriptions are repeated in line 2-3 and line 15-16.

Response: By following the reviewer's suggestion, we make reduce the abstract and make it more summary.

2. All "East China" could be better to be changed with "Eastern China".

Response: All "East China" in the manuscript has been changed with "Eastern China"

3. Page 10172, Line 20-21: "natural dust is at its minimum in autumn", which could be only true over the Taklimakan desert. The seasonal changes of natural dust are different over the other deserts, even in the northern China.

Response:“Because anthropogenic dust has little seasonal dependence and natural dust is at its minimum during dust inactive season (eg. autumn for Northern China), we used 4 years (2007 through 2010) of autumn measurements to look at the optical properties of anthropogenic dust.”

4. In Figs. 6, 7 and 9, the white color bars are hard seen. Please modify them.

Response: The white color background in the Figs. 6, 7 and 9 has been replaced by gray color.

5. To better discuss the results of anthropogenic dust contribution to North American air quality, please reference this paper: Park, S. H., S. L. Gong, W. Gong, P. A. Makar, M. D. Moran, J. Zhang, and C. A. Stroud (2010), Relative impact of windblown dust versus anthropogenic fugitive dust in PM_{2.5} on air quality in North America, *J. Geophys. Res.*, 115, D16210, doi:10.1029/2009JD013144.

Response: We have cited this paper and acknowledged the earlier work by different authors.