

**Referee Comment in the interactive discussion for the paper: “Comparison of key absorption and optical properties between pure and transported anthropogenic dust over East and Central Asia”, by Jianrong Bi et al.**

The work presented in this paper is very interesting and well structured.

The authors suggest a method for discriminating the presence of Desert dust in the atmosphere, dividing it in two different cases: pure dust and transported anthropogenic dust.

The method is based on a threshold on AOD (440 nm) and Angstrom exponent (calculated using the two wavelengths 400 and 870 nm), and provided good results when compared with the plots of the volume size distributions.

Also the section devoted to the comparison among the values retrieved from measurements and the ones from models generally used, is very interesting and useful.

To complete the paper, I suggest the authors to give a look to the following paper where a similar work has been done for Saharan dust in Europe : “Inventory of African desert dust events over the southwestern Iberian Peninsula in 2000–2005 with an AERONET Cimel Sun photometer”, Toledano et al, 2007, DOI: 10.1029/2006JD008307.

Also in this paper thresholds on Angstrom exponent and AOD are used in order to set up an Automatic Criterion for Detection and Evaluation of Desert Dust Intrusions and, as expected, they are different from the ones used in this paper.

I think it should be highlighted in the text that the chosen values are good for the type of dust intrusion of the selected area, and that for a smaller area or a different geographical location, they must be selected carefully.

In that paper it is also written that a larger sensitivity to the presence of dust particles has been found at 870 nm rather than 440 nm.

Do the authors think that using a threshold on this wavelength in the case of TDU would help to discriminate more accurately the amount of dust from the anthropogenic aerosol? Did the author never find (in TDU dataset) a 3 modal volume size distribution?

If yes, it could be another possibility for better understanding the composition of TDU dust.

Minor comments in addition of the ones already done by the other referees:

Line 189: put the acronyms of SSA, ASY, Ri and Re in line 186, where these quantities are listed.

192: “are dependent on  $AOD_{440} \geq 0.4$ ” I think it would be better saying “are valid for  $AOD_{440} \geq 0.4$ ...”

277: “capability” instead of “intensity”

346: it is written that the pick radius of the coarse mode is about 2.24 for both PDU and TDU. However for Yulin in TDU it seems to be about 3. I think that in the case of TDU it would be better saying that the pick radius is between 2-3.

512-514: the sentence begins with “because” but it doesn't seem to have a correct grammatical structure ( subject, verb , object..). Please check it