

Comment on “Measurement of scattering and absorption properties of dust aerosol in a Gobi farmland region of northwest China—a potential anthropogenic influence” by Bi et al.

This manuscript presents the measurement of scattering and absorption properties of dust aerosol from a comprehensive field campaign in a Gobi farmland region of northwest China during spring 2012. Overall, the manuscript could make a good contribution to the scientific research by providing useful scientific knowledge on the interaction among dust aerosol, atmospheric chemistry, and climate change in desert source region.. However, I believe that the manuscript needs the following minor revisions before it is accepted for publication by ACP:.

- 1) Lines 22–24: Please present the more results and discussions on the statement in the text about the statement in the abstract that “The anthropogenic dust produced by agricultural cultivations (e.g., land planning, plowing, and disking) exerted a significant superimposed effect on high dust concentrations in Dunhuang farmland prior to the growing season (i.e., from 1 April to 10 May).”
- 2) Lines 25–27: It is a misleading conclusion that “Strong south valley wind and vertical mixing in daytime scavenged the pollution and weak northeast mountain wind and stable inversion layer at night favorably accumulated the air pollutants near the surface.” Please follow the diurnal changes of winds and PM_{10} in Figs. 4 and 6.
- 3) It could be unnecessary to present the wind fields at 500 hPa and 850hPa levels from the MERRA reanalysis products in Fig.7, because the dust aerosols in a Gobi farmland region of northwest China are mostly the local emissions and a short-distance transport to the measurement site within the boundary layer.
- 4) Line 532: “mesoscale cyclones” should be “synoptic cyclones” .
- 5) Lines 570–577: It is an interesting result that Figure 10d displays that the DLW values under dusty cases were always greater than that in clear-sky cases, with the total average differences of $+40\sim+60 Wm^{-2}$. ” . However, the interpretation is unconvinced. From Fig. 10d, it could be seen that the warming dust layer could enhance the surface DLW with a large $(+40\sim+60 Wm^{-2})$:not a few percentages!) contribution to the increased DLW. It is unreasonable that the

potential greenhouse gases in the atmosphere could substantially affect the DLW differences between dusty and clear-sky cases (Fig. 10d). Also, please present the measured cloud cover or RH on April 9 to support the statement that “it is partly attributable to the higher RH values on 9 June than that in other days”.

- 6) Please improve the quality of all the Figs., with clarifying the figure captions, such as horizontal wind vector in Figs 4, near surface wind in Figs. 6 and 8, and the same color curves for all the Figs. 10a, 10b, 10c and 10d,