

Interactive comment on “Taklimakan Desert Nocturnal Low Level Jet: Climatology and Dust Emission” by J. M. Ge et al.

Anonymous Referee #2

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The authors presents characteristics and climatology of nocturnal Low-Level Jets (NLLJ) over the Taklimakan Desert (TD) with the meteorological reanalysis data. Their investigation, in which they attempt to reveal a linkage between NLLJ and dust emission, is interesting and valuable. The manuscript is well written and structured. I recommend publication after addressing the following concern.

General comments:

- As the authors mentioned in the manuscript, the easterly wind by cold frontal intrusions associated with synoptic scale lows is common and activates large dust storms in the TD. My concern is if the detection scheme can reject such easterly intrusions from the easterly wind activated by NLLJ. Could you tell us the difference between easterly winds caused by the cold front and NLLJ?

C1

- I could not find any evidence of direct linkage between NLLJ and dust emission. You used data at 0000 UTC (early morning) for analyses of NLLJ, surface wind and momentum transport. On the other hand, vertical column density (AOT) measured by satellite at 1330 LT (after noon) were used for representation of dust emission. What Figure 10 shows is that appearance of NLLJ has positive relationship with dust column density at afternoon only in Summer and Autumn.

Specific comments: L49: Could you show reference? Zhang et al. (2003) estimated that the TD is the third most dust source in East Asia. Zhang et al., Sources of Asian dust and role of climate change versus desertification in Asian dust emission, Geophys. Res. Lett., 30, 2272, 2003.

L85: in wind speed from 1.0 to 2.0 km?

L130: Horizontal resolution of 80 km (1 degree) is enough to detect NLLJ and subsequent mixing of momentum and reinforcement of the surface winds?

L162-L164: Only wind speed has dip in July and August.

L167: In L88, you mentioned the maximum speed of NLLJ occurs around 0000 to 0300 local time. Why did you use wind speeds at 0000 UTC (0600 LT) in Figure 2 instead of 1800 UTC (0000 LT)?

L178-180 and Figure 4: Did you found any seasonal variation in the comparison of the vertical wind profiles between observation and reanalysis data?

L197: You used reanalysis data at 0000 UTC or 0600 UTC? Please clarify.

L228-229: How did you conclude Figure 5 is reliable? By comparing with other studies?

L256: Surface reflectivity in the TD become higher in the cold season (has seasonal variation)? How? Snow cover?

L349: the same but "moment" are significantly different?

C2

Figure 5 and 8: Cloud you add the TD region in the figure like Figure 1?

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