Supporting Information for

Study on the life cycle of ice crystal cloud over the Taklimakan desert using muti-source data

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Figures S1 to S5

Introduction

Five figures have been included as supplementary material to support interpretation of the results presented in the manuscript.

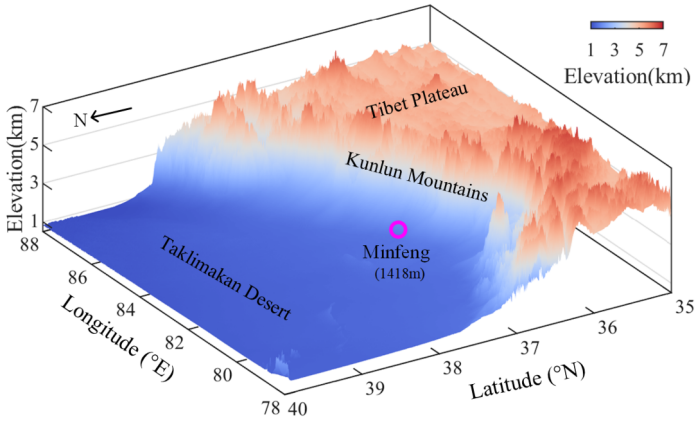

Figure S1. The Digital elevation map of the study site Mingfeng. Sloping terrain facilitates the upslope transport of dust along mountain ranges.

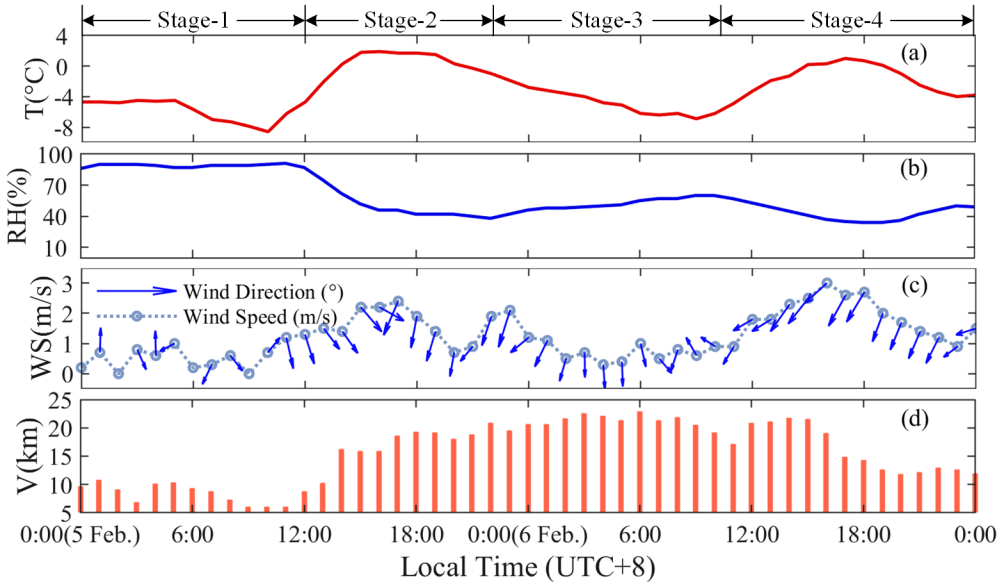

Figure S2. Local meteorological data from 5 to 6 February, 2022, local time (UTC+8). (a) atmospheric temperature. (b) relative humidity. (c) horizontal wind speed and horizontal wind direction, the blue arrow and the open circle dotted line represent the wind direction and wind speed, respectively. (d) horizontal visibility. According to the national meteorological standards of China, when horizontal visibility in the desert is below 10 km, it is classified as a dust weather (Classification of sand and dust weather, GB/T 20480-2017).

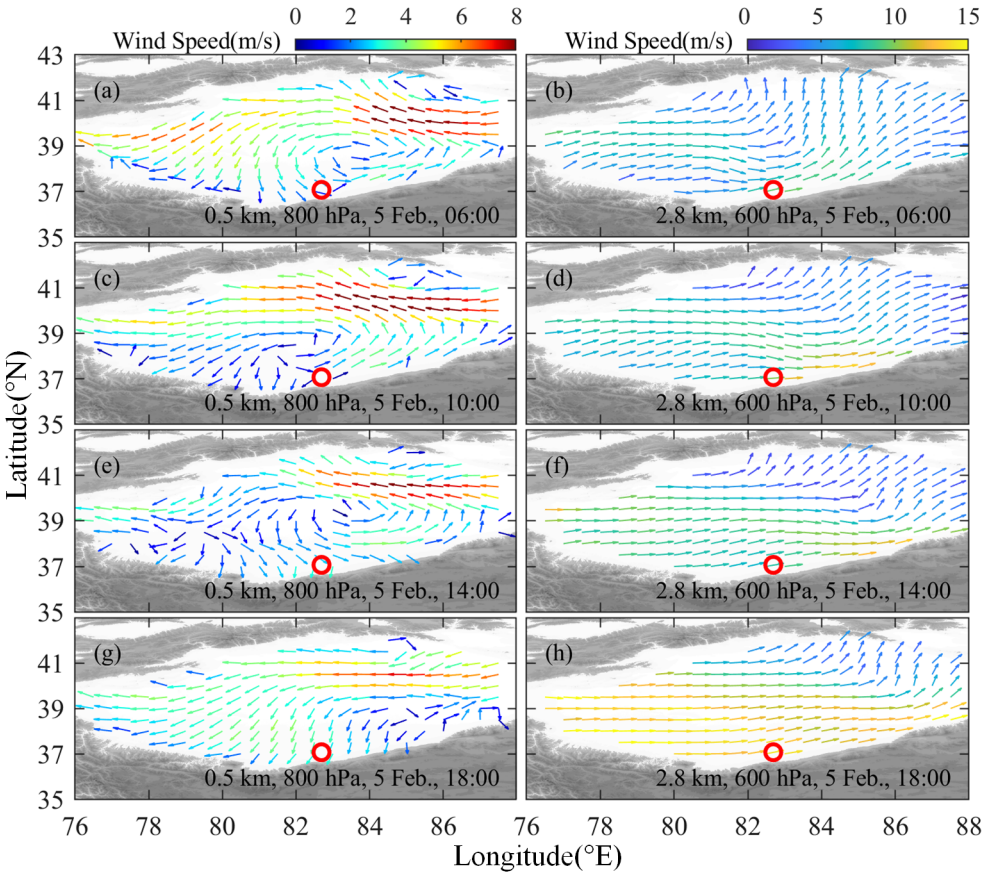

Figure S3. Wind vectors at 800 hPa (left) and 600 hPa (right) over the Taklimakan Desert from 6:00 to 18:00 LT (UTC+8) on 5 February 2022. The gray areas are the higher mountains, the white areas are the lower basin, and the red circle symbol is the study site. The life cycle of ice crystal cloud for (a-d) Stage-1 and (e-h) Stage-2 is shown.

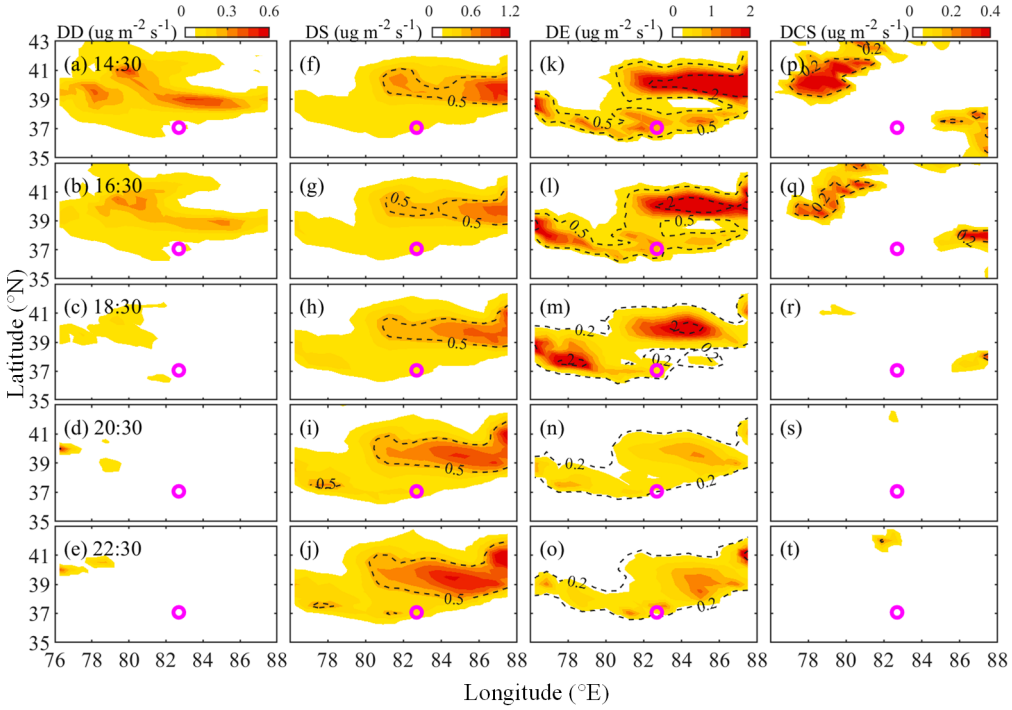

Figure S4. The movement of dust aerosol over the Taklimakan Desert in MERRA-2 reanalysis data from 14:30 to 22:30 LT (UTC+8) on 5 February 2022. (a-e) dust dry and wet deposition (DD), (f-j) dust sedimentation (DS), (k-o) dust emission (DE), (p-t) dust convection scavenging (DCS). From the figure, it can be seen that the dust emission rate far exceeds the dust dry and wet deposition rate.

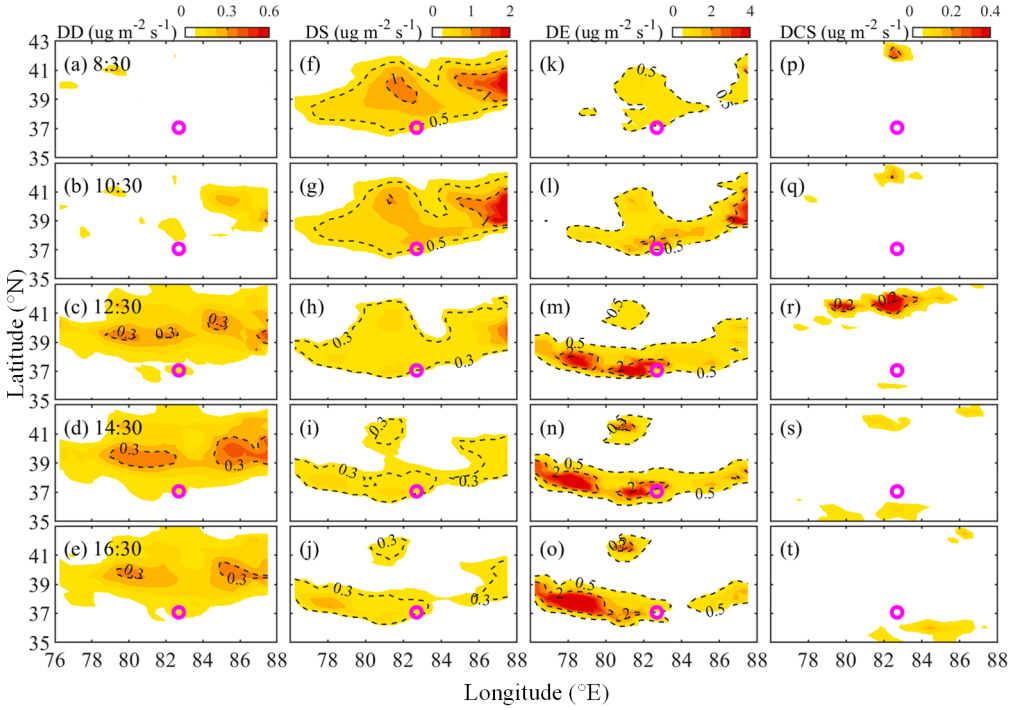

Figure S5. The movement of dust aerosol over the Taklimakan Desert in MERRA-2 reanalysis data from 8:30 to 16:30 LT (UTC+8) on 6 February 2022. (a-e) dust dry and wet deposition (DD), (f-j) dust sedimentation (DS), (k-o) dust emission (DE), (p-t) dust convection scavenging (DCS).