

Supplement of Atmos. Chem. Phys., 19, 363–378, 2019
<https://doi.org/10.5194/acp-19-363-2019-supplement>
© Author(s) 2019. This work is distributed under
the Creative Commons Attribution 4.0 License.



Supplement of

Climatology of Asian dust activation and transport potential based on MISR satellite observations and trajectory analysis

Yan Yu et al.

Correspondence to: Yan Yu (yuyan06@gmail.com)

The copyright of individual parts of the supplement might differ from the CC BY 4.0 License.

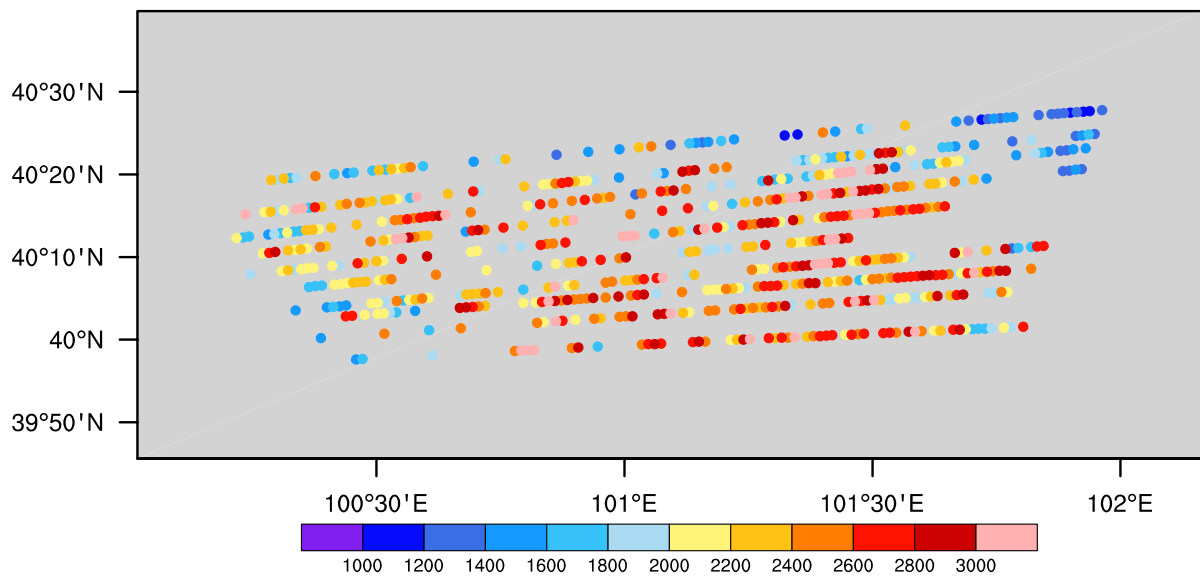


Figure S1: MINX retrieval of dust injection height (m ASL) in a dust event on 30 April, 2001 in the Gobi Desert. Trajectories are initiated from each of these points with the observed height, thus constituting a natural ensemble of dust trajectories from this particular dust plume.

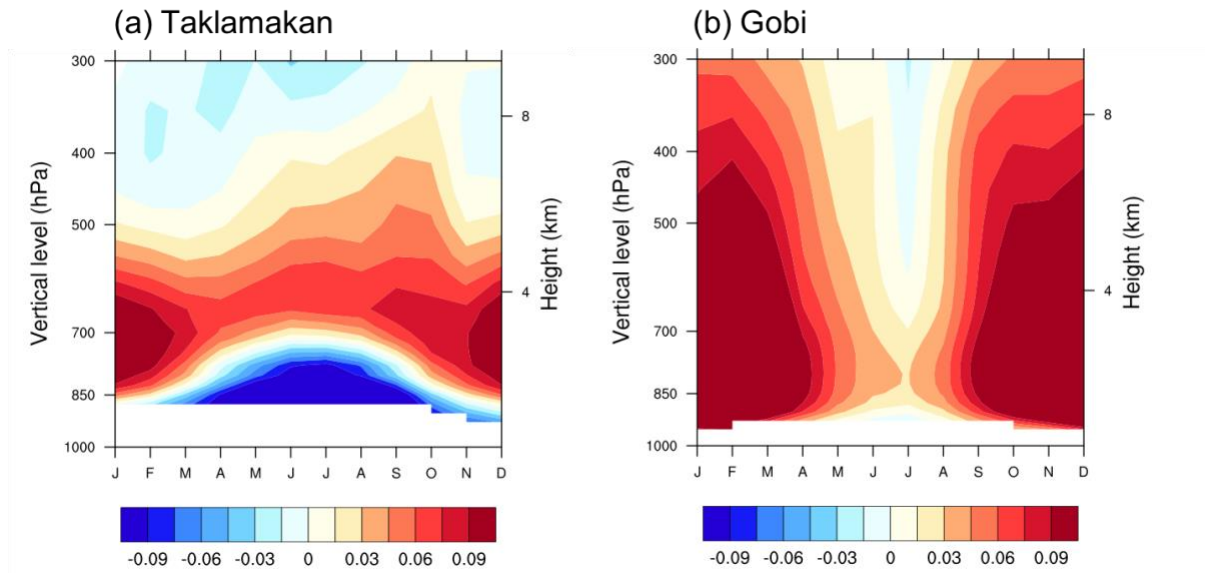


Figure S2: Climatological seasonal cycle of vertical motion (Pa s^{-1}) averaged over the (a) Taklamakan and (b) Gobi Deserts during 2000-2017. The vertical motion data is from MERRA-2 reanalysis.

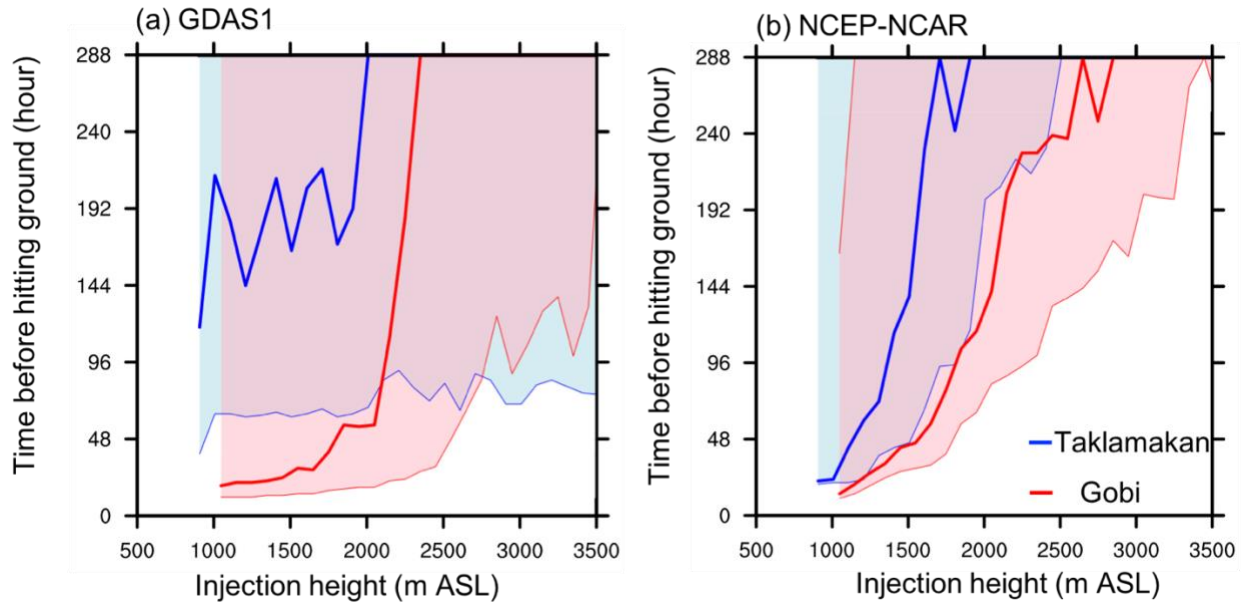


Figure S3: Atmospheric suspension time (hours) of dust particles emitted from the Taklamakan (40°N , 89°E , elevation = 805 m ASL) (blue) and Gobi (43.5°N , 130°E , elevation = 954 m ASL) (red) Deserts as a function of injection height (m ASL), based on trajectories in March-May of 2006-2008, driven by (a) GDAS1 and (b) NCEP-NCAR Reanalysis. The thick lines (shading) represent the median (10^{th} to 90^{th} percentiles) of suspension time among 276 trajectories for each injection height. The trajectories driven by GDAS1 confirm the NCEP-NCAR-based conclusions: (1) dust particles emitted from the Taklamakan Desert generally stay longer in the atmosphere than dust from Gobi; and (2) dust particles injected to above 2 km ASL from both deserts are likely to stay in the atmosphere for longer than 10 days, thus enabling long-range transport.

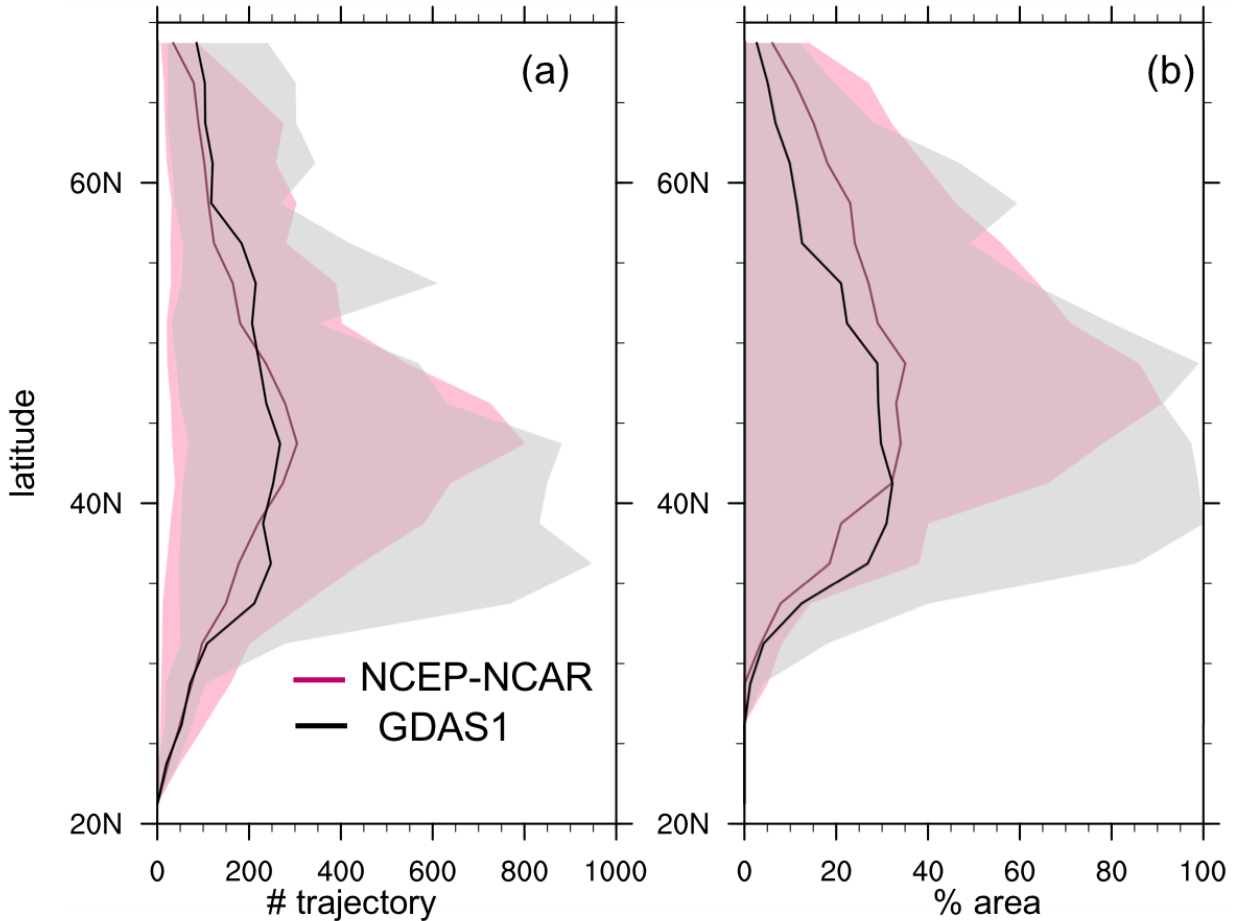


Figure S4: Influence of Taklamakan dust on North America by latitude, represented by trajectory passage during 2006-2011, driven by GDAS1 (black) and NCEP-NCAR (purple) Reanalysis. (a) Number of trajectories per year from Taklamakan that pass over each 2.5° latitude band. (b) Percentage of area in each 2.5° latitude band influenced by more than 100 trajectories per year from the Taklamakan Desert. The shadings represent maximum and minimum values during 2006-2011. The additional trajectories driven by GDAS1 conform the NCEP-NCAR-based finding regarding the latitudinal spread of dust from the Taklamakan Desert that peak around 40°N-45°N over North America.