

Occurrence of micro-meso scale dust storms and its relationship to the vegetation and topography in Mongolian grassland and Gobi Desert

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Gobi Desert and Mongolian grassland are one of the main sources of the Asian dust. In order to investigate the occurrence of micro-meso scale dust storms and its relationship to the vegetation and topography, we conducted moving observations running across the Gobi Desert from Ulaanbaatar to Dalanzadgad in springs of 2015-2017. An optical particle counter (OPC: Aerotrak 9306-V2), a sunphotometer (Microtops II) and meteorological instrument were installed in a car.

The vegetation had a suppression effect on the dust emission. Number concentrations of coarse particles (1-10 μm) decreased from the desert to the grassland. They had significant negative correlations with the vegetation (NDVI) from 3 μm to 10 μm , but the number concentration at 0.3 -0.5 μm had little correlation to the vegetation.

During the moving observations, we found a hotspot of dust storms in the Gobi Desert. An analysis of Himawari-8 Dust RGB clearly shows that the hotspot appeared at a jointing point of two valleys, a bottleneck and an exit of a valley.

In summary, the horizontal distribution of number concentrations of aerosol particles reflected the surface vegetation. Locations of the hotspot were determined by a local topography such a jointing point of two valleys.

Keywords: Asian dust, Himawari-8 Dust RGB, Hotspot of dust storms