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Spatial-temporal evolution of dust events and the column burden of natural and anthropogenic dust of northern China

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The evolution of the spatial-temporal varying trends of dust events shows that the dust event occurrences (DEO) remarkable reduced at the beginning of this century by using an ensemble empirical mode decomposition (EEMD) method over northern China. The results indicate that the steady decreased wind speed on Northern Hemisphere was largely responsible for the recent remarkable decline of DEO, however, the anthropogenic dust due to human activities also play key roles. Despite several attempts has been performed to investigate the climate effects due to anthropogenic dust, large uncertainties were still found due to the multi-satellite retrievals. In this study, a new method combining the multi-satellite instruments with the surface observations of dust events is develop in estimating the contribution of anthropogenic dust due to human activities in disturbed soil regions. Statistically, the column burdens of anthropogenic dust may be increased higher than 82% in the eastern areas caused by heavy local air pollution derived by human activities, but only with a limited effect lower than 15% near the desert regions. However, either way the anthropogenic effects of dust column burden are non-negligible. This study highlights the ability of significantly reducing the large uncertainty in estimating the contribution of anthropogenic dust to total atmospheric dust loadings.

Biography

Xin Wang has his expertise in the physical and chemical properties of mineral dust aerosols, and the optical properties of the insoluble light-absorbing impurities in seasonal snow based on both field surveys and model simulations. The foundation in this study is based on a new method combining the multi-satellite instruments with the surface observations of dust events is develop in estimating the contribution of anthropogenic dust due to human activities in disturbed soil regions.

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