



Observed trend in Asian dust days in South Korea and its geo-physiological implications

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South Korea has experienced significant socio-economic damages by Asian dust (also called Yellow sand or Yellow dust). Asian dust is a wind-driven natural phenomenon that carries fine sand particles along with surface pollutants from semi-arid areas in northern China, Inner Mongolia, the Gobi Desert, and the Taklimakan Desert to the East Asia. Its occurrence requires three necessary conditions: dry soil in source areas, strong ascending air current to lift sand particles up, and intense wind speed to transport the particles. Accordingly, the drier source areas are, the larger amount of source materials for Asian dust becomes. Further, regional wind speed and direction are key elements that determine the influencing boundary and level of damage.

In this study, we investigate number of Asian dust days over South Korea. We utilize monthly data over 50 years (from 1961 to 2013) recorded at 12 stations, operated by the Korean Meteorological Administration, which are evenly distributed over the country. We find that annual number of Asian dust days in South Korea tends to increase until early 2000s and the increasing trend is ceased since then. Interestingly, this transition time (early 2000s) matches the time when the surface wind speed trend has reversed (*Kim and Paik, 2015*). Hence, we hypothesize that occurrence of Asian dust in South Korea can be largely captured by surface wind, instead of air circulation at high altitude. We also hypothesize that the transition in the trend around early 2000s is associated with expansion of cold air system during winter over the East Asia. Detailed analysis to support these findings will be presented.

Reference

Kim, J.C., & Paik, K. (2015). Recent recovery of surface wind speed after decadal decrease: A focus on South Korea. *Climate Dynamics*, (Under review).